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Sanjay Mohapatra
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Cloud Computing and ROI

A New Framework for IT Strategy

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Dedicated to our elders who shaped our lives
Late Parmananda Mishra,
Late Dr. Sushila Mishra,
Dr. B.C. Mohapatra,
H.K. Mohapatra,
Kanyakumari Mohapatra (Bou)
AND
Dhanwantrao Lokhande
Deepa Lokhande

Preface

This book is written by a teacher and a professional as co-authors with prime focus of making understanding of concepts of IT strategy, e-commerce and cloud computing more practical and achieving learning in a more reader-friendly manner. The uniqueness of the book lies in the fact that its content not only includes standard topics pertaining to IT strategy, e-commerce and cloud computing but also the classroom teachings and discussions among students and teacher makes it much easier to understand and content is more relevant to any reader as it includes the concepts with basic examples used while classroom teaching. The simplicity of the book is further enhanced with the help of multiple flowchart and diagrams used wherever applicable and required. The book is an experiment of one of its own kind to present the subject from students' point of view coupled with rich knowledge and experience of the teacher, together making it a combined feedback mechanism of teaching and learning simultaneously. *The whole art of teaching is the only art of awakening the natural curiosity of young minds for the purpose of satisfying it afterwards*; *and curiosity itself can be vivid and wholesome only in proportion as the mind is contented and happy—Anatole France.* This quote truly finds its meaning in the book as it not only contains the latest standard theories and topics of ever-changing today's IT strategy and related subjects but also incorporates the basic yet relevant questions and arguments raised by the students (readers of this book) in the classroom and subsequent answers, discussions and clarifications thereon and for this sole purpose a teacher and his student made this small joint effort to achieve the purpose of the quote through this book. During the classroom teaching the ideas, arguments and questions were positively accepted, analyzed and answered by both the teacher and students, the combined result of which led to constructive feedback portrayed through the reader friendliness of this book.

In today's scenario we require teaching while learning (for students) and learning while teaching (for professors) to create well qualified and learned generation for future. Classroom activities should enhance beyond simply one-way teaching and learning and this book of ours to a large extent is the result of the two-way approach of teaching while learning and learning while teaching through a continuous constructive feedback. We hope that publishing of this book would make the

classroom discussions more healthy and constructive which would subsequently enable development of new ideas and concepts and at the same time find better innovative and dynamic solutions and suggestions for the existing issues.

Content of the Book

Before implementing any strategy in an organization, it is imperative to understand the basics of organization and its working. The introductory portion of the book provides detailed theoretical concepts, frameworks and parameters required for understanding the organization. Subsequently it explains IT strategy and its implementation with business with the help of starting questions and an implementation approach. Further, it discusses concepts of cloud computing and social commerce with their pros and cons. The framework discussed here has been derived based on consulting assignments that the authors have carried out and hence is implementable and practicable. The book also provides case studies where the authors discuss the way IS can be designed and implemented. These case studies are from different industries and show how the framework can be used universally with customization as required.

Audience

The book is primarily targeted towards students for academic purposes; however, the practical concepts and examples explained in the book will turn out useful for the first-generation entrepreneurs who seek to start their ventures in IT, e-commerce and cloud computing-related domains. The book uses examples from IT and e-commerce industry including the very large and reputed corporate such as Google, Microsoft, Amazon, IBM to name a few to small ones like redBus and IndiaInfoline (eventually growing big) making their mark in this fast-growing and dynamic industry. Although introductory in its first few chapters, the book definitely turns out to be a comprehensive content as it progresses chapter by chapter with detailed discussion and explanations with relevant examples.

Notes for Faculty

The book is intended to have three roles:

1. Introduce the concepts related to recent developments in IT strategy, its implementation and growing role of e-commerce and cloud computing in various industries.

2. Explain the above concepts with examples, flowcharts, diagrams and classroom discussion and feedback.
3. Help the readers (students) enhance their learning with live case studies with feasible solutions making the learning more practical.

Each chapter of our book starts with learning objectives and introductory note so as to enable the reader the outcome after studying it and makes the understanding more specific rather than just browsing through the chapter and taking a generic view. What make reading the chapters more interesting apart from the body are the ending sections which cover well-articulated summary, glossary and unique portions such as review questions, real-life assignments and multiple choice questions not found in majority of the books. These end questions will help the students to revise the chapters in an easy and quick manner, summary will assist to recall the concepts in a complete and more importantly a structured way and assignments will enable the learning to be more practical and allow the students to think for solutions and ideas beyond the book. The body of the chapter uses adequate and relevant flowcharts and diagrams to allow the students remember the subjects in an effective manner with longer recall and maturity.

Bhubaneswar, India — Sanjay Mohapatra
Pune, India — Laxmikant Lokhande

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This book has used latest concepts, theories and framework for designing and implementing cloud computing strategy. These have been "class tested" and we would like to thank the students who could make the applications possible. We would like to mention each one of them and they are—Ankit Verma, Aryasuta Nayak, Biswajit Das, Chirag Kadam, Meghna Ranjan, Monalisa Guru, Asish Kumar Tripathy, Deepak Ghildiyal, Faheem Akram, Tirthankar Talukdar, Utpal Das, Laura Gray, Amit Nanda, B. Ashwin, Pradeep Sethia, Rahul Nayak, Rashmi Ranjan Das and S. Subramanian.

We would also like to thank our family members for their unstinted and continued support in every walk of our lives.

Finally to God, WHO made it all possible.

Sanjay Mohapatra
Laxmikant Lokhande

Contents

Chapter 1
Introduction

Learning Objectives

- Organization Life Cycle (OLC)
- Process and its characteristics
- Process map and its implementation
- Business Model
- Work Flow
- Benchmarking

Introduction

In today's competitive world it is mandate for an organization to keep up the pace with its competitors and understand various aspects related to the organization for its continuous growth and development. It is important for the top management to be aware about the critical issues pertaining to the organization. Technology and customer demands and expectations are improving so rapidly that processes need to be redefined continuously. The old methods of production and services must be modified so that current level of expectations from market and customers could be met. In this chapter we would cover various topics such as *Organization Life Cycle*, *Process and Workflow*, *Critical Success Factors* (*CSFs*), *Business Model*, *Benchmarking*, etc. related specifically to an organization and its processes. The study of these topics would help in understanding the organization in a better way.

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Organization Life Cycle

Organization Life Cycle (OLC) refers to the life span of an organization from its birth to death. It represents various phases that occur in the life of an organization. An organization is no less than a living organism and historians, academicians and researchers have treated organizations as living beings to study them in a better way and extract most of their practices. Organizations take birth, develop and grow, mature, decline and finally expire (in most of the cases).

Study of OLC has led to development of various models which have helped organizations to design better strategies and take important decisions judiciously. OLC of many companies have become great case studies for others in the industry. These studies and cases have helped the organizations to implement best practices of the industry (each company had its own competitive advantage depending on the stage of the OLC they are into) and improve their process and management efficiency.

Any stage of the organization is affected by external (macro-economic) as well as internal (micro-economic) factors. External factors affect the entire industry or world whereas internal factors are firm or company specific.

External/Macro-economic Factors

Macro-economic factors are the factors mainly concerned with a large set of population than an individual. They usually extend beyond the national boundaries and have impact globally (most of the times). Companies or individuals have no or very less control over these factors. Global Economic Meltdown 2008 and European Debt Crisis (2009–2011), US Fiscal Cliff are some of the macro-economic events.

Various external or macro-economic factors that may affect organizations are:

1. *Political factors*: These refer to the extent of intervention of government in the economy. These cover areas such as tax policies, labour law, tariffs, political stability, etc.
2. *Environmental factors*: These mainly include climatic and weather changes. These factors are very important for the companies of industries such as tea, chemical/fertilizer manufacturing, agriculture, etc. Current industry practices are giving a lot of importance to climate change, global warming and carbon footprints.
3. *Social factors*: These represent the social and cultural aspects which include age and growth rate of population, health, safety, career prospects, etc.
4. *Technological factors*: These involve R&D activities and day to day technological developments. To maintain its position in the market a company needs to innovate and sustain it. To keep up with the pace of technological developments is one of the major requirements to gain and maintain the competitive advantage.
5. *Economic factors*: These refer to the economy related parameters such as interest rate, growth rate, inflation rate, exchange rates, etc. These factors play a very

important role in decision making and operations of any organization. For example, interest and inflation rate have a direct impact on the cost of productions thus affecting the sales and profit of the company.

6. *Legal factors*: These define various laws that govern the operations and activities of the company. They affect the demand of the products and cost of production to a great extent. Various laws covered may include consumer law, employment laws, internal relations law, health and safety laws (becomes very important for industries such as mining, petroleum, chemical), etc.

Internal/Micro-economic Factors

Micro-economic factors are company or individual specific. It may or may not be dependent on aggregate economy but are mainly concerned with individual units of the economy. They are mainly concerned with the individual choices and decisions and its coordination with the market. Companies and individuals have a greater control over these factors as compared to macro-economic factors (Fig. 1.1).

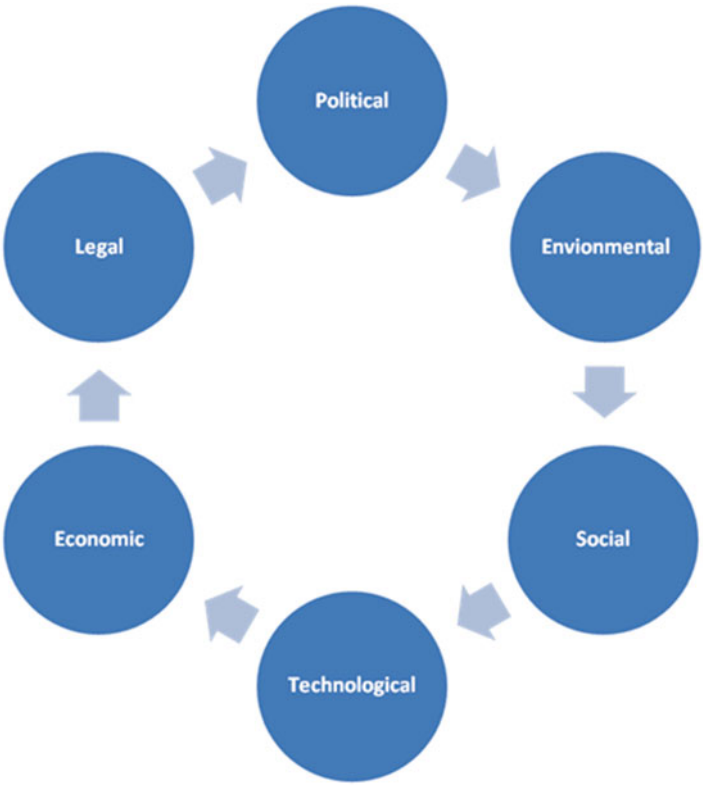

Fig. 1.1 External/macro-economic factors (PESTEL analysis framework)

Various internal or micro-economic factors that may affect organizations are:

Customers: Customers are always very important for any business. It is very important for any organizations to satisfy the needs of its customer in the best possible way.

Employees: Employees are the most important resource for any company, but they are the ones who are most difficult to manage. Skills and experience of employees is a very important asset for any firm.

Suppliers: Relationship with suppliers has a large impact on the operational activities and cost of production. Quality of raw materials and services provided by the suppliers will determine the final product being produced by the company.

Shareholders: For continuous growth any organization requires investment which is provided by the shareholders but they expect good returns for their investments. Thus it becomes important for a company to retain their shareholders by providing them expected returns for their own growth. Good relationship with shareholders results in quick and efficient decision making.

Media: For promoting the positives and building a strong reputation for the organization media plays a crucial role. Media promotion can "make" or "break" the organization depending on its control and relations with media. It is also an important and efficient source to attract the customers and create demand for the goods and services.

Competitors: Organizations need to differentiate themselves from their competitors in order to make gain market share and make profits. Competitor analysis is therefore very important to safeguard the customers and demand in the market. Competitors' operational activities and decisions will affect the company to a large extent.

Stages of OLC

Study of various stages of OLC is important because company's' goals and objectives, growth opportunities, threats, managerial processes, culture, resource requirements and utilization, type of decision making, technology, etc. will all depend on the current stage of the organization. Thus it is crucial to know the characteristics of each and every stage and act accordingly. The current stage of the company will determine all the business, functional and operational strategies. The decisions vary significantly form one stage to another, e.g. a company in foundation stage will reinvest more of its profit for expansion as compared to a company which is in decline or death stage (Fig. 1.2).

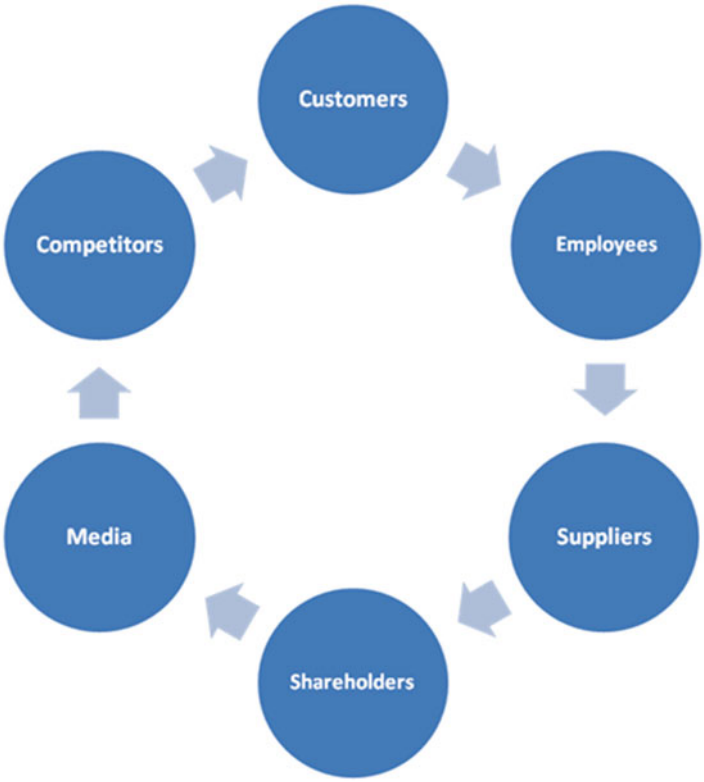

Fig. 1.2 Internal/micro-economic factors

Different studies and researchers have classified OLC from ten to three stages. The classification varies according to the type of study and requirement of the researcher. But according to the majority of models OLC can be broadly divided into following five stages:

1. *Forming/Foundation*: It is the first stage of OLC.

   Features of foundation stage are:

   - One of the simplest organization structures in which management is at the top of hierarchy.
   - Majority of the decisions are taken by the top management with little or no involvement of the mid and low level authorities.
   - Size of the organization is small.
   - Organization is non bureaucratic in nature.
   - Employees have overlapping tasks.
   - There are no written rules in the organization.
   - No professional staff.

- Internal Systems are non-existent.
- Lateral teams and task forces are not present for coordination.
- Development of products and services starts.
- Capital is accumulated.
- New employees are hired.
- Business opportunities exceed resources and infrastructure.
- Processes are ad-hoc.
- Customer is reference point.
- Employee Retention is very important.

2. *Growth/Boom*: It is the second stage of OLC.

   Features of boom stage are:

   - Repeated business.
   - Structured processes.
   - More focus on turn-over and growth percentage.
   - Resources and workforces are increased.
   - Strong customer base is established.
   - Companies look for additional capital (sometimes they go public).
   - Size of the organization is medium.
   - Organization is pre bureaucratic in nature.
   - Departments are created within company.
   - Few rules are standardized.
   - More than one decision maker.

3. *Maturity/Stable*: It is the third stage of the OLC.

   Features of stable stage are:

   - Size of organization is large.
   - Company is bureaucratic in nature.
   - Many departments are created to distribute the roles and responsibilities.
   - Policy and procedures are well defined.
   - Firm is very bureaucratic.
   - Division of labour is extensive with small jobs and many descriptions.
   - Integration between department starts.
   - Company is established in the market.
   - Accumulated assets and solid profits.
   - Merger and acquisition starts.
   - Product lines are expanded.
   - Companies go for diversification.

4. *Decline*: It is the fourth stage of OLC.

   Features of decline stage are:

   - PIP (Process Improvement Plan) starts.
   - Formal structure exists.

- Productivity starts decreasing.
- Sales and profits drop.
- Hiring of new employees drop.
- Demand for products and services decreases.
- Re-engineering campaign starts.
- Size of the organization is very large.
- Top management is heavy.

5. *Death/Revamp/Bust*: It is the fifth and last stage of OLC.

   Features of death stage are:

   - Research and development stops.
   - Companies can lead to:
     - Sustained growth.
     - Bare existence.
     - Extinction.
   - Companies look for shut down or a buyer.

Organization Process and Its Characteristics

A process is a sequence of procedures and actions which are linked and interdependent and performed to achieve a result. A process has various stages and at every stage resources (time, energy, machines, money, etc.) are consumed. These resources are used to convert inputs into output. One output behaves as input for another action and using more of the resources final known output, goal or end result is obtained (Figs. 1.3 and 1.4).

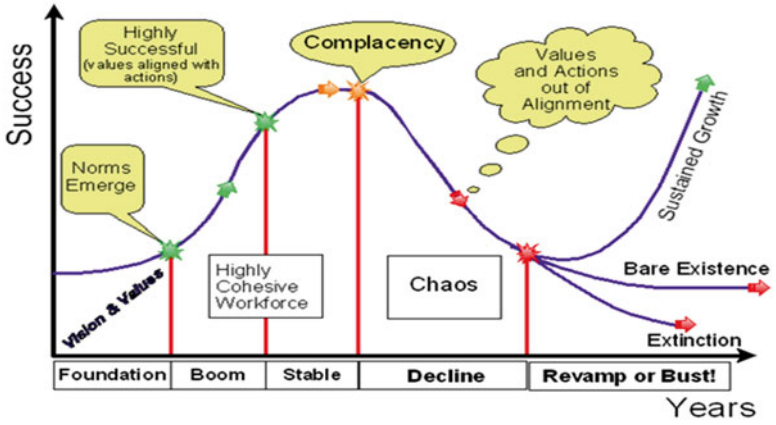

Fig. 1.3 Organization life cycle (OLC)

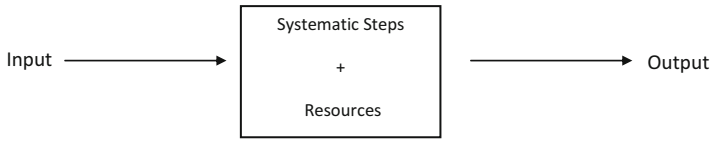

Fig. 1.4 Process flow

Various characteristics of a process are:

1. *E-Entry*: It is the starting point of a process where first input is fed. This input is converted into an intermediate output using various resources and tasks. This intermediate output becomes input for the next task until the final desired output is obtained.
2. *T-Tasks*: Activities that are carried out to convert input into output are known as tasks.
3. *V-Verification/Validation* (*compliance*): After the final output (product/service) is obtained it is compared with the reference/standard to check for the quality.

   Verification: Testing which is done in industrial or simulated environment.
   For example metal pipes are exposed to high pressure under simulated environment to check for its strength.
   Validation: Testing which is done in actual user environment.
   For example once all the components of vehicle are assembled and vehicle is driven on road for mileage, BHP testing

4. *X-Exit*: It is the end point of a process where final known output is obtained.
5. *M-Measurement*: Final output is measured for both quality and quantity so as to keep the process in control.
6. *F-Feedback*: Feedback is one of the most important characteristics of any process in order to bring improvements in the process. Feedback is communicated back to the tasks and the entry stage so that product/service quality can be improves and efficiency of the process can be improved.

Business Model

A business model is a plan of activities which a company would implement in order to generate revenues and make profits. It represents different functions and components of the business including the revenues generated and the expenses incurred. It would also involve various stakeholders of the business such as partners and clients.

Every business model has ***processes***.
Every process has ***procedures*** (*work instructions*).
Every procedure has ***transactions***.
Every transaction (*instance of procedure*) *leads to* ***data***.

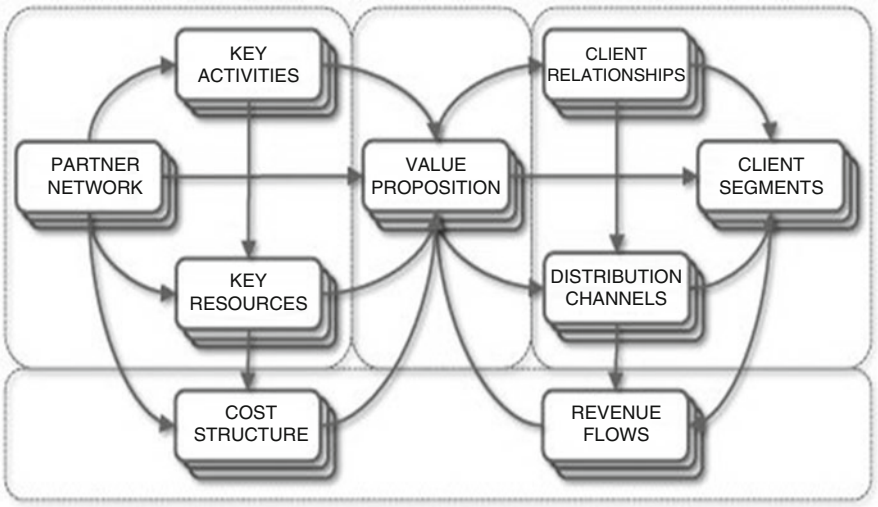

Fig. 1.5 Business model

As shown in Fig. 1.5 the business model can be explained with the help of nine building blocks:

1. *Value Proposition*: It refers to the value offered to the customer by the company through its products and services. Value would determine the revenues generated and profit making ability of the organization.
2. *Client Segments*: They are basically the customers for the company to whom the value is offered. These clients generate revenue for the company.
3. *Distribution Channels*: These are the various communication channels to reach the clients and offer them the value proposition.
4. *Client Relationships*: The relationships developed with the clients will produce repeated business for the company and ensure growing revenues and stability of the company. Retaining customers is one of the keys to sustain the business. Acquiring new clients on a regular basis is very difficult and costly.
5. *Key Resources*: To provide value proposition to the clients in the form of product and services, an organization will need key resources such as employees' skill, time and energy, money, machines, etc.
6. *Key Activities*: A set of activities with the help of resources would help deliver the value to the clients. These activities would help to implement the business model.
7. *Partner Network*: Key partners will be involved in decision making at various stages. They would also be involved in designing the strategies at business, functional and operational level.
8. *Revenue Flows*: It would determine the revenue stream generated by the company. It would cover the various sources of revenue for the company and aggregate them to give the total revenue generated by the business model.

9. *Cost Structure*: It would include the various types of costs incurred by the company while delivering the value proposition to its clients through its products and services. Cost structure would help to classify different types of costs and their contribution so as to reduce the total cost of production for the value proposition delivered.

Innovation and Business Model

Innovation and business model are closely related. Business model refers to the wide range of revenue and profit generating opportunities. These opportunities are created by various business designs which come out of innovative ideas. The value proposition offered to the client needs to be continuously improved through innovation if the business wants to remain sustained in the market. For example, when mobile phones came into market they offered a different and improved value proposition to users as compared to fixed line phones. The features and services provided by mobile phone were the result of the innovation in telecom industry and it brought a revolution in the way people communicate today. Introduction of mobile phones has given birth to various business models today such as social media, advertising, mobile banking, etc. Similar is the case with evolution of internet. With high speed net connections coming up various online business models have come up and are growing day by day. E-commerce is one of the top growing businesses with the advent of high quality internet services. Organizations such as DELL have utilized internet tremendously as a distribution channel. Websites like Amazon and Flipkart are selling a variety of products ranging from books, apparels to electronic goods online and making good profits. Apple, Wal-Mart, Intel, Google and Gillette are some other organizations who have continuously innovated and improved their business models.

Critical Success Factors: Identifying What Really Matters for Success

Success is not far if one knows what really will bring it. Success is a subjective term and has different meanings for different individuals. In a team, most of the times it becomes very difficult to pull all the team members in one direction and get them work for a common task. A team requires definite set of goals and objectives to get the success.

CSFs are the factors, parameters, activities which will help the business and organization to achieve its mission, objectives and goals. As the name suggests they are critical for the success of the business. CSFs act as a common reference point which can be used to determine and measure the success of the project and the business. They help team members to know what is important to perform, maintain and control. Thus the work is performed in the right way and pulls the entire team towards the goals and objectives.

Table 1.1 Business objectives and critical success factors

Objective	Critical success factor
1. Revenue growth by 20 %	Bring new customers
2.	

CSFs were first introduced by D. Ronald Daniel in the 1960s. The idea was further built, improved and popularized by F. Rockart, of MIT's Sloan School of Management, a decade later.

Rockart defined CSFs as:

> The limited number of areas in which results, if they are satisfactory, will ensure successful competitive performance for the organization. They are the few key areas where things must go right for the business to flourish. If results in these areas are not adequate, the organization's efforts for the period will be less than desired.

An Example:

It can include a hypothetical or real mission statement and a CSF Table can be formed in the format as below (Table 1.1).

Many times CSFs will have metrics to measure the performance. Metrics can be of two types:

1. Primary Metrics: These metrics gives the measurement in direct/absolute manner.
2. Secondary Metrics: They provide relative measurement in the form of ratios.

Work Flow

Workflow determines process flow and roles and responsibilities in any business process. Process flow is the sequence of the connected processes which need to be carried out in a predetermined manner to obtain the output. Whereas roles and responsibilities refer to the personnel involved in the business process and tasks which need to be performed by them. Workflow is like a blue print giving macro view of business processes.

Workflow chart is a very important tool for having a control over business processes. A workflow chart will clearly determine "who will perform what" and help the processes to complete smoothly without any confusion.

Figure 1.6 shows a simple workflow chart consisting of N number of processes. Each process is assigned a person who will perform the specific tasks. There could be multiple persons assigned to a single process and multiple tasks performed by a person; however for simplicity we have shown a single person and single task for each process. A Workflow chart can have multiple flows depending upon the project requirements.

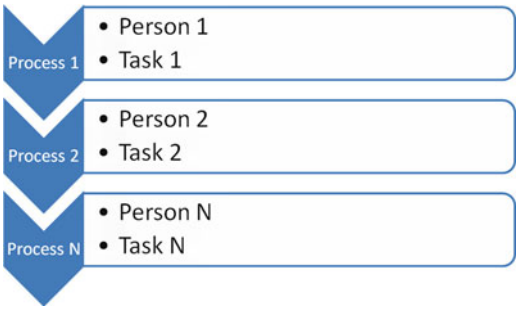

Fig. 1.6 Workflow chart

A Workflow chart will contain all the processes required to reach the output and thus will contain all the persons and tasks involved. A clear description of flow of processes will increase the efficiency of the system.

Advantages of Workflow Chart

1. It helps employees to better understand the strategies and decisions of management.
2. It provides broad scope of the project.
3. Visual representation helps to figure out the links quickly.
4. Debugging becomes easy and cheaper (bottlenecks and fail points are identified easily).
5. Shows the flow of knowledge and information.
6. It simplifies the process and helps to eliminate the non-value adding activities.
7. Helps in better communication and analysis.
8. Process documentation becomes more structured.
9. Efficient performance and maintenance.
10. Provides better flexibility and control.

Benchmarking

Benchmarking is the process of comparing ourselves with the best ones. Benchmarking may be related to products as well as processes. In benchmarking we look for the "best practices" in the industry and compare them so as to identify efficiency and quality of our products and services. Benchmarking can be extended beyond a particular industry to other industries as well.

The main aim of benchmarking is to understand the current business position. After understanding we evaluate the business for various parameters such as value, quality, efficiency, etc. Comparison with "*best practices*" will lead to identification of areas which can be improved and will finally lead to performance improvement.

Benchmarking is a "outward looking" concept in which an organization looks beyond its own boundaries, industry, people, country to find out what is best. While looking outside organizations try to find out:

- Others goals and objectives
- Their performance levels
- Tasks and activities they perform
- Their strategies and decisions

In this way benchmarking helps to extract best out of all and reach towards the excellent performance. Usually industry leaders are used as a reference for benchmarking. Learning from benchmarking exercise when is applied to the current business leads to increased efficiency and improved performance. It allows organizations to concentrate on critical functions and improve in the key areas of business.

> Benchmarking is not a onetime exercise, rather it's a continuous process which needs to be monitored and exercised regularly in order to keep the momentum of performance going.

Benchmarking Steps

Although the number of steps in benchmarking process may vary from organization to organization, depending on the type of business and processes, majorly there are six steps in benchmarking.

1. *What to benchmark*?
   There would be number of issues and problems in an organization but due to lack of resources (man and money) all can't be addressed simultaneously. So it becomes very important to decide which issues need to be addressed first depending on their respective priorities.
2. *Understand the current performance*
   In order to observe the changes and improvements, it is very important to understand the current performance so that it can be compared with the new results. Only after a careful comparison and observation the improvements can be identified.
3. *Plan*
   A proper step by step plan is required to implement the benchmarking process. The benchmarking processes should be synchronized with time so that results can be obtained timely.
4. *Study others*
   Observing the competitors and their processes is important because it would provide a different perspective to the problems. It is important to learn how the same problem can be solved in various ways utilizing the minimal resources and gaining maximum utility. One's mistakes can be learning lessons for others (Fig. 1.7).

Fig. 1.7 Benchmarking steps

Fig. 1.8 Benchmarking parameters

5. *Learn from data*
   Numbers always speak the truth and hence they should be given importance. Data on previous results always helps in finding the shortcomings and gives a way for improvement. Also results are easy to compare and demonstrate once they take the form of numbers.
6. *Use findings*
   Findings can be obtained from the people working close to the processes. These people work in vicinity of the processes day in and out and are aware about the problems which may not be visible to higher management. A genuine feedback from such people could help in improving the processes to a large extent.

Benchmarking Parameters

Benchmarking is done with respect to some parameters. There could be a stand-alone parameter or a combination of them. It depends on the process and the type of result and improvement expected after the benchmarking process (Fig. 1.8).

Summary

In this chapter we started with OLC and its various stages. Organizations have been treated like human beings by most of the researchers. As human beings have various life stages so does an organization. Identifying the current life cycle of an organization is very important because the decisions and strategies for any organization depend on its life cycle. Every stage has its own unique characteristics which need to be considered by the management for designing various business and tactical strategies. If the decisions are related to the stage the organizational growth would be faster as well as sustainable. We also discussed how macro-economic and micro-economic factors affect various stages of OLC.

We then talked about processes and its characteristics. They are the heart of the organization. These individual processes define the entire organization. The way these processes are designed and handled by the employees takes the organization on its path of success. Understanding these processes to the core is very important for the top management. The processes important for the value chain must be given priority and dealt accordingly. We also discussed Business Model, Innovation, importance of CSFs and work flow.

Finally we discussed benchmarking. Benchmarking is one of the steps to improve the current processes in the organization. To learn from the best industry practices and implement them in the current processes is one of the best ways to improve the results. There are various steps which are involved in the process of benchmarking. These steps could vary from process to process. Also there are parameters on which benchmarking is done to compare the improved results. These parameters again depend on the process and the type of results expected.

Review Questions

1. What is OLC?
2. What are macro-economic and micro-economic factors?
3. How do macro-economic and micro-economic factors affect OLC?
4. What are the various stages of OLC? Briefly describe them.
5. What is a process? Define its various characteristics.
6. Define business model and also mention its essential building blocks.
7. How innovation and business model are related to each other?
8. What are CSFs and what is their importance?
9. Explain CSFs with an example from

   (a) IT company.
   (b) Auto-mobile company.
   (c) Manufacturing company.
   (d) Logistics company.
   (e) FMCG company.
   (f) Banking.

10. What are primary and secondary metrics? Explain with examples.
11. Explain workflow with a diagram. Also mention its various advantages.
12. What is benchmarking and its importance?
13. Explain various steps and parameters in the benchmarking?
14. Give an example from industry illustrating various benchmarking steps and parameters.

Assignments

1. Select an organization from different industries such as manufacturing, service, etc. and identify their current OLC stage. Explain the reasons for your identification of their current stage. Recommend suggestions for the company with respect to the current problems faced by them.
2. Analyse the business models of companies from various sectors. Identify their work flow and CSFs and compare with other companies.
3. Identify various benchmarking methods followed by companies from different sectors and countries. Figure out similarities and differences amongst them.

Chapter 2
Understanding IT Strategy

Learning Objectives

- Vision, Mission and Goal statements
- VMG (Vision, Mission and Goal) Framework
- IT Strategy and its components
- IT Strategy Implementation Steps

Introduction

IT (Information Technology) has travelled a long distance very quickly to reach its current state and has a very long way to go ahead. IT mainly started with the help to accountants. The accountants used to do a lot of data interpretation and number crunching to convert numbers into strategic and tactical decisions. IT has helped to develop new business models and become an important resource for the organization. It was possible due to the continuous research and the corporate which promoted them. Innovation and new ideas were encouraged to match the day to day developing technology and extend the use of IT to a large number of areas and domains. IT has created such numerous opportunities that organizations are forced as well as motivated to develop its business models in synchronization with it. For example online marketing by Dell, e-commerce portals for buying tickets for air travel and many more. The vastness of IT has brought a big change in current business structure and added a new life to them.

Business managers have tremendously improved their business and decisions with the help of characteristics, opportunities and possibilities provided by IT. Retail organizations such as Wal-Mart, Big-Bazaar etc. are heavily dependent on IT for their operations and control their stock, inventory and supply chain in control. Great volumes of daily transactions in these organizations are manually impossible to

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S. Mohapatra, L. Lokhande, *Cloud Computing and ROI: A New Framework for IT Strategy*, Management for Professionals, DOI 10.1007/978-3-319-08663-7_2

handle. With the help of IT, it is possible to know the real time data such as product sold in India can be easily tracked in centralized database in the USA.

Technology has continuously improved over the years and helped businesses in many ways such as reducing the cost of production, reducing the lead time for supply chain operators, reducing the inventory and logistics cost and ultimately benefitting the customers by reducing the cost of purchase/ownership. In this way IT has valued the entire supply chain form the entry to exit point.

Thus, we see that IT forms a very important part of the strategy of any organization, big or small. It helps to achieve the goals and objectives of the organization to a large extent. It is up to the organizations how they utilize the tremendous power of IT through their creativity and innovation. Utilizing those powers and implementing them in the day to day business processes is what IT strategy is all about.

VMG (Vision, Mission and Goal) Framework

Vision

It defines one's aspirations in life, the way one wants things to be in future, the way one would like his business to grow up. Without a vision one would not know where he wants to go, how he would reach there and in the end whether he has arrived or achieved the desired results or not. Vision is a purpose which acts as a guide and provides a direction for achieving the desired outcome. It also acts as a motivator in achieving the results. It is very important for the vision statement to be precise so that it can be effectively communicated. It requires commitment, time, effort and energy to develop the vision statement.

A vision must:

- Align with core values of both individuals as well as business.
- Should be very well accepted by all the stakeholders of the business (management, board officials, employees, shareholders, suppliers and even customers).

Vision is of two types:

1. *Top Down*: This type of vision is usually followed by family owned and well defined business. They strictly adhere to their core values and there is almost no change in the vision, statement over a period of time.

   For example Reliance, TATA, Godrej.

2. *Bottom up*: Most of the organizations hire professionals appointed by board of directors for a specific tenure to help define the vision statement. Their vision statement might see a change over a period of time considering the changes in market forces and increasing customer expectations.

   For example HP, Yahoo.

Fig. 2.1 Goal characteristics

Mission

It defines how one is going to accomplish his aspirations. It is the set of day to day business activities which will be carried out in order to achieve one's results. They serve as a guide to the strategic and tactical decision making for the firm.

Goal

It is basically the end result which one would want to achieve. Goals provide the roadmap to head towards the vision and mission of the organization. They are the stepping stones towards the success (Fig. 2.1).

Characteristics of Goals: Goals Should Be SMART

VMG Framework

VMG framework is used while designing strategies and taking important decisions for the business. It mainly focuses on keeping vision, mission and goal statement of the organization on top priority while designing strategies and implementing them. The main aim is to keep the core values of the organization and business intact and align each and every activity of the business with its core values. Changes which are brought in (irrespective of their effectiveness and profit making ability) should not deviate from the core value of the business. Any new activity taken up should be analyzed properly. It should justify the purpose of existence of the organization.

VMG framework helps to sort out the priorities and take better decisions. New strategies and decisions should be aimed at increasing the shareholder's value and not depleting them. If the activities are in sync with the core values, shareholder's value will always follow a growing trajectory (Fig. 2.2).

Thus VMG framework is an important tool for the management whenever management is taking new strategic decisions and trying to bring changes in the existing processes.

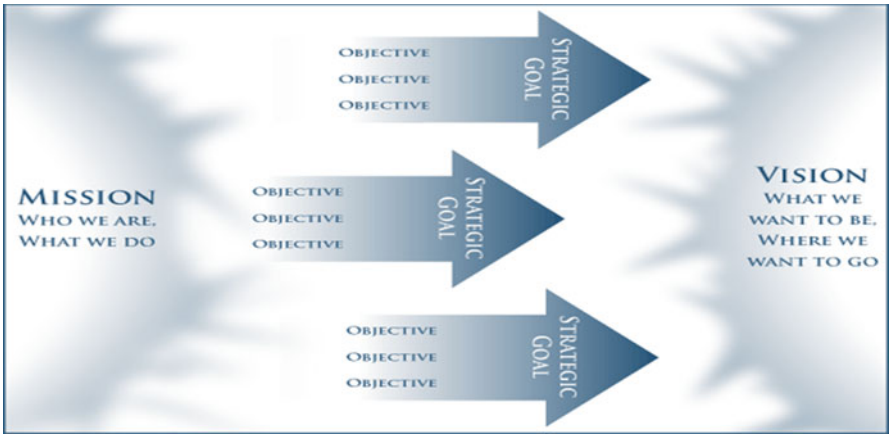

Fig. 2.2 VMG framework

IT Strategy and Business

Now that we have understood the importance of IT and its relevance to various businesses both in commercial and government organization, we will now focus on what is IT strategy and its importance. We will also discuss various components of IT strategy.

Strategy mainly focuses on three questions, namely

- What is your destination?
- What is your current position?
- How are you going to reach your destination from your current position?

Strategy is the combination of plans and policies and putting them together into the operations to achieve the desired results. It is the roadmap for reaching the business goals and objectives.

In the context of IT strategy it mainly answers the third question. How IT is going to increase the chances of success of your organization and help the business grow at a faster pace? Thus while creating strategies managers try to organize the resources and enablers which would help them in forming better strategies. Such strategies would be feasible and implemented without any execution constraints. IT serves as one of the best strategic enablers which will help in designing business strategies as well as in their successful delivery and execution. IT had tremendous capabilities in supporting various businesses. Since past managers had vast faith in IT in delivering the services and goods to the customers in the most efficient way so as to gain the competitive advantage.

The importance of IT in today's scenario is also revealed from the fact that CIO is invited in most of the strategic planning sessions. The reason behind this is to provide a different perspective rather an IT perspective to the thinking processes

and decision making. IT could easily remove the constraints which otherwise hinder the ideas or implementation of managers from other departments. Presence of CIO and IT in the discussions helps to understand the processes and find better and efficient solutions.

Introduction of IT in forming business strategies depends on the way management thinks and current situation of the organization. The way organization wants to change and expand itself will decide the role of IT as an enabler. Currently in developing countries IT is mainly used for accounting purposes and the wide spectrum of opportunities provided by IT as an enabler is untouched. The untapped potential of IT could be easily utilized if organizations start using the top-down approach (holistic approach) while designing their strategies so that ideas and decisions flow from top management to operational level employees (shop floor) in a hustle manner.

In one of the internet based articles "IT Value Management" from Roland Berger, Strategy Consultants, Gerard Ritchter and Martin Bednaric also depicted similar results, as in Fig. 2.3.

IT and IT strategy always has strategic business intent. It is leveraged for business advantage. It provides solutions to business problems. All those projects have gone bust where IT was not connected to business benefits. Those IT systems could never be assimilated in business and did not have longer life. A good IT project must focus at business benefits, users' enablement and support to business processes. People, who understand the complete gamut of IT solutions and factors improving IT usage, even quote that having latest technology is not that important, the solution and adaptability aspect of users are more important. I have seen business and IT managers agreeing to a technology that is not so new or the solution that is not even optimum as their people and skill level of users are not to the level where they absorb and benefit from newer technology. Thus "People" aspect is also important and an

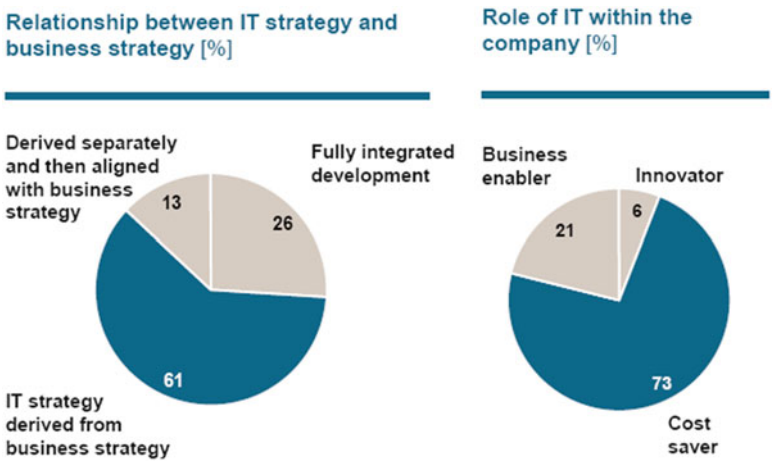

Fig. 2.3 IT and business strategy

IT strategy must take care of them as well. Faulkner Consulting and Richard Ivey School of Business have presented three elements in business context of IT strategy. We find them quite relevant in our experience too. These three elements must grow together and remain in balance for a successful implementation of IT. We call them "3 Must" basic elements of IT strategy (http://www.cioindex.com, Accessed in 2013) and they are

- Process
- People
- Technology

Major Components of IT Strategy

We now take a glance at the high level approach to IT strategy. This approach creates the IT strategy and it would help us in understanding its pillars and components. Business strategy is not like a wish list or a dream. Managers put a lot of hard work to explain strategies in detail by determining critical success factors, control and monitoring, roll out plans (initial, intermediate and final), stakeholder's interest (communicating implications to them and align their interests), reviews at regular time periods, feedback and adjustments, and many such activities which is necessary to ensure proper implementation and success of the strategy.

Business managers call it strategy so that their business strategy works. When managers are asked about the success of their strategy, you will obtain answers with a very high level of analysis and feasibility plans. They will explain you how various enablers will be used to achieve the best results under given scenario and conditions. While drafting business strategy business managers try to make efficient use of enablers such as finance, process, assets, people, technology or their combination. They try to identify their strengths and weaknesses and figure out how they would impact their business and drafted business strategy. Because of this impact, strategies are usually a part of main strategies or CSFs. Later on drafted strategies are detailed (Fig. 2.4).

IT is one of the most important enablers these days due to various innovations and developments in technology. As a result of this it regularly draws the attention of business managers. The various enablers help in building the capabilities of organization which in turn helps achieve the business objectives through the defined strategy implementation.

IT strategy like any other strategy will answer the following questions

- Where are we?
- What we want to achieve?
- How we want to achieve?

The last question would also focus on:

– How to optimize resources and investment and maximize benefits?
– How to monitor and adjust deviations while implementing new plans?

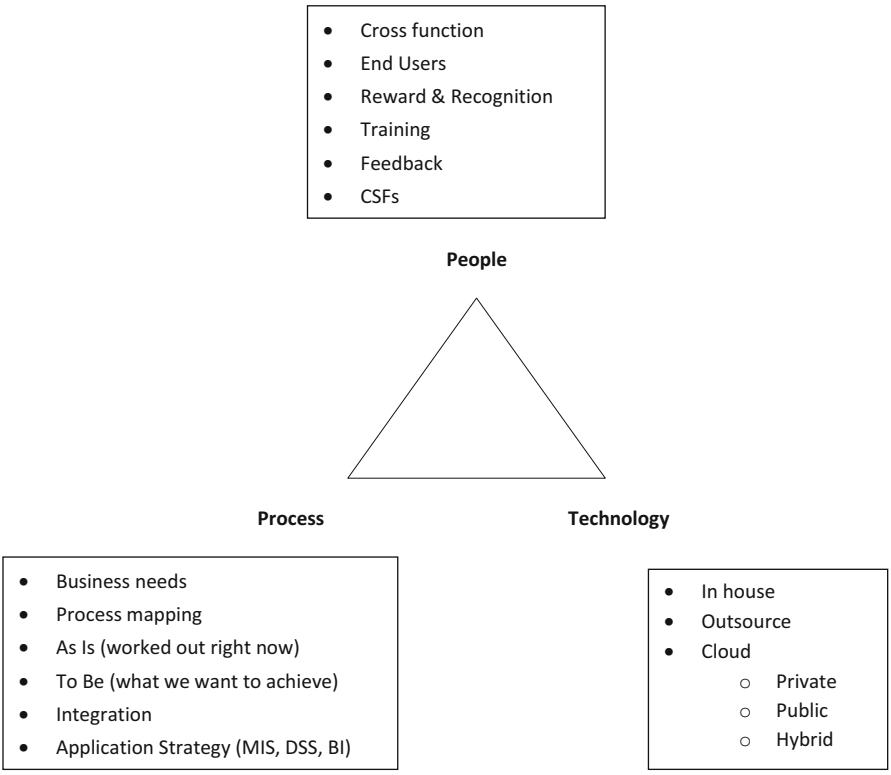

Fig. 2.4 "3 Must"—basic elements of IT strategy

Business Purpose

Business managers plan their strategy and at the same time identify business domain/functions encompassed by the strategy. After that they look for factors which would make this strategy successful. These CSFs will be mapped on IT value chain. This mapping will determine how IT characteristics will support the CSFs. Development and design of complete IT infrastructure and the associated enablers is done around CSFs.

Business purpose or the objective is the first component of IT strategy. It is the responsibility of the business managers and their respective CIO to bridge the gap between IT and the business strategy.

Most of the times strategies and plans become dependent on IT, in such cases managers need to prioritize their strategies. This is similar to allocation of resources in an organization. Allocation of resources depends on their individual contribution towards achieving business objective and strategic benefit. In most of the cases IT expectations are given top preference so that IT infrastructure could be laid down. This will fulfil both short term as well as long term goals and later on scalability and expandability can be achieved.

A New Strategic Mindset

It is also called as management commitment. The organizations should understand that they aren't using IT because others are using it, rather they should focus on the strengths of IT and make use of this powerful tool. In many cases the investment in IT is based on the reports of various consultants. These investment ranges from 0.5 to 3 %. Senior managers compare various consultants' reports and then arrive at their decisions. Arriving investment decisions in such a way clearly depicts a non-strategic thinking approach which should not be the case.

The top management should take IT as a strategic tool and understand its strategic value. They should drive IT with right perspective since the success of the business strategy depends on the success of the IT. Investment in IT infrastructure and services must be looked as an investment and not as a cost. Management should have a long term perspective when it comes to investment in IT. Investment in IT depends on the business needs, business nature and investment capacity of the organization. The investment in IT as a percentage of revenue would be different for different organization. The investment can't be same for Wal-Mart, SAIL (Steel Authority of India Limited), Tata Motors and JP Morgan. The reasons are very simple. These four organizations have different business models, demand-supply gap in market, seasonal variations, and impact due to market changes. Critical Success Factor (CSF) for Wal-Mart is Supply Chain Management (SCM) whereas for SAIL it is steel making and its marketing. The business involving more of trading, supply chain needs and retailing requires a larger and stronger IT infrastructure such as in JP Morgan and Wal-Mart. Financial institutions like JP Morgan and retail outlets like Wal-Mart can't think of running their business without the help of IT. These businesses require real time data processing and information exchange to serve their customers which can be enabled only through IT infrastructure. Whereas for organizations like SAIL and other manufacturing companies the major cost would be plant and equipment setup. For Wal-Mart the information required per unit of items sold as well as per thousand dollars of revenue is much higher than any manufacturing company.

In one survey report published by IDC#2 on IT status and trend in Western European countries, it presented that the government is moving slowly towards the usage of technology for governance and citizen centric services. In the same report it was also presented that government sectors are slowly getting familiarized with the technology and its usage is growing reasonably. But in developing nations usage of IT in government sectors is still lagging. Public sector companies have better usage than pure government offices and establishments. In India, there has been success in railway ticket reservation in some progressive states, but that is not good enough to motivate and expedite the progress in local and central governments. Even the progress in e-governance sector is not good enough.

Currently government organizations follow a hands-off approach. Government establishments providing crucial services like education, health care, revenue services, etc. are yet to plan how to implement IT in their operations. There is a lack of quality information in government offices whether it is related to citizen,

environment or health of government assets. The records are not up to date which created problems like disputes arising while acquiring land for industrialization. During run up to Indian budget for 2009–2010, the Chairman, NASSCOM Mr. Pramod Bhasin, while representing IT industry, emphasized the need for more IT systems in India. He requested the finance manager to bring focus to IT adoption in government sectors, which have been far behind the private sector, especially the large capital corporate. He was right in his speech. Even we have observed that when IT services are being sold to government agencies and departments, management wants to move forward quickly. But due to inadequate understandings as how IT can scale up the performance and bring improvements and internal dynamics and constraints, they are unable to make quick decisions and faster implementation. When IBM recommended that India should lead second wave of IT adoption similar sentiments were sounded. Some organizations and managers have been very progressive such as The Dharma Port who has started investment in IT as soon as their port construction started. The CEO wanted the port to be of 21st century and not of 19th century, thus they laid the IT foundation along with the construction project itself.

When Maersk took over P&O Nedlloyd, the top management also thought about IT integration strategy to make merger smooth and successful. This might be better written up as a mini-case example. Demonstrating direct benefits of IT is a very difficult task. The business doesn't benefit just because of IT or buying and installing modern technology applications. For proper benefits it must be used properly. That usage requires a complete ecosystem which includes process, people and governance. Therefore, the benefit must be targeted with balanced growth in all the components of IT ecosystem and not only in IT. You should be very clear about this fact that a modern IT infrastructure with costly applications in isolation will not yield benefit. It remains the toy in the hand of publicity makers. The old practices followed by business mangers continue and then IT is blamed. Such imbalances are clearly observed in government offices, where IT infrastructure and applications are installed but not used properly. The use of IT is out of focus there. It must be used efficiently for improving operational efficiency and quality of services provided to the public. To avoid this pitfall, one needs to drive with definite goal, develop all components of IT ecosystem and monitor the benefit. Another change which is desired is the area of technology selection and infrastructure life. The preferences for technological solutions must be based on purpose suitability, available support and the supplier relationship.

Most of the companies do not chase technology and big branded service providers. Companies like Microsoft, Intel, AMD and other hardware vendors have ensured that hardware products are more or less standardized and their performances are comparable to make the choice easy for buyer and implementer. The users' lives have become simpler in this way. But due to rapid changes in technology and update in software the infrastructure life has become shorter. IT managers have to approach business managers for investment to upgrade and changes in IT infrastructure and assets frequently, unlike production manager of a factory. Senior management needs to understand and appreciate this phenomenon.

For example client–server based technology existed till late 1990s and re-launched after dotcom burst. But the way dotcom and web based systems returned with new features supporting remote access, facilitating collaboration across organizations and geographies and hardware architecture free applications, the infrastructure needed face change. Touch screen, Smart cards, RFID, Voice interface, Microsoft Surface technology and others have already started putting pressure for changes again in IT infrastructure and applications. IT enabled services have become new competitive tool to build new capability to reach to the customers, collaborate, improve financials and globalize their product and services. These changes have occurred within a decade.

Most of the business managers are not able to understand this phenomenon and thus create a hindrance to modernization which leaves them behind competitors. Big companies can utilize different technologies for different functions which provide them an additional facility. Even though that is part of their strategy, which could have been driven by cost saving or business needs, they have started thinking of integration. It has crossed the limit of information integration and reached to virtualization i.e. common platform to improve manageability. Areas on the priorities are updated first. Hence, one needs to apply his own thoughts on selection of right technology and investing in it. The decision has to be based on the rational need of the organization. Tata Steel has built its own IT strategy and based business function to certain application and line of technology. They have standardized these platforms purely based on manageability and coverage of business functions.

Generally Upgrade of Infrastructure Depends On

- Where one wants his/her business to reach?
- Whether there are compelling reasons from Customers and Competitors?
- Whether it will negatively impact the current services?
- Whether the requirements from regulators or government need changes e.g. HDFC Bank's Disaster Recovery (DR) project was because of central bank (RBI) directive which recommended that Indian banks put in place a DR plan.

Government has allowed higher rate of depreciation since they have recognized the short life of these IT assets. Software assets are quickly amortized by many organizations so that they can choose their own option depending upon their needs. When we observe that the understanding and awareness of IT amongst senior managers would make IT adoption for business purpose better, we recommend CIO and IT managers to take a pragmatic view and put an effort to educate and win the confidence (www.cioindex.com, Accessed in 2013). It is but obvious that business managers will understand contribution of IT in terms of business benefits and money; and some successful CIO does adopt this approach. This helps the business managers to appreciate IT and connect IT-investments to their business. They get committed to leverage IT successfully.

Holistic Approach

We propose a holistic approach to IT strategy similar to Gartner. They recommended three approaches for IT strategy:

- Developing demand
- Control side of strategy
- Supply side of strategy

IT strategy should have business goals and capabilities required under demand and administration and governance under control and supply side of strategy. It should address sourcing issues, service and most importantly people related to it. Learning from our experiences we have presented a bit different approach in this book. We suggest to design and develop strategies around three basic contexts discussed above with main focus on business benefits. They might not be very similar to Gartner's approach but the assembly line looks different. While designing, developing and assembling the components of various strategies the main concern should be to achieve the expected goal. Therefore these components must be depicted clearly so that executers can get better guidance and assemble these components in the best possible way.

For better performance a policy wise decision making process will certainly help. For example

- Which approach should be followed in selecting the technology?
- Will the development and implementation be done in-house or through outsourcing?

These policies should guide the executioners and provide a road map to all the stake holders. It must also fulfil the expectations of top management. They must be able to see the profits and growth in their investments. All IT strategies must present current as well as future scenarios and the way organization would reach there. This should lay emphasis on complete IT ecosystem so that a balanced and holistic approach could be followed. IT strategy will mention the high level measurements and actions which will provide progress and help the organization to reach the right end. It should provide visibility on the following items like an investment proposal:

- Current scenario
- Process:
  - Business effectiveness.
  - Business integration.
  - Business process.
  - Opportunity to improve.

- People:
  - Capability and skill level of IT and business people.
  - Change management capability.
  - Design of services vis-à-vis employee involvement.
- IT:
  - IT infrastructure.
  - Application portfolio.
  - Level of IT integration with business.
  - Stock of digital data.
  - Service and Support.
- IT management structure.
- Business priorities and intended coverage.
- Future scenario.
- Process:
  - New orientation to process.
  - Change deployment.
  - Support needed from IT.
- People:
  - Desired level of skill and capability.
  - Process for people enablement.
  - Change management.
- IT:
  - Infrastructure and Operations.
  - New technology and application.
  - Implementation approach.
  - Service (outsourcing, technology upgrade, IT Processes etc.) and Support.
- Approach to service delivery.
- IT and Data Security and Business continuity strategy.
- Investments.
- Risks and mitigations.
- Benefits and success measurements.

The top management will approve only if there is sufficient visibility and analysis in the strategy and benefits could be expected out of it. It is very difficult to attribute tangible benefits directly to IT. Therefore senior management must appreciate this fact and consider non-tangible benefits of IT as well. They must understand the role of IT as an enabler for investment decisions. As the benefit of education in removing poverty, improving health and population control can't be explained directly similar is the case with IT in helping organizations. It should also be noted that it is extremely

difficult to provide complete details on IT strategy during the business planning stage since the changes in strategy would be flexible and would vary during the implementation. Thus strategy information would be provided in two stages:

- At High level: IT is treated as a strategic tool to achieve the business objectives and goals.
- At Low level: A detailed exercise and elaboration on working of IT strategy would be provided.

The high level may have extra details if the key business people in the organization understand IT. In many cases it is seen that without IT it's not possible to carry out day to day operations. In such cases even business managers themselves provide and elaborate additional parameters. In one of the organizations, where obsolescence of IT has reached to service breakdown stage, business people wanted IT to be on high priority. They identified business risks, expected benefits from IT implementation and the new system expansion which would match their own strategies on:

- Operational efficiency
- Cost reduction
- Customer responsiveness

It provided a better and comprehensive scenario to the concerned IT managers and how they should drive the IT strategy. With this they also got extended support in implementation from business managers.

Approach to Green IT

A worldwide awareness is already being generated related to the sensitivity of our environment and climate change. World bodies have been continuously taking many initiatives in this regard such as:

- Communication from Commission of The European Communities to European Parliament
- Kyoto Protocol
- Attempt by United Nations to arrive to an agreement amongst its members vide Climate Change Conference 2009 at Copenhagen (http://en.cop15.dk/)

These initiatives have clearly shown the concern of world towards environmental and climate change. Industrial authorities and governance have become stricter towards the emission of green house gases. Industries of all the countries whether developed, developing or underdeveloped are made to accept the emission norms so that entire world can curb these problems together. Each and every one is expected to support the climatic change movements.

For achieving this, organizations must use their resources optimally and help reduce the emissions of green house gases which are causing a continuous rise in average temperature of earth which is further causing melting of ice-caps in polar regions and increasing the mean-sea levels. Some recommendations to reduce emissions are:

- Recycling
- Use of bio-friendly materials
- Plantation of trees

IT can contribute to this movement by (www.symantec.com/greenit)

- *Green use*—reducing the energy consumption of computers and other information systems as well as using them in an environmentally sound manner
- *Green disposal*—refurbishing and reusing old computers and properly recycling unwanted computers and other electronic equipment
- *Green design*—designing energy-efficient and environmentally sound components, computers, servers, cooling equipment and data centres
- *Green manufacturing*—manufacturing electronic components, computers and other associated subsystems with minimal impact on the environment

The summit site (http://en.cop15.dk/) also suggests many ways to green computing. We could see at least two areas in IT domain that visibly impacted by this campaign. The first is power consumption by the IT equipments and the cooling need, and the second is paper consumption. Reduction in usage of fossil fuels for power generation and mass reduction of paper consumption in business and offices are certainly a welcome contribution from IT. There are ample opportunities to save energy by choosing right hardware, right configuration and system design. Use of blade/rack servers instead of boxes, consolidation of systems and systems that are supporting online availability of data and information, use of LCD monitors instead of CRT monitors and use of solar panels for supplementing power need are also in support of this goal. Again the tendency of having more printed report for verification/analysis of data as well as records can easily be controlled by educating the users and providing matching features in the system. Recognizing electronic data instead of papers in government offices and government dealings with business will be another good step in this direction.

In one of the survey reports on green IT "Green IT Survey Results—May 2009" from Symantec it has been reported that *Ninety-six percent of companies are at least discussing a Green IT strategy. Fifty-two percent are in the discussion or trial stages, while 45 percent have already implemented a strategy. Additionally, 87 percent of companies said that it is somewhat/significantly important that their IT organization implement Green IT initiatives. Only two percent said it was somewhat/significantly unimportant*. It also adds that *Companies are willing to spend more today than in the past to implement green technology. Seventy-three percent of respondents predicted an increase in Green IT budgets over the next 12 months*.

Today the international users/customers have become so sensitive to this fact that they ask for audit reports on energy consumptions and initiatives towards Green IT before outsourcing the IT business. *Martyn Hart, chairman of the National Outsourcing Association has quoted in his article dated 23rd Sept 2008, that UK government committed to ensuring its IT operations are carbon neutral by 2013*. The article also quotes, *The Brown-Wilson Group's 2007 Black Book of Outsourcing study indicates that more than 21 percent of US and European companies that already outsource have added green policies and performance indictors to their outsourcing agreements*. This number has been rising since then. Similar message is provided in the "2009 Green Outsourcing Survey" by TheBlackBookofOutsourcing. com.

One of the world's big logistics companies more detail needed which went under similar scrutiny by their big customer posed the same discipline to its vendors including IT vendors, and IT service providers from India too adopted these practices. Similarly while creating an IT strategy for a Hydro Power Generation company, which has policies for social responsibilities, the company wanted an exclusive consideration for Green IT in its IT strategy. This might make a good mini-case. This is new phenomenon and it will spread like epidemic soon. Therefore, it is important that any new IT strategy must evaluate an opportunity for this and adapt it. This not only provides an opportunity to be socially responsible organization but also saves cost, thus making good business sense.

Globalization

As per White et al., 2007, today IT has become a good tool to support the organizations' globalization plans. Big corporate of the USA from financial, trading and manufacturing industries have pioneered in globalization using IT. They extensively used the technology to integrate business across the globe and confirm the convenience and benefit from IT in achieving their objective. In an article on Itstrategyblog. com Raj Sheelvant highlighted how Coca Cola used IT effectively to make their global strategy of collaboration within different sets of employees, suppliers and customers were achieved. IT directly helped them to two of their vital business strategies, market Dominance and Defensive Strategy in supply chain. Like Coca Cola, many front runner organizations, which used IT extensively for their global ambitions, create new directions and opportunities of services for IT. Global Strategy to reduce cost by outsourcing of IT and IT enabled Services could be successful only because of IT. Currently, the industries, which are innovating new solutions based on global participation and collaboration, are influencing the new research and development in IT.

IT strategy must reflect the business strategy of globalization and plans to reach beyond geographical boundaries. This helps the planner to visualize the need of

infrastructure and create strategy to support business till last mile. In context of having many differences including language, regulation, culture, demography, technology adaptation and business conditions across different markets it is better to indicate the expectations from IT as part of the business strategy. These must happen by design than on adhoc basis.

Current infrastructure level and ever expanding the same have created good opportunities for business to integrate seamlessly across countries and continent boundaries. Even regulators have started collaborating and taking help of IT to globalize. This was evident when SEBI, The Indian Stock market regulator and SEC, the USA agreed to share practices and data to monitor and regulate the stock exchanges and investments as well as investigations. The regulators cooperation again became important when the USA made Tax-heaven countries to declare the money and investments belonging to American citizens. Many business establishments want to create new business models based on IT. This was evident when many new business models like remote tuition services through internet, sell and auction services are provided by real estate builders, electronic payments for services, use and pay services for software came into being. This means success and failure of business directly and holistically depends on IT. In such scenario IT becomes utmost important. There also business strategists provide certain performance and expectation guidelines which they think important for them to succeed. This dependence of business on IT makes business to develop their e-Strategy and when this helps to globalize the business, it is called "e-Strategy for Globalization" (Mohapatra 2009a, 2009b; Ashwini et al. 2012). This approach where complete business runs over IT, throws different type of demand on IT. This also demands that business managers have better understanding of IT thus helping in amalgamating IT with their thoughts.

IT Strategy Implementation

Now we start with the implementation of the IT strategy. It is one of the most critical steps leading to the final implementation of business strategy (Fig. 2.5).

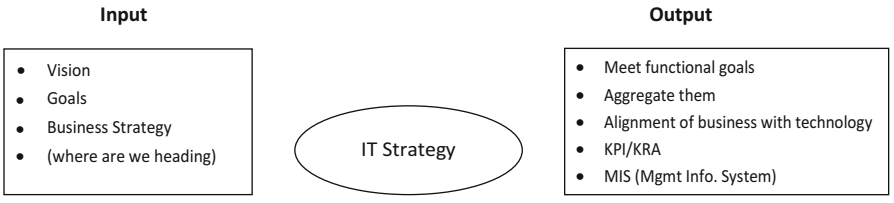

Fig. 2.5 IT as enabler

Starting Questions

Before you start with the implementation process you need to ask following related questions:

1. *Objectives/Goals*: What are the current goals and objectives of the organization/business?
   It will play an important role in the way implementation is carried out. Implementation steps will directly affect the desired results and objectives thus it is critical to clarify the objectives before starting the implementation process.
2. *External Drivers*: What are the external drivers affecting the business and organization?
   Some of the external factors could be competitors, government policies, porter's five forces etc. These factors should be critically analyzed beforehand so that they don't create any hindrance to the implementation process later on. Since the cost of altering the implementation or stopping could be huge and might also prove as sunk such risks should be mitigated with priority.
3. *Internal Drivers*: What are the internal drivers affecting the business and organization?
   Internal factors could be growth, stage of lifecycle (OLC), consolidation, partnering, stakeholder's problem etc. Since these factors are internal to the organization and business these must be sorted out by management before bringing in any new change. Change would be fruitful only if these parameters are in proper condition.
4. *Real time data*: How are you going to obtain and process the real time data?
   During implementation it is very crucial to observe the changes and obtain those results. It is possible only if you have a robust system for collecting and processing retail time data. For sectors like retail, FMCG, and banks one can't think of completing even one process without the real time data. The entire operations say in a bank would depend on the sequence of data which should be available in real time. If data at one step is missed, next step can't be carried out. Such is the nature of operations that one is bound to have a real time data system installed which would run with the IT support and infrastructure.
5. *Schedule of Authorization* (*SOA*): What is the SOA in the organization?
   SOA determines the hierarchy followed in the organization for approval process. It could be one of the major bottlenecks during implementation phase. If the managers at different levels aren't aware about their authorities and responsibilities the tasks would not be directed properly. It would create confusions at different levels and cause both problems and delay for the implementing team. A proper SOA will help define the work flow.

   For example in a bank, does approval of a cheque depend upon the criticality of the process/transaction such as cheque amount of Rs. 10,000, 20,000, 50,000, 100,000 etc.? Now if the cashier, manager or cheque collector is unaware who should be the one handling the cheques, those cheques would take more time to get cleared. This would create unnecessary trouble for both bank customer and bank employee who is authorized to clear the cheques. A proper guideline for

the roles and responsibilities covering all the conditions would sort out this problem easily.

6. *Latent Data Need*: How much time does it take to trace the data and give it to the authority?
   Latent data is required by the authority to track the progress of any process. One can't wait for the entire process to get over and then analyze and compare the results. It could be a risky and costly affair. As said "*prevention is better than cure*," so it makes sense to provide the latent data to the concerned authority at regular intervals.

   But the question is:

   (a) How do we obtain this data?
   (b) Do we have a robust system which would provide us with accurate data?
   (c) How much time does it take to obtain and process that data?
   (d) Do we have a strong database to preserve this precious data?

   These are some of the questions whose answers should be sought before implementation. For example in BFSI sector data needs to be archived for as long as 7 years. One can assume how large chunk of data would be produced during these 7 long years. Storing such large data and retrieving it with accuracy will definitely require a very strong database system.

7. *One point data entry*: Do you have one data point entry system?
   Single point entry is one of the most important characteristics of Enterprise Resource Planning (ERP). In order to create a repository which has well structured stored data we need:

   (a) Central database
   (b) One point data entry
   (c) Integration of different processes

   Above features would ensure easy retrieval of data with better accuracy and less work overlap. Central database would be shared partially/fully to various authorities according to their roles and responsibilities. Such a system would also offer additional security to the stored data.

8. *Support Functions*: What are the various support functions which need to be integrated?
   There are many independent departments such as Finance, Marketing, HR, Operations, Administration, and Accounts etc. in an organization. These independent departments should be integrated so that they:

   (a) Work together in synchronization
   (b) Understand problems and find solutions as an organization and not as an individual entity
   (c) Achieve better results by helping each other in the various business functions
   (d) Do not compete for resources, rather contribute to each other in whichever way possible

9. *Degree of statutory compliance*: How are the processes bound by statutory compliance?
   Business processes in most of the cases are bound by statutory compliance. It is very important to understand the laws and regulations related to one's processes. Dealing with legal laws could be time consuming and costly. Inappropriateness in such matters could prove as bottlenecks for the operations and there is no way escaping out. Thus necessary requirements must be fulfilled beforehand.
   For example: Statutory Compliance varies from sector to sector
   (a) *Banking Sector*—High degree of statutory compliance needs to be fulfilled. Each and every process has to be followed under various banking laws. Forging with such laws could prove disastrous for any banking business.
   (b) *Service Sector*—Low degree of statutory compliance. There are some general laws which need to be followed while carrying out business activities. There is a Custom Bond in IT industries that after 7 years company has to dispose desktops they are using. Either they have to donate or throw it. But there is no compliance for e-waste management when they throw it off.
10. *Degree of Automation*: What is the degree of automation you want to achieve?
    Not every process can be automated either due to lack of resources or the nature/criticality of the process. You need to figure out the degree of automation you want to achieve in your processes. Automation improves the efficiency of the process but at the same time needs solid maintenance to ensure proper control over it. For achieving automation one needs to focus on:
    (a) Process automation
    (b) Support Function
11. *Reliability*: How reliable is your system?
    Reliability is the measure of the ability of a component or system to perform its assigned tasks and functions under the specified given conditions for a particular time period. Every product and service comes with certain reliability depending on the nature of functions performed or delivered. Reliability is measured with the help of following two parameters:
    (a) *Availability*: this answers will system or component will be available when required.
    (b) Down Time: this determines the time taken by the system to recover and perform once again in case it fails.

12. *Total Cost of Ownership*: What is the total cost of ownership of the system? Total Cost of Ownership includes different types of costs described below:
    (a) Cost of hardware
    (b) Cost of software
    (c) Cost of Maintenance (fixing the problem)
    (d) Cost of Upgrade (adding new features)
    (e) Cost as Salary
    (f) Cost of Training
    (g) Cost of Migration (data, system, hardware, software)

Implementation Approach

After understanding the problems mentioned in previous section and finding feasible solutions to them we now proceed towards the implementation.

1. *Pilot Phase*:
   Implementation starts with defining Critical Success Factors (CSF). CSFs are measured at milestone.

   CSF provides answers to following questions:

   (a) *Roadmap*: what processes, route are to be followed?
   (b) Milestone: when would be results achieved?
   (c) *Reviewer*: who is the appropriate authority to review the achieved results?
   (d) *Status Reports*: how will the status reports be generated?

2. Project Goals:
   Under this, structure for the implementation would be developed. Structure would constitute following features:

   (a) *Members*: who are the people involved in the implementation process?
   (b) *Roles and Responsibilities*: what are the roles and responsibilities of the members?
   (c) *Cross functional Support*: how people from different departments will generate feedback and help to redefine CSFs?

3. *Critical Success Factors*:
   CSFs would be analyzed by internal evaluation. A communication protocol and strategy would be developed to determine the critical success factors.
4. *Project Organization Structure*:
   This would determine the overall organization structure to be followed during project implementation. It would also define hierarchies at different project level implementation.

5. *Roles and Responsibilities*:
   Roles and responsibilities at different levels of hierarchy would make the process smooth and avoid overlap of work. Clear mention of rules would also help to curb the clash of interests in decision making.
6. *Milestones and Roadmap*:
   Milestones determine the time oriented results and roadmap determines the timely progress path.
7. *Reward and Recognition Scheme*:
   Reward is monetary whereas recognition is non-monetary. Proper reward and recognition schemes would ensure internal competitiveness and help improve the efficiency of the resources.
8. *Training Requirement*:
   New changes whenever implemented require professional team at work. Also the existing employees must be trained properly for the new techniques and approaches so that implementation can be carried out as it was planned. Some of the issues related to training which need to be tackled are:

   (a) Training cost
   (b) Feasibility of training
   (c) Benefits of training
   (d) Acceptance of employees to the new changes

9. *Review*:
   Review covers mainly four aspects:

   (a) Who will review?
   (b) When will review be done?
   (c) What is to be reviewed?
   (d) How will review be done?

   KPIs (Key Performance Indicators) are for individuals and regular activities
   CSFs will determine whether system has been implemented correctly or not.

Summary

In this chapter we started with the definition of vision, mission and goal. A vision defines where an organization want to be in future, mission is the set of day to day activities whereas goal is the end result (more of quantitative). We also discussed two types of vision: top down and bottom up and five SMART characteristics of goals. Then we looked at the VMG framework. VMG framework is used while designing strategies and taking important decisions for the business. It mainly focuses on keeping vision, mission and goal statement of the organization on top priority while designing strategies and implementing them. VMG framework helps to sort out the priorities and take better decisions.

IT strategy and business are very closely related. Strategy mainly focuses on current position, destination and how are we going to reach from our current position to destination. IT plays a very important role in any organization. The extent of that role would depend on the nature of the business. There is also a strong linkage between IT strategy and business strategy and this linkage must remain strong throughout the operations to achieve the desired results.

We then focussed upon the major components of IT. These components have evolved over a period of technological changes. Business purpose must be closely linked to the IT strategy formulation and implementation. A strategic mindset for management is must while bring IT into the organizations. There is a need of holistic approach while implementing IT. Managers must look at both tangible as well as intangible benefits while investing into IT infrastructure and services. Green IT is another important component of IT. Recent environmental and climatic changes have forced the world bodies to follow strict rules and regulations when it comes to saving the environment and earth. World is now a global village. With the help of IT organizations are able to run their businesses in multiple locations across the world at the same time. They even serve customers of another nation from their home country.

After that we looked at different IT Strategy implementation steps. We started with the questions that must be asked before we start the implementation process. Seeking answers to these important questions would keep the implementation process in line with the business strategy. Finally we ended with the implementation approach and its various steps.

Review Questions

1. What is vision? Explain its different types.
2. What is a mission? Explain with a live example.
3. What is a goal? What are the different characteristics of a goal?
4. Explain VMG framework and its importance with an example.
5. Explain how IT strategy and Business strategy are related to each other.
6. What are three main areas where strategy focuses?
7. What are the major components of IT Strategy?
8. Why is it difficult to attribute tangible benefits to IT?
9. What do you mean by approach to green IT?
10. How globalization and IT strategy are related to each other? Explain with an example.
11. Explain the term “IT as an Enabler.”
12. What are the questions necessary to be answered before starting the implementation process?
13. What are KPIs and CSFs? Explain their role in IT strategy implementation.

Assignments

1. Identify organizations from three different sectors and analyze the role of IT infrastructure and services in them. Compare and recommend the ways to improve.
2. Choose an organization and draw a flowchart of IT implementation process in it. Also explain the various stages in detail.

Chapter 3
Cloud Computing and Social Commerce

Learning Objectives

The chapter will discuss the following concepts:

- What is cloud computing?
- Opportunities and potential of cloud
- Requirements for implementing cloud computing
- Cloud computing realities
- What is social e-commerce?
- How do firms get benefits out of it?
- Value addition from social commerce
- Strategy for social commerce

Introduction

In today's world businesses are growing at a tremendous speed and so are their clients and customers. Such a fast growing pace is causing lack of resources and their proper utilization. One of the examples is the usage of IT technology. The use of IT in today's growing businesses has expanded to such a great extent that it is posing problem for the organization to serve and satisfy their customers. The business during peak hours (time when maximum customers want to be served) is extremely difficult to handle. Some of the common examples are railway reservation when the window for ticket reservation just opens, students visiting website when results are declared, ticket bookings on weekends, etc. To serve the customers in these cases companies can't go after continuously installing the new systems and resources because they would be unused during non-peak hours. Such a problem gives rise to a new solution which is known as Cloud Computing in which resources are shared to adjust the traffic of the requests to be served. But the question is where do we start from? With the growing hype about cloud computing there are some

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more questions creeping into the minds of management about implementing cloud solutions in their organizations. For example, which case it will be the most helpful? How will it improve the efficiencies? Which areas it will not be fruitful? Should we adapt to cloud-based solutions or not? These are some of the questions which we will try to answer in this chapter.

It's Time to Say Goodbye to Hardware

In today's world most of the businesses need ideas and ways to stay quick and light. They can't afford to have tonnes of hardware. It's the time they go for cloud computing so that they can minimize their hardware requirements and at the same time quicken their operations.

Using cloud solutions not only reduces the costs but at the same time increases the revenue to a great extent. Cloud helps to adjust the traffic judiciously. Data, processing power and the memory are retrieved accordingly from the cloud server to handle the increased work traffic, when the workload on the system increases. Examples of such situations could be railway reservation on IRCTC website during tatkal ticket booking hours, stock transactions on NSE and BSE websites during peak hours, declaration of examination results on website, etc.

Today software companies can set up hundreds of servers for their new project within 30 min with the help of cloud computing technologies. Companies like Infosys, TCS doesn't need to buy new resources for their projects. They can simply fit "virtual servers" in their data centre in a minimal space with a minimal effort. Earlier buying hardware for new projects was a very cumbersome and time consuming process. It used to take several weeks and sometimes months to start the project but today it's just the matter of hours. This is one of the examples which reveals the tremendous potential of cloud computing. So now someone may ask what this cloud computing is all about. In simple terms it is like buying the computing power as we buy electricity for our use. As everybody requires electricity but no one attempts to produce it. People use it and then pay for it. Similarly in cloud computing the external virtual servers provide the data, memory and the computing power required by the companies and in return companies pay as per their usage. Now organizations can get rid of their need to buy expensive hardware and software and cumbersome storage space. They can buy the requisite amount and then pay a rental fee as per their usage. Cloud computing has a lot of potential in bringing rapid changes to current business models, provides cost benefits and changes the role of IT in organizations. Many large companies like Infosys, TCS, Tata Motors, and Wal-mart are making full use of cloud computing to reduce their IT hardware and software expenses.

Cloud Computing: Opportunities Ahead

Google has more than two million enterprise customers who are using Google Apps in India alone. Google also claims that today it has about 100,000 enterprises including businesses, educational institutions and NGOs. The companies like Salesforce.com and Microsoft are also joining in the league in acquiring the new clients. Salesforce.com alone has around 87,000 customers using 240,000 applications globally. It includes variety of customers ranging from small and medium businesses to large organizations such as Bajaj Finance and Su-kam. As the IT and broadband infrastructure becomes stronger and reliable day by day cloud computing will also reach great heights. In a recent survey of 100 Indian CIOs by Zinnov Consulting, 40 % of respondents are planning to spend around 5 % of their IT budget on cloud and 21 % are expecting to spend close to 10 % of their IT budget. This shows that cloud is looked as an important technology nowadays and organization have a faith in this technology which is clear from the spending which they are eager to put into cloud.

Cloud computing is one of the technologies which is going to dominate over the next 5–10 years. The reason being fulfilling the objective of internet: To create a global computing grid, always-on, cheap and easy to use. It will surely take some time to realize the potential of cloud computing. So now one would ask why cloud is so unique and interesting. Let's understand this with an example. We can't think of even one area where organization can add or reduce capacity at will after spending on it. The office space needs to be purchased in advance considering the future hires. Now suppose the extra space in office is not required it can't be sold out easily since it is integrated with the required space. IT systems, plant, machinery, all these are to be bought in advance. Capital expenditure needs forward planning and increasing or decreasing debt in favour of equity requires consulting of expensive investment bankers. Even people as a resource can't be handled at organization's will. It's easy to hire people at will but once they are hired one can't get rid of them as easily as it seems. If extra people are hired in anticipation of new projects and if those projects don't start, people can't be shown pink slips so easily. These extra resources would only increase the cost of organization. Now let's focus on cloud computing. Why is it so interesting? IT costs can be adjusted on demand with the help of cloud computing. It is easy to manage (increase and decrease both) IT infrastructure because you pay for only what you use. There is no unutilized capacity and cost overheads.

Over the next 5 years, according to a survey conducted by Zinnov, more than 40 % of the Indian companies will move IT services like e-mail, ERP software, and customer relationship software to the cloud. The reason is simple. Companies would want to cut their IT costs and go for pay as you use model. There is no point investing into huge hardware installations and then purchasing software applications to enable the hardware. The capacity utilizations, even for big players may not be very high. In this way the unutilized portion adds to costs overheads. Survey study reveals that organizations are rather investing in buying virtual servers and

computing power. It is also found that not big companies but small ones are investing more into cloud technology. They are evolving their business models like Airtel and HUL to target the price sensitive customers and market which big tech companies have failed to do. Many smaller firms like Sify, Nustreet, Netmagic, etc. have come into the cloud market.

Is Cloud Computing for You?

It is very important for the organizations to understand whether cloud would be useful for them or not. Not every business will gain by adopting cloud. Philip McKinney, vice president and chief technology officer of Hewlett-Packard's Personal Systems Group provides us a framework consisting of five criteria to judge before one goes to adopt the cloud technology.

1. How Fast Is Your Business Growing?
   Hardware and software investments usually follow a stair-step pattern. Increasing investments usually lead to too much capacity. In most of the cases, cloud computing investments fall within the budget of company's expenditure. Fast growing businesses are better candidates for cloud rather than slow or seasonal demand business.
2. Where Are The Troops?
   Cloud computing offers its services 24×7. Both employees and customers can have access to information in real time anywhere on the planet. Companies having their operations at multiple locations and time zones can take huge advantage of cloud services. More widespread a business is, more helpful a cloud would be.
3. How Reliable Must Your System Be?
   A system of 99.999 % availability implies that it will be offline for 6.05 s per week, whereas a system offering 99 % availability will be offline for 1.68 h per week. The difference of 99.999 and 99 % isn't cheap. It would be eight to ten times the cost of the 99 % availability service. So here comes the decision making, the trade off between the extra cost and up-time your system must deliver to serve the customer needs. The availability of the system depends on the sector you are serving. If you are in critical sectors like health care, telecommunication or public safety industries you need to bear the extra high cost to achieve all time availability, whereas to serve the other sectors a system with 99.xx % would be enough. Another factor which needs to be considered is that overall reliability of the system doesn't depend entirely on the cloud vendor but also the network service provider. Thus it becomes important for the managers to understand their customer and business needs before going for the cloud expenses.
4. Is the Service Secure Enough?
   Cloud vendors usually share their extra server capacity with other customers. In this way a server is shared by multiple clients who might not be apt for the companies which require data security such as banking, health care, etc. This is because the data is never 100 % secure in a shared environment.

5. Good Track Record?
   Increasing buzz about the potential of cloud computing and its numerous advantages to businesses have increased the competition among cloud service providers in the market. There are 100 of cloud vendors present in the market and companies have lot of options to choose from. Many vendors are differentiating themselves from the league by launching new services like mobile marketing and social networking. But regular entrance of new players and continuous innovation leads to instability and cloud vendors lose their business for all sorts of reasons. Managers should carefully examine cloud vendors by scanning sites like cloudfail.net, which tracks data on outages and reliability for popular cloud services. The dissatisfied customers posts their views and comments on Twitter business intelligence software which could help the new customers to decide before opting for cloud services from vendors. Initially big IT companies were first to buy this software whereas small and medium sized companies took around 5 years to go for the same.

Big Steps Taken by Small Companies

Most of the cloud software products were being bought by big companies so there was hardly any need for the service providers to customize or re-engineer their products for medium and small sized players. As a result of this smaller companies could never invest in an ERP. SAP and Oracle did not get into small towns and reach out to smaller businesses. Even if these companies tried to sell their software products in smaller markets, they would fail because of their very high product costs. Karnal Agro Forging could never invest in ERP software. The company was located in a small town Karnal with a population of less than one million people. It was a 50-year-old company that makes metal parts for agricultural equipment. Then Rohit Rajpal, 28-year-old third generation family business-man took over as the executive director of manufacturing and IT department. He wanted to take the advantage of efficiency and process focus provided by ERP. And then he found the service provided by S. Parthasarthy, CEO of NuStreet. Parthasarthy also founded Aztec Software earlier, today wanted to target the small and medium sized business (SMB) sector because he believed that SMB isn't well served in terms of IT services which is in fact true. NuStreet, the Chennai based company now provides software applications to niche segments like forging, spinning, health care and manufacturing. Applications are hosted on Microsoft infrastructure to reduce the hardware cost. If the company had gone for customization for different market segments the cost would have been tremendously high including the selling expenses. But since the application is on cloud, the basic kernel of the software can be used and customized a bit according to the customers of different industries. Executive director now gets all the key business metrics in his e-mail every day by paying a monthly fee without going for a large investment in hardware. Earlier the production planning used to take a lot of time, around 15–20 days which used to be done in advance, but now can

be finished within a single day. Today Rs. 150-crore enterprise has all its 25 units linked through the cloud for effective software services. The company has been able to save 5–10 % by identifying the line-rejections. Also with the help of MIS (Management Information System) data, the flow of raw materials can be tracked and the blockage can be identified which has improved the cash flows of the company by 10 %. The profitability meter which is built in the application can easily compare the company's performance vis-a-vis industry average.

For most of the SMEs the biggest challenge is to keep their IT department staffed. For companies like Wildcraft, manufacturer of travel and adventure gear, this is a bad news. Wildcraft was cautious for many years in expanding its network because it was a self-funded company and was unsure of the way it would manage its cash operations. The company could not offer many products because it would have increased the inventory of the company. As a result it was very conservative in its approach. But after adopting the cloud-based ERP system in 2009, the company has been successful in scaling up fast. According to company's founder director, now the time taken to configure a new showroom is less than an hour. Wildcraft has been able to expand its network and increase its stores from 5 to 30 and products from 150 to 1,000 in just one and a half years of time. This has lead to a five times increase in the sales of the company. Even for extremely savvy and venture-funded companies cloud offers great benefit of speed.

redBus has pioneered online sales of bus tickets and today is the business leader in just 5 years. The company is highly tech-savvy as compared to its competitors and founders are all engineers and ex-employees of IT companies. The company migrated to Amazon's cloud service lock, stock and barrel after facing the problem of adding a new server and opening an additional hardware port. These processes took a very long time for them and they decided to switch to cloud solution. The developers of the company had to spend a long time to chase their data centre service provider even for smaller things which could otherwise be solved with less effort and time. Due to this their hardware was over-utilized and stressed during peak hours and under-utilized during normal days. During Diwali when the number of visitors on the website of the company shot up, the servers slowed down and eventually crashed. The company did not have any option but to restart everything. It caused company to lose few lakh rupees of revenues as well as their precious time and efforts required during peak demand during festive season of Diwali. But this problem got solved next year when company switched to cloud applications. Next Diwali when customers' visits increased by almost 100 %, redBus ordered extra servers in no time and served its huge traffic customers efficiently. Computing powers are bought from Amazon on an hourly basis depending on the website load. Today redBus has 35 servers to handle the bus bookings on its website during daytime and during night when visits are low the number of servers gets reduced to 20.

The volatile nature of customer demand has become a norm for many businesses today, especially the e-commerce business as that of redBus and IndiaInfoline. As a result of this, IT spending isn't able to provide the expected yield. The IT spending usually grows as a percentage of sales. During upturn the IT spending increases proportionately with the expected increased revenue however those spending aren't

justifiable during downturn few years down the line. Most of the companies aren't able to absorb the extra spending which are difficult to reduce instantly especially the hardware setups. They are not easy to get rid of. The demand cycle in IT industry is much shorter as compared to 10–12 year demand cycle of manufacturing operations. Also it is easy for manufacturing facilities to take the advantage of operating leverage and economies of scale when compared to IT firms. In case the company is not able to compensate for increased costs of offices and computers it has no other option than to lay off its employees to maintain its profitability. But with the use of cloud services these extra costs are always adjustable and it makes the investment look recovered in most of the cases. Another advantage of using cloud services is that the organizations don't have to worry about installing latest software and updates for their products. Cloud providers automatically provide the latest hardware and software updates to its clients on a regular basis.

With the IT department's ability to deliver business returns, its role in the organization also changes. They just can't be specification experts, they are expected to know more than what to buy, when to order, what forms to fill, etc. Today they are required to understand the business apart from understanding the technicalities of the business. They need to be capacity planners who can boost company volumes and find new avenues for cost reduction and improving revenues.

How Big Organizations Gel with Cloud Computing?

In the previous section we discussed the problems faced by smaller organizations and how cloud services could help them in solving them and increase their profitability. We discussed that it was easy for small companies to switch to cloud services according to their needs and boost up their revenues. But does the same condition follow for bigger players? Is the process that simple and easy for them? Let's find it out.

It's not that large companies do not wish to change and make use of cloud computing. It's just that they aren't comfortable in seeing their huge data and their computers lying on virtual platform rather than their own hardware system which they consider more secure and accessible. What if the server crashes? What if the data gets corrupt or stolen? What if the data is not accessible when required? Companies are more worried about these issues.

For example, Welspun, a textile company uses a software to collect the real-time data from shop floor directly with the help of machines. The analysis of this real-time data collected can be very useful for the company and can reveal things like the reasons for maximum rejection, the product most liked by the customer, amount of sales, inventory levels of the stores, etc. which are very essential for production planning and marketing activities of the company. These results are obtained almost instantly as soon as the data is received. If these services are deployed with the help of cloud software it could cost 30–40 % less than the traditional hardware and software support used by the company. But Welspun has gone for a mid-way solution to

tackle the problem. IT systems of the company are managed by Covacsis, which has developed the software solution for the use. Covacsis through its own small private cloud provides its services and customer support to companies like Castrol India, Grasim and Godrej along with Welspun where it has deployed its software product. Tarun Mishra, whose company Covacsis manages the facilities for Welspun and other such company says that culturally they are a control-freak population so initial apprehension for cloud is justifiable.

Now consider the case of HDFC Bank. It will move only the applications that run on the Windows platform to the cloud and critical applications such as core banking and ATM switches will work on the internal system of the bank. The CIO of the bank very well understands the cost advantages of cloud computing but thinks that the critical software which they use are currently not compatible with cloud platform. Most of the banking software especially ATM software are usually created with the help of specific hardware so that it could deliver higher performance and work with higher efficiency and reliability. When this customized software is run on other hardware their performance is severely affected. When applications are moved onto cloud platform it is difficult to maintain the exact configuration of the original hardware. In such a case organizations move less critical applications on the cloud platform and retain the critical ones within their internal system. For critical applications they would like to look at the longer time frame. A large company like HDFC having numerous customer bases will require more assurance from cloud technology vendors before they switch entirely on it.

According to Mr. Rakesh Kumar, Vice President of research firm Gartner, big software makers aren't friendly and compatible with cloud computing at the moment. Cloud applications providers like SAP and Oracle are unsure and suspicious about introducing cloud specific licensing models because they think it could cause a decline in their revenues. As a result of this when big players like HDFC Bank and Tata Steel want to switch over their applications to cloud platform their software costs largely remain unchanged. Thus there is no incentive for them to switch to cloud along with security and performance related issues. Many big companies also feel that quality assurances they get on cloud platform aren't satisfactory enough. Another reason why larger players want to own their own hardware and software systems is to avail the tax benefits which they get after charging depreciation and amortization on their tangible and non-tangible assets.

But the biggest concern which remains for larger players is security. Considering their very large scale of operations data becomes very critical for them. Their entire operations could suffer if this data is lost, not accessible at desired time or stolen. They have traditionally stored data on the internal hardware within their premises and secured them with appropriate firewalls, anti-virus software and a complete range of controls both physical and virtual. When the data is loaded on cloud there is a fear of data loss and theft. Mint newspaper once lost all the blog posts it had moved on the cloud server. Such concerns will always prevent the companies to trust cloud especially with their critical data which is the key to their day to day business operations. Besides this, cloud does not provide any mechanism for the client to see whether their data is lost or stolen. When a particular client uses less

space on the server, unused part of the machine that stored the data previously would be utilized to store the data of the other client. Another issue closely tied with the data is the fear of data being locked to the cloud provider. Availability of data 24×7 remains a critical factor for companies that have a larger customer base. "Open Cloud Manifesto" is a document which calls for open standards in cloud computing. This document ensures that customers can shift their data and applications from one cloud server to another without any hassle. The IT players such as IBM, Cisco, Jamcracker, Sybase have provided support for this document but the bigger names in cloud computing such as Amazon, Google, Microsoft and Salesforce.com are yet to furnish their support for it. The standards for cloud computing are slowly coming up and bigger players are themselves pushing for some of them. Cloud should be a combination of strengths and not a forced convergence of common subset of capabilities. It is very easy for anyone to say why the standards for cloud are not in place but one should also keep in mind the fact that cloud concepts are still in their nascent stage. It requires efforts and shift from traditional businesses the way they have looked and treated the support of IT. Today we are living in a post-PC world. The move from PC to cloud is as significant as the move from mainframe to PCs. The companies which have made huge investments in IT systems still have a long way to go. The transition is not one step rather a series of complex processes.

For a large organization the applications are customized to a great extent and data is stored at multiple locations depending on its type, criticality and requirement. Therefore the decision for them to shift to cloud is not as easy as it is for small company. The service levels of cloud computing aren't that attractive to make organizations shift to it. Large organizations have more stringent quality norms as compared to smaller players which make them more resistant to switch. Also the higher prices paid for such standards will wipe out the cost advantage of cloud computing.

In many ways cloud computing is to technology what outsourcing was to global business. The shift to cloud technology will end the role of many entities such as enterprise software vendors, hardware makers and internal IT teams in the technology value chain. But the service providers like Amazon, Google, Sify, etc. will bring in new roles in the existing value chain. Once the companies like redBus, IndiaInfoline extensively use the cloud computing and gain the market share, it would be difficult for competitors and even larger players to keep themselves away from cloud applications and ignore its tremendous potential.

Cloud Computing: Myth or Reality

Just because cloud computing is a modern concept and many are using it, management should not adopt it blindly. The IT industry has a bad habit of sinking into the buzzwords and trying to implement them everywhere in their processes. Cloud is no exception. They just want to portray that they are catching up with the latest technologies and not behind anyone in using them. To understand more about cloud

computing we start with the National Institute of Standards and Technology (NIST) definition of cloud computing published October 7, 2009:

> Cloud computing is a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction.

Cloud computing is an opportunity to build the relationship between consumers and sellers of IT. Today organizations are replacing company owned hardware and software systems with "pay per use" service models provided by other companies. Such a change will promote the growth and development of IT products in many areas and at the same time cause reduction in other areas. Similar to the evolutionary changes of IT during the last four decades, new technologies and developments initially prove to be disruptive. Hypes about them spread faster than the actual realities about them. But when the same technology is studied and understood deeply the benefits outweigh the negatives.

Cloud computing concepts have different meaning for different people. So here we are presenting five myths about the cloud concepts:

Myth one: Procurement of IT services is done most inexpensively through public cloud

Public cloud works on "pay-as-you-use" model. For example, the starting price for standard on-demand instances with the Amazon EC2 Web service is less than a dime per hour based on system size, operating system, and locale. Thus people think that public cloud delivery is cheaper than the internal IT. But this is always not the case. When the resources are required on continuous basis organizations can reduce the cost by leveraging other cloud models such as shared resources making use of private cloud. In such a case the overall cost would be even less than the "pay-as-you-use" model. A simple analogy can be drawn with an example of a buy vs. rent a car. Suppose if we require a car for short term then it would be better to rent a car and pay as per the usage, but if we require a car for long-term usage and travel more frequently, buying a car would be a better economical decision. There are many factors apart from price such as performance, security, availability, compliance, and service-level agreements, which need to be considered before bringing cloud computing into the system.

Cloud strategy is essential: It is very essential to incorporate our specific requirements into a well structured and defined cloud strategy whether we are using a public cloud service, developing our own private cloud or taking a hybrid approach. A cloud strategy must encompass all the aspects related to our security and control issues, performance and availability requirements. Therefore developing a cloud roadmap is not a simple task. Another very important question is whether to go for private cloud, public cloud or both. It has been observed that most of the organizations prefer to start with a private cloud to understand it within the confines of their own firewalls. It is a viable option to analyze our applications first and then take the cloud delivery decision. Organizations should first evaluate specific applications, consider security and compliance issues and then decide which apps would be

appropriate for a private cloud. They should also determine the apps that can be shifted immediately onto the public cloud.

In order to help organizations develop their own strategy and roadmap HP conducted a Cloud Workshop. It helped the managers to know about the key success factors and the required components for developing a cloud solution. It also helped them to understand the implications of cloud for the business and IT and build consensus among various stakeholders. It was a one-day workshop in which HP consultants used highly visual displays and discussed various topics such as cloud concepts, key technologies such as CloudSystem and their architecture, management, service portfolio, governance, financials, etc.

Myth two: baby steps in virtualization are the only way to reach the cloud

For businesses there are many good reasons to switch to virtualization technology such as improved flexibility and better utilization of existing computer resources to name a few. In transforming IT virtualization is a very powerful step however it doesn't account for the real transformation. The real transformation happens only when organizations completely encompass the cloud computing. There are many benefits of building a private cloud such as significantly lowering IT costs, reducing IT complexity, and enabling a more flexible and agile service delivery.

Virtualization and cloud computing are not mutually exclusive. Many technologies consider virtualization as a catalyst for successfully adopting the cloud computing. But private cloud in itself is a complete package that automates the underlying provisioning of infrastructure and applications. It provides a convenient way for end customers/users to request IT services. Traditional IT silos are unable to meet the growing pace of business demands because of rigidity, data centre sprawl, complexity, and costs. A private cloud that uses a shared pool of resources can help IT to keep up the business needs by automatically tapping the required resources. With the help of private cloud IT managers can use all the available assets and resources and at the same time adhere to the security standards required both within the cloud and data centre. Cloud helps to automate the processes and reduce the human involvement. Thus time consuming but important tasks such as provisioning of applications can be processed speedily. Manually it takes 3–6 months to provision the new applications or may be longer but with the help of Cloud and IT it can be finished within hours. The database and applications can be automated to save a lot of time which IT administrators spend in maintaining manually.

Thus we see that private cloud can solve lot many issues and problems. Now the question is why businesses cause delay in adopting cloud strategy and automation? The simple answer is inflexibility of organization and its people to adapt to new change. Some executives also think that the amount of work and effort required to automate will outweigh the gains achieved after automation. Sometimes they also believe that they need to first standardize their current environment to make full advantage of automation. But the fact is that the effort required to get cloud today is minimal. Companies like HP have built many automation and integration tools required for faster development of private clouds. If the organization has already adopted virtual technology it would certainly help in integrating cloud technology.

But it's not at all important to adapt to virtualization first in order to move on to cloud environment. HP CloudStart is a fast track on-ramp to the cloud. CloudStart is a turnkey HP Services solution that allows establishing an open and private cloud system. The solution is implemented within 30 days at a fixed-price and fixed-scope. Based on HP CloudSystem, a private cloud service catalogue is established by HP CloudStart services. This catalogue has up to four services integrated with the backup and security environments.

Myth three: critical applications do not belong in the cloud

One of the tasks that is assigned to cloud-based infrastructure is relegating the servers running test and development jobs. But the most important charter for IT organizations is to deliver business applications quickly and efficiently. A recent study by Forbes has shown that IT executives have following priorities:

- Deliver applications with greater speed
- Cut infrastructure costs
- Adjust their service levels to meet changing needs

With the help of cloud computing IT professionals intend to help IT executives with all the three above issues. But administrators and CIO's worry mainly about the major business critical applications such as Microsoft, SAP and Oracle. They doubt how IT can deploy these complex hardware bound entities with the help of cloud. How can cloud be configured so that these applications can run speedily, safely and most importantly securely without wasting much time and effort of the IT department? In short they worry about whether cloud would be able to handle the applications which are critical for success of the business.

HP developed Cloud Maps to answer these questions. With the help of HP Cloud Maps a comprehensive catalogue of applications can be quickly built for push-button simple deployment with HP CloudSystem. It drastically reduces the time to deliver a new application from months or weeks to few hours or even less than it. HP Cloud Maps are basically templates and additional content. This content is the result of the 1,000 of hours of research and development leading to industry-leading intellectual property. The decades of close partnerships between HP, customers and systems integrators (SIs) have also helped in developing these.

Myth four: all cloud security requirements are created equally

In a public cloud we pay only for the service delivered to us. Thus it reduces the cost of software and hardware to a great extent. Today cloud services are required for most areas of the businesses, thus IT manages it at the service level. But IT executives don't prefer the systems where data is out of their control. There are strict rules followed in organizations about handling and archiving of sensitive data. It is mainly due to compliance regulations, risks and governance to be followed. Some of the major security issues defined by Cloud Security Alliance are:

- Abuse and nefarious use of cloud computing
- Unknown risk profiles
- Account, service, and traffic hijacking

- Insecure application programming interfaces
- Data loss/leakage
- Malicious insiders
- Shared technology vulnerabilities

Fear due to continuous growth in data fudge and attack methodologies have forced IT executives to go for private cloud. They believe that in private cloud the infrastructure would be inside the company's premises, within their firewall and IT group will have direct control over it. The executives want the private cloud to have the same level of security assurance as they have on their traditional networks.

But the question is whether private cloud is impenetrable and safe? The answer is certainly no because when it is connected to internet vulnerabilities do exist. Threats such as data theft and insider attacks also exist. It requires great specialities to secure a cloud. Real expertise is required in securing the cloud. To deal with the security issues and challenges you should start with a comprehensive risk understanding and then do a thorough analysis on the same. A proper governance and a compliance and risk program must be created to solve the security concerns which would be tailored to the cloud. There is also a requirement for high-level security architecture for services based on the cloud applications.

Companies should also define additional security controls which are very important to protect the information assets in different types of cloud environments. Investments in the security must be maintained while complying with the industry norms and regulations without affecting the availability and current performance. Service Providers can help the companies in building the necessary security controls and principles and also in designing the risk mitigation strategies against the risk issues.

Myth five: there is only one way to do cloud computing

There are number of cloud delivery models available today. To name a few are public, private and hybrid. We have already discussed public and private cloud earlier. Let us now understand about the hybrid cloud. As the name suggests a hybrid cloud consists of two or more clouds. They may be private, public or community clouds. These clouds behave as unique entities but they are bounded with the help of standardized technology. This technology helps in enabling the data and application portability (e.g. cloud bursting for load-balancing between clouds).

Next generation cloud computing decisions will be more complex. They will be designed to allocate the resources across an array of predefined building blocks as per the development by the service providers. They will scale up and scale down as per the demand. To achieve this one would require a careful evaluation and analysis of the subscribers' inventory of enterprise applications so that it becomes easy to determine which applications can be moved to cloud platform easily. Also we would get an idea which cloud it should run upon (public, private or hybrid). Careful analysis of applications would make the decisions easy and clearly highlight the options for cloud delivery available with the organization.

Benefits of private cloud:

- Leverages cloud technology
- More standardization of infrastructure and business processes
- Reduce overall operational costs (OPEX)
- Improves business agility

Benefits of public cloud:

- Leverages others' infrastructure to run IT workloads
- Works on pay-as-you-go basis
- Reduces CAPEX costs

Are You Ready for the Cloud?

As we have seen there is plenty of hype about cloud computing, but its proper implementation can bring lot of benefits to an organization. Cloud applications can make a lot of sense for one's business by speeding the processes helping to increase the revenues and reduce the costs. But for a successful implementation organizations must go beyond the hypes to find the real solutions as per their requirement. Service Providers like HP and IBM have people, processes, expertise and proven track record in implementing the cloud computing platforms. They can make a real difference and provide a direct route towards the cloud applications.

Security Strategy Roadmap for Cloud Computing

One of the most important reasons why organizations fear from adopting or providing cloud services is security concern. They are inhibited by the privacy risk concerns. Organizations and management should ask themselves the following questions before starting with the cloud strategy:

- Do they understand different types of security issues and risks associated with cloud computing?
- Does the organization have a sound security system which aligns with the security concerns of the customer and the corporate?
- What would be the expenditures on security in order to optimize the cloud initiatives?

There are companies like IBM that provide cloud security consulting depending on the specific requirements of the client. IBM Professional Security Services Cloud Computing helps its clients to develop a cloud security strategy roadmap that helps to understand, establish and define the steps to achieve the security goals with respect to their cloud computing strategy. Their expertise in security areas of cloud

computing help organizations to determine their cloud computing goals and initiatives and identify the security risks and privacy issues with the help of onsite work sessions and discussions. Once the security risks and privacy issues are understood it becomes easier to design the appropriate risk mitigation strategies. Eventually it will provide a high-level security strategy roadmap for successfully achieving the cloud security requirements.

IBM Professional Security Services Cloud Computing follows the following steps in helping their clients with the cloud security solutions:

- *Provides guidance around client's cloud security and privacy concerns*: Their onsite working sessions begin with the discussions on cloud computing and the associated security issues and privacy concerns. The subject matter experts provide an overview of security risks that apply to the subscriber and providers of cloud computing application and help to assess the risks that are appropriate to their cloud initiative.
- *Determines the cloud scenarios that best meet client's business needs*: Throughout the process and work, subject matter experts are in direct contact with the client's key personnel to understand their specific cloud initiatives and goals and then outline the associated cloud deployment scenarios. Each scenario is discussed in detail and then respective security risks are identified. The identified risks are mitigated in relation to identified legal, regulatory and security requirements. To further fulfil the remaining gaps the controls for required subscriber and providers are outlined.
- *Leverage expertise to provide a high-level roadmap*: Once the high priority tasks are determined the security experts collaborate with the business people to establish the risk mitigation process. The mitigation strategies and steps are designed for effective migration to cloud computing. They work with the company people to ensure that the designed risk mitigation strategy is in line with the security objectives and goals of the organization. Documentation of discussion, decisions and actions from the working session is done which is the result of the engagement and high-level security roadmap for the client's cloud initiative.

Social Commerce

Many entrepreneurs had bloomed in the year 1999 using dot com portal. Most of them were using e-commerce to offer their products and services. These entrepreneurs wanted to follow the model of Amazon.com. New ventures like Firstandsecond.com, Sify.com, rediff.com, Fabmart, etc. started offering their services to Indian customers. Apnaloan offered its loan services through e-commerce portal instead of selling the traditional products. Shaadi.com, a matrimonial site offered matchmaking through internet. All these companies' progresses before the bubble burst for dot com portals. When NASDAQ crashed in April, 2000 investors and venture capitalists lost a huge sum of money. Private equity contributors also suffered huge losses.

It took a long time after the crash to bring back the confidence of investors and venture capitalist back into e-commerce. Hundreds of businesses closed down after the crash in 6–8 months and e-commerce business model was treated as immature. However, e-commerce revived after many months as the spirit had survived. Today many organizations are offering the products and services through internet that were earlier offered through traditional channels. Indians have become more tech-savvy and like to spend time on internet being engaged in several activities, this has given push to e-commerce trend in Indian market. A village near Hyderabad is a perfect example to this scenario. The village is around 45 min drive from the main city. The infrastructure of the village hasn't change much during last 5 years. The roads are improper, loose wires lie around everywhere, there are no new schools and hospitals built in the village. But almost in every household of the village one would find a DTH (Direct to Home) satellite TV. The customers select their preference channels and make payments as "pay per view." They order movies and shows according to their desire. And what is more surprising is that, none of them have gone to physical store to buy this DTH. They have ordered these through e-commerce and have received delivery in a span of 4–5 days. The villagers have been able to get the products at best rates sometimes even cheaper than the physical stores. Internet is ubiquitous and it is slowly changing the buying pattern of the customers. There is a huge scope for e-commerce with ever increasing usage of internet and latest technology gadgets including mobile phones, laptops, ipads, etc. E-commerce has brought a big difference in the lives of people all over the globe. It has provided a different perspective to the social lives of the customer.

Social Power and Civilization

The year 2011 was remarkable and saw the rise of social power. People of Tunisia, Egypt and Libya used Facebook and Twitter to protest against dictators and knock them down. Even in Syria public outcried using social networking sites and Syria has gone to the polls. Similar things were happening in many countries. Ordinary people used the social platforms to protest against mighty powers and bring them down to their knees.

Companies and marketers have taken full use of social power to design their products, market them and after selling get the feedback from customers to improve their products and services. Today individuals are using potential of technology and harnessing social media to design and implement their business strategies. The managers no longer take the decision alone and put them on their teams, rather they reframe and redesign their strategies and policies accordingly in line with social power. Salesforce.com became leader in selling its Customer Relationship Management (CRM) software products by using the concept of social commerce. Today leaders have to show good faith, transparency and fairness to their stakeholders, otherwise their customers and employees may not be as loyal to them as they were earlier.

Customers also post their buyer and user experience on social media platform. This could have both beneficial as well as disastrous effect. If the experience was unpleasant the potential buyer will get influenced and think twice before buying that product. However if the user experience is pleasant the same potential buyer will be influenced and might get converted into an actual buyer. Traditional companies never used this approach and will find it difficult to sustain if they ignore the potential of social media. The executives handling the traditional business will have to reorient their minds towards social media. These changes will bring a new trend for both business as well as society. The business is becoming more reflective of the choices and desires of the customers. Social power today can make or make a business model. To grow the business and move the company forward customers have become an important source for new ideas through their feedback and reviews. At the same time dissatisfied customers could cause reputation damage to the company.

In order to adapt the social commerce business model business leaders need to change. This change has to come in the form of ability to listen to customer feedback and implement it in improving the products and services. The reviews of the customers on internet must be taken seriously and should be treated as new innovative ideas which company or business could not deliver or think of. Business leaders must build the trust by showing transparency and openness to different criticisms. The more the company is open to criticism the better it will be able to solve the problems and serve its customers. This way the success achieved will be more sustainable. For example, Salesforce.com once had problem with reliability of one of their servers. Initially company did not have any discussions on it which made its customers unhappy. The customers were rather upset with this attitude. It later on turned into a public relation (PR) problem. The management then decided to come up with a website detailing all the issues related to the server. All the technical problems were discussed in detail on website and all possible information was provided before customers could complain about them. This approach reduced the anguish of the customers and helped the company built trust with their stakeholders.

Understanding Social Commerce

Social commerce is a concept in which electronic commerce is used along with social networking sites such as Facebook and Twitter to conduct business. It could be treated as a subset of electronic commerce, only difference being it involves social networking online sites. The concept involves the customers/user contribution and social interaction to help in buying and selling the products and services online. Social Commerce takes inputs from social networking sites and thus helps in increasing the online transactions. The concept describes a set of online collaborative shopping tools generated by social networking site users. These tools are picking lists, user ratings, suggestions, feedback, reviews, etc. This information is available for various products and services which have been used and experienced by users. The online shopping stores such as Amazon and Flipkart use these tools

extensively to increase their customer base. Reviews from their customers coupled with discounts and offers help them to attract more customers and improve their sales and network.

The user reviews, content and comments generated with the help of social commerce act as free advertisements for different products and services. "Word of mouth" is the best and most reliable source of information for a new customer. The varied experience of users provides a complete overview of the product and service which can help the customer to choose the best from available stock. Prospective buyers can buy these products and services online with the help of e-commerce site using these comments. In most of the cases e-commerce site is linked with the social networking site so that users can directly access them from the social networking site. Nowadays, with the increasing technology changes and advent of smart phones access to social networking sites have become much easier and faster. Subsequent to this e-commerce has become ubiquitous. The mobile software developers are coming up with new and advanced dedicated apps for both social networking and e-commerce sites which are becoming beneficial for both seller and buyer. These days one can see pre-installed apps for Facebook and Twitter built in the phone. Also apps for e-commerce sites such as Flipkart, Amazon, Quickr, and OLX are freely available on mobile phone services market. The shoppers can get advice from trusted users, search desired goods and services and purchase them with the help of collaborative e-commerce tools. Advices available on the social network have found to increase the prospective customer's trust in the buyer, product and the buying process.

The scope and area of social commerce is continuously expanding to include more social media techniques and tools with advancement of technology. Take for example, the case of movies; the number of tickets that are brought online is a direct function of the reviews put up by those who have already seen that movie. After watching movie, people rate the movie based on the experience and likeability. Some people even post their reviews regarding the various aspects of the movie such as cast, story, music, camera work, acting, etc. Thus a new person can get a lot of information about the movie and based on his interest and take his decision wisely. The content of the reviews can be read by the users at their convenience and since the same site is integrated with the e-commerce site, one can also buy the tickets instantly, saving both time, effort and in some case even money through discount offers provided by service provider.

The difference between "social commerce" and "social shopping" is that social commerce is a collaborative network of online participants (which include vendors, users, etc.) for business whereas social shopping is mainly collaborative activity of online shoppers without involving the vendor or the seller. Each industry has varied usability of social commerce. In apparel, automobile and electronic industry e-commerce sites have taken comments generated by the users seriously. These reviews have proven to affect the topline of companies in a broad way. These comments provide credibility to the e-commerce site and are generally authenticated. Let us consider automobile industry, the websites such as carwale.com, cardekho.com have reviewed each and every comment on their website for different models

of car manufacturers. These comments have been used extensively by OEM's (Original Equipment Manufacturers) to improve their product features and at the same time improve service levels in the supply chain. These sites use various techniques such as user recommendations and referrals, customer ratings and reviews, social communities and forums, shopping tools and social advertisements.

How Has Social Commerce Evolved Over a Period of Time?

Social commerce has basically evolved from e-commerce and growing with the help of social networking websites like Facebook and the upcoming social shopping websites. Facebook itself has given birth to F-commerce which is gaining prominence among suppliers, customers and retailers. Retailers are busy developing their own Facebook page to promote and grow their business. They are developing applications for their page to help customers with their buying decisions. They are enabling the purchase of product and services at the same place. In short, it is the concept of buying at the same place and at the same time.

Social commerce has found its place in virtual marketplace through social shopping websites after its advent through social networking sites. One example of social shopping website is Stylehive (http://www.stylehive.com). This site is a perfect combination of online shopping business model and social networking. Using this site a shopper can browse through various products and services offered by the company, compare their prices, read reviews posted by the users, interact with other buyers, check best sellers list and finally make a purchase decision.

According to industry reports on Generation Y, 60 % of people take help of social media to associate with brands and their respective business. More than 50 % of people feel that blogs, Facebook posts and comments, and related online media affect their views and purchase decisions about the products and services. Websites are influential in nurturing the sentiments of the Generation Y like brick-and-mortar stores.

Features of Social Commerce

User reviews and ratings are in great demand from customers of social shopping stores. Highly sophisticated recommendation technology has been implemented on shopping and social networking websites through which customers get access to the reviews and product ratings . With the help of this information customers are not only able to make more informed decision for them but also switch to a brand offering the same product at a lower price. Based on the interest, actions on the web and preferences the customers get product recommendation. According to a study conducted by Brand Reputation, more than 80 % of the customers check online reviews about the product or service before purchasing them. This shows the growing importance of social commerce in today's technology enabled world.

Majority of social media networks have large number of members who are potential content generators and a repository of data and information. These networked users help in generating new ideas, advertising, creating added value without any cost, identifying prospective customers. They increase business efficiency by understanding customer needs in a better way and thereby developing customer loyalty. To exploit the power of such networking, Volkswagen recently launched an ad campaign on YouTube. The ad campaign majorly focussed on ecological concerns. The main agenda of the campaign was to encourage users to develop innovative solutions for the changing environment and share them. VW utilized these newly generated ideas by customers and incorporated them in their own ads, thus delivering a creation by a customer to a customer, a unique way to reach out to prospective customers in one of the most efficient ways.

The above approach adopted by VW illustrates the importance and value of social media presence around us. In order to provide up-to-date information to consumers effectively MIS (Management Information System) plays a critical role. Also in order to generate that up-to-date information, inputs from customers and users are required. These inputs (both objective and subjective) are gathered with the help of feedback, reviews and rating obtained from the users. Thus, we see that real-time data capture becomes essential and critical for implementation. This is achieved with the help of irreplaceable option of Information Systems.

The Facebook "Like" Button on the Product's Web Page

Facebook "Like" button directly represents the liking of the user for a particular brand or product. When users visit the page of a particular brand or a product, they can represent their liking by clicking on the "Like" button. In this way brands and companies can promote their products in an almost cost free manner.

Social networking sites like Facebook helps e-commerce websites in three ways:

1. *Better Understanding of the Consumer's behaviour*:
   After integrating the Facebook "Like" button on product and brand pages and analyzing them companies can know their popularity. The product having the maximum number of likes will be more profitable as compared to the product having minimum likes. In this way, number of likes helps in immediate understanding of the customer's preferences. By interpreting these numbers companies can do an alpha or beta testing of their products without actually developing or producing the product. Trial costs for products are almost nil in such as cases which otherwise would have required huge amount of investment in terms of money, time and efforts. They can understand the response and behaviour of customer for their future products and can plan their actual production, marketing and selling depending on the demand visualized by the analysis of number of likes.

2. *Instant Personalization of the user experience*:
   The Facebook "Like" button is integrated with tools like "Facebook Instant Personalization pilot" program which enables personalization of visitor's experience by using their public information available on their Facebook profile.
3. *Brand Growth*:
   The brands and the products are easily able to expand their reach to a large customer base with the help of social networking sites without much investment of money, time and effort. Reaching out to a large section of customer also helps them in garnering visibility on various fronts which ensures the product's success and sustained brand growth and development.

Advantages of Social Commerce

Social Commerce provides a unique personalized shopping experience to a shopper. Customers can get lot of information about the products and services by reading reviews and feedback of the past users. Reviews and ratings on social networking websites are very closely monitored so that customers can rely on the available information to make their buying decisions. Social commerce also provides a platform where customers can interact with both seller as well as past consumers. At the same time customers also provide inputs to company by generating new ideas and mentioning their preferences which help the company to improve their products and services. The retailers have access to customer's interests and social graph on social networking sites which can help them in developing promotional strategies and plans. Through these plans and strategies they can better suit to the interests and preference of the customer and satisfy them in a more efficient way. By positioning their offerings retailers can also attract prospective customers. Social Commerce provides an opportunity for customers to interact with online retailers and at the same time network with other customers by creating a direct contact with "Communities." In this way consumers can exchange reviews about the products they wish to purchase or have already purchased so that others can benefit from the same.

Building trust is more important in case of intangible products (which can be touched, seen or felt). Such products can only be viewed online and researched extensively to ensure buying. Social commerce helps in creating a trusted environment under these scenarios. Today technology is providing an immersive shopping environment along with great usability which makes the customer experience a seamless process. Right from providing the content from company, product reviews from past users, various payment options, to final purchase by the customer, the entire buying process has become easy and user friendly. Word of mouth publicity is the most influential factor to improve the promotional strategies for products/services. The social networking site also provides real-time feedback. With social commerce, retailers are able to receive customer feedback instantly and at the same time manage them in few minutes. Retail brands can react according to the

customer's requirement since they have real time and instant access to the consumer behaviour. Retailers ensure that the products they are offering turn out to be most relevant for their consumer base. They can also analyze the weaknesses of their products and provide better products and services to their customer in future.

Pitfalls

By implementing right strategy, social commerce connects social media investment with new revenue sources. The key challenge that remains is to recognize and apply appropriate techniques to establish that connection and integrate them with suitable marketing, communication strategies and most importantly the business. If the key challenge is fulfilled, a right creative user experience will be generated.

Some of the trends and the challenges of social commerce are as follows:

Moving Away from the Traditional Media

Social media is the mother of all communication tools. It provides a platform to businesses to not only know the customer's reviews but also engage with them, thus strengthening the buyer–seller relationship. In order to make efficient use of that platform companies need to adapt the culture existing in social media. They need to design their strategies, user communication which fits the members of social media. However, social media will not change businesses on its own. The businesses will have to think in line with the concept of social media and make best possible use of the opportunities provided by it. The critical challenge which remains is the generation of new ideas and unique ways to engage customers with the business.

Offering a United Shopping Experience

Social media is transformed into e-retail sites through social commerce. E-retail sites are also complemented by functionality of e-commerce. In most of the cases it is seen that businesses are able to use either of the functionalities but not both simultaneously. This is the point where businesses lose out to make full utilization of social commerce. Funkrush is an example of business having both F-store integrated with its e-shop. Businesses have been also looking for newer platforms such as Tumblr and YouTube to promote their offerings in the market and attract more customers. Multi-channel shoppers incur over 80 % extra cost for each new transaction when compared to a shopper who shop in store. Retailers also face the task of minimizing the cost in such a limited customer's experience. This challenge could be solved with the help of single login which would prove out to be a great customer service in terms of speedy checkout and personalized payment portal.

Privacy

There is no doubt in the fact that social media provides great offers and exciting new things to customers continuously. But it should be noted that constantly changing privacy policies and sharing settings have forced social media users to rethink about openly sharing their views on the social websites. Customers are not willing to share their review, likes and dislikes openly since they expect some privacy to be maintained while their personal information and choices are shared freely in public domain. In a recent study it was found that more than 70 % of the social networking site users (18–29 years of age) are reconsidering their privacy and sharing settings and are trying to limit the content which they are sharing online. The latest hacking scandals and accidental leakage of credit card numbers involving the top businesses like McDonald's and MasterCard have increased the customer's concern over safety and security of their personal data. With more and more businesses come into this field the personal data of customer is bound to become more vulnerable and the key challenge for any company is to develop a robust security model which could prevent the data theft and develop a long lasting trust and retain it among the users. One way to achieve this is to make customers understand the privacy policies and issues and ways to handle them. A well written privacy policy easily understood by the user will make them aware about the concerns and built a trust which would motivate them to share their data and content on the public domain.

Customer Engagement

With continuously expanding social network it is very important for the companies and their brands to find new ideas and ways to create a direct connection with their customers. They need to rise above the common chaos and ensure that there exists a direct interaction with the customers. The ever increasing number of social networking sites will confuse both customers as well as e-retailers. Customers will be unable to distinguish between numerous offerings and at the same time e-retailers will be unable to offer differentiated offerings to its customers. With so many options available it will require a large amount of time for a customer to compare the prices, feature, availability, etc. of products and increase the overall effort in making their buying decision. Thus it is essential for businesses to select social media platforms judiciously and use only those which best suit their purpose and customer base.

Some other key issues which need attention:

- Most of the social commerce sites integrate the payment gateway on the social media network itself to ease out the payment process for the customer. Thus the users who would like to buy the product are redirected to the website of the company to complete the purchase process.

- Buyers want a separate and secure payment network for purchasing the product. The privacy policy of the social sites like Facebook is not strong enough to convince buyers to make their payment directly on the social network.
- Tools and applications of social commerce change rapidly with the changing interest of the people. Thus investment in engaging customers through social commerce could be risky. Earlier to Facebook, sites like MySpace, Orkut were very popular but are seen nowhere in today's race. Thus being informed about the latest requirements and changes in customer interest is crucial.
- There are lot of intangible hidden costs involved in online selling unlike direct selling. It takes a long time to develop trust and relationship with the customer and sustaining it. A strong relationship and trust may be difficult to develop as there is no direct or one to one connection with the customer. Therefore one time selling may be easier through lucrative offer and promotion but retaining the customer might be a difficult task.
- It is much easier for the consumer to express his regret or dissatisfaction from the product or service being offered by the company. They have powerful tools in their hands like Twitter and YouTube to express their disappointment which could impact the brand's reputation in a negative way.

How to Address These Pitfalls?

The issues discussed above must be sorted at strategic level. While designing the social networking website these challenges must be kept in mind to efficiently integrate social media with e-commerce. While designing, following points must be kept in mind:

1. Facilitation of planning and control
2. Minimization of information redundancy
3. Integration of processes
4. Efficient metrics
5. Personalization/customization
6. Feedback

A complete shopping experience can be created for a customer by combining social networking, online transactions and virtual marketplace business models by integrating various processes. Security measures are taken with the help of firewalls, anti-virus and antispyware software, intrusion detection system, digital certificates, encryptions mechanisms and rigorous software testing and metrics. A variety of data privacy mechanisms are available on social networking and social shopping sites which can help users to manage their privacy settings. Information Systems (IS) available on these websites have been programmed in such a way that provide flexibility to user in terms of demographics, availability of personal information, areas of interest and updates. Social commerce websites can reach out to right

customers at right time and place with the help of customization through various processes in information system. For effective advertising, websites like Stylehive and Facebook have customized the processes. IS, thus helps in developing a personalized marketing strategy for enhanced customer engagement.

Future of Social Commerce

So far from our discussion in this chapter it can be easily believed that social commerce has tremendous potential in becoming one of the primary revenue generating sources in near future. Currently the social commerce platforms used on websites like Facebook are effective only in impulse purchase. However if a proper balance between data privacy policies and providing right information to advertisers is maintained, social commerce can prove out to be the next best thing for businesses in this world of digitization.

Another shortcoming prevalent in social commerce platform is the absence of B2B transactions which are generally high volume and specific business related transactions. Currently social networking and social shopping websites are limited to B2C transactions, thus providing immense potential for business to business dealings through social media and e-commerce.

Chapter 4
Cloud Computing Strategy

Learning Objectives

- When should a company adopt cloud computing
- Cloud strategy framework
- Cloud architecture design principles
- Cloud risk management

Introduction

IndiaInfoline (www.indiainfoline.com) is a brokerage firm dealing with retail and corporate brokerages. It has also operations in consumer lending apart from realty and wealth management. The challenge faced by the organization is variable demand, spike in volumes and online security issues. The firm wanted to concentrate in its core business and reduce effort, time and investment in technology infrastructure. The CIO was asked to devise a strategy that will reduce spending on IT while all transactions will be carried out with the help of technology. This will help in consistency and predictability in performance. The CIO adopted cloud strategy. He managed to reduce IndiaInfoline's annual IT costs by a factor of five in a time span of 12 months. During the same period the company's revenues increased 36 %. This means not only the cloud strategy supported business growth, it also reduced spending on technology. They are, if you allow for a little exaggeration, much like commodity traders. They scour for events when the need for computing power will surge and buy it just before the spike.

For instance, the day Coal India (www.coalindia.in) listed on the stock exchanges in India, the number of transactions done through IndiaInfoline jumped up 60 %. The IT team managed the surge in volume through cloud strategy. The day was uneventful because the IT department had already obtained virtual computers to take care of surge in volumes. And once the surge was over, all those computers

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were decommissioned without incurring any further costs. Muralikrishna K., the head of Infosys' Communications and Computers division, manages projects executed by more than 150,000 employees throughout the world. These employees are engaged in around 7,500 projects running on any given day at Infosys. Using Global Delivery Model, the company delivers projects to clients across the world. Being bound by rules and regulations of Software Technology Park of India, Infosys can buy hardware after bagging a project, which means it cannot forecast its hardware requirements well in advance. I there are many orders "software park," the company was bound by rules that allowed it to procure hardware only when projects arrived, he says.

> Today, using cloud computing technologies, Infosys can set up to 100 servers for a new project within 30 min. Back in its data centre, Muralikrishna can fit 800 "virtual servers" in the space that would have been occupied by a 165-L refrigerator. "New projects would take up to 6 weeks to start. Now we can do it in just 30 min," he says. This is just a glimpse of the potential cloud computing holds.

Cloud computing helps you to buy computing power the way you buy electricity. Today nobody manufactures their own electricity, but chooses to use from different options depending on their requirements. Cloud computing promises to get rid organizations of their needs to buy physical hardware, expensive software and spend money on cumbersome storage. Organizations can buy the computing power they need by paying appropriate rental fee. If early signs are any indication, cloud computing holds the potential to allow rapid changes to their business model, deliver cost savings and change the way IT functions in organizations. Companies such as IndiaInfoline, Infosys, Tata Motors, ESPN-Star, Schiller Corp and Mahindra Renault are using it to reduce either their IT hardware costs or software costs.

The Future

With the changing market dynamics, companies now need to have agility to serve their customers. Earlier, the firms could manage with longer lead time for acquiring customers, but now it has gone down drastically. Using cloud computing the companies can get these customers to their fold faster than they were able to do that earlier. Today, Google claims that "it has signed up over two million enterprise customers." This has been possible because of several Google applications. Google encourages several professional developers to partner with Google. Using these Google Apps platform, about 100,000 enterprises (businesses, educational institutions and NGOs) in India alone have become its customer. The business models of companies like www. Salesforce.com and Microsoft (www.microsoft.com) encourage open source, collaborations and virtual installations of software. This implies that software like Office 365 can be used by users without installing them on their hard drives. This gives the users to pay only for the amount of usage rather than paying for number of licenses purchased. This approach could hasten the process of acquiring more customers as well as get other companies as their partners.

www.Salesforce.com has 87,200 customers globally using 240,000 applications. It has number of customers in third world countries including India. In India, it has a variety of customers spread across small and medium enterprises (SME). This gives credential to the fact that cloud computing can be used by SMEs. As far as big firms are concerned, www.salesforce.com has customers such as Janalakshmi Financial Services, Bajaj Finance, Su-Kam and Tulip Telecom.

Microsoft launched cloud computing solutions named Azure in India. It used several collaborators such as professional developers and independent software vendors. These collaborators were connected to a network using virtual forums such as chat room, webinars, etc. Using these collaborations, Microsoft managed 6,000 apps to be developed on this platform within a short span of 15 months. Microsoft would have taken years together to develop all these applications through its own resources (personnel) employed in its Development Centres. As a result, after launch of this service, Microsoft has acquired 600 customers within 9 months. As the broadband and IT infrastructure becomes much more reliable, one expects to see the cloud computing more popular. In a survey conducted by Zinnov Consulting (http://www.zinnov.com/), CIOs discussed adaptability of cloud computing in small and medium enterprises. The survey says that by 2015, 40 % of respondents plan to spend at least 5 % of the their IT budget on cloud and 21 % expect to spend close to 10 % of their IT budget on this new technology trend.

> You should be able to Increase and decrease IT infrastructure and you should be able to pay for only what you use
>
> —Sharad Sanghi, CEO, Netmagic

We are witness to a strong trend in technology—cloud computing. It is predicted (Gartner report on technology trend) that for the next 5 years, it will be cloud computing that will dominate decisions related to different business models. This is because of ever increasing infrastructure investment in all the economies (both developing and developed countries). This has helped in greater presence of internet resulting in creation of a global computing grid. This grid is available all the time, "always-on," affordable and easy to use. There could be initial inhibitions related to adopting cloud computing as a technology strategy. But as the benefits of the cloud computing impact all the stakeholders, it will make a big change in the entire infrastructure network. For example, in a traditional business model, infrastructure needs to be bought well in advance and with a plan for future growth. Plant, machinery and even IT systems have to be bought in advance. The problem with the approach is that, in case the business does not take off as initially planned, we can't get rid of infrastructure if we don't need it. Capital-raising has to be done at the initial stage. Increasing or decreasing debt in favour of equity always needs forward planning and involvement of professionals from investment banks. If the business goes through a variable demand, then it would be difficult to retrench and hire people at will. Cloud computing strategy takes care of this variable demand. With cloud computing, IT costs can be adjusted on demand. Thus, there is a business case for cloud computing. A firm should be able to increase and decrease IT infrastructure and pay for only what it uses.

According to Zinnov's survey, over the next 5 years, more than 40 % Indian companies will move email, enterprise software and customer relationship management software to the cloud. They have already started investing in buying computing power or virtual servers, just the way IndiaInfoline (www.indiainfoline.com) does. The paradoxical thing about the cloud is that it is small companies rather than the big companies that are investing in it. Since the big tech companies have not done what mobile companies like Airtel or FMCG companies like HUL have done, which evolve business models to target the price sensitive mass market, it has allowed a host of smaller technology firms like Netmagic, Sify, Nustreet, Affordable Business Solutions and even Amazon to move into this market. Considering the big ticket IT investments that Indian companies have made in the last 15 years, this approach will make their operations more efficient. It started with the enterprise resource planning software (ERP) implementation in cloud. Later on salesforce.com used cloud computing to attract customers to its customer relationship software.

Cloud Computing Readiness

Cloud computing strategy has many advantages, but the firm must be ready to adopt it. Whether to be or not to be in cloud computing is a question that every CEO needs an answer. Cloud computing reduces the cost of investment and increases operational efficiency; this happens because the firms can engage its human resources to its core business areas. As a result, small and medium enterprises can get a head start in their business operations. However, not every business needs to operate "in the cloud." Before one makes the move, consider these five criteria. (These five criteria have been given by Philip McKinney, vice president and chief technology officer of Hewlett-Packard's Personal Systems Group.)

Growth of Business

Investments in hardware and software typically follow a stair-step pattern. Incremental outlays often lead to too much capacity. Cloud computing can more smoothly match technology expenditures with a company's natural trajectory. Fast-growers tend to be good candidates for the cloud, as are those with choppy or seasonal demand.

Geographical spread of business

Cloud services, by definition, are available 24 × 7. That gives employees and customers access to information from anywhere and in real time—a huge advantage for companies with operations in different locations and in multiple time zones. The more spread out a business is, the more the cloud can help.

Service-Level Agreement

This is a typical decision between control vs. cost. If the customers demand a high level of reliability in the system, then a judicious decision needs to be taken. For example, a system boasting 99.999 % availability means that it will be offline just 6.05 s per week, while one offering mere 99 % availability will be down 1.68 h per week. Those three extra 9 s don't come cheap—perhaps 8–10 times more than cut-rate 99 % service—so be honest about how much up-time your system must deliver to meet your customers' needs. (If you're not in the health care, telecommunication or public safety industries, 99.95 % should do.) Also keep in mind that overall reliability depends not just on the cloud vendor but also on the network provider. Beware: Neither cloud vendors nor broadband providers will race to take ownership of your system's reliability.

Security

Some cloud vendors share their servers with other customers—that may not be a good fit for companies in regulated industries, such as health care and banking, as data are never 100 % secured in a shared environment. A hybrid approach for cloud can make a positive impact on the business.

Vendor Reliability

There are now 100 of cloud vendors to choose from. Many are launching new services, like mobile marketing and social networking, to separate them from others. But lots of new players and incessant innovation also invite instability, and cloud vendors go out of business for all sorts of reasons. Learn the credibility of a vendor by looking at data such as data on outages and reliability for popular cloud services. Also several sites will have complaints from the customers which will be recorded. These will help to determine which vendor to choose from and determine their credibility.

Change in Business Model

ERP implementation was beyond the reach of many small and medium enterprises because this would mean high cost of purchase, implementation, training and time required to implement were high (often more than 15 months). As big companies were customers, there was little need for software companies to redesign their products for the smaller companies. This is one reason why Karnal Agro Forging (a small unit in Karnal, Haryana, India, does not have a website of its own) could never invest in an ERP. Located in Karnal, where the population is less than one million people, it isn't really where the big names of the world (such as SAP,

ORACLE, etc.) would look for customers. This is so because their costs would be too high for this small company that makes metal parts for agricultural equipment. These businesses need a different business model.

Parthasarathy, who earlier founded Aztec Software & Technology Services Ltd. (http://www.aztec.soft.net), targets the SME sector, which isn't well-served in terms of IT offerings. So, Chennai-based *Nu Street Technologies* (*website* : www.nustreet.com) builds applications for niches like spinning, forging, manufacturing and healthcare sectors, and hosts them on Microsoft platform based cloud infrastructure. This helps in reducing its own hardware cost. In a conventional software scenario, the cost of customization and selling it to different market segments would have increased the cost of implementation. But because the application is in the cloud, he can use the basic kernel of the software, customize it a little bit and offer it to customers of different industries.

Using cloud computing, an executive can get key business metrics in his email every day. This he can get for a monthly fee and no upfront investment. Earlier, the production planning needed to be done 15–20 days in advance, now he can do it in a day. Typically a firm now can have all its 25 units in enterprise linked through the cloud. The company can now identify reasons for line rejections, which has led to 5–10 % savings. Secondly, due to MIS (management information system) data, an executive can find out where the raw material is getting blocked, which has led to 10 % improvement in work in progress, which has resulted improved cash flow. Moreover, due to the dashboard in the application, he is able to benchmark his company's performance against the industry average every month.

For many small- and medium-sized companies the big challenge is keeping their investment of resources (money, time and human) in IT department small. This will help them to focus on their core business. "We've got clients whose entire IT departments have been wiped out in one shot from just one headhunter who comes calling," says Srikant Rao, CEO of Affordable Business Solutions (http://www.abs.in), a Bangalore-based company that develops customized cloud-based ERP solutions for SMEs.

This is also encouraging for a company like Wildcraft (http://www.wildcraft.in), a maker of travel and adventure gear. A self-funded company, Wildcraft was for many years wary of expanding its store network because the company was unsure how well it could manage its cash operations. It was also very conservative with the number of products it offered because it felt its inventory would get too unwieldy. But since adopting the cloud-based ERP in April 2009, the company has been able to scale up fast. Siddharth Sood, one of the company's founder-directors, says, "It now takes me less than an hour to configure a new showroom." Wildcraft has expanded its stores from 5 to 30, and products from 150 to 1,000 in 18 months, leading to a fivefold increase in sales.

Even for companies that are extremely savvy and venture-funded, the cloud offers the great advantage of speed. redBus (http://redbus.in) is a 5-year-old company (established in 2008) that pioneered online sales of bus tickets and is today the leader in that field. It is much more technology-savvy than most companies its size.

The founders are all engineers and ex-employees of IT companies. Yet in March 2013 they migrated to Amazon's cloud service offerings. The database and business logic have moved to Amazon's cloud services. This helped them to reduce time for adding a new server during peak load. This they learnt the hard way after they had serious challenges with time required to do things like adding a new server or simply open an additional hardware port. Charan Padmaraju, its co-founder and CTO, says as a result, his developers spent hours chasing up with their data centre service provider for even minor things. The result was their hardware was either stressed out during spikes and under-utilized during average days. "Last Diwali as the visitors to our website shot up, our servers slowed down before finally crashing. We were completely helpless and had no option but to restart everything. We must have lost a few lakh rupees because of that," says CEO Phanin-dra Sama. In contrast, this Diwali, as customer visits increased by 100 %, redBus simply ordered extra servers that were just "clicks away," says Sama. Today redBus buys computing on an hourly basis from Amazon. During the day it has 35 servers to handle the booking load. At night there are only 20 servers in existence. "We just de-commission other machines during the night," says Sama.

Variable Demand

The volatile nature of customer demands (such as sudden spurt in demand during festive season and no or less demand during other seasons) is seen more often today. The experience of redBus or IndiaInfoline is a reality for many retail businesses today (which has Business To Customer, B2C models). This is also the reason that investment in IT spending doesn't make business cases that used to be earlier; this sort of paybacks that CIOs often used to present their CEOs. In 2005, IndiaInfoline's technology spending was about 4–5 % of total sales. That's a very normal level. Then as the bull market gathered momentum, trading volumes increased. Annual IT spends shot up to 7–8 % of total sales. "It was considered okay because conventional wisdom had it that in 3 years you recover your money," says Bannerjee. During the economy slow down, the trading volumes dropped fast but more importantly, revenues dropped even faster. IT Investments made during the peak period did not yield payback. "Our business is not like steel where the demand cycle is 10–12 years. It is much, much shorter," says Bannerjee. So what does a company do when it can't let go of office space or computers? In order to survive, the firm starts reducing staff size. It lets its people go to reduce costs and maintain profitability. However, with cloud computing strategy, this situation is avoidable or has a minimum impact. With the cloud, since all these costs are truly adjustable, it means the investment is always recovered. "Plus, I always have the latest IT hardware running and the latest version of the software running," says Bannerjee.

Role of CIO in Cloud Computing

With the CIO's ability to deliver business returns, his role in the organization is all set to change. That is best seen in the way other staff in the IT department functions. Earlier employees from IT department were technical specification experts. Their knowledge was limited to different processors, ports in computers, etc. They were also experts in knowing when to order, what forms to be filled to get approvals. With cloud computing, technical people can understand their business better. This helps to plan for capacity planning and capacity utilization. It isn't as if large companies don't see these changes. It is just that large organizations aren't sure about wanting to see their data, their computers all in a virtual form. What if the Internet crashes? What if the data gets stolen? Consider the case of Welspun (http://www.welspun.com/), a textile company. It uses software to collect real-time shop floor data directly from machines. The analysis of this data can reveal things like the top five reasons causing maximum rejection in the last 30 min, and this happens instantly. This software could cost 30 % less if deployed in the cloud. But Welspun has opted for an in-between method. Its IT systems are leveraged by Covacsis (http://www.covacsis.com/en/), which has developed the software solution, for deployment. Through its own private cloud, Covacsis provides customer support not only to Welspun but to other companies like Castrol India, Grasim and Godrej where it has deployed its software product.

The decision to adopt cloud computing strategy depends on the culture of the organization. If the company has a control-freak culture, apprehension for cloud is understandable. This strategy implies that cloud strategy has to be well thought of and both cloud strategy as well as cloud architecture need to be aligned with business goals. This chapter deals with design of cloud strategy framework and cloud architecture. Both these designs need to be enabling business at strategic, functional and operational levels. For example, for HDFC Bank (http://www.hdfcbank.com), it has moved all the applications, that are run on Windows platform, to cloud computing. These applications are payroll, Human Resource Information System, infrastructure management applications, that are resource intensive, require constant updating and are maintained by outside vendors (not by its IT employees). However, applications that require sensitive data to be stored, such as core banking and ATM switches' software will remain inside its premises. This means that the cost advantages of the cloud are well understood but depending on the criticality of the software being used, one needs to weigh between options of cost and control. If there is a mission-critical software that is being used or if there is a proprietary software that needs to be employed, then it doesn't take to the cloud as of now. Similar views have been echoed by several CIOs.

Most banking software, or for that matter ATM software, is usually created around specific hardware for high performance. The performance of such software suffers severely when put on any other type of hardware. Hence, if these software are put on cloud computing then it is hard to control the exact configuration of hardware. So HDFC Bank is planning to move its less critical applications on the cloud

while business sensitive applications requiring special hardware will continue to be installed in its premises. "For the more critical applications, we will have to look at a longer time frame," says Jaggia. A large company like HDFC Bank will need more assurances from its technology vendors before it does that.

However, the industry still wants to wait and watch. Many big IT service providers aren't very cloud friendly at the moment; this is per an analyst from the research firm Gartner (http://www.gartner.com). Firms like SAP and Oracle are wary of introducing cloud-specific licensing models because they're afraid that their revenues will dip. As a result, when a company like HDFC Bank or Tata Steel wants to shift its enterprise applications to the cloud, it does not find the proposition to be attractive. Many large companies also say that the service-level agreements and quality of service commitments that they get on cloud platforms aren't good enough. In addition, it is true that large enterprises prefer to have their own hardware and software so as to claim tax (depreciation) benefits.

The biggest concern for effective cloud computing strategy is data security. Companies have traditionally stored data on the hardware in their premises and secured them with firewalls, anti-virus software and a range of controls—physical and virtual. When the data moves to cloud there is a fear of data loss (e.g. in October, *Mint* newspaper (http://www.livemint.com/) lost all the blog posts it had hosted on a cloud server), and indeed data were stolen. Besides, cloud does not offer customers the satisfaction of seeing data destruction. (No optical disk gets shredded, for example.) When you use less data, the part of the machine that stored your data simply goes to someone else. Another aspect closely tied to data is the fear of getting locked to a cloud provider. "Open Cloud Manifesto," a document calling for open standards in cloud computing, so that customers can move data and applications from one cloud to another easily, seems to have enlisted support from a range of IT players such as IBM and Cisco, etc. But not everyone has joined the coalition; Amazon, Google, Microsoft and Salesforce.com are missing from the coalition. This implies that guidelines and standards for cloud computing are coming up, which will improve predictability and standardization. In cloud computing, interpretability of clouds is essential but it "should be a combination of strengths, not a forced convergence of common subset of capabilities." This will help increase the flexibility and make it trust worthy.

It's easy to see why standards are not in place. Cloud computing is still in a nascent stage. It demands a fundamental shift in the way businesses have looked at IT. The move from premises based storage to cloud computing is as significant as the move from Mainframe to PCs. Moving to cloud computing will require transition and proper risk management strategy. For a large enterprise, with its applications customized extensively, it becomes difficult to change the attitude. The attitude and corresponding change management need to be addressed as sense of lack of ownership, loss of control would be difficult to overcome. If the company has a distributed network and data reside in different places, the decision is not easy to move to cloud computing. In a way this transition is similar to moving to PC based network from mainframe based network. The transition from legacy system to PC

based infrastructure had several pain points and it took quite sometime before standardization could happen. We see a similar mindset and attitude problems with respect to transition to cloud computing.

If the existing legacy systems make it difficult for them to move, the benefits of cloud computing are not reaped completely because of less than attractive service levels. Large companies have much more stringent quality norms than smaller companies and they find that the higher price they pay for such standards wipes out the cost advantages. The enterprise-level service levels that large companies seek also tend to be 25–30 % more expensive than what cloud computing vendors can provide. In many ways cloud computing is to technology what outsourcing was to global business. This shift, though inevitable, will upend many entities in the technology value chain—enterprise software vendors, hardware makers and internal IT teams. This shift in strategy not only needs to be aligned with business model, but also requires a shift in mindset. Once companies like Indiafoline, redBus or even Welspun use this technology trend to gain market share, it would be hard for peers to keep the cloud at bay. Probably what Robert De Niro said in Cape Fear "You can run, but you can't hide!" Cloud could be inevitable in long run.

Criteria for Moving to Cloud

We have discussed benefits of cloud computing in great depth; in this section we discuss on competencies required for cloud. As many organizations think that cloud is going to be their priority, there are many research findings which tells us widening gap between demand and supply of cloud skills. Apart from other factors cloud computing skills shortage is going to prevent the growth and adoption unless we do something immediately.

To uncover this, the following section describes different competencies and skills that are required to move to cloud computing. This will help in reducing the gap in preparedness and will help moving the enterprise to manage transition. There is a huge opportunity to train the workforce and become ready to tap the megatrend. The competencies are discussed below.

Cloud Technical

This consists of understanding of technical aspects of virtualization and management of cloud lifecycle. Conducting due diligence for cloud to identify candidates for public and private cloud and how cloud should be implemented is something which cloud specialists must understand. It also includes monitoring, service management and SLA management over cloud, which is different from traditional approaches.

Partner Management

This will be required for certain types of cloud. The firm needs to manage its relationship with its cloud provider. It will not be a short-term relationship and has to be managed with perfection so that the service does not face challenges. This will be required for both supplier and consumer as the heartburns of moving to cloud needs to be addressed through proper understanding as the failure of relationship will have catastrophic impact.

Demand Management

This is needed for consumers of service as commoditization of IT resources will convert them as demand managers where they need to understand the business demand and channelize it to right provider.

Contract Management

You will have to understand contracts better once you lose control over in-house capabilities. This is something which will keep you in control on your various providers through your deep understanding of what you have contracted. Inability to manage contracts will keep you in sticky wicket and create issues with relationships. While I do not advocate using contract for managing relationship but is an important piece of control and guidance.

Cloud Financials

Understanding cloud financials is important and one must learn how to compute the costs and savings when you move to cloud.

Negotiation

This is necessary because cloud providers tend to give an impression that their services are not negotiable and it is at times very difficult. Traditional vendor management skills may not create a breakthrough result as cloud negotiations are different and it requires deeper negotiations. We have to revisit our skills of negotiations under the changed circumstances of commoditization and consumerization. The negotiations will happen internally as well as externally as you release control over the IT.

Governance

Mostly an afterthought in the entire process of cloud, a good cloud governance leads to successful and satisfied customer and provider of service. Failure to govern will generate myths, which will lead to resistance to change elsewhere. It should incorporate management forums, reporting and MIS, service delivery management, etc. I advocate setting up of "Cloud Management Office" and executive committees of different levels with your cloud provider. This should also have understanding of audits and compliances over cloud.

Today's CIOs and business leaders from industry and governments around the globe are challenged to stay competitive and meet business objectives. Aligning the enterprise IT model with the business, controlling costs and keeping pace with the rapid rate of innovation are critical. The reasons cited are compelling. Early adopters of cloud computing have already realized significant benefits, including:

- Reducing IT labour cost by up to 50 % in configuration, operations, management and monitoring.
- Reducing server and application provisioning cycle times from weeks to minutes.
- Improving quality.
- Eliminating up to 30 % of software defects.
- Lowering end-user IT support costs by up to 40 %.

With the growing adoption of cloud computing there has been a concurrent growth in the number and variety of vendors in the marketplace with cloud offerings. These providers range from established IT industry leaders like IBM to software as a service vendors leveraging cloud computing to broaden their scope—Salesforce.com, for example—to players leveraging other domain expertise or partnerships to enter the cloud arena, such as Amazon, Google, Cisco and VMware, along with numerous telecommunications and hosting service providers.

The more crowded this marketplace becomes, the more challenging it is for CIOs to select the right cloud vendor to meet the organization's needs. And as the applications deployed on private or public clouds move up the value chain and into the enterprise computing realm, the stakes increase as well—with selection criteria shifting from an emphasis on price to considerations such as security, reliability, scalability, control and tooling, and a trusted vendor relationship.

Cloud Architecture

Cloud computing can potentially be a disruptive change to the way an enterprise's IT services are delivered. We propose that before making a transition to cloud computing strategy, the firm needs to follow a framework that will reduce the chances of error. This framework will also help in minimizing risks involved in the switch to cloud computing. By examining a firm's present business model, the cloud solution

provider's reference architecture should also be examined as a foundation for transition. Cloud computing must be enabled with effective security, resiliency, service management, governance, business planning and technology lifecycle management. These are the components of an effective and comprehensive cloud architecture that will enable the enterprise to control the environment more effectively, optimize productivity, reduce associated labour costs and ensure safe environment for business users. By delivering best practices in a standardized, methodical way, this reference architecture ensures consistency and quality across.

Cloud architecture should be:

- Based on open standards.
- Delivers robust security, governance, compliance and privacy capabilities.
- Combines powerful automation and services management (low touch) with rich business management functions for fully integrated, top-to-bottom management of cloud infrastructure and cloud services.
- Supports the full spectrum of cloud service models, including infrastructure as a service (IaaS), platform as a service (PaaS), software as a service (SaaS) and business process as a service (BPaaS).
- Enables the flexible scaling and resiliency required for successful cloud economics and ROI.
- Facilitates seamless integration into existing customers' environments based on industry-leading expertise with SOA for building services and service-oriented architectures.

This architecture provides specifications not only for the physical components of a cloud implementation (network, compute, storage, virtualization), but as importantly for the software components required to run operational and business management processes. It also defines governance policies tailored for the environment or organization (Fig. 4.1).

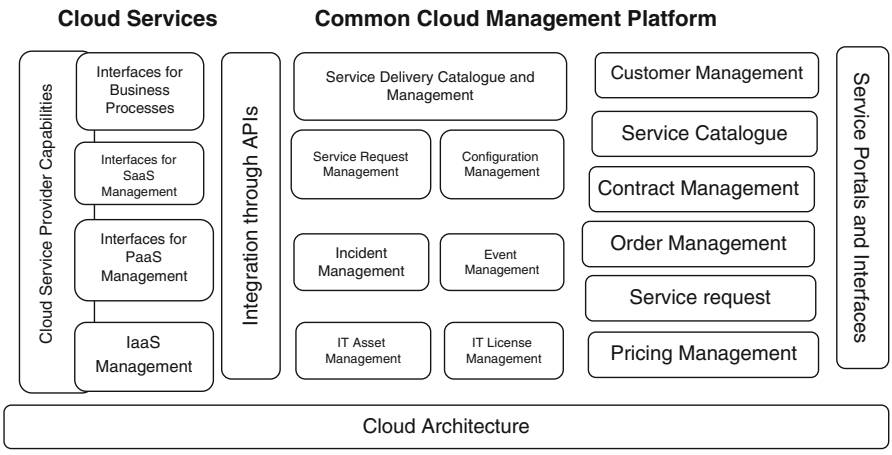

Fig. 4.1 Cloud architecture

Principles Guiding Cloud Architecture Decisions

An architectural principle is an overarching guideline or paradigm driving decisions across the entire architecture development process. There are three established principles that guide cloud architects in defining the detailed components of each module

Efficiency principle. Design for cloud-scale efficiencies and time-to-deliver/time-to-change metrics when realizing cloud characteristics such as elasticity, self-service access and flexible sourcing. Objective: drive down costs per service instance hour and time to response by orders of magnitude.

Lightweight principle. Support lean and lightweight service management policies, processes and technologies with an eliminate-standardize-optimize evolutionary approach. Objective: radical exploitation of standardization in cloud environments to reduce management costs.

Economies-of-scale principle. Identify and leverage commonality in cloud service design. Objective: Optimize sharing of management components and infrastructure across cloud services to reduce capital expense, operating expense and time to market.

Cloud reference architecture addresses the three major roles in any cloud computing environment: cloud service provider (CSP), cloud service creator and cloud service consumer. With this strict separation of concerns, the cloud architecture enables specific perspectives to be assumed in order to understand the requirements, expectations and value propositions placed upon the system, and the supporting capabilities necessary to fulfil these requirements:

- From the service consumer's perspective, a simplified interface is needed with well-understood service offerings, pricing and contracts. The value proposition for the service consumer is to get fast, on-demand access to the service they need while only paying for the period of time the service is used.
- From the service provider's perspective, a highly efficient service delivery and service support infrastructure and organization are needed in order to provide differentiated, well-understood, standardized and high-quality services to end users. Service management makes it possible for significant economies of scale to be achieved. A self-service portal allows exposing a well defined set of services in a highly automated fashion at a very attractive cost point.
- From the service creator's perspective, a tooling environment is needed for modelling and assembling service elements (virtual images, for example) as well as an effective means of managing the service lifecycle.

Components of Cloud Architecture

Cloud reference architecture, security, resiliency, performance and consumability underpin all other service provider components: the common cloud management platform, the cloud services layer and the physical infrastructure layer. This approach

is critical to maintaining consistency in how various non-functional requirements are executed at each of these other layers of the architecture. For example, if a security policy at the highest level defines that customer information cannot leave the country, then at the lower level of physical resources, disk space must be allocated only in the country where the data originates.

The key security focus areas for the cloud services layer include:

- Federated identity, authorization and entitlements.
- Audit and compliance reporting.
- Intrusion detection and prevention.
- Secure separation of subscriber domains.
- Secure integration with existing enterprise security infrastructure.

Managing Cloud Services

Increasing Transparency Through Cloud Services and Architecture

Well-designed cloud architectures and solutions must address the difficult realities of "layers of complexity" in distributed IT environments. While much industry discussion has focused on infrastructure (network, compute, storage), significant challenges also exist in achieving the low touch automation required to successfully scale to economically successful cloud solutions. Masking complexity for users, supporting cloud business models and managing heterogeneous, distributed environments are the top service management challenges for any cloud architecture.

Enabling the Business Side of the Cloud Services Paradigm

Cloud services represent any type of IT capability that is offered by the CSP to cloud service consumers. Typical categories of cloud services are infrastructure, platform, software or business process services. In contrast to traditional IT services, cloud services have attributes associated with cloud computing, such as a pay-per-use model, self-service acquisition of services, flexible scaling, and sharing of underlying IT resources.

Open, Vendor-Neutral Approach

The infrastructure layer of the cloud reference architecture comprises all hardware infrastructure elements needed to provide cloud services. This includes facilities as well as the server, storage and network resources and how those resources are deployed and connected within a data centre. It is important to note that in a true cloud environment, significant engineering and thinking must be invested for selecting and deploying these infrastructure elements to achieve minimal costs in

combination with optimal performance, scalability, security and resiliency. A key factor to consider in evaluating a cloud reference architecture is how these typically virtualized resources will be managed. As a vendor designing, implementing or managing private cloud implementations for customers—either on premises or outsourced—the architecture should be vendor and technology neutral. This approach means that IT organizations have greater flexibility in repurposing existing physical server, storage and network resources for use in a cloud environment.

Benchmarking Against Standards

In evaluating vendors for enterprise-class cloud solutions, consider also the way a vendor's reference architecture supports the tools that service creators and service consumers use to develop and integrate cloud services. Some cloud platforms are highly proprietary, and in turn require developers to use proprietary tools and develop to proprietary standards, resulting in high switching costs to move logic, data or applications from one CSP to another.

The reference architecture builds on existing SOA reference architecture standards and defines open standards support for several categories of tools used by service creators and service consumers.

These include:

Service creation tools: Service creation tools are used to create new cloud services. These include tools for developing runtime components, such as virtual machine images or SaaS applications, as well as tools supporting the development of cloud service-specific management configurations and artefacts for all OSS and BSS components. These configurations and artefacts define how the CCMP OSS and BSS functionality is used in the context of the respective cloud service.

Service integration tools: It is important for customers to be able to integrate cloud services with in-house IT. This functionality is specifically relevant in the context of hybrid clouds, where seamless integrated management and usage of different cloud services and in-house IT is critical.

Cloud reference architecture framework:

This section describes the step-by-step approach that will lead to better utilization of cloud services, seamless integration of different services. This leads to better customer services, higher business benefits for the end users. The reference architecture supports the detailed design of the cloud solution in three major steps:

1. Define the requirements (both functional and non-functional) for the cloud implementation by leveraging and extending the defined roles, use cases and non-functional requirements from the reference architecture. Furthermore, the reference architecture defines a step-by-step process for creating new cloud services as the basis for capturing requirements associated with each new service that the cloud implementation will deliver. Finally, the reference architecture provides the considerations for the consumability of the cloud services that can be used to impose further requirements on the implementation.

2. The logical design of the cloud solution can be derived from the detailed architecture overview provided by the reference architecture. The architect/designer can choose from existing solution patterns to guide the design, choose the applicable architectural components that are needed to support the requirements, and choose the appropriate products to implement the components.
3. The physical design of the cloud solution defines the details of the implementation. The first step is to choose the detailed components and nodes from those defined in the reference architecture that will form the basis of the implementation. These are augmented with the definition of the service flows (derived from those provided by the reference architecture) of the automated management processes. The final step is to layout the details of the solution deployment, including nodes, networking and topologies. The above design approach is further supported by the reference architecture through the definition of applicable architectural decisions, standards and detailed technical domains (e.g. scalability and performance) that can be used to guide the solution design and implementation details. Note that the reference architecture provides this support in terms of documented work products that cover each of the areas discussed above, and is consistent with the solution design methodology. Please see Fig. 4.2 for components of cloud management.

Thus, cloud reference architecture should have a comprehensive set of cloud capabilities:

- Technology, tools, and skilled resources to help clients plan, build and deliver cloud services. CLOUD ARCHITECTURE provides clear economic value and helps the client work through the right mix of delivery models and choices by workload to reap the maximum benefit.
- *A proven*, *common architecture* for the design, build and management of all services across the CLOUD ARCHITECTURE portfolio, including the cloud environment. The CLOUD architecture captures the aggregate experience of 100 of CLOUD ARCHITECTURE experts in building cloud environments and service-oriented architectures, across all divisions specializing in hardware, software, service management, research, and security.
- *Unequalled experience and expertise* with hybrid cloud solutions.
- *Global relevance*. CLOUD ARCHITECTURE has partners, delivery centres, and a worldwide network of partners in 174 countries. CLOUD ARCHITECTURE also has the experience of running a globally integrated enterprise and understands what it takes to make a global company run.
- *IT flexibility*. Easy connectivity across a wide infrastructure and ecosystem of partners.
- *Robust and secure cloud solutions* based on the demanding needs for clear visibility of assets, complex data governance, and security and resilience of the solution.
- *Simplicity of design*. From sourcing to usage to maintenance, CLOUD ARCHITECTURE cloud solutions are designed to be simple, intuitive and based on how people actually work.

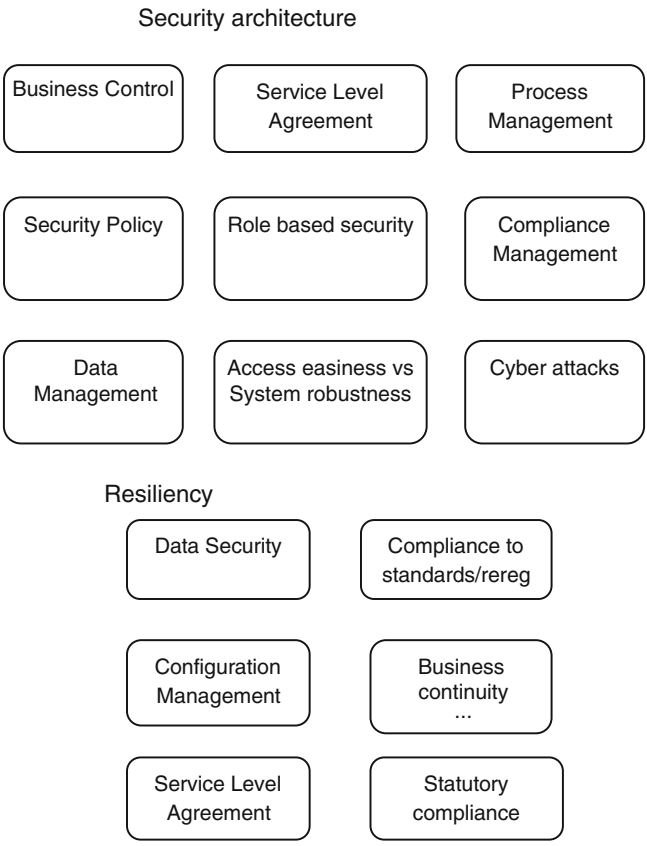

Fig. 4.2 Cloud security and resiliency architecture components

- *Open standards*. CLOUD ARCHITECTURE has taken a leadership role in developing standards for cloud computing built on current architecture, industry and open standards, including SOA, assuring consistency and compatibility across all cloud platforms.

Types of Cloud Services

Infrastructure cloud services ("infrastructure as a service" or IaaS)—The capability provided to the consumer is to provision processing, storage, networks, and other fundamental computing resources where the consumer is able to deploy and run arbitrary software, which can include operating systems and applications. The consumer does not manage or control the underlying cloud infrastructure but has control over operating systems, storage, deployed applications, and possibly limited control of select networking components (e.g. host firewalls).

Platform cloud services ("platform as a service" or PaaS)—The capability provided to the consumer is to deploy onto the cloud infrastructure consumer-created or acquired applications created using programming languages and tools supported by the provider. The consumer does not manage or control the underlying cloud infrastructure including network, servers, operating systems, or storage, but has control over the deployed applications and possibly application hosting environment configurations.

Application cloud services ("software as a service" or SaaS)—The capability provided to the consumer is to use the provider's applications running on a cloud infrastructure. The applications are accessible from various client devices through a thin client interface such as a web browser (e.g. web-based email). The consumer does not manage or control the underlying cloud infrastructure including network, servers, operating systems, storage, or even individual application capabilities, with the possible exception of limited user-specific application configuration settings.

Business process cloud services ("business process as a service" or BPaaS)—Business process services are any business process (horizontal or vertical) delivered through the cloud service model (multitenant, self-service provisioning, elastic scaling and usage metering or pricing) via the Internet with access via web-centric interfaces and exploiting web-oriented cloud architecture. The BPaaS provider is responsible for the related business function(s).

The reference architecture includes a detailed component model that:

- Defines each component and sub-component, including how the components are different from the traditional enterprise IT management scope.
- Incorporates industry standards, including ITIL-based best practices for service management.
- Provides product-neutral guidance (specification) on how each functional component should be scoped and realized to support cloud-scale efficiencies and costs.
- Details the relationships and dependencies between individual components, including diagrams and textual descriptions of component interfaces.

Public PaaS, for a variety of reasons, is not accessible to a majority of enterprise IT use cases. PaaS, however, provides significant value ranging from the automation of typically mundane and long running tasks such as application deployment, to providing a foundational architecture for guest application scalability. The ability to deploy a PaaS within your enterprise IT infrastructure, a "private PaaS", allows for your enterprise developers to access PaaS value without the accessibility problems of public PaaS. By deploying a private PaaS and moving current and future custom applications to the private PaaS, your enterprise IT organization will experience significant value including:

- Faster time to market: Private PaaS provides for a self-service utility model that allows you to upload your compiled code and in a button click, "publish" it. Never configure an application or server again.
- Deploy apps in minutes rather than weeks or months.

- Increased Agility: Leveraging private PaaS simplifies application deployment and management, and increases developer productivity through shared services.
- Reduced Costs: Private PaaS allows for greatly improved infrastructure utilization, removes human configuration tasks where appropriate, and provides self-service interfaces.
- Reduced Complexity: Private PaaS simplifies ongoing application management by abstracting applications away from infrastructure and enforcing a common, inheritable architecture.
- Streamlined Application Management: Private PaaS enables you to manage all of your applications from a central place and never worry about being outside the bounds of IT governance.

The prospect of leverage cloud architectures like PaaS within the enterprise IT infrastructure provides a "best of both worlds" outcome: significant cloud-based improvements in the enterprise IT experience without the adoption hurdles associated with public PaaS.

Cloud Architecture

The sea change of the past decade in enterprise IT has been driven by SOA and virtualization. These technologies have brought tremendous value to numerous organizations, solving problems related to agility and complexity. SOA has fulfiled the promise of a proper, reusable architecture pattern, and virtualization has delivered a clean, flexible approach to managing unwieldy infrastructure requirements. As with any technology, however, neither has provided a panacea to all that ails enterprise IT strategies. Please refer to Fig. 4.2 for cloud resilience components:

Significant issues still exist, ranging from how custom applications are architected and written by enterprise software developers all the way through cumbersome deployment and management processes that can typically delay releasing a new custom application by 30–45 days. Enterprise IT has not realized the vision of rapid development, deployment, and management of new applications, nor has it pushed the envelope with respect to driving cost down and efficiency up.

The era of cloud computing, and in particular of PaaS, which will be described a bit later, has been touted as the newest in technology shifts that promise to revolutionize enterprise IT. Cloud computing will undoubtedly drive agility and cost savings to new heights. Today, enterprise software developers can write applications using traditional programming languages and modern architecture patterns, and deploy those applications in the cloud to a public PaaS. In addition to providing commoditized platform services (e.g. caching), the PaaS model allows enterprise software developers to bypass internal infrastructure and to avoid becoming entangled in the cumbersome internal procedures required to deploy and manage their newly developed app.

While the promise of public PaaS is appealing, for a variety of reasons ranging from security to performance, a majority of enterprise use cases cannot leverage

public PaaS. This poses a problem. A PaaS, as an operational layer in a computing infrastructure, provides tremendous value–with or without the "outsourced IT" provided by a public option–but is typically tightly coupled to a public deployment model where a third party both built and operates the PaaS. This tight coupling is awkward and counter-productive. Assuming that a PaaS software layer must be coupled to a public context in order to provide value is a fallacy that we readily dismiss in analogous scenarios.

For example, the non-motorized bus (as in the road vehicle that carries multiple passengers) was first put into use by Blaise Pascal in 1662 to support a public mass transit line. Although the bus was first deployed to support public transit by Pascal, the utility and value of the bus, namely the ability to amortize transport costs across many individuals, goes well beyond public transit. Modern motorized buses are used by private agencies including private charter companies, police departments, tourism agencies, sports teams and many more. To state that PaaS is valuable only in its public form factor is akin to stating the bus is valuable only in the context of public mass transit: clearly a broken world view. The analogy is not attempting to discredit public mass transit, but only to highlight the tremendous value of the bus in general.

This brings us to the vital question for enterprises: how can enterprise IT secure the value of PaaS without the adoption friction inherent in public offerings? These are the questions that they need to answer:

1. The concept of a private PaaS.
2. Why the software layer that enables PaaS and not the outsourcing function provided by the public form factor is the primary value driver.
3. Advantages of deploying a private PaaS.
4. How Apprenda is designed as a "plug and play" private PaaS for custom Microsoft .NET web and SOA applications.

The book does not intend to prove that private cloud or public cloud is better. Rather, it illustrates that the software technologies to enable public cloud, and specifically public PaaS, are extremely useful in the private context, and provide significant ROI on their own. This section describes different components in cloud management and their role in cloud computing strategy. Please see Fig. 4.3. Interactions between different components in cloud management are described.

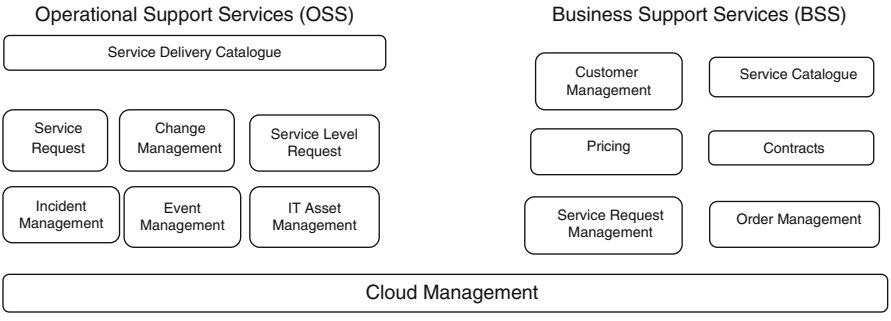

Fig. 4.3 Cloud management

Understanding Private Platform as a Service

PaaS is best and most simply defined as the application container at the centre of a revolutionary approach to computing platforms where a full stack–data centre, OS, runtime, and deployment mechanics–are offered as a service. This means that application developers can write apps that conform to the PaaS's standards, and deploy them to the PaaS with the click of a button. The PaaS depicts a majority of the heavy lifting related to deployment, configuration, and even scaling of a web or SOA application. It also exposes complex workflows associated with application deployment and management to developers through web portals and/or application programming interface (API) calls (described in detail later in this whitepaper). PaaS accomplishes this by abstracting away any number of server, OS, and networking components like load balancers into a single resource pool that can be co-habited by multiple "guest applications." In a PaaS, the application components are the first class citizens, while server infrastructure and OS images are merely commodity resources. This is in stark contrast to the current application delivery model where infrastructure and virtual machines (VMs) are the first class citizens in a network, with applications as secondary and subservient to the constraints of the infrastructure.

More advanced PaaS offerings may go beyond simply deploying and managing guest applications, and may also take a critical role in the application execution by routing trac and even managing memory. Additionally, a PaaS may wrap guest applications with developer operations workflows such as lifecycle management, scale-out capability, and identity management, and may cover cross-cutting services such as caching via an API. Conceptually, this is not much different than traditional application servers—think of PaaS as the application server for the cloud era.

PaaS is typically deployed in a "public" fashion, meaning that a PaaS provider deals with both the PaaS and operates the underlying infrastructure; the entire service is accessible in an "outsourced" fashion to other organizations. While this form factor is good for small development shops, some independent software vendors, and for a number of enterprise use cases, it by no means addresses all, or even a majority of, the needs of enterprise IT. In enterprise IT, there are a myriad of use cases that call for keeping applications behind the firewall, where leveraging a public PaaS is not an option. Constraints such as SLA requirements, latency, regulatory concerns, risk management, and co-located integrations and data access are real concerns that might prevent an enterprise from leveraging public PaaS.

Cloud-Ready Network Architecture

We are at a critical inflection point in the cloud evolution. Enterprise clients are now moving from "sandbox" projects to full-scale production of important IT and business services. The market forecast bears this out: cloud revenue is expected to grow almost five times faster than traditional IT. According to IDC, worldwide revenue from public IT cloud services is expected to exceed $55 billion in 2014, a compound annual growth rate of 27 % from $16 billion in 2009. Traditional IT product

revenue is projected to grow 5 % in the same period.1Cloud solutions should deliver deep insight, breakthrough technologies, and cloud services squarely focused on the enterprise to provide for clear progression paths to achieve long-term and sustained value. Simply stated, cloud describes an architecture in which the servers and networks in the data centre can rapidly respond to changing demands, by quickly scaling compute capacity and connecting that server capacity where it is needed. The technology underlying this fluidity is server virtualization, which by now has been established as a reliable and essential core technology for most data centres. Cloud architectures are being massively deployed in today's data centres because they offer unprecedented flexibility, scalability, and cost-effectiveness. The cloud's advantages are critical to many Wall Street firms, which have implemented cloud computing to help them innovate and compete more successfully. Fortune 500 enterprises are also using cloud computing to scale application capacity in response to changing business conditions. Instead of waiting for servers to be delivered, installed, and provisioned, cloud computing lets administrators increase capacity simply by making selections on a control screen.

At the other end of the spectrum, smaller businesses are turning to cloud computing to accomplish more work with limited budgets, using virtualization to squeeze out optimal efficiency from their server and network investments. Regardless of the size of the data centre, it is critical that improvements to the network infrastructure are put in place to enable the benefits of the new flexible server capacity. Data centre administrators that hope to realize similar benefits from cloud computing should consider three network fundamentals when building a cloud-ready network infrastructure:

- *Compute elements*—the rapid growth of virtualization technology has helped data centre managers use server resources more efficiently. Today, virtualization can provide even greater benefits when it is used to support virtual machine mobility. The ability to establish and move virtual machines around the network quickly and automatically lets data centres add application capacity and support dynamic business requirements quickly.
- *Connectivity fabric*—a feature-rich fabric that connects the compute elements with high bandwidth and low latency is critical to cloud computing. Features should support capabilities such as disaster recovery, provisioning, and load balancing.
- *Orchestration*—as the data centre becomes more complex and takes advantage of more technology, integrated management tools become increasingly important—especially as activity scales. Many early adopters and technology experts expect to see data centres scaling to 10 of 1,000 of servers using cloud computing. Supporting this environment will require data centre administrators to manage policies; service-level agreements; and network, application, and storage traffic from any location in the cloud today, and between clouds in the future.

As data centre administrators address these areas and begin to implement cloud computing, they will need to understand the new demands that a dynamic, cloud-enabled infrastructure will place on the network. One of the most significant

challenges will therefore be how to best execute the networking layer that is the heart of the cloud.

Cloud-enabled data centres place higher technical demands on the network in areas such as speed, flexibility, cost-effective operation, and scalability. From a business perspective, a viable network architecture for today's cloud computing applications should also support incremental deployment that does not require razing an existing facility and building a new one. And as new pieces of the cloud are fitted into place, IT managers do not want to be locked into a single-vendor implementation for any aspect of the solution. They want the freedom to select best-in-class hardware and software components. To meet the technical and business requirements of cloud computing, the networking layer of a cloud must offer

- High bandwidth with low latency.
- Converged communications and storage.
- Agile networks for mobile virtual machines.
- Scalable management tools.
- Power efficiency.

High Bandwidth with Low Latency

In the past, adding bandwidth meant adding more Gigabit Ethernet (GbE) connections. Today, the rapidly rising server utilization and network traffic levels fuelled by technology advances such as multicore processors, virtualization, and the convergence of storage and data networks have made that strategy impractical. Scaling the number of GbE connections to the levels necessary for cloud computing would be too costly and require too many ports to manage efficiently. With 10 GbE now a viable technology, and low-latency 10 GbE switches available for less than $500 per port, cloud computing becomes a realistic alternative. A network architecture suitable for cloud computing can be practical for users and profitable for service providers if they offer 10 GbE performance and low latency to support high application performance and server utilization.

Converged Communications and Storage

One of the main advantages of cloud computing is the ability to carry massive amounts of data. Managing and maintaining separate local area network (LAN) and storage area network (SAN) infrastructures for such vast quantities of data make little sense when today's converged networks can provide sufficient performance and scalability. Therefore, convergence will be vital to building, maintaining, and managing a cloud computing infrastructure cost-effectively. And with the availability of network attached storage (NAS), Internet small computer system interface (iSCSI), and Fibre Channel over Ethernet (FCoE), that network is certain to be Ethernet. Also vital, FCoE must be deployed with lossless characteristics to ensure that storage traffic is delivered reliably and in a timely manner. A lossless implementation also adds the benefit of increasing TCP/IP traffic efficiency.

Agile Networks for Mobile Virtual Machines

One of the main advantages of cloud computing is on-demand access to resources. Virtualization plays a key role in providing those resources. The advantage of on-demand resources can be greatly magnified with the ability to move virtual machines between physical servers while applications continue to run. An infrastructure with mobile, active virtual machines can respond to new requirements much more quickly and cost-effectively. Cloud computing users can gain even greater advantages from mobile virtual machines when they can be moved not only within a cloud, but over greater distances to connect multiple clouds. Movement between clouds enables applications such as disaster recovery and data replication.

Moving running virtual machines has traditionally been a complex task because of the time-consuming requirements of moving the network-level policies associated with each virtual machine to its new location. These policies govern factors such as security and Quality of Service (QoS). The policies differ based on the users and applications, making their movement with the virtual machine critical. Without a virtualization-aware network, moving policies along with virtual machines requires extensive manual configuration and carries a significant opportunity for misconfiguration and security breaches if not implemented correctly. In the fluid cloud environment, administrators need tools that can manage mobile virtual machines with their associated policies, and scale to potentially 10 of 1,000 of physical servers. Such tools and the ability to automate mobile virtual machine management will be critical to administrator productivity.

Scalable Management Tools

Outside the realm of virtual machine management, administrators also need basic management tools that can scale to cloud computing proportions. Server-by-server management is simply not practical when a network is handling a trillion packets per second. All management tools must be scalable and replicable to minimize administrator effort. Real-time metrics, ready navigation through logical resource groupings, and the ability to drilldown to see problem areas quickly are important features of managing cloud computing networks.

Power efficiency

Power and cooling are some of the biggest expenses facing data centre managers today. New environmental mandates, combined with rising energy costs and demand, are forcing administrators to focus on green initiatives. A common estimate for data centre cooling and distribution costs is 2 W for every watt consumed by data centre equipment—so choosing the most power-efficient network components is essential. As clouds expand to 1,000 of servers and beyond, per-component power savings will be magnified into vital budget reductions.

Case Study: Maharashtra Government Shows Power of Cloud with Savings of Rs. 50 Crore

Maharashtra's (It is a state in India) IT Secretary Rajesh Aggarwal, the key driving force behind MahaGov Cloud, is showing other government departments, on how the cloud can be a real transformational force within the government. Virtual machines customized to your requirement for a measly Rs. 4,000 per month; ability to kick start projects quickly and a massive ROI of Rs. 50 crore—this is just a glimpse of the potential of a technology like cloud computing for the Government. Led by an aggressive IT secretary in Rajesh Aggarwal, the Maharashtra government is showing other departments what one can achieve if technology is leveraged to its optimum. Called MahaGov Cloud—a private cloud setup by DIT, Government of Maharashtra, the initiative seeks to provide IaaS, PaaS and SaaS cloud services to various departments in Government of Maharashtra. Led by a passionate and enthusiastic IT secretary, Rajesh Aggarwal, the initiative has quietly transformed the way IT services are provisioned by the government. Today, the MahaGov Cloud has been implemented in the State. The list of departments which use the cloud include departments like Public Health Dept., Mhada, DIT, Charity Commissioner, Textile, Law and Judiciary, Water Supply and Sanitation, IGRO, Food and Drugs, School Education, Social Justice, Relief and Rehabilitation, Forest Department, Rojgarvahini, Tribal, Bombay High court, UID, Solapur University, Sales Tax Department and CIDCO.

Our objective was to reduce the cost of providing IT services, while increasing the capacity of our IT team to kickstart projects with maximum flexibility and scalability. The cloud has already delivered approximate savings of Rs. 50 crore on a conservative basis, and has given us the ability to accelerate projects of national importance," says Maharashtra IT secretary, Rajesh Aggarwal. The Maharashtra SDC happens to be the first State Data Center (SDC) in the country to have a fully operational government cloud. It is also the only SDC in India to be a member of APNIC, making it vendor independent for internet bandwidth.

During implementation of MH-SDC, the State had conceptualized on implementing virtualization for efficient utilization of the infrastructure in SDC. Accordingly, a PoC on virtualization using VMWare and Microsoft Hyper V was started in November 2011 leading to implementation of fully operational cloud by May 2012. To avoid dependence on a particular technology, MahaGov Cloud works on Microsoft as well as VMware. The VMware cloud has been chosen for critical applications, for now. Around 350 VMs were deployed in just 3 months as part of the MahaGov Cloud on Vmware.

Due to template and clone features, the time to provision a server along with OS and database has been reduced tremendously. Using feature of thin provision of storage and memory, resources are efficiently utilized and allocated as per the requirement and performance. The department is also taking advantage of features like live migration has helped the SDC team to manage planned maintenance without requiring any downtime of the application. The entire management and

monitoring of cloud can be done using a dashboard with appropriate alerts and reports. To encourage adoption, the team is also conducting a series of awareness sessions on cloud for sharing knowledge.

Chargeback Model: A First in the Government

What's also noteworthy and unique about the MahGov Cloud initiative is the fact that the department has in a first created a comprehensive rate chart for availing cloud services. Departments can pick and choose IT components as per their requirement. Departments can also access a self-provisioning portal for cloud. To encourage adoption, initially, cloud services are being offered for free to all departments.

> "We want to make the cloud self-sustainable. Based on initial capital and maintenance costs, we have devised a chargeback and metering mechanism. Some departments are being served dummy bills so that they know how much is actually provisioned and consumed by them in the SDC. We are encouraging departments to host their applications on our SDC. The rate card has acted as a counterforce for containing costs and has also contributed in stabilizing and putting an upper cap for prices of standard services," says Aggarwal.

Everything as a Service

Having established the cloud as a basic platform, Maharashtra's IT secretary is now experimenting with all possible options. Besides providing IaaS, PaaS and SaaS on a monthly basis, the department is offering Business Intelligence tools as a Service (BIaaS), GIS thematic map as a Service (GISaaS), API as a service and Survey as a Service and Authentication as a service.

> "We want to provide every possible combination for government departments. Many senior government executives now carry iPads, and we want to encourage them to start experimenting with data by providing them with an interface to analyze using what-if-scenarios. We have a vision that all departments, commissionerates and organizations within Maharashtra should be able to use business intelligence reports and dashboards to perform analysis to get meaningful and actionable information," states Aggarwal.

For example, dashboards have been created for tracking UID enrolment and comparison of enrolment data with Census data. The dashboards enable key insights into demographic profile of enrolled residents and also into the process and performance of enrolment. The state government has also implemented a tablet based application for conducting audit of UID enrolment centres and has made it available to other states over cloud. Dashboards have also been created for the transaction details of service delivery through Citizen Service Centers. Some interesting observations and information from the analysis of this data is currently being investigated to understand patterns of consumption of services across the state.

The GIS as a service has been rolled out to encourage and enable all departments to subscribe and avail the benefits of GIS. The future roadmap for GIS includes

mapping of electricity metres in each household of Maharashtra and UID integration of the household data. Once the basic household data is mapped, and UID based integration is achieved, GIS would become the common platform for delivery of services and benefits across several schemes and programs.

The Opportunity to Accelerate

Apart from the huge cost savings, the real benefit is the opportunity to accelerate. Aggarwal gives the example of a department which had a project cost of Rs. 20 crore, and would have required a timeframe of 6–7 months to setup the infrastructure. "We showed the department that by hosting the applications on our cloud, the department could reduce the significantly reduce the cost and accelerate the project. We reduced the cost from Rs. 20 crore to Rs. 5 crore and enabled the department to go live quickly. In many cases, if a project is started quickly, the effect can be transformational," opines Aggarwal. The Maharashtra government's approach and aggressive embracement of cloud technologies is a superb case to showcase how a technology like cloud can be fully leveraged to bring about large scale transformation. If other state governments start going on the cloud path, the journey towards transformation of India will be faster and much more efficient.

ta Centre and is extensively used by departments for website and application hosting.

> The cloud has already delivered approximate savings of Rs. 50 crore on a conservative basis, and has given us the ability to accelerate projects of national importance

Risk Management in Cloud Computing

As more companies move operations to the cloud, the unique risk management issues that accompany data are a growing concern. A recent SearchCompliance. com survey found that almost 40 % of respondents expected their spending on cloud security products to increase in the first half of 2013.

To alleviate these problems, organizations need to ask the right questions of cloud providers and prepare their own governance, risk and compliance processes for the cloud. This handbook offers detailed risk management advice for organizations pursuing cloud computing arrangements.

In "Risk Management Frameworks for Cloud Security," Eric Holmquist lists several readily available risk management frameworks that can be applied to cloud computing, and spells out the 20 questions that should be asked of every cloud provider. In our second article, consultant Ed Moyle looks at how to create harmony between the compliance and information security functions, two sometimes-contentious groups that must be able to work together to ensure a successful cloud deployment.

And finally, SearchCIO.com features writer Karen Goulart examines cloud provider service-level agreements and provides real-world examples of how IT leaders across the country use SLAs to protect their security and compliance processes when using the cloud.

We hope this information helps ease the transition as your organization moves data storage and other business processes to the cloud.

Companies looking to expand their infrastructure capabilities are increasingly turning to cloud-based solutions for remote hosting, colocation data centres or full infrastructure outsourcing. CSPs have proven to be a very cost-effective, highly efficient resource for businesses of all sizes, and confidence is growing that the cloud can be an effective way to host data and applications, as well as reduce key infrastructure costs.

But as CSPs continue to evolve, so, too, does the related security infrastructure required to ensure that client data remains safely segregated and accessible only to authorized users.

The key to managing cloud computing information security is to understand that it cannot be managed using an 80/20 rule—that is, mitigating the obvious risks and then dealing with the rest as it occurs. Unlike other forms of operational risks, this is an area that has to be managed to a "zero event"—a data loss just cannot happen. Simply put, businesses can outsource the technology but can't outsource the risk. Therefore, CSPs must be managed proactively, aggressively and with a carefully structured approach.

Applying Risk Frameworks

While there are a number of standards and frameworks available, very few specifically address any outsourced IT services, let alone CSPs. Nevertheless, many of these standards and frameworks can be helpful to risk management in the cloud. The frameworks described in Fig. 4.4 address some key governance issues in cloud risk management processes:

COBIT. The Control Objectives for Information and Related Technology remains the gold standard for IT governance. It is the most widely used control framework and integrates easily with both COSO and ISO 27000x. It is fairly inexpensive and is available to all ISACA members. COBIT is not strong on information security, so it does need to be amended with an organization's specific security standards. However, COBIT's fundamental processes for identifying potential risks and implementing suitable mitigating controls applies and extends to CSP management as much as it does other internal business processes.

ITIL. The IT Infrastructure Library provides some strong guidance for the IT environment's service aspect. It is not a governance framework and does not address enterprise architecture, but the ITIL processes depicting the "availability" aspect of

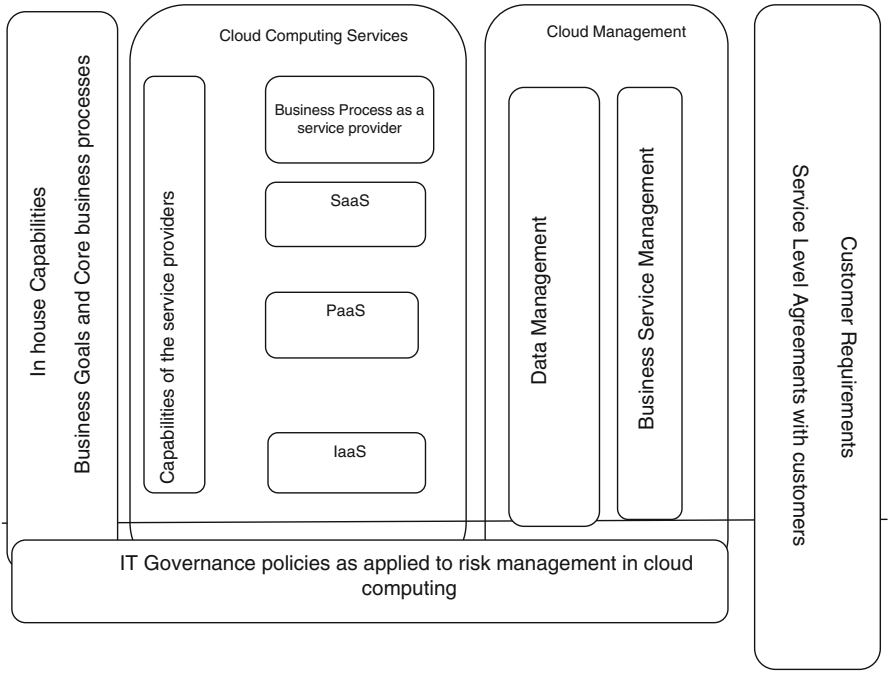

Fig. 4.4 IT governance policies as applied to risk management in cloud computing

IT services certainly relate to the cloud environment. ITIL aligns very well with the COBIT framework and includes a certification process.

ISO 27000x. The international standard for information security practices remains one of the best resources for information security guidance. The standard follows a risk-based approach to prioritizing security emphases and contains practical data control strategies. In addition, the standard goes beyond confidentiality and also covers availability and integrity—all of which are applicable to managing third-party service providers. All CSPs should attest to being ISO 27000x compliant.

PCI-DSS. Although the Payment Card Industry Data Security Standard is only applicable to companies that store or process credit card data, it is still a very good standard to use as a reference tool. It does not provide a governance structure and is fairly high level, but it provides some input on managing third parties. It also contains a decent self-assessment and is free to download.

CSA. Finally, while not a standard or framework, the latest entrant into the risk governance universe is the Cloud Security Alliance, a not-for-profit organization with a mission to promote best practices for providing cloud computing security assurance. The CSA provides a "Cloud Controls Matrix," as well as mapping tools to other standards and frameworks (including ISO, COBIT, PCI, etc.). The CSA is a relatively new resource, but one that should be in every IT manager's risk assessment toolbox.

Cloud Provider Due Diligence

Regardless of whether you use one or more standards or frameworks, there are some basic risk management principles that must be followed when managing outsourced CSPs. The essential elements of third-party due diligence are fairly straightforward. These include:

Third-party reviews (SSAE 16, PCI certification, etc.)

- Documentation on the provider's information security and business continuity programs.
- Financial and insurance information.
- References and independent research.
- Vendor history (service interruptions, security breaches, legal or regulatory issues, etc.).

It is critical not just to acquire this information, but also to conduct a detailed review and analysis of it. Any information that raises issues or concerns should be addressed promptly with the CSP.

While there are almost infinite number of questions that can be asked of any CSP, ultimately all of the due diligence comes down to answering two key questions:

How do you know the cloud provider can support your operation, and up to your service-level expectations?

How do you know the provider can protect your data?

Acquiring enough governance and technical information to answer both of these questions satisfactorily is the key to CSP management. If any other IT or risk management frameworks help in this management process, then they also may be worth considering as part of your overall risk management programme.

Information Security, Compliance and the Cloud

To say that information security and compliance professionals are sometimes at odds with each other is a bit of an understatement. Despite IT industry guidance about the value of network security and compliance teams working together, quite a bit of friction can occur. The root cause, most often, has to do with the fundamental disconnect between how the two disciplines prioritize specific efforts, including individual technology controls.

Understanding why this friction crops up isn't difficult. Information security professionals focus on risk management (i.e. keeping technology-related risk within acceptable parameters), so they concentrate on deploying controls with the potential to significantly lower overall technological risk. Compliance professionals, by contrast, need to ensure that technology controls fully address regulatory compliance requirements.

From the compliance professional's point of view, failing to implement a required control is a risk in and of itself. Disagreement between the information security and compliance camps comes when there is disparity between how a given control fulfils one function but not the other. For example, a control required by regulatory mandates sometimes provides little in the way of overall technological risk reduction, and a control with practical risk reduction doesn't always meet a regulatory objective.

This prioritization gap has been difficult to rectify. Organizations sometimes try to align the information security and compliance functions via governance, risk and compliance unification efforts. Very often, however, these integrated functions tend to drift back towards a more independent dichotomy.

Recent changes in the way organizations purchase IT services—specifically, the adoption of provider-supplied services through cloud technologies—helps redefine the relationship between info security and compliance teams. This can harmonize the working relationship between each department's resources through necessity. By the same token, when that necessity is ignored and contentious relationships persist, it can become a recipe for security and compliance concern.

The use of cloud—especially multitenant, provider-supplied technology services—requires high-level coordination between compliance and technical security teams. Why? A significant percentage of cloud security controls in this context are provider-supplied resources. As a result, these controls require input from both disciplines to be managed and evaluated effectively.

Forging an Alliance

A primary goal of compliance professionals is to validate vendor-implemented controls and deem them sufficient to meet regulatory mandates. To do so, they almost certainly need to draw upon technical insights from information security stakeholders. Not only are information security teams (usually) more technically focused than their compliance counterparts, but they are also intimately familiar with the organization's internal technical security controls.

This means that the information security department is best equipped to understand the technical challenges when operating those controls post-deployment. These professionals are also more likely to understand the potential integration issues (including possible gaps in control coverage) that can occur when internal processes, applications and systems start to directly interact with vendor-managed ones.

Correspondingly, IT security personnel need to draw on compliance team members' skill sets to understand the risk dynamics of a vendor-hosted environment. It is the compliance team that has the processes, methodologies and subject matter expertise to properly audit sufficiency, scope and coverage. Because compliance

team members have this audit and data collection expertise, they are (or at least have the capability to be) the eyes and ears of risk management relative to the vendor-managed services and controls. It's important for organizations to recognize that both teams have a role to play in evaluating cloud deployment from a security and compliance standpoint. The same is true for monitoring activities post-deployment. In situations where the information security and compliance teams are already working well together on a consistent basis, a tighter working relationship will happen naturally. But in situations where they are either completely independent or where they don't see eye to eye, it's imperative that a closer-knit relationship be formed. If the two teams don't communicate or otherwise work together, both technical risk and compliance risk come into play.

In those situations where there isn't an already-established close working relationship between security and compliance, a few productive measures can go a long way towards starting one. One approach is the designation of a cloud "tiger team"—a multidisciplinary team that incorporates stakeholders from across the organization (including security and compliance) when considering and implementing cloud deployment. As team members work closely together, they solidify relationships that tend to carry over into other business processes.

A modified version of the team approach that incorporates direct partnership between information security and compliance (without the rest of the multidisciplinary team) can work, but requires an internal champion in one or both of the disciplines. Alternatively, standardization and toolset sharing for tracking vendor compliance can also be helpful, assuming you can get to a consensus on what the tool should be and how it will be used.

When all else fails, a "top-down" approach or, put simply, a directive from senior management outlining joint ownership of tasks, is better than nothing. But because this approach doesn't start demonstrating the value of this cooperation, it can be more brittle than relationships that evolve themselves.

Whichever route organizations take to remove the information security and compliance disconnect, it is vital to the success of any cloud deployment, as well as many other organizational functions. If the two functions don't work together when it comes to cloud deployment, risk and compliance concerns will abound.

Cloud SLAs

If you want to make IT and compliance professionals laugh, try suggesting that the importance of service-level agreements is overblown when it comes to cloud services. Take a spin around the Web, or read some blogs, and it becomes apparent that leaders from top CSPs believe IT executives put too much emphasis on cloud service-level agreements (SLAs). These providers often claim that IT customers fret more about potential out outages than about mastering the details of how the technology will be applied to and benefit their business.

Recognizing the business value of one's cloud service doesn't, however, diminish the value of an SLA, many experts insist. As more cloud offerings enter the market and find their way into not just IT departments but business units across the enterprise, proponents of cloud SLAs say that getting base-level parameters in writing—from up-time expectations to incident notification—is a must for risk management purposes.

Don Peterson, Merced College's director of IT, takes the SLA very seriously. He recently oversaw the implementation of cloud-based storage to support the data security and compliance demands of the California college's nearly 18,000 students, staff and faculty.

> "We wouldn't even think about [using cloud technology] without an SLA," Peterson said. "It's the ground rules."

Arlis Brotner, Peterson's network manager who researched and proposed that Merced turn to the cloud for storage, said base-level expectations, especially from a security and compliance standpoint, have to be explicitly stated in writing. "It's not just about downtime; it's about response time, how quickly we report it and how they respond to it—that's critical to have," he said.

Otherwise, you're essentially left in the dark when it comes to cloud use. Unlike with on-premises technology, there is no one to turn to with questions or with blame when there are security or compliance issues.

As it turned out, Peterson and Brotner were fortunate to forge a good relationship with their cloud storage vendor, which didn't balk at an SLA that included some finer points. "We needed it to really spell out how they were protecting our data, the redundancy, that it was encrypted in transit and in storage, all those things," Peterson said. "Some SLAs aren't quite so granular as that, but we needed that. It protects us and it protects the vendor." Cloud gateways (and their accompanying SLAs) might be another answer for those still hesitant about moving data operations to the cloud. In an August 2012 report, Forrester Research analyst Andrew Reichman asserted that issues holding back cloud-based storage solutions from broader adoption in the enterprise could be addressed through agreements with gateway providers.

Reichman identified latency, uncertainty about accessing data across the WAN, difficulty coding to cloud providers' APIs and the risk of data leaks as enterprise organizations' chief cloud storage concerns. In response, the market is seeing a growing number of cloud gateway vendors. Most gateways provide data caching for frequently accessed data; WAN optimization; API integration; protocol translation; and data encryption, protection, synchronization and deduplication.

The Cloud SLA Bill of Rights

The importance of cloud SLAs and setting ground rules for cloud risk management are more important than ever, according to analyst group Constellation Research Inc. The San Francisco-based firm recently released The Enterprise Cloud Buyers Bill of Rights. Focused on Software as a Service (SaaS), the document includes 55 "basic rights" that organizations should demand over the life of a cloud service.

Constellation Principal Analyst and CEO R "Ray" Wang said that with the majority of enterprise software now being consumed via SaaS or cloud deployment, companies need to apply the same rigor and expectations in adopting and negotiating these contracts as for on-premises software. Just in terms of customer experience, for example, three "critical rights" must be met: quality guarantees and remuneration, ownership of and access to data with no questions asked, and ongoing financial and risk management transparency.

Those rights go well beyond the ones demanded by the IT department. As Wang states, the relationship between the vendor and the "client" today often includes not just IT but the chief marketing officer and other business executives, including compliance officers. Going from on-premises software to the cloud is a chance for a clean slate for the IT department—not only in building a trusted relationship with the vendor but also in building a strong partnership with the business units that are served by the cloud.

The security issues and legal concerns inherent in cloud computing are complex, to be sure, said analyst Robert Desisto at Stamford, Conn.-based Gartner, Inc. But there are some things that should be simple and straightforward. For example, some cloud applications are less mission-critical than others, and their lack of availability might not harm a company, he said. But even for these less critical business apps, buyers must insist on reaching a written agreement on performance expectations.

> "The bottom line is, if vendors are so confident about their performance, why not put it down on paper? What is the resistance?" he said. "The resistance is they don't want to have the liability out there that they won't be able to perform as advertised."

Desisto won't get any argument about that from Walter Weir. In 2012, the University of Nebraska CIO and his IT team carried out a cloud migration that moved 13,000 staff and faculty members from an on-premises system to a cloud-based system. For him, those more specific details about business value were covered in a request for proposals. But, he said, that didn't diminish the importance of the cloud SLA.

> "There's an understanding that stuff happens and nobody's going to go gunning for anybody unless it's drastic," Weir said. "But you still want some degree of confidence that your partnership will be driven, managed and evaluated on the vendor's ability to live up to this agreement."—*Karen Goulart*.

Twenty Questions for CSP

What is the basic systems architecture?
Where will the data be held, physically and logically?
Who will have access to the data?
How, when and where is data encrypted, both at rest and in motion?
Are clear text protocols allowed on the network and in use?
How is incident response handled?
What is the CSP's fault tolerance capability?
What is the provider's business model (consumer/enterprise, small business/corporate, etc.)?
What type of applications will you be hosting? What information will they contain?
What internal technical standards need to be replicated to the CSP?
What regulatory requirements need to be applied to the CSP?
How are encryption keys stored and managed? Who has access to these keys?
Is anti-virus/anti-malware installed on all servers and workstations, and how is it updated?
Is security penetration testing performed against the external and internal networks?
What is the CSP's password policy? Are user access policies and procedures documented, approved and implemented?
What firewalls, IPS/IDS and Web filtering technologies are in place?
Are data leakage prevention controls in place at the network, email and end-user computing layers?
Are baseline security requirements established and applied to the design and implementation of applications, databases, systems and network infrastructure and information processing?
Are existing wireless networks encrypted with WPAv2, and are these networks isolated from the internal networks?
Is two-factor authentication required for remote administration of all networking and infrastructure devices?

Cloud ROI

Chargeback (Cost Accounting) in a cloud is becoming a necessity. A Cloud/virtual environment provides extensive computing resources which it shares with multiple consumers (referred to as multi-tenancy). Such consumers (individuals, departments, Business Units) own and control their Virtual Machines (VM) which runs inside the cloud (private or public). Cloud or virtual environment providers

(e.g. hosting companies, or internal IT departments) are accountable for and must safeguard the following:

- Performance.
- Security.
- Disaster Recovery.
- Scalability.
- *Cost control—Financial Management.*
- Governance.
- Regulatory compliance.
- Monitoring, Reporting.

There are three methods for Chargeback in a cloud:

1. Allocation
2. Metered
3. Hybrid (combination of Allocation and Metered)

Many organizations perceive Chargeback in a cloud or virtual environment to be too cumbersome and complex. Hence they rely on outdated methods (e.g. Fixed cost pricing) and cost models. Software solutions help reduce complexity and automate many tasks of a Chargeback process (e.g. Automated invoicing). The current market trend (exponentially driven by cloud computing) is to utilize a metered Chargeback model. Various literature refers to this method as a *PAYG* (Pay As You Go) strategy, allowing consumers to only pay for what they actually use.

While cloud providers can decide on the pricing policies and payment options they would like to offers its customers, they must be able to accurately measure consumption and forecast demand. Consumers demand a "roll up" figure (total cost of service) and the ability to "drill down" to the granular level, identifying cost drivers. Successful financial management in a cloud must meet the following requirements:

- Accurate measurement of consumption data.
- Transparent cost models.
- Flexible billing options (e.g. Fixed, PAYG).
- Reporting (historical data and forecasting).
- Competitive service rates.
- Cost recovery strategy.
- Budgeting.

The current industry trend (driven by consumers) for Chargeback and cost accounting in a cloud is to select the Metered method. In the future (some advanced software vendors are already leading the way) a move towards the hybrid method will emerge. The hybrid method (Activity Based Costing/Management—ABC/M) is the move from a unit measurement method to an activity based cost management method. A hybrid method will assist TCO (Total Cost of Ownership) objectives, identifying the true cost of providing services, measuring tangible and intangible resources. Organizations that acquire the capability for performing Chargeback

with the hybrid method will be in a better position, due to advanced cost visibility of resources (tangibles and intangibles, such as human time). Such cost visibility will provide a competitive advantage to organizations, as it will allow them to identify inefficiency at an earlier stage and help optimize activities within their value chain. Once and organization has selected the Chargeback method, it can begin with the creation of Cost Models.

Cost modelling is still a manual task, as accountants and financially oriented personas need to discover the TCO of services and activities (covering tangibles and intangibles). Many software solutions available today allow for sophisticated cost modelling within their applications. Some vendor solutions provide parallel cost models (e.g. Allocation and Metered) for an accounting period. This can highlight cost differences and has the potential of providing financial incentives to consumers. Pricing strategies need to be transparent, fair and competitive as information is widely available to the consumer. As there is no standardization in cloud computing (yet), many discrepancies will exist, especially in the tightly guarded space of costing and pricing.

Summary

Cloud computing seems to be ever increasing in its presence. However, caution should be applied before adopting cloud computing. Not every company should move towards cloud. Hence, cloud computing readiness should be assessed before deciding to transition. There are several risks associated with cloud computing and hence this chapter proposes a cloud architecture that would help to minimize the risk as well as align business benefits to components of cloud computing strategy. Every investment needs to be measured with respect to the benefits that it provides in terms of returns on investment. The chapter also deals with an approach for calculating ROI. The subsequent chapters are case studies that have applied the framework and have calculated ROI.

Review Questions

1. How can you determine cloud readiness for a firm?
2. How do you calculate ROI for cloud investment?
3. Does CIO have a role in cloud computing strategy?
4. What are the components of cloud architecture?
5. What are different types of cloud services? Explain their usage in terms of applications.
6. What are risks involved in cloud computing/How do you mitigate the same?

Chapter 5
Cloud Computing Strategy Design for Myntra.com

Case Overview

The purpose of the case is to analyze and study the processes of Myntra, an e-commerce vendor, and also understand the role of various factors which have impact on these processes and the overall integration between IT and the processes. Also to find solutions to integrate the present processes with cloud strategy to align itself with the vision and mission of the company.

For the fulfilment of this objective we analyzed the data, processes and encapsulated our findings in the following chapter. Study of different departments and the process within the company gave us a foundation platform and we integrated those sub-processes in order to assimilate the overall major processes. We analyzed the different issues that might arise out of the different processes. We then recommended few IT (cloud) strategic solutions for the issues with respect to the big picture helping Myntra to achieve their goals in the near future and also streamlining their business. We also did a cost analysis and calculated ROI of IT solutions and architectural designs along with an outline to a brief road map for implementation of the IT (Cloud) Strategy. We defined the Critical Success Factors (CSF) important to achieve the overall goal. Change management and Risk management needed to be followed in order to implement the IT (Cloud) Strategy effectively.

Introduction

Myntra was established by three IIT alumni Mukesh Bansal, Vineet Saxena and Ashutosh Lawania in February 2007. It has its headquarters in Bangalore and has three regional offices in New Delhi, Mumbai and Chennai.

It began its operations in the B2B (business to business) segment with the personalization of gifts, which included mugs, caps and t-shirts.

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In 2010, the company shifted its strategy from being a B2B to becoming a B2C (business to customer) oriented firm.

Myntra.com is ranked among the top ten e-commerce firms in India. In the last 3 years, Myntra has become the most popular destination for personalized products in the country. Myntra is known for its innovative and out-of-the box marketing. It involves being the first one to start online coupons, promotion coupons, tying up with top fashion and lifestyle brands in India like Reebok, Puma, Nike Inc., etc. so as to offer a wide range of current seasonal merchandise. Undoubtedly it enjoyed the first mover advantage in the e-tailing business.

Industry Analysis (PESTEL)

Political

High government investment in National IT infrastructure leads to faster, better and more reliable Internet access for all users. It is the key for the e-commerce industry.

Another aspect is 100 % FDI in retail. This will allow retailers like Wal-Mart to enter the Indian market. This could be considered as a threat from substitutes.

Economic

With a rise in PPP, more people are getting Internet connections with the growing economy. This would imply more online buyers. Another factor is that the e-commerce industry thrives on giving promotional offers to attract customers. It might be beneficial only if there are economies of scale. Logistics cost is one of the vital factors which determines the profitability of the e-commerce industry.

Social

Increase in social networking e-marketer online has given Marketing the advantage to promote e-commerce. But at the same time, Product category risk and financial risk decrease the popularity of online shopping. The e-commerce industry needs to win the confidence of the customer so as to gain market share and increase customer base.

Another factor, the absence of the “touch/feel” has been detrimental to the e-commerce industry in general.

Technological

To increase the frequency of use—there has been a rapid development of "high speed" network services—also leading to the increase in usability of media-rich applications. Increase in telecommunications and information technologies for Internet access has played an important role.

Environmental

The increased awareness of global warming has created a positive impact on e-commerce industry. People prefer buying online according to their convenience.

Sites need to adopt the "go-green" strategy to attract consumers. Companies can do that by changing their postage, work environment and packaging.

Legal

There is no uniform regulation governing the e-commerce industry. It is an impediment while dealing with customers all over the world.

Organization

VMG Framework

- Vision:
  Aims at providing a hassle free and enjoyable shopping experience to shoppers across the country with the widest range of brands and products on its portal.
  It is making a conscious effort to bring the power of fashion to shoppers with an array of the latest and trendiest products available in the country.
- Mission:
  Giving customers the power and ease of purchasing fashion and lifestyle products online.
- Goals:
  To expand the logistics network in at least 4–5 new cities per quarter.
  To fulfil 20,000/- orders per month from 5,000/- per month.
  To reach 800 crores turnover mark by 2014.

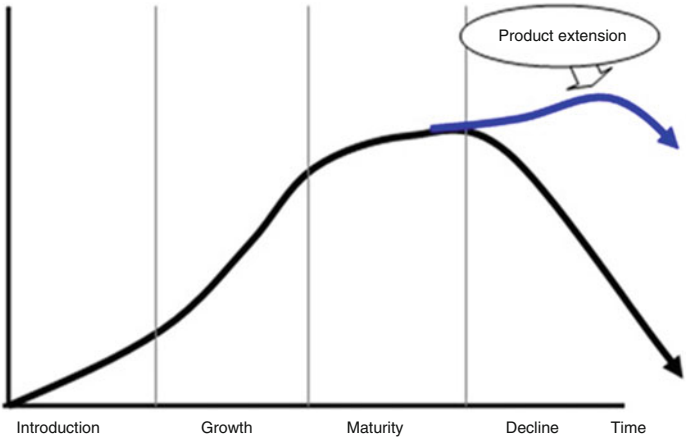


Fig. 5.1 OLC

OLC

Right now Myntra is in the 2nd–3rd stage. Reason being the processes are still in progress. The Process Improvement Process is being implemented. For example, Myntra recently bought Fitiquette, a developer of virtual fitting room technology and a TC Disrupt finalist from Sep 2012. It intends to use Fitiquette's core product on its retail site to drive more fashion purchases online. Moreover, acquisition is in full swing. There have been two recent acquisitions by Myntra. The first one in November 2012 when it acquired New York based Exclusively, which has the private label vertical, Sher Singh. The most recent being Fitiquette—a virtual fitting room (Fig. 5.1).

Strategy

The various strategies that should be employed to attain the targeted business goals are corporate strategy, marketing strategy and HR strategy.

Corporate strategy involves the goal of reaching the 800 crores turnover mark by 2014, i.e. almost the double, to increase productivity, to provide better customer service—by increasing the service level agreement. It also involves introducing the exchange policy in some cities. Moreover, it also involves building customer confidence in online shopping by providing relevant fashion solutions to the shoppers and making online shopping easier for them. *The metrics to measure the success of the strategy are productivity* (*productivity*=*output*/*input*) *and increase in overall market share*.

The second strategy is *Marketing Strategy*. This strategy involves increasing brand visibility by investing in brand promotion. It would involve investing 8–10 %

of the sales revenue in brand promotion to develop the market. Moreover, it will also include penetration in small tier-2 cities. To deepen its presence in the online space, Myntra has decided to shift its focus towards tier-2 cities. It is observed that people residing in tier-2 cities are more attracted towards promotional discounts, are price sensitive. To cash in on that human tendency, Myntra has recently raised USD65 million through venture capital route for expansion. *The metrics to measure the success of the strategy are sales growth*, *existing customer retention ratio*, *budget allocation for research and development. Sales growth is measured by the following formula*:

$$\text{Sales growth} = \left(\text{Revenue this year} - \text{Revenue of previous year}\right) / \text{Revenue of previous year}$$

The next strategy is the *HR Strategy*. Myntra, being an e-commerce firm, the main focus of it is gaining customer's confidence. HR Strategy involves incorporating better customer service through improved SLA by recruiting more people. It also involves training and development so as to be abreast with latest technology. *The metrics that can be used to measure the success of the employed strategy are no of people added per quarter*, *increase in customer satisfaction due to improved SLA*, *employee productivity*, *average percentage of hike across departments*.

Stakeholders

The various stakeholders of Myntra are *customers*, *investors*, *employees*, *business partners—Suppliers*, *Distributors*, *Collaborators and environment*. The objectives of customers are to get high value for money, good customer service and high quality products. Investors have the basic objective of getting a high ROI. Employees want a good career progression and work-life balance. Similar to investors, business partners want a high profit/ROI. The objective of considering environment as one of the main stakeholders is to have a social ROI. It helps in identifying ways to improve performance, and to enhance the performance of investments. It involves family, society at large and the economic environment. It involves family, society at large and the economic environment. Family implies work-life balance. Society wants high employment, no degradation and no decay. The economic environment involves GDP and FDI.

Functions

L0—The Context Diagram

Myntra is an e-commerce website. The main entities it interacts with are the investors, employees, customers and the environment. Employees and Investors give their valuable inputs to Myntra and only then the organization can operate successfully. Myntra interacts with the environment and provides output to Customers (Fig. 5.2).

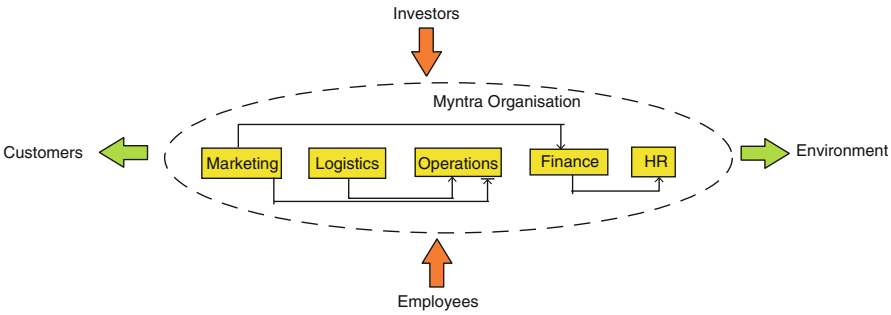


Fig. 5.2 L0 for Myntra

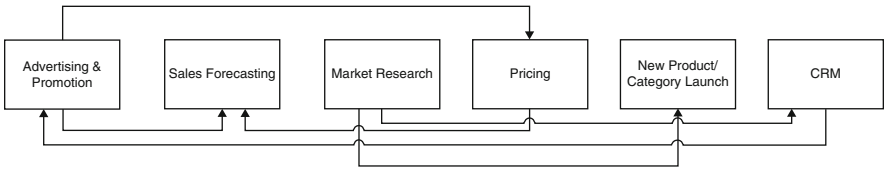


Fig. 5.3 L1 marketing department

The main departments identified are: Marketing, Logistics, Operations, Finance and Human Resources.

Each of these departments interacts with each other for the organization to work well as a whole. For example, The Marketing Department sends its information about sales forecasting to the Finance Department so that they can accordingly work on allocating the necessary capital.

L1 Diagrams

L1 involves Identification of the various processes and analyzing them with the ETVXMF framework.

Marketing Department

Marketing Department consists of the following main processes: Advertising and Promotion, Sales Forecasting, Market Research, Pricing, New Product Category Launch and Customer Relationship Management (CRM) (Fig. 5.3).

Each of these processes, in turn interact with each other. For example, depending on the input from the "Advertising and Promotion" function—the "Pricing" team decides the price of the products according to the packages/offerings.

ETVXMF Framework for Sales Forecasting

- *Entry*: At the beginning of each period (maybe monthly, quarterly, or half-yearly depending on the inventory management).
- *Tasks* consist of—gathering data, selecting the sales forecasting model, checking the consistency or accuracy of the model after getting the results, finalizing the forecast and finally, sending the results to other related departments like Operations, Finance, etc.
- *Verification/Validation*: Check whether the forecasted data was accurate by comparing the previous year's actual sales with the forecasted data values.
- *Exit*: Once the figures are finalized and orders are about to be placed in tandem with the forecasted figure.
- *Metrics* are Profit and Sales.
- *Feedback*: _____

ETVXMF Framework for Market Research

- *Entry*: When there is a decision to launch a new product or category, to understand market share.
- *Tasks* consist of Study market trends, understand consumer buying behaviour through surveys, questionnaire, etc.
- *Verification/Validation*: Check if the study of market trends resulted in increased sales of that product or category.
- *Exit*: Once the decided category is launched successfully and the sales are steady.
- *Metric*: Increased turnover in sales of that particular category or an increase in market share.
- *Feedback*: _____

ETVXMF Framework for Pricing

- *Entry*: Once the vendor and the design of the product/category is decided.
- *Tasks* consist of Negotiate on the purchase price, Check the demand for similar products, Decide on promotional discounts or less price and Finalize the price after calculating the profitability.
- *Verification/Validation*: Check if the sales and the demand of the product are steady with the decided pricing.
- *Exit*: It is an ongoing process. Exit from the main pricing process will take place once a price is agreed upon for those set of products.
- *Metric*: Increased turnover in sales of that particular category.
- *Feedback*: _____

Logistics Department

Logistics Department consists of the following main processes: Inbound Logistics, Value Addition, and Shipping and Delivery (Fig. 5.4).

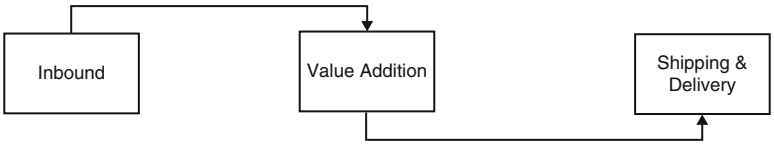


Fig. 5.4 L1 logistics department

Each of these processes, in turn interact with each other. For example, after the "Value addition" stage, the order is sent to be "Shipped and Delivered" to the Customer.

ETVXMF for Inbound Logistics

- *Entry*: Arrival of customer order or the need for replenishment arises.
- *Task* consists of the following steps—Check if the required stock is available or not, if it is below the required level, decide the product, quantity and the SKU requirement of each category. Next comes—select the distributor, create invoice and send it to distributor, run a quality check on receiving the merchandise and finally perform warehouse management.
- *Verification/Validation*: Check the quality of the goods received. Only if the merchandise passes the quality check, it is ready for storage or for sale.
- *Exit*: When the products are certified "OK" and ready to be stored or dispatched to the end user.
- *Metric*: Efficiency of the entire process, Time taken to get the goods.
- *Feedback*: _____

ETVXMF for Outbound Logistics

- *Entry*: Takes place when an Order Placement/Confirmation happens.
- *Tasks* consist of—Capture the order details –Quantity, SKU id, Price, Create the entire delivery, delivery through 3PL or own—depending on the area (pin-code) to be serviced. Check the 3PL contract and charges, on delivery 3PL collects the exact amount (COD) or in case of pre-payment just delivers the order with the signature.
- The amount collected after COD order deliveries is to be sent back to Myntra after deducting the commissioning fee. The website displays "Order Delivered"
- *Validation/Verification*: Once the goods are safely delivered to the customer with the packaging intact, the order verification process is completed.
- *Exit*: When the customer receives the order and the website is updated with the receiver's details.
- *Metric*: Time taken for the delivery, Success rate of CODs, delivery to the correct recipient.
- *Feedback*: _____

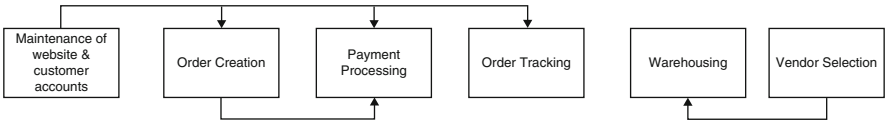


Fig. 5.5 L1 operations department

Operations Department

Operations Department consists of the following main processes: Maintenance of website and customer accounts, Order Creation, Payment Processing, Order Tracking, Warehousing, and Vendor Selection (Fig. 5.5).

Each of these processes, in turn interact with each other. For example, "Order Creation" will forward the Customer to "Payment Processing."

ETVXMF for Order Creation

- *Entry*: User browsing items on the website of Myntra and selecting some items.
- *Task*: Order processing consists of multiple steps—Select items with details: Quantity, Size, Price, Do Cart Management, Checkout and calculate payment amount on basis of user profile. Proceed to payment and finally send a confirmation e-mail from Myntra to the user regarding the placement of the order.
- *Verification/Validation*: The order is successfully created. Order no is sent to the user. Ease of placing an order will determine the number of new customers shopping with Myntra.
- *Exit*: Successful order being placed or transaction failing.
- *Metric*: Number of successful order creation in a month, Number of new customers, No of repeat purchasers.
- *Feedback*: _____

ETVXMF for Payment Processing

- *Entry*: Payment details received by customer as part of order processing
- *Tasks*: Check for the mode of payment as Net banking, Credit card or Debit Card, COD. Proceed with payment processing in stages of authorization and verification and post the receipt except in the case of COD.
- *Verification/Validation*: For each order, it is checked if successful payment transaction was possible or not.
- *Exit*: Once the required amount is deducted from the customer's account, the process is completed by generating the transaction no and the order no and positioning the receipt.
- *Metric*: No of CODs, No of pre-payment orders, Time taken to perform one transaction, No. of failed transactions due to server errors or other reasons.
- *Feedback*: _____

Finance Department

Finance Department consists of the following main processes: Means of Financing, Capital Budgeting and Cash and Credit Management (Fig. 5.6).

Each of these processes, in turn interact with each other. For example, "Capital Budgeting" will help decide the "Cash and Credit Management."

ETVXMF for Accounts Receivable

- *Entry* point of this process is when the invoices are obtained by the organization
- *Tasks* consist of selecting the payment option, setting up reminders in case the payment option is COD, receiving the payment.
- *Verification/Validation* consists of checking whether the payment is received in the bank's account.
- *Exit*: Once the figure in the invoice and that of actual cash payment is tallied and the account settlement is confirmed.
- *Metrics*: Amount in invoice=Amount actually credited to the organization's account
- *Feedback*: _____

Human Resources Department

Human Resources Department consists of the following main processes: Employee Engagement and Retention, Employee Performance, T&D, Compensation, Administration and Performance and Recruitment (Fig. 5.7).

Each of these processes, in turn interact with each other. For example, "Employee Performance, T&D, Compensation" will be involved in setting up the "Employee Engagement and Retention" process.

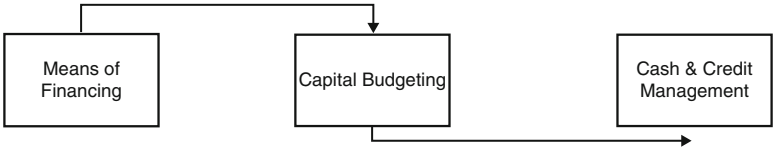


Fig. 5.6 L1 finance department

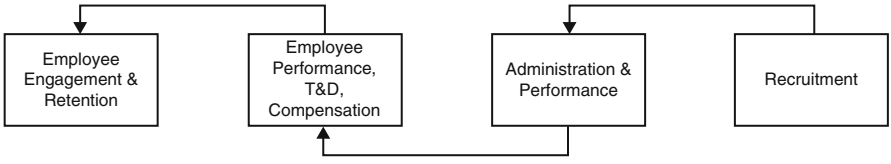


Fig. 5.7 L1 human resources department

ETVXMF for Training and Development

- *Entry*: Business goals is set and the gap is identified
- *Tasks* consist of multiple steps—Information is gathered about the required and available skill set of the employees. Create an action plan to reach the goals, offer training programmes. Evaluate the employees and ensure they get an opportunity to apply them.
- *Verification*/*Validation*: The training programmes are checked for their relevance and effectiveness.
- *Exit*: Once the employees understand the tricks of the trade, the process is completed.
- *Metric*: Effectiveness of the training and development programmes in terms of customer service and increase in sales.
- *Feedback*: _____

L2 Diagrams

1. Sales Forecasting
   (Fig. 5.8)
2. Inbound Logistics
   (Fig. 5.9)
3. Outbound Logistics
   (Fig. 5.10)
4. Order Processing
   (Fig. 5.11)
5. Payment Processing
   (Fig. 5.12)
6. Accounts Receivable
   (Fig. 5.13)
7. Training and Development
   (Fig. 5.14)

Factors that Affect IT Strategy

There are basically three factors which affect IT strategy

Industry Characteristics

The penetration of Internet and therefore e-commerce is low in India in compared to markets like the United States and the United Kingdom but is growing at a much faster rate with a large number of new entrants. India has a vibrant cash economy,

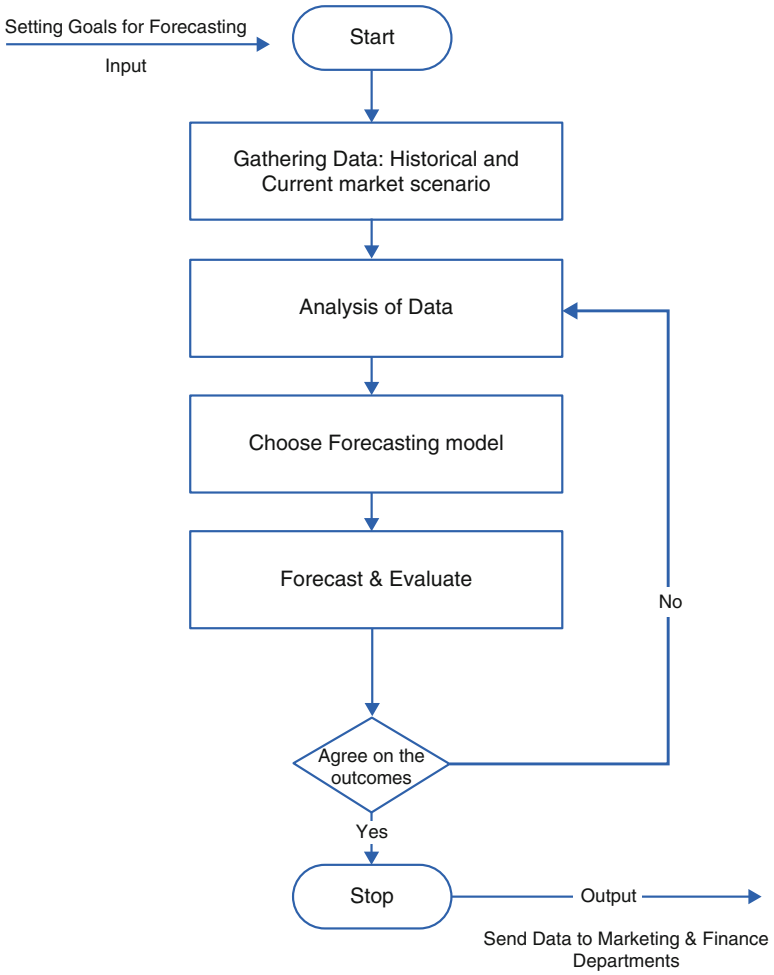


Fig. 5.8 L2 sales forecasting

as a result of which 80 % of Indian e-commerce tends to be COD, i.e. cash on delivery. Demand for international consumer is growing at a much faster rate than in-country supply from authorized distributors and e-commerce offerings. Hence, direct imports constitute a large component of online sales.

Organization

Myntra was established by Mukesh Bansal, Vineet Saxena and Ashutosh Lawania in February 2007, headquartered in Bangalore and has been funded by Venture Capital funds like IndoUS, IDG and Accel Partners. Myntra.com is an aggregator

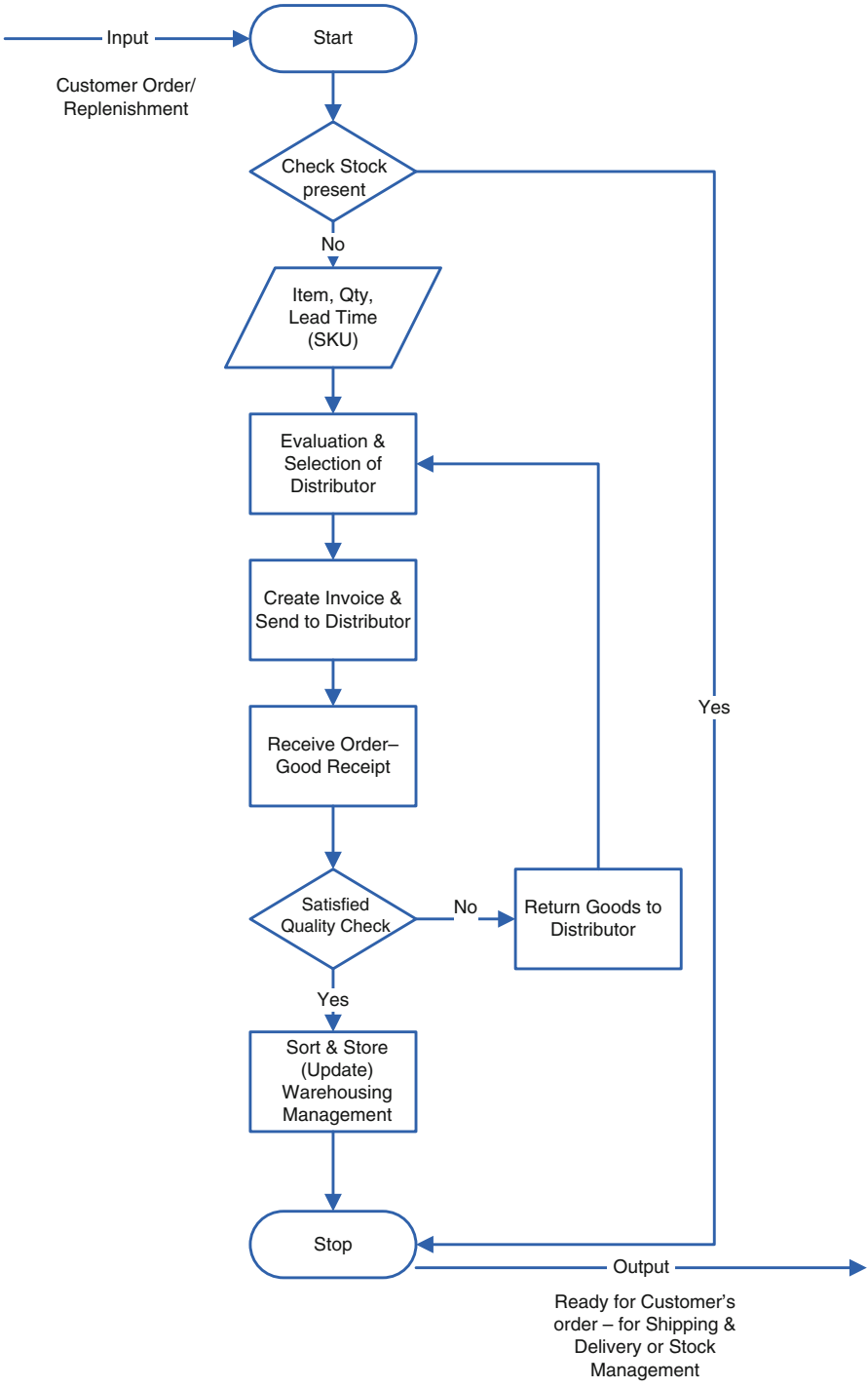


Fig. 5.9 L2 inbound logistics

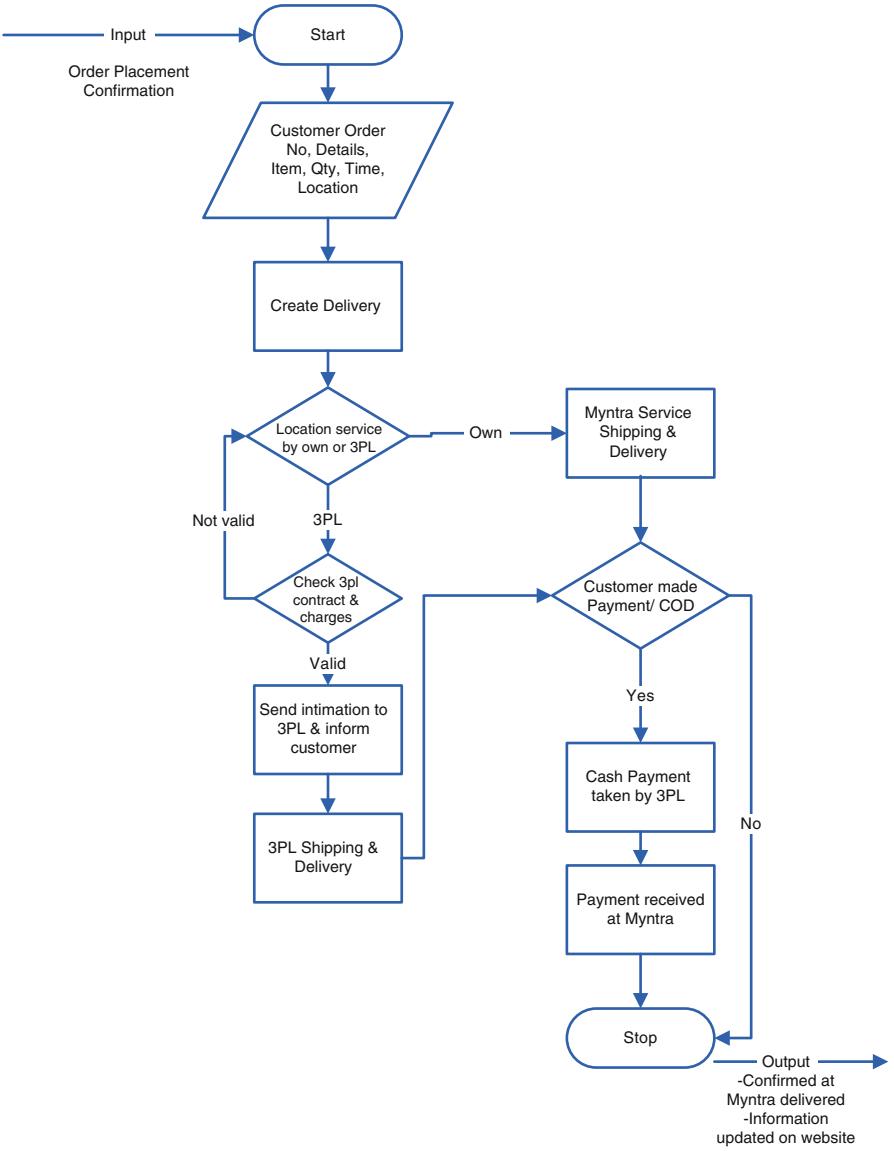


Fig. 5.10 L2 outbound logistics

of multiple brands. Its business model is based on procuring current season merchandise from various brands and making them available on the portal at the same time as in respective retail brand outlets. In 2013, Myntra acquired a virtual fitting room technology firm based out of San-Francisco Fitiquette.

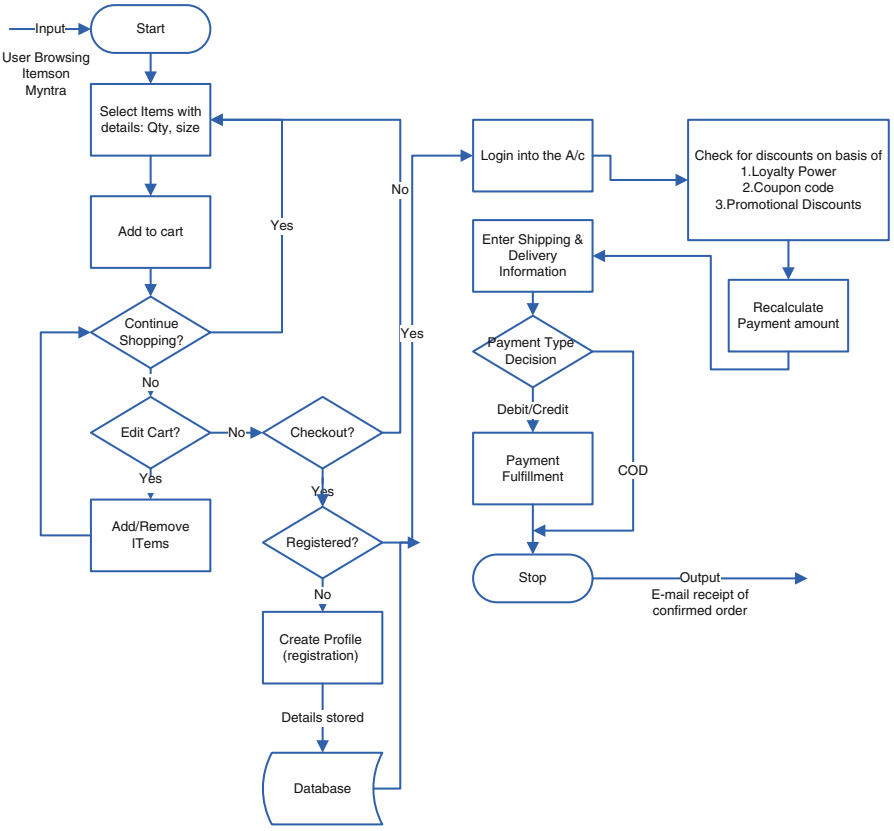


Fig. 5.11 L2 order processing

Issues and Challenges

The major barriers are (1) resistance to technology, (2) implementation difficulties, (3) security concerns, (4) lack of technology skills, (5) lack of potential customers, and (6) internal and external barriers. Along with these cultural differences, incompatible B2B interfaces, organizational differences, international trade barriers, and lack of standards mar the company's image at some point of time.

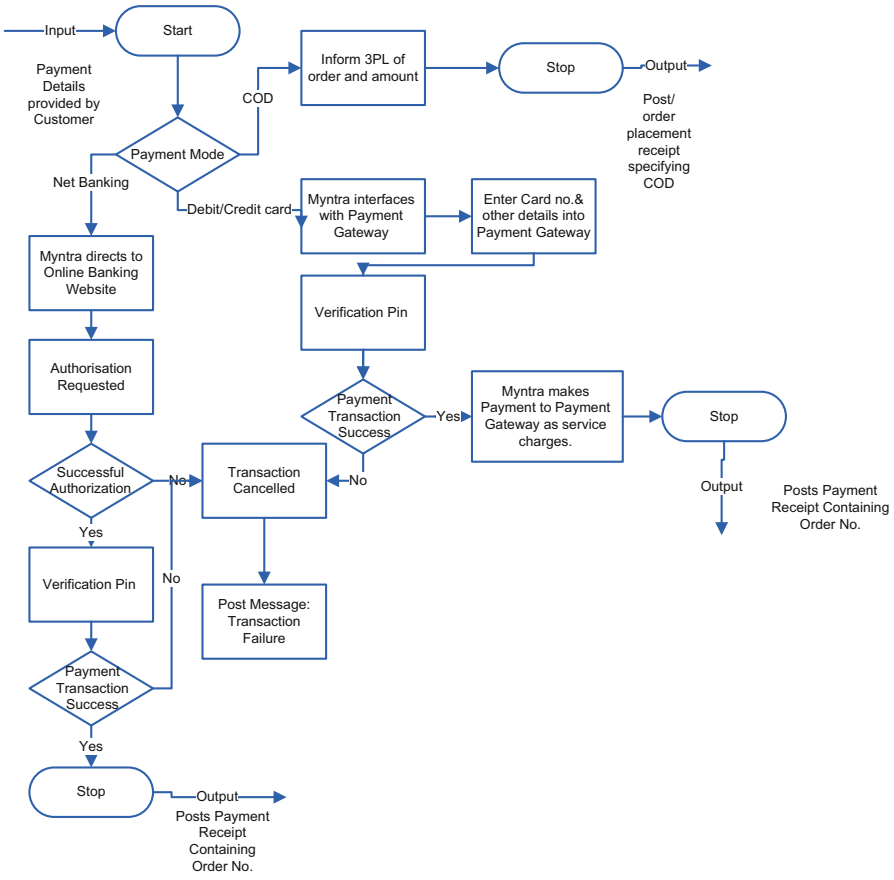


Fig. 5.12 L2 payment processing

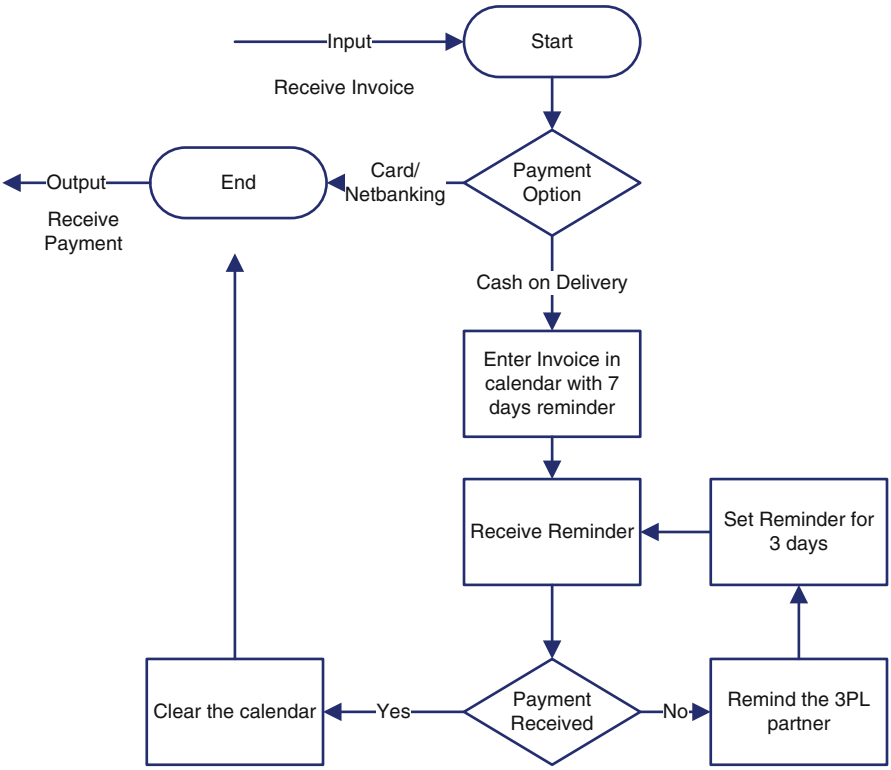


Fig. 5.13 L2 accounts receivable

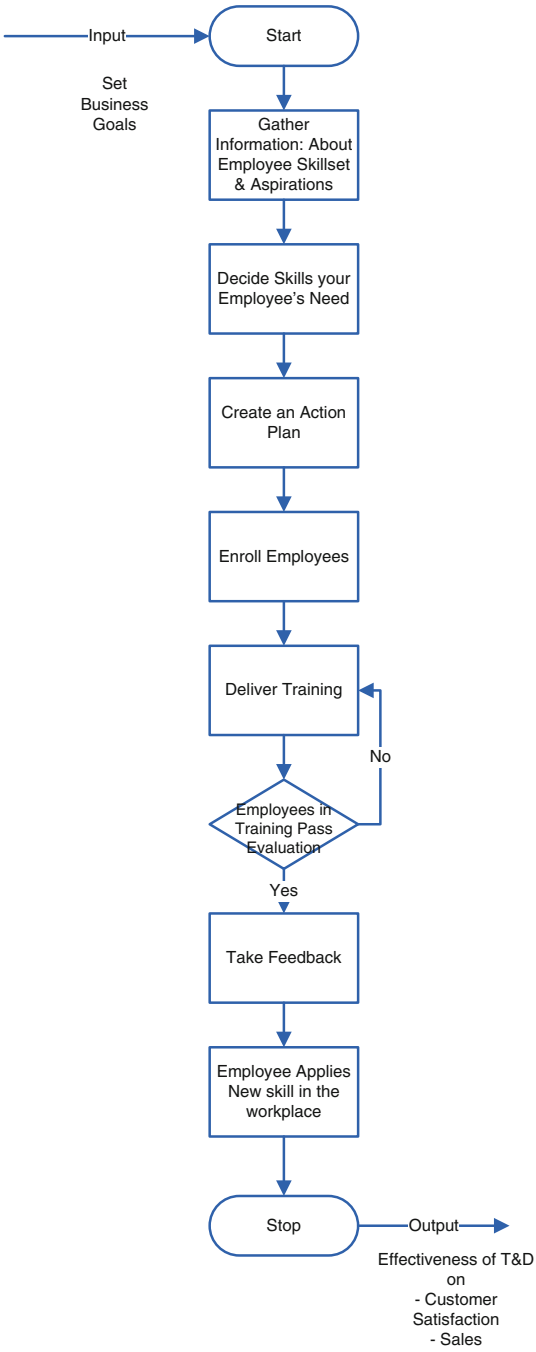


Fig. 5.14 L2 training and development

Process Integration

The identified processes are now evaluated for integration across departments as well as in the same department (if applicable) (Fig. 5.15).

For example, Order Tracking is to be integrated with Outbound Logistics. This ensures that the details of the shipping and delivery are accessible to the Customer for tracking the shipment.

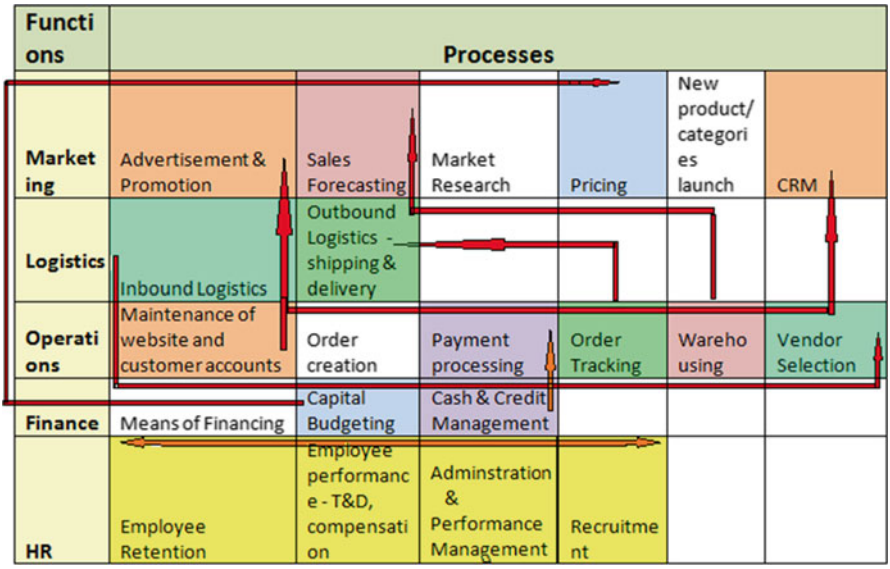


Fig. 5.15 Process integration

Applications Integration

After integrating the processes across functions, depending on the business requirements, there is a need for application integration. The approach used for this is that the processes were determined and then applications were searched to integrate those processes. It takes into account the availability of best practices in industry. Some of the applications that can be used to integrate the processes are IBM Tools, Teradata, CRM+, SAP, Microsoft Dynamics, SAP R/5, SAP Tally Kronos, etc. (Fig. 5.16).

Applications	Processes		
IBM Tools, TERADATA	Sales Forecasting	Warehousing	
civiCRM,CRM+	Advertisement & Promotion	Maintenance of website and customer accounts	CRM
SAP,Microsoft Dynamics	Outbound Logistics - shipping & delivery	Order Tracking	Vendor Selection
SAP R/5	Payment processing	Cash & Credit Management	
SAP, Tally	Capital Budgeting	Pricing	
iCMS, KRONOS	Employee Retention and recruitment	Employee performance - T&D, compensation	Administration & Performance Management

Fig. 5.16 Application integration

Technology Integration

(a) Cloud Strategy:
Based on our analysis of Myntra's business model and its growth aspiration, we propose the following cloud strategy for Myntra. We will keep a cold site on public cloud.

No.	Service type	
1	Private IaaS	Customer Relationship Management
		Master Data Management
		Enterprise Management
2	Private SaaS	POS Application
		Real-time Reporting Application
		HR Management application
		Knowledge management
3	Public/Hybrid PaaS	Analytics Applications (Big Data and Business Intelligence)
		Backup and Restore

(b) Cloud Architecture

Private IaaS (Fig. 5.17).
Private SaaS (Fig. 5.18).
Hybrid PaaS (Fig. 5.19).

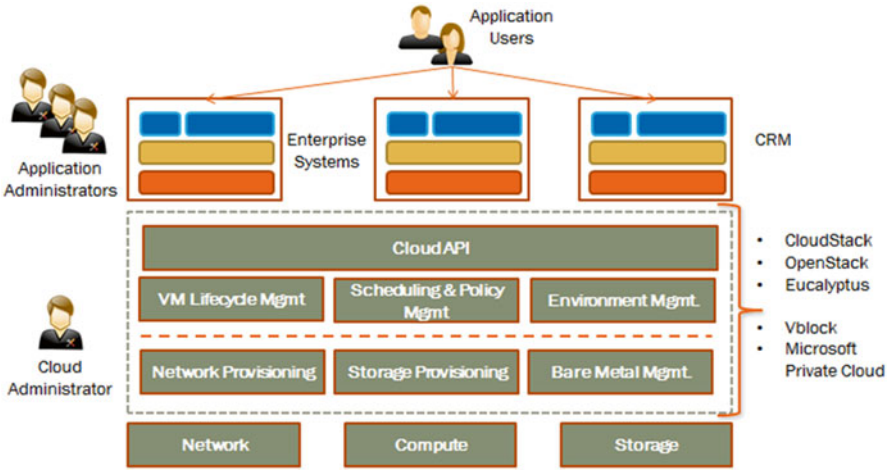


Fig. 5.17 Private IaaS

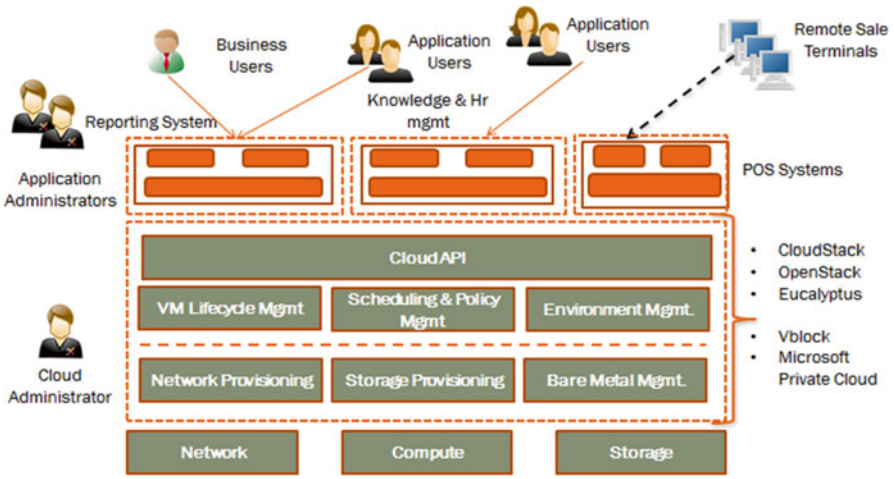


Fig. 5.18 Private SaaS

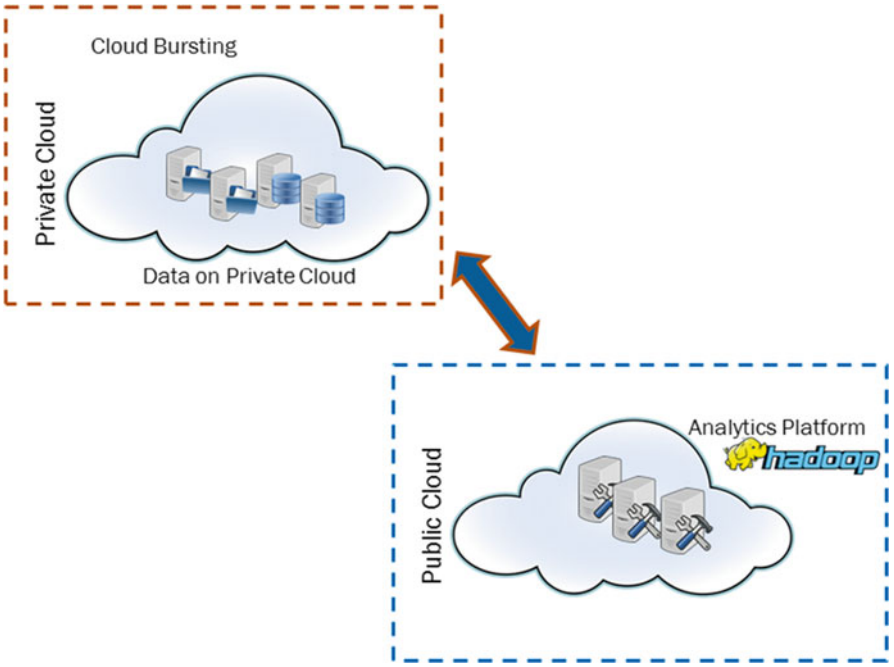


Fig. 5.19 Hybrid PaaS

(c) Benefits of Cloud Computing to all Stakeholders

No.	Stakeholder	Benefits
1	Investor and Promoter	Lower upfront Investment and lower burn rate
2	Employee	Streamlined and centralized Processes
3	Suppliers	Transparency in data brings in Collaborative planning

Economies of scale:
Myntra is expected to grow at 70 % CAGR for the next 5 years. This will require huge IT infrastructure to support the growth. Cloud provides increased volume output or productivity with fewer people. The cost per unit, project or product reduces.

Reduced spending from proposed cloud model:
Public cloud computing reduces the capex for IT infrastructure. Also private cloud reduces spending because of removal of overlapping of IT infra. With the proposed cloud strategy for Myntra, spending on IT will be substantially reduced.

Cheap workforce:
People can use cloud if they have access to Internet/VPN. Myntra can place its workforce anywhere taking advantage of cheap workforce.
Minimize licensing new software:
With public computing pay per use model it is possible to grow without the need to buy expensive software licenses or programmes upfront. This can help Myntra to lower its burn rate.

Streamline processes
Cloud computing streamlines the processes hence makes it easier to do more work done with less time with less people.

(d) Cloud ROI:
Assumptions:
We have assumed IT assets of Myntra to be 8 % of Total Assets, 12 % of Operational Expenses are IT Operational Expenses, IT Assets are procured every 3 years, Cost of IT Assets increases 20 % over 3 years, IT Operational Expenses will rise 4 % every year Without Cloud and With Cloud, IT Operational Expenses reduce by 5 % every year (Fig. 5.20).
Discount Rate: 10.0 %
Sensitivity Analysis

Sl. No.	Operational expenses from Cloud	NPV (lakhs)
1.	Reduction in Operational Expenses by 5 % Annually (Best Case)	135.46
2.	Operational Expenses Constant throughout the period	107.10
3.	Operational Expenses remains same as Non-Cloud Scenario	35.33

(e) Risk Analysis for Cloud Strategy
(Fig. 5.21)

(f) Roadmap for Cloud
(Fig. 5.22)

All Values in Lakh rupee

		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
Non-Cloud	Total Capex	32			38.4			46.1
	OPEX	48	52.8	58.08	63.9	70.3	77.3	85.0
	Total Expenses	80	52.8	58.08	102.3	70.3	77.3	131.1
	Sales	400	800	1100	1350	1600	1850	2100
With Cloud	OPEX	48	48	48	48	48	48	48
	Capex for cloud	48						
	Total Expenses	96.0	48.0	48.0	48.0	48.0	48.0	48.0
	Sales	400	800	1100	1350	1600	1850	2100
Benefit		-16.0	4.8	10.1	54.3	22.3	29.3	83.1
NPV	**107.10**							

Fig. 5.20 Cloud ROI

No.	Risk Identified	Impact (In Lakhs Rs)	Probability	Impact factor	Risk Index	Risk Mitigation	Cost	Annual Loss	Remark
1	**Data availability and business continuity (Per hr loss)**	10	3.0%	8	2.4	1. Using multiple ISP's (at least 3)	30	7008	Cost<Annual loss, Will implement Risk Mitigation plan
						2. Maintaining backup server			
2	**security (Attacks) (depends on attack severity)**	100	5.0%	8	40	1. Frequent updation of all software patches	5	40	Cost<Annual loss, Will implement Risk Mitigation plan
3	**Disaster recovery — (Per day loss)**	112	0.1%	7	0.784	1. Maintaining hot and cold sites in different geographies	60	286.16	Cost<Annual loss, Will implement Risk Mitigation plan
						2. Mock drills to testify the operational of cold sites			
4	**Data privacy and security -**	15	20.0%	3	9	1. Setting up compliance office	6	9	Cost<Annual loss, Will implement Risk Mitigation plan
5	**Record retention requirements —**	15	20.0%	3	9	1. Increased cost of storage	6	9	Cost<Annual loss, Will implement Risk Mitigation plan

Fig. 5.21 Risk analysis for Cloud strategy

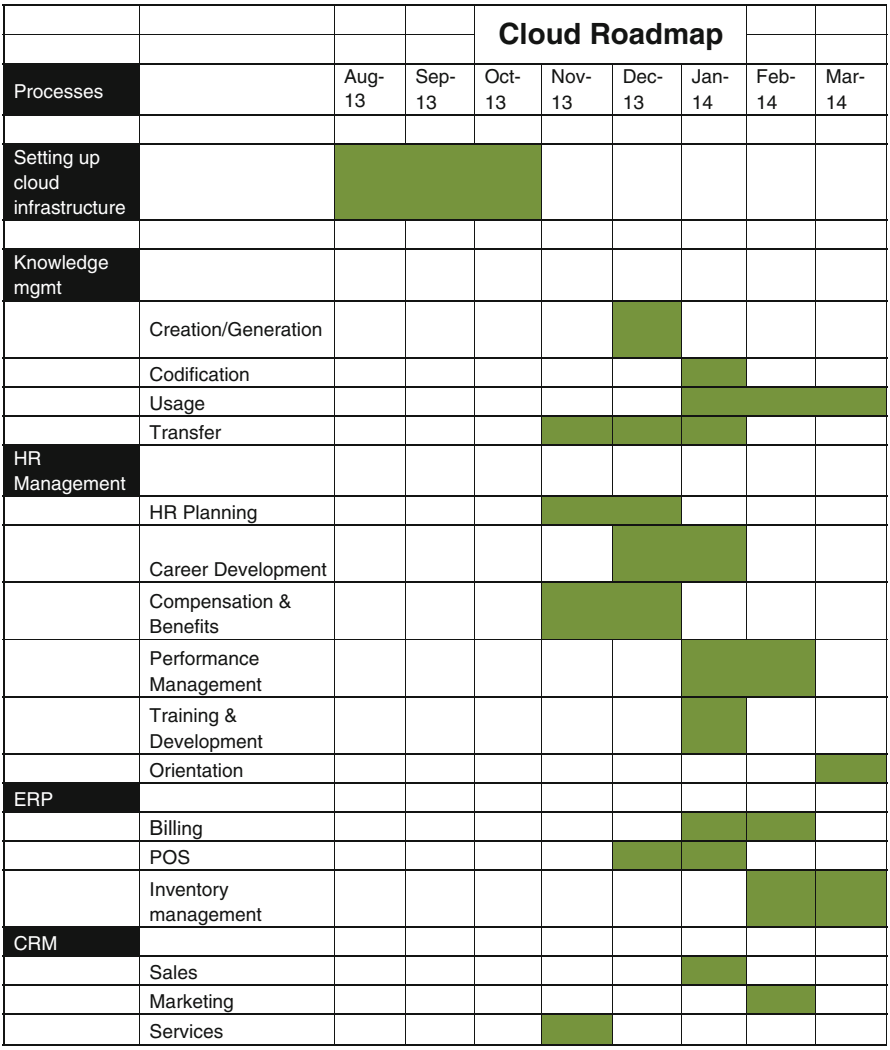


Fig. 5.22 Roadmap for Cloud

Department Scorecard

GOALS	To expand the logistics network in at least 4-5 new cities per quarter To fulfil 20,000/- orders per month from 5,000/- per month. To reach 800 Cr.turnover mark by 2014

ASSUMPTIONS	PIP is in full swing along with Acquisitions Industry growth rate is 15% Myntra is scalable enough to adopt the change

Figure 5.23

	Consolidated Department Score Card		
No.	**Departments**	**Functional Goals**	**Weight**
1	**Customer Relationship Department**	Keep Store Managers on the Selling Floor, Not Behind a Desk. Give Store Operations the Right Information at the Right Time to Make the Right Decisions.	20%
2	**Merchandizing Department**	Significantly reduce costs, eliminate the expense of stock-outs and overstocks, and make powerful, rapid decisions	10%
3	**Operations Department**	Keep Store Managers on the Selling Floor, Not Behind a Desk. Give Store Operations the Right Information at the Right Time to Make the Right Decisions.	10%
4	**Vendor and SKU Management Department**	Analyze Vendor Performance, Drive Improvement, and Strengthen Negotiations. Improve Performance Across the Supply Chain	15%
5	**Marketing Department**	Online and social becomes a big factor in deciding to make a purchase, new techniques are emerging around cross - selling, location-based marketing, in-store behavior analysis, customer micro - segmentation, sentiment analysis and enhanced multichannel consumer experience.	20%
6	**Finance and Accounts Department**	Returns, Fraud and Loss Prevention	10%
7	**HR Department**	Human resource and allocation of resources to indiviual project and assignments	15%
	Total		100%

Fig. 5.23 Consolidated department scorecard

Customer Relationship Department (20%)						
Functional	**Strategy**	**Strategy Weight**	**Score**	**Metric**	**Performance Predicted**	**Actual**
Understand Your Most Valuable Customers. Target Them to Maximize Profits and Loyalty	Discover who your customers are. Identify their unique characteristics, and know what products they purchase and why.	20%	4%	Customer retention rate, Attachment rates		
	Expectation and sentiment tracking.	15%	3%	Affinity Tracking		
	Track the impact of promotions on customer baskets as they move through your stores and provide a holistic view of all of their behaviors.	30%	6%	New customer base, market share		
	Tap into their transactional data to connect the dots between customers, stores, products, and promotions.	20%	4%	Behavioural profiling		
	Move beyond basic segmentation, personas, and list pulls to create targeted micro-segments – highly-refined groups of customers based on user-defined characteristics.	15%	3%	Core item frequency, Item per basket		

Merchandizing Department (10%)						
Functional	**Strategy**	**Strategy Weight**	**Score**	**Metric**	**Performance Predicted**	**Actual**
Significantly reduce costs, eliminate the expense of stock-outs and overstocks, and make powerful, rapid decisions	To balance inventory levels with in-stock positions while maintaining assortments that are relevant and fresh	50%	5%	Stock %,Hot item report		
	Mobility and constant connectivity to respond to consumer demand, seasonal trends, and fashion styles	30%	3%	Inventory turns		
	Improve inventory decisions	20%	2%	Seasonal buying, sell through reallocations		

Operations Department (10%)						
Functional	**Strategy**	**Strategy Weight**	**Score**	**Metric**	**Performance Predicted**	**Actual**
Keep Store Managers on the Selling Floor, Not Behind a Desk. Give Store Operations the Right Information at the Right Time to Make the Right Decisions.	Store traffic information delivers detail on a store's performance	30%	3%	Asset turn over, inventory turn over		
	Relevant, filtered information delivered when and where it is needed helps store personnel identify anomalies in their operations	30%	3%	Competitor store, labour cost analysis		
	Drive immediate action in the areas of labour scheduling, customer service, merchandise display, promotional signage, potential stock shortfalls caused by local market conditions, and more.	40%	4%	ROA, sales margin, Register usage analysis		

Marketing Department (20%)						
Functional	**Strategy**	**Strategy Weight**	**Score**	**Metric**	**Performance Predicted**	**Actual**
Online and social becomes a big factor in deciding to make a purchase, new techniques are emerging around cross-selling, location-based marketing, in-store behavior analysis, customer micro-segmentation, sentiment analysis and enhanced multichannel consumer experience.	Promotions via large-scale e-mail targeting efficiency	15%	3%	Channel Share, Ad block		
	Big data to integrate marketing promotions, location data and differential pricing	25%	5%	new technology sales increase		
	Combination analytics from integrating profiles, peer sentiment, recommendations and comments on Twitter, Yelp and Facebook are playing a bigger role in influence and purchase decisions	30%	6%	End cap efficiency, coupon distribution		
	Emerging social marketing services changing the dynamics of real-time customer interaction in that age group.	20%	4%	Promo lifts, price points		
	Open rates on targeted e-mails with custom catalogues with tailored personalized storefronts	10%	2%	Market share, seasonal products sale, Marketing areas		

Vendor and SKU Management Department (15%)						
Functional	**Strategy**	**Strategy Weight**	**Score**	**Metric**	**Performance Predicted**	**Actual**
Analyze Vendor Performance, Drive Improvement, and Strengthen Negotiations. Improve Performance Across the Supply Chain	Performance of category and products	20%	3%	Category contribution, category scorecard		
	Operational issues in delivering the product	10%	2%	Role analysis		
	Profit contribution of each product	30%	5%	Profit contribution, pricing modules		
	Results of promotional efforts	25%	4%	market comparison		
	Forecasting efficiency of various product levels	15%	2%	Share of shelf, sales forecast		

Finance and Accounts Department (10%)						
Functional	Strategy	Strategy Weight	Score	Metric	Performance Predicted	Actual
Returns, Fraud and Loss Prevention	Predicting return trends by product and SKU; and keeping necessary reserves.	40%	4%	Back orders, cancels, Distribution sink		
	Predicting return trends by product and SKU; and keeping necessary reserves.	40%	4%	Mark down, natural losses		
	Lesser Pricing inefficiencies	20%	2%	Return rates, risk adjusted return		

HR Department (15%)						
Functional	Strategy	Strategy Weight	Score	Metric	Performance Predicted	Actual
Human resource and allocation of resources to individual project and assignments	Recruitment new sales force	20%	3%	retention rate, cost of recruitment		
	Training and development	30%	5%	Training expense, number of hours		
	Compensation	15%	2%	salary rate per sales		
	Employee feedback to increase performance	15%	2%	plans on feedback,# of feedback		
	Employee engagement program and retention rate	20%	3%	attrition rate, job satisfaction index		

Change Management for Cloud Strategy

The organization would go through the following change curve during the change management process:

The change curve moves through the following stages:

Shock—This is the initial stage of introducing the change and hence comes as a shock to the employees. The employees are most resistant to change in this stage (Fig. 5.24).

Denial—The employees do not want the new system and want to stick to the old system.

Frustration—The employees are frustrated in this stage because they are ignorant of the new system. They do not encourage learning the new system too.

Depression—This is the stage when the leader's role is most important. The employees should be motivated to welcome the change.

Experiments—The employees need to be trained and imparted knowledge about the new system in the experimentation stage. The leaders should ensure to reduce sources of confusion and anxiety.

Decisions—Here employees take the decision whether to accept or reject the change.

Integration—In this phase, changes throughout the organization are integrated for successful completion of the entire process.

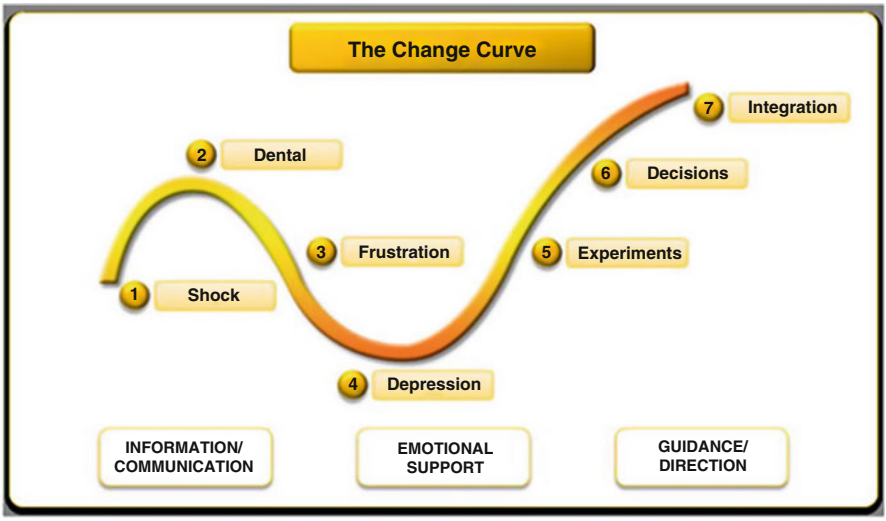


Fig. 5.24 Change curve

With the implementation of new processes, different stakeholders are affected and involved. The way they work and interact with each other will change. This might create the apprehensions in them leading to resistance.

Before implementing the change management process, the following should be kept in mind:

Find out, who all will be impacted by the change and how?
Employees will be the most impacted. As they have to go through trainings to learn new skill sets as well as processes. This might increase their workload. Employees also have to adhere to new policies as well as reporting standards.

Find out why they will create resistance?
One of the primary resistances might be due to the adoption of new technology. With the use of new technology, resources with older technologies might be apprehensive of losing their jobs and hence might create resistance. Another might be due to the new reporting procedures which might cause the employees to be more regular and punctual. One more potential resistance might be due to the increased workload because of increase in training activities to prepare them to work with the changed system and process.

The Change Management process has to incorporate the following steps:
First of all we identify those processes which need to be modified and/or automated. Then a cost benefit analysis and a feasibility test are performed and we check if there are any integration issues with the existing system. In case there are no integration issues, we proceed with a detailed roadmap citing the milestones and the estimated duration of the each intermediary step. We also provide necessary training to the concerned staff who would be handling the system. The progress is being monitored at regular intervals and we check whether the actual benefits achieved are the same as envisaged. In case of integration issues, resolve them taking into consideration the opinions of the concerned stakeholders.

Certain key elements needed to be taken in order to ensure successful transition:
Firstly, management at the level above where the change takes place should play an active and visible role throughout the transition period. Moreover, the direct supervisors of individuals concerned should be put to contribution. Overall leadership of the operation should be entrusted to a top manager. On the whole, there should be no change in priorities so long as the intended change has not been sufficiently integrated. And a mechanism parallel to the usual management mechanisms is put in place to ensure that the project is managed and monitored. While, the affected staff members are provided with tangible, close and sustained support, sufficient resources are also made available to support the staff in its transition efforts. Finally, Progress is regularly monitored in order to identify gaps, which are then rapidly corrected.

Implementation Framework

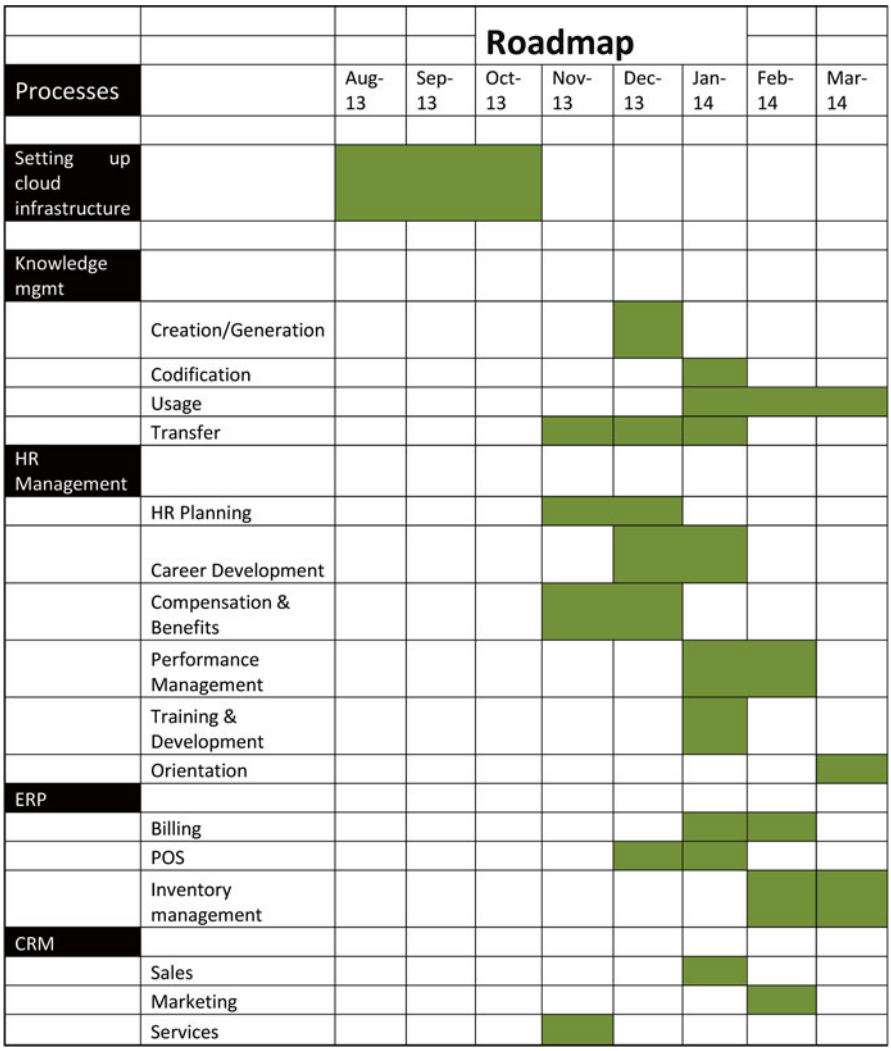
Business Objective

Myntra's long-term business strategy is designed to capitalize on the numerous opportunities that exist in the e-commerce marketplace and related markets. They strategically invest in product, technology, brand support and customer service to improve their market positioning in an effort to achieve long-term growth and profitability and create shareholder value. In support of this strategy, they are investing in operations on a wide basis while controlling the growth of operating expenses. The main business objectives towards driving this project are acquiring new customers, improving customer service and providing high quality deliverables and efficient supply chain management.

Business Process

Business Process is implemented based on priorities, which in turn are chosen based on business requirements. Myntra being a rapidly growing e-commerce website—the CRM process is a highly critical process followed by Market Research and Sales Forecasting. The next set of processes is Advertising and Promotion, Payment Processing and Outbound Logistics.

Roadmap



Critical Success Factors

CSF are the essential areas of activity that must be performed well if you are to achieve the mission, objectives or goals for your business or project. As a common point of reference, CSFs help everyone in the team to know exactly what's most important. And this helps people perform their own work in the right context and so pull together towards the same overall aims.

A CSF is not a key performance indicator (KPI). CSF are elements that are vital for a strategy to be successful. KPIs are measures that quantify management objectives and enable the measurement of strategic performance. A CSF is what drives the company forward, it is what makes the company or breaks the company. As staff must ask themselves everyday "What makes us the first choice of customers?" and they will find the answer is the CSF.

There are four basic types of CSF. They are:

1. Industry CSFs resulting from specific industry characteristics;
2. Strategy CSFs resulting from the chosen competitive strategy of the business;
3. Environmental CSFs resulting from economic or technological changes; and
4. Temporal CSFs resulting from internal organizational needs and changes.

All data of stakeholders in the master database are making information retrieval instantaneous. We need to confirm that there is Single Data Entry point to store the master data. Implementation of project is within the budgeted amount and stipulated time without any major deviations or variability. We also assume that all the end users are happy and satisfied with less number of complaints. Also all the users are using the implemented system in the system with higher frequency. Assume improved relations with Suppliers and vendors as an outcome of faster processes. And the success of the project coincides with increase in productivity and efficiency of the system.

Steering Committee

Any Cloud strategy implementation faces the biggest hurdle in the form of change management. People are reluctant to adopt the new processes and the customers as well pose stiff resistance. However, in order to have a smooth transition to the new process, the roles and responsibilities should be clearly defined so as to have accountability in the system (Fig. 5.25).

Senior Management Review

Role of VP-Human Resources

The main role of a VP-HR will be primarily to improve the recruitment process to take motivated employees and reduce attrition. Also improve training and development to improve employee performance. Designing the salary structure for employees and review of compensation based on employee's cost-to-company and revenue generated per employee also falls under the gamut of responsibilities. Provide incentives to reduce absenteeism and implement the performance appraisal process and help the senior management in conducting the process.

Critical Success Factor for Myntra		
Critical Success Factor	**Source of CSF**	**Primary Measures & Targets**
Increase in Customers count	Environmental (Targeting the tier2 and 3 cities)	Increase in the number of new users
		Increase in customer retention
		Robust front end architecture for smoother customer buying experience with lesser lag time (for all gadgets and pc)
Increase in Sales		Increase in average time spent per user
Increase in ROI		Increase the Traffic Sales Conversion rate to >10%
Increasing the repeat sales		Increase average basket size of customers to bundling and dynamic buying recommendations
High Quality Deliverable	Industry (Quality of work)	Zero Customer Complaints
		Provide personalized service
Suppliers and Vendors better relationship		Faster Clearance Process
		Reliable supply of merchandising to cater to the demand
Robust Master Data Management	Strategy (Improve timeliness of deliverables)	Business process reengineering and linking the back office systems to the cloud
Acceptance of activity tracker by stakeholders		100% workflow management and activity tracker
		Higher frequency of System Usage
Acceptance and use of automated processes by the employees and peripherals		Training and 99% automated data entry process and analytics and metrics
MIS/ERP/CRM Accuracy, efficiency and relevance		Many Strategic Reports

Fig. 5.25 Critical success factors

Role of Head-Brand Marketing

The main responsibility of a BM-Head will be primarily to connect users with brands in creative and most effective ways. Performing analytics through social media to find consumer insights and current trends and leveraging these consumer insights to influence product development also fall under the umbrella. He must also oversee brand management and work on bringing new brands to the store while improving social media presence and promotions in social media to improve brand visibility.

Role of Chief Operating Officer

The main role of a COO will be primarily to coordinate with the CEO to decide on the future direction of the company. Oversee periodic financial statements to ascertain the financial health of the company, to improve the inventory turnover rate, oversee the design and implementation of labour schedules are some of the other roles of the COO too. Improve the inventory management systems and look for new opportunities and threats to the company also lie under the hood.

Role of Chief Strategy Officer

The main responsibility of a CSO will be primarily to assess the strengths/weaknesses of the current business strategy, develop a new business strategy, if needed. Also to check the feasibility of the strategy and implement it across departments and to cascade the strategy to the lower levels of the company, with appropriate incentives to align personnel goals with company goals falls under the gamut of responsibilities.

Role of the Chief Technology Officer

The main role of a COO will be primarily to overview the current technologies used in the company's products and services manage innovation in the company and identify new and emerging technologies and their feasibility for implementation in the company

Role of Chief Executive Officer

The main responsibility of a CSO will be primarily to lead, in conjunction with the Board of Directors, the development of the company's strategy as well as oversee the implementation of the Company's short and long-term plans in accordance with its strategy. He also has to act as a liaison between the management and the Board, while communicating effectively with employees, Government authorities, other stakeholders and the public. He also needs to determine the date, place and time of the annual meeting of shareholders and to develop the agenda for the meetings. On an overall basis he needs to keep abreast of all material undertakings and activities of the company and all material external factors affecting the company.

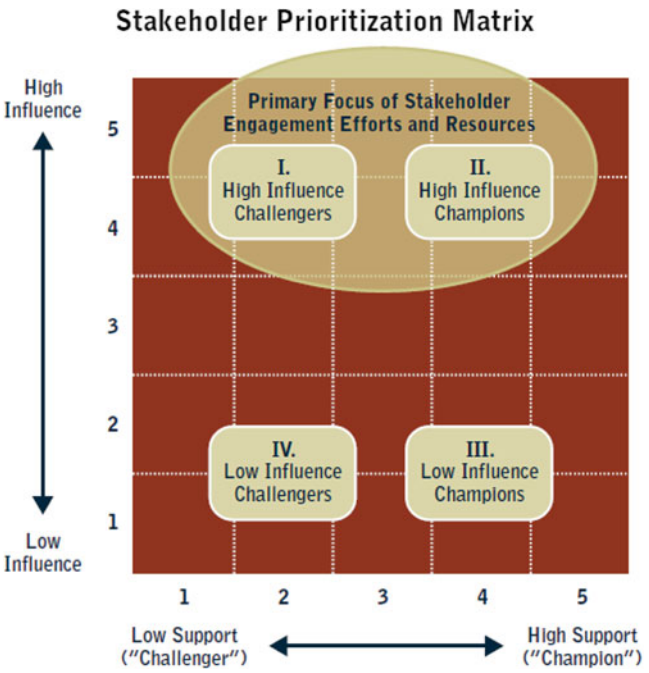
Roles and Responsibilities

Roles	Responsibilities
Steering Committee	• Drive the project—set goals and milestones
	• Oversee the adherences to the timelines
	• Organize and review the efficiency of the project
	• Resolve the exceptions generated—technology decision
Consultant	• The auditor to review the correctness of the process, procedures and standards for the "To Be Process"
	• Validate the effectiveness and efficiency us of the process.
	• Compliance to Quality standards
Users	• To adhere to the processes and timelines.
	• Report any discrepancy spotted.
	• Undergo training for proficiency in use of system to achieve optimum productivity.
	• Provide Feedback

Communication Protocol

Myntra Stakeholder Communication Map				
		Type	***Description***	***Communication Strategy***
Internal Stakeholders	***Tier I***	***Executive Leaders***	Stakeholders most directly involved with defining vision, mission and goals of the company.	Direct communication is needed to define the benefits to them in company GMs
	Tier II	***Employees***	Stakeholders most directly impacted by changes resulting from the cloud strategy	Communication citing the alignment to goals of the company, various benefits in terms of efficiency, cost savings and quality improvements with better stakeholder engagement programs.
		Customers		
	Tier III	***Retail Shareholders***	Stakeholders not directly related to the project but may have general interest in the project's outcome	Indirect communication should suffice though less energy should be utilised towards this
External Stakeholders		***Non- Core Suppliers, Govt. Authorities, etc***	External Stakeholders with direct/indirect interest in the project. Having commercial interests that may be directly impacted by the project or having simple general interest in the outcome.	Minimal or No communication is required.

Stakeholder Prioritization Matrix



High Influence Challengers: Outreach efforts should be designed to convert them to champions. Simultaneously plan of countermeasures to help equalize/neutralize any actions they might take that could potentially harm or sabotage the project should be done.

High Influence Champions: Proactively leverage the positive inputs from these individuals to further the business objectives and to build a strong support foundation.

Low Influence Challengers: Maintain awareness of any awareness that could potentially harm the project, but put less energy into converting these challengers to champions.

Low Influence Champions: Make an effort to ensure that the positive relationships are maintained, but put less energy into further cultivating these champions.

Training

Initially the deliverables that are expected at the end of training are clearly identified. After the deliverables are clearly defined, we identify the methods and assist in coaching and training so required skills are developed. This would be done through hands-on workshop for the user/employees. The employees need training for using the cloud implementation (CRM/ERP/MDM, etc.). We also need to develop a training calendar and a review mechanism for the imparted training. In the meanwhile we continue motivating and counselling the users through various channels to reiterate the benefits of the new system and the process enablement.

Risk Management

Please refer the worksheet for detailed elaboration

Sl. No.	Type of risk	Risk identified	Impact (in crore Rs.)	Probability (%)	Impact factor	Risk index	Risk mitigation plan	Cost	Total cost	Remarks
1	Business Risk	Regulatory changes	200	30	8	480	Strong Lobbying	5 crores	*75 crores*	Go with the Risk Mitigation Plan as the cost of undertaking is less than the risk
		Using websites to conduct illegal promotional games, such as a sweepstakes or contests					Adaptive measure to oppose policy changes	10 crores		
		Impact on business due to intellectual property lost due to employees moving to competitors					Correct collection and database for intellectual property	10 crores		
		Products out-of-stock due to poor communication with operations					Data warehousing and data mining for store data	18 crores		
		Insufficient integration of e-commerce with supply chain channels					Usage of better software packages	5 crores		
		Burn Rate, COD being one of the factors					Have a strategic plan with a timebound investment structure and have more working capital	25 crores		
		Risk due to unprotected domain names which are usurped by other organizations					Continuous revival and maintenance of domain server	2 crores		

2	Information Risk	Content on web page exposing web publisher to libel, defamation of character, slander	200	10	7	140	Infrastructure development and maintenance plan	15 crores	*24.5 crores*	Go with the Risk Mitigation Plan as the cost of undertaking it is less than the risk
		After unauthorized access to a website, online information about employees or customers is stolen, damaged or released without authorization					Copyright infringement act awareness	50 lakhs		
		Credit card information intercepted in transit is disclosed or used for fraudulent purposes					Intellectual property rights	4 crores		
		Information that has been changed or inserted in transmission is processed leading to erroneous results					Use of encryption methods for data transformation	5 crores		
3	Technology Risk	Software error and omission risks causing unauthorized access	50	40	6	120	Selection and maintenance of good software vendor	6 crores	*13 crores*	Go with the Risk Mitigation Plan as the cost of undertaking it is less than the risk
		Third party intercepts credit card information in transit causing breeches in security for online payments					Internet service provider security	2 crores		
		Insufficient bandwidth to handle traffic					Careful in third party and payment transactions	5 crores		

(continued)

(continued)

Sl. No.	Type of risk	Risk identified	Impact (in crore Rs.)	Probability (%)	Impact factor	Risk index	Risk mitigation plan	Cost	Total cost	Remarks
4	Competitive Risk	Change in the mode or basis of competition to its own disadvantage	250	10	5	125	Keeping track of competitors movement	2 crores	*7 crores*	Go with the Risk Mitigation Plan as the cost of undertaking it is less than the risk
		Badly timed strategy					Avoidance unusual competition	5 crores		
5	Business Partner Risk	Increased use of outsourcing	200	20	6	240	Good relationship with suppliers by giving incentives	2 crores	*3 crores*	Go with the Risk Mitigation Plan as the cost of undertaking it is less than the risk
		Putting suppliers out of business line					Agreements and contracts are maintained	1 crore		

Conclusion

Myntra today faces numerous challenges which are synonymous with any growing company. As Myntra had carved a niche for itself in the beginning, it was able to manage its operations with ease. But with the deluge of numerous e-tailing websites, the company is losing its charm.

In order to grow to the next level, Myntra must re-engineer some of its processes and bring in automation and cloud to manage its ever growing product line and satisfy its evermore demanding customers. The implementation of cloud strategy may be carried out in order to improve the processes, quality of service while increasing the revenue (and profitability).

The suggestions made, if implemented, will drastically reduce the cost of operations for Myntra and at the same time free more working capital which is essential for catapulting the company to a higher trajectory of growth. Also it would help the operations of the company to be aligned towards its vision, mission and goals.

Chapter 6
Case Study: Developing Cloud Computing Strategy for Dabur

Case Overview

The major objective of this project is to design an IT Implementation strategy for Dabur. Many of the FMCG companies in India have a similar structure hence this IT strategy might as well be applicable to other companies in the Indian FMCG sector. Most of the processes in Dabur have now been computerized with the advancement of technology, but there is a disconnect between various functions at Dabur and a major portion on data available cannot be leveraged for obtaining competitive advantage due to this lack of integration. We interviewed few of the professionals (ASMs and Sales Executives) working in Dabur to get an idea of the existing processes in Dabur. We also looked at the competitors of Dabur such as Reckitt Benckiser and P&G to analyze processes followed there. We also looked at industry reports on current trends in the Indian FMCG sector and current applicability of Cloud Implementation in the FMCG segment. And then taking into account the Vision, Mission and Goals of Dabur we were able to chalk out an implementation plan for IT Strategy for Dabur.

We have suggested that Dabur leverage the Cloud Implementation technology to streamline its business processes. This will not only ensure that they are able to fulfill their promise to their investors to accelerate profitable growth, but also will ensure future scalability, security and higher efficiency at lower costs.

Stakeholders such as investors, suppliers, distributors, etc. will have better integration with one another and with Dabur, resulting in a just-in-time model, which will ultimately add value to the business partners.

With increase in its business Dabur needs an IT infrastructure that is Scalable, Manageable, Secured, Portable and Durable. Cloud is definitely the way forward with the growing demand for flexibility and increase in competition.

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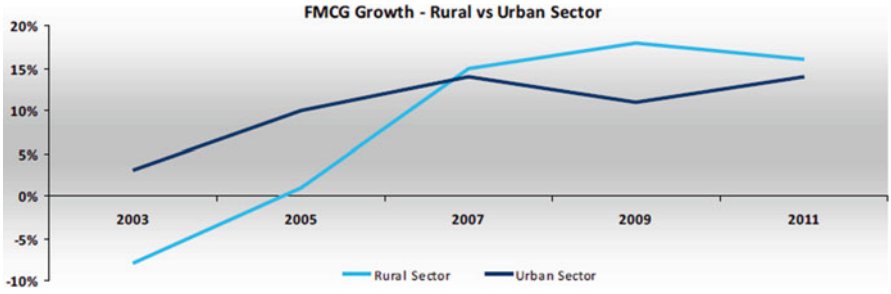
SWOT Analysis for Indian FMCG Sector

- *Strengths*:
  - Moderate operating costs.
  - Established distribution networks in both urban and rural areas.
  - Presence of well-known brands in FMCG sector.
  - Favourable government policies.
- *Weaknesses*:
  - Lower scope of investing in technology and achieving economies of scale, especially in small sectors.
  - Low exports levels.
  - Counterfeit Products.
- *Opportunities*:
  - Untapped rural market.
  - Rising income levels, i.e. increase in purchasing power of consumers.
  - Large domestic market—a population of over one billion.
  - Export potential.
  - High consumer goods spending.
- *Threats*:
  - Removal of import restrictions resulting in replacement of domestic brands.
  - Slowdown in rural demand.
  - Tax and regulatory structure.

PES Analysis of Indian FMCG Sector

- *Political*:
  - *Tax Structure*: Complicated tax structure, high indirect tax, lack of uniformity, high octroi and entry tax and changing tax policies.
  - *Infrastructure Issues*: Performance of FMCG is very much depended on government spending on Agricultural Infrastructure, Power, and Transportation Infrastructure.
  - *Regulatory Constraints*: Requirement for multiplicity of permits and licenses for various states, prevailing outdated labour laws, cumbersome and lengthy export procedures, confusing and time consuming subsidy availing procedures.
  - *Policy framework*: Approval related to investment of FDI into Retail sector (single-brand retail and multi-brand retail), license rules in setting up of Industry, changes in Statutory Minimum Price (SMP) of commodities and Priority sector classification of Industries.

- *Economic*:
  - *GDP Growth*: Growth of the industry is consistent with the Indian economy.
  - *Inflation*: Inflationary pressures alter the purchasing power of money. This has a direct impact on consumer spending and business investment.
  - *Consumer Income*: Increase in incomes is mainly an outcome of economic growth across sectors. Over the past few years, India has seen increased economic growth, with a continuous and substantial impact on consumer disposable income which enabled good growth for the FMCG sector.
  - *Private Consumption*: The Indian economy, unlike other economies, has high rate of private consumption (61 %).
  - *Urbanization*: India has 70 % of its population living in rural areas. With rising urbanization, more people will have exposure to modern products and brands and thus market focus shifts to branded and packaged goods and products.
- *Social*:
  - *Change in consumer Profile*: Rapid urbanization, increased literacy and rising per capita income, have all caused rapid growth and change in demand patterns, leading to an explosion of new opportunities. Around 45 % of the population in India is below 20 years of age and the young population is set to rise further.
  - *Change in Lifestyle*: Changing Lifestyle of Indian consumers has led to focus on premium products among Indian FMCG players.
  - *Rural focus*: As market is getting saturated, companies are focusing on rural area for penetration, by providing consumers with bite-sized or single-use packs.



About Dabur

Dabur India Limited is a leading Indian consumer goods company with interests in Hair Care, Oral Care, Health Care, Skin Care, Home Care and Foods. It is one of the leading consumer goods company in India with a turnover of Rs. 5,283 crores (FY12). It has two major strategic business units—Consumer Care Business and International Business Division (IBD). It also has two Subsidiary Group companies—Dabur International and NewU. It has 17 ultra-modern manufacturing units spread around the globe. Dabur's products are marketed in over 60 countries. Dabur has achieved wide and deep market penetration through 50 C&F agents, more than 5,000 distributors and over 3.4 million retail outlets all over India.

TEL Analysis of Dabur

- *Technological*:
  - Dabur established Dabur Research Foundation (R&D centre) to focus on new product developments in FMCG and Pharmaceutical segment.
  - Dabur has also made continuous efforts towards technology absorption and innovation, which have contributed towards preserving natural resources. These efforts include:

    Minimum use of water in process by pre-concentration of herbal extract and reduction in concentration time.

    Uniform heating in VTDs by hot water as against steam earlier, resulting in 30 % reduction in bulk wastage by using non-stick coating and formulation change.

    Improvement in water treatment plant through introduction of RO (reverse osmosis) system for DM water, reutilization of waste water from pump seal cooling and RO reject waste-water management.

    Introduction of water efficient CIP system with recycling of water in fruit juice manufacturing.

    Development of in-house technology to convert fruit waste into organic manure by using the culture *Lactobacillus burchi*.

  - The Company has achieved a host of significant benefits in terms of product improvement, cost reduction, product development, import substitution, cleaner environment and waste disposal, among others.
- *Environmental*:
  - *At Dabur*, *environment and nature is the lifeline of our business*: With a portfolio of Ayurveda and nature-based products, conservation of nature and natural resources is deep rooted in the organizational DNA, and in every aspect of Dabur's business.

- *Conservation of Energy*:

  Dabur has been undertaking a host of energy conservation measures. Successful implementation of various energy conservation projects has resulted in a 13.8 % reduction in the Company's energy bill in the 2008–2009 fiscal alone. What was noteworthy was the fact that this reduction has come despite an 8–9 % volume increase in manufacturing, and an average 11.7 % increase in cost of key input fuels.

  The host of measures—key among them being use of bio-fuels in boilers, generation of biogas and installation of energy efficient equipment—helped lower the cost of production, besides reduce effluent and improve hygiene conditions and productivity.

- Health Safety and Environmental Review

  Renewing the commitment to Health Safety and Environment, Dabur has formulated a policy focusing on People, Technology and Facilities. A dedicated "Safety Management Team" has also been put in place to work towards the prevention of untoward incidents at the corporate and unit level, besides educate and motivate employees on various aspects of Health, Safety and Environment

  The Company is also continuously monitoring its waste in adherence with the pollution control norms. In pursuance of its commitment towards the society, efforts have also been initiated to conserve and maintain the ground water level. The efforts include implementation of rainwater harvesting, which has delivered encouraging results and has put the company on the path to becoming a Water-Positive Corporation

  Dabur also initiated a Carbon Foot Print Study at the unit level with an aim to become a carbon positive Company in years to come

Vision and Mission of Dabur

- *Vision*:
  - "Dedicated to the health and well-being of every household."
- *Mission*:
  - Being a Leader in the Natural Foods and Beverages Industry and aiming at offering High Quality products while creating maximum returns for the Stakeholders.

Strategic Intent of Dabur for Business and its Stakeholders:

The strategic intent is to significantly *accelerate profitable growth*. To do this, Dabur will:

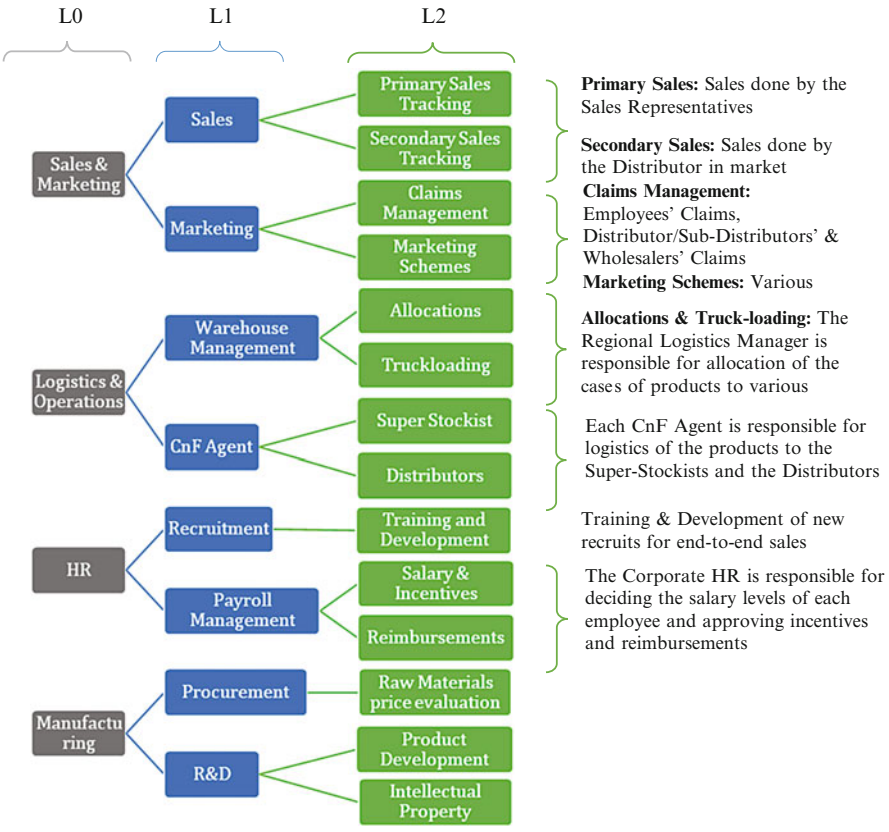
- Focus on growing its core brands across categories, extending to new geographies, within and outside India, and improving operational efficiencies by leveraging information technology.
- Be the preferred company by target consumers to meet their health and personal grooming needs with safe, efficacious, natural solutions by intermingling their deep knowledge of Ayurveda and herbs with modern science.
- Provide target consumers with innovative products within easy access.
- Build a platform to enable Dabur to become a global Ayurvedic leader.
- Be a professionally managed employer of choice, attracting, developing and retaining quality personnel.
- Be a responsible citizen with a commitment to environmental protection.
- Try to provide superior returns to its shareholders, relative to its competitors.

Mapping Functions and Processes within Dabur

Dabur resembles any typical FMCG company in its structure with following being the major functions:

- Sales and Marketing
- Logistics and Operations
- HR
- Manufacturing

The following diagram depicts an L0, L1 and L2 view of the various processes in these functional departments:



Factors Affecting IT Strategy

Service Level Agreements: The SLA between Dabur and other stakeholders such as the suppliers, logistics, distributors, etc. will play an important role in formulating the IT strategy.

Real-Time Data Issues: There may be a need to update Product price and data on a real-time basis so that there are no discrepancies.

Time to Market: With development of the competition, the need of the hour is to respond quickly to customer demands, hence time to market in these conditions becomes very important to gain competitiveness over the others.

Reliability of system: The system needs to deliver 99.99 % up time for continued service.

Regulatory Compliance Requirements: Governmental agencies regularly track various records to check compliance. Hence, effective compliance requires real-time

information and identification of compliance issues. Moreover any change in the regulatory framework of health–related issues will have a severe impact on parts of Dabur's business and profitability. Therefore, while designing IT strategy the above factors need to be considered and serves as one of the key challenges.

Business Continuity and Data Recovery: With a size of the company as Dabur it is imperative to have business running without any obstacles. IT will help Dabur to plan business actions well in time, so as to avoid any roadblock to business.

Transparency: Uniformity of information over data and customer details.

Applications Integration

Application Integration Considerations

- Request for information versus request for processing
  - Is the application integration solution intended for informational access only or is it intended to integrate requests for processing as well?
- Foreground versus background integration
  - Are the applications providing some result to the user (e.g. a real-time process where user is retrieving a price quote for a particular product) or are the applications running behind the scenes (e.g. data synchronization of pricing information to all the local stores from the central office).
- Operation latency (applications and/or data queries)
  - What is the time required for completion of an operation in the application? Operations that can't be completed in less than a few seconds require implementation of asynchronous methods of integration. For example, a query on product inventory could be a quick operation whereas the assessment of the production plan for manufacturing that inventory could even take hours to complete.
- Geographic proximity
  - What is the geographical proximity of the applications being integrated w.r.t one another? Integration of applications residing at the same data centre may have smaller integration latency than integration of applications present at geographically distant locations.
- Process re-engineering
  - Are we looking at re-engineering the business processes or just extending the already existing business processes?

Best Practices for Application Integration Using Cloud

- *Enabling smooth and non-disruptive consolidation*: System consolidation is a key step to private cloud architectures. But, we should ensure that there should be no or very less downtime for our critical systems. We can leverage log-based, real-time data replication to consolidate the databases without database downtime. Automation should be preferred over manual scripts for fast time to value.
- *Integrate applications at data-laye*r: In the private cloud environment, shared application services are a key requirement for enabling agility and best use of resources. The same applies to data access and other important data manipulation requirements like transformations and data quality. The application integration should be done at a cloud environment with easy-to-deploy data services.
- *Connect non-cloud systems with private cloud*: If some applications are being hosted on private cloud, most likely we won't have all the desired applications in the cloud environment from the first day itself. For business operations, we will need to share the data in our stand-alone enterprise systems with the newly implemented private cloud environment. Real-time data integration can help by enabling data sharing and distribution to support the fast-paced business processes and to achieve a holistic and up-to-date view of operations.
- *Connect non-cloud systems with public cloud*: Some of our applications may be present on public cloud and we may need to access the application data from the cloud for our business operations. This is critical not only for some of the business processes depending on this data on the cloud, but also have a complete view of your business for better decision making across the board. Hence the non-cloud systems should be properly integrated with the public cloud.
- *Ensuring continuous availability for data infrastructure*: In addition to enabling continuous operations while migrating to cloud, we need to choose or build an environment that has minimal unplanned and planned downtime.

Technology Integration

Cloud Strategy

A cloud strategy implementation will impact the way Dabur innovate products and processes. The huge amount of computing power will enable Dabur to efficiently manage the various resources leading to better profitability.

IaaS (Infrastructure as a Service)

Dabur would require its own servers and storage devices for running its OS, applications and databases for its confidential and secure data and applications. IaaS is required for the on-premise private cloud component as mentioned later on in the cloud architecture.

The service delivery layer processes like demand management, procurement, business relationship management, service catalog management, service lifecycle management, capacity management and information security management are to be implemented on the private cloud.

The management layer processes like financial management, services reporting, security management, network management, corporate HR, sales and marketing and production management are also to be implemented on the private cloud.

Platform as a Service

Dabur would also need flexibility to configure the applications as per its own requirement. Platform as a Service (PaaS) model can be implemented for the provisioning of Public cloud component of the hybrid network. Application developers can develop and implement the software solutions on the cloud platform without incurring the complexity and cost of buying and managing the underlying software and hardware layers.

The operations layer processes like secondary sales tracking, master data management, employee management, knowledge management, request fulfillment, change management and claims management are to be implemented in the public cloud. Operations layer is directly connected with the services delivery layer and management layer which are part of the private cloud. The various processes as part of the cloud strategy will have to be implemented with the platform as a service model.

In the FMCG industry data associated for channel usages, service requests, and history on a channel basis are collated on a regular basis. Products are sold quite fast compared to any other industry. In case of Dabur, the cloud implementation strategy must consider the fact that FMCGs have a shot shelf life, so the amount of data that has to be collected for efficient market research is huge. PaaS implementation for provisioning of public cloud has to take care of the various data collection processes in such a way that there can be continuous data movement to service delivery and management layer on demand basis.

Challenges in Implementation of Cloud Strategy

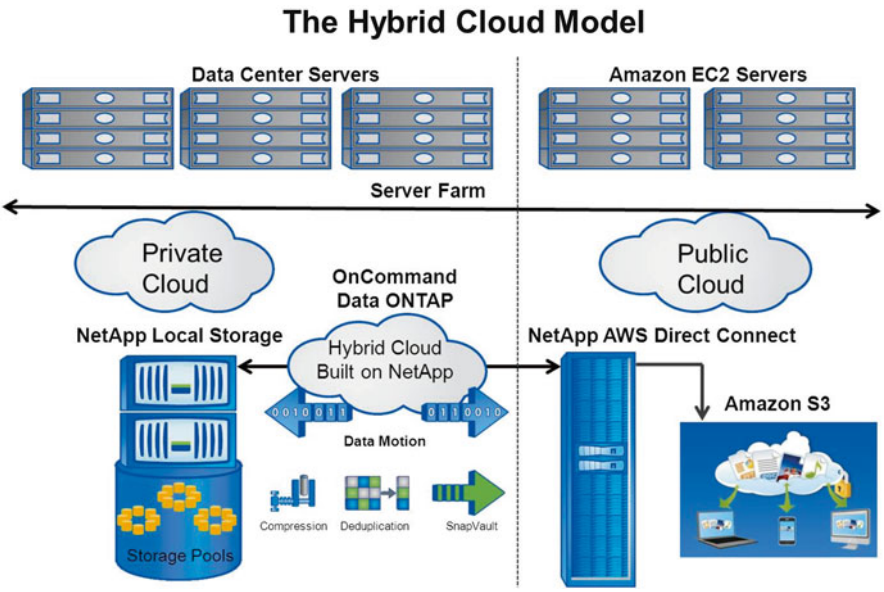
The efficient management of supply chain in the FMCG industry is a big challenge. The cloud implementation must take care of all the intricacies of the supply chain in case of Dabur. Reduction of process costs and minimization of wastage are of prime importance while implementing cloud. Efficient collaboration and communication among the stakeholders should be taken care off. The various campaigns during a product launch leads to sudden flow of huge amount of data. An efficient system will be able to capture data on constant basis and can deliver on demand basis.

Cloud Architecture

Dabur is a major player in the field of Ayurvedic products. Hence it owns a lot of patents, copyrights and other such sensitive information. The *R&D department* of Dabur deals with new product developments, the data for which needs a highly secure environment. These factors demand that the cloud implementation for Dabur should be on a highly secure network in order to prevent data leakage/data loss of any kind. An on-premise *Private Cloud* model would thus be apt to host the applications related to these functions. The Private Cloud model would thus help Dabur in the standardization of cloud service management processes while maintaining highest level of security.

But apart from this, other general processes, e.g. *Primary and Secondary Sales Tracking*, which may not require such high security environment could be hosted on a *Public Cloud* for cost minimization. A public cloud offers high scalability and a huge cost advantage.

Thus the two deployment models can be integrated together in the *Hybrid Cloud architecture* for Dabur.



Two combinations of Service Models and Deployment Models can be prescribed for Dabur. Dabur would require its own servers and storage devices for running its OS, applications and databases for its confidential and secure data and applications. Thus it would require *Infrastructure as a Service* (*IaaS*) for the on-premise Private

Cloud component. Similarly for general applications, Dabur would need flexibility to configure the applications as per its own requirement and hence could go for *Platform as a Service* (*PaaS*) model for the provisioned Public Cloud component of the Hybrid Network.

Benefits of Cloud to Stakeholders

Suppliers: The suppliers will be able to monitor demand in the factories well in advance, thereby reducing lead times. Demand forecasting and some data analytics could be done by the public cloud itself for the suppliers.

Distributors: The distributors will be able to place orders for the products which are high in demand in advance preventing any stock out situations.

Sales Representatives: The sales representatives will be able to monitor both Primary and Secondary sales data, which in turn will help them in achieving monthly targets and fulfilling their KPIs.

Marketing: The marketing team can make use of the previous demands and existing demands to create various promotions on the products and instantly roll them out to the market due to integration of the various other stakeholders, thereby reducing go to market time significantly, which in turn will affect the bottom line by pumping up sales.

ROI from Implementing Cloud

1. *Cost savings and rate of adaption*: By reducing costs brought about by delays in decision and quick transitioning to new capabilities to keep up with market trends, Dabur can rapidly improve the standing of their company against the competition which brings about more revenue quicker and gives them a chance to grab important market share.
2. *Total cost of ownership*: Because of a virtually non-existent barrier to entry and low technical skill requirement, cloud computing ensures that even non-IT staff can configure and run infrastructure and applications suited for the organization's needs. This includes savings through labour and expertise cost, maintenance costs, and of course installation costs.
3. *Rapid and dynamic provisioning of resources*: Cloud computing allows for the rapid provisioning of resources to scale to the growth or reduction eliminating the need for new equipment or decommissioning of no longer needed ones, ensuring that the new department or business unit becomes productive very quickly.
4. *Increased cost and margin control*: Growth in revenue and opportunities will allow Dabur to cater to new markets and widen its customer base for further growth and improvement. The scalability of cloud computing allows for the

avoidance of under or over provisioning of IT services which always ensures enhanced capacity utilization and avoidance of waste.

5. *Process improvement*: Through on demand solutions and shared services, organizations can capitalize on the development of new skills and solutions. This leads to better business processes which in turn ensure that the organization is lean enough to adapt to market changes and even see them as new opportunities for growth.

Methodology for Dabur: The cost savings for the industry in which Dabur operates comes to about 11 % of the Operating Expenditure. So the OPEX was first obtained from the annual report of the company. The opex rises on an average by about 5 % on a yearly basis and the cost of capital comes to about 16 %. So we discounted the cost savings of the first 5 years of implementation at the abovementioned rate and arrived at the present value of cost savings. The total return was thereby ascertained and annualized over a period of 5 years. The Return on an assumed investment of Rs. 100,000 lakhs came to about 8.98 %.

All figures are in lakhs	Year 1	Year 2	Year 3	Year 4	Year 5
Cost savings	41,000	43,050	47,355	5,2090.5	5,7299.55
Incremental CAPEX	100,000				
Discounting factor	0.862069	0.743163	0.640658	0.552291	0.476113
PV of inflows/(outflows)	–5,0862.1	3,1993.16	3,0338.34	2,8769.12	2,7281.06
Net present value (NPV)	6,7519.62				
Total return over a period of 5 years	1,53726.5				
Total investment	100,000				
ROI over a period of 5 years annualized	8.98 %				

Roadmap for Cloud Implementation

- Step 1: Assembling the team
  The adoption of the cloud is a strategic business decision that will allow Dabur not only to improve its IT efficiency but also help in achieving of business goals like streamlining its supply chain and extending its existing business processes to make them more accessible by third parties. Hence, the adoption of the cloud should be led by senior management of Dabur including the CEO and CFO. The CIO and CTO will play the role of key enablers. Resources will be drawn from IT, business (sales and marketing), finance, administrative and legal departments of Dabur to build a team that can address the various aspects of cloud adoption—strategic, tactical and operational.
- Step 2: Deciding on the enterprise cloud strategy
  While developing a strategic plan for adoption of cloud, each new cloud service will need to be evaluated against the current cost of delivery. For example, the

reduced capital costs for cloud services will need to be weighed against cloud service charges. Dabur will also have to determine whether to train its own internal resources on the new cloud technologies or pay for external services to provide the resources temporarily or permanently.

- Step 3: Selecting Cloud Services and Deployment Models
  We have come to the conclusion that Dabur should adopt IaaS and PaaS service models and the hybrid model of cloud deployment. Below is an example of how the service model may be adopted:

  – *Example Approach for PaaS adoption*:
    Analyze the available PaaS offerings in terms of TCO/ROI and the associated risks such as vendor lock in, interoperability and existing IT infrastructure.
    Define a PaaS strategy for both private and public implementations before adopting any specific PaaS offering.

- Step 4: Determining who will develop, test and deploy the cloud services
  The next step involves determining who will develop test and deploy the cloud services needed by Dabur.
- Step 5: Developing a proof-of-concept (POC) before the move to production
  The implementation team needs to ensure the following activities are completed before the existing systems are integrated with the cloud:

  – Verifying that the cloud service delivers required functionality in a test environment.
  – Verifying that all processes continue to work-end users simulate transactions.
  – Verify data recovery activities.

- Step 6: Integrating cloud with the existing enterprise services
  A huge company like Dabur has already invested a lot in existing services. Hence cloud adoption does not mean that all the existing services are replaced. Thus a seamless link needs to be established between the existing services and the newly implemented cloud services.
- Step 7: Developing and managing SLAs
  Creation of an SLA is important set expectations for service between Dabur and the cloud provider. As part of the SLA, a service availability target from the cloud provider should be included. The level of service may be lower if the service is tied to a non-critical data whereas if the data is critical, higher levels of service and appropriate penalty clauses may be agreed upon. Considerations must also be given to the different kinds of service models (IaaS, PaaS and SaaS) since each model brings in different requirements.
- Step 8: Managing the cloud environment

  – *Technical and Customer Support Requirements*:
    For an onsite private cloud, the management of the cloud would be consistent with the management of existing services within the enterprise.
    For Public cloud, the responsibility for management of the cloud service(s) would be decided in the SLA. The SLA will establish processes for

identifying a problem, who is responsible and depending on the impact of the problem, what resources are brought to bear to resolve the problem (from both consumer and provider).

A disaster recovery process must also be defined and implemented to protect Dabur and its digital assets.

Department Score Card

It helps in identifying the strategies pertaining to individual functional departments and further assisting in aligning the functional strategies to the functional goals which in turn are associated with the business goals.

Business Goals of Dabur:

- To be a market leader in the consumer healthcare space.
- Dabur has set itself a target to achieve a topline of Rs. 7,000 crores by the end of the 2013–2014 fiscal.

Business Metrics

The business metrics used can be broadly categorized into:

- Manufacturing and Operations Metrics:
  - No. of new products offered.
  - Percentage increase in the sale of adapted products.
  - Percentage of products adapted/targeted to the low-income consumer segment.
  - Order-to-delivery lead time.
  - Supply chain response time.
  - Delivery performance (On Time/Delivery Date).
  - Percentage reduction in energy/water usage/waste generated per unit produced/carbon footprint.
  - Percentage products in compliance with consumer product safety and labeling regulation.
  - Forecasting techniques and average forecast error rate.
  - Stock out rate.
  - Time-to-market.
- Sales and Marketing Metrics
  - ROMI = Increase in sales – Marketing campaign investment)/(Marketing campaign investment).

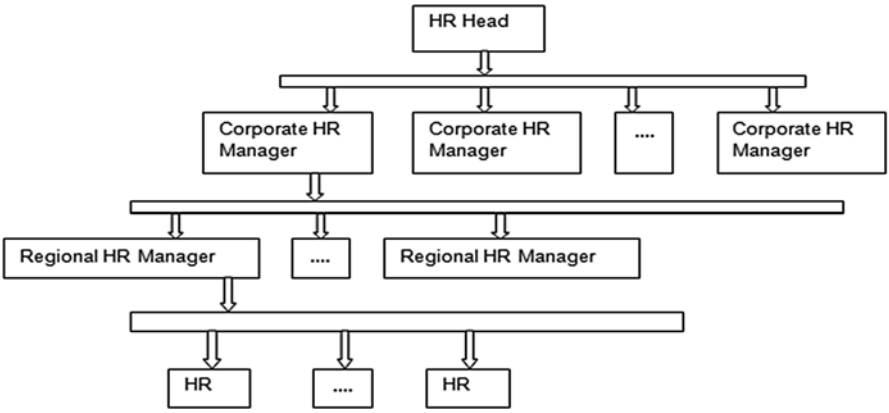
  - Cost per lead = Total cost of marketing campaign/Number of leads generated.
  - Engagement score = Number of leads generated/Number of contacts made.
  - Brand awareness = (Number of people who know brand Dabur/Number of people surveyed).
  - Market share = (Total sales made by Dabur/Total sales made by competitors).
  - Existing customer retention ratio = (Sales made to existing customers/Total sales).
  - Social media marketing on Facebook and other social networking websites.
  - CSR initiatives through Sustainable Development Society (SUNDESH).
  - Brand Fame Index = Perceived Popularity/Actual Popularity.
- Procurement Metrics
  - Past Trends.
  - Long Forward positions.
- HR metrics
  - No. of employees added per quarter.
  - Employee Productivity = No. of units manufactured per employee.
  - Average Salary person takes across departments.
  - Rate of filling the position.
- Financial Metrics
  - Sales.
  - EBITDA.
  - PAT (profit after Tax).
  - Shareholder's Fund.
  - Book Value per Share = (Equity + Reserve)/Total no. of outstanding shares.
  - Net fixed Asset Turnover.
  - Earnings per Share = Profit after tax/Total no. of outstanding shares.
  - Dividend per Share.
  - Market Capitalization = Total no. of outstanding shares × Market Price of a share.

Organization Structure

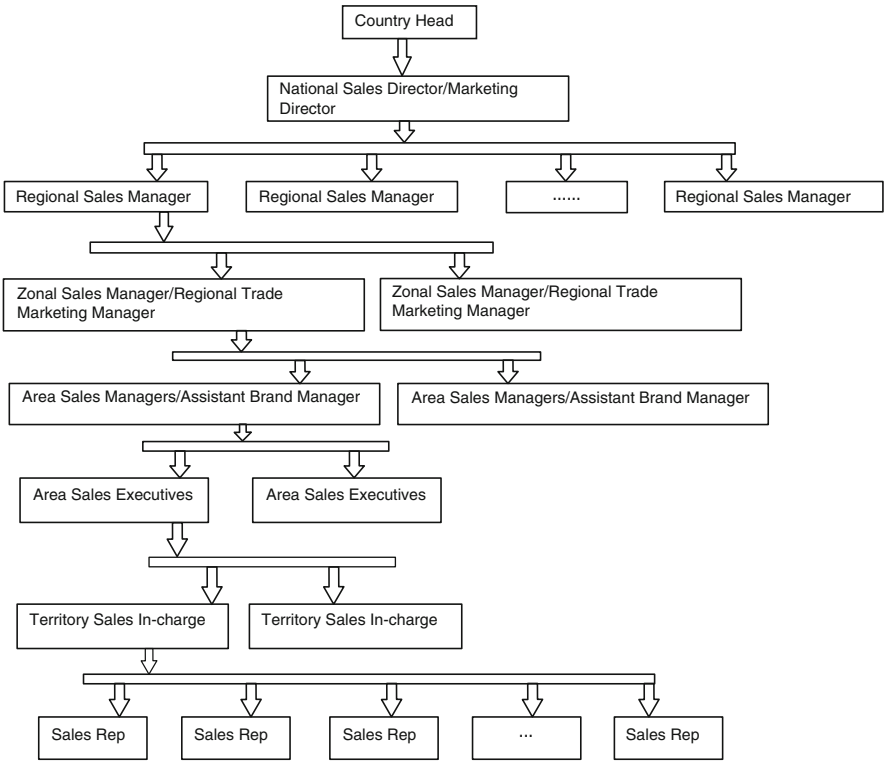
The following are the identified departments of Dabur industries:

- Manufacturing and Operations
- Sales and Marketing
- Procurement
- HR

The organization structure for HR department is shown below:



The organization structure of marketing department is shown below:



Department Scorecard

Functional goals	Functional strategy	Strategy weight	Metrics	Weighted score
Marketing (*0.40*)				
Increasing market share to be a market leader	Increase in market share (*Entering new geographies*)	0.4	• ROMI = Increase in sales—Marketing campaign investment)/ (Marketing campaign investment)	0.16
			• Cost per lead = Total cost of marketing campaign/ Number of leads generated	
			• Engagement score = Number of leads generated/Number of contacts made	
			• Brand awareness = (Number of people who know brand Dabur/Number of people surveyed)	
	Increase in market share (*Penetrating existing markets*)	0.4	• Market share = (Total sales made by Dabur/ Total sales made by competitors)	0.16
			• Existing customer retention ratio = (Sales made to existing customers/Total sales)	
	Branding Strategy	0.2	• Social media marketing on Facebook and other social networking websites	0.08
			• CSR initiatives through Sustainable Development Society (SUNDESH)	
			• Brand Fame Index = Perceived Popularity/Actual Popularity	

(continued)

(continued)

Functional goals	Functional strategy	Strategy weight	Metrics	Weighted score
Manufacturing/Operations (*0.3*)				
Introducing new, innovative and quality product within affordable price	Manufacturing innovative products and new packs within easy reach	0.4	• No. of new products offered	0.12
			• Percentage increase in the sale of adapted products	
			• Percentage of products adapted/targeted to the low-income consumer segment	
	Supply Chain realignment with corporate strategy	0.3	• Order-to-delivery lead time	0.09
			• Supply chain response time	
			• Delivery performance (On Time/Delivery Date)	
	Safety awareness and quality improvement	0.2	• Percentage reduction in energy/water usage/waste generated per unit produced/carbon footprint	0.06
			• Percentage products in compliance with consumer product safety and labelling regulation	
	Pull production system—Quantity of production at every stage is controlled by the demand in the next stage	0.1	Stock out rate, time-to-market	0.03
Procurement (*0.15*)				
Maintaining Profit margin by lowering procurement cost	Predicting commodity price movements in commodity exchange	0.6	• *Past Trends*	0.09
	Hedging activities	0.4	• Long Forward positions	0.06
HR (*0.15*)				
Talent acquisition, retention and improving productivity	Talent Acquisition	0.25	No. of employees added per quarter	0.0375
	Training and Development	0.35	Employee Productivity = No. of units manufactured per employee	0.0525
	Compensation	0.2	Average Salary person takes across departments	0.03
	Retention and Motivation	0.2	Rate of filling the position	0.03

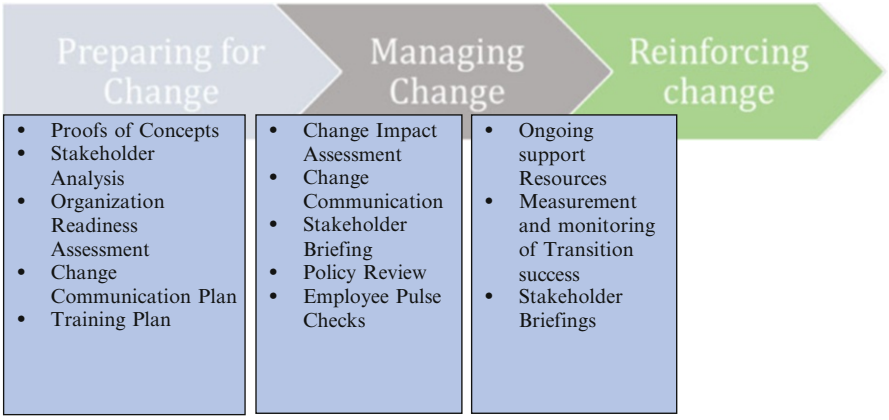
Change Management for Cloud Implementation

Defining the Future State and Assessing organizational Readiness: Transition to cloud exposes an organization to many benefits and capabilities. Many leaders do not fully understand the impact of a cloud-based environment on the resources, training, communications, and cultural changes. Hence defining the targeted future state and assessing organizational readiness is necessary, which includes the scope of benefits the organization anticipates.

Building Internal Support and Momentum: Transition to cloud may raise a lot of concerns among employees regarding changes in the mobility policies and changes in tools that enable document sharing and management. All staff should be confident that the move to cloud delivers the appropriate output for the entire organization. Through stakeholder engagement strategies, proofs of concept, business testing, and change teams, the organization should try to understand the full range of staff and management perspectives, and thus garner employee support for implementation success.

Cultivating Collaboration and Adoption: Leadership action planning, strategic communications, and training to employees is necessary for proper adoption of the new cloud tools.

Supporting Mobility and Aligning Policy: With the improvement in mobility that results from cloud solutions, employees need not be at the office or use a particular device to access their files or to engage with their team. But to achieve these improvements, legacy policies need to be reviewed and updated to support a mobile culture. The managers should roll-out plans to help staff understand new capabilities and expectations and adapt to new more agile ways of working



Managerial Implication for Cloud Strategy

The managerial implications will include the following-

1. *Information Sharing*: In the FMCG sector, extensive communication and collaboration among the different stakeholders is supremely important. The different stakeholder viz. suppliers, investors, employees and the end-consumers must have proper set of information for efficient functioning of the value chain. Dabur wants to innovate processes and products continuously to fulfill the needs of the consumers through its superior understanding of consumer requirements. Cloud implementation will enable the company to efficiently manage information on a larger scale thus providing various opportunities to the different stakeholders to reap collaborative benefit.
2. *Careful Supplier Selection*: Manufacturing industry without suppliers is like a building without iron pillars. Inefficient management of suppliers will surely lead to catastrophic results both financially and economically. Dabur will be able to select the best suppliers following the consistent set of information with the other stakeholders. The raw material information can be shared more efficiently with the suppliers in cloud strategy approach. The suppliers have proper information on the raw materials need to be supplied and Dabur can efficiently and effectively manage the quantity, quality, price and various other factors of a typical delivery system.
3. *Governance Process*: Dabur wants to be one of the preferred companies worldwide to meet the personal grooming and health requirements of the target consumers as part of its strategic intent. A solid governance process powered by an efficient cloud implementation strategy will help Dabur to manufacture efficacious and safe natural solutions by synthesizing in-depth knowledge of herbs and Ayurveda in coordination with modern sciences.
4. *Scalability*: There is a plethora of underlying process in Dabur like Secondary Sales Tracking, Service Catalog Management, Capacity Management, Master Data Management, etc. Scaling up is a fundamental requirement to stay competitive in the present business world. The only thing that needs to be taken care by Dabur is to innovate new processes but not at the cost of the underlying processes. An efficient cloud implementation strategy will help Dabur to understand the objective of growth from the stakeholder's perspective and to scale up strategically. The focus on developing brands categories across different core brands must not dilute the very strategic intent of Dabur.
5. *Cost Efficiency*: Managing supply chain and the associated cost is slowly becoming a burden for big multinationals across the world. Cloud implementation in Dabur will help the organization to manage cost efficiently within prescribed limit. Rental fees to the cloud service provider and routine audit of the service are the only associated cost in implementation of cloud. The most important savings come in the efficient management of the supply chain with proper information sharing architecture.

Benefits to Stakeholders Through Cloud Strategy

1. *Backup and Recovery*: Data loss in any company is a huge loss. Data stored on physical data servers in the company premises are subjected to various kinds of losses. There are an ample number of processes in Dabur which are interlinked with each other. The loss of data related to one process may indirectly or directly affect other processes thus creating immense issues for Dabur. A FMCG company like Dabur has to manage huge amount of information related to various stakeholders for operational efficiency. The consumer behavior, buying pattern, sales related data and various other point-of-sales data is extremely necessary for a company like Dabur. Cloud strategy will help Dabur to assure the various stakeholders in perspective of data losses and steps taken to recover back.
2. *Unlimited Storage Capacity*: New product information and related stakeholder information will slowly eat up storage space, Companies like Dabur which is focusing on growing its core brands across categories may face issues if storage is not available to store the constantly changing consumer information. The FMCG companies worldwide are slowly implementing cloud to manage the storage issue. Unlimited storage capacity will help Dabur to efficiently innovate new products without much looking into data storage constraints.
3. *Quick Deployment*: The different processes of Dabur can be subdivided in various layers namely management, operations and services delivery. This subdivision of layers will help Dabur to quickly deploy various resources according to the cloud strategy. The efficient management of resources with the help of cloud implementation will help Dabur to categorize products and innovate according to the availability of various parallel resources.
4. *Optimal Resource Utilization*: Utilization of resources optimally has become a major concern for various companies across the globe. Competition in the market is the major reason because of which every other company is trying to find out ways to optimally use the available resources to reap maximum benefit. Cloud implementation in Dabur will definitely prove to be a strong weapon. The strategic intent to build a strong platform can be efficiently targeted by Dabur while optimally managing the resources.
5. *Automatic Software Integration*: Absence of cloud in various companies is inducing them to customize and integrate the processes to manage the value chain. Dabur can very well focus on innovation and market leadership without facing technology constraint. There is not a huge requirement to customize processes on adoption of cloud strategy. The automatic software integration capability is built-in in various cloud services.

Risk Management

Revenue of Dabur as on 2013 is Rs. 6,146.38 crores. If any of the below discussed contingencies actually takes place, it is expected that the revenue as well as the brand value of Dabur will take a hit. Thus, in the calculation of "Impact" the summation of estimated losses in both the cases is used.

- Total impact is calculated in Rupees = Estimated loss in revenue + Expected reduction in brand value.
- Impact factor rates the degree to which Dabur will get affected by the adversity on a scale of 1–10; 1 denoting least severe and 10 the most severe of impacts.
- Risk index (Rs.) = Impact (Rs.) × Probability × Impact factor.

Sl. No.	Risk identified	Impact	Probability (%)	Impact factor	Risk index	Risk mitigation plan	Cost of mitigation	Remarks
1	Critical information leak due to hacking of the servers	Loss of competitive edge. *Rs. 307.3 crores* (5 % loss in revenue due to lost competitive advantage)	7	4	*Rs. 61.46 crores*	Regularly upgrade encryption modules. Renew Security Certificates whenever required	*Rs. 1–3 crores per year*	Mitigation of a risk of such magnitude is imperative considering relatively lower cost of mitigation
2	Change in rules and regulation related to Cloud service	*Rs. 30.73 crores* (0.5 % loss in revenue due to renew of the service to adhere guidelines)	2	8	*Rs. 0.49 crores*	Continuously be update with the guidelines and act as per the demand to avoid major cost	*Rs. 0.08–0.18 crores*	Prevention is always better than cure. There is no need to go for additional investment in backup mechanism if the existing system has the potential to support the current demand
3	Significant Network Outage (say for 2 h or more) in a working day impacting information sharing and hence urgent decision making	*Rs. 153.65 crores.* Revenue loss due to opportunity cost	0.5	5	*Rs. 3.84 crores*	Maintain an alternate network that can be switched over to in case of such a situation	*Rs. 55–60 Lakhs*	Maintaining a redundant facility for such a completely unexpected situation cannot be justified owing to the volume of investment required for the same

4	Sensitive data lost owing to corruption of memory modules	*Rs. 737.52 crores* (12 % loss in revenue due to severity of impact in decision making)	8	9	*Rs. 531.01 crores*	Regular data backup and intermittent disk health check-up activities	*Rs. 180–230 crores* per year	Batch jobs should be deployed to automate the task of taking backup of sensitive data at predefined intervals in addition to regular maintenance activities
5	Physical damage to servers due to natural calamities	*Rs. 491.7 crores* (8 % loss in revenue due to serious impact to the overall system including production processes)	0.05	10	*Rs. 24.58 crores*	Maintain an alternate facility	*Rs. 5–10 crores per year*	Maintain the facilities properly with regular checkups
6	Virus/Malware attack to the system	*Rs. 122.96 crores* (2 % drop in revenue due to lost competitive advantage)	1	9	*Rs. 11.06 crores*	Update the antivirus at proper interval. Use of Firefox	*Rs. 2–3 crores per year*	Use of Firefox. Outsource the work from third party in case if required

We have tried to assess the risk based on these important parameters. The cost associated with the solution for the problem includes the summation of all the costs associated following the implementation of different alternatives.

Conclusion

Cloud implementation can produce significant transformational benefits over the course of long-range strategic plans or incremental improvements through tactical implementation of discrete capabilities.

In Dabur we wanted to reduce the cost of integrating IT systems into the organization to increase business agility. Cloud implementation can hence provide a foundation for achieving these goals. We have taken a pragmatic approach to Cloud adoption designed to deliver specific desired benefits.

Chapter 7
Cloud Computing Strategy for Mahindra Automobiles

Case Overview

Automotive industry demonstrates complex operational challenges. It has a long supply chain and multiple stakeholders. With increasing global competition, Mahindra & Mahindra faces key challenges in quality, technology and cost fronts. In order to be successful, M&M needs to leverage technology throughout their value chain.

In this project we have studied various functions of the company and automobile industry in general. We have worked on formulating a cloud implementation strategy for the firm. Cloud computing provides dynamically scalable and virtualized resources as a service. With implementation of cloud model investment is considered an operating expense rather than a capital expenditure. Another key driver to cloud model is the ability to deploy resources quickly or speed to value, which can be crucial in environments like the automotive industry with fluctuating needs that may grow or shrink rapidly.

The analysis done here is with secondary data. We have studied automobile industry in general as well to understand the functions in a better way. Tools like departmental scorecard have been used to demonstrate the necessity of cloud strategy.

Industry Analysis (PESTEL)

Political Scenario

- In 2002, Indian government formulated an auto policy that aimed at promoting integrated, enduring and self-sustained growth of the Indian automotive industry.
- Allows automatic approval for foreign equity investment up to 100 % in the automotive sector and does not lay down any minimum investment criteria.

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- Formulation of an appropriate auto fuel policy to ensure availability of adequate amount of appropriate fuel to meet emission norms.
- Lying emphasis on R&D activities carried out by companies in India, by giving a weighted tax deduction of up to 150 % for in-house research and R&D activities.
- Promoting multi-model transportation and the implementation of mass rapid transport system.
- Plan to have a terminal life policy for CVs along with incentives for replacement for such vehicles.
- Ensures a balanced transition to open trade at minimal risk to the Indian economy and local industry.
- International hub for manufacturing small, affordable passenger cars as well as tractor and two wheelers.

Economic Scenario

- The manufacturing sector has grown at 8–10 % per annum in the last few years. Projected growth rate for 2013 is 5.8 %.
- Weighted tax deduction of up to 150 % for in-house research and R&D activities.
- Finance availability to CV buyers has grown in scope during the last few years.
- Several Indian firms have partnered with global players. While some have formed joint ventures with equity participation, other also has entered into technology tie-ups.
- India is now a established manufacturing hub, for mini, compact cars, OEMs and for auto components.
- The level of inflation Employment level per capita is right.
- Economic pressures on the industry are causing automobile companies to reorganize the traditional sales process.
- Govt. has granted concessions, such as reduced interest rates for export financing.

Social Scenario

- Since changed lifestyle of people, leads to increased purchase of automobiles, so automobile sector have a large customer base to serve.
- The average family size is 4, which makes it favourable to buy a four wheeler.
- Growth in urbanization, fourth largest economy by PPP index.
- 85 % of cars are financed in India.
- Vehicles priced between INR 300,000 and 650,000 form the largest segment in the passenger car market.

- Indian customers are highly discerning, educated and well informed. They are price sensitive and put a lot of emphasis on value for money.
- Preference for small and compact cars. They are socially acceptable even among the well off.
- Car priced below INR 650,000 accounts for nearly 80 % of the market.

Technological Scenario

- The Government of India is promoting National Automotive Testing and R&D Infrastructure Project (NATRIP) to support the growth of the auto industry in India.
- With the entry of global companies into the Indian market, advanced technologies, both in product and production process have developed.
- Other prominent global players have setup R&D centres in India.
- Customized solutions (designer cars, etc.) can be provided with the proliferation of technology.
- Internet makes it easy to collect and analyze customer feedback.

Environmental Scenario

- With the entry of global companies into the Indian market, advanced technologies, both in product and production process have developed.
- Introduction of Bharat Stage-V emission norms will lead to stricter regulations of the emission standards of engines.
- With the development or evolution of alternate fuels, hybrid cars have made an entry into the market.
- Physical conditions like environmental situation affect the use of automobiles. If the environment is pleasant then it will lead to more use of vehicles.

Legal Scenario

- Legal provision relate to environmental pollution by automobiles and its norms.
- Legal provisions relate to safety measures.
- Confirms the government's intention on harmonizing the regulatory standards with the rest of the world.
- Indian government auto policy aimed at promoting an integrated, phased and conductive growth of the Indian automobile industry.
- Ensure a balanced transition to open trade at minimal risk to the Indian economy and local industry.

Organization

VMG Framework

Vision

To create a fully collaborative environment in which suppliers can deliver exactly what the company needs, when it needs it, and at a competitive cost.

Mission

To create India's largest automobile and automobile-related products distribution network by providing dealers and customers with the largest choice of unique world-class products and services

Strategies

To unify Mahindra's image across industries and geographies the conglomerate launched a new corporate brand—Mahindra Rise. The brand positions Mahindra products and services as aspirational, supporting customers' ambitions to "Rise."

The Rise philosophy has three pillars to it:

- Accepting no limits
- Thinking innovatively
- Driving positive change

Very recently the company also shifted from its previous Mergers and Acquisitions strategy to stitching up global alliances. One of them was with Spanish auto components maker CIE Automotive. Mahindra will merge all its auto components businesses into its Mahindra Forgings unit, which will be renamed Mahindra CIE Automotive. CIE will hold 51 % of Mahindra CIE and Mahindra about 20 %, with the remaining owned by institutional and public shareholders. In April 2010, it bought out French auto maker Renault SA's 49 % stake in a 5-year-old joint venture, Mahindra Renault India Pvt. Ltd. Mahindra's auto component business comprises companies that are into forging, casting, stamping, gears and composites. Mahindra Systech clocked revenue of INR 4,000 crores in fiscal 2013. Mahindra Systech, as the auto components business is known, had acquired ten companies in the past 8 years, making consolidation critical. This will also help them focus on its core business of manufacturing passenger vehicles better.

Mahindra, that has interests in businesses including automobile and information technology, will merge all its auto components businesses into its Mahindra Forgings (MAFR.NS) unit. Mahindra Forgings will be renamed Mahindra CIE Automotive,

in which Spanish auto components maker CIE will hold 51 % and Mahindra will own about 20 %. The rest will be held by institutional and public shareholders.

Mahindra was concerned that its dominance would wane due to globalization, entry of foreign companies, import of pre-used vehicles under World Trade Organization (WTO) mandates, and more stringent emission, noise and safety norms. Mahindra Satyam created a 5 year plan for Business Process Reengineering which was to be carried out in the following three phases:

1. Long-term Business Strategy—Mahindra Satyam helped the company identify suitable business opportunities and craft strategies to capitalize on them, enabling it to achieve the business objectives irrespective of mounting competition.
2. Process-Centric Enterprise (PCE) Phase I—Preparation: Mahindra Satyam created a plan for the client to migrate into a Process-Centric Organization.
3. PCE Phase II—Transformation: Mahindra Satyam helped the client become a PCE by redesigning key business processes.

Mahindra Auto aspires to be among the top 50 most admired brands in the world by 2021. This alongside developing a work-culture of good governance, clean administration, fair dealing and transparency, where entrepreneurship can thrive will be the key strategies for Mahindra automotive.

Business Metrics

Business metrics and performance measures serve as dashboard gauges that help in guiding the strategic direction of a firm. The purpose of the same is to indicate the directional trends, performance, baselines, and targets. For instance where stakeholders are internal—business metrics are defined to be the basis for organizational tune-up, quality improvement, or BPR. Shareholders, customers, creditors, or vendors also use business metrics to evaluate the quality of a provider or estimating the future growth of a firm.

With the strategies as defined above, the business metrics for Mahindra Automotive can be listed under following headers as:

Marketing Metric

(a) *Sales volume growth*: This is to gauge all product offerings from Mahindra and their YoY increase in sales.
(b) *Total sales*: Comparative sales across product line length and breadth.
(c) *Customers' intent to purchase*: This is a non-traditional metric that signals future sales growth and market-share formation
(d) *Market penetration and share*: Both actual and perceived market share of Mahindra automobiles across segments.

Financial Metrics

(a) *Liquidity*: The availability of liquid assets to Mahindra automotive.
(b) *Dividends*: The EPS and dividend payout will form an important business metric for external stakeholders.
(c) *Sales revenue*: Revenues earned from sales and after sales service.

Environmental Metrics

(a) *Natural resources consumption*: With a lot of emphasis on sustainable growth, the check on natural resource consumption becomes important for both external and internal stakeholders.
(b) *Emission norms*: Compliance to the tighter emission norms.

Stakeholders

Many people are involved in running a business. Some have direct interest while others have indirect interest in the running of the business. These individuals or groups are known as stakeholders. The key stakeholders as identified by the Mahindra group are Employees, Customers, Suppliers, Dealers and Community.

Employees

The Mahindra Group has always given importance to the nurturing and all-round development of its employees—these include sharing of knowledge and sharpening of logical and statistical ability. The Group HR (corporate centre) has started organizing an initiative known as "Fireside Chats." These are informal meetings held at every quarter where top management engage with young talent in small groups in a freewheeling discussion about the company's vision, mission, and strategic direction and objectives for the future.

The Mahindra STAT club consists of bright, young executives working together to deal with key priorities and examine strategic issues of the Sector and provide an "alternative" point of view to the senior management. Conducting training on advanced statistical tools and techniques, organizing seminars on various statistical topics and building competency are few of the objectives of the STAT club.

Customers

Mahindra Great Escape gave customers an opportunity to fully explore the off-road capabilities of their vehicles with strict safety measures in mind.

Coalesce—The objective of the meeting is to understand and address the operational issues that customers may face. Moreover it serves as a forum to address customers' feedback on operational issues.

Home user guide—This guidebook introduces the green features installed in the home providing technical help and practical tips on energy saving and recycling.

E-Engagement continues actively on social networking websites like Facebook and Twitter.

Kisan Mela—The stall provided the ideal platform for interaction and knowledge sharing with the farming community.

Suppliers

"Supplier Meet 2010" was organized by Automotive and Farm Divisions. The aim was to share the current and future scenario of automotive and tractor industry, Mahindra's business plans and expectations from suppliers on QCD. This helps in keeping suppliers abreast of the organizations' plans and expectations of building a greener supply chain.

Dealers

Dealer Advisory committee: The objective of the committee is to form a common platform between Mahindra Finance and Mahindra's dealers by making them a strategic partner in the group. The aim is to create a sustainable future for both, in their respective core businesses.

Force 500/1,000 Dealers Meet: Dealers with sales of more than 500 or 1,000 tractors in a year, invited. Seminars on wide ranging topics like alignment of purpose, identity and values between the Company and its channel partners, value proposition in the coming year and the key challenge were conducted.

Local Community

Mahindra Group has always strived to bring about a positive change in the local community that resides around its manufacturing facilities as well as the society in general. For the same, it has started setting up Samriddhi centres in rural India since

2007. These educate farmers about various technological inputs that keep them abreast with world-class solutions to farming issues.

Mahindra also started a Project: "Sapno Ka Bharat" (Dream India). This was initiated with the aim to conduct Education, Health and Environmental activities targeting the present and future generation under one umbrella.

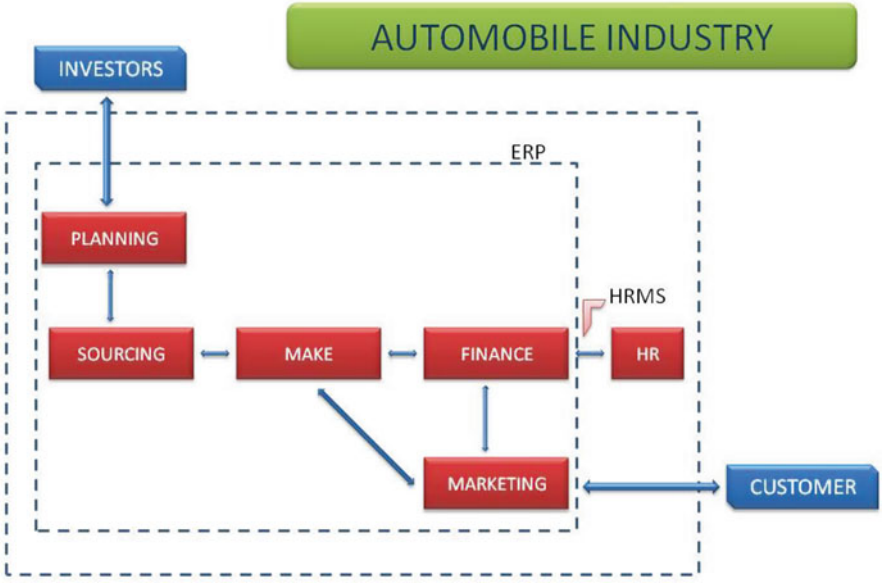
Functions

Increase in global competition has led Indian firms to continually reduce their costs while, simultaneously, maintaining innovation and quality leadership.

The role of information technology has been immense in the gradual transformation of the industry from its original status as a product industry into what is increasingly a service industry. The role of information technology (IT) has always been infrastructural, making possible subtle but profound changes in nearly every aspect of the industry.

The following diagram shows the major functions in an automobile industry:

Level: L0 → Context diagram



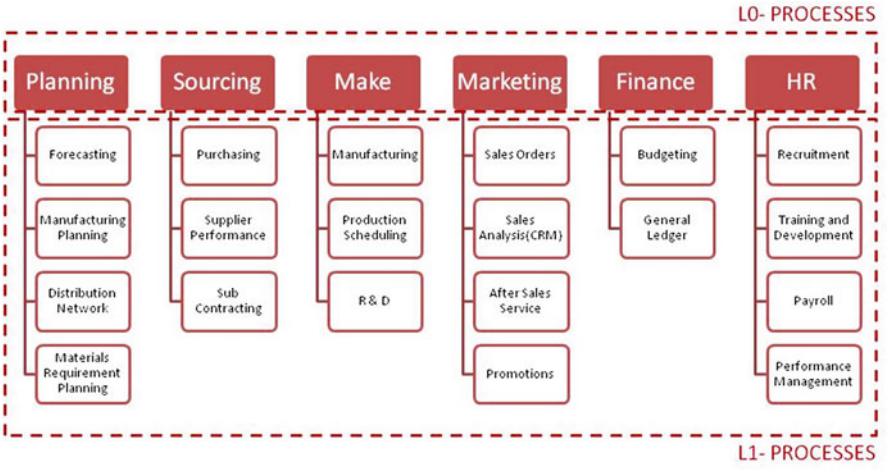
Processes and Factors That Would Affect IT Strategy

In order to compete in the increased competition, following necessities mandate the implementation of a robust IT strategy for the firm:

1. Markets and product requirements are frequently changing which indeed enhances process complexity. The cost pressures add to the need for high operational efficiency.
2. Since, product life cycle is shortening, development; manufacturing and logistics need to be highly integrated.
3. Legacy systems are slow and redundant. Moreover they are expensive to maintain.
4. Global networking is growing continually to accommodate the vendors in the system.
5. Frequent sales fluctuation requires flexibility in production systems.

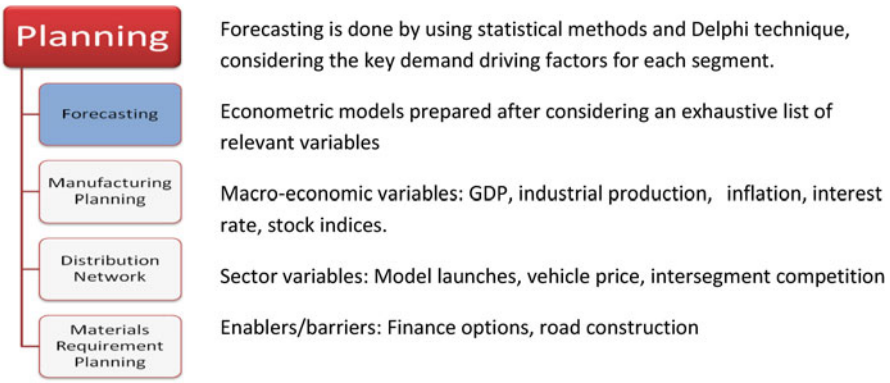
To become future-oriented in the automotive industry a firm requires horizontal technology integration and optimization of entire business processes.

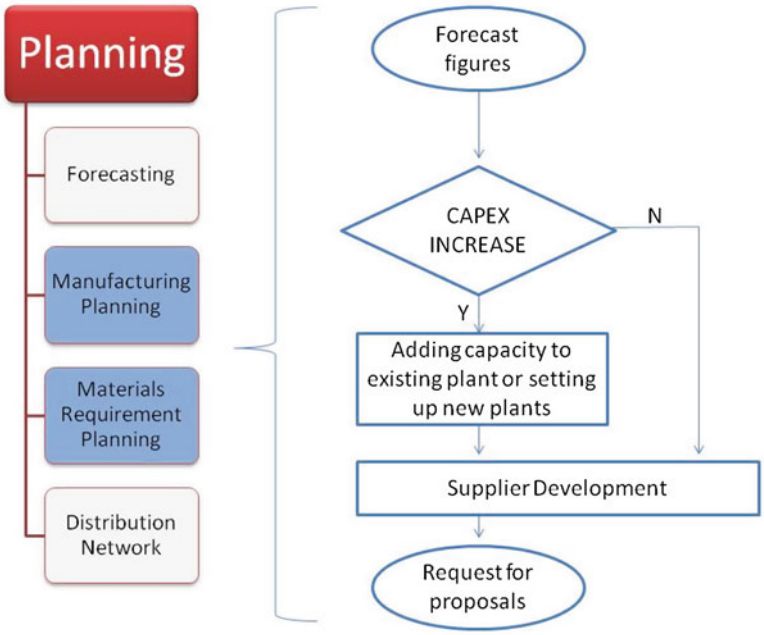
The top level functions highlighted above, contain major sub-functions as shown in the diagram below:



Each of the processes is discussed in detail below:

Planning:





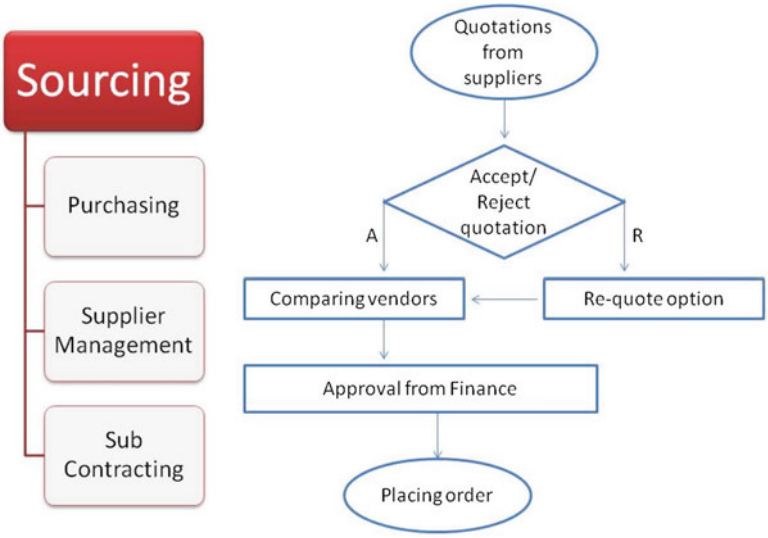
Distribution Network: Generally, automobile industries in India follow 3PL logistics system.

Sourcing:

The gradual globalization of markets necessitates global procurement of required production material and the manufacturing of goods in large volumes. This leads to issues such as:

- Tracking of parts.
- Procurement, capacity management, parts naming and buyer assignment.
- Global sourcing and respective strategy.
- Supplier shortlist and monitoring.

Another key challenge is the ever-increasing cost pressure. This necessitates a high flexibility in procurement and production.



Companies in automotive sector are focusing on their core competencies and so reducing the extent of in-house manufacturing. Suppliers are being commissioned to develop and manufacture complete modules and system units. This is leading to an increase in purchasing volumes and making efficient supplier management an even more crucial strategic success factor.

The integrated approach to supplier management therefore extends from supplier evaluation through risk-oriented and demand-based supplier assessment to the demand-based development and optimization of supplier cooperation. The management of strategic partners plays a special role here.

Make: Product Manufacturing

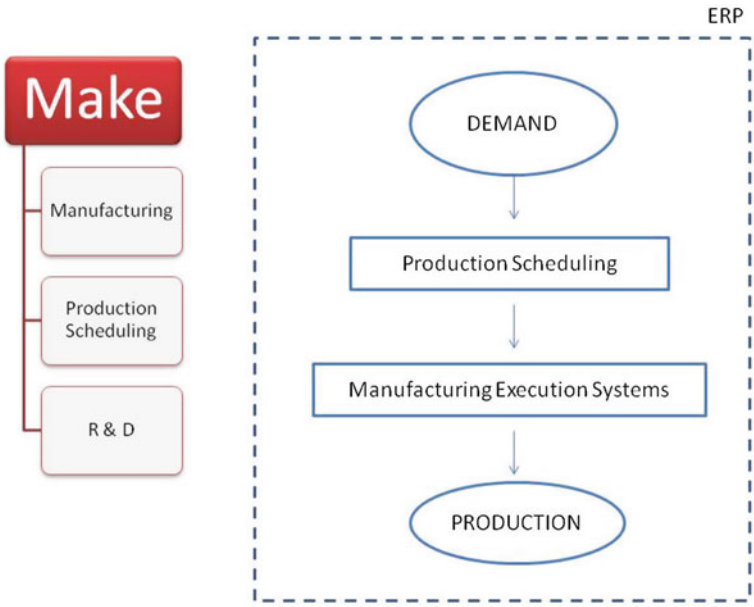
The maturity of the market in terms of volume and the continuously growing competition drives automotive manufacturers to improve their profitability in every area, especially their plants.

Automotive manufacturers are also facing growing complexity in their business connections, which include suppliers who must cooperate to achieve required production levels. This complex environment has to coexist with the extremely demanding features of the automotive market, where a high variety of products, short time to market, quality and strict compliance regulations have led to heightened management of manufacturing business processes.

Because of these challenges, the automotive organizations need a modular platform that can provide key capabilities in the manufacturing landscape across plants, including:

- Synchronization between manufacturing and business systems through interoperability
- Standardization of processes
- Production performance
- Integrated quality and quality data monitoring
- Transparency, efficiency and responsiveness
- Complete part traceability
- Increased throughput and better delivery performances
- Better quality management
- Plant operations analytical and reporting capabilities

The integration of ERP systems and production solutions on a factory level with Manufacturing Execution Systems (MES) is critical to the long-term success of supply chain management solutions.



> "The legacy IT environment required us to stock high inventory levels in each part of the supply chain—like tractors with the dealers and at the stockyards, raw materials and work in progress in the plant as well as with vendors and in transit. The planning cycle was very long. It included everything from the start of the demand plan to the production plan, and also to informing the vendors of supply schedules. Moreover, once production plans were finalised, they could not easily be adjusted to changing market demand. The planning was done in monthly buckets," says Satish Moorjani, head-Supply Chain Planning & Control, Mahindra & Mahindra—Farm Equipment Sector.

Marketing:
In current scenario, companies need to fulfil the responsibilities of marketing in an environment where data is overwhelming and customers are increasingly driving the brand conversation.

As a result, companies need to:

- Understand each customer as an individual
- Create a system of engagement that optimizes value creation at every touch point
- Design the culture and brand so they are authentically single

The use of business analytics to track the social media impact can help automotive companies identify what consumers need, identify whether brand messages are resonating with consumers and discover if brand messages are trending up or down with consumers. Business analytics is a powerful sales and marketing tool that can help design cash incentive programmes. Capturing web metrics and applying business analytics can help determine consumer interest in incentives being offered.

Because the automobile industry is extremely competitive, cloud-based business analytics may reduce the time needed to identify changes in shopping trends in response to a competitor's latest promotion and shorten the reaction time needed to introduce counter measures.

From the perspective of the garage or dealer, the key concern is the combination of services on one hand and spare parts on the other. As a result, sales become easier while the quality of customer care is increased.

The background to this is, not least, the frequently-changing parts configurations with limited time frames in which to produce and sell. Thanks to the IT-based bundling of services and part/accessory configurations, customers are given transparent and verifiable pricing and delivery commitments. Service and cost alternatives can also be determined this way.

Finance:

The common activities carried out by finance department are:

- Account Management
- Journal Entry Processing
- Allocations
- Automatic Account Reconciliation
- Consolidated Reporting in Any Currency
- Annual Close
- Integrity Reporting

With the implementation of IT systems, traditional book keeping has been completely shifted online. Cloud computing can help access the common database across locations.

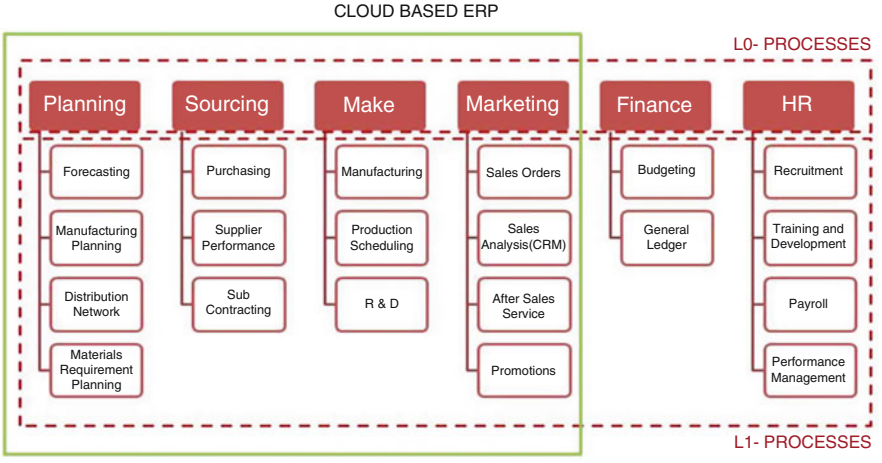
Human resources:

Employee satisfaction is the key to growth of a firm in present scenario. Employee development ensures that organization has a steady talent pipeline.

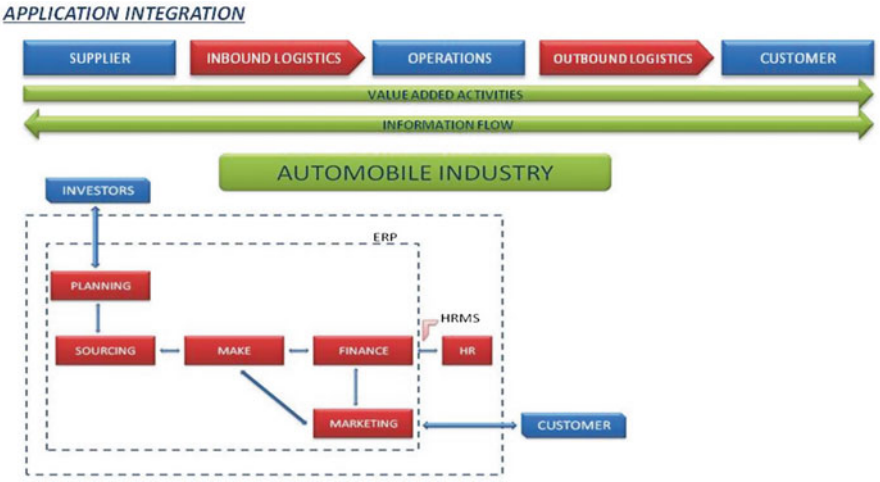
The HRMS (Human Resource management System) helps employee update and keep track of data by himself.

This data has to be kept confidential.

Process Integration



Application Integration



Technology Integration

Cloud Strategy

Cloud computing has lately gained a lot of interest for the advantages it delivers from a price to performance ratio based on the principles of multi-tenancy, distribution and scalability that forms the core principles of cloud computing.

There is not only a strong commercial aspect supporting migration of applications to cloud but also valid technical reasons to do so. cloud-based architectures allows applications to scale to massive levels dynamically with little tuning while leveraging the capabilities of the underlying architecture.

Cloud computing integration architecture will need to support composite applications built from multiple services from external suppliers and internal IT sources (Fig. 7.1).

Many technical and legal issues prevent broader enterprise adoption of public clouds. These issues are largely addressed if the cloud operates inside the enterprise, where there is greater control over the cloud. Because of this, a private cloud is the ideal place to start proving cloud-related technologies and is a logical first step before attempting more widespread migration to a public cloud. A large enterprise can gain many benefits from the greater abstraction of applications and infrastructure that accompanies a migration to a private cloud. Once standard interfaces and

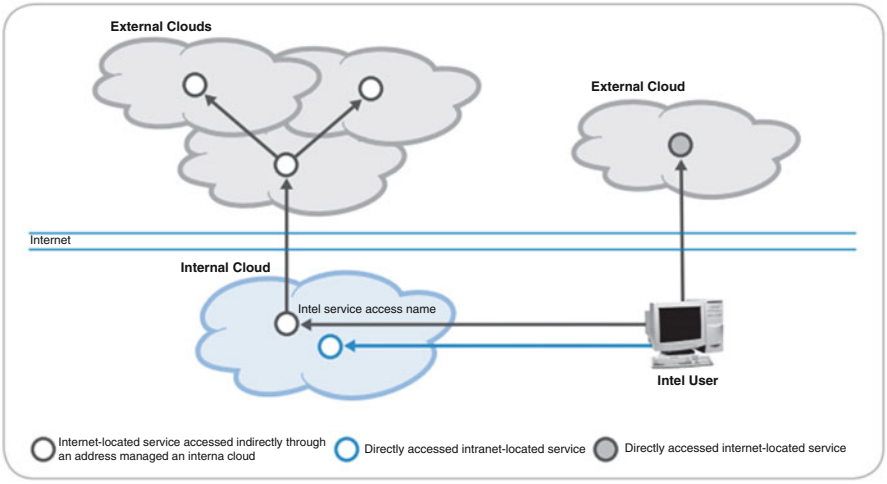


Fig. 7.1 Access to cloud computing services in multiple locations

protocols exist and technical and legal obstacles have been overcome, IT organizations can start to make greater use of public cloud-based capabilities with minimal disruption to users, while reducing the data centre footprint of their private physical infrastructure.

This means that IT organizations will need to balance three broad areas of computing while making the transition to the public cloud:

- Current, conventional computing
- Private cloud
- Public cloud

Cloud Architecture

Conventional Computing

Conventional computing will continue to provide the enterprise with capabilities for many years, with a gradual migration of applications to private and public clouds. Some conventional computing resources are likely to remain in long-term use, including those that need to be physically located on isolated segment or associated with specific hardware.

Private Cloud

In private cloud the infrastructure and services are maintained on a private network. These offer the highest level of security and control, but require the company to purchase and maintain all the software and infrastructure, which reduces the cost savings. A private cloud is the obvious choice when

- Business is data and applications. Thus, control and security are paramount.
- Business is part of an industry that must conform to strict security and data privacy issues.
- Company is large to run a next generation cloud data centre efficiently on its own.

Private clouds can have most of the features of public clouds. They can use similar technologies to host cloud-aware applications and to provide a dynamic infrastructure that responds to demand and fault signals. IT organizations can try out new chargeback billing methods; these also provide a benchmark for measuring the value of moving a service to public suppliers. Private clouds can act as a bridge to a future based on the public cloud. Applications can be developed to standards supported by both private and public clouds, so that they may be readily migrated to a public cloud as necessary to support business strategy. It should be possible to move an application between locations within the private cloud without disruption to users. In the same way, it should ideally be possible to perform live migration of an application from a private Infrastructure as a Service (IaaS) cloud to an public cloud without disruption to users. Much of an enterprise's infrastructure could be serviced by a single private cloud comprised of multiple physical data centres. The private cloud could be logically and physically subdivided if necessary for business continuity or regulatory purposes.

Public Cloud

A public cloud is one in which the services and infrastructure are provided off-site over the Internet. These offer the highest level of efficiency in shared resources; but, they are also more vulnerable than private clouds. A public cloud is the obvious choice when

- Standardized workload for applications is used by lots of people, such as e-mail.
- Need to test and develop application code.
- Have SaaS (Software as a Service) applications from a vendor who has a well-implemented security strategy.
- Need incremental capacity (the ability to add computer capacity for peak times).
- Doing collaboration projects.
- Doing an ad hoc software development project using a Platform as a Service (PaaS) offering cloud.

Ultimately, public clouds will play a significant role in delivering conventional enterprise compute needs, but the private cloud is expected to remain a critical part of the IT infrastructure for the foreseeable future. Key applications may never move completely out of the enterprise because of their mission-critical or business-sensitive nature.

Cloud Service Providers offer their services through several models.

Infrastructure as a Service

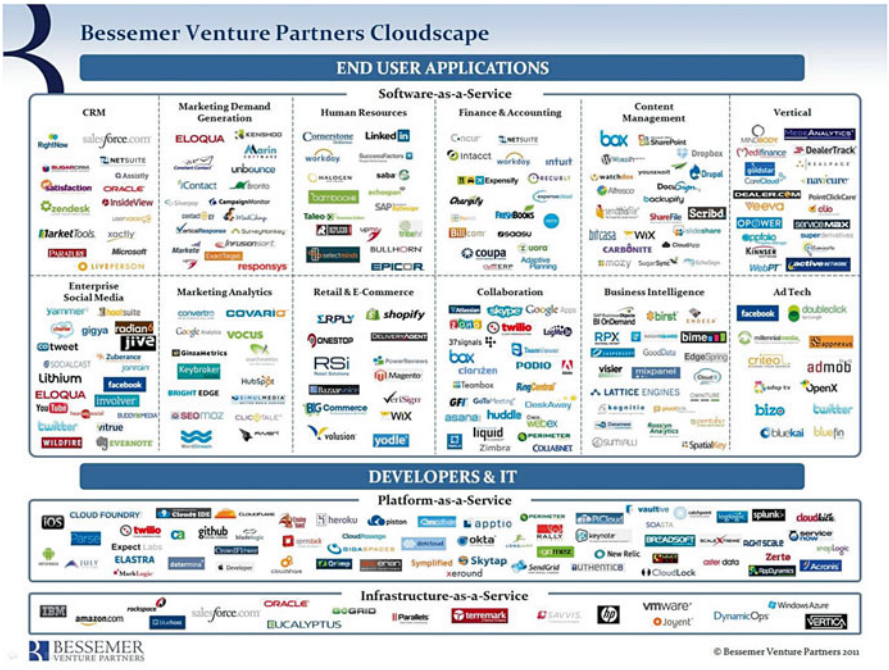
IaaS is a provision model in which an organization outsources the equipment used to support operations, including storage, hardware, servers and networking components. The service provider owns the equipment and is responsible for housing, running and maintaining it. The client typically pays on a per-use basis.

Platform as a Service

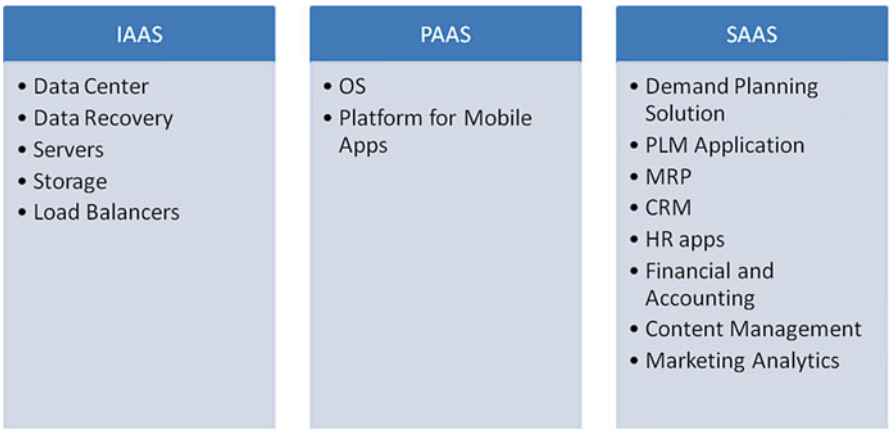
Platform as a Service (PaaS) is a way to rent hardware, operating systems, storage and network capacity over the Internet. The service delivery model allows the customer to rent virtualized servers and associated services for running existing applications or developing and testing new ones.

Software as a Service

SaaS is a software distribution model in which applications are hosted by a vendor or service provider and made available to customers over a network, typically the Internet.



Our Recommendations



Benefits to Stakeholders Through Cloud Strategy

1. Cost Efficient to use, maintain and upgrade. The finances are shifted from Capex to Opex. Pay as you go is very beneficial.
2. Scalability and Performance—Cloud instances are deployed automatically only when needed and as a result, pay only for the applications and data storage. Elasticity is also a factor as clouds can be scaled to meet Mahindra's changing IT system demands.
3. Unlimited Storage—Mahindra can get as much space as required from the cloud.
4. Backup and Recovery—Backup of data and restoring of the same is relatively simple and easier
5. Automatic Software Integration—No need to take additional efforts to customize and integrate your applications as per your preferences.

ROI from Cloud Strategy

Without Cloud (in Rs. Crore)								
Particulars	FY13	FY14	FY15	FY16	FY17	FY18	FY19	FY20
Operational Income	40,441.16	52,573.51	68,345.56	88,849.23	115,503.9971	150,155.1962	195,201.7551	253,762.2816
Other Income	727.1	1,163.36	1,861.376	2,978.202	4,765.12256	7,624.196096	12,198.71375	19,517.94201
Total Income	41,168.26	53,736.87	70,206.94	91,827.43	120,269.12	157,779.39	207,400.47	273,280.22
COGS	30,881.66	40,309.78	52,664.52	68,882.76	90,217.8052	118,355.4891	155,577.8836	204,996.4451
Employee Cost	1,866.45	2,436.274	3,182.98	4,163.19	5,452.654505	7,153.261924	9,402.938211	12,389.73601
Manufacturing Expenses	141.16	46.06398	240.7294	314.863	412.3853893	541.0026806	711.146164	937.0382999
Selling and Admin Expenses	1,811.88	1,419.027	3,089.918	4,041.47	5,293.233488	6,944.119701	9,128.021477	12,027.4933
Miscellaneous Expenses	3,013.02	2,359.734	5,138.301	6,720.66	8,802.248695	11,547.54815	15,179.21235	20,000.81566
Total Expenses	37,714.17	46,570.88	64,316.45	84,122.95	110,178.33	144,541.42	189,999.20	250,351.53
EBITDA	3,454.09	7,165.98	5,890.49	7,704.48	10,090.79	13,237.97	17,401.27	22,928.70
Interest	191.19	229.428	275.3136	330.3763	396.451584	475.7419008	570.890281	685.0683372
EBDT	3,262.90	6,936.56	5,615.17	7,374.11	9,694.34	12,762.23	16,830.38	22,243.63
Depreciation	710.81	888.5125	1,110.641	1,388.301	1,735.375977	2,169.219971	2,711.524963	3,389.406204
EBT	2,552.09	6,048.04	4,504.53	5,985.81	7,958.96	10,593.01	14,118.85	18,854.22
Tax	1,094.27	1,313.124	1,575.749	1,890.899	2,269.078272	2,722.893926	3,267.472712	3,920.967254
PAT	1,457.82	4,734.92	2,928.78	4,094.91	5,689.89	7,870.11	10,851.38	14,933.25

COGS	75.01 %	No reduction
Employee Cost	4.53 %	No reduction
Other Manufacturing Expenses	0.34 %	0.09 %
Selling and Admin Expenses	4.40 %	2.64 %
Miscellaneous Expenses	7.32 %	4.39 %

With Cloud (in Rs. Crore)								
Particulars	FY13	FY14	FY15	FY16	FY17	FY18	FY19	FY20
Operational Income	40,441.16	52,573.51	68,345.56	88,849.23	115,503.9971	150,155.1962	195,201.7551	253,762.2816
Other Income	727.1	1,163.36	1,861.376	2,978.202	4,765.12256	7,624.196096	12,198.71375	19,517.94201
Total Income	41,168.26	53,736.87	70,206.94	91,827.43	120,269.12	157,779.39	207,400.47	273,280.22
COGS	30,881.66	40,309.78	52,664.52	68,882.76	90,217.8052	118,355.4891	155,577.8836	204,996.4451
Employee cost	1,866.45	2,436.274	3,182.98	4,163.19	5,452.654505	7,153.261924	9,402.938211	12,389.73601
Manufacturing expenses	141.16	128.9792	168.5106	220.4041	288.6697725	378.7018764	497.8023148	655.9268099
Selling and Admin Expenses	1,811.88	1,892.035	2,471.934	3,233.176	4,234.586791	5,555.295761	7,302.417181	9,621.994644
Miscellaneous Expenses	3,013.02	3,342.957	4,367.556	5,712.561	7,481.91139	9,815.415927	12,902.3305	17,000.69331
Fixed Cost (Cloud)	472.032	424.8288	467.3117	514.0428	565.4471328	621.9918461	684.1910307	752.6101338
Total Expenses	38,186.20	48,534.86	63,322.81	82,726.14	108,241.07	141,880.16	186,367.56	245,417.41
EBITDA	2,982.06	5,202.01	6,884.12	9,101.29	12,028.04	15,899.24	21,032.91	27,862.82
Interest	191.19	229.428	275.3136	330.3763	396.451584	475.7419008	570.890281	685.0683372
EBDT	2,790.87	4,972.58	6,608.81	8,770.92	11,631.59	15,423.49	20,462.02	27,177.75
Depreciation	710.81	888.5125	1110.641	1388.301	1,735.375977	2,169.219971	2,711.524963	3,389.406204
EBT	2,080.06	4,084.07	5,498.17	7,382.62	9,896.22	13,254.27	17,750.49	23,788.34
Tax	1,094.27	1,313.124	1,575.749	1,890.899	2,269.078272	2,722.893926	3,267.472712	3,920.967254

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With Cloud (in Rs. Crore)								
Particulars	FY13	FY14	FY15	FY16	FY17	FY18	FY19	FY20
PAT	985.79	2,770.94	3,922.42	5,491.72	7,627.14	10,531.38	14,483.02	19,867.38
Net increase in PAT with cloud	−472.03	−1,963.98	993.64	1,396.81	1,937.25	2,661.27	3,631.64	4,934.12
Discount rate	10 %							
NPV of PAT with Cloud	$651.88							
NPV of cloud cost	$2,886.81							
ROI	23 %							

COGS	75.01 %	No reduction
Employee Cost	4.53 %	No reduction
Other manufacturing Expenses	0.34 %	0.24 %
Selling and admin Expenses	4.40 %	3.52 %
Miscellaneous Expenses	7.32 %	6.22 %

Roadmap for Cloud

Mahindra need to consider how to take account of and plan for cloud computing services such as:

Infrastructure
CPU, memory, and disk capacity available on demand, real time, and usage based will be a big driver of benefit

Applications
Commercial cloud-based organization applications that provide industrial strength functionality are emerging and growing rapidly.

Establish a clear structure for cloud computing
Mahindra already has rules and structures in place that govern how IT decisions are shared between departmental leaders and IT executives. Use them (and if they don't exist, create them) to decide who inside and outside the IT Mahindra should be engaged in decisions on cloud computing, and what decision-making rights and responsibilities they have.

Global Expansion:
As companies consolidate across the world and expand to seize revenue and cost opportunities in emerging markets, they face the daunting task of standing up the technology infrastructure to support their increasingly diverse global operations. Cloud can substantially impact the related costs and speed to deliver. Put simply, if Mahindra want to expand and consolidate their global footprint in a cost-efficient way, cloud is now the way to deliver it.

- Business value is at the core of any technological investment, even more to consider in the case of an automotive company like Mahindra. Business drivers may vary and hence a detailed analysis must be performed to identify reasons for cloud migration. These may be controlling up-front capital costs and expenses, or increased agility, business process improvement, or reduction in your physical technology footprint.
- Value is associated with comparison of cost benefits of cloud v/s on premise physical hardware and software. Access to expanded technical skill sets by the service providers allows hotels to focus on servicing guests rather than technology focus.
- The roadmap should consider differences in enterprise size and IT maturity level.

The steps followed as follows:

- *Team Assembling*:
  Cloud adoption should be led by the CEO himself (Mr. Anand Mahindra), and the CFO, with the CIO and CTO as the key enablers and resources drawn from across all functional areas such as IT, marketing, finance, legal and administrative. This diverse approach can best address the skills required at different stages of adoption.

- *Develop Business case and an Enterprise cloud strategy*:
  Cloud strategy should be comprehensive such that it sets the foundation for project specific adoptions. Each cloud service should be compared against the cost of delivery. Even the training costs (internal or outsourced) should be considered in this stage.
- *Cloud Deployment Model*:
  Depending on the IT maturity and size of the Mahindra, deployment model has to be chosen. Since on the cloud scale Mahindra will be in first stage, it can go for all offices-all features (AO-AF). Factors to consider include: migration costs, security needs, multi-tenancy, and elasticity.
- *Cloud Service Model*:
  Even though the conventional IaaS, PaaS and SaaS are available as a standard cloud service models, Mahindra has to look into core operations (automobile manufacturing) where the cloud will make an impact and align it with other service models to find feasibility and ROI.
- *Determine who will develop*, *test and deploy the cloud service*:
  For large organizations like Mahindra, an In-house cloud service provider will work more favourably than a contracted service provider. In-house cloud resources should be designated based on cloud skills, start-up, service updates and regular testing
- *Develop a proof of concept team before the actual implementation*:
  Proof of concept team (a team of professional IT architects and administrators representing each SBU) can be setup to simulate the cloud services in a test environment. Also data recovery activities can be checked (redundancy-99.999 % reliability) and should develop a back out plan for an unexpected problem in the early stages.
- *Integrate with existing enterprise services*:
  To increase inter operability, open infrastructure standards should be adopted, i.e. use the new cloud deployment as the baseline and integrating standards through APIs. By achieving this integration, data transfer will be much easier.
- *Develop and Manage SLAs*:
  The key elements of Service Level Agreement include:
  - Establishing a team from business, operations, IT to review SLA considerations.
  - Defining critical processes with the cloud provider.
  - Scheduling reviews with different stakeholders.
  - Maintain a level of responsibility.
- *Managing the cloud Environment*:
  Shared responsibility must exist for the deployment and maintenance of cloud between CIO, manager-support, of course, with the backing of the SLA.

Change management process must be put in place to convert the validation and testing of needs from the business side and a disaster recovery process must be defined, implemented and verified before going forward with cloud production.

Department Scorecard

Financial:
On managing and improving business process, customer and employee satisfaction, the financial perspective should improve accordingly. The importance of financial performance is to measure whether Mahindra's strategy and implementation results the better bottom-line improvement, and good return to shareholders. Furthermore, improved sales revenue, sales growth, net profit and gross profit among financial measure are preferred by market share, increase revenue, reduce expense, and improve financial results.

Customer Relationship:
The customer perspective on the performance will help Mahindra to be concern about quality of product and service, cost of their products, customer service and satisfaction, effectiveness of its delivery, and then align its internal business process well with customers in order to improve financial result. This perspective encompasses measures such as customer satisfaction, retention, response time, loyalty, market share, and on time delivery. Therefore, the information and analysis data gathered from understanding of customers' need based on specification and requirement will assist Mahindra to produce high quality product and service. This is because; customer's evaluation will have a direct impact on Mahindra's performance.

Internal Business Process:
In order to develop internal business process measurement, top management should identify the operation management processes that give beneficial effects to Mahindra's strategy. This can be done through customer satisfaction, financial returns to shareholders, an increase of the employee skill level and satisfaction. Operations management processes activities in manufacturing organizations like Mahindra involve acquiring raw materials from suppliers, converting raw materials to finished goods, distributing finished goods to customers, and managing risk. The key performance measures under this perspective may include such as manufacturing efficiency, quality, defect rate, and cycle time for continually improving the internal process.

Innovation and Learning:
Learning and growth perspective can determine Mahindra future in which it develops employee skill and satisfaction, improvement in technology system and procedure, and innovation of new market development. The two objective satisfied are (1) the development of new product, new pattern, quality of leadership, new market, and new technology, (2) the improvement level of employee skill, health and safety,

absenteeism, and satisfaction. Thus, innovation and learning growth measure is important to achieve long-term-value creation process, competing for global demand, enhancement external product markets.

Business Goal → Increase Revenue by 16 %

Category	Functional Goals	Functional metrics	Weight age
Operations (40 %)	To improve the productivity and competitiveness (20 %)	Production equal to demand	0.06
		Velocity and flexibility	
		On time delivery	
	Efficiently monitoring business operations (20 %)	% of logistics outsourcing	0.06
		Elimination/reduction of waste	
		Project time frame	
	Efficient Inventory management (30 %)	Inventory turns ratio	0.12
		Raw Material availability	
		Finished goods in hand	
	Efficiency of SCM operations (30 %)	Manufacturing cycle time	0.12
		Outsourcing and off shoring distribution	
		Inventory Turns	
Human Resources (25 %)	Recruitment (25 %)	Recruitment cost per employee	0.625
		Number of interviews conducted per CV	
		% New hires achieving 24 months service	
	Training and Development (25 %)	Training expenditures/total wages	0.625
		No of training hours per employee	
		%HR budget spent on training	
		Employee satisfaction index	
	Compensation (20 %)	Salary rate/sales turnover	0.05
		Average income per employee by month	
		Cost rate of medical/social insurances	
	Labour relation (30 %)	Number of staff briefing sessions conducted	0.075
		Number of teams meeting	
		Number of active flexible working agreements	

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Category	Functional Goals	Functional metrics	Weight age
Marketing (20 %)	Marketing contribution to revenue (30 %)	% of revenue sourced by marketing	0.06
		% of revenue influenced by marketing	
	Increase sales (40 %)	Customer retention or turnover	0.08
		Frequent customers as a percentage of the total customers	
	Social Media Reach (20 %)	Number of lead conversions assisted by social media channel	0.04
		% of traffic associated with social media channels	
	Customer Lifetime Value (10 %)	Avg. sale/customer × Avg. no. of times a customer buys × Avg. retention time in months/years	0.02
Finance (15 %)	Profitability (35 %)	Gross Profit Margin	0.0525
		Net Profit Margin	
	Liquidity (35 %)	Current Ratio	0.0525
		Quick Ratio	
	Working Capital Measurements (30 %)	Accounts Payable days	0.045
		Accounts Receivable days	
		Inventory Turnover days	

Examples of cloud computing in Automobile industries:

- General Motors' new IT strategy includes cloud.
- Ford My Touch uses cloud to help turn its vehicles into mobile communications hubs.
- Daimler uses cloud to connect with its supplier network.

Change Management for Cloud Strategy

Change management is the process of transitioning individuals, teams and organizations to a desired new state. In view of project management, it's a process by which new changes to a project are formally approved and introduced.

Is Change Management Really Required for Implementing Cloud?

This question arises especially because of the perception that the cloud implementation is simple and easy. The impact of implementation of cloud can vary depending on the stage of maturity of the organization and to the extent to which it is implementing cloud. Like an organization at Level 1 maturity would have relatively less impact compared to a Level 4 organization where the processes are relatively more mature and benchmarked. Moreover it's easier to motivate employees of a level 1 organization than a level 4 organization, as they are more open to change. So no matter how small or large the organization is and which level of maturity it is in, change management is necessary for a smoother transition.

By moving applications and workload to cloud, IT operating model is the most effected. It would result in changed roles and responsibilities and new expectations.

Change Management Strategy for Mahindra Automotive

1. *Scope of Implementation*
   The project would be implemented in two phases.

   Phase 1 would consist of implementing IaaS on cloud. In this we would move our entire database on cloud but in a phased manner. In the second part of phase 1 we would be moving out Application servers, Web servers and Agent servers to cloud.

   Phase 2 would consist of implementing SaaS on cloud. In this we would move all the tools and applications to cloud.
2. *Process Priorities*
   Priority of various processes would be set. Some of the processes would be implemented in parallel and the others in a sequence. The priorities would be clear in the roadmap section.
3. *Roadmap*
   Tentative roadmap of various implementations would be as below.

	September 13	October 13	November 13	December 13	January 14	February 14
Primary DB migration						
Secondary DB migration						
DB manager migration						
Web Server migration						
Application Server migration						
Agent Server migration						
Tools and Application migration						
Testing (unit, integration)						

4. *Milestone Review*
   Milestone review would be done at the end of every month to check if the plan for the month is met or if there is any deviation from the actual plan. If there is a deviation corrective action is taken and reason for deviation is investigated.
5. *Senior Management Review*
   Senior management consisting of managing directors of all verticals would meet once in the beginning of every month to discuss the progress made the previous month. They would examine the impact of the change on their vertical and would suggest changes or steps to improve if any. A milestone would be said to be complete only if the Senior management approves it, and the next job can only be started after their approval.
6. *Critical Success Factors*
   Various CSFs are mentioned below

   (a) Primary DB migration has to be successful before Secondary DB migration can be started.
   (b) DB migration has to be complete before other migrations like Web Server migration and Application server migration could begin.
   (c) Agent server migration would start only after Web server and Application server migration is fully done.
   (d) Agent server migration and tools and application migration should happen in parallel.
   (e) Each test stage should be successful and bug free before next stage starts.

7. *Project Organization Structure*
   (a) Steering Committee—Steering Committee would be set up consisting of Managers of each module. Every change has to be reviewed and approved by steering committee before its implemented and deployed.
   (b) Operational—Various roles and responsibilities would be specified and training on the new roles would be given to the employees.
8. *Communication Strategy*
   It deals with the strategy that would be used to communicate changes to the various stakeholders especially the employees.

   Posters would be put up in all strategic locations like lifts, notice boards, cafeteria, etc. well before the actual implementation begins so that the employees are mentally prepared for the change. The communication would clearly state the benefits of the change and what stake they have in the change. Regular updates on the progress of the project would be communicated through official mail and would also be posted in employee forum.

   Escalation chat is prepared and communicated.
9. *Rewards and Recognition*
   The employees who make effort to adopt to the new process will be duly recognized and rewarded. The rewards and recognition would be in line with the company's rewards and recognition policy.
10. *Training*
    The employees and the stakeholders would be given classroom and on job training. Classroom training would be complete before the project goes live and on job training would happen after project goes live. Throughout the process the employees would be supported and guided by experts. This would continue till the employees are familiar with the new change and are comfortable taking it up on their own.
11. *Pilot Strategy*
    This would define the scope of pilot and the number of departments and employees who would be covered under each pilot.

Managerial Implication for Cloud Strategy

The major implications are prominent over the below four departments: HR, IT, Finance, and Senior Management.

Department	Comments	Favourable/ unfavourable	Impact	Implication and importance		
				Timeframe	Effect	Importance
	How the implementation of cloud going to affect the departments inside Mahindra & Mahindra?		The potential impact of these factors on the company?	S: 0–6 months	On the department:	To industry:
			H—High	M: 6–12 months	Positive: (+)	C—Critical
			M—Medium	L: 12–24 months	Negative: (–)	I—Important
			L—Low	F: 24 + months	Unknown: (?)	N—Not important
			I—Interesting to know			U—Unknown
Human Resource	It will lead to employees becoming jobless, due to the outsourcing	Favourable	*M*	*M*	–	*I*
Information Technology	IT expenditure will increase as the data will be stored in a shared pool and will require initial investment	Unfavourable	*L* (Will be beneficial in long run)	*S*	+	*C*
Senior management	It will externalize the additional responsibilities of maintaining data by M&M themselves	Favourable	*I* (A change expecting to keep up with the technology)	*M*	+	*I*
Finance	Cost of recruitment of IT experts will come down where as huge initial investment will be needed for hosting the data on cloud and building the whole paradigm	Unfavourable	*M*	*F*	?	*C*

This framework correlates whether the cloud implementation is favourable or unfavourable, whether the impact is high/low/medium/interesting to know. Regarding the implications and importance aspect: it gives us an idea of timeframe of implementation, effect on performance, and importance. The overall rationale behind this analysis is that we can get a distinction as well as holistic view of the whole underlying system which has its stake while going for cloud implementation.

When it comes to the impact with respect to the stakeholders there can be two scenarios depending upon the outcome of implementing cloud:

Positive value addition:

- Increase in the share price and in turn return on equity(ROE)
- Reduction in system cost so there can be more dividend distribution
- The capex will be converted to opex and thus externalizing the risk of investment

No/Negative value addition:

- Share prices going down
- The stocks may get a hit due to the negative perception
- Investors may feel reluctant to invest as it will appear to be a rehabilitation phase

Risk Management

"The decision to embrace cloud computing technology is a risk-based decision, not a technology-based decision" (source: FEDRAMP). All organizations, interested in cloud implementation, needs to establish the right decision framework and mechanisms to use the service successfully. These rely on an ability to analyze and assess the risks.

Risk Identification

In this phase all possible factors which can be at a risk are written down and then a zeroing down happens where the most critical ones are listed which are further assessed to get the actual idea of what contributes to the make or break decision which is taken with regards to implementation.

Risk Assessment

Mission risks: The systemic risks that affect the programme's ability to achieve its key objectives. A mission risk arises from a factor that has a strong influence on the eventual outcome or result. Such a factor is called a *driver*. Drivers enable a systemic approach to risk management by aggregating the effects of conditions and potential

events. But to assess the feasibility Mahindra should identify gaps or areas of risk that might need to be taken into account in decisions to approve a cloud project or in assessing the use of the cloud service.

The following factors are important while taking a decision in this aspect:

Regulatory compliance:
Changing the host is not nullifying the risk and the accountability towards customers for any security and integrity issues remains the same. Risk is typically evaluated through a process of regular external audits.

Geographical spread of our data:
Mahindra's data may or may not be residing in the same city, state or even country.

Data loss and recovery:
Data on cloud is mostly encrypted; this is to ensure data security. This comes with a trade off—it is tougher to recover corrupted encrypted data as compared to unencrypted data. So planning for a disaster scenario and the mitigation strategy needs to present.

Availability of data:
It is essential to gaze tolerance level for information unavailability in case of a vendor downtime. Cloud computing should be applied to specific low to medium risk business areas. Choosing a cloud provider requires a lot of due diligence than normal IT procurement. The risk premium is rewards can be tremendous if various risks are well managed.

Cloud Mission Risks
- The solution does not meet its financial objectives
- It does not work in the context of the user enterprise's partnership and culture
- It cannot be developed due to the difficulty of integrating the cloud services involved
- It does not comply with its legal, contractual, and moral obligations
- A disaster occurs from which the solution cannot recover
- An external cloud service used by the solution is inadequate
- The system quality of the solution is inadequate, so that it does not meet its users' needs

Risk Mitigation Plan

This step suggests plausible solution or remedies or prospective risk avoidance mechanisms. This will be subjective to industry, organization, and culture as well.

Risk Management Matrix:
In the below matrix the risk analysis is done across the seven most critical fields which can have a severe impact on the decision of whether to go or do not-go for cloud implementation in case of Mahindra Auto sector.

Risk Identification	Impact (in crore rupees)		Probability	Impact Factor	Risk Index	Risk Mitigation plan	Cost	Cost vs Risk Index	Remark
Financial	Delay in ROI, opportunity cost etc	40	35%	8	112	In ROI calculation the assumptions needs to be reviewed by SMEs for better results	100	<	Margin will depend on accurate predictions and how quickly the system responds to it
Issues in partnership	Leveraging core competency	50	15%	7	52.5	Ensuring tech. risks are understood, clear deployment road map to be established, and clear consensus to be reached	50	<	Strong partnership with collaborators is essential to develop a competitive edge in the market
System Quality	Impacts can be on performance, manageability, security, user satisfaction, and functionality	180	45%	8	648	Improved margin can be achieved from better quality	550	<	Most important aspect which requires utmost attention
Cloud Service Unavailable	SLA Breaching Penalty	250	14%	7	245	Satellite Backup	200	<	Cloud service unavailability will lead to lost sales as well as customers
Disaster Recovery	Distributed system, so a disaster happening in any part of the globe can affect the whole system	100	23%	7	161	Data can be segregated in to categories depending upon the criticality & allowable timeframe Vs downtime to be checked	130	<	If the system downtime is within the tolerance limit, and the system recpvers consistent information then it will be ideal
Risk of compliance	Issues related to integrity, and confidentiality	100	20%	7	140	Better terms and conditions / robust negotiation with partner organization	100	<	Identifying and following legal procedures in the non compliance / adherence
Forex Risk in the foreign currency involvement	Loss in projected profitability/Deviation from planned profits (Actual profits less than planned profits)	50	10%	5	25	Proper mix of domestic and external loan	10	<	Strategies to be aligned with the measures that are needed to minimize the impact of Forex risk

Conclusion

Automotive industry is a dynamic industry, with challenges at all levels starting from planning to production. In automotive industry, products have to be produced in a controlled environment, and make sure all the vehicles meet compliance standards and are produced, dispatched and distributed on time. Mahindra & Mahindra is demanding and chaotic, making it extremely important that their functions are running smoothly. To reduce the chaos and bring sanity in Mahindra, they require more than IT support. Cloud computing for Mahindra can revolutionize their working and operations. Cloud applications can engineer functions, customer services, administrative tasks, etc. Adopting cloud technology can allow Mahindra to achieve competency and gain optimum benefits. Cloud services provide support for variety of operations like coordinating tasks; organizing and securing data; critical finance functions; communicating with customers, so on and so forth. Cloud services can smooth out management tasks within the Mahindra. Apart from the obvious benefits such as more scalability, efficiency in handling data and tasks, shift from Capex to Opex, cloud can help in making retrieval, collaboration and securing easier.

Glossary

OLC	Organization Life Cycle
CSF	Critical Success Factors
PESTEL	Political, Environmental, Social, Technological, Economic, and Legal
R&D	Research and Development
SCM	Supply Chain Management
IT	Information Technology
OLC	Organizational Life Cycle
ERP	Enterprise Resource Planning
KPI	Key Performance Indicators
CSFs	Critical Success Factors
SOA	Schedule of Authorization
HR	Human Resource
IT	Information Technology
SAIL	Steel Authority of India Limited
SCM	Supply Chain Management

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Index

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