UNDERSTANDING

Information Technology

A Self-study Module

[For CA-Intermediate (IPC) Course]

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Dedicated to

My Grandfather
Late Shree Ram Pyar Tiwary

Preface

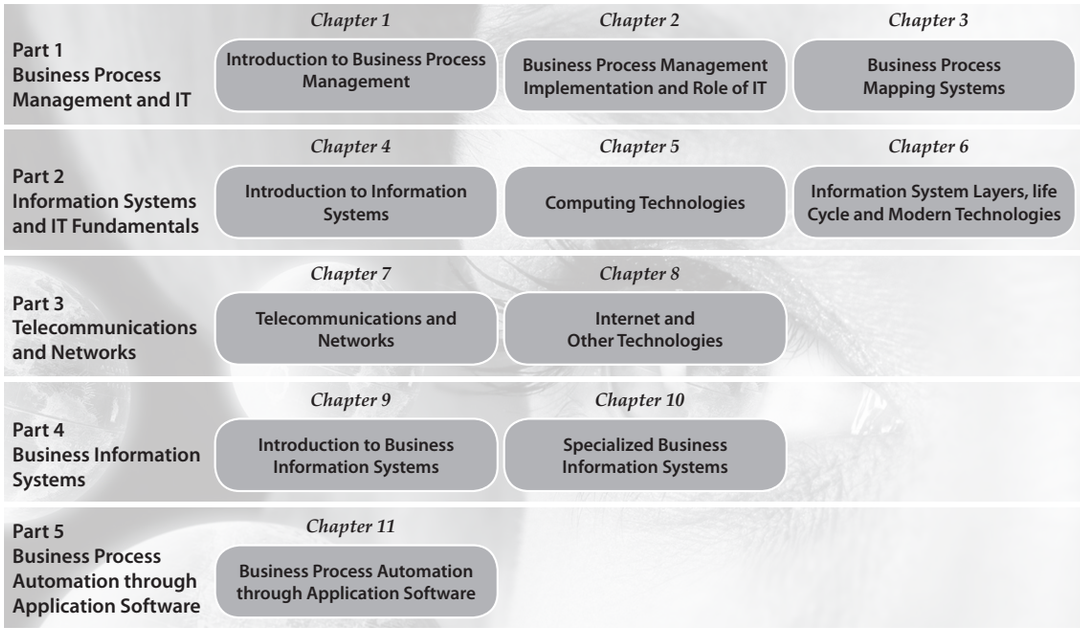
Welcome to this new edition of *'Understanding* Information Technology: *A Self-study Module'!* As an author, I am sensitive to your learning needs. I believe that presentation is an effective tool that determines the success of an author. For this very reason, I have taken your point of view into consideration. In writing each chapter, I have taken every care to make the content informative as well as easy and interesting to read.

This new course can have a major impact on your career direction and future success. It provides the comprehensive knowledge of information technology that would help you to utilize your talent in the dynamic 21st century business world where information systems and emerging new technologies have taken centre stage in running businesses.

The aim of *'Understanding* Information Technology: *A Self-study Module'* is to help CA Intermediate (IPC) students by clearly explaining, analysing, and evaluating important information technology concepts. My approach in writing this book was essentially twofold: to write an accessible textbook that students feel comfortable with but without compromising on the academic rigour.

The case-studies, herein, have been taken from contemporary world and leading brands around us. These help to bridge the gap between theories to practice; aiming not only at a comprehensive learning experience but also offering an interesting reading. To supplement this, I have tried to adopt a user-friendly writing style that gives clear and concise explanations to help students engage readily with the content and grasp complex IT concepts easily.

The book *'Understanding* Information Technology: *A Self-study Module'* has been divided into five parts and seven chapters. The chapter organization provides a student-friendly approach to the study of Information Technology. Structure of this book has been shown in this diagram.



I would be happy to get your feedback, comments and queries. You can get in touch with me at *om.trivedi@carvinowledge.in*, www.facebook.com/strategyclasses or call me at *9953922272 (between 8 pm – 10 pm)*.

Good luck for a challenging and successful learning experience!

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Syllabi Mapping

Intermediate (IPC), Group-II
Paper-7A: Information Technology (50 Marks)

Level of Knowledge: Working Knowledge

Objective: "To develop understanding of Information Technology as a key enabler and facilitator of implementing Information Systems in enterprises and their impact on business processes and controls".

Parts	Syllabus	Chapters in the book
Part I	**Business Process Management and IT**	
	Introduction to various Business processes: Accounting, Finances, Sale and Purchase.	**Chapter 1: Introduction to Business Process Management**
	Business Process Automation– Benefits & Risks Accounting systems vs. Value chain automation, Information as a business asset Impact of IT on business processes, Business Risks of failure of IT Business Process Re-engineering	**Chapter 2: Business Process Management Implementation and Role of IT**
	Approach to mapping systems: Entity Diagrams, Data Flow Diagrams, Systems Flow diagrams, Decision trees/tables.	**Chapter 3: Business Process Mapping Systems**
Part II	**Information Systems and IT Fundamentals**	
	Understand importance of IT in business and relevance to Audit with case studies.	**Chapter 4: Introduction to Information Systems**
	Understand working of computers and networks in business process automation from business information perspective Concepts of Computing, Computing Technologies & Hardware –Servers, end points, popular computing architectures, emerging computing architectures & delivery models – example: SaaS, Cloud Computing, Mobile computing, etc. Example: Overview of latest devices/technologies –i5, Bluetooth, Tablet, Wi-Fi, Android, Touchpad, iPad, iPod, Laptop, Notebook, Smartphone, Ultra-Mobile PC etc.)	**Chapter 5: Computing Technologies**
	Overview of IS Layers–Applications, DBMS, systems software, hardware, networks & links and people Overview of Information Systems life cycle and key phases	**Chapter 6: Information System Layers, life Cycle and Modern Technologies**
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	How Internet works, Internet architecture, key concepts, risks and controls E-Commerce and M-commerce technologies	**Chapter 8: Internet and Other Technologies**
Part IV	Business Information Systems	
	Information Systems and their role in businesses The relationship between organisations, information systems and business processes Accounting Information Systems and linkages to Operational systems Business Reporting, MIS & IT	**Chapter 9: Introduction to Business Information Systems**
	IT as a business enabler & driver –ERP, Core Banking System, CRM, SCM, HRMS, Payment Mechanisms Organisation Roles & responsibilities and table or authorities, importance of access controls, privilege controls Specialised systems -MIS, DSS, Business Intelligence, Expert Systems, Artificial Intelligence, Knowledge Management systems etc.	**Chapter 10: Specialized Business Information Systems**
Part V	Business process automation through Application software	
	Business Applications–overview and types Business Process Automation, relevant controls and information systems Information Processing & Delivery channels and their role in Information Systems Key types of Application Controls and their need Emerging concepts– Virtualisation, Grid Computing, Cloud delivery model	**Chapter 11: Business Process Automation through Application Software**

Acknowledgements

It is always difficult to express gratitude and sentiments in words; it can only be felt. In all humility, I am grateful to a large number of students and professors who contributed in my development in more than one ways. My sincere gratitude to my Guru and great visionary Professor Prashant Mishra (IIMC), who has always boosted my morale. *'Understanding* Information Technology: *A Self-study Module'* has benefited from an extensive development process. Over 30 faculty reviewers, students and industry professionals provided feedback about the accuracy and relevance of the content as well as suggestions for its improvements. They provided us with a detailed and critical analysis of each chapter throughout the development of the book. We do acknowledge that their feedback was invaluable in our attempt at creating the best possible book on information technology. We would like to thank the following for their time and commitment:

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Professor - IDT
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New Delhi

CA Parimal Jha
Partner - Chaturvedi and Shah
Mumbai

CA Amit Rajpurohit
Chartered Accountant
Mumbai

Student Reviewers

We took the help of many students who class-tested the manuscript, evaluated it for clarity, and assessed each feature. Their comments helped us expand the book's content, improved the pedagogical features, and strengthened the assessment features. We are thankful to the following:

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Arun Shah Krishna Ravesh Manish Abhishek Gunjan
Naringh Chauhan Ruchi Sonal Vineet

I am grateful to my esteemed colleagues, friends and students who have contributed to this book by advising me and by giving constructive feedback. This book would not have taken its present shape without the continuous support and encouragement from the editorial and production team of Carvinowledge Press and it has been a real pleasure working in coordination with their extremely professional set up.

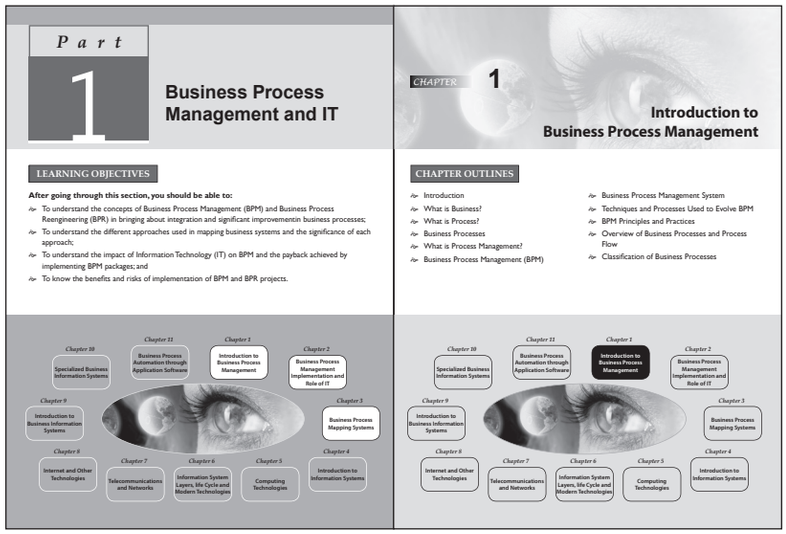
I have immensely benefitted from referring to several books and publications. Thus, I owe an enormous intellectual debt to all authors, publications, publishers and institutions whose work I have drawn upon in developing this textbook. Specially, I would like to thank and dedicate this work to my wife, Eesha and daughter, Aparna for their unflagging support. Last but not the least, I am always thankful to the almighty God for choosing me to disseminate this knowledge. Valuable suggestions and constructive feedback from learners is welcome and would be acknowledged. I can be reached at om.trivedi@carvinowledge.in, www.facebook.com/Strategy Classes.

Om S Trivedi

Visual Walkthrough

Part Learning Objectives and Planning

Every part contains a 'Learning Objectives' and a 'Chart' that provides an overview of each part with important learning objectives and chapters covered under it.



Part 1

Business Process Management and IT

CHAPTER 1

Introduction to Business Process Management

LEARNING OBJECTIVES

After going through this section, you should be able to:

- To understand the concepts of Business Process Management (BPM) and Business Process Reengineering (BPR) in bringing about integration and significant improvementin business processes;
- To understand the different approaches used in mapping business systems and the significance of each approach;
- To understand the impact of Information Technology (IT) on BPM and the payback achieved by implementing BPM packages; and
- To know the benefits and risks of implementation of BPM and BPR projects.

CHAPTER OUTLINES

- Introduction
- What is Business?
- What is Process?
- Business Processes
- What is Process Management?
- Business Process Management (BPM)
- Business Process Management System
- Techniques and Processes Used to Evolve BPM
- BPM Principles and Practices
- Overview of Business Processes and Process Flow
- Classification of Business Processes

Chapter Outline

Every chapter contains a chapter outline that provides an overview of the chapter with important topics covered.

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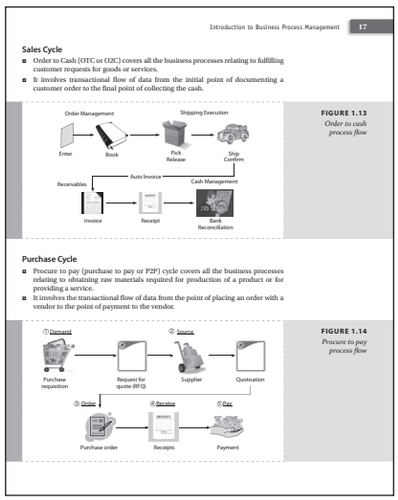
Syllabi Mapping

The text has been mapped with the new CA Intermediate (IPC) syllabus of 'Information Technology' issued by the ICAI.

Flow Diagrams

Flow diagrams have been used at relevant places to depict the concept in simulated manner. The purpose is to provide visualization of the theoretical concept or some phenomenon.



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Sales Cycle

- Order to Cash (OTC or O2C) covers all the business processes relating to fulfilling customer requests for goods or services.
- It involves transactional flow of data from the initial point of documenting a customer order to the final point of collecting the cash.

Order Management — Enter, Book — Shipping Execution — Pick Release, Ship Confirm

Receivables — Auto Invoice — Cash Management — Invoice, Receipt, Bank Reconciliation

FIGURE 1.13 *Order to cash process flow*

Purchase Cycle

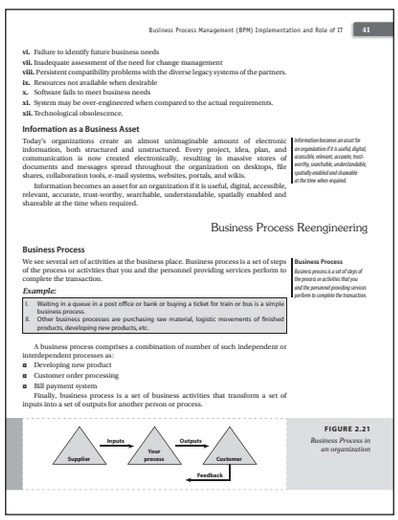
- Procure to pay (purchase to pay or P2P) cycle covers all the business processes relating to obtaining raw materials required for production of a product or for providing a service.
- It involves the transactional flow of data from the point of placing an order with a vendor to the point of payment to the vendor.

① Demand — Purchase requisition; ② Source — Request for quote (RFQ), Supplier, Quotes/bids; ③ Order — Purchase order; ④ Receive — Receipts; ⑤ Pay — Payment

FIGURE 1.14 *Procure to pay process flow*

Annotation/Facts Boxes

These are the shortest way to explain the meaning of particular concept. Margin notes, along with the text provide material that is complementary to the matter contained in the text.



Business Process Management (BPM) Implementation and Role of IT 41

vi. Failure to identify future business needs
vii. Inadequate assessment of the need for change management
viii. Persistent compatibility problems with the diverse legacy systems of the partners.
ix. Resources not available when desirable
x. Software fails to meet business needs
xi. System may be over-engineered when compared to the actual requirements.
xii. Technological obsolescence.

Information as a Business Asset

Today's organizations create an almost unimaginable amount of electronic information, both structured and unstructured. Every project, idea, plan, and communication is now created electronically, resulting in massive stores of documents and messages spread throughout the organization on desktops, file shares, collaboration tools, e-mail systems, websites, portals, and wikis.

Information becomes an asset for an organization if it is useful, digital, accessible, relevant, accurate, trust-worthy, searchable, understandable, spatially enabled and shareable at the time when required.

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Business Process Reengineering

Business Process

We see several set of activities at the business place. Business process is a set of steps of the process or activities that you and the personnel providing services perform to complete the transaction.

Example:

I. Waiting in a queue in a post office or bank or buying a ticket for train or bus is a simple business process.
II. Other business processes are purchasing raw material, logistic movements of finished products, developing new products, etc.

Business Process

Business process is a set of steps of the process or activities that you and the personnel providing services perform to complete the transaction.

A business process comprises a combination of number of such independent or interdependent processes as:

- Developing new product
- Customer order processing
- Bill payment system

Finally, business process is a set of business activities that transform a set of inputs into a set of outputs for another person or process.

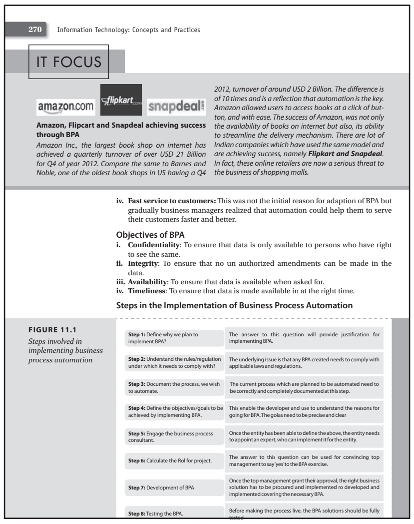
Supplier — Inputs — Your process — Outputs — Customer — Feedback

FIGURE 2.21 *Business Process in an organization*

Examples

Each chapter includes examples illustrating the concepts you need to know and the techniques you need to learn.

Visual Walkthrough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IT FOCUS

Amazon, Flipkart and Snapdeal achieving success through BPA

Amazon Inc., the largest book shop on internet has achieved a quarterly turnover of over USD 21 Billion for Q4 of year 2012. Compare the same to Barnes and Noble, one of the oldest book shops in US having a Q4 2012, turnover of around USD 2 Billion. The difference is of 10 times and is a reflection that automation is the key. Amazon allowed users to access books at a click of button, and with ease. The success of Amazon, was not only the availability of books on internet but also, its ability to streamline the delivery mechanism. There are lot of Indian companies which have used the same model and are achieving success, namely ***Flipkart and Snapdeal****. In fact, these online retailers are now a serious threat to the business of shopping malls.*

iv. **Fast service to customers:** This was not the initial reason for adaption of BPA but gradually business managers realized that automation could help them to serve their customers faster and better.

Objectives of BPA

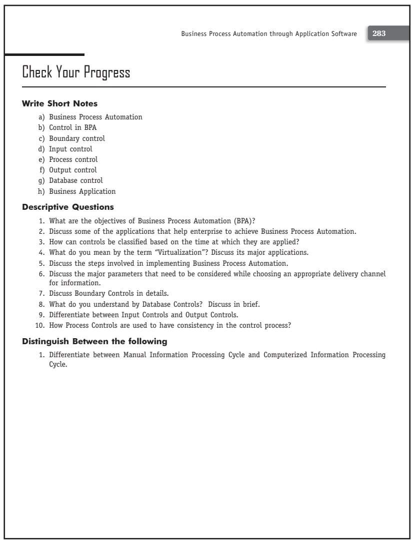
i. **Confidentiality:** To ensure that data is only available to persons who have right to see the same.
ii. **Integrity:** To ensure that no un-authorized amendments can be made in the data.
iii. **Availability:** To ensure that data is available when asked for.
iv. **Timeliness:** To ensure that data is made available in at the right time.

Steps in the Implementation of Business Process Automation

FIGURE 11.1 *Steps involved in implementing business process automation*

IT Focus Box

Here, we tried to introduce some industry and real life aspects of information technology. This box has also been created keeping in mind CA IPC questions, to be asked in the examinations.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Check Your Progress

Write Short Notes

a) Business Process Automation
b) Control in BPA
c) Boundary control
d) Input control
e) Process control
f) Output control
g) Database control
h) Business Application

Descriptive Questions

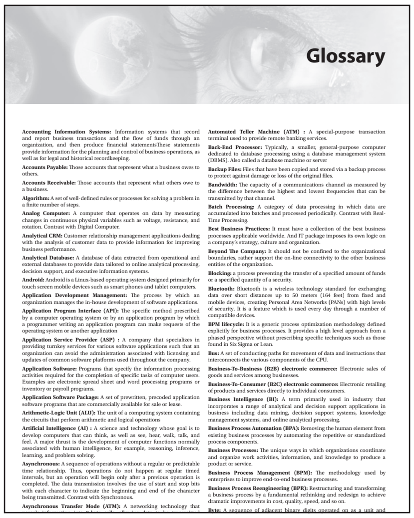
1. What are the objectives of Business Process Automation (BPA)?
2. Discuss some of the applications that help enterprise to achieve Business Process Automation.
3. How can controls be classified based on the time at which they are applied?
4. What do you mean by the term "Virtualization"? Discuss its major applications.
5. Discuss the steps involved in implementing Business Process Automation.
6. Discuss the major parameters that need to be considered while choosing an appropriate delivery channel for information.
7. Discuss Boundary Controls in details.
8. What do you understand by Database Controls? Discuss in brief.
9. Differentiate between Input Controls and Output Controls.
10. How Process Controls are used to have consistency in the control process?

Distinguish Between the following

1. Differentiate between Manual Information Processing Cycle and Computerized Information Processing Cycle.

Chapter-end Questions

It has been given in the form of 'Check Your Progress'. This will help the CA Intermediate (IPC) students in learning the recalling progress and serves as ready reference to the previous years' examination questions.



Glossary

A complete glossary of information technology concepts has been provided in the book for quick recap of the important topics discussed throughout.

Instructor's Resources

'Understanding Information Technology: A Self-study Module' includes teaching tools to support instructors in the classroom. The supplements that accompany the textbook include an Instructor's Manual, Test Bank and Power Point Presentations. Please contact your Carvinowledge Press sales representative to request the CD-ROM containing teaching tools or mail us at ***info@carvinowledge.in***.

Contents

Part 1

Business Process Management and IT

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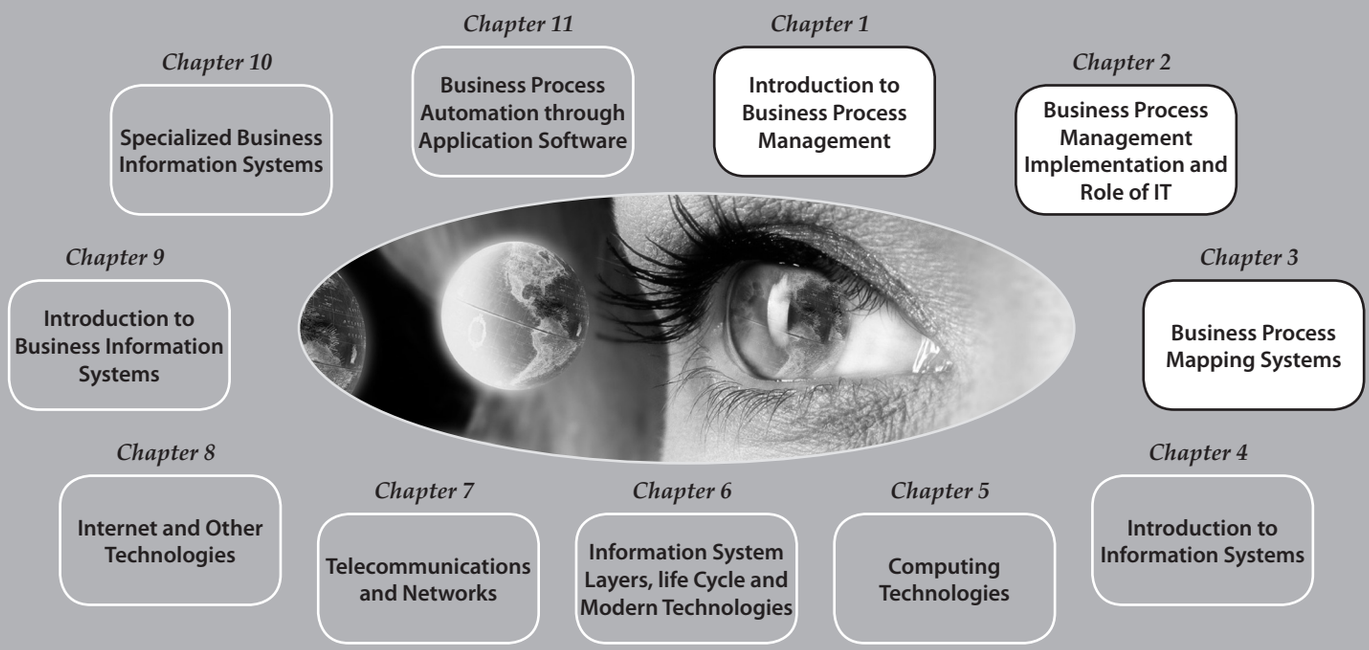

CHAPTER 1

Introduction to Business Process Management

CHAPTER OUTLINES

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Chapter 10
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Chapter 11
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Business Process Mapping Systems

Chapter 8
Internet and Other Technologies

Chapter 7
Telecommunications and Networks

Chapter 6
Information System Layers, life Cycle and Modern Technologies

Chapter 5
Computing Technologies

Chapter 4
Introduction to Information Systems

Introduction

Important aspects of business process management from a business management point of view are increasing customer satisfaction, reducing cost of doing business (cost reduction), and establishing new products and services at low cost (value creation).

Business Process Management (BPM) has received attention recently by both business management and computer science communities. People in business management are interested in improving the operations of their businesses. Important aspects of business process management from a business management point of view are *increasing customer satisfaction, reducing cost of doing business (cost reduction), and establishing new products and services at low cost (value creation).* Business process management is based on the observation that each product that a company provides to the market is the outcome of a number of activities performed.

Automation plays a major role in BPM. Information technology in general and information systems in particular deserve an important role in business process management, because more and more activities that a company performs are supported by information systems. Business process activities can be performed by the company's employees manually or by the help of information systems. There are also business process activities that can be enacted automatically by information systems, without any human involvement. A company can reach its business goals in an efficient and effective manner, only if, people and other enterprise resources, such as information systems, play together well.

What is Business?

Business

The term business refers to all economic activities pursued mainly to satisfy the material needs of the society, with the purpose of earning profits.

A business for our purposes can be any activity contributing purchase, sale, manufacture, processing, and/or marketing of products and/or services. A neighbourhood restaurant or bakery is surely a business. But among businesses, there is great diversity in size: small, medium and large.

> ***"The term business refers to all economic activities pursued mainly to satisfy the material needs of the society, with the purpose of earning profits."***
>
> ***"A business is created to provide products or services to customers. If it can conduct its operations effectively, its owners earn a reasonable return on their investment in the firm."***

The first step in understanding how businesses operate is to recognize their most important functions and the environment in which they operate.

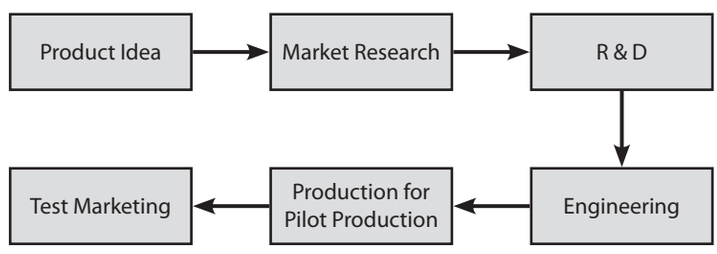

FIGURE 1.1
Initial Functions of a Business

What is the goal of a business?

- Businesses are established by owners who seek to make profits to serve the needs of customers.
- The owner may believe that he can produce and sell a product or service at a lower price than the competing firm.
- By providing a product as desired by the customers, he may be able to make profits for his business.

Profit Maximization

Profit Maximization implies that a firm either produces maximum output for a given amount of input, or uses minimum input for producing a given output. The underlying logic of profit maximization is efficiency.

Revenue – Expenses = Profit

The profit goes to the owner of a business. Thus, the owner who creates the business has a strong incentive to ensure that it is successful, as he or she are directly rewarded for his/her efforts.

Wealth Maximization

A process that increases the current net value of business or shareholder capital gains, with the objective of bringing in the highest possible return. It involves making sound financial decisions.

Peter Drucker's conclusion on business:

- Business is created and managed by people.
- The focus of business is on development of wealth rather than profit maximization.

What is Process?

A process is a sequence of events that uses inputs to produce outputs.

FIGURE 1.2
Basic Process

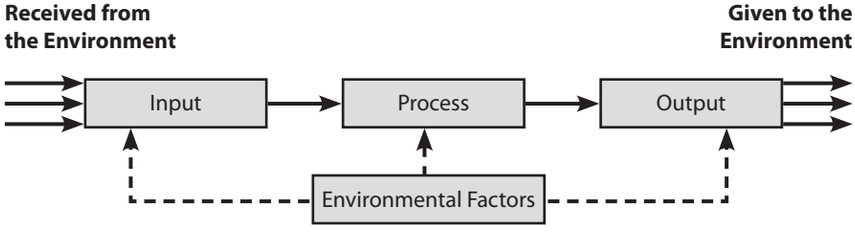

FIGURE 1.3
Environmental Influence on Process

Process

*A **Process** is a coordinated and standardized flow of activities performed by people or machines, which can traverse functional or departmental boundariesto achieve a business objective and creates value for internal or external customers.*

It can include sequences as mechanical as:

- reading a file and transforming the file to a desired output format.
- taking a customer order, filling that order, and issuing the customer invoice.

Business Processes

According to Michael Hammer and James Champy:

> ***"The radical redesign of the business as a collection of activities that take one or more kinds of input and create an output that is of value to the customer."***

This definition puts emphasis on the input/output activities of a business process by stating its **pre-condition (inputs)** and its **post-condition (output)**.

From a business perspective, a process is a coordinated and standardized flow of activities performed by people or machines, which can traverse functional or departmental boundaries to achieve a business objective that creates value for internal or external customers.

Business Process
Business process is a set of steps of the process or activities that you and the personnel providing services perform to complete the transaction.

We see several set of activities at the business place. Business process is a set of steps of the process or activities that you and the personnel providing services perform to complete the transaction.

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II. Other business processes are purchasing raw material, logistic movements of finished products, developing new products, etc.

A business process comprises a combination of number of such independent or interdependent processes as:

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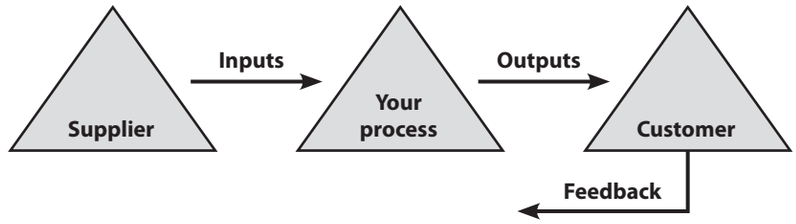
- Bill payment system

*Finally, **business process** is a set of business activities that transform a set of inputs into a set of outputs for another person or process.*

Finally, business process is a set of business activities that transform a set of inputs into a set of outputs for another person or process.

FIGURE 1.4
Business Process in an organization



Functional Vs Process Organization

Basis	Functional/Traditional Organization	Process/Modern Organization
Work Unit	• Department	• Team
Key Figure	• Functional Executive	• Process Owner
Benefits	• Focus on functional excellence • Easy work flow implementation • Work balancing because workers have similar skills • Clear management direction on how work should be performed	• Responsive to market requirements • Improved communication • Better collaboration between different functional tasks • Performance measurements aligned with process goals
Weaknesses	• Barrier to communication between different functions • Poor handover between functions that affects customer service • Lack of end-to-end focus to optimize organizational performance	• Duplication of functional expertise • Inconsistency of functional performance between processes • Increased operational complexity
Strategic Value	• Supports **cost leadership** strategy.	• Supports **differentiation** strategy.

TABLE 1.1
Difference between a functional organization and process organization.

What is Process Management?

Business processes should be coordinated and standardized. Processes should not be haphazard sets of activities to accomplish a business objective. By coordinating and standardizing the activities, processes are reusable and maximize the value they create while lowering the costs when compared to a non-standardized approach of executing activities.

"Process management involves concerted efforts to map, improve, and adhere to organizational processes."

***Process management** involves concerted efforts to map, improve, and adhere to organizational processes.*

Steps to manage a process:

i. To **define** the steps (tasks) in the process.

ii. To **map** the tasks to the roles involved in the process.

iii. To **implement** the steps (tasks) in the process.

iv. To **establish** performance measures to improve the process.

v. To **set up the organizational** process that enables the standardization of and adherence to the process throughout the organization.

Business Process Management (BPM)

Origin of BPM

Since 1993, when Michael Hammer and James Champy published "Reengineering the Corporation" (Harper Business, 1993), we have known that managing an enterprise requires managing its processes. The decade that followed saw Business Process Reengineering (BPR), Business Process Outsourcing (BPO), Digitization, Enterprise Resource Planning (ERP), Total Quantity Management (TQM) and Six Sigma.

These were worthwhile initiatives, and seemed like the very latest in management thinking, but the spirit that animated them was that of Frederick Winslow Taylor (1856-1915). The unstated assumption was that the primary reason to study a process is to eliminate waste.

What is BPM?

BPM is a set of functions in a certain sequence that, at the end, delivers value for an internal or external customer.

BPM is a set of functions in a certain sequence that, at the end, delivers value for an internal or external customer.

Michael Hammer defines BPM as:

> ***"Business Process management is the culmination of the movement to transform business operations. It provides a unifying theme for initiatives directed at improving organizational performance."***

According to Elzinga of University of Florida, BPM is:

BPM is a methodology used by the enterprises to improve end-to-end business processes.

> ***"A systemic, structured approach to analyze, improve, control, and manage processes with the aim of improving the quality of products and services. ... BPM is thereby the method by which an enterprise's 'Quality' program is carried out."***

A business process is a set of functions in a sequence that adds value for the customer.

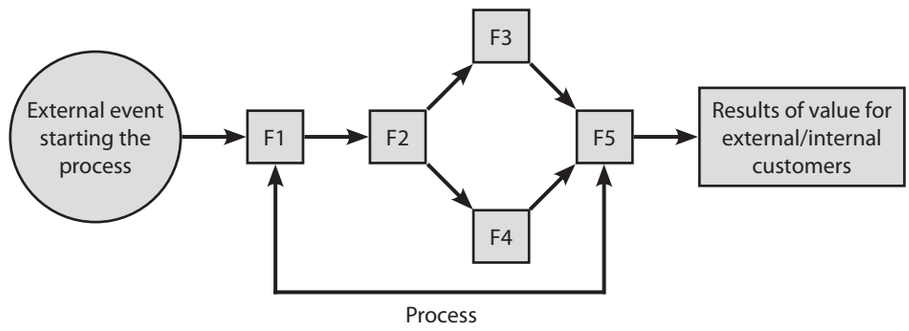


FIGURE 1.5
Business Process Management in an organization
- *F1, F2, F3, F4 and F5 are different business functions*

Business process management includes concepts, methods, and techniques to support the design, administration, configuration, enactment, and analysis of business processes.

Business Process Management System

A business process management system is a generic software system that is driven by explicit process representations to coordinate the enactment of business processes.

Example:

A simple ordering process by the buyer and selling process by the seller.

- The buyer sends an order, receives payment information, settles the invoice, and receives the ordered products. **(Figure 1.6)**
- In the ordering process, an order is received, an invoice is sent, payment is received, and the ordered products are shipped. **(Figure 1.7)**

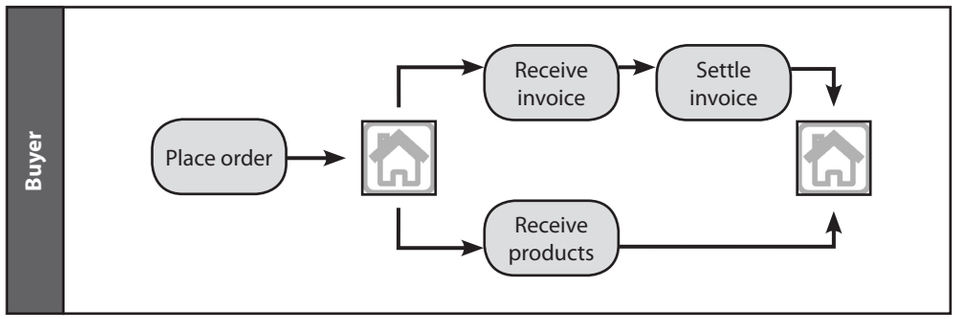


FIGURE 1.6
Ordering process of a buyer

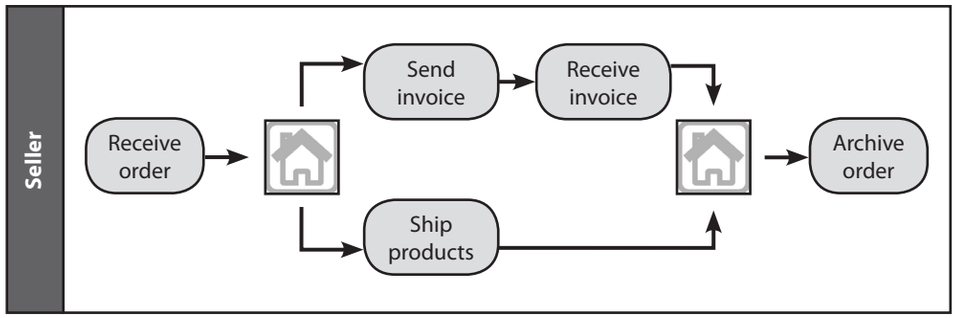


FIGURE 1.7
Simple order processing by the seller

Interaction between the Business Processes of the Buyer and Seller

The business processes of the seller and the buyer interacts with each other in the following way:

Step 1: The buyer sends an order message to the seller **(Place Order activity)**.

Step 2: The seller accepts the order message **(Receive Order activity)**. The order information is then extracted from the message, and order processing continues.

Step 3: The seller sends an invoice **(Send Invoice)** and ships the ordered products **(Ship Products)**.

Step 4: The buyer receives the invoice. **(Receive Invoice activity)**.

Step 5: The buyer sends the payment. **(Settle Invoice activity)**.

Step 6: Finally, the buyer receives the ordered products. **(Receive Products activity)**.

FIGURE 1.8
Interacting business processes from process choreography

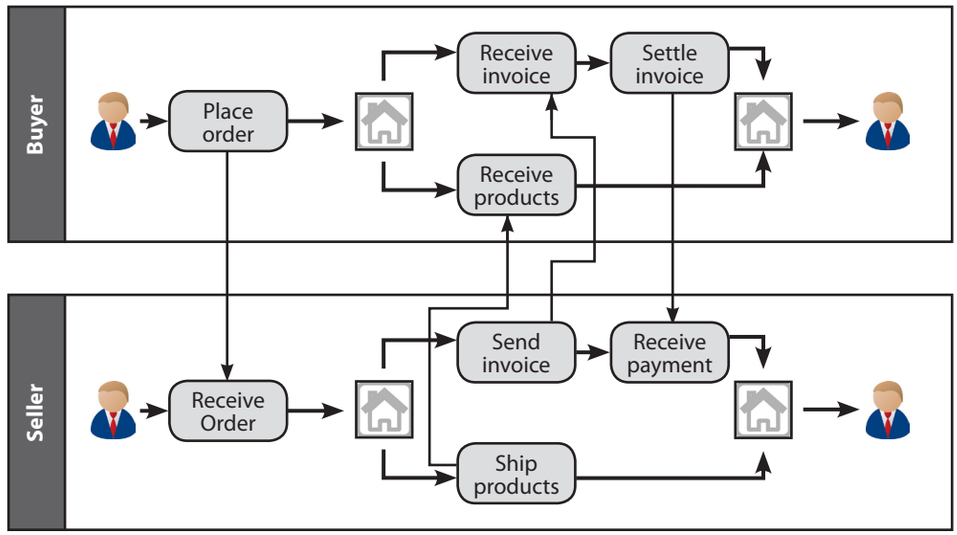
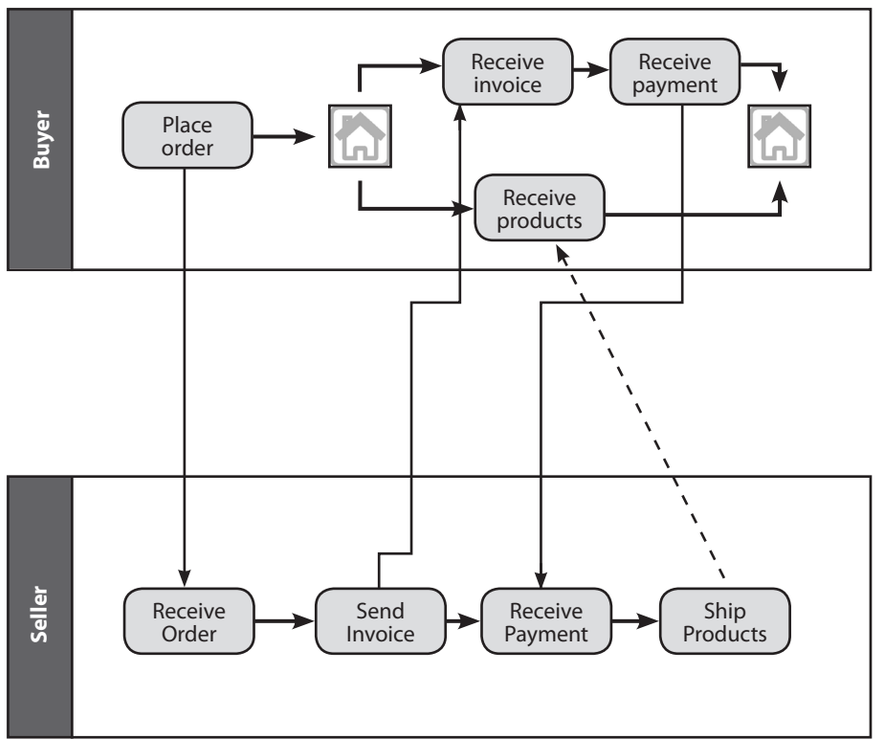


FIGURE 1.9
Variant of seller process with interacting business process



Finally, BPM may be defined as:

> ***"The achievement of an organization's objectives through the improvement, management and control of essential business processes".***

Objectives of BPM

- To evaluate the efficacy and usefulness of business processes for reducing costs and ensure value creation.
- To constantly analyze and streamline business processes.
- To assess the usefulness of these processes and helps them to achieve enterprise objectives at optimum cost.
- To manage business processes efficiently and effectively.

Techniques and Processes Used to Evolve BPM

A. Business Process Reengineering (BPR)

Business process reengineering is a business management strategy, originally pioneered in the early 1990s by Michael Hammer, a former professor of computer science at the Massachusetts Institute of Technology.

Business Process Reengineering (BPR)
The Restructuring and transforming a business process by a fundamental rethinking and redesign to achieve dramatic improvements in cost, quality, speed, and so on.

Hammer and Champy define BPR as

> ***"fundamental revision and radical redesign of processes to reach spectacular improvements in critical and contemporary measurements of efficiency, such as costs, quality, service and quickness."***

Business Process Reengineering (BPR) involves *fundamental rethinking and radical redesigning* of a business process so that a company can create best value for the customer by eliminating barriers that create distance between employees and customers.

B. Six Sigma

Six Sigma is a business strategy developed by Motorola in 1986 to achieve process improvement. Six Sigma is a highly disciplined process that helps us focus on developing and delivering near-perfect products and services.

Six Sigma
Six Sigma is a highly disciplined process that helps us focus on developing and delivering near-perfect products and services.

It strives to meet and improve organizational goals on quality, cost, scheduling, manpower, new products and so on. It works continuously towards revising the current standards and establishing higher ones.

Six Sigma has its base in the concept of probability and normal distribution in statistics. Six Sigma strives that ***99.99966% of products manufactured are defect free***. Six Sigma is a smarter way to manage a business or a department. Six Sigma puts the customer first and uses facts and data to drive better solutions.

Six Sigma efforts target three main areas:

- Improving customer satisfaction
- Reducing cycle time
- Reducing defects

It also follows a life-cycle having phases: **Define, Measure, Analyze, Improve and Control (or DMAIC)** which are described as follows:

i. **Define:** Customers are identified and their requirements are gathered. Measurements that are critical to customer satisfaction [Critical to Quality, (CTQ)] are identified for further project improvement.

ii. **Measure:** Process output measures that are attributes of CTQs are determined and variables that affect these output measures are identified. Data on current process are gathered and current baseline performance for process output

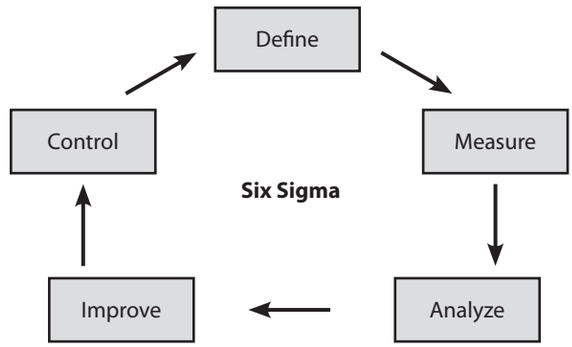
measures are established. Variances of output measures are graphed and process sigma are calculated.

iii. **Analyze:** Using statistical methods and graphical displays, possible causes of process output variations are identified. These possible causes are analysed statistically to determine root cause of variation.

iv. **Improve:** Solution alternatives are generated to fix the root cause. The most appropriate solution is identified using solution prioritization matrix and validated using pilot testing. Cost and benefit analysis is performed to validate the financial benefit of the solution. Implementation plan is drafted and executed.

v. **Control:** Process is standardized and documented. Before and after analysis is performed on the new process to validate expected results, monitoring system is implemented to ensure process is performing as designed. Project is evaluated and lessons learned are shared with others.

FIGURE 1.10
Six Sigma Life-cycle (DMAIC)



C. Total Quality Management (TQM)

Total Quality Management
Planning and implementing programs of continuous quality improvement, wherequality is defined as meeting or exceeding the requirementsand expectations of customers for a product or service.

Total Quality Management (TQM) is a people-focused management system that aims at continual increase in customer satisfaction at continually lower real cost.

TQM is a total system approach (not a separate area or program) and an integral part of high level strategy; it works horizontally across functions and departments, involves all employees, top to bottom, and extends backward and forward to include the supply chain and the customer chain. TQM stresses learning and adaptation to continual change as keys to organizational success.

> ***"TQM is a management approach for an organization, centered on quality, based on the participation of all its members and aiming at long-term success through customer satisfaction, and benefits to all members of the organization and to society."***

D. Workflow Management

A **workflow** consists of an orchestrated and repeatable pattern of business activity enabled by the systematic organization of resources into processes that transform materials, provide services, or process information. It can be depicted as a sequence of operations, declared as work of a person or group, an organization of staff, or one or more simple or complex mechanisms.

The term *workflow* is more commonly used in particular industries, such as printing and professional domains.

Steps in Workflow Management

i. Processes
ii. Planning and scheduling
iii. Flow control
iv. In-transit visibility

Examples:

(a) **In traditional offset and digital printing**, the concept of workflow represents the process, people and usually software technology controllers that play a part in pre/post processing of print-related files, e.g. PDF pre-flight checking to make certain that fonts are embedded or that the imaging output to plate or digital press will be able to render the document intent properly for the image-output capabilities of the press that will print the final image.
(b) **In machine shops**, particularly job shops and flow shops, the flow of a part through the various processing stations is a work flow.
(c) **Insurance claims** processing is an example of an information-intensive, document-driven workflow.

E. Process Analysis

Process analysis is an approach that helps managers improve the performance of their business activities. It is a step-by-step breakdown of the phases of a process, used to convey the inputs, outputs, and operations that take place during each phase. A process analysis can be used to improve understanding of how the process operates, and to determine potential targets for process improvement through removing waste and increasing efficiency.

Process analysis answers the question: **"*How?*"** Process analysis explains how the sequential steps of a procedure lead to its accomplishment; or, how a certain series of events occurred. There are two kinds of process analysis:

Process Analysis
Process analysis explains how the sequential steps of a procedure lead to its accomplishment; or, how a certain series of events occurred.

i. Directional (How do you do it?): The analysis provides directions, as in the Methods section of a laboratory report, or prescribes a certain process to follow.
ii. Informational (How does it work or occur?: How is it done?): This kind of analysis explains how something is, or was, accomplished. The analysis provides information, as in the outline of an organic process, or describes how (not why) certain events led to a particular outcome.

F. Automation Suites

G. Service Enabled Systems

Benefits of using Techniques for BPM

i. Effectiveness gains for enterprises: It can be done through the automated coordination of activities, distribution of tasks to process participants and the amalgamation of applications.
ii. Creation of basic operational value proposition: It is the ability to process more with less effort and higher quality.
iii. Revenue growth: BPM can grow revenues quickly while controlling resource costs.

Benefits of Using Techniques for BPM
i. Effectiveness gains for enterprises
ii. Creation of basic operational value proposition
iii. Revenue growth
iv. Process improvements
v. Goal fulfillment

iv. **Process improvements:** Businesses try to improve on their operations or process as a process improvement project. This requires using advanced methodologies and technologies to deliver consistent, repeatable, and more efficient outcomes by the improvement project.

v. **Goal fulfillment:** BPM helps to define and manage the business processes to reach the desired goals.

BPM Principles and Practices

BPM Goals

Improve products and services through structured approach to performance improvement that centers on systematic design and management of a company's business processes.

BPM Principles

BPM Principles
i. Processes are assets
ii. Processes produce consistent value to customers
iii. Continuous improvement of processes
iv. Role of IT

i. **Processes are assets:** Business processes are organizational assets that are central to creating value for customers.

ii. **Processes produce consistent value to customers:** By measuring, monitoring, controlling, and analyzing business processes, a company can deliver consistent value to customers.

iii. **Continuous improvement of processes:** Business processes are central to an organization's value creation. As the basis for process improvement - business processes should be continuously improved.

iv. **Role of IT:** Information technology is an essential enabler for BPM.

BPM Practices

i. Strive for process-oriented organizational structure.

ii. Appoint process owners.

iii. Senior management needs to commit and drive BPM.

iv. Execution of BPM process improvements should take a bottom-up approach.

v. Put in place information technology systems to monitor, control, analyze, and improve processes.

vi. Work collaboratively with business partners on cross-organizational business processes.

vii. Continuously train the workforce and continuously improve business processes.

viii. Align employee bonuses and rewards to business process performance.

ix. Utilize both incremental (e.g., Six Sigma) and more radical (e.g., BPR) methodologies to implement process improvement.

Overview of Business Processes and Process Flow

Business Process Flow

- A business process flow is a prescribed sequence of work steps.
- It is performed in order to produce a desired result for the organization.

- It is initiated by a particular kind of event.
- It has a well-defined beginning and end.
- It is usually completed in a relatively short period.

Example:

Sales of goods or services, procurement of raw material, payment of employees' salary, payment to suppliers, cash withdrawal from bank; etc.

Business processes have direct or indirect effect on the financial status of the organization.

Example:

i. To complete a sale directly reduces cash or increases liabilities.
ii. Purchasing new efficient machinery directly affects assets and/or liability accounts
iii. Purchasing new efficient machinery is also expected to indirectly affect sales and assets as it provides for increased productivity and an expanded customer base.

Different businesses follow different types of business process flows and the processes performed would also vary. This is also impacted by automation of business processes.

Business Process Life Cycle

The business process consists of phases that are related to each other. The phases are organized in a cyclical structure. It shows the logical order in which one order is dependent on another process.

Business Process Management-Life cycle establishes a sustainable process management capability that empowers organizations to embrace and manage process changes successfully. Because it incorporates both human resources and technology—culture, roles and responsibilities, as well as data content, applications and infrastructure—the approach enables fully informed decision-making right across an organization.

Phases of Business Process Management-Life cycle

i. **Analysis phase:** This involves analysis of the current environment and currentprocesses, identification of needs and definition of requirements.

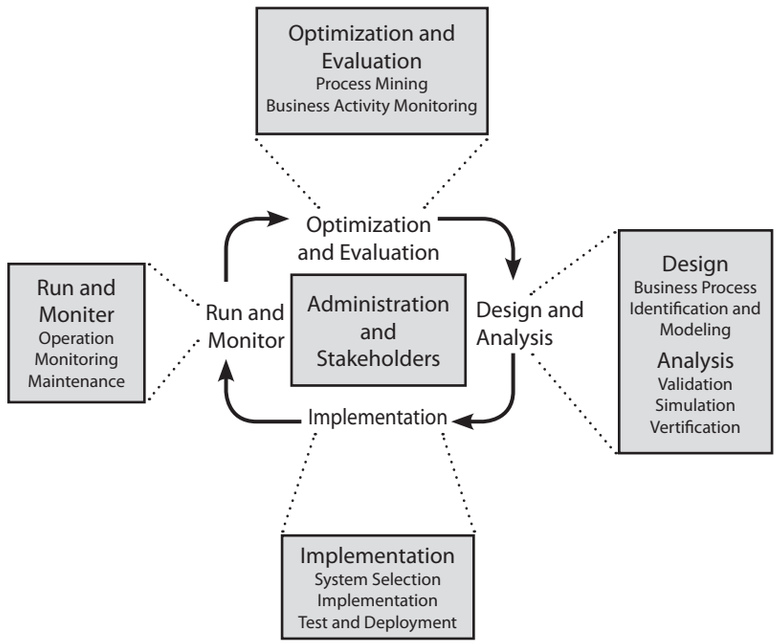
ii. **Design phase:** This involves evaluation of potential solutions to meet the identified needs, business process designing and business process modeling.

iii. **Implementation phase:** This involves project preparation, blue printing, realization, final preparation, go live and support.

iv. **Run and Monitor phase:** This involves business process execution or deployment and business process monitoring.

v. **Optimize:** Iterate for continuous improvement.

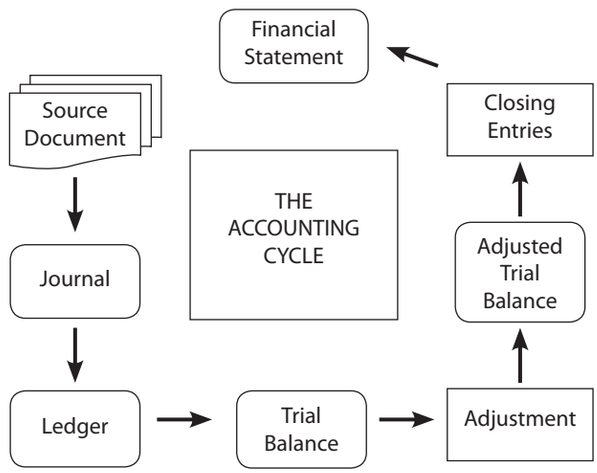
FIGURE 1.11
Business process management lifecycle



Accounting Cycle

- Accounting covers the business processes involved in recording and processing accounting events of a company.
- It begins when a transaction occurs and ends with its inclusion in the financial statements.

FIGURE 1.12
Accounting process flow



Sales Cycle

- Order to Cash (OTC or O2C) covers all the business processes relating to fulfilling customer requests for goods or services.
- It involves transactional flow of data from the initial point of documenting a customer order to the final point of collecting the cash.

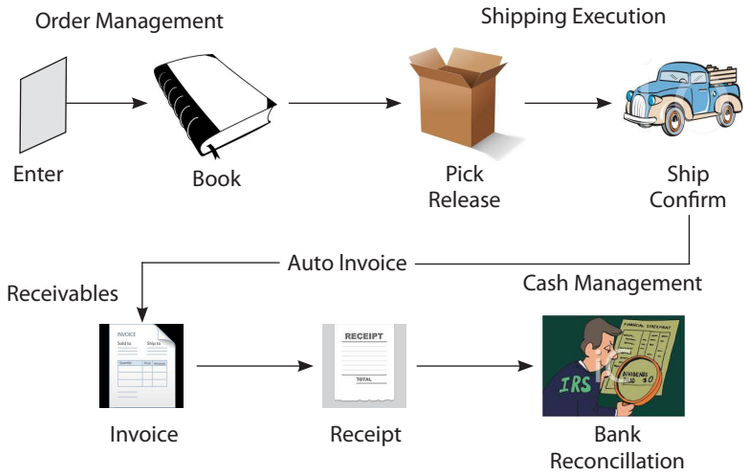


FIGURE 1.13
Order to cash process flow

Purchase Cycle

- Procure to pay (purchase to pay or P2P) cycle covers all the business processes relating to obtaining raw materials required for production of a product or for providing a service.
- It involves the transactional flow of data from the point of placing an order with a vendor to the point of payment to the vendor.

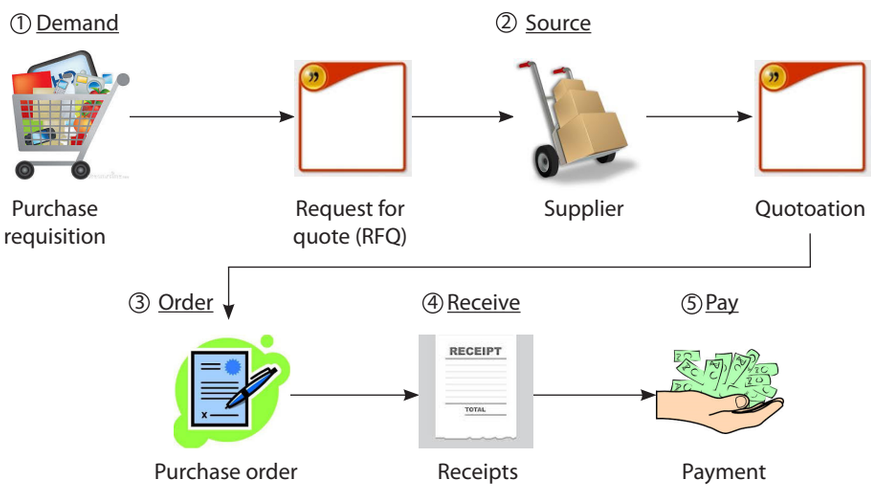


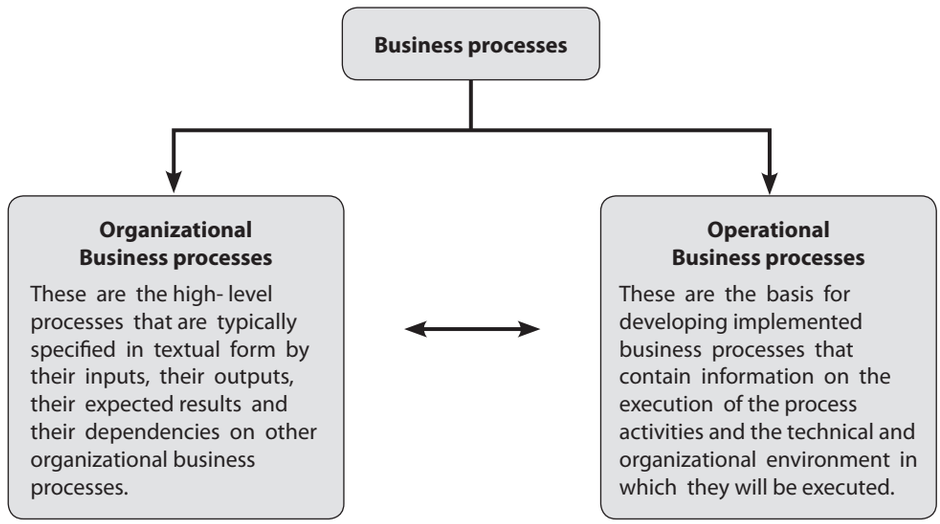
FIGURE 1.14
Procure to pay process flow

Classification of Business Processes

FIGURE 1.15

Types of business process

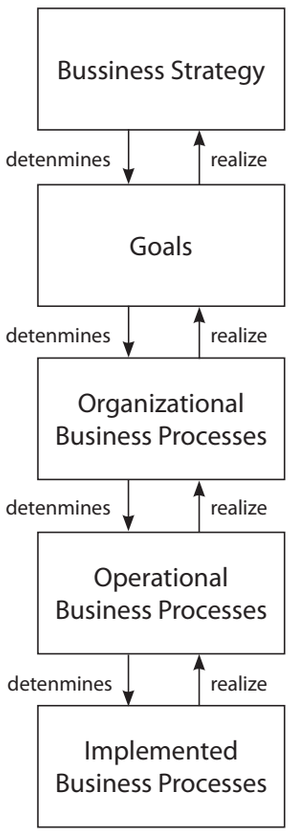
- *Organizational business process*
- *Operational business process*



Business Process Levels: Business Strategy to Business Process Implementation

FIGURE 1.16

Levels of business processes from business strategy to implemented business processes



a. The ***business strategy*** of the company is specified. It describes company's long-term concepts to develop a sustainable competitive advantage in the market. **Example:** ***Cost leadership*** for products in a certain domain.

b. Business strategy is broken down to ***operational goals***. These goals can be organized, so that each goal can be divided into a set of sub-goals. **Example:** Reducing the cost for supplied materials is a goal that contributes to the realization of the ***Cost leadership*** for products.

c. ***Organizational business processes*** are high-level processes that are typically specified in textual form by their inputs, their outputs, their expected results, and their dependencies on other organizational business processes. These business processes act as supplier or consumer processes. **Example:** Managing incoming raw materials provided by a set of suppliers.

d. Multiple ***operational business processes*** contribute in the creation and successful implementation of one organizational business process. In ***operational business processes***, the activities and their relationships are specified, but implementation aspects of the business process are disregarded. Operational business processes are specified by business process models.

e. Operational Business Processes are the basis for developing *implemented business processes*. ***Implemented business processes*** contain information on the execution of the process activities and the technical and organizational environment in which they will be executed.

There are multiple ways to implement business processes, viz; written procedures and policies of the organization, the use of process enactment platforms; etc. In any case, implemented business process refers to a specification that allows the enactment of the process on a given platform, be it organizational or technical.

To conclude, we can say that the business process management space is influenced by the business strategy of the enterprise, i.e., by the target markets, by business strategies opening new opportunities, and, in general, by the overall strategic goals of the enterprise.

BPM and Information System

- Information system plays a key role in setting a successful BPM at organizational level.
- BPM is based on the resources of an enterprise, most prominently on the information systems in place.
- Information systems enable knowledge workers to perform business process activities in an effective manner.
- Information systems also have implications on business processes, since some business processes might not be possible without appropriate information system support.

Refer Figure 1.17 to see the influence of information system on organizational level BPM.

BPM and Its Interaction with Stakeholders

Stakeholders have implications on the organizational business processes. But business processes also have implications on the stakeholders.

Refer Figure 1.17 to see the influence of stakeholders and organizational level BPM on each other.

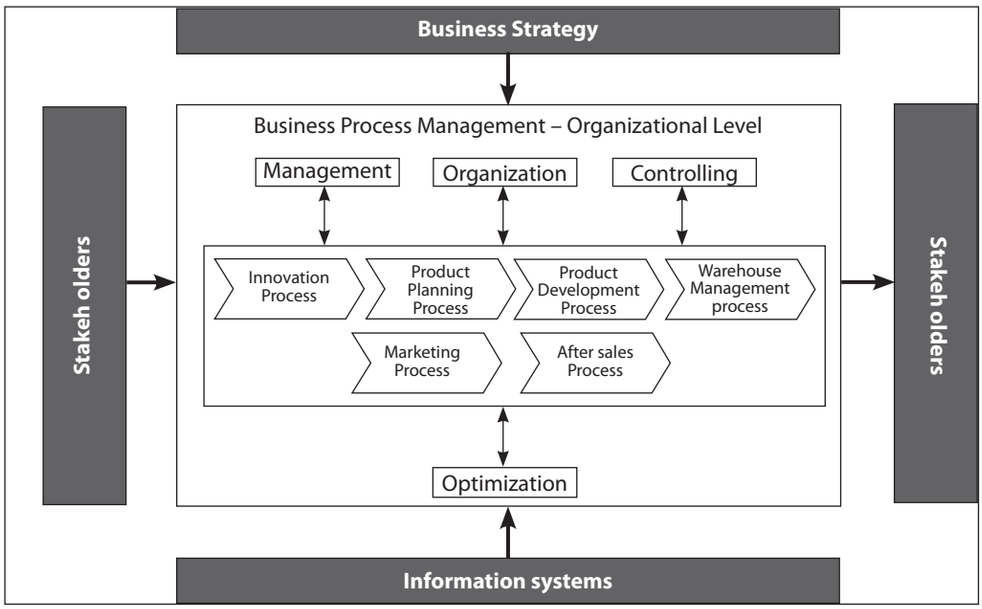


FIGURE 1.17
Influence of information system on organization-level business process management and its influence on stakeholder

IT FOCUS

Key Stakeholders in a Business

Every business involves transactions with certain people. These people are affected by the business and therefore have a stake in it. They are referred to as stakeholders, or people who have interest (stake) in the business.

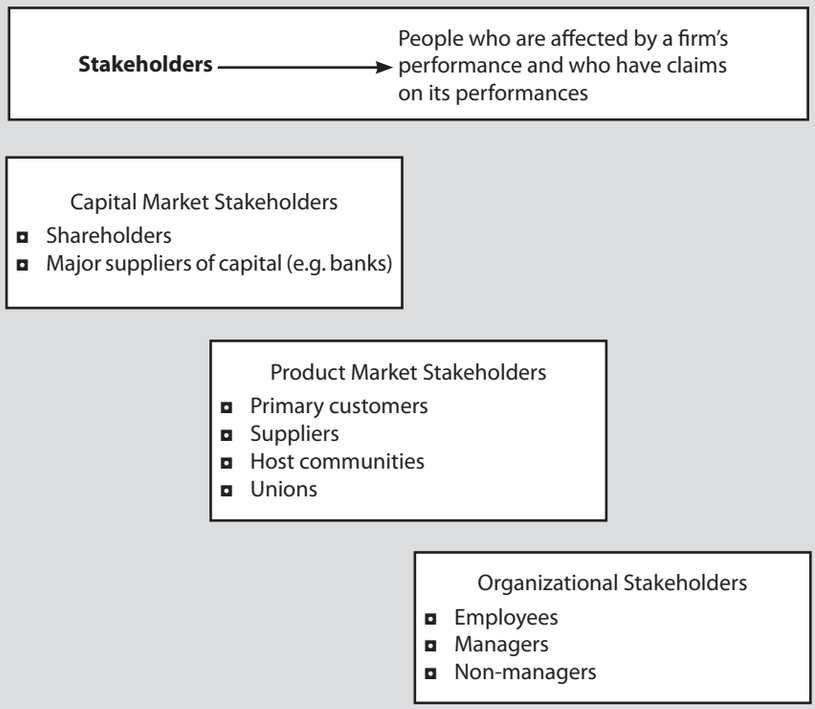


FIGURE 1.18

The Three Stakeholder Groups

Interaction Among All Stakeholders

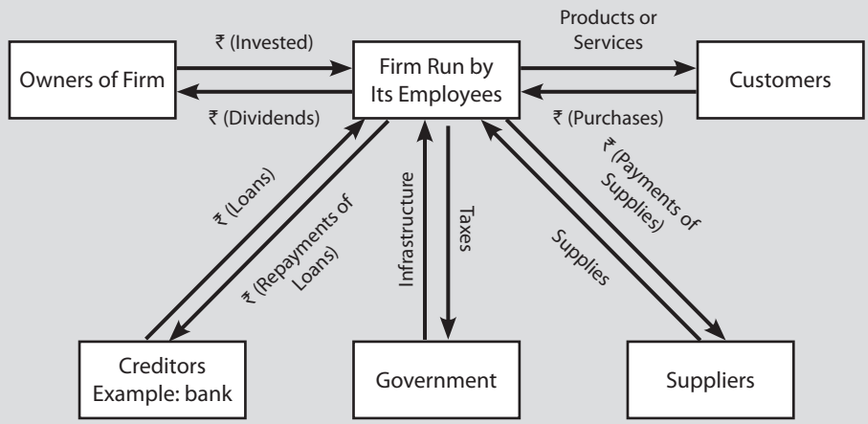


FIGURE 1.19

Interaction among all stakeholders

• Owners • Employees • Customers • Debtors • Supplies • Government

Organizational Business Processes and Process Landscape Diagram

Process Landscape Diagram represents the relationships between the organizational business processes and their dependencies on each other.

- Process Landscape Diagram represents the relationships between the organizational business processes and their dependencies on each other **(refer Figure 1.20)**.
- It contains each organizational business process as a block and dependencies are represented by arrows.
- There are different forms of dependencies, including information transfer and the transfer of physical goods.
- The interfaces of the organizational business processes need to be designed carefully, since unclear interfaces are a source of inefficiency.
- These interfaces need to be broken down into interfaces of the operational business processes that actually realize the organizational business process.
- Stakeholders such as customers are also depicted as interfaces.

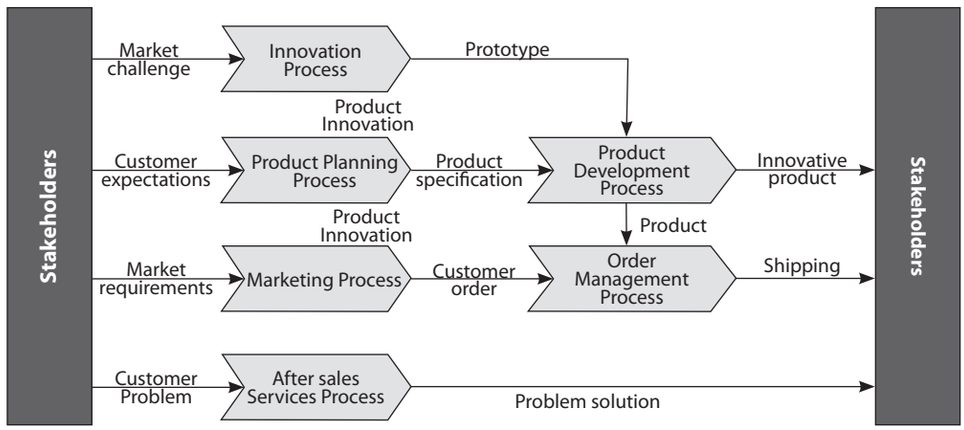


FIGURE 1.20
Process landscape diagram

Check Your Progress

Write Short Notes

a) Business
b) Process
c) Process Management
d) Business Process Flow
e) Business Process Lifecycle
f) Accounting Cycle
g) Sales Cycle
h) Purchase Cycle
i) Stakeholders
j) Operational business process
k) Organizational business process
l) Six Sigma
m) Total Quantity Management (TQM)
n) Workflow management

Descriptive Questions

1. What are the steps to manage a process?
2. Discuss Six Sigma, BPM Life Cycle and Total Quality Management (TQM).
3. What are the key goals of Business Process Management?
4. What is Business Process Management System (BPMS)? Discuss the benefits of Business Process Management System.
5. What are the key benefits of using processes and techniques for evolving Business Process Management?
6. Discuss the BPM principles and practices.
7. What are the phases in BPM Life Cycle?
8. Discuss in brief about the interaction of BPM with its stakeholders.

Distinguish between the following

1. Differentiate between functional and process organization.
2. Differentiate between operational business process and organizational business process.