

## MODULE (Business and Applications Planning)

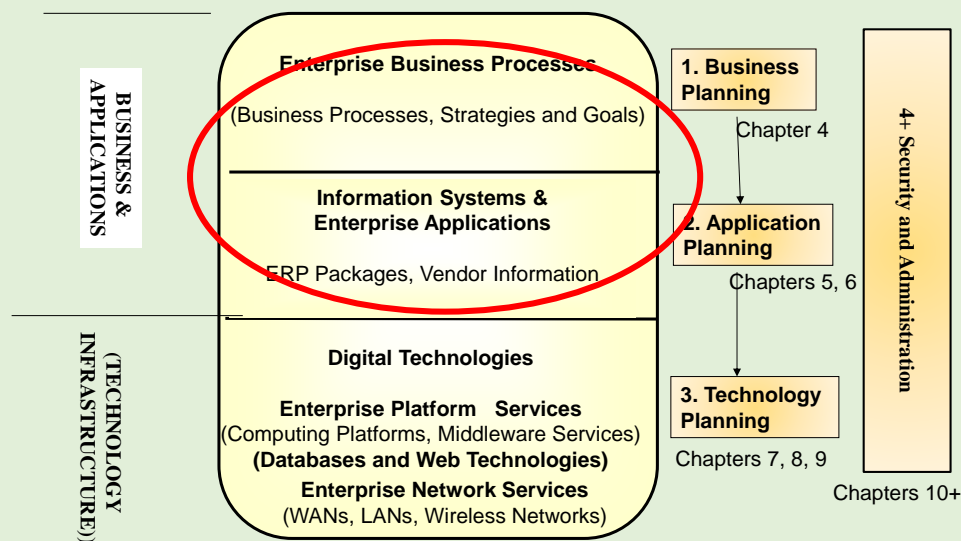
This module initiates the discussion of the simple strategic planning framework introduced in Chapter 2 (shown below). The focus of this module is on the two high level layers (i.e. business processes and enterprise applications).

This module consists of the following chapters:

Chapter 4: Business Strategy and Business Processes in the Digital Age

Chapter 5: Enterprise Information Systems and Application Planning

Chapter 6: Enterprise Systems and ERPs



**Note:** All layers need to be planned, integrated, secured and administered

## Module Project: Strategic Planning for XYZCorp

Suppose that you have been hired by XYZ Corp., an imaginary company very similar to Dave's Digital Store (Case Study in Chapter 3) to develop a strategic plan for this small company. Your first main tasks concentrate on business aspects of the plan. Specifically, you need to do the following:

- Develop a business strategy that drives the overall planning process
- Develop an application plan that supports the business strategy
- Explore the use of ERPs in application planning

Chapters 4, 5 and 6 give the detailed guidance needed to achieve your goals.

# 4 Business Strategies and Business Processes in the Digital Age

## Opening Vignette: “Let Your Digital Strategy Emerge”.

[Ross 2018] emphasizes that digital technologies are making new products and services possible and introducing entirely new revenue streams. However, it is not an easy task. For example, IoTs and AI are very promising technologies but not all IoT and AI-based products are successful. Digital strategies must tackle two questions:

- What can digital technologies do to help us solve customer problems?
- What solutions will customers find valuable?

Many technology-enabled solutions are not of interest to anyone. Customers do not see the problem being solved, or they do not want to change their habits, or they just are not comfortable buying the latest gadgets. [Ross 2018] suggests that companies engage with customers to gain deep insights into their problems and potential solutions. In reality, very few people can articulate a need for a concept that does not exist, and digital companies often sell solutions to problems that people do not know they had. For example, Steve Jobs declared that he did not ask customers what they wanted because he knew better than they did -- customers could not imagine an iPhone until they had one.

For this to work, though, companies need to know what their customers do now and what they are willing to do differently. In addition, seemingly great ideas do not find immediate buyers. Customers have entrenched habits, many cannot easily shift to new value proposition.

Bottom Line: deep customer insights are essential to digital success.

Source: Ross, J. (2018), “Let Your Digital Strategy Emerge”, Sloan Management Review, (Oct 01, 2018)

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## 4.1 Introduction - Why Worry About the Business and Organizations

Understanding the business and business strategy is an essential part of strategic planning. This chapter gives an overview of strategic issues by discussing the business strategies that are vital to modern businesses, the business models that are at the core of these strategies, and the alignment of IT to support the strategies. Case studies and examples illustrate the key points.

As stated previously, an enterprise is a group of people with an overall and common goal. Different names are used to represent an enterprise: organization, company, or firm. An enterprise can be formed by at least two people but most enterprises consist of hundreds and thousands of people. Some organizations are for profit and some are non-profit. In addition, meta organizations (organizations of organizations) are much larger organizations that consist of governments and organizations such as the United Nations, European Union, and the African Union. In this book, we consider enterprises in the public as well as private sectors:

- *Private Enterprises* are organizations in the private sector -- they are owned and operated by private individuals. These enterprises may provide services in manufacturing, transportation, healthcare, education, technologies, and dozens of other for-profit or non-profit settings. Because these are owned by private individuals, they can establish and pursue their own strategies and goals. Well known examples of private enterprises are Amazon, Apple, Coca Cola, Dell, Google, IBM, Kentucky Fried Chicken, Microsoft, Walmart, Yahoo, etc.
- *Government Enterprises* are organizations in the public sector which are owned and operated by the governments. Governments are legally responsible for the safety and welfare of the public , but private companies do not have such responsibilities. Thus government enterprises (also known as government agencies) offer public safety (e.g., law enforcement, emergency services),

public welfare (e.g., social services, parks), and other services. In addition, several government agencies regulate and support private enterprises. For example, department of agriculture regulates and supports farming industries and department of transportation supports and regulates private transportation companies such as airlines, trains and busses. Government agencies also partially fund selected private industries for industrial growth and public welfare. For example, some private schools and healthcare agencies are partially supported by government funds.

This chapter gives a quick overview of the business and organizational issues that are vital for strategic planning. Specifically, the following key questions are answered:

- What is the role of businesses and organizations in strategic planning projects
- What is a business strategy and how it can be developed
- What role business patterns play in understanding and modeling businesses
- How can IT be aligned to businesses

### Chapter Highlights

- An understanding of the business and basic organizational models are a good starting point towards understanding the context of the planning projects. For example, an understanding of healthcare business is vital to develop a plan for a healthcare agency.
- Business strategy is a game plan to win and usually a business strategy drives strategic planning projects. For example, the business strategy of doubling sales in 3 years will drive the plan needed to accomplish this strategic goal.
- Business patterns are very helpful in quickly identifying and modeling the most common business processes in most business sectors. For example, healthcare business patterns can be used to identify what type of business processes need to be supported for a healthcare facility regardless of its location.
- Different models have been suggested in the literature to align IT to business needs.

## 4.2 XYZ Corp Develops a Business Strategy

XYZ Corp., an imaginary company very similar to Dave's Digital Store (Case Study in Chapter 3), wants to develop a strategic plan. Specifically, the following tasks are needed to get started:

- Task1: Develop a *business strategy* that drives the overall planning process
- Task2: Develop an *application plan* that supports the business strategy
- Task3: Explore the use of *ERPs* (Enterprise Resource Planning Systems) in application planning

Task1 (business strategy) is the focus of this chapter. The other tasks are covered in the next two chapters. To develop a business strategy, you need to answer the following questions:

- What will be the overall strategy development approach to determine the needed internal as well as external strategies. Specifically what will the typical management models (e.g., customers versus products model, Porter Competitive Forces model) look like for XYZ Corp.?
- What will be the IT strategy needed to support the business in the next 3-5 years? Specifically, what role will *the Internet of Things, AI and mobility* play?
- Where in the Internet-stage model should the company start and why? What are the specific benefits and risks in choosing a stage?

- The company wants to be a next generation enterprise – advise in favor or against it.
- Are business patterns of any value in establishing a business strategy for XYZ Corp.?



### The Agenda

- Organizational Theory Concepts
- Business Strategy
- Aligning IT with Business
- Business Processes and Patterns

## **4.3 Understanding the Business - A Quick Tour of Organizational Theory**

### **4.3.1 Nature of Organizations – The Basic Models**

Competition drives most organizations. Organizations succeed by using different competitive advantages such as cost (cheaper items are more appealing to buyers), time to deliver (buyers do not like to wait), or time to market (bring new products to market quicker). Due to the global nature of modern businesses, hyper-competition exists between organizations at global level (this is called global competition). Some companies go global due to competition at local levels. For example, educational institutions offer online courses to attract global audiences and cellular phone companies routinely offer services to international customers. All modern organizations share some characteristics, such as:

- Use of hierarchical structure
- Accountability, authority in system of impartial decision making
- Adherence to principle of efficiency
- Other features include routines, business processes, organizational politics, organizational culture, environments, and structures

Different models have been proposed to illustrate different aspects of an organization. Figure 4-1 shows the well-known feedback model, also known as the *learning* model. In this model, the capital, raw materials, facilities, and labor are the inputs provided to an organization. The inputs are used and transformed by the firm's business activities to produce products and services (outputs) to the environment (customers). The outputs are produced based on goals (quotas), and they provide the feedback. For example, the goal may be to produce 100 laptops per day. Suppose the company produces only 70, then this feedback is used to adjust business activities to increase the production. The products and services are consumed by the environment, which supplies additional capital and labor as the inputs in the feedback loop if needed. Thus, the entire organization behaves as a thermostat which adjusts itself to produce the desired results. This simple model is also the foundation of learning organizations and systems thinking which will be discussed shortly.

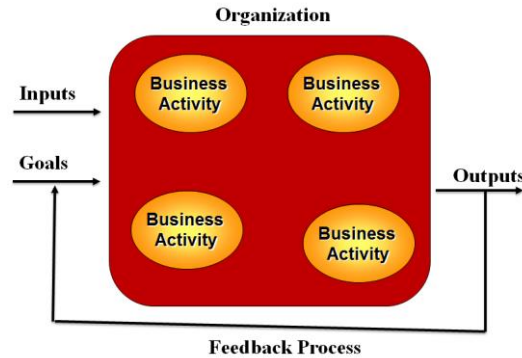


Figure 4-1: The Feedback (Learning) Model of an Organization

This simple model helps us to understand the following organizational issues:

- Given desired outputs, what kind of inputs are needed
- Given inputs, what type of outputs can be produced
- Given inputs and outputs, what type of business activities are needed

To answer these questions, we need to understand the interrelationships and tradeoffs between *people*, *processes* and *technologies*. For example, a change in technology impacts the people as well as the processes, and vice versa because these three are strongly interrelated in enterprises (see Figure 4-2).



Figure 4-2: Interrelationships between People, Processes and Technologies

As another example, if a new automated system is introduced to handle customer calls, then the number of people needed to handle the calls is reduced and new procedures are needed. Some enterprises heavily rely on technologies, but technologies influence and change the culture and structure of an organization. For example, use of information technologies has eliminated the need for many middle management tasks and has flattened organizations. Similarly, new regulations (processes) in healthcare require changes in healthcare software as well as responsibilities of healthcare officials for compliance.

A major topic of discussion at present is the increasing use of automation, especially through Artificial Intelligence (AI). In the past, only routine and clerical activities were being automated that reduced and eliminated clerical and factory jobs. However, increased use of automation created more skilled worker jobs. For example, secretary jobs that took dictation in the 1960s are almost completely gone and have been replaced by technology savvy administrative assistants who can do web searches and use social media more effectively. However, recent advances in AI, as shown by expert systems such as IBM Watson, drones, driverless cars, and intelligent robots are now threatening the typical skilled and white collar workers such as doctors, lawyers, consultants, and teachers. This is also changing our day-to-day activities (i.e., the processes). The issue of people, processes and technologies tradeoffs due to AI is becoming a topic of hot debates. We will revisit it in Chapter 10. Stay tuned!

### 4.3.2 Systems Thinking and Learning Organizations

*Systems thinking* is an important topic of discussion in modern organizations. Basically, a system consists of several *interdependent* components, with a particular goal. For example, a family is a system, a restaurant is a system, and a village or city is a system. Basically, all organizations are considered as systems. In case of organizations, the system components are people, processes and technologies. It is important to manage the interactions between people, processes and technologies in an organization to obtain the following goal:

System Goal:  $1+1+1 > 3$

For example, if each worker assembles one laptop per day, then 10 independent workers should be able to assemble 10 laptops per day. But if the workers did their job in one factory, then the factory should assure that the workers can now produce more than 10 laptops per day. This in fact is the responsibility of good managers. The managers have to use a mixture of trainings, collaborations and technologies to improve productivity. For example, the feedback model shown in Figure 4-1 can be used to develop and design the activities to meet the goals.

Although the idea of systems and systems thinking has been around since the 1920s, but the book, “The Fifth Discipline” by Peter Senge, has made the idea of systems thinking significantly popular. Peter Senge, a systems scientist who is a senior lecturer at the MIT Sloan School of Management, published this book in 1994 – it has sold more than one million copies. The basic ideas presented by Peter Senge are as the followings:

- A simple example of a system is a family because a family has many components (family members) that are interrelated. An organization also can be thought of as a family (a system).
- The actions of one family member produce consequences that impact other family members. For example, job resignation of the head of a family has serious consequences on all members of the family. Same is true with organizations.
- The most important aspect of a system is the *interdependencies* between the components. Most people do not completely understand this concept.
- Most people do not understand the consequences of the interdependencies in a system and do not know how to manage them.
- A good systems thinker and systems engineer attempts to reduce the interdependencies between the components and tries to manage the consequences of different interaction scenarios.
- Systems grow on top of other systems; thus creating complex systems with vertical and horizontal inter-dependencies. For example, when companies join other companies due to mergers and acquisitions, new interdependences are created that must be understood and managed properly.

Peter Senge also proposed that just like people, organizations must learn, adapt, and change based on the environment and the situation. Figure 4-1 has already shown this concept, but Figure 4-3 shows a learning organization in which learning is explicitly included in the typical plan-do-check cycle of organizations. The idea is that organizations must learn and gain knowledge as they go through the plan-do-check iterations. These organizations rely heavily on knowledge management techniques in order to document, use and improve their knowledge as they get involved in different projects. This is essential for consultants, lawyers, and other knowledge workers.



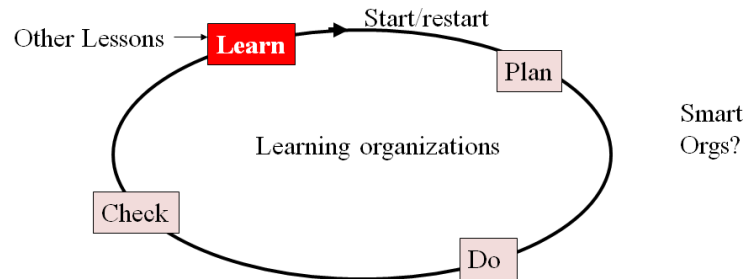


Figure 4-3: Learning Organization -- Learn, Plan, Do, and Check Cycle

### 4.3.3 Short Note on History of Organizational Theory

Organizations are complex entities with many interrelated people, processes and technology tradeoffs that are further complicated due to organizational politics and culture. The key challenge is how to develop and manage an organization that is more productive than its competitors. Different views and theories have been proposed over the years. Most of these theories were formalized in the industrial age when economy of scale became important. Scientific management was introduced by Frederick Taylor [Taylor 1911] to focus on worker efficiency. Many other competing views (e.g., humanistic view of management, i.e., happy workers make good workers) have been proposed.

The subject of organizational theory gained acceptance after World War II when Herbert Simon at Carnegie Mellon made it into an active area of research and academic study. Organizational theory was the foundation of business schools. Recent focus is on digital enterprises and especially on the role of technologies to compete and succeed in the marketplace. We have introduced the main concepts of digital enterprise in Chapter 1 and will take a closer look at this topic in later chapters.

#### Important Books on Strategy, Organization Theory and Management

- Donald Lester, *Organizational Theory: A Strategic Perspective*. 1<sup>st</sup> edition, Thomson, 2006
- Charles W. L. Hill and Gareth R. Jones. *Strategic Management: An Integrated Approach*. 2015, 11<sup>th</sup> edition. South-Western Cengage Learning.
- Peter M. Senge. *The Fifth Discipline: The Art & Practice of the Learning Organization*. Currency Doubleday. 1994.
- Michael E. Porter. *Competitive Strategy*. Free Press. 2004.



#### Time To Take a Break

- ✓ • Organizational Theory Concepts
- Business Strategy
- Aligning IT with Business
- Business Processes and Patterns



### Suggested Review Questions Before Proceeding

- What roles do businesses and organizations play in strategic planning
- What is the organizational feedback model and does it help us to understand the nature of an organization
- What is a learning organization and how is it related to knowledge management
- What is the need for organizational theory

## 4.4 Business Strategies

### 4.4.1 What is a Strategy?

Simply stated, a strategy is a game plan to win. According to Webster, "strategy is a plan or a method to achieve a specific goal". In general, goals are *long range* and *significant* such as succeeding in business, getting ahead in life, winning a battle, or winning a law suit. In the turbulent and highly competitive marketplaces of today, business managers have to develop strategies to win or to help their companies to win. Within the context of this course, the key distinguishing features of a strategy are:

- It is a game plan to win, i.e., it is not one approach but multiple approaches that could be used if needed.
- It is concerned with long range issues (short range issues are referred to as tactical issues).
- It is focused on things that are vital to the company (e.g., attracting and retaining customers and making profits).
- It does not just emerge, but it is developed by the key players.
- It is opportunistic and involves choices and trade-off analysis depending on the opportunity.

In this digital age, *a business strategy is the game plan to win through digital technologies and services*. With "Internet of Things" and "Web of Things", almost all businesses are becoming digital enterprise (see the Sidebar "Internet of Things and Business Strategies"). A modern business strategy combines a business strategy (the business plan to compete in the marketplace) with an IT strategy (an IT plan to help a company win). Companies need to develop strategies that focus on time to market and customer service. Obviously, customers have many choices in this new economy. If a company takes months to deliver a service while its competitors take days, then the company simply goes out of business. It is essential to transform internal systems and develop effective interfaces with customers and suppliers to be successful. Naturally, information technology plays a pivotal role in this area. See, for example, the sidebar "Case Study: Kmart Loses Due to Lack of Attention to e-Business".

Figure 4-4 shows the overall process of developing a strategy. It is an iterative process that is based on the following steps:

- *Statement of the Mission:* The mission and the goal of the organization must be stated clearly. The mission may be to make as much profit as possible, or to help the underserved populations.

- *Internal Analysis:* Determine the organizations core competencies, the products and the services to be offered. The focus is on analysis of the organization's *internal* strengths and weaknesses.
- *External Analysis:* Analyze the opportunities, threats, or constraints that exist in the organization's external environment. This helps to determine how will the organization compete with other players in the marketplace.
- *Strategy Formulation:* Reassess and adjust the organization's missions and its goals based on the internal and external analyses and formulate a game plan to win if needed. The idea is to build and sustain competitive advantage by matching the organization's strengths and weaknesses with the environment's opportunities and threats. The formulated strategy must include the role of technology and consider the culture of the organization to compete and succeed in the marketplace.
- *Strategy Implementation:* Implement the strategies that have been developed. This typically involves adjustments in the technologies being used, the organizational structure, and the prevailing culture. Due to the difficulties involved, there is almost always a difference between the intended strategy (the strategy that was originally planned) and the realized strategy (the strategy that is actually implemented).
- *Governance, Monitoring and Control:* Monitor and evaluate the effectiveness of the *implemented* strategy and adjust different aspects of the strategy if needed. The structures and processes needed to monitor and control the implemented strategy is usually referred to as *governance*. For example, governance would clearly define how exactly the newly launched digital marketing strategy will be managed, monitored, and controlled. Governance is an important aspect of a game plan to win; it establishes organizational structures and enforces iterative refinement of the strategy. This is accomplished through monitoring and control activities to assure that the expected results are produced.

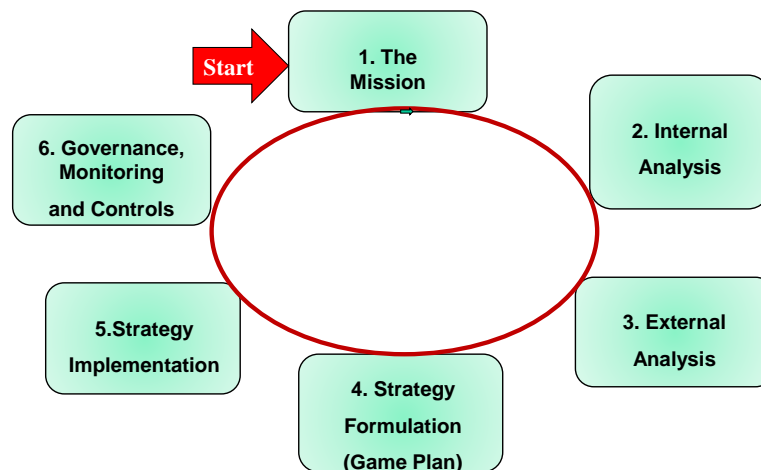


Figure 4-4: Strategy Formulation

SWOT (Strengths, Weaknesses, Opportunities, Threats) Analysis is a common approach to quickly formulate strategies – they capture the results of the first two steps shown in Figure 4-4. The following table, shown in Figure 4-5, explains a typical SWOT analysis. Basically, strengths and weaknesses capture the results of internal analysis while opportunities and threats focus on external analysis. Ideally, SWOT analysis serves as catalysts for insightful discussions about business opportunities before implementation.

A similar approach, called *PEST* (Politics, Economics, Society, Technology), is used in government agencies to understand the political, economical, societal, and technological aspects

of an undertaking before the implementation. *PESTLE* adds legal and environmental aspects to PEST. International and demographic aspects can be also added to this line of reasoning.

SWOT or PEST is of no value unless the key players and stakeholders react to the issues raised and develop suitable responses *before* undertaking expensive implementations that require staffing, training and reorganization.

Strengths	Weaknesses
Focus on internal factors that identify unique competencies for new products and/or services .	Focus on factors that reveal internal organizational or technological obstacles to the achievement of goals.
Opportunities	Threats
Focus on the external factors that identify current and future gaps in the marketplace	Focus on new products, services and providers that could limit the opportunities.

Figure 4-5: SWOT Analysis at a Glance

Different types of strategies (e.g., growth versus stability strategy) at different levels (corporate versus functional level) are being used in modern enterprises for different purposes (e.g., mergers and acquisitions). An interesting alternative to pursuing a merger or acquisition is a *Strategic Alliance Strategy* whereby an enterprise chooses to form a close relationship with another enterprise without becoming part of the same enterprise. Basically, a strategic alliance occurs when two or more firms agree to share the costs, risks, and benefits associated with pursuing existing or new business opportunities. An interesting example is the strategic Alliance between IBM and Apple.

### Case Study: Kmart Looses Due to Lack of Attention to e-Business

Kmart is still one of the largest retail companies in the United States which filed for bankruptcy in 2002. The company is a large chain of retail stores across the United States. It sells a wide range of items including clothes, household and kitchen items, make-up, car tires, and others. The bankruptcy was distressing because Kmart was the leader in retail business and in fact originated the idea of department stores. Although Kmart has somewhat recovered by now as a medium-sized retail store, its bankruptcy in 2002 was a major shock. So, what went wrong?

Multiple factors led Kmart to bankruptcy, but Kmart's improper use of the Internet for business was the biggest reason for its economic downfall. Kmart really did not pay any attention to the role of IT in its business and maintained a very small IT department that was continuously shrunk. In contrast, its biggest competitor Wal-Mart dramatically increased its IT spending and implemented systems that tied suppliers with their stores through satellites. During the same time period, companies such as GE embarked on major e-business initiatives (see the case study discussed above).

Finally, in 2000 and 2001 Kmart spent over \$1 billion to overhaul its IT systems, but it was too late because competitors such as Wal-Mart had already gained significant market shares initially held by Kmart. In January 2002, Kmart announced that it obtained a \$2 billion financing package to fund its turnaround and continue investment in "critical technology, standardized information technology platforms, merchandising opportunities and supply chain enhancements", according to the Kmart CEO Charles Conaway.

Kmart has failed to establish a consistent IT strategy due to several reasons. First, Kmart had trouble with its Chief Information Officers (CIOs) -- it has had five CIOs between 1994 and 2002. A high turnover in this position has not allowed the company to plan and implement the proper information systems required to keep Kmart competitive. Second, it had to change major directions to cope with market conditions. For example, Kmart's e-commerce division, BlueLight.com, disappeared and Kmart.com became the on-line shopping site in the mid 2002. Without a coordinated vision and leadership to see the project through, Kmart fell far behind its biggest competitors Wal-Mart and Target. Third, Kmart's inferior distribution and inventory systems placed it at a huge disadvantage against its competitors.

On the supply side, the suppliers complained that it was very difficult to connect to Kmart's distribution systems and getting data from its point-of-sale or inventory systems. They compared this experience with Wal-Mart's easy to interface systems. On the customer side, customers of Bluelight.com often complained because there weren't enough items offered for sale. The main problem with Kmart was that it used quick fixes and patches instead of using fully integrated systems that follow an overall strategy.

Despite the past failures, Kmart is hoping that its most recent IT activities will help gain a competitive advantage over their competitors. The current Kmart management team is focusing on improving the customer experience at checkout and better communication between their suppliers and merchandisers. The recent roll-out includes a wide range of technologies that include state-of-the-art scanners and faster cash registers for faster service, a new business-to-business collaboration, planning, forecasting and replenishment system, and a new system for buyers to track and manage inventory for real-time inventory management. The final results of this latest IT push will possibly have a major impact on Kmart's future.

Sources:

- Yale School of Management Case Study on Kmart Failure: <http://som.yale.edu/our-approach/teaching-method/case-research-and-development/cases-directory/kmart-bankruptcy> (accessed September 16, 2017)
- Frank Hayes, "Lessons From Kmart," January 28, 2002, [Computerworld.com](http://www.computerworld.com/industrytopics/retail/story/0,10801,67740,00.html). <http://www.computerworld.com/industrytopics/retail/story/0,10801,67740,00.html>
- Carol Sliwa, "Beyond IT: Business Strategy Was a Problem, Too," January 25, 2002, [Computerworld.com](http://www.computerworld.com). <http://www.computerworld.com/industrytopics/retail/story/0,10801,67735,00.html>

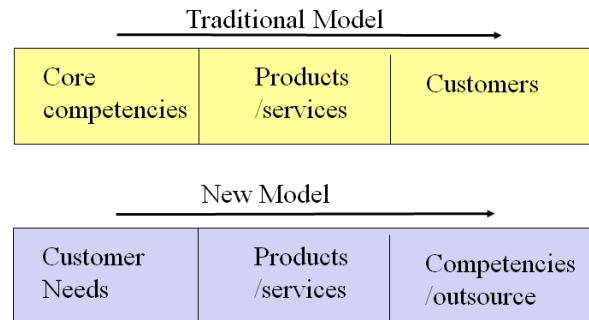
#### 4.4.2 Internal Strategy – Evaluating Core Competencies

As stated previously, strategy is a game plan to win, but how are business strategies developed? The first and most important step is to develop an internal strategy that answers the following questions:

- Who are the customers that we need to serve?
- What are the products and services needed by these customers?
- What are the core competencies needed for the required products and/or services?

Traditional business approaches started with core competencies that drove the products/services which were delivered to the customers. The new model starts with examining customer needs first,

then developing products/services to satisfy the needs, and then relying on the competencies of service providers by outsourcing product development. Both models are shown in figure 4-6.



**Figure 4-6: e-Business Design (Traditional versus New Model)**

This does not mean that the traditional model does not work. In fact, both models work at different times. The trick is to know what model works when. The new model implies a great deal of flexibility because customer needs change very quickly. This model heavily relies on outsourcing because outsourcing gives flexibility (if your business needs change, you get new service providers). It also implies heavy reliance on IT to quickly understand and respond to customer needs.

Basically, information technology must be aligned with the business needs of an organization. For example, Michael Hammer [Hammer 1990] defines and promotes business process reengineering (BPR) as the use of IT to radically redesign business processes to dramatically improve performance. In essence, IT must enable the organization to survive and prosper in the competitive global economy. While there is a general agreement on the importance of aligning IT with business, the approaches and views differ widely.

Several other approaches for establishing internal business strategy also exist. A common approach is based on two factors: products (existing, new) and customers (existing, new). The basic idea is presented in Figure 4-7. To be successful, companies need to consider all four cells of Figure 4-7. Naturally, existing products for existing customers need to be strengthened -- this is a firm's base. However, firms cannot survive without introducing new products and attracting new customers. It is also desirable to expand existing customer base by selling existing products to new customers and also "upsell" by introducing new products to existing customers. The riskiest undertaking is when you are exploring new horizons by introducing new products for new customers. The challenge faced by companies is to understand and exploit the confluence of:

- *Customer trends* (e.g., speed of service demanded by the customers and appeal of self-service),
- *organizational trends* (e.g., outsourcing and continued innovation), and
- *technology trends* (e.g., integration of user views and back-end systems, broadband and mobile networks, component-based software).

The main question is: which cell should a company focus on? A variety of models have been developed for establishing strategies. The best known models in this category are the Porter Models and SWOT analysis.

	Existing Products	New Products
Existing Customers	Strengthen Current Situation	Upselling
New Customers	Expand Customer Base	Explore New Horizons

Figure 4-7: The Products Versus Customers Model

### 4.4.3 External Business Strategies and Porter Competitive Forces Model

Once a company establishes an internal strategy, then the systems are developed to realize the strategy through effective use of information technologies and other organizational procedures. For example, Dell established and implemented integrated systems with partners that produce a customized PC to minimize the time to start using the PC. Similarly, Amazon developed technologies such as One-Click and established business partnerships with many bookstores so that the customers could quickly select and purchase books from a very large virtual bookstore.

Porter Models were introduced by Michael Porter first in 1980 and then later in 1985 [Porter 1980, Porter 1985]. The first model, known as the *Porter Competitive Forces Model* is used the most. Porter's basic idea is that companies must contend with five competitive forces (see figure 4-8):

- threat of new entrants,
- bargaining powers of customers and buyers,
- buying power of suppliers,
- substitutes for your products and services, and
- the intensity of rivalry among competitors.

Porter's competitive forces model provides general view of firm, its competitors, and environment. It helps us to understand why and how do some firms become leaders within their industry. Specifically, the Porter's Model shows that the following competitive forces shape the fate of a firm:

- *The intensity of rivalry among incumbent firms:* Competition between firms can result in price wars, better customer loyalty programs, and introduction of new products and services.
- *The threat of new competitors entering the industry:* New entrants typically intensify price wars, the fights over market share, and reduction of profit margins.
- *The threat of substitute products or services:* Some new products and services can threaten the entire product line of a firm. For example, email has drastically reduced the sales of postage stamps.
- *The bargaining power of customers:* The customers can play one firm against the other and can also change their attitudes towards a new technology. For example, the US Post Office did not think that so many people will start using email instead of letters.
- *The bargaining power of suppliers:* The suppliers can raise prices, thus reducing profit margins or can fuel the growth of some new products and services. For example, numerous ISPs (Internet



Service Providers) started offering practically free email services, thus fueling a dramatic growth in email adoption.

He then proposes three strategies to succeed: differentiate your products and services, be the lowest cost provider, and find a niche.

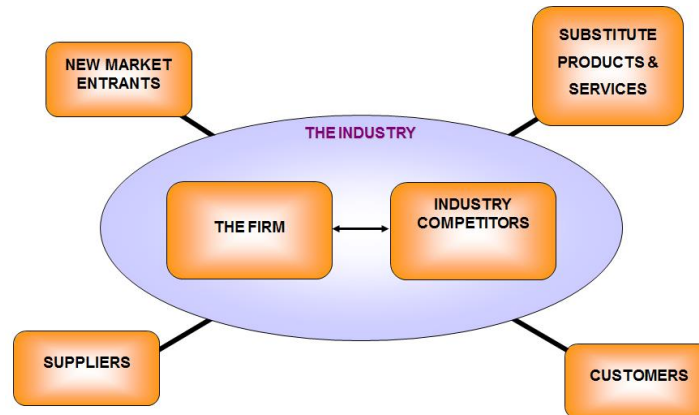


Figure 4-8: Porter's Competitive Forces Model

Let us use the following examples to illustrate the Porter's Competitive Force Model.

- Example1:** The US Post Office Services, circa 1980, had no competition. Federal Express was a new market entrant that came up with the overnight delivery services and became a competitor to the Post Office Services. Other entrants such as UPS also became competitors to the Post Office Services. While positioning to compete with the new entrants, the Post Office had to face a substitute service -- the e-mail. As we all know, e-mail is a substitute for paper mail and even telephone calls. Thus, the new entrants and the substitute services cannot be ignored. In addition, more customers started using Internet and email because of the numerous ISPs (Internet Service Providers) that started offering practically free email services; thus, fueling a dramatic growth in email adoption. The need for postage stamps further declined due to Web Banking and other Web-based services. Realizing that the market for letters was disappearing, the US Post Office adjusted its strategy to take advantage of increased demand for parcels due to ever-growing online purchasing. Basically, more people are buying online and have the items shipped to them. Due to strategic partnerships, the US Post Office is now a preferred shipment supplier for eBay, Amazon and other large retail stores. This is a very interesting example of seeing the Porter's Competitive Forces Model in action.
- Example2:** Rand McNally has been printing maps since 1916 and has been the leader in printed maps ever since. The company publishes a very successful *Rand McNally Road Atlas* that has sold 150 million copies. However, as the digital economy developed at the beginning of the 1990s, Rand McNally's management ignored the full impact of the new Internet and other computer-related developments. In particular, new startups such as MapQuest came out of nowhere and became a chief competitor in the new on-line map environment. New management was brought in to create a web site (RandMcNally.com) to put Rand McNally maps and address-to-address driving directions on the Web. Despite several attempts at gaining the online map and end-to-end directions business, Rand McNally has a long way to go to catch up with its more digital-savvy competitors. Thus new entrants such as MapQuest armed with substitute products (online maps) and additional services (e.g., online directions) have successfully competed with



the market leader. Obviously, the changes in customer attitudes (many customers are comfortable with the idea of getting maps and directions online) have helped the new entrants.

- **Additional Examples:** Porter's Competitive Forces Model has been used extensively by many companies around the globe (e.g., Amazon, Coca Cola, Facebook, Google, Nike, Starbucks, and Tesla Motors). A very nice summary of the analysis performed can be found at the Panmore Institute's website (<http://panmore.com/tag/porters-five-forces-analysis>).

The main message of Porter's competitive forces model is that the success of a firm is determined not only by competition with its traditional direct competitors, but also by other forces in the industry's environment: new market entrants, substitute products, customers, and suppliers.

Companies need to continuously watch out for new entrants and substitute products. They also need to develop new products to stay in business. While developing strategies, the following few principles are worth keeping in mind (see [Kalakota 2000] for an expanded discussion of these and other related principles):

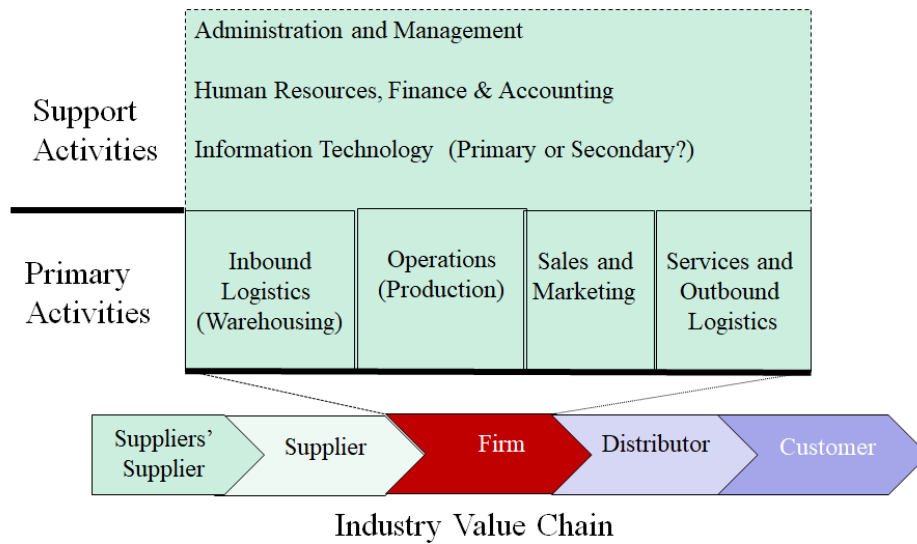
1. Technology should not be an afterthought in forming business strategy but it should be a cause and a driver. In fact, "electronification" of the current and future systems must be part of a business strategy.
2. Streamlining the flow of information is more important than that of products. This is essential because the information surrounding a product or a service is more important than the product itself in this information age.
3. You must be able to overthrow outdated business design to avoid failure and develop new business design that relies on outsourcing to attract and retain customers.
4. Business design of the future should be highly reconfigurable and technology should be used to innovate, entertain, and involve the customer experience.

#### **4.4.4 Primary and Secondary Business Activities – Porter's Value Chain Model**

Five years after his very simple, yet elegant, Competitive Forces model, Porter proposed a Value Chain model in 1985 suggesting that to be successful, companies must add value at every step of creation, development, sale, and after-sale. This model also became very popular in strategic planning. Simply stated, a value chain is a set of activities that a firm performs in order to deliver a valuable product or service. For example, in an auto manufacturing firm, raw materials are transformed into an automobile through a chain of activities, each activity adding some value towards the goal of producing a car. The activities in a value chain are divided into:

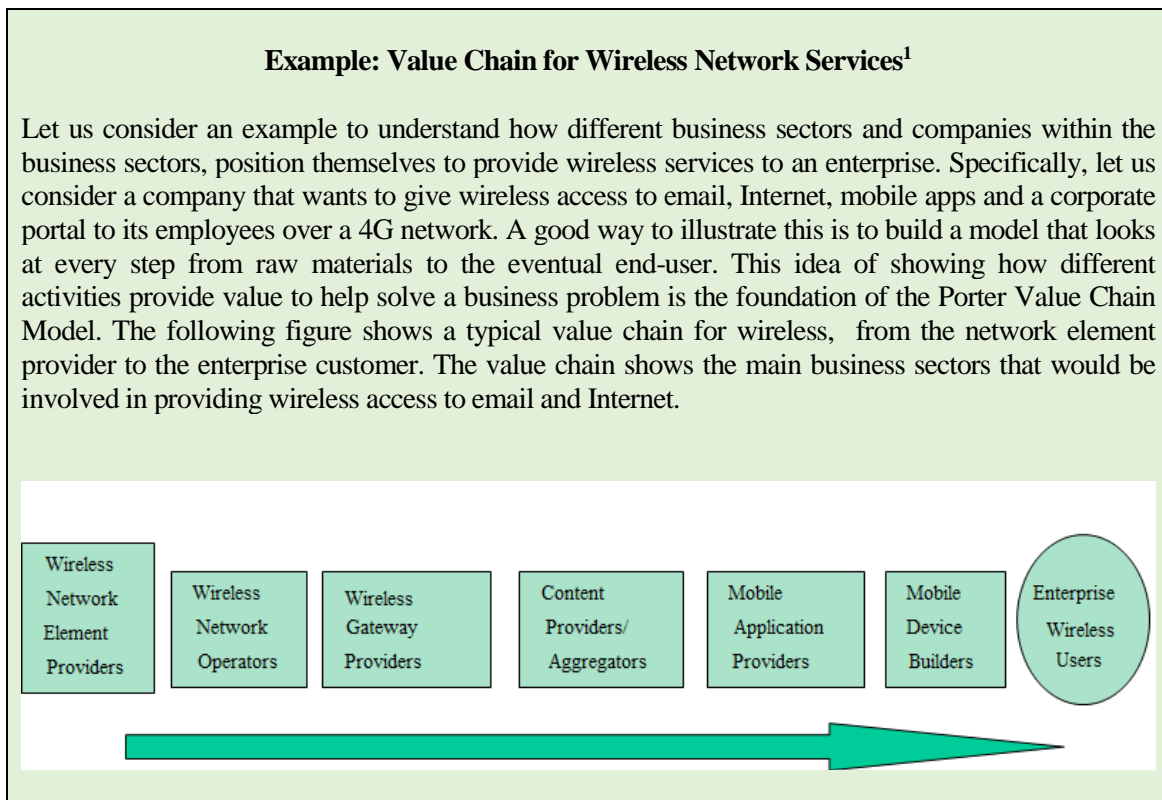
- Primary activities that transform the raw materials into products and services
- Support activities, such as accounting and finance, that enable the primary activities (it should be noted that in the digital age, IT systems are increasingly becoming of primary value)

illustrates the value chain model and shows both the primary and support activities of a firm and its partners that add value to a firm's products and/or services. Basically, each activity must provide some value to the end product and/or service. This is extremely important in strategic planning because the proposed plan must add value through its services. See the Textbox "Example: Value Chain for Enterprise Wireless Services" for an illustration of how value chains can be used in wireless services.



- **Industry Value Chain shows the role of multiple players (customer is of the highest Value)**
- **Primary Activities are of critical importance to the company**
- **Support Activities enable the Primary Activities**

Figure 4-9: Porter's Value Chain Model with Primary and Secondary Activities



<sup>1</sup> This discussion is based on [Evans 2001].

The major players in the value chain include the network elements, the operators of the wireless networks, the wireless gateway providers (converters from wireless to wired), content and application services, and the end-user devices.

The network element provider in this case provides the basic networking equipment such as the base stations and may be a company such as Cisco. The wireless network operator may be a 4G network operator such as T-Mobile. The content providers in this case are of two types: the external content providers on the Internet and the corporate portal. The application provider in this case is google or iPhone application service provider. Finally, the device manufacturer may be a handset manufacturer such as Ericsson or Texas Instruments. The enterprise customer, in this example, downloads and invokes mobile apps over the wireless Internet. This activity involves all players in the value chain.

This value chain may change if new services are needed. The value chain may also change if the wireless service is intended for the consumer market instead of the enterprise users. The main difference between the consumer-focused value chain and the enterprise-focused value chain is that the consumer value chain concentrates more on external retailers and content providers. Naturally this value chain becomes more complex as network operators work with any array of retailers, financial institutions, content providers, and advertisers to assemble their wireless data portals for the large consumer population. See [Evans 2001] for additional details of value chains.

#### 4.4.5 Thoughts on Industry Sectors, Business Ecosystems and Disruptive Technologies

Companies belong to *industry sectors* such as healthcare, education, transportation, entertainment, agriculture, manufacturing, finance, insurance, and technologies. An overall understanding of industry sectors is essential in developing a strategic plan because it provides a context for the competitive landscape – some sectors are much more competitive and harder to succeed in than the others. In addition, industries have their own life cycles and some are growing while the others are declining. It is easier to succeed in a growing market than a declining and shrinking market. Figure 4-10 shows the typical phases of industries lifecycle: startup, growth, shakeout, maturity, decline and death/rebirth. Throughout these phases, companies go through mergers and acquisitions, diversification and refocusing.

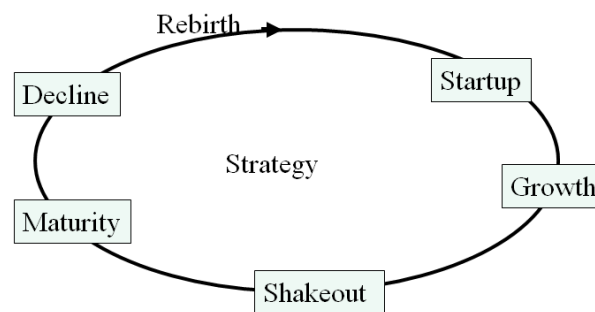


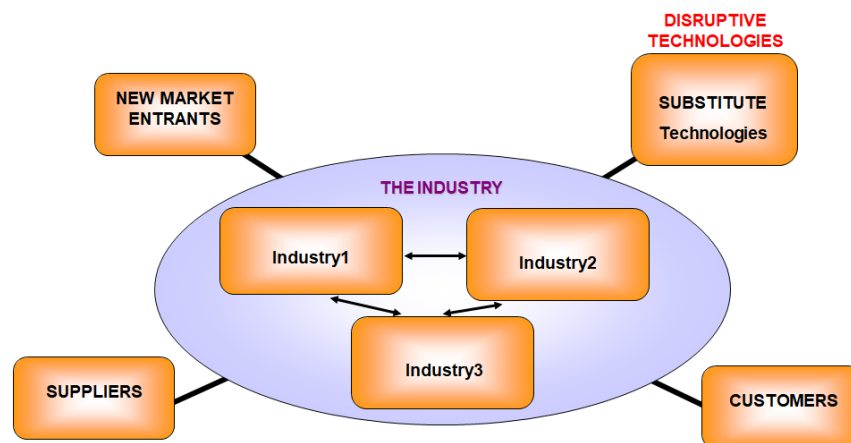
Figure 4-10: Industry Life Cycle

Different views and models have been proposed to show how businesses interact with each other within an industry sector. For example, how does a hospital interact with its patients, physicians, insurance companies and government regulators. The idea of “Business Ecosystem”, first introduced by James F. Moore [Moore 2006], has gained popularity in digital enterprises to understand the interdependencies between suppliers, consumers, competitors, regulators and other players in the marketplace. The main idea is that a business ecosystem is a set of interdependent processes for

developing and commercializing new technologies through rapid prototyping, short product-development cycles, venture funding, and technology savvy customers who line up on highways to buy the latest products. For example, innovative companies in the Silicon Valley are supported by networks of funding bodies, educational institutions, manufacturers, and marketing agencies.

shows a conceptual view of a business ecosystem that is based on the Porter Competitive Forces Model. In this model, keystone firms dominate ecosystem and create platforms that are used by the niche firms to rely on. For example, Microsoft is a keystone firm because it has developed the Windows platform that is used by thousands of firms for their Windows-based products. Many individual firms have succeeded in the marketplace by becoming profitable niche players by using the Microsoft platform. However, this creates some interdependencies between the keystone and niche firms – a change in Microsoft platform impacts thousands of niche players.

Basically, in the ecosystem model, multiple industries work together to deliver value to the customer. The substitute technologies in a business ecosystem may be *disruptive* because they can shake up multiple industry sectors. Examples are the driverless cars, blockchains, and machine learning technologies that are disrupting the auto industries, financial institutions, and healthcare systems, among others, respectively.



In the ecosystem model, multiple industries, suppliers, customers, new entrants and substitute technologies work together to deliver value to the customer.

Examples are manufacturing & healthcare eco systems.

Substitute Technologies may be **disruptive**, i.e., shakeup multiple industries

Figure 4-11: Business Ecosystem for Digital Enterprises

It is beyond the scope of this book to discuss business strategies in more detail. A great deal of literature on business strategies has accumulated over the years. The Michael Porter book “Competitive Strategy” [Porter 2004] and Peter Senge book “The Fifth Discipline” [Senge 1994] are considered classics. A good starting point is the book “Organizational Theory: A Strategic Perspective” by Donald Letser [Lester 2006]. Our objective here is to introduce the key concepts that are essential for business planning.

The following sidebars summarize the main ideas from different perspectives. The sidebar “Business Eco Systems and Industry Analysis”, is a graduate level course at Harrisburg University of Science and Technology for students in Information Systems Engineering and Management. The sidebar “Disruptive Technologies – When NOT to Listen to Your Customers” presents a very important view

by Christiansen on how some companies fail because they keep listening to their existing customers. “How Home Depot Created a New Market” sidebar shows how Home Depot succeeded in a very competitive marketplace by addressing the needs of homeowners. Several books, such as [Kalakota 2000, Sawhney 2001, Whyte 2001], and journals/magazines such as Journal of Business Strategy, Harvard Business Review, Sloan Management Review, the CIO Magazine, and Information Week, could be consulted for detailed insights. In addition, consulting firms such as Gartner ([www.gartner.com](http://www.gartner.com)) and IDC ([www.IDC.com](http://www.IDC.com)) have published series of reports on e-business strategies.

### **Business Eco Systems and Industry Analysis**

Complex interdependencies exist between various industry sectors and emerging technologies. This graduate level course at Harrisburg University of Science and Technology is designed to provide a broad understanding of industries and their dependence on emerging technologies. Topics include analysis of the key industry sectors in the digital age and an examination of their financial and logistical interdependencies. Focus of the course is on industry ecosystem as the network of organizations — including suppliers, distributors, customers, competitors, government agencies, and others — involved in the delivery of a specific product or service through competition, cooperation, and organizational learning. Particular attention is paid to the role of substitute technologies that could disrupt an entire industry ecosystem. Several real-life case studies and examples with focus on supply chains will be used to illustrate the key points.

#### **Key Course Materials:**

- Christensen, C., “The Innovator’s Dilemma”, Harvard Business Review Press, 1997
- Rong, K. and Shi, Y., “Business Ecosystems -- Constructs, Configurations, and the Nurturing Process”, Palgrave-McMillan Publication, 2015
- Ruth, M. and Davidsdotti, B., “Changing Stocks, Flows and Behaviors in Industrial Ecosystems”, Edward Elgar Publication, 2009
- Mason, SG., “Regional Industry Analysis: An Approach for Economies Large and Smaller”, SAGE Journals, [journals.sagepub.com/doi/abs/10.1177/0891242417690438](http://journals.sagepub.com/doi/abs/10.1177/0891242417690438), 2017
- Christensen, C.M., “The Ongoing Process of Building a Theory of Disruption”, Journal of Product Innovation Management, 2006, Wiley Online Library
- Danneels, E., “Disruptive Technology Reconsidered: A Critique and Research Agenda”, Journal of Product Innovation Management, 2004, Wiley Online Library

### **Disruptive Technologies – When NOT to Listen to Your Customers**

Many leading companies fail to stay at the top of their industries when markets or technologies change. IBM dominated the mainframe market but missed the minicomputers by several years even though minicomputers are much less sophisticated than mainframes. Digital Equipment Corporation (DEC) dominated the minicomputer market due to its Vax machines but missed the smaller PC market. Apple computers led the user friendly computers but lagged 5 years behind its competitors to bring its portable computers to the market.

The main reason for many of these failures is that companies stay too close to their existing customers while new customers and products are emerging. For example, Xerox built large copy machines for copy centers. When asked, the copy centers did not see any need for smaller copy machines. Similarly

IBM asked its mainframe customers to see if minicomputers and desktops could be of use to them -- IBM found that these customers wanted more mainframe features instead of smaller computers.

Managers must be aware of the disruptive technologies that do not initially meet the needs of their existing customers. Disruptive technologies such as small copy machines in the era of big copy machines must be looked at as new products/services for new customers.

Source: Bower, J. and Christiansen, C, "Disruptive Technologies; Catching the Wave", HBR, Feb 1995

### How Home Depot Created a New Market

Home Depot has revolutionized the do-it yourself market in North America. It has become a more than \$25 billion company that has created 130,000 new jobs in more than 1000 stores across the United States. Home Depot succeeded in creating a new market by converting home-owners into do-it yourselfers. The main idea is that home owners do not like to wait for contractors to arrive at random schedule hours and over charge them for jobs that are not well done. Instead, the homeowners would like to do things themselves, if possible. Home Depot enabled these homeowners to do their own thing and hired trained staff such as ex-contractors to help customers in buying the right products and give "how to" advice.

Source: Kim, W.C., and Mauborgne, R., "Creating a New Market Space", HBR, Jan-Feb, 1999.



### Time To Take a Break

- ✓ • Organizational Theory Concepts
- ✓ • Business Strategy
  - Aligning IT with Business
  - Business Processes and Patterns

### **Suggested Review Questions Before Proceeding**

- What is a business strategy and how can it be developed
- What is an example of internal strategy
- What is an example of external business strategy
- Is the Porter Model related to internal or external strategy
- Give an example of a primary and a secondary activity for a hospital system
- What is an example of a business ecosystem

## 4.5 Aligning IT with Business Strategies

### 4.5.1 Aligning IT with Business – An Overview

The Digital Enterprise model shown in Figure 4-12 which was introduced in the first chapter, is a good tool to show the interrelationships between business and technologies by using a few attributes. With each attribute, we associate a set of discrete values, {Low, Medium, High, Very High}, based on an informal and qualitative estimation shown in Figure 4-12. In this model, NGEs (Next Generation Enterprises) conduct business by fully exploiting four “mega trends” and are thus heavily dependent on the following digital technologies:

- Web (W) reliance* of internal as well as external business activities through ebusiness, ecommerce and other “e-initiatives”
- Mobility (M)* support for mobile customers, workforce, and operations
- Data (D)* for critical business decisions based on Big Data
- Smartness (S)* to quickly detect and respond to changing business conditions and learn from them to do a better job in the next round

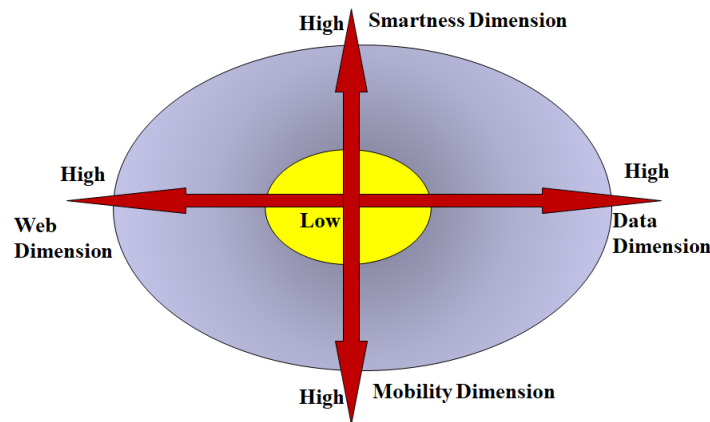


Figure 4-12: Basic Multidimensional View of Digital Enterprises

These four dimensions (WMDS) provide a simple yet powerful mechanism to represent a very wide range of enterprise models, including the ones discussed previously. Different enterprises cover a region in this diagram and are represented as circles/ellipses. For example, the inner circle shown in the figure indicates a local bakery store with low reliance on any of these four capabilities while the outermost circle represents a global enterprise such as Google. For each dimension, the {Low, Medium, High} ordering is defined by locating the “easy case” at the center so that outer regions naturally come to represent more challenging areas.

Although the four dimensional view of digital enterprises based on the megatrends of Web, Mobility, Data and Smartness is a good starting point, we can easily add several other major digital technology trends to this model. Figure 4-13 displays an extended model that adds the following four digital technologies to capture the more realistic view of modern digital enterprises:

- Analytics (A)* dimension represents the use of statistical and optimization techniques to analyze, forecast and optimize business operations. Extensive reliance on analytics techniques represent the high values of this dimension.



- *Outsourcing* (O) of operations to widely dispersed sites and partners is a common business practice at present. Cloud providers offer extensive capabilities for very high levels of outsourcing.
- *Security* (S) technologies are essential for most modern digital enterprises. Extremely high levels of security measures are needed for financial institutions, government agencies and defense organizations.
- Globalization (G) of operations to widely dispersed sites by using the broadband digital networks supported by satellite communication systems. Global enterprises conduct business operations that are dispersed across multiple locations in different countries and continents.

The eight dimensional model seems to capture a very large number of digital enterprises. For example, IBM has a CAMSS (Cloud, Analytics, Mobile, Social Media, and Security) model for modern smart enterprises. Our eight dimensional model captures the CAMSS model very well (the social media is represented by the Web Dimension in our model). While more dimensions can be always added, it seems that 6 to 8 dimensions are good enough for our purpose: to represent a large number of digital enterprises in a simple yet elegant manner.

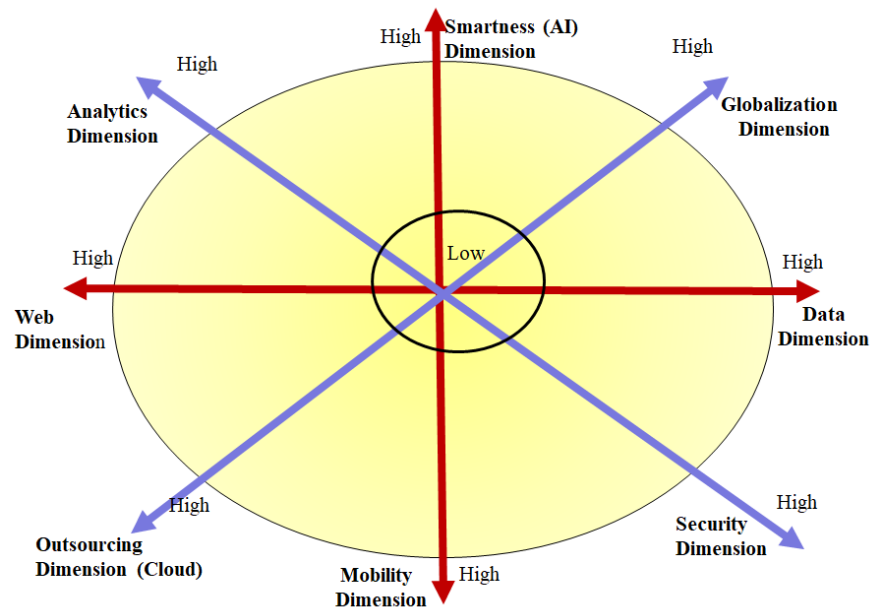


Figure 4-13: Extended View - Eight Dimensional View of Digital Enterprises

The main idea is that the Next Generation Enterprises (NGEs) lie at the outer edges of these multidimensional models. As the NGEs push *simultaneously* towards these multiple dimensions, they dramatically increase their reliance on a complex array of IT (information technology) services. Basically, NGEs are not one dimensional entities that can be characterized as “e-corporations”, “mobile corporations” or “on demand enterprises”, but they are multidimensional entities that are *simultaneously* using multiple digital technologies to conduct business. As the enterprises push towards these four dimensions, they not only dramatically increase their reliance on IT services, but also change the situation where IT infrastructure starts driving the business strategies. We will use these ideas to discuss some classical IT alignment models. The following sidebar “Digital Enterprises and Technologies at a Glance” is repeated from the first chapter as a “refresher”.

### **Digital Enterprises and Technologies at a Glance**

*What are Digital Enterprises:*

“Organizations where nearly all significant business processes and relationships with customers, suppliers, and employees are digitally enabled and key corporate assets are managed through digital means” [Laudon & Laudon 2015].

*What are the key Digital Technologies being used by Digital Enterprises:*

- Web and the Internet: Global digital networks and the Internet technologies that include IoTs (Internet of Things). Web technologies that range from the classical web to Web2.0+ and Social Media over the Web
- Mobile applications that include location based services, wireless sensor networks that support the IoTs
- Database technologies that include Big Data to store, retrieve, visualize, mine and analyze the massive amount of digital data accumulating in organizations
- Artificial Intelligence (AI) based smart systems that rely heavily on Big Data, Machine Learning, sensors, speech processing, pattern recognition and others for decision support
- Security technologies that include encryption techniques and blockchains to assure the privacy, accountability and integrity of corporate data
- Additional technologies such as 3D printing, nano technology, wireless mesh networks, biotechnology, and augmented/virtual reality (AR/VR) for yet to be fully exploited applications

*How are enterprises leveraging these digital technologies:*

- Reduce costs, sometime up to 90%, through digital marketing, online purchasing, and improved operations that integrate Web access and traditional IT systems
- Broaden their markets by extending their reach globally at minimal additional expense and enticing new prospects to become customers
- Enter new business areas through IoTs, collaborations, and expanded services made possible with Web and mobile apps
- Increase employee productivity by providing easier access to corporate information and services
- Achieve operating efficiencies by reducing the number of people making routine decisions, decreasing turnaround time, managing reduced inventories, etc.
- Enable business opportunities through mobile apps over fast wireless networks that could not be made profitable with manual implementations

*What are the main digital challenges for the enterprises:*

- How to understand the rapidly evolving digital technologies and decide which one to adopt and which to defer
- Determine where the real values of digital technologies are (besides marketing and sales)
- Evaluate the automating decision support systems by using the latest developments in AI
- How to compete in this digital age where new digital startups can easily respond to customer needs compared to older companies with legacy systems
- Who should lead the digital strategies? Is it the CIO, CEO or a new “chief digital officer”
- How to build digital skills across the enterprise

Main Sources: [Sloan Management Reviews: 2015-now], [Forrester 2016], [Willmott 2014], [Kane 2015], [Ruppa 2017], [Segars 2018].

### 4.5.2 How Digital Technologies are Driving Business Strategy for Modern Enterprises

Most organizations are trying very hard to use the latest technologies to compete and succeed in the marketplace. However, technology is expensive, and many companies have filed for bankruptcy because they invested in the wrong technology – or too early. Here are some examples.

**IoT (Internet of Things)** has been a hot topic among researchers and techies for a while but the businesses have been skeptical about investing in this technology. The Accenture Consulting Annual Survey (2015) of about 700 CEOs, found that “while they might recognize the benefits of the IoT, this is not necessarily translating into effective moves to exploit it.” Specifically, only 7% of the CEOs were investing in IoTs.

Most could not translate the technical promise of IoT into a sound business strategy. For example, data-rich sensors and devices are becoming commonly available with many possible business applications. However, business managers are having technical and financial difficulties in finding suitable business applications. But smart city initiatives are changing everything by fully exploiting Internet of Things for better services to the citizens. Here are some examples:

- Smart traffic solutions use different types of sensors to determine the number, location and the speed of vehicles. Also, smart traffic lights are connected to each other and are monitored to automatically change the lights to prevent congestion.
- Smart roads and intelligent highways have warning messages according to climate conditions, accidents or traffic jams. Also, smart parking monitors parking spaces availability in a city.
- Smart structural monitoring of vibrations and material conditions in bridges and buildings detect and warn authorities of needed actions. In addition, sensors detect rubbish levels in containers to optimize the trash collection routes.

**Artificial Intelligence (AI), Machine Learning and Data Analytics** are finding diverse applications after a bumpy start (many AI projects were cancelled in the early 2000s). But there are many success stories at present:

- Salesforce.com introduced a Smart CRM solution that uses machine learning to build customer profiles, identify crucial touch points and uncover additional sales opportunities.
- Nestlé uses smart supply chain forecasting to improve warehousing and inventory management on a global level. Nestle operates more than 447 factories in more than 150 countries. This strategy improved Nestlé’s sales precision by 9% in Brazil alone.
- Boston Medical Center applies predictive analytics to determine staff and room allocation during peak times, optimizing scheduling while improving efficiency and wait times.
- Deloitte developed Natural Language Processing (NLP) models that extract important information from complex documents such as contracts.

**Blockchain Technology** has been around for a while for secure ledgers but is now becoming very popular. Blockchain is not limited to cryptocurrency -- it represents a decentralized and encrypted secure system of a ledger with many applications in banking, law, government, music and many other industries. For example, Walmart is using blockchain to ensure the quality of livestock transactions and diamond-makers are eliminating counterfeiting by registering its diamonds in a blockchain.

Sources:

- Forbes Site: <https://www.forbes.com/sites/forbestechcouncil/2018/04/13/innovation-case-studies-how-companies-use-technology-to-solidify-a-competitive-advantage/#56135af11410>
- Libelium Case Studies: <http://www.libelium.com/case-studies/>
- Accenture Report “Driving Business Strategies with the Internet of Things”, 2015, URL: <https://www.accenture.com/us-en/insight-ceo-briefing-2015-productivity-outcom>

### 4.5.3 Porter’s Thoughts on the impact of Internet and Digital Technologies on Business Strategy

Some have argued that the Internet and the digital technologies make strategy obsolete. Michael Porter [Porter 2001] contends that the opposite is true. In fact, Internet lowers entry barriers for newcomers, thus it is even more important for the companies to distinguish themselves through strategy. The winners, according to Porter, are the companies that view the Internet as a complement to the traditional ways of competing. Since 2001, Porter has written and lectured extensively on the role of the digital technologies in establishing business strategies. A good example is the 2016 Videoclip “Michael Porter: Strategy, Competition and the Age of the Smart, Connected Machines”, URL: <https://www.youtube.com/watch?v=Up6AiNFJI3g>. Porter makes an important point that digital technologies are playing a dual role in business strategies:

- Digital technologies enable companies to develop, deploy and support new products and services. These products and services, such as food and dairy products, may not be Internet enabled.
- Digital technologies are themselves becoming the *products* especially because of Internet of Things (IoTs), i.e. many new products (things) such as wrist watches and refrigerators are now Internet enabled.

Porter explains this idea by using a simple example of an Internet-enabled tennis racket. Of course, the company is using Internet technologies to market such rackets but the tennis racket itself is also Internet enabled so that the data about how it is being used is being captured in a database. This data can be later combined with other relevant data and analyzed to determine the optimal racket design for players of different age groups, gender and health conditions. Thus the Internet is not only supporting the sales of the racket but also how to improve the sales by building a better product.

Digital technologies can be used, wisely or unwisely, as a part of any strategy and in any industry. The main question facing the companies is how to deploy these technologies. In general, the companies that succeed are the ones that use these technologies as a complement to the traditional ways of competing and do not separate their Internet initiatives apart from their established operations. All companies can benefit from the Internet by making it a tool for distinctive strategies. Thus, the Internet makes strategies more essential than before. In addition, the digital technologies have opened new markets for potential profits, but it is difficult to maintain a competitive edge because everyone can enter the new digital marketplace as well.

For a better understanding of Michael Porter’s evolving views on business strategy in the digital age, please do an Internet search on “Porter and Digital Strategy” and you will discover a large collection of articles, books and videoclips of lectures by Porter.

### 4.5.4 Business Strategies in the Digital Age – Views from MIT Sloan Management Review

Very interesting articles on different business strategies in the digital age have been published in the MIT Sloan Management Review since the 1990s. Here are quick snapshots of a few.

**“Strategic Thinking at the Top”.** [Goldman 2007] argues that “Expertise in strategic thinking is not the product of innate ability and pure serendipity. It arises from specific experiences (personal, interpersonal, organizational and external) which occur over 10 or more years”. The question is what makes a top strategic thinker. To answer this question, Goldman conducted a study of top strategic thinkers in their industry and investigated their experiences (educational, job related or other) that contributed to their high expertise in strategic thinking. The main finding is that it typically takes more than a decade to educate a top strategic thinker.

**“How to Recognize a Strategic Priority When You See One”.** [Sull and Turconi 2017] point out that most companies establish and prioritize their strategies, but it is not very easy to find what exactly are their strategies. The authors found that a company’s financial reports can provide critical insights into its strategy. They analyzed how large and publicly traded companies described their strategy in public documents. In their research, they reviewed 494 companies included in the 2014 Standard & Poor’s 500 Index (S&P 500) that were publicly traded at the end of 2015. This gave them interesting ideas about how companies specify and prioritize their strategies. The authors present excellent ideas about how to identify strategies and priorities in financial filings (e.g., Form10-K).

**“How to Be a Strategic Leader”.** [Kruschwitz 2016] stresses that a strategic leader knows how to translate an action plan into a “sensible way of thinking about the world” that a group can align with. In this short video, Stanford Graduate School of Business Professor Jesper Sørensen, emphasizes that strategy is an ongoing, iterative process that leaders are engaging in all the time. A strategic leader knows not only how to translate a strategy into an action plan but also to make sure that the action plan is a sensible way that a group can align with. A strategic leader helps build a community that is willing and able to work from a shared sense of purpose.

**“Why Companies Need a New Playbook to Succeed in the Digital Age”.** [Weill and Woerner 2018] Contend that companies must use digital technologies to offer customers something new and compelling. To prove their point, the authors conducted workshops on digital disruption with CEOs and senior leaders from four companies that operate in the housing market (e.g., a bank, an insurance company, a law firm, and a real estate company). All participants came up with the same model: it is better to become a destination for customers to find and acquire a house by providing integrated bundles of services for the home buyer instead of just providing a mortgage, or insurance, or legal contracts, or home search services.

The authors contend that in the digital world, companies need to create ecosystems or webs of relationships with partners that help them become more customer focused. In addition to building ecosystems to offer customers new types of products and services, companies need to develop new ways of attracting and engaging customers. For example, DBS Bank in Singapore decided to expand to India, where it did not have any customer base. Instead of traditional marketing, it partnered with a popular coffeehouse franchise to create a branchless bank, where customers can access the technology at the coffee company’s stores to enroll and start banking immediately on their mobile devices. The coffee-chain partnership generated 1.2 million banking customers in India.

**“Explaining the Business Case for Sustainability Again ... and Again ... and Again”.** [Winston 2018] points out that most large companies realize that environmental and social issues affect the company’s bottom line but many companies still raise the question: What’s the business case for sustainability?”. The author observes that although many companies are aligning with the United Nations’ Sustainable Development Goals but at the same time, there are still many who are not

buying it. The conclusion is that the case for sustainability will need to be made again and again for years to come.

**"The Case Against Agility".** [Mukherjee 2017] builds an interesting case against agility by arguing that thoughtfulness is much more important than being the first in the marketplace. Many organizations that were first in the marketplace did not succeed. For example, Netscape browser was the first browser that has disappeared from the marketplace. In addition, Google was not the first search engine – many of its predecessors such as AltaVista have vanished. And the idea of a minimum viable product just to make it quickly is flawed because Boeing should not launch a minimally viable airplane. Being first in the marketplace for a new product without carefully exploiting the technical and business tradeoffs is insane. According to Mukherjee, the following three ideas must go: “i) Agility, which prizes the ability to rapidly change established strategies, assets, or processes; ii) First-mover advantage, which decrees that whoever introduces a new product or service or technology first will almost inevitably win; and iii) Minimum viable product, which encourages the release of early versions of products or services, letting the market decide whether to give these early versions further support.”

#### 4.5.5 Balanced Score Card (BSC) – An Approach to Monitor Progress Towards Strategic Goals

The Balanced Scorecard (BSC) is a commonly used management system that presents a big-picture of strategic goals and a measurement technique to reach those goals. It is called “balanced scorecard” because it goes beyond the financial balance sheets and includes strategic concerns such as customer support, organizational learning, and internal process improvement. The main idea was formally presented by [Kaplan and Norton 1992] to emphasize the following key points:

- Companies need to pay special attention to non-financial performance to compete and succeed in the marketplace – hence the name “balanced scorecard”.
- The proposed methodology is top-down that starts with business mission and strategy.
- The main focus is on four perspectives (financial, customer support, organizational learning, and internal process improvement).
- The progress on each perspective is measured in terms of Key Performance Indicators (KPI)

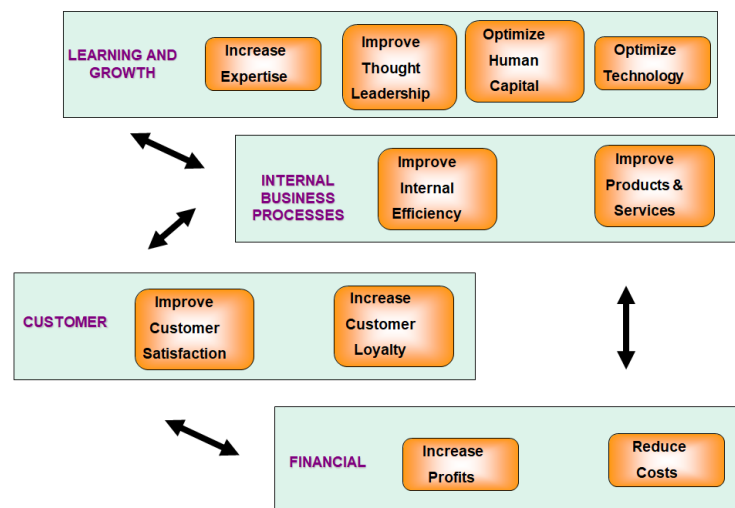


Figure 4-14: A Sample Balanced Score Card

Figure 4-14 shows a sample balanced scorecard that measures an organization’s health from the four perspectives that focus on different aspects of a company and create a balanced view of an

organization. As shown below, each perspective can be further decomposed into strategic objectives that can be measured precisely through KPIs. Examples of such strategic objectives are improve customer satisfaction, increase profits, reduce costs, increase expertise improve internal efficiency. Small organization identify one main strategic objective for each perspective and concentrate on 2-3 KPIs that can be easily measured.

Please keep in mind that the four perspectives are not independent entities. In fact, they affect each other. For example, improvements in Learning and Growth usually result in improved Internal Business Processes that help Customer Care which usually results in better Financial Gains. In addition, improved Financial Gains can help a company to invest more in Learning and Growth, and so on. Some of these interdependencies are displayed as arrows in Figure 4-14 .

The idea of a balanced scorecard is very straightforward: a) identify the 4 or more perspectives of the company in terms of customers, finance and other perspectives, b) for each perspective identify the few strategic objectives and KPIs (key performance indicators), and c) use the KPIs to measure the progress towards the objectives. Please keep in mind that BSCs provide a starting point and can be further customized. Specifically:

- **Financial Perspective** concentrates on the financial aspects of a business. Specific measures are concerned with improving earnings, keeping shareholders happy, increasing profits, decreasing expenses, etc. Financial planning and budgeting systems are of major value in modern businesses.
- **Learning and Growth Perspectives** focus on the overall corporate culture of learning and growth, i.e., are the employees being given an opportunity to increase their expertise and thought leadership and are they aware of the latest industry and technology trends? Digital technologies play a major role in learning and growth so that organizations can stay ahead of their competition.
- **Internal Business Perspectives** focus on a smooth and efficient system of internal policies and procedures. The main concern in the digital marketplace is how quickly can a company adapt to changing business conditions. This includes business process improvement and business process reengineering initiatives.
- **Customer Perspective** concentrates on the customer satisfaction and retention. A major area of work at present is understanding the customer behavior through sophisticated customer relationship management (CRM) systems such as Salesforce.Com.

Choosing strategic objectives for each perspective is an important part of BSCs. These objectives, shown as rounded corner rectangles in Figure 4-14, can be actually measured and thus can be used to develop KPIs (Key Performance Indicators). Strategic objectives usually start with a verb such as Increase, Decrease, Improve, Reduce, Maximize, Minimize, and Optimize. These objectives should also be Actionable (i.e., you can do something about them) and Measurable (i.e., you can develop a KPI for them). The strategic objectives shown in Figure 4-14 illustrate common examples of strategic objectives.

Although BSCs help to monitor a business success, the following issues have been raised:

- Some people introduce too many KPIs --it is best to introduce a few but good KPIs
- Despite the emphasis on balance, some managers primarily focus on financial perspective
- Instead of generic objectives and KPIs, it is best to develop your own that can be actually used

To summarize, a balanced scorecard consists of a few Perspectives (e.g., Customers, Financial, Learning Organization, and Internal Processes) and each perspective has several Strategic Objectives that can be measured by using KPIs. Obviously, all elements of the BSC are heavily impacted by the



digital technologies. For example, customer satisfaction and loyalty can be improved by the CRMs, costs can be reduced by automation, learning can be improved by using better knowledge management technologies, and the internal business processes can be improved by using automation and better integration of business processes. A large number of BSC tools, videoclips and papers are available over the Internet.

#### 4.5.6 IT Strategies – How to Align IT with Business Needs

As noted previously, different views and models for aligning IT with business needs have been discussed widely in the management literature. While the models and approaches differ between IT management scholars, the basic principles of aligning business and IT are the same. Let us discuss a model presented by Henderson and Venkataram [Henderson 1994] to illustrate the key concepts. This model is accepted in the IT management research community and has been adopted by IBM for management training and is used by the IBM Consulting Group. The basic Henderson-Venkataram model views business and IT in terms of strategy and infrastructure (see Figure 4-15). The four closely interacting components of this model are: business strategy, IT strategy, business infrastructure, and IT infrastructure.

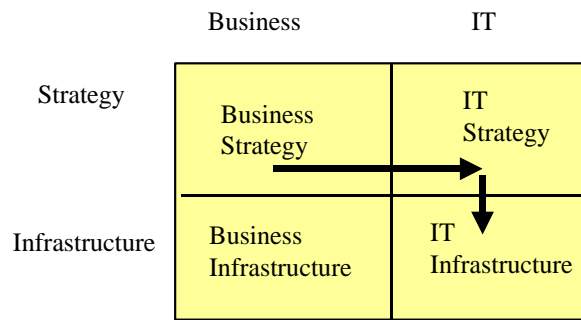


Figure 4-15: Henderson-Venkataram (H-V) Strategic Alignment Model

Henderson-Venkataram (H-V) proposed that IT can be aligned with business by involving at least three components of the alignment model. The effort can be initiated (driven) from any component and then involve the other two. For example, the following scenarios for aligning IT with business processes can be envisioned (see Figure 4-16):

- Business strategy -> IT strategy -> IT infrastructure. In this case, the business strategy drives the IT strategy, which in turn influences the IT infrastructure (Figure 4-16a).
- Business strategy -> Business infrastructure -> IT infrastructure. In this case, the business strategy drives the business infrastructure, which in turn influences the IT infrastructure (Figure 4-16b). This is the traditional BPR (business process re-engineering) model.
- IT strategy -> Business strategy -> Business infrastructure. In some cases, the IT strategy drives the Business strategy, which in turn influences the Business infrastructure (figure 4-20c). This scenario is used in cases where organizations initiate new businesses due to their expertise in IT (this happened in the telecommunications industry where the Baby Bells entered the Internet market to take advantage of their networking know-how). [Yetton 1994] give a very detailed example of how almost a reverse of the typical business strategy driven process took place in Flower and Samios, a small architectural firm in Sydney, Australia.
- IT strategy -> IT infrastructure -> Business infrastructure. In this case, the IT strategy influences the IT infrastructure which in turn influences the business infrastructure (Figure 4-16d).

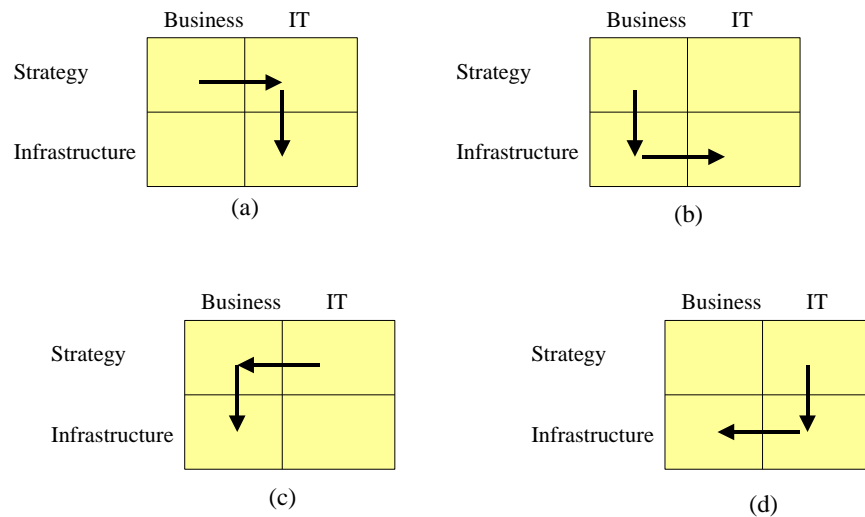



Figure 4-16: Aligning IT with Business - A few Scenarios

These scenarios show some of the interactions between IT and business. Naturally, other scenarios and interactions can be envisioned. Here are some general observations and guidelines to move forward:

- The Business strategy → IT strategy → IT infrastructure approach, depicted in Figure 4-16a, should be used most often even in the case of NGEs. However, in some cases, new technologies will introduce new business strategies and thus technology driven planning should be considered frequently.
- Real strategic and sizable business gains do not result only from re-engineering the applications. They come from the combination of business re-engineering along with the supporting application re-engineering. See the sidebar "Case Study: e-Business Strategies at Federal Express".
- IT should be used to enable business decisions and processes. Make sure that there are clear business drivers before you get carried away with the technology.
- Many new technologies that claim to eliminate existing N technologies themselves become N+1. Thus, new technologies eliminate nothing and just keep adding to the technology baggage.
- The life cycle for the reason for undertaking an effort should be longer than the life cycle of the undertaking itself. In other words, if you undertake a two year reengineering effort to save hardware cost, but hardware costs change in 6 months, you may be looking at a very tough year and a half.
- Distribution is not always good. Replacing a mainframe with multiple PCs may be like replacing a horse with 100 chickens to pull a cart. You face similar coordination problems!
- There is a thin line between vision and hallucination. You should know when you cross it.



### Time To Take a Break

- ✓ • Organizational Theory Concepts
- ✓ • Business Strategy
- ✓ • Aligning IT with Business
- Business Processes and Patterns

### **Suggested Review Questions Before Proceeding**

- Give an example of the key role being played by digital technologies in business strategies
- Does Porter believe that the Internet is irrelevant to business strategy
- List three ideas from SMR reviews that you found interesting (one line each)
- Please review the Sample Balanced Score Card (BSC) shown in Figure 4-14 and suggest 3 changes to align it better to your company
- Which IT Alignment Scenario of the H-V is most common, in your view

## **4.6 Business Processes, Patterns and Modeling to Support the Strategy**

Establishing a business strategy is the first step in a strategic planning process. The next step, discussed in this section is identifying the business processes that may need to be automated or re-engineered to support the selected business strategy.

### **4.6.1 Business Processes**

A business firm can be viewed as a collection of business processes (BPs) that represent standard operating procedures, precise rules, and practices developed to cope with different expected situations and scenarios. For example, a bookseller has to support business processes of book selection, payment, inventory management, and possibly shipping. Formally, a business process is "a set of logically related tasks performed to achieve a defined business outcome" [Davenport & Short 1990] – it is a series of business activities that support the goals of an enterprise. Examples of business processes include purchasing raw materials, paying employees, handling customer requests, establishing inventory management systems, developing new products and services, administering the delivery of products to customers, initiating new lines of software products, constructing new office buildings, etc.

There are different levels, interests, and responsibilities in an organization; consequently, there are different kinds of business processes (BPs). Figure 4-17 presents a common way to depict the different types of BPs at different levels in an organization. In this illustration, the organization is horizontally divided into strategic management, knowledge (middle) management, and operational levels. It is further divided into vertical functional areas such as sales and marketing, finance and accounting, human resources, and product-service development. For example:

- A sales process at the operational level records daily sales figures
- A middle management-level process tracks monthly sales figures by sales territory and reports on territories where sales exceed or fall below anticipated levels.
- A strategic management level process forecasts sales trends over a five-year period.



Figure 4-17: Different types of Application Systems at Different Levels

Broadly speaking, three main types of business processes serve different organizational levels:

- **Operational-level** processes support day-to-day activities and transactions of the organization, such as sales, payrolls, and flow of materials in a factory. Processes at this level answer routine questions such as the followings: did Joe pay his bill, how many parts are in inventory, how many chairs were sold today, etc. Examples of operational-level processes include an inventory management system and a system that tracks the number of hours worked each day by hourly workers.
- **Management/knowledge-level** processes serve the middle managers and the specialists in a firm. Specifically they serve the monitoring, controlling, and decision-making needs of middle managers and attempt to make the specialists more productive. Management-level processes typically provide periodic reports so that the managers can understand how things are working. An example of a management/knowledge-level process is a material requirement planning system that helps the managers decide how much material will be needed to meet the production demand. Another example is a financial planning system for financial analysts.
- **Strategic-level** processes help senior management address strategic issues and long-term trends with special focus on the external environment. The principal concern here is to understand the changes in the external environment and match them with the internal situation. Types of questions addressed by these processes are: what are the new trade regulations that could affect us, what will employment levels be in five years, what are the new products in the marketplace, and how will they affect us.

A business process can be naturally decomposed into several sub-processes. These sub-processes have their own attributes, but also contribute to achieve the goal of the parent process. Business process analysis typically includes the mapping of processes and sub-processes to several levels of granularity. Due to the emphasis on service oriented architectures, one might ask the question: what is the difference between a business process and a business service? Exhibit “Business Process Versus Business Service” attempts to answer this question. A great deal of literature on BPs has accumulated since the 1980s when the auto industry attempted to improve and reengineer its business processes to compete with the Japanese auto manufacturers. A great deal of literature on this topic is available over the Internet.

### Business Process Versus Business Service

A business process (BP), as stated previously, is a collection of activities that are required to achieve a business goal. At a basic level, a BP can be represented as a flowchart that specifies the orchestration needed to complete the goal. A business service, on the other hand specifies something that is delivered to the customer. Thus a business service specifies what a user receives while a business process shows *how* the service may be provided. In other words, a business service is an external view, while a process provides an internal set of activities.

Examples:

- Dry cleaning is a business service. The BPs that support this service are taking the order, sending the clothes for cleaning, etc
- Online purchasing is a service. The BPs that support this service are verifying the customer, checking inventory, and notifying a customer.

#### 4.6.2 Business Process Patterns to Represent Business Architectures

There are different ways of representing business processes in an enterprise. A powerful way of representing this information is through a *Business Process Pattern (BPP)*, shown in Figure 4-18, that captures an overall view of enterprise functional areas (e.g., sales, corporate management, back-office operations), the major business processes in each functional area (e.g., purchasing and payment within procurement) and the key interactions between these processes. A BPP can be used to identify what BPs are automated by different types of enterprise applications. For example, a purchasing application system, sometimes also referred to as a purchasing application package, automates the purchasing business process.

A BPP can be used to represent an enterprise business architecture (EBA), because it can be used to represent various business processes and their interrelationships and interactions. In addition, the critical business processes can be identified to represent a business strategy. BPPs can be used to conduct quick sensitivity analysis such as the following: a) if one BP is eliminated, then what other BPs will be impacted, b) if an application package that supports a BP is replaced with another application, what other applications/BPs will be impacted, c) which application, if replaced, will have the most impact in terms of integration, d) which application, if replaced, will have the least impact in terms of integration. We will use business process patterns and other types of patterns throughout this book. A more detailed discussion of patterns is given in the next chapter.

### Patterns – Another Look

In this book, a pattern  $T$  is a tuple  $T(p, s, e)$  where  $p$  is the problem to be solved,  $s$  is the solution (what works in practice), and  $e$  is an example. Additional information such as diagrams, contexts, benefits, consequences, and limitations can also be added to a pattern to help the designer. In addition, each pattern is assigned a name. The main value of a pattern is the solution  $s$  that represents the best practice and what works in real life situations. The solution  $s$  is provided to a designer as a generic solution -- a sketch -- that can be refined and specialized based on the situation, additional inputs, or inferences from other patterns. Solutions in a pattern depend on previous choices represented by other patterns. The patterns discussed in this document are based on extensive literature reviews and the knowledge of an IT consulting team.

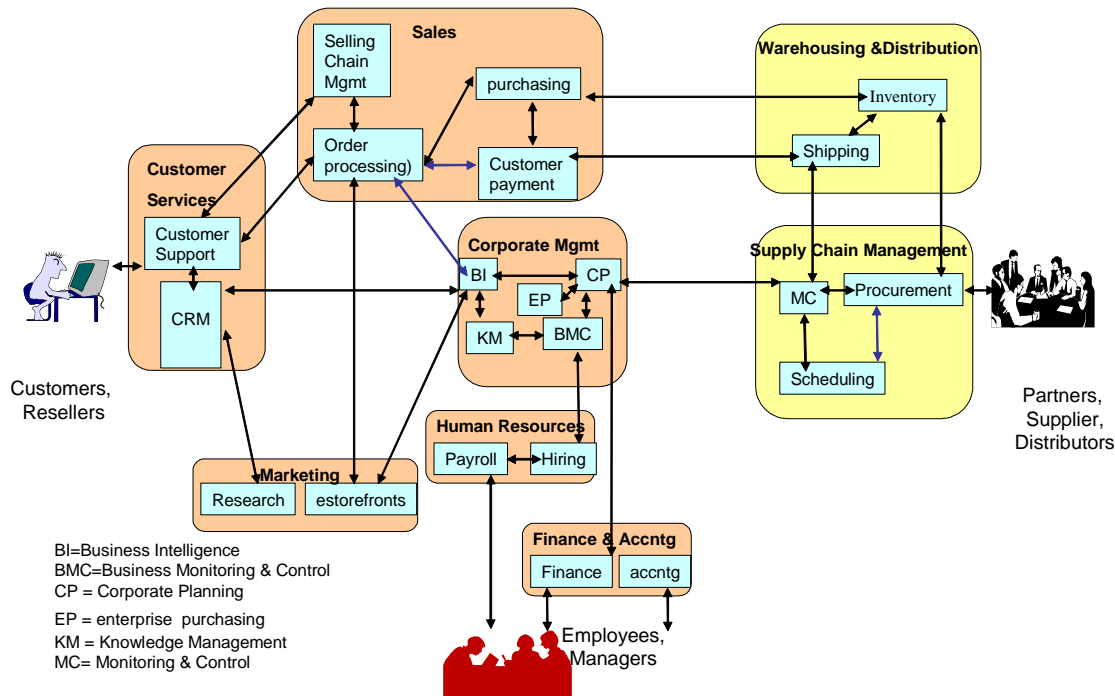


Figure 4-18: Business Process Pattern for a Retail Store

The business process patterns can be used very effectively to represent horizontal as well as vertical industry specific applications. The following discussion illustrates this point by using examples from the healthcare and manufacturing industry segments. More examples of this approach can be found in the PISA (Planning, Integration, Security & Administration) environment. See [www.ngepisa.com](http://www.ngepisa.com) for details.

**Healthcare Specific Business Process Patterns:** Figure 4-19 is a high level view of business processes and their interactions for the healthcare, i.e., hospitals, industry. This pattern shows the common (darker rounded edges) and industry specific (lighter rounded edges) business processes. We will discuss the common business processes and apps later. Let us briefly look at the industry specific (also known as vertical) business processes that are clustered into two business functional areas: healthcare clinical services and administrative services.

to the patients. Clinical services are typically offered by healthcare companies. However, some large organizations also offer some healthcare services (e.g., regular health checkups) to their employees. Clinical services are offered through practicing physicians for in-patient (hospital residence) and out-patient (homecare) situations. In addition to delivering patient care, clinical services enhancements and new service offerings are developed on an ongoing basis. As shown in the figure, clinical services consist of patient care (in-patient, outpatient), physician system and healthcare networks, and clinical services development processes. The clinical services primarily interact with:

- Patient administration services to assure that the admitted patients are provided proper clinical care.
- Facilities management to assure that appropriate facilities are available for the admitted patients.

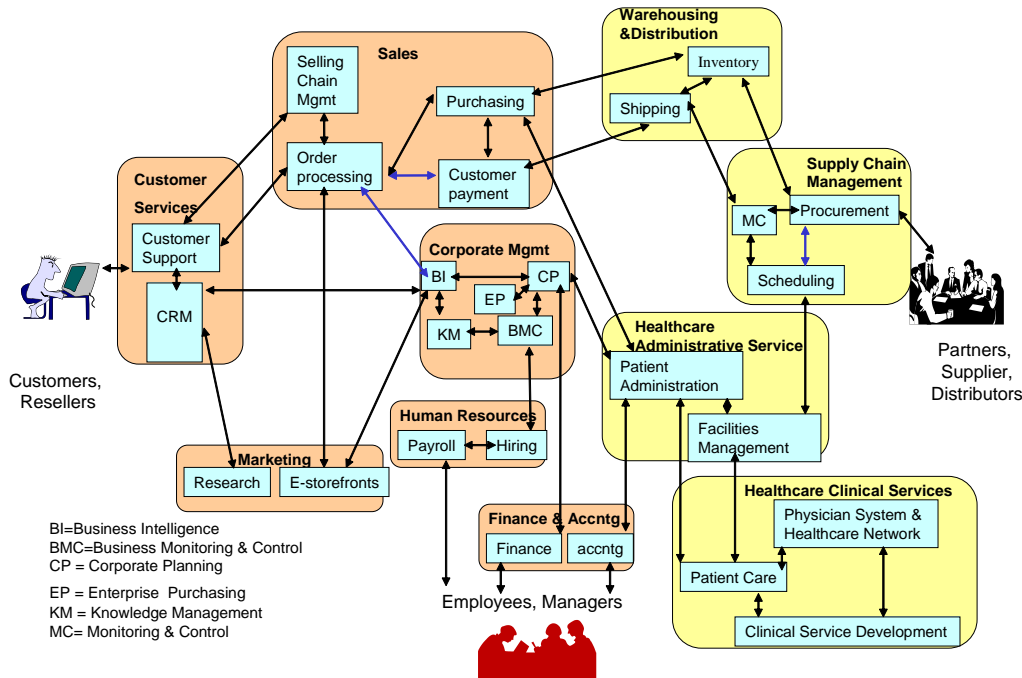


Figure 4-19: Enterprise Business Pattern for Healthcare Industries

Healthcare clinical services are responsible for developing new clinical services and delivering them. Healthcare administrative services are responsible for managing the administrative aspects of healthcare business. Healthcare patient administration and healthcare facilities management are the two main processes in this area, as shown. These processes include registering the patients, and communications with payers, healthcare providers, physicians, facilities suppliers, and other healthcare suppliers. These processes also include planning and customer relationship management activities. As shown in the figure, healthcare administrative services interface with:

- Patient care: the objective of these services is to facilitate the clinical services needed by the patient.
- Purchasing and accounting: customers have to agree to pay for the healthcare services to be offered.
- Corporate planning (CP): all healthcare services (clinical plus administrative) have to be approved by the company administration.

**Manufacturing Specific Business Process Patterns:** Figure 4-20 is a high level view of business processes and their interactions for the manufacturing industry. Let us briefly look at the industry specific (vertical) business processes that are clustered into two business functional areas: manufacturing logistics and manufacturing production services.

- Manufacturing logistics is responsible for maintaining the quality of products manufactured, minimizing risks to the company that may be incurred due to the manufactured products, and managing the product life cycle and data resources. These services include quality assurance (QA), risk management, product life cycle, and data management business processes. As shown in the figure, logistic services interact with:
- Monitoring and Control (MC) activities of supply chain management. In particular, the quality assurance (QA) deals directly with MC to assure that supply chain pressures do not decrease quality of products.



- Materials planning of manufacturing production. In particular, product life cycle management (PLM) activities feed directly into materials planning because different stages of a product ("finished goods") need different types of materials.

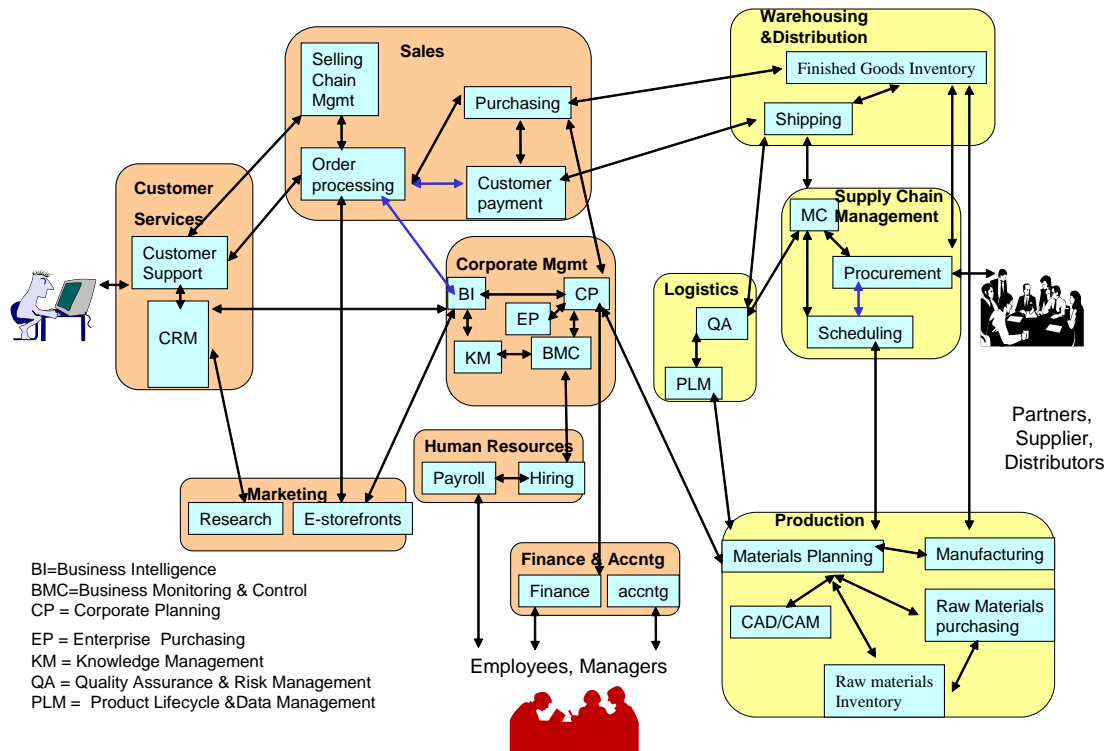


Figure 4-20: Enterprise Business Pattern for Manufacturing

Manufacturing production is the core manufacturing activity that converts raw materials into finished goods -- it is responsible for producing a firm's goods and services. Manufacturing and production systems deal with materials requirement planning, CAD, CAM, raw materials inventory, and raw materials purchasing. As shown in the figure, manufacturing production processes interact with:

- Supply chain management to assure that the suppliers provide the products needed for purchasing
- Warehousing and inventory to update the finished goods inventory whenever new goods are produced
- Logistics for quality assurance and PLM activities
- Corporate planning (CP) to make sure that the corporate management is aware of long range needs of manufacturing activities

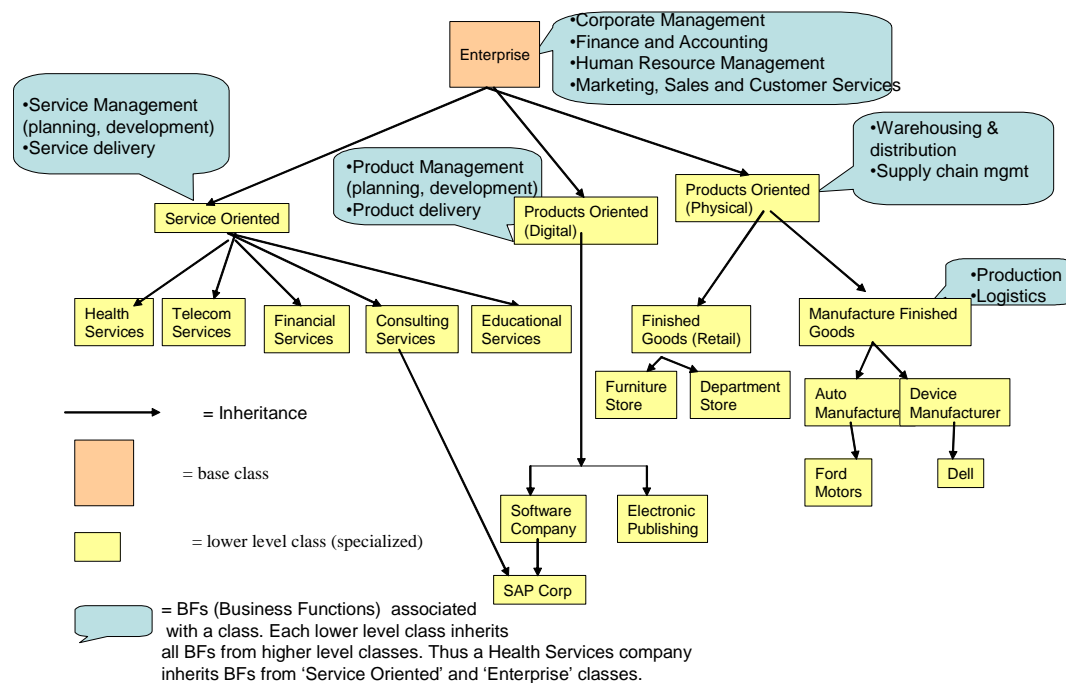
#### 4.6.3 Industry Patterns – A Classification of Business Patterns

Business process patterns (BPPs) represent *industry specific* information because each industry has a set of commonly used BPs (business processes), i.e., a BF consists of several BPs. To compose and organize these patterns, we have developed a class hierarchical view of businesses and business processes that shows inheritances between high to low level classes. It is believed that this technique used commonly in object-oriented systems development has not been used to represent enterprises and business processes.. The main idea, presented in Figure 4-21, is that all enterprises have common BFs (Corporate Management, Finance and Accounting, Human Resource Management, Marketing, Sales and Customer Services) that are inherited by all industry segments. Similar inheritance relationships exist between industry segments and sub-segments as shown. Thus all service oriented

industries have Service Management (planning, development) and Service Delivery BFs, in addition to the common BFs. Also note that “composite” BFs/BPs can be handled by allowing inheritance from multiple activities. For example, SAP is a software development company that also provides consulting services. Thus, SAP has a set of BPs inherited from the core BPs, the software development BPs, and consulting BPs.

This innovative class hierarchy allows a very quick identification of BPs for a very wide range of industry segments. By using such inheritance trees, we created business process patterns (BPPs) for 12 industry segments that include manufacturing, healthcare, telecom, and others. Figure 4-18 shows a BPP for retail industries that has been constructed by using Figure 4-21. This pattern captures a high level view of enterprise functional areas represented as BFs (e.g., corporate management, sales and marketing), the major business processes in each functional area (e.g., order processing and purchasing within sales) and the key interactions between these processes.

This high level view is very useful for enterprises because it shows the supplier/partner focused BPs (e.g., supply chain management, warehousing) and their interactions/interfaces with other BPs of the enterprise. For example, Figure 4-18 can be used to answer the query: if inventory management system is replaced, what other systems will be affected (answer: purchasing, shipping, and procurement). It can also help a business to develop a BPO (Business Process Outsourcing) strategy, an enterprise application strategy (i.e., what BPs to automate), and an integration strategy. BPPs provide a powerful tool for representing a wide range of enterprises in different industry segments.



**Figure 4-21: An Inheritance Class Hierarchical View of Businesses and Business Functions**

Figure 4-21 also illustrates the need for characterizing BPs for specific industry subtypes. In fact, we must capture differences within the same BP, depending on a particular industry segment. In reality, corporate management and back-office functions usually have very common and general requirements, but production, procurement or sales functions could differ greatly between industry segments. For instance, for the hospitality industry, sales functions need rate management, with real

time pricing, or package management (flight + hotel + car rental); the fashion industry is instead characterized by brands, seasons, campaigns, and collections management. The BPs are characterized by using attributes -- instead of defining several qualities related to a particular industry, we decided to stereotype a particular BP using a macro-attribute, related to industry-sub-type. This approach is somewhat simplistic, but it is preferable since it is much easier to implement. During the user interview, the system allows the user to select several industry types and subtypes. For instance:

- Type: service industries with subtype: hospitality, media, telecommunications, etc.
- Type: manufacturing industries with subtype: consumer products (Apparel and Footwear), consumer products (Food), automotive, etc.

As defined earlier, each industry type has a specific business pattern; the Enterprise Model (E) which is instantiated during the interview, uses the most appropriate BPP and tags its BPs depending on industry subtype. The industry subtype attribute is also used to characterize the applications and can be used to select or suggest them, as we will clarify later.



## Time to Take a Break

### Suggested Review Questions Before Proceeding

- What are key business processes in a retail store (list about 5)
- How can business process patterns represent business architectures (give an example)
- What is an industry pattern and how can you develop a business architecture by using industry patterns
- Why does IT need to be aligned with Business
- Are IT strategies important for aligning IT with business needs
- Give an example of Porter's Value Chain Model from any industry segment
- Identify three interesting case studies from the following websites: ([www.digitalenterprise.org](http://www.digitalenterprise.org)), ([www.centerdigitalgov.com/](http://www.centerdigitalgov.com/)) and ([www.unpan.org](http://www.unpan.org)).

## 4.7 Case Studies and Examples

Competing in today's business is like driving in heavy traffic in an unfamiliar neighborhood under changing weather conditions. You have to keep reading signs, keep changing directions, and be aware of all the movements around you. Here are a few examples of how some companies have established strategies and used IT to survive and thrive.

The following websites have very good case studies and examples of business-strategies that should be valuable:

- The Study.com site ([www.study.com](http://www.study.com)) is a very nice site with examples, case studies, tutorials and short courses on various business and management topics.

- The BusinessCasestudies organization in England has a very good site (<http://businesscasestudies.co.uk/>) for many case studies on a wide range of topics, including Business Strategy.
- The Panmore Institute has a very rich site ([www.panmore.com](http://www.panmore.com)) for examples of Business Analysis of a large number of companies. This site also has results of Porter Competitive Forces Model for more than 50 companies.

A very good source for digital enterprise information is the website ([www.digitalenterprise.org](http://www.digitalenterprise.org)) maintained by Mike Rappa. This site also has many case studies that include Amazon, eBay, Google, Yahoo, and many more. Please see the sidebar “A Good Source for Digital Enterprise Case Studies”. Many examples of digital government services are published regularly in the Center for Digital Governments ([www.centerdigitalgov.com/](http://www.centerdigitalgov.com/)) and the United Nations Public Administration Network ([www.unpan.org](http://www.unpan.org)).

**A Good Source for Digital Enterprise Case Studies: [www.digitalenterprise.org/cases/](http://www.digitalenterprise.org/cases/)**

The screenshot shows the 'MANAGING THE DIGITAL ENTERPRISE' website by Michael Rappa. The main section is titled 'CASE STUDIES' and features a table with two columns: 'Module' and 'Case Study'. The table lists various digital enterprise topics and the companies or services associated with them. To the left of the table is a 'Course information' sidebar with links like 'About', 'Notices', 'Schedule', 'Administrivia', and 'Contact'. To the right is a 'Case index' sidebar listing numerous company names. A search bar is located below the course information links.

Module	Case Study
Introduction	Yahoo!, Flickr
Navigation	Google
Digital Design	Amazon, Craigslist
Web Metrics	Nielsen/NetRatings
Business Models	America Online, Classmates, Craigslist, Dell Computer, Flickr, iTunes, Listen, Monster, Netflix, NY Times, Priceline, Red Hat, SciQuest, Slashdot, Wikipedia
Digital Markets	ChemConnect
Digital Automata	LiveWire Logic, Netflix
Auctions	eBay
Channel Conflict	Orbitz
Trust in Cyberspace	Truste
Security	Counterpane
Internet Privacy	DoubleClick, Truste
Intellectual Property	WIPO, iTunes
Internet Governance	ICANN
Web Ethics	PayPal

**Note: This screenshot was taken on January 3, 2016.**

#### 4.7.1 Short Examples ("Snippets")

- Several companies are developing business strategies that include sustainability. According to [Winston 2018]: “The battle to get companies interested in sustainability is basically over. No large company seriously debates whether environmental and social issues affect the company’s bottom line”. However, we live in a bifurcated world. While large organizations such as the United Nations strongly supports Sustainable Development Goals, but many companies keep asking the question “What’s the business case for sustainability?”. For a detailed discussion of this topic, see [Winston 2018]. [Fromartz 2009] published "The Mini-Cases: 5 Companies, 5 Strategies, 5 Transformations" that show how companies are capitalizing on sustainability by reducing energy consumption, lowering carbon footprints and becoming more efficient consumers of water.
- General Electric has become a real-time enterprise where the GE CEO monitors the real-time status of business activities and applications critical to GE's day-to-day operations. The monitoring is done through a screen that flashes a series of green, yellow, and red icons for various GE business units. The goal is to monitor, once every 15 minutes, GE's mission-critical operations such as sales, daily order rates, inventory levels, and other important activities across the company's 13 different businesses around the globe. The icons are checked regularly by agents that feed business status information to the control panel so that the management can respond to changes (e.g., supply chain disruptions) and manage risks continuously. GE estimates that its digitization efforts saved the company \$1.6 billion in 2001 and is expected to do the same in 2002.
- Microsoft anticipated changes in customer behavior and embarked on a business strategy to attract mass consumer market that goes beyond the typical PC users in office. By using the Microsoft Network (MSN) infrastructure, it reengineered several value chains such as travel (Expedia), real estate (HomeAdvisor), finance (Investor), and automotive sales (CarPoint). Microsoft's business strategy is to win a major share of the sales and distribution charges in the huge markets for airline tickets (\$100 billion), automobile sales (\$334 billion), and retail goods (over \$100 billion). By entering in these markets, Microsoft has significantly impacted the marketplace.
- Nestle, an international food and pharmaceutical company operating in more than 70 countries, decided to standardize its business processes to compete in e-business. The factories in different countries did business according to local rules and culture. But this did not allow the company to use its worldwide buying power for commonly used raw materials. The company introduced a single Enterprise Resource Planning (ERP) to streamline its material requirements and planning systems and significantly reduced operational costs.
- Auto-by-Tel, a web-based auto sales company, started with the strategy that the auto prices for the same car vary widely between dealers and potential customers cannot visit all auto dealers to find the best deal. Auto dealers bought into this idea because it increased their sales channels. The large auto manufacturers are also responding to the web-based auto sales as a "virtual dealerships" that can sell cars. This is a good example of a solution that addressed an existing problem.
- Charles Schwab made customer focus the core of its business strategy to stay competitive. This required that the Schwab brokers have complete and recent information about the customers as well as the investment opportunities (i.e., minimize "I will call you back with more information"). To achieve this, Schwab linked all of its sales and customer service organizations with one another and with all the customer-interfacing parts of the company. A new information infrastructure was needed to capture and integrate information about customers and their behavior.

### 4.7.2 DELL COMPUTER – A Well-Known Digital Success Story

Dell Computer is the world's leading direct computer systems company – it claimed to be the number one computer systems supplier in the United States and number two worldwide in April 2000. Dell was founded in 1984 by Michael Dell on a simple concept: that by selling computer systems directly to customers, Dell could best understand customer needs and efficiently provide the most effective computing solutions to meet those needs.

Headquartered in Austin, Texas, Dell's climb to market leadership is the result of a persistent focus on delivering the best possible customer experience by directly selling computing products and services based on industry standard technology. This direct business model eliminates retailers that add unnecessary time and cost, or can diminish Dell's understanding of customer expectations. The direct model allows the company to build powerful, richly configured systems at competitive prices and offer it directly to the customers. Dell also introduces the latest relevant technology much more quickly than other companies that have slow-moving, indirect distribution channels (average four days for inventory turnover). The business challenges addressed by Dell are:

- Provide next-business-day-service to the majority of its customers.
- Manage a global service inventory that changes rapidly due to component substitutions, upgrades, and engineering change orders.
- Enhance product demonstration and customer experience on the company's Website.

Dell led the commercial migration to the Internet, launching [www.dell.com](http://www.dell.com) in 1994 and adding e-commerce capabilities in 1996. The company is increasingly realizing Internet-associated efficiencies throughout its business, including procurement, customer support and relationship management. The company exploits Internet and associated technologies to support its global customers and suppliers, ties suppliers and internal operations electronically.

More than half of Dell's revenues (\$25 billion) come from online sales. At [www.dell.com](http://www.dell.com), customers may review, configure and price systems within Dell's entire product line, order systems online, and track orders from manufacturing through shipping. The main weapon of Dell Website is the Premiere Page program that serves the largest Dell's corporate, government, and educational accounts. When Dell wins an account with more than 400 employees, it builds a Premiere Page for the new account and links it directly to Dell's system for quick order placements and configurations. More than \$30 million worth of Dell computers are ordered per day this way.

Dell suppliers are also tied into Dell extranet to help them coordinate their inventories and activities around Dell order activity. At [valuechain.dell.com](http://valuechain.dell.com), Dell shares information with its suppliers on a range of topics, including product quality and inventory.

Dell has enhanced and broadened the fundamental competitive advantages of the direct model by applying the efficiencies of the Internet to its entire business. Today, Dell is operating one of the highest volume Internet commerce sites in the world that has resulted in solid financial gains. The financial success of the company is due in great part to its e-commerce site, which Dell continues to support by implementing new site features and using innovative technology solutions to enhance its Website.

Sources:

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### 4.7.3 Case Study: General Motors Leverages Web Technologies

Engineering automobiles is a daunting and costly task requiring highly cooperative efforts within a company, as well as with numerous outside suppliers. In the mid 1990s, GM's cars and trucks took as long as four years to get to the market, mainly due to the collaboration needed between its many internal divisions and more than 9,000 outside suppliers. In 2002, this time has been reduced to 18 months due to aggressive outsourcing and Web-based collaboration. With its new technology upgrades, GM produced new or redesigned models every three weeks between 2003 and 2008. This is a dramatic gain in the automaker's ability to bring a car or truck to the market. In addition, GM built 70 cars and crashed them for safety testing in the early 1990s. Now, it only needs to crash test only 10 cars – other tests are conducted through virtual crashes over the Web.

#### How did GM do this?

The main difficulty all automakers face is that no single department handles all the engineering issues of an automobile. Separate teams, in different geographical locations, develop components such as the engine, the chassis, and suspension system. Thousands of companies, also located throughout the world, provide the needed parts. Over the years, GM engineers have used computer-aided design (CAD) to complete their pieces of a project. GM then relied on each piece from the different teams to perfectly fit together, to create a safe and high quality product that could be sold to consumers. The main issue GM faced was that each division had its own separate CAD system and did not share drawings. Each work-in-progress obviously had very particular and intricate details which needed constant sharing during the prototype development. The result was a lengthy development process that needed to create as many as 70 models for physical crash tests to make sure that all separately built components worked safely together. At a cost of up to one million dollars per prototype, this undertaking was both expensive and time consuming. The crash testing also added to the development time leading to an overall 4-year period before a car or truck could go from the drawing board to the driveway.

The transformation of GM began in the mid-1990s with increased Internet bandwidth for sharing large design files. The faster network was also shared with key suppliers. Then GM's 7,000 legacy IT systems were reduced by half. For example, before 1996, GM had 23 disparate CAD (computer aided design) systems in use. The engine people could not share drawings electronically with the suspension people or the sheet-metal people, and this made design integration a long and difficult process. To reduce the amount of time needed in the early stages of the development process, GM decided to use a more centralized CAD system by adopting Unigraphics, a Web-based service created and offered by Electronic Data Systems (EDS). Unigraphics allowed 3-D drawings to be shared amongst 18,000 GM designers and engineers over the Web and across the globe. It also gave access to around 1,000 suppliers. This provided much more information and knowledge to each group involved in the tedious design stages.

With Unigraphics, the engineers had the opportunity to see how their parts fit into the big picture of the final product. They could alter specifications more easily and make adjustments earlier, as opposed to having to wait and see the results of the crash tests. Other technologies that have cut down development time and costs include Microsoft's NetMeeting and eVis, from EDS. These technologies reduce the time that is necessary for the vehicle review process and in some cases, change the way the process is handled. Utilizing new Web technologies, GM has now the ability to do real time review with testing teams in various geographical locations. The engineers can now crash cars virtually over the Web. Due to this, GM performs ten physical crash tests, a huge reduction from the seventy or more required in the past.



GM rapidly altered its early development phases. By employing Web technologies, GM significantly improved sharing of engineering drawings and design documents and doing real time vehicle reviewing among widely dispersed groups. Because of this new approach, GM can create new or redesigned models of automobiles at an astonishing rate of one every three weeks. Thus, GM has many more quality options in choosing what types of cars or trucks it actually wants to put into production and giving the company a competitive advantage.

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### **Realities of Modern Business -- Some Personal Observations**

Here are my own informal observations based on years of practical experience:

1. Today's strategic edge becomes tomorrow's cost of doing business. In the early 2000s, having a website provided a strategic edge to companies. At present, having a website is among other costs of doing business -- just like electricity and air conditioning. If companies gain competitive advantage due to something, then everyone does the same thing -- eventually making it a cost of doing business.
2. Technology is a necessary but not a sufficient tool for success. Solid technology is necessary to satisfy the organizational needs, but numerous training sessions, organizational changes, one-on-one discussions, and handholding meetings are needed to make sure that the technology is actually used successfully. Many organizations have found this to be true while introducing ERP and CRM systems, because these systems change the way people do their work (see, for example, the CRM and ERP case studies of Honeywell and Owens-Corning in Chapter 5 of this Module).
3. Most technology waves last about three years. First year is typically the "honeymoon" period when companies decide to use it, the second year involves some experimentation, and the results become known in the third year when it is time to jump to the next wave.
4. Roughly 20% of claims made about a new technology wave are true -- the other 80% are hype. Thus the Pareto's Principle of 80-20 rule lives on. The good news is that 20% per technology wave does make a significant difference over a decade (about a 60% real gain!).
5. Almost every new technology that claims to replace the existing N technologies itself becomes N+1. Consider, for example, Java. Instead of replacing existing, let us say 10 programming languages, it has become 11<sup>th</sup>. The implication is that the bundle of technologies keeps growing -- very few things completely die and disappear in this field.
6. Absence of thought is the recurring theme in business failures. This is somewhat cynical but there seems to be very little thinking in major business decisions (my own observations). I have seen numerous marketing and new product studies that show lots of charts, graphs, and diagrams but have absolutely nothing valuable to present. The presenters and the listeners are greatly impressed by all the information that has been gathered. Nobody asks "so what?"

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