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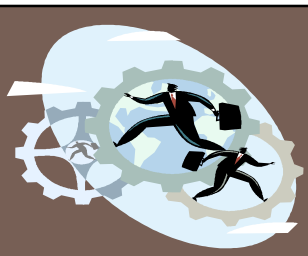
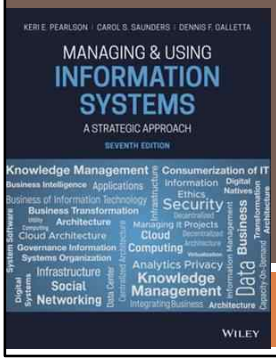


CHAPTER 5
INFORMATION SYSTEMS AND DIGITAL TRANSFORMATION



Managing & Using Information Systems: A Strategic Approach (7th Edition), Pearlson, Saunders, & Galletta

Chapter Introduction

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- Transformation requires thinking about things in a revolutionary (혁명적/획기적) way--recognizing and shedding (get rid of) outdated rules and fundamental assumptions that underlie the business.
- Business processes, *the cross-functional sets of activities that turn inputs into outputs*, are at the heart of how businesses operate and how transformation takes place.
- Digital transformation uses the principles of finding new ways to differentiate a business by offering customers a new and valuable way to meet their needs, often over digital media.

Chapter Introduction

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- This chapter discusses business processes, digital business transformation and the systems that support them.
- The chapter begins with a discussion of a functional (silo) versus a process perspective of a firm, including agile and dynamic business processes.
- The chapter then focuses on the way managers change business processes, including incremental and radical approaches.

Chapter Introduction

4

- Digital business transformation is then introduced.
- Information systems (IS) including workflow and business process management systems and enterprise systems that support and automate business processes follow.
- The chapter concludes by examining when IS drive business transformations and the complexities that arise when companies integrate systems.

CASE: Sloan Valve Company

5

- Business strategy at Sloan Valve Company, a family-owned global manufacturer of plumbing products, had executives launching a range of new products every year.
- The new product development (NPD) process was both core and strategic for Sloan, but it was also complex and slow; over 16 functional units were involved, and it often took 18-24 months to bring a new product to market.
- Sloan Valve's process of initiating and screening new product ideas was immature and not producing the business results needed for the company.

CASE: Sloan Valve Company

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- More than 50% of the ideas that began the process didn't make it through, resulting in wasted resources.
- Further, no one was accountable for the process, making it difficult to get a handle on process management and improvement.
- Information flow was blocked in part because of the structure of the organization.

CASE: Sloan Valve Company

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- Management initially invested in an enterprise system to automate the company's internal processes, believing that IS would provide a common language, database, and platform.
- Despite successful implementation, the communication and coordination problems continued.
- Further, the new system did not provide an NPD process.

CASE: Sloan Valve Company

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- Upon deeper analysis by a new CIO brought in to "fix things," management realized that the enterprise system was working fine, but the underlying (fundamental, 기본적인) process was broken.
- Top management decided to redesign the NPD process.
- The NPD process redesign team was led by an IT manager with considerable process experience and involved members from manufacturing, engineering, IT, finance, marketing, operations, and quality assurance.

CASE: Sloan Valve Company

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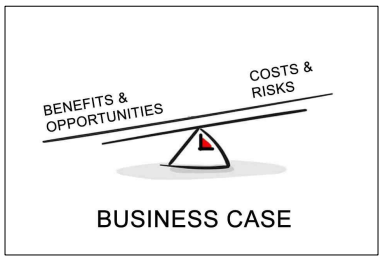
- The director of design engineering was made process owner to provide oversight for all changes.
- The team spent nine months assessing the current way of working and proposed a new end-to-end NPD process.
- The reengineered NPD process included six sub-processes: ideation, business case (사업계획서) development, project portfolio management, product development, product and process validation, and launch.



CASE: Sloan Valve Company

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- The underlying (fundamental, 기본적인) information system was the enterprise system upgraded to include newer modules, which supported product life cycle management.
- The quality, timing, and output of NPD greatly improved.
- The new NPD process reduced time-to-market (cycle time) to less than 12 months.

CASE: Sloan Valve Company

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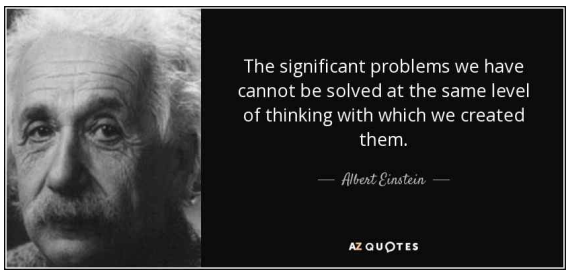
- New product ideas that were unlikely to work were filtered out early, eliminating problems of wasting resources.
- Synthesis of product and process information improved.
- Customer feedback was easier to access.
- And accountability increased, smoothing out responsibilities and workflow.

Companies That Ran Into Significant Problems

12

- Not all IS enterprise system implementations are as successful as that at Sloan Valve.
- There are hundreds of stories of companies that ran into significant problems when automating and transforming their business processes, especially when an information system is at the heart of the change.



- ✓ "우리가 직면한 중대한 문제들은 그 문제들을 만들어냈을 때와 같은 수준의 사고방식으로는 해결할 수 없다"
- ✓ 기존의 낡은 관념을 깨고 새로운 시각과 혁신적인 접근으로 난제에 접근해야 함을 의미
- ✓ Discontinuous Thinking (불연속적 사고).

Companies That Ran Into Significant Problems: Overstock.com

13

- Overstock.com's order tracking system failed for a full week when it rolled out a new enterprise system.
- By rushing to implement the new system, a glitch (작은 문제/결함) put the enterprise system out of sync with the accounting system, causing the company to have to restate more than five years of earnings, which showed lower revenue and higher losses.

overstock
BED BATH & BEYOND®

Companies That Ran Into Significant Problems: Woolworth's Australia

14

- Woolworth's Australia ("Woolies") experienced major problems during its six-year long transition from a 30-year-old ERP built in-house to SAP.
- The weekly profit-and-loss reports designed for individual store managers couldn't be generated for nearly 18 months by the new SAP ERP.
- The problem was attributed to the loss of so many senior employees during the long transition period that all institutional knowledge about the system was lost.
- Consequently, no one knew the processes well enough to correctly implement SAP.

Woolworths
The fresh food people

Companies That Ran Into Significant Problems: Avis Europe

15

- Avis Europe attempted to implement an enterprise system, but project delays and cost overruns caused the company to cancel the project and write off (탕감하다) £28 million on its books.
- With so much at risk, general managers must be informed and involved in these types of complex IS that change business processes.

AVIS®

Implications

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- IS can enable or impede business change.
- The right design coupled with the right technology can result in changes such as those experienced by Sloan Valve.
- The wrong business process design or the wrong technology, however, can force a company into operational, and sometimes financial, crisis as the Overstock.com, Woolies, and Avis Europe examples show.

Silo Perspective Versus Business Process Perspective

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- When effectively linked with improvements to business processes, advances in IS enable increased competitiveness.
- IS can:
  - Inhibit change when managers fail to adapt business processes because they rely on inflexible systems.
  - Drive change.
- Transformation requires discontinuous thinking (불연속적 사고).
  - Recognizing and shedding (get rid of) outdated rules and fundamental assumptions that underlie operations.

Functional (Silo) Perspective

18

- A typical hierarchical structure is organized by function (department) (Figure 5.1).

Typical Hierarchical Organization Structure

Figure 5.1 Hierarchical Structure

Advantages of Functional (Silo) Perspective

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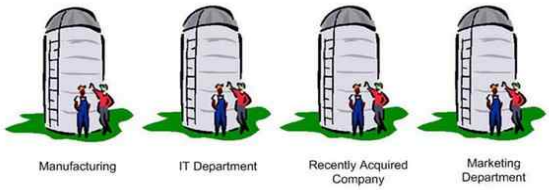
- Silos are self-contained (self-controlled) functional units that:
  - Optimize expertise and training.
  - Avoid redundancy in expertise.
  - Are easier to benchmark with outside organizations.
  - Utilize bodies of knowledge created for each function.
  - Make it easier to understand the role of each silo.



Disadvantages of Functional (Silo) Perspective

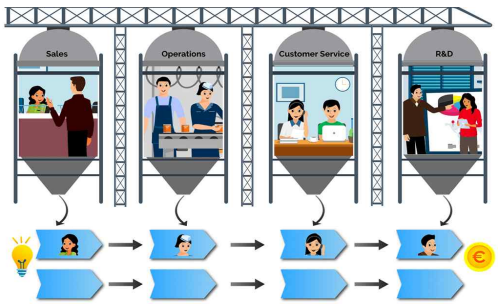
20

- Silo organizations can experience significant sub-optimization.
- Communication gaps between departments are often wide.
- Hand-offs between silos are often a source of problems.
  - Finger-pointing and lost information in business processes.
- Silos tend to lose sight of the overall objective of the organization and operate in a way that maximizes their local goals.
- Each group is primarily concerned with its own set of objectives.
- Losing the big picture means losing business effectiveness.
- Customers and stakeholders are not being well served.

Process Perspective

21

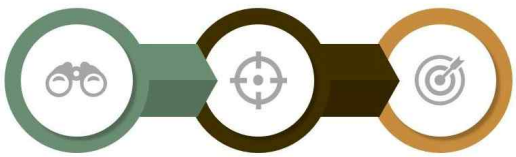
- Allows the manager to concentrate on the work that must be done to ensure optimal creation of value.
  - Avoid or reduce duplicate work, facilitate cross-functional communication, optimize business processes, and best serve the customers and stakeholders.



Process Perspective

22

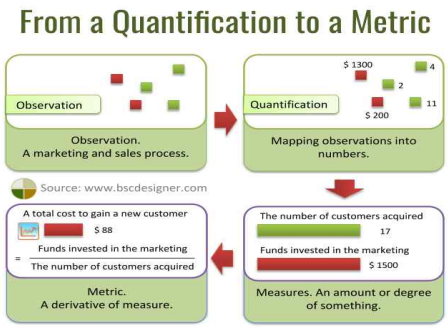
- A process is defined as an interrelated, sequential set of activities and tasks that turn inputs into outputs and have:
  - A beginning and an end.
  - Inputs and outputs.
  - A set of tasks (sub-processes or activities) that transform the inputs into outputs.
  - A set of metrics for measuring effectiveness.



Process Perspective

23

- A workflow is a sequence of activities that take place in a process.
- Metrics help to focus managers on the critical dimensions of the process.
  - Throughput (처리량)
  - Outputs
  - Customer satisfaction
  - Revenue per output
  - Profit per output
  - Quality of the output



Process Perspective

24

- Examples of business processes include customer order fulfillment, manufacturing, planning and execution, payroll, financial reporting, and procurement (Figure 5.2).

Figure 5.2 – Sample Procurement Business Process

- Focus on the process ensures focus on the business's goals--the "big picture."
- Each process has an "endpoint"--a deliverable to a customer, supplier, or other stakeholder.

Process Perspective

25

- A process perspective recognizes that processes are often cross-functional (Figure 5.3).

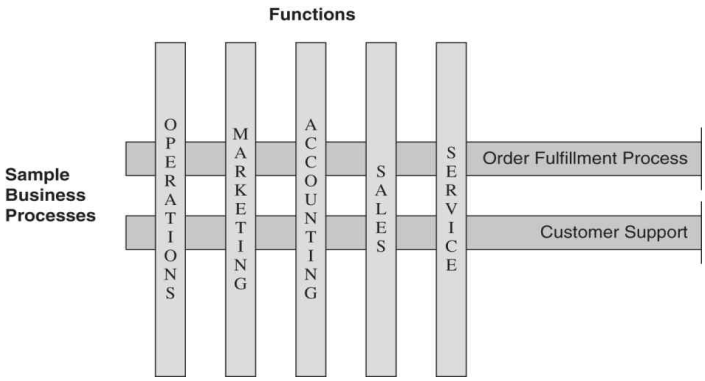


Figure 5.3.1 Cross-Functional Nature of Business Processes

Process Perspective

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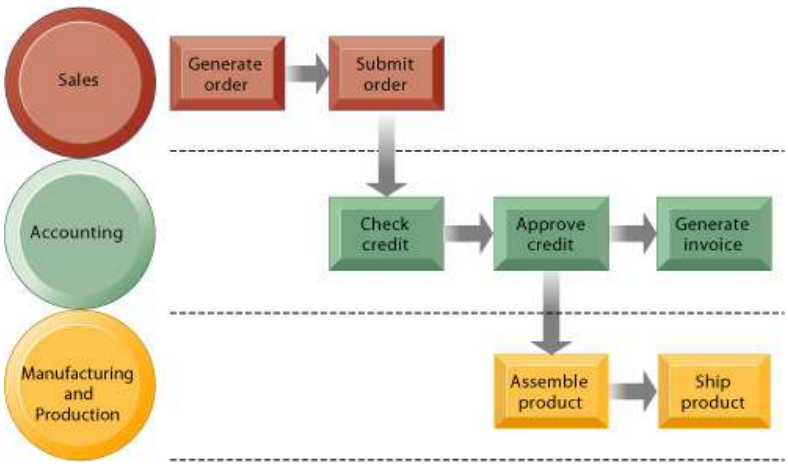

Figure 5.3.2 Cross-Functional Nature of Business Processes

Process Perspective

27

- Functional departments must work together to optimize processes in light of the business's goals.
- When managers gain the process perspective, they begin to lead their organizations to change and optimize the value received by customers and stakeholders.
  1. Identifying the customers of processes
     - ✓ Who receives the output of the process?
  2. Identifying these customers' requirements
     - ✓ What are the criteria for successful implementation of the process?

Process Perspective

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- When managers gain the process perspective, they begin to lead their organizations to change and optimize the value received by customers and stakeholders.
  3. Clarifying the value that each process adds to the overall goals of the organization.
  4. Sharing their perspective with other organizational members until the organization itself becomes more process focused.

	Silo Perspective	Business Process Perspective
Definition	• Self-contained functional units such as marketing, operations, finance	• Interrelated, sequential set of activities and tasks that turns inputs into outputs
Focus	• Function	• Cross-function
Goal Accomplishment	• Goals optimized for the function, which may be suboptimal for the organization	• Goals optimized for the organization, or the "big picture"
Benefits	• Core competencies highlighted and developed • Functional efficiencies	• Avoidance of work duplication and cross-functional communication gaps • Organizational effectiveness
Problems	• Redundancy of information throughout the organization • Cross-functional inefficiencies • Communication problems	• Difficulty in finding staff who can be knowledgeable generalists • Need for sophisticated software

Figure 5.4 Comparison of Silo Perspective and Business Process Perspective

29

Zara's Cross-Functional Perspective

30

- Spanish clothing retailer Zara has over 1,600 stores in 78 countries around the world.
- A well-designed set of cross-functional processes.
- Zara is able to design, produce, and deliver a garment within 15 days.
- Managers must regularly create and rapidly replenish small batches of goods all over the world.

Zara's Cross-Functional Perspective

31

- Zara's organization, operational procedures, performance measures, and office layout are all designed to easily transfer information.
- Cross-functional teams enable information sharing among everyone who "needs to know."
- Able to change quickly to respond to new market trends.

Building Agile and Dynamic Business Processes

32

- Dynamic business processes (or agile business processes).
  - Processes that iterate through a constant renewal cycle of design, deliver, evaluate, and redesign.
- Agile processes
  - Designed with the intention of simplifying redesign and reconfiguration.
  - Flexible and easily adaptable to changes in the business environment.
  - Can be incrementally changed with little effort.

Building Agile and Dynamic Business Processes

33

- Dynamic processes reconfigure themselves as they "learn" and are utilized in the business.
- As more of the process is done with software, the easier it is to change and the more likely it can be designed to be agile or dynamic.

Building Agility-Using the Internet and Social Technologies

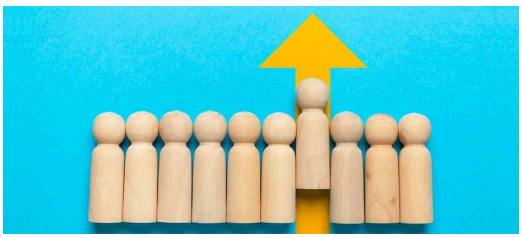
34

- Building agility into business processes is increasingly common.
  - Run entirely on the Internet (e.g., order management, service provisioning, software development, and human resource support).
  - Incorporate the latest innovations offered by vendors on the Internet.
- Dynamic IT applications are required for dynamic business processes.

Building Agility-Using the Internet and Social Technologies

35

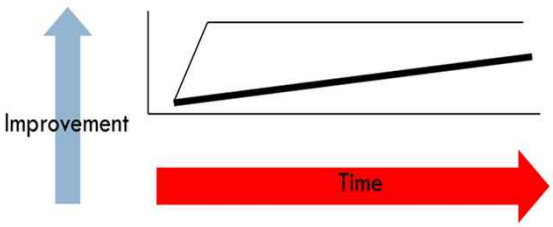
- When the underlying (fundamental/basic) IT is not designed with this goal in mind, the business process cannot adapt to changing requirements in the business environment.
- Agile and dynamic business processes enable operational efficiency through incremental and quick, game-changing (판도를 뒤집는, 대세를 바꾸는, 획기적인) innovative processes.



Changing Business Processes

36

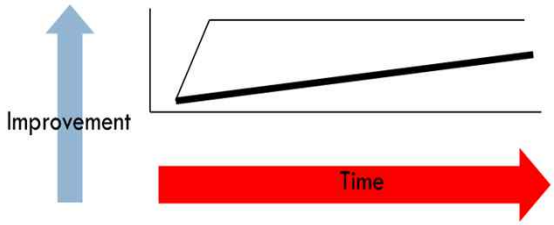
- Two techniques are used to transform business processes:
  - Radical process redesign:
    - ✓ Also called business process reengineering (BPR) or simply reengineering.
  - Incremental, continuous process improvement.
    - ✓ Includes total quality management (TQM), also called quality management and Six Sigma.



Changing Business Processes

37

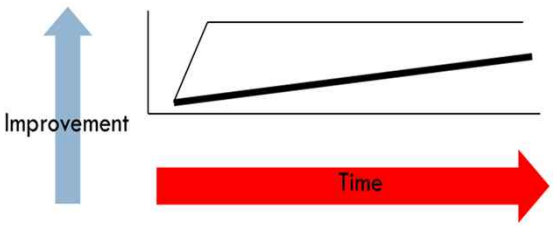
- Radical and incremental improvement concepts enable a manager to affect change in the way his or her organization does business.
- These approaches view the business as a set of business processes rather than using a silo perspective.



Incremental Change

38

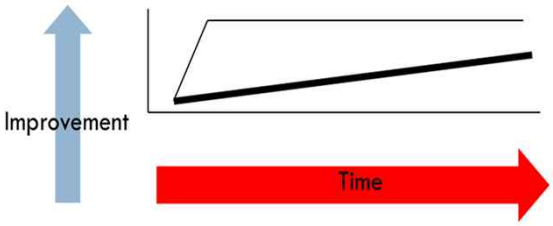
- Managers improve business processes through small, incremental changes.
  - Choosing a business process to improve.
  - Choosing a metric by which to measure the business process.
  - Enabling personnel to improve the process based on the metric.



Incremental Change

39

- Workers often react favorably to incremental change.
  - Gain control and ownership of improvements.
  - Render change less threatening.



Total Quality Management

40

- Based on W. Edwards Deming's key principles to transform business processes—Deming's 14 Points.
- A set of activities for increasing quality and improving productivity.
- Advocates small, incremental changes.

Deming's 14 Points (1)

41

1. Create constancy of purpose for improving products and services.
2. Adopt the new philosophy.
3. Cease dependence on inspection to achieve quality.
4. End the practice of awarding business on price alone; instead, minimize total cost by working with a single supplier.
5. Improve constantly and forever every process for planning, production and service.
6. Institute training on the job.
7. Adopt and institute leadership.
8. Drive out fear.
9. Break down barriers between staff areas.
10. Eliminate slogans, exhortations and targets for the workforce.
11. Eliminate numerical quotas for the workforce and numerical goals for management.
12. Remove barriers that rob people of pride of workmanship, and eliminate the annual rating or merit system.
13. Institute a vigorous program of education and self-improvement for everyone.
14. Put everybody in the company to work accomplishing the transformation.

Deming's 14 Points (2)

42

1. 목적의 일관성을 창조하라.
2. 새로운 철학을 수용하라.
3. 품질 검사에 대한 의존을 중단하라.
4. 단일 공급업체와의 거래를 지향하라.
5. 생산 및 서비스의 시스템을 지속적으로 개선하라.
6. 직무 훈련을 제도화하라.
7. 리더십을 가르치고 정착시켜라.
8. 두려움을 몰아내라.
9. 부서간의 장벽을 허물어라.
10. 표어를 제거하라.
11. 목표량과 할당량을 제거하라.
12. 장애물을 제거한다.
13. 교육과 자기개선
14. 활동 계획을 제도화하고, 회사 내 모든 사람들을 대상으로 변화를 이루기 위한 작업에 참여시킨다.

Six Sigma

43

- One popular approach to TQM.
- Developed at Motorola.
- Institutionalized at GE for "near-perfect products".
- Generally regarded as 3.4 defects per million opportunities for defect (6 SD from Mean).
- An incremental approach to quality management.
- A data-driven approach and methodology for eliminating defects from a process.
- Promotes a low rate of defects—close to zero defects.

Six Sigma

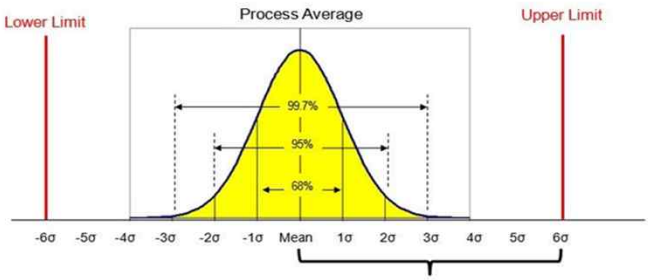
44

- Six Sigma methodology is a very specific set of steps to be followed called DMAIC and DMADV.
  - DMAIC (define, measure, analyze, improve, control) is an improvement system for existing processes falling below specification and looking for incremental improvement.
  - DMADV (define, measure, analyze, design, verify) is an improvement system used to develop new processes or products at Six Sigma quality levels.

Six Sigma

45

- Carried out by experts known as Green Belts.
- More experienced experts, known as Black Belts, have taken special Six Sigma training and have worked on numerous Six Sigma projects.



Radical Change

46

- Appropriate for addressing cross-functional processes.
- Helps attain aggressive improvement goals.
- The goal is to make a rapid, breakthrough impact on key metrics (Figure 5.5).

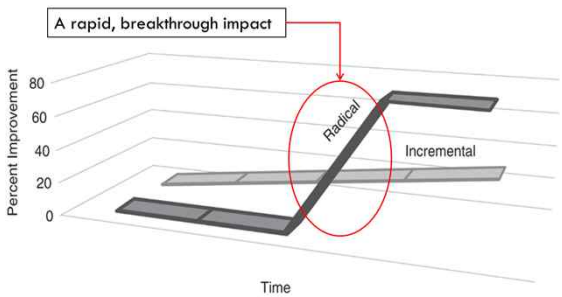


Figure 5.5 Comparison of Radical and Incremental Improvement

Radical Change

47

- Radical change typically faces greater internal resistance compared with incremental change.
- Requires careful planning.
- Used only when major change is needed in a short time.

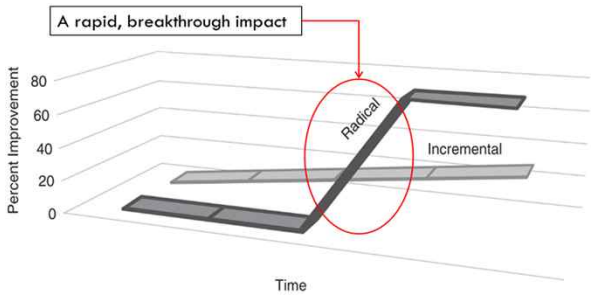


Figure 5.5 Comparison of Radical and Incremental Improvement

Key Aspects of Radical Change

48

- The need for major change in a short amount of time.
- Thinking from a cross-functional process perspective.
- Challenging old assumptions.
- Networked (cross-functional) organizing.
- Empowerment of individuals in the process.
- Measurement of success via metrics tied directly to business goals and the effectiveness of new processes (e.g., production cost, cycle time, scrap and rework rates, customer satisfaction, revenues, and quality).

Digital Business Transformation

49

- Digital technologies have enabled organizations to make radical change to many business processes, leading managers to create entirely new digital business models.
- Research suggests that these new business models have changed from value chains to digital ecosystems and enabled managers to have a razor sharp (지극히 예리한) understanding of customer needs.
- Research suggests that digital business models fall into one of four types based on knowledge needed/known of the customer and business design and control of key decisions (Figure 5.6).

Digital Business Transformation

50

		Business Design and Control of Key Decisions	
		Value Chain	Ecosystem
Knowledge of Customers	Complete	• Omnichannel Companies • Ex: Banks, Retail, Energy Companies	• Ecosystem Driver • Ex: Amazon, Fidelity, WeChat
	Partial	• Supplier • Ex: Insurance via Agent, TV via Retailer	• Modular Producer • Ex: Pay Pal, Kabbage

Figure 5.6 Weill and Woerner's Digital Business Model Framework.

Digital Business Transformation

51

- Omnichannel Companies
  - Have strong customer relationships and often create multiple, complex customer experiences to deepen the relationships using an integrated value chain.
- Ecosystem Drivers
  - Have strong customer relationships but, on the other hand, they have used digital technologies to collect and use customer data from all interactions with customers, and add complementary products even if they are offered by competitors.
  - In so doing, they become the key company to do business with in their space.

Digital Business Transformation

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- Suppliers
  - Sell through others by being the low-cost producer in the value chain of the company who has the primary connection with the customer.
- Modular Producers
  - Offer products and services primarily to others who manage the ultimate customers, but with their strong focus on digital innovations, they are more adaptable and able to serve multiple ecosystems, plugging in easily to different value chain models.

Workflow and Mapping Processes

53

- Workflow is a way to look at a cross-functional process.
  - A series of connected tasks and activities done by people and computers to form a business process.
  - Workflow includes software products that document and automate processes.
  - Workflow software facilitates the design of business processes and creates a digital workflow diagram.

Workflow and Mapping Processes

54

- When combined with business process management modules, processes can be managed, monitored, and modified.
- Workflow diagrams show a picture, or map, of the sequence and detail of each process step.

- SPRINT
  - 단기 업무 주기
  - 소프트웨어 개발, 기획, 디자인, 마케팅 등에서 정해진 짧은 기간(보통 1~4주) 동안 목표한 작업을 집중적으로 끝마치는 반복 실행 주기

Business Process Management (BPM)

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- Thinking about the business as a set of processes has become more common, but managing the business as a set of processes is another story.
- Some claim that to have truly dynamic or agile business processes requires a well-defined and optimized set of IT processes, tools, and skills called BPM suites.
- These systems include process modeling, simulation, code generation, process execution, monitoring, and integration capabilities for both company-based and web-based systems to document and redesign workflow and business processes.

Business Process Management (BPM)

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- The tools allow an organization to actively manage and improve its processes from beginning to end.
- BPM software automates, executes, and monitors business processes making it possible for managers and analysts to build and modify processes quickly and without having to know programming languages that historically were necessary to create the code needed to run a process.

BPM: Enterprise Rent-A-Car

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- Enterprise Rent-A-Car, one of the largest car rental companies in the world with 7,600 locations in 85 countries, used BPM to model, manage, and streamline its IT-based processes.
- It used BPM to build Request Online, the system through which employees requested laptops, software and applications, system access, reports, and other services available from the IS department.
- The prior system was mostly manual, not scalable as volume increased, and not automatable.

BPM: Enterprise Rent-A-Car

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- Not surprisingly, it was difficult to make improvements to that system.
- Using a BPM system, the IT staff developed a model that copied the way service requests were already handled so the experience would be familiar and added features slowly to enhance the experience.
- The result was a BPM-based system that provided better management capabilities and created a common platform for rapid change and capacity for future growth.
- That proved critical when Enterprise acquired National Car Rental and Alamo Rent A Car, creating much more demand for Request Online.

BPM: Enterprise Rent-A-Car

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- Enterprise was able to shift development to less costly IT staff who could make process modifications directly through the BPM.
- Finally, the usability of the system was increased as the BPM facilitated the creation of customized interfaces based on characteristics of the specific users.

appian

enterprise rent-a-car

Business Process Management (BPM)

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- Business process management (BPM) systems provide a way to build, execute, and monitor automated processes that are intelligent, dynamic, and may go across organizational boundaries.
- BPM systems offer process designers a number of design and management capabilities.
  - Figure 5.7

BPM Capability	Description
• Business Process Automation	• Automate the interaction of people, machines, etc.
• Human Task Management and Collaboration	• Initiate tasks and processes as needed. • Provide for collaboration.
• Monitoring and Business Alignment	• Plan, model, coordinate, govern, monitor in real time.
• Business Rules and Decision Management	• Manage rule, recommendation, and decision engines to ensure following company policy.
• Analytics	• Use process and business data for insights, predictions, and prescriptions to aid in decisions and trigger automatic responses.
• Interoperability	• Connect to external applications for additional features/services.
• Process Discovery and Optimization	• Quickly discover and optimize behaviors to improve business processes.
• Context and Behavioral History	• Manage data about the context and behavior in the past.

Figure 5.7 Sample Capabilities of BPM

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Integration versus Standardization

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		Business Process Standardization	
		Low	High
Business Process Integration	High	Single face to customers and suppliers but standards not enforced internally (Merrill Lynch)	High needs for reliability, predictability, and sharing; single view of process
	Low	Decentralized design; business units decide how to meet customer needs	Tasks are done the same way across units, but there is little need for business units to interact (CEMEX)

Figure 5.8 Process Integration versus Process Standardization

Integration versus Standardization

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- CEMEX, the multinational cement company based in Monterrey, Mexico, built a business based on high levels of process standardization, but low levels of process integration.
- CEMEX standardized on eight information systems-based business processes to cover logistics, manufacturing, accounting, planning, operations, procurement, finance, and HR.
- Each of the CEMEX operating units uses the same processes and creates similar data, but the units run autonomously, rarely sharing data.
- CEMEX finds a competitive advantage from their standardized processes because it enables them to assimilate acquired companies quickly.

Integration versus Standardization

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- A company with a high degree of integration and low standardization is Merrill Lynch's Global Private Client business, which provides a wide range of financial services to clients across multiple channels such as financial advisory services, online services, and help-center support services.
- The key to their success is integration across processes to provide a single view of the customer, which can then be leveraged when new products and services are announced.
- At the same time, the company does not expect standardization across processes; each operating unit can create what they need, as long as they use a standardized technology platform that also supports the integrated design.

Enterprise Systems (Enterprise IS)

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- Are a set of IS tools used to enable information flow within and between processes across an organization.
- Ensure integration and coordination across functions such as accounting, production, customer management, and supplier management.
- Include: Figure 5.9~5.10
  - Enterprise Resource Planning (ERP)
  - Supply Chain Management (SCM)
  - Customer Relationship Management (CRM)
  - Product Lifecycle Management (PLM) systems

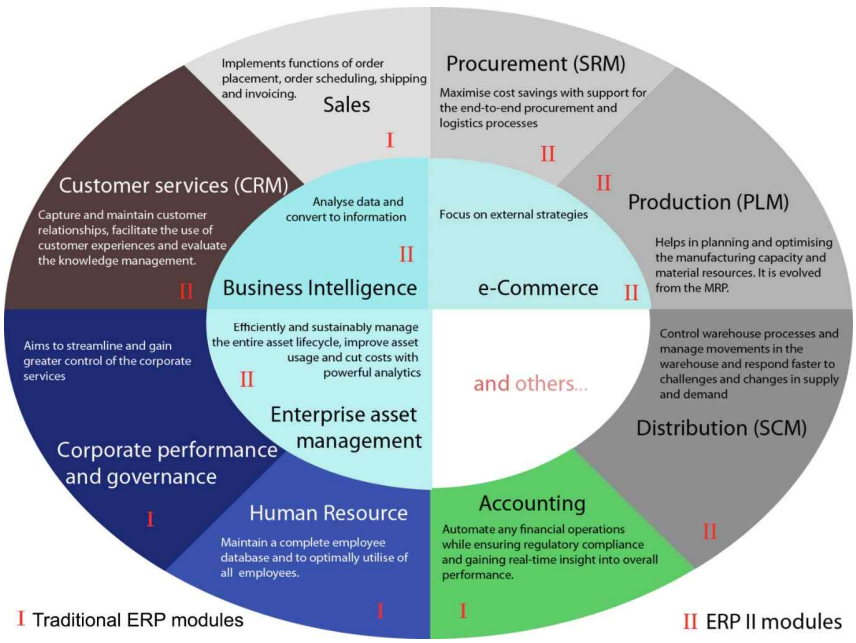

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Figure 5.9 Enterprise Systems and the Processes They Automate.

Enterprise Systems (Enterprise IS)

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Enterprise System	Sample Processes
Enterprise Resource Planning (ERP)	• Financial management (accounting, financial close, invoice to pay process, receivable management); human capital management (talent management, payrolls, succession planning); operations management (procurement, logistics, requisition invoice payment, parts inventory)
Customer Relationship Management (CRM)	• Marketing (brand management, campaign management); lead management; loyalty program management; sales planning and forecasting; territory and account management; customer service and support (claims, returns, warranties)
Supply Chain Management (SCM)	• Supply chain design; order fulfillment; warehouse management; demand planning, forecasting; sales and operations planning; service parts planning; source-to-pay/procurement process; supplier life cycle management; supply contract management
Product Life Cycle Management (PLM)	• Innovation management (strategy and planning, idea capture and management, program/project management); product development and management; product compliance management

Figure 5.10 Enterprise Systems and Examples of Processes They Support.

Enterprise Resource Planning (ERP)

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- Two of the largest vendors of enterprise systems are German-based SAP and California-based Oracle.
- Designed to help large companies manage the fragmentation of information stored in hundreds of individual desktop, department, and business unit computers across the organization.
- Change from mainframe systems to client-server environments.
- A Y2K (2000년 문제)-compliant (뿅하는) enterprise solution.
- Makes company information immediately available to all departments throughout the company.

ERP II

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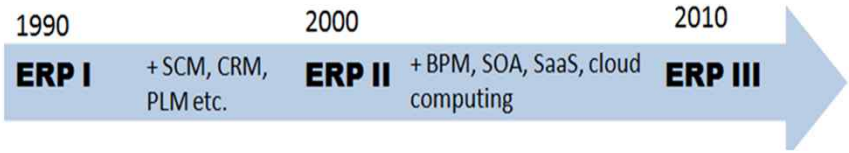
- Makes company information immediately available to external stakeholders (e.g., customers and partners).
- Enables e-business by integrating business processes with the enterprise and its trading partners.
- More recently, a move to better manage IS using the cloud has again called into question (이의를 제기하다) the design of some business processes.



ERP III

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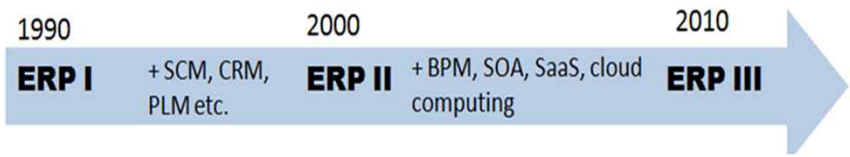
- Include all of the ERP II functionality plus social and collaboration features (see Figure 5.11).
- SAP's ERP solution includes SAP ERP Financials, SAP ERP Human Capital Management, and SAP ERP Operations.
- Oracle's ERP solution, EnterpriseOne, offers these same functions.



Enterprise Resource Planning (ERP)

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ERP Generation	Key Features
ERP I	• Enterprise optimization and integration of manufacturing, distribution and support processes
ERP II	• Value chain participants connecting all business processes in an organization, including external stakeholders
ERP III	• Value networks and virtual value chain processes connecting global stakeholders including customers, strategic alliance partners and collaborators in an open network to create a borderless enterprise

Figure 5.11.1 Comparison of ERP Generations

Enterprise Resource Planning (ERP)

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ERP III

- Extends the supply chain further down to current and potential customers
  - Adds marketing analytics such as checking information from people browsing for products
  - Can retrieve and analyze social media discussions
- Usually, data are spread among cloud repositories

ERP II

- Adds fast integration with suppliers, vendors, and customers
- Examples:
  - Customer Relationship Management (CRM)
  - SRM (Supplier Relationship Management, or Procurement)
  - PLM (Product Lifecycle Management)
  - SCM (Supply Chain Management)
- Includes Business Intelligence, Asset Management, and e-Commerce

ERP I

- Tracking sales, human resources, corporate performance, in local systems

Figure 5.11.2 Comparison of ERP Generations

Characteristics of ERP Systems

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- Integration – Seamlessly integrate information flows throughout the company.
- Packages – They are commercial packages purchased from software vendors (like SAP, Oracle, Peoplesoft, etc.).
- Best practices – Reflect industry best practices.
  - The most efficient and effective ways to complete a business process
  - 특정 목표를 달성하기 위해 경험과 연구를 통해 효과가 검증되어 가장 우수한 방법으로 인정받는 모범 사례나 관행

Characteristics of ERP Systems

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- Some assembly required – The systems need to be integrated with the existing hardware, OS's, databases, and telecommunications.
  - Requires middleware used to connect processes running in one or more computers across a network.
  - Requires "bolt-on" (손쉽게 접합할 수 있는) systems used to make all the components operational.
- Evolving – The systems continue to change to fit the needs of the diverse marketplace.

Managing Customer Relationships

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- Customer Relationship Management (CRM) is a set of software programs that support management activities performed to obtain, enhance relationships with, and retain customers.
  - Includes: sales, support, and service processes.
  - Consists of technological components as well as many pieces of information about customers, sales, marketing effectiveness, responsiveness, and market trends.
- Optimized CRM processes and systems can lead to better customer service, more efficient call centers, product cross-selling, simplified sales and marketing efforts, more efficient sales transactions, and increased customer revenues.

Managing Customer Relationships

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- Three common CRM systems are Oracle, SAP, and Salesforce.com.
- Oracle and SAP have CRM systems that integrate nicely with their other enterprise systems.
- Modules include pricing, sales force automation, sales order management, support activities, customer self-service, and service management.
- SAP's CRM also has marketing support modules such as resource and brand management, campaign management, real-time offer management, loyalty management, and e-marketing.

Managing Customer Relationships

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- Oracle and SAP evolved from enterprise systems, whereas Salesforce.com began as a Web-based cloud system.
- Social IT is increasingly integrated into CRM solutions.
  - Providing software or web applications that extend the brand, engage customers, allow customers to interact with each other and with employees, and provide service options generates additional "touches" with customers.
  - CRM systems record these touches.
- These additional channels of data are useful for building customer relationships.

Customer Experience Management

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조선일보, Weekly Biz, 2019-07-19(금)

Managing Supply Chains

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- Supply Chain Management (SCM) systems manage the integrated supply chain.
- Processes are linked across companies.
  - A companion process at a company's customer or supplier creates an integrated supply chain.
- Web-based technology links customers and suppliers through a single network.
- Costs and opportunities are optimized for all companies in the supply chain.

Managing Supply Chains

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- Globalization of business, ubiquity of communication networks, and IT have enabled businesses to use suppliers from almost anywhere in the world.
- Supply chain integration is the approach of technically linking supply chains of vendors and customers to streamline the process and to increase efficiency and accuracy.
- Challenges may be caused by different degrees of integration and coordination among supply chain members.

Managing Supply Chains

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- Information integration.
  - Partners must agree on:
    - ✓ The type of information to share.
    - ✓ The format of that information.
    - ✓ The technological standards they will both use to share the information.
    - ✓ The security they will use to ensure that only authorized partners access the information.
  - Trust must be established so the partners can solve higher-level issues that may arise.

Managing Supply Chains

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- Synchronized planning
  - A joint design of planning, forecasting, and replenishment.
- Workflow coordination
  - The coordination, integration, and automation of critical business processes between partners.
- Using a third party to link the procurement process to the preferred vendors or communities of vendors who compete virtually for the business.

Managing Supply Chains

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- The integration leads to new business models.
- Demand-driven supply networks are the next step for companies with highly-evolved supply chain capabilities.
- Integrated supply chains are global in nature.

Product Life Cycle Management (PLM)

84

- PLM systems automate the PLM steps starting with the idea for a product and ending with the "end-of-life" of a product.
  - Includes the innovation activities, new product development and management, design, and product compliance.
- PLM contains all the information about a product.
  - Design, production, maintenance, components, vendors, customer feedback, and marketing.

Advantages of Enterprise Systems

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- All modules easily communicate together with efficiency.
- Useful tools for effectively centralizing operations and decision making.
- Reinforce the use of standard procedures across different locations.
- Redundant data entry and duplicate data may be eliminated.
- Standards for numbering, naming, and coding enforced.
- Data and records can be cleaned up through standardization.

Disadvantages of Enterprise Systems

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- Implementation requires an enormous amount of work.
- Requires redesigning business processes to achieve optimal performance of the integrated modules.
- Organizations are expected to conform to the approach used in the enterprise system (e.g., change organization structure, tasks).
- A hefty price tag: additional costs for project management, user training, and IT support.
- Sold as a suite rather than individual modules.
- Enterprise systems have high risk of failure.

Advantages and Disadvantages of Enterprise Systems

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Advantages	Disadvantages
• Represent "best practices" • Allow modules throughout the organization to communicate with each other • Enable centralized decision-making • Eliminate redundant data entry • Enable standardized procedures in different locations	• Require enormous amount of work • Require redesign of business practices for maximum benefit • Require organizational change • Have high risk of failure • Have very high cost • Are sold as a suite, not individual modules

Figure 5.12 Advantages and Disadvantages of Enterprise Systems

When the Systems Drives the Transformation

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- It is appropriate for an organization to let the enterprise system drive business process redesign when:
  - It is just starting out and processes do not yet exist.
  - Operational business processes are not a source of competitive advantage.
  - Current systems are in crisis and there is not enough time, resources, or knowledge in the firm to fix them.

When the Systems Drives the Transformation

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- It is inappropriate to let the enterprise system drive business process change when:
  - Changing processes that are relied upon for strategic advantage.
  - The features of available packages do not fit the needs of the business.
  - There is a lack of top management support.

Challenge for Integrating Enterprise Systems Between Companies

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- Deciding what to share, how to share it, and what to do with it when the sharing takes place.
- Agreeing on security and encryption or other measures to protect data integrity and ensure that only authorized parties have access.
- The complexity of the integration can be reduced by insisting on standards—either at the industry level or at the system level.
- The increasing use of cloud-based systems with standard interfaces makes the integration easier.