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IT Governance Simultaneously Empowers and Controls

DO YOUR information technology (IT) capabilities enhance your competitiveness?[1] Do managers throughout your organization recognize their responsibilities for the effective management and use of IT—or do they assume that the IT department will manage IT? Do your IT investments target enterprisewide strategic priorities—or does your firm squander resources on diverse tactical initiatives? Simply put, are you getting acceptable value from your IT investments?

Firms manage many assets—people, money, plant, and customer relationships—but information and the technologies that collect, store, and disseminate information may be the assets that perplex them the most. Business needs constantly change, while systems, once in place, remain relatively rigid. IT implementations involve both up-front and ongoing investments for outcomes that no one can precisely predict. These uncertainties and complexities lead many managers to abdicate their responsibilities for ensuring that their people use IT effectively.

For many years, some organizations could succeed despite weak IT management practices. But information—and consequently IT—is an increasingly important element of organizational products and services and the foundation of enterprisewide processes. The tight linkage between IT and organizational processes means that

the IT unit cannot bear sole—or even primary—responsibility for the effective use of information and information technology. Getting more value from IT is an increasingly important organizational competency. Leaders throughout an enterprise must develop this competency.

Our research shows that top-performing enterprises generate returns on their IT investments up to 40 percent greater than their competitors.[2] These top-performing enterprises proactively seek value from IT in a variety of ways:

- They clarify business strategies and the role of IT in achieving them.
- They measure and manage the amount spent on and the value received from IT.
- They assign accountability for the organizational changes required to benefit from new IT capabilities.
- They learn from each implementation, becoming more adept at sharing and reusing IT assets.

Top-performing enterprises succeed where others fail by implementing effective IT governance to support their strategies. For example, firms with above-average IT governance following a specific strategy (for example, customer intimacy) had more than 20 percent higher profits than firms with poor governance following the same strategy.[3] We define IT governance as *specifying the decision rights and accountability framework to encourage desirable behavior in using IT*. IT governance is not about making specific IT decisions—management does that—but rather determines who systematically makes and contributes to those decisions. IT governance reflects broader corporate governance principles while focusing on the management and use of IT to achieve corporate performance goals. Effective IT governance encourages and leverages the ingenuity of the enterprise's people in IT usage and ensures compliance with the enterprise's overall vision and values. This book is intended to alert both business and IT unit executives to the critical role they play in defining IT governance processes—a role that ultimately determines how much value the enterprise receives from IT.

All enterprises have IT governance. Those with effective governance have *actively* designed a set of IT governance mechanisms (committees, budgeting processes, approvals, and so on) that encourage behavior consistent with the organization's mission, strategy, values, norms, and culture. In these enterprises, IT can factor significantly into competitive strategy. For example, David Spina, CEO of State Street Corporation, a world leader in global investor services, defined the firm's corporate vision in 2001 as "One State Street." This vision shifted the focus of the enterprise from the individual accomplishments of business units such as investment research and management, trading and brokerage services, and fund accounting and custodial services, to the firmwide demands of the customer. Desirable behaviors changed to include optimization of enterprisewide as well as business unit objectives. State Street established and refined a set of governance mechanisms, including enterprisewide IT budgeting and an Office of IT Architecture, to encourage the new behaviors.[4]

In contrast, enterprises that govern IT by default more often find that IT can sabotage business strategy. One financial services firm was pursuing a cost reduction strategy. Rather than create a comprehensive set of mechanisms that would encourage cost saving, this firm relied on a new chargeback system to curtail demand for IT services. When the chargeback system led to bickering among IT and business managers, the CIO assigned relationship managers to restore internal customer satisfaction. They improved satisfaction scores but did not lower IT or business process costs. Without a cohesive IT governance design, enterprises must rely on their CIOs to ameliorate problems through tactical solutions rather than position IT as a strategic asset.

To understand IT value creation, we studied IT governance in over 250 multibusiness unit for-profit and not-for-profit enterprises in twenty-three countries in the Americas, Europe, and Asia Pacific (see appendix A). Our research revealed that top-performing enterprises governed IT differently than did other enterprises. Mindful of competing internal forces, the top performers designed governance structures linked to the performance measure on which they excelled (for example, growth or return on assets), thereby harmonizing business objectives, governance approach, governance mechanisms, and performance goals and metrics. The net effect: Good governance design allows enterprises to deliver superior results on their IT investments. We conclude that *effective IT*

governance is the single most important predictor of the value an organization generates from IT.

What Is Governance?

Before we dive into IT governance, we must look at the broader issue of corporate governance in enterprises. Corporate governance became a dominant business topic in the wake of the spate of corporate scandals of midyear 2002—Enron, Worldcom, and Tyco, to name a few. Interest in corporate governance is not new, but the severity of the financial impacts of these scandals undermined the confidence of both the institutional and the individual investor and heightened concerns about the ability and resolve of private enterprises to protect their stakeholders. The crisis in confidence in the corporate sector contributed to the downward pressure on stock prices worldwide and particularly in the United States. In the first six months of 2002 the S&P 500 fell 16 percent; the technology-heavy NASDAQ fell 36 percent. The U.S. government intervened, and new legislation required CEOs to personally attest to the accuracy of their firms' accounts and report results more quickly.[5] Simultaneously, corporate America increased the level of self-regulation.

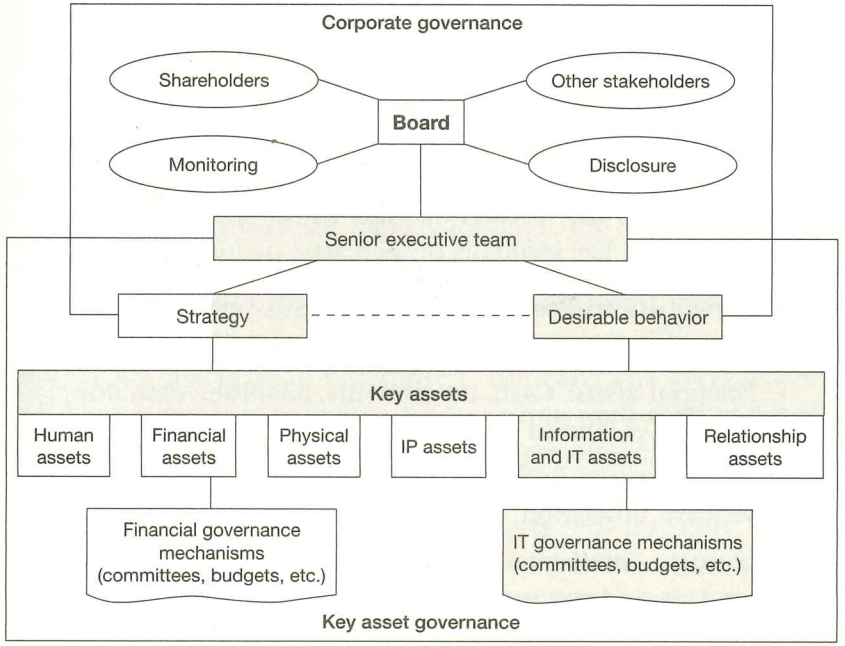
Good corporate governance is important to professional investors. Major institutions rank corporate governance on par with the firm's financial indicators when evaluating investment decisions. A McKinsey study found that professional investors are even prepared to pay large premiums for investments in firms with high governance standards.[6] Premiums ranged from an average of 13 percent in North America and Western Europe to 20 or 25 percent in Asia and Latin America and even higher in Eastern Europe and Africa.[7] On average, when moving from poorest to best on corporate governance, firms could expect an increase of 10 to 12 percent in market value.

A number of bodies have published guidelines for good corporate governance.[8] One we found very useful was the Organization for Economic Cooperation and Development's 1999 publication "OECD Principles for Corporate Governance," which defined corporate governance as providing the structure for determining organizational objectives and monitoring performance to ensure that objectives are attained.[9] The OECD emphasized that "there is no single model of good corporate governance," but it noted that in many countries corporate governance is vested in a supervisory board that is responsible for protecting the rights of shareholders and other stakeholders (employees, customers, creditors, and so on). The board, in turn, works with a senior management team to implement governance principles that ensure the effectiveness of organizational processes.

We propose a framework for linking corporate and IT governance. The top of the framework (figure 1-1) depicts the board's relationships. The senior executive team, as the board's agent, articulates strategies and desirable behaviors to fulfill board mandates.

FIGURE 1-1

Corporate and Key Asset Governance



☐ IT governance.

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We see strategy as a set of choices.[10] Who are the targeted customers? What are the products and service offerings? What is the unique and valuable position targeted by the firm? What core processes embody the firm's unique market position?

Desirable behaviors embody the beliefs and culture of the organization as defined and enacted through not only strategy but also corporate value statements, mission statements, business principles, rituals, and structures.[11] Desirable behaviors are different in every enterprise. Behaviors, not strategies, create value. For example, Johnson & Johnson relied on autonomous business units to create shareholder value for nearly a hundred years. Eventually, however, customers insisted that they wanted to deal with J&J—not a set of individual J&J operating companies. Accordingly, J&J's well-known corporate credo has evolved to specify desirable behaviors such as lowering the cost of its products to customers, creating mechanisms for better understanding the unique needs of individual customers, and transferring employees across J&J companies to enhance individual careers and help them identify with the corporation.[12] Clear desirable behaviors are key to effective governance and are major topics in chapters 3 and 6.

The lower half of figure 1-1 identifies the six key assets through which enterprises accomplish their strategies and generate business value. Senior executive teams create mechanisms to govern the management and use of each of these assets both independently and together. The key elements of each asset include the following:

- *Human assets:* People, skills, career paths, training, reporting, mentoring, competencies, and so on
- *Financial assets:* Cash, investments, liabilities, cash flow, receivables, and so on
- *Physical assets:* Buildings, plant, equipment, maintenance, security, utilization, and so on
- *IP assets:* Intellectual property (IP), including product, services, and process know-how formally patented, copyrighted, or embedded in the enterprises' people and systems
- *Information and IT assets:* Digitized data, information, and knowledge about customers, processes performance, finances, information systems, and so on
- *Relationship assets:* Relationships within the enterprise as well as relationships, brand, and reputation with customers, suppliers, business units, regulators, competitors, channel partners, and so on

Governance of the key assets occurs via a large number of organizational mechanisms (for example, structures, processes, committee, procedures, and audits). Some mechanisms are unique to a particular asset (for example, the IT architecture committee) and others cross and integrate multiple asset types (the capital approval process, for example) ensuring synergies between key assets. Maturity across the governance of the six key assets varies significantly in most enterprises today with financial and physical assets typically the best governed and information assets among the worst.

At the bottom of figure 1-1 are the mechanisms used to govern each of the six key assets. We contend that enterprises with common mechanisms across multiple assets perform better. For example, if the same executive committee governs both financial and IT assets, a firm can achieve better integration and create more value. Some mechanisms will always be unique to each asset—the audit committee for financial assets and the IT architecture committee for IT, for example—but some common mechanisms lead to better coordination of the six assets.

As a sobering exercise, quickly jot down the list of mechanisms used in your enterprise to govern each of the six assets. Could you complete the lists? How many of the mechanisms were common across more than one asset—more than two assets? Coordinating the six key assets of an enterprise is not easy. The average assessment of a group of forty-two CIOs on how well their enterprises integrated IT governance with the governance of the other key assets was less than three on a five-point scale.[13] Creating common governance mechanisms across the assets will not only increase integration but the resulting smaller number of mechanisms will be simpler to communicate and implement. Education of the senior management team about how governance mechanisms combine to work for the enterprise is an essential and ongoing task for effective governance. We contend that many tangible benefits await better IT governance.

What Is IT Governance?

In governing IT, we can learn from good financial and corporate governance. For example, the CFO doesn't sign every check or authorize every payment. Instead, he or she sets up financial governance specifying who can make the decisions and how. The CFO then oversees the enterprise's portfolio of investments and manages the required cash flow and risk exposure. The CFO tracks a series of financial metrics to manage the enterprise's financial assets, intervening only if there are problems or unforeseen opportunities. Similar principles apply to who can commit the enterprise to a contract or a partnership. Exactly the same approach should be applied to IT governance.

IT governance: Specifying the decision rights and accountability framework to encourage desirable behavior in the use of IT

This definition of IT governance aims to capture the simplicity of IT governance—decision rights and accountability—and its complexity—desirable behaviors that are different in every enterprise.[14] Governance determines who makes the decisions. Management is the process of making and implementing the decisions. For example, governance determines who holds the decision rights for how much the enterprise invests in IT. Management determines the actual amount of money invested in a given year and the areas in which the money is invested. The senior management team designs IT decision rights and accountabilities to encourage the enterprise's desirable behaviors. If desirable behavior involves independent and entrepreneurial business units, IT investment decisions will be primarily with the business unit heads. In contrast, if desirable behavior involves an enterprisewide view of the customer with a single point of customer contact, a more centralized IT investment governance model works better. More centralized models for HR (and the other key assets) would also assist in achieving a single point of customer contact. Problems occur when there is a mismatch between desirable behavior and governance. In one financial services firm, a key desirable behavior was rapid innovation by business units to meet the enterprisewide objective of an increased percentage of sales from products introduced in the last five years. In contrast to the stated desirable behavior, most of the IT governance mechanisms conspired to discourage innovation. A particular business unit wanted to lead its financial services industry segment with a new IT-enabled service providing alerts to important clients via their handheld devices like pagers and cell phones. To implement this service, the business unit had to pay the entire cost of the wireless infrastructure (the technical foundation for the product) plus the application development cost for the business process that would use the wireless infrastructure for alerts. This up-front payment was required even though other business units and product offerings would probably utilize the same wireless infrastructure. Thus the innovator was asked to bear all the risk and other business units could then utilize the infrastructure if successful. This practice is like asking the first car using the road to pay all the construction costs.

This firm's solution was to introduce a dividend system consistent with the firm's culture. If the enterprise's senior management saw a potential multibusiness unit application for the infrastructure, the CEO would fund some of the cost (typically 20 percent) from corporate funds. Then the innovating business unit would make the remaining infrastructure investment. If other business units later utilized the infrastructure, the innovating business unit received a dividend of one-third its cost from each business unit using the infrastructure. This approach encouraged early adopters and created infrastructure to foster future innovation across the enterprise. The new funding mechanism, implemented via the executive management, capital investment, and IT architecture committees, carefully balanced risk and reward, encouraging rather than discouraging desirable behavior.

This example highlights two complementary sides of governance articulated by the OECD:[15]

- *Behavioral side of corporate governance:* "Corporate governance encompasses the relationships and ensuing patterns of behavior between different agents in a limited liability corporation; the way managers and shareholders but also

employees, creditors, key customers, and communities interact with each other to form the strategy of the company."

- *Normative side of corporate governance:* "Corporate governance also refers to the set of rules that frame these relationships and private behaviors, thus shaping corporate strategy formation. These can be the company law, securities regulation, listing requirements. But they may also be private, self-regulation."

The behavioral side of IT governance defines the formal and informal relationships and assigns decision rights to specific individuals or groups of individuals. The normative side defines mechanisms formalizing the relationships and providing rules and operating procedures to ensure that objectives are met. We found that enterprises often implement a dozen or more mechanisms to make IT decisions.

Effective IT governance must address three questions:

1. What decisions must be made to ensure effective management and use of IT?
2. Who should make these decisions?
3. How will these decisions be made and monitored?

The goal of this book is to provide frameworks and insights from top-performing enterprises to help management teams address these questions.

Important IT Governance Concepts

Figure 1-2 provides a grid that addresses the first two IT governance questions: What decisions must be made and who should make them? We will refer to this grid as the Governance Arrangements Matrix. The column heading of the Governance Arrangements Matrix lists five interrelated IT decisions:

- *IT principles*—Clarifying the business role of IT
- *IT architecture*—Defining integration and standardization requirements
- *IT infrastructure*—Determining shared and enabling services
- *Business application needs*—Specifying the business need for purchased or internally developed IT applications
- *IT investment and prioritization*—Choosing which initiatives to fund and how much to spend

These five key decisions are all related and require linking for effective governance—typically flowing from left to right on the matrix. For example, IT principles drive the architecture that leads to infrastructure. The infrastructure capability enables applications to be built based on business needs specified often by the business process owners. Finally IT investments (shorthand for IT investment and prioritization process) must be driven by the IT principles, architecture, infrastructure, and application needs. However, each of these decisions has at its core a unique set of issues, which we will describe in chapter 2. One or more people are responsible for making each of these decisions. Typically, many more people provide input to these decisions. IT governance involves defining

FIGURE 1-2

Governance Arrangements Matrix—Which Governance Archetypes Are Used for Different Types of Decisions?

DECISION / ARCHETYPE	IT Principles	IT Architecture	IT Infrastructure Strategies	Business Application Needs	IT Investment
Business Monarchy					
IT Monarchy					
Feudal					
Federal					
Duopoly					
Anarchy					
Don't Know					

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each decision.

The row headings in figure 1-2 list a set of archetypes for specifying decision rights. We deliberately chose provocative political archetypes because, although exaggerated, most managers identify with these stereotypes.[16] Each archetype identifies the type of people involved in making an IT decision:

- *Business monarchy*—Top managers
- *IT monarchy*—IT specialists
- *Feudal*—Each business unit making independent decisions
- *Federal*—Combination of the corporate center and the business units with or without IT people involved
- *IT duopoly*—IT group and one other group (for example, top management or business unit leaders)
- *Anarchy*—Isolated individual or small group decision making

Together these archetypes describe all the decision arrangements we found. Most enterprises use a variety of decision archetypes across the five decisions. The question mark in figure 1-2 represents the challenge for every enterprise to determine where it wants to locate both input and decision-making responsibility for each type of governance decision. Throughout this book, we will describe how top-performing companies have allocated their governance responsibilities. In chapter 5 we will report findings from our research on the relationships between various governance arrangements and governance and financial performance.

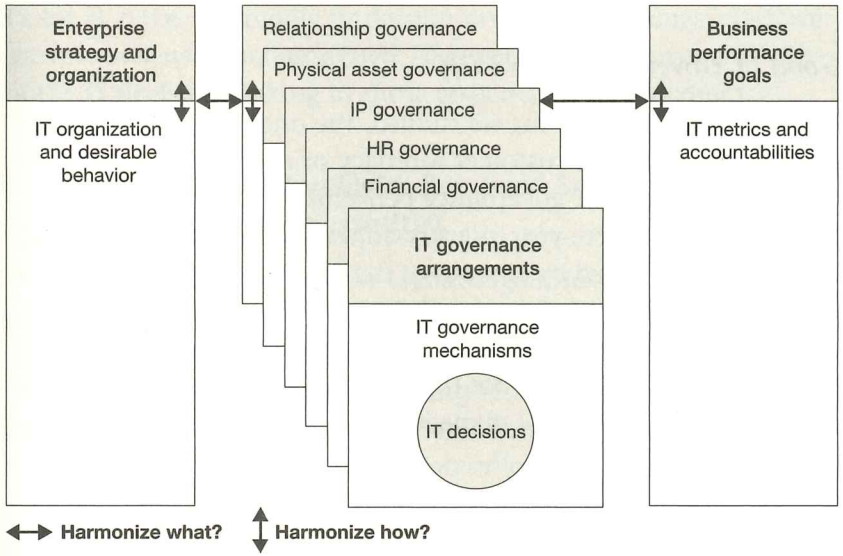
While the Governance Arrangements Matrix maps out the types of decisions and the archetypes for making the decisions, the third question—how these decisions will be made and monitored—requires design and implementation of governance mechanisms, such as committees, roles, and formal processes. In chapter 4 we look at common mechanisms (business/IT relationship managers, IT councils, service-level agreements, chargeback arrangements, organizational structures, and so on) and discuss their effectiveness.

Given that enterprises are making five types of IT decisions at multiple organizational levels using a variety of mechanisms, it is easy to see how individual actions might work in opposition to each other rather than in harmony. The complexity and difficulty of explaining IT governance is one of the most serious barriers to improvement. We found empirically that the best predictor of IT governance performance is the percentage of managers in leadership positions who can accurately describe IT governance.[17] Contributing to governance woes is the fact the majority of senior executives aren't familiar with their governance. On average, CIOs in our study estimated that only 38 percent of managers in leadership positions in their enterprises could accurately describe their IT governance—so how could they follow it? In above average governance-performing enterprises, 45 percent or more of managers could accurately describe their IT governance. In only a few very top performers were 80 percent of senior executives familiar with their IT governance. What is the percentage in your enterprise? Why?

To help understand, design, communicate, and sustain effective governance, we propose an IT Governance Design Framework in figure 1-3. We present it here in skeletal form so that readers can

FIGURE 1-3

IT Governance Design Framework



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nization (the horizontal arrows) of enterprise strategy and organization, IT governance arrangements, and business performance goals. The enterprise strategy, governance arrangements, and performance goals are enacted through IT organization and desirable behaviors, governance mechanisms, and metrics, respectively. The framework also illustrates the need to harmonize IT governance with the governance of other key assets. We will return to this framework in chapter 6 to study how enterprises can assign and assess IT governance.

Why Is IT Governance Important?

Effective IT governance requires a significant amount of management time and attention. Is it worth it? Growing enterprise dependence on information and IT suggests that it is. Good IT governance harmonizes decisions about the management and use of IT with desired behaviors and business objectives. Without carefully designed and implemented governance structures, enterprises leave this harmony to chance. There are many reasons why IT decision making should not be left to chance and thus needs good governance. Eight of the reasons follow.

Good IT Governance Pays Off

Among the for-profit firms we studied, the ones pursuing a specific strategy (for example, customer intimacy or operational excellence) with above-average IT governance performance had superior profits as measured by a three-year industry-adjusted return on assets (ROA). The differences varied by strategy of the firm, but the above-average governance-performing firms had ROAs more than 20 percent higher than the firms with poorer governance pursuing the same strategy. Governance was, of course not the only factor, but good governance often comes with effective management practices in all areas.[18]

IT Is Expensive

The average enterprise's IT investment is now greater than 4.2 percent of annual revenues and still rising.[19] This investment results in IT exceeding 50 percent of the annual total capital investment of many enterprises. As IT has become more important and pervasive, senior management teams are increasingly challenged to manage and control IT to ensure that value is created. To address this issue, many enterprises are creating or refining IT governance structures to better focus IT spending on strategic priorities.

IT Is Pervasive

In many enterprises, centrally managed IT is no longer possible or desirable. There was a time when requests for IT spending came only from the IT group. Now IT spending originates all over the enterprise. Some estimates suggest that only 20 percent of IT spending is visible in the IT budget.[20] The rest of the spending occurs in business process budgets, product development budgets, and every other type of budget. In several firms we examined, we even found substantial IT spending hidden in the furniture budgets! Gone too are the days when the IT group was the only place where technically savvy people worked. There isn't a foreign exchange desk manager today who wouldn't get personally involved in making decisions about the technology platform for foreign exchange operations. After all, when 100 percent of your cash flow is on line there is a lot at stake. Personally understanding the technology platform just makes sense. Well-designed IT governance arrangements distribute IT decision making to those responsible for outcomes.

New Information Technologies Bombard Enterprises with New Business Opportunities

The rapid introduction of new technologies, including Web-based services, mobile technologies, and enterprise systems, creates strategic threats and opportunities.[21] Witness the rise of mass customization and one-to-one marketing resulting from technologies capable of capturing customer information in a cost-effective and real-time fashion. The fact that information is so readily available, however, means that information assets decay nearly as rapidly as they accumulate. For example, aggregators like Yodalee—which aggregate an individual's financial information from multiple sites—posed a threat to financial services firms such as Citibank

and Vanguard by attempting to intermediate their customer relationships. Financial services firms responded within six months by absorbing aggregator functionality into their own offerings. Many firms now hold information about their customers' entire financial holdings on their sites.

To respond so rapidly to the threat of aggregators, Citibank, Vanguard. and other firms needed a flexible IT infrastructure. Infrastructure must balance the dual needs of cost effectiveness in meeting current business requirements and the flexibility to support future business needs. Foresight in establishing the right infrastructure at the right time enables rapid implementation of new electronically based business initiatives as well as consolidation and cost reduction of current business processes. Inability to respond to technology-induced market changes can threaten a firm's survival, as retailers such as Barnes & Noble and Toys "R" Us learned in the late 1990s. Foresight is more likely if an enterprise has formalized governance processes for harmonizing desirable behaviors and IT principles.

IT Governance Is Critical to Organizational Learning About IT Value

As a visiting CEO once remarked to our M.B.A. class, "IT investment is like advertising. I know half of it is well spent. I just don't know which half."

Enterprises have struggled to understand the value of their IT-related initiatives because value cannot always be readily demonstrated through a traditional discounted cash flow analysis. Value results not only from incremental process improvements but also from the ability to respond to competitive pressures. As the aggregator example demonstrates, it can be difficult to determine in advance how much a new capability or additional information is worth. Customers of Citibank and Vanguard value the convenience of having all their financial information in one place. Would they be willing to pay separately for this service? Not clear. But aggregation has become a prerequisite to doing business as a full-service financial services company. Citibank and Vanguard can more likely attach a value to the information after it has become available and they learn more about their customers and how they can ethically use this information. Effective governance creates mechanisms through which enterprises can debate potential value and formalize their learning.

Governance also facilitates learning by formalizing exception processes. Enterprises often learn through exceptions—where a different approach from standard practice is used for good reasons. Effective governance makes learning via exceptions explicit and shares any new practices across the enterprise if appropriate. Enterprises in our study reported that 50 percent of new systems involved exceptions to their enterprises' normal policies for architecture or investment. Just over half of the exceptions occurred through the formal exception process, allowing enterprises to learn and update their policies. However, the rest of the exceptions occurred when renegades made decisions independently to meet local needs, effectively preventing systematic enterprise learning. These renegade decisions result from poorly designed, poorly communicated governance arrangements that are not aligned with management incentives.

IT Value Depends on More Than Good Technology

In recent years there have been spectacular failures of large IT investments—major enterprise resource planning (ERP) systems initiatives that were never completed, e-business initiatives that were ill-conceived or poorly executed, and data-mining experiments that generated plenty of data but few valuable leads. Some estimates place IT failure rates at over 70 percent of all IT projects.[22] Although some failures result from technical glitches, most represent the inability of organizations to adopt new processes that apply new technologies effectively.

As IT implementations enable increasing standardization and integration of business processes, the roles of technologists and business leaders become increasingly intertwined. IT decision making necessarily becomes joint decision making. When senior managers abdicate to IT executives responsibility for IT success, disaster often ensues.[23] Successful firms not only make better IT decisions, they also have better IT decision-making processes. Specifically, successful firms involve the right people in the process. Having the right people involved in IT decision making yields both more strategic applications and greater buy-in. These more involved people then produce better implementations.

Senior Management Has Limited Bandwidth

Senior management does not have the bandwidth to consider all the requests for IT investments that occur in a large enterprise let alone to get involved in the many other IT-related decisions. If senior managers attempt to make too many decisions, they become a bottleneck. But decisions throughout the enterprise should be consistent with the direction in which senior management is taking the organization. Carefully designed IT governance provides a clear, transparent IT decision-making process that leads to consistent behavior linked back to the senior management vision while empowering everyone's creativity.

Leading Enterprises Govern IT Differently

Top-performing firms, in our study, did not follow the most common governance patterns. Instead, leading performers on a particular financial metric had specific governance patterns that encouraged their unique combination of desirable behaviors. For example, firms leading on revenue growth had more decentralized governance arrangements designed to promote customer responsiveness and fast innovation. In contrast, firms leading on profit had much more centralized governance arrangements designed to promote sharing and reuse and asset utilization. Top performing firms balancing multiple performance goals had governance models that blended centralized and decentralized decision making. All top performers' governance had one aspect in common. Their governance made transparent the tensions around IT decisions such as standardization versus innovation. We will explore the governance design implications of these patterns in more detail in chapter 5.

How Effective IT Governance Impacts IT Value: A Case Study of UPS

United Parcel Service (UPS) illustrates how an enterprise can transform IT from a strategic liability to a strategic advantage through effective IT governance.[24] When Oz Nelson became CEO of UPS in 1986, he was concerned about the firm's competitiveness given its existing technology competence. His CIO described the concern as follows: "The strength of Federal Express's tracking system and the things they were doing with technology were eroding what little share of the market UPS had in air services. The UPS board was immensely concerned that Federal Express would not only take the air business away but also start doing daily ground business. The board also saw the profitability of the air business and said, "We just can't continue as we are. We [must] put a lot of money into technology."[25]

Under Nelson's leadership, senior management invested $11 billion over ten years to build a state-of-the-art data center, hire technical experts, create a global network, develop sharable databases, implement enterprisewide applications, and construct a redundant operations environment to protect against disaster. But UPS invested more than money: it invested management time and attention to target spending at key business objectives and to generate benefits from the investments. While creating its new systems environment, UPS designed and implemented IT governance processes that ensured effective IT-related decisions.

UPS's IT governance had its roots in a senior management IT Steering Committee, which established the role of IT at UPS and approved key investment decisions. The IT Steering Committee mandated the firm's highly centralized and standardized IT environment to ensure reliability, cost effectiveness, consistent customer service, and easy access for customers to their package data. These principles have consistently guided other key IT decisions at UPS. For example, UPS's IT Governance Committee (a team of top IT leaders) enforces Steering Committee mandates related to the design, implementation, and management of the IT architecture. The CIO—a member of the IT Steering Committee—heads the Governance Committee. The Governance Committee is responsible for enforcing architectural standards, but members of the committee also work to ensure that UPS's commitment to standards does not unintentionally restrict the firm's flexibility. This flexibility has become increasingly important as the firm has diversified into businesses like supply chain financing and service parts logistics, which have different technology needs from the package delivery business.

But the Governance Committee represents only one step in the debates about technology standards. The top IT architect—who

reports to the CIO and is also a member of the Governance Committee—heads a Standards Committee of key technologists who determine when specific standards have become obsolete or cannot meet the requirements of a specific application. This committee handles most of the daily negotiations on standards, but it refers decisions to the Governance Committee when members believe that a standards decision has implications beyond the application in question. Similarly, in cases where the Governance Committee believes that a standards decision will have long-term strategic implications for the firm, the CIO can refer the decision to the IT Steering Committee. The objective is to gain the benefits of standardization without stifling business opportunities.

While IT-only committees shepherd architecture and standards decisions, business leaders take responsibility for identifying IT priorities. UPS's executive team has defined the firm's four cross-functional core processes: customer relationship management, customer information management, package management, and product management. A senior executive heads each core process and has full-time staff responsible for designing subprocesses and identifying IT requirements. Anyone in the firm can submit a project charter to a process team. The project charter spells out the expected costs and benefits of a potential project. The process teams review the charters and refer their highest priority projects to the Steering Committee.

These multiple IT governance mechanisms continuously align IT-related behaviors with corporate strategy at UPS. In the mid-1990s existing governance mechanisms helped key managers recognize the importance of the Internet to UPS's business. Consequently, UPS benefited quickly from its e-business initiatives. The firm continues to aggressively pursue e-business opportunities, cutting operating costs and enhancing customer services. IT governance first helped the firm survive a competitive threat. Now, UPS's governance mechanisms position IT as a strategic weapon.

How IT Governance Simultaneously Empowers and Controls

As the UPS case illustrates, making IT a competitive asset requires senior management leadership. UPS's IT governance structures create strategic control at the top of the firm while empowering decision making at multiple organizational levels. Senior management makes IT governance transparent so that everyone understands and follows the process for proposing, implementing, and using IT. Consequently, UPS can consistently generate desirable behaviors regarding the management and use of IT in the firm, and it shows in the firm's bottom-line performance.

In Figure 1-4, we show UPS's governance arrangements in a simple version of the Governance Arrangements Matrix. UPS has thoughtfully designed IT governance to be transparent to all executives through its four coordinated governance mechanisms: (a) the IT Steering Committee, which vests strategic decisions in four top executives, (b) the IT Governance Committee, which places architecture decisions in the hands of top IT executives, (c) the formal "charter" process, which winnows down the entire enterprise's IT project proposals to those best aligned with strategic objectives, and (d) the referral process for handling exceptions to standards at the appropriate organizational level. Knowing what decisions are made by others and what decisions are under their own responsibility enables managers to make decisions that result in desirable behavior as defined at UPS.

FIGURE 1-4

IT Governance at UPS

		DECISION									
		IT Principles		IT Architecture		IT Infrastructure Strategies		Business Application Needs		IT Investment	
		Input	Decision	Input	Decision	Input	Decision	Input	Decision	Input	Decision
GOVERNANCE ARCHETYPE	Business Monarchy		X								X
	IT Monarchy				X		X				
	Feudal										
	Federal								X	X	
	Duopoly	X		X		X		X			

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Governance: Call to Action

Information has always been important in business enterprises, but with recent technological developments, the role and value of information has changed significantly in recent years. Information

- is increasingly easy to collect and digitize
- has increasing importance in products and services
- is very hard to value or price
- has a decreasing half-life
- has increasing risk exposure (e.g., security and privacy)
- is a significant expense in most enterprises

These factors together make information and IT the least understood and most poorly utilized key asset in many enterprises.

This book provides an overview and framework for IT governance, a critical management issue for enterprises concerned with the value they receive from IT. The concept of IT governance has existed for almost as long as computers have been in businesses, but widespread interest and concern is fairly new—resulting from recent business trends such as e-business, globalization, Y2K, business process reengineering, business continuance, and transparency in corporate reporting. In the worst case, probably true in almost all enterprises somewhere, these trends resulted in knee-jerk and unsound IT decision making with no accountability. Little field-based research on IT governance and few publications help managers understand the issues involved in designing effective governance structures and processes.

Recall the study that found enterprises with superior corporate governance to be more highly valued in the market. We found a similar pattern of higher financial performance for enterprises with better IT governance. Thus, we believe a performance premium awaits senior managers who can implement IT governance appropriate to their particular combination of strategy, desirable behavior, and corporate governance. The senior managers that accept that responsibility first will gain the premium—the followers will just play catch-up. This book should help senior managers achieve that premium. We unleashed the "killer app" in the 1990s. Now we must govern the apps that are killing us.

Goals and Overview of the Book

This book proposes an approach to systematically planning IT input and decision rights in key IT decisions. The model relies on two tools: the Governance Arrangements Matrix (figure 1-2) and the Governance Design Framework (figure 1-3). These two tools apply our political governance archetypes (monarchy, feudal, federal, duopoly, and anarchy) for each decision and identify a coherent set of formal governance mechanisms for implementation (for example, committees, approval processes, relationships, and organizational structures). We illustrate the approach with examples from a number of leading enterprises (State Street Corporation, Delta Air Lines, DBS Bank in Singapore, DuPont, UNICEF, and the Metropolitan Police Service–Scotland Yard in the United Kingdom) and explore how their governance patterns evolved to become a strategic tool.

This book is designed for all executives in all types of enterprises struggling to generate additional value from IT. Executive readers will finish the book with specific ideas for management changes that will make a difference in the performance of their enterprise. IT managers will finish the book with a framework, best practices, and clear examples of how to work with their business colleagues to improve their IT governance.

Chapters 2, 3, and 4 review the three questions governance must address: (a) what decisions to make, (b) who should make the decisions, and (c) how to make and monitor the decisions. Chapter 2 explores the five key IT decisions. After delineating the management issues associated with each decision, this chapter raises the question of who should be making each decision in your enterprise. A case on Delta Air Lines demonstrates the interrelationships of the five IT decisions.

Chapter 3 discusses who should make IT decisions. This chapter explores common governance patterns using the Governance Arrangements Matrix. The discussion describes how common IT governance patterns limit the value generated from IT. The chapter reveals how governance differs across the five decision domains. Case studies of DuPont, DBS Bank, and Motorola describe the approaches of three leading firms to aligning governance with business objectives.

Chapter 4 discusses how decisions are made and monitored by focusing on the formal mechanisms enterprises deploy to implement governance. The chapter reviews the benefits and risks of the most popular mechanisms. Examples of governance mechanisms used by Carlson Companies and other leading enterprises describe how well-implemented mechanisms can encourage desirable behavior.

Chapters 5 and 6 discuss the relationship between IT governance and business strategy and how IT governance influences enterprise outcomes. Chapter 5 shows how top-performing enterprises govern differently from the typical enterprise and from each other. We contrast the governance arrangements of exceptional enterprises in the areas of: governance performance, profitability, revenue growth, and enterprisewide asset utilization, using the Governance Arrangements Matrix.

Chapter 6 discusses how enterprises can use the Governance Design Framework to design and assess governance. This chapter identifies the range of strategic objectives enterprises pursue, such as specific value disciplines, and describes how enterprises harmonize individual IT decisions and how governance changes to reflect strategic business changes. The chapter also discusses how governance addresses dueling requirements for business unit autonomy and synergy. The State Street Corporation case study provides an example of how new strategic objectives lead to a new governance approach.

Chapter 7 focuses on the unique environments of not-for-profit and government enterprises. Although research findings reported in this book generally apply to both for-profit and not-for-profit enterprises, the not-for-profit sector has unique objectives that necessarily affect governance. We explore those issues through case studies of the Metropolitan Police Service–Scotland Yard and UNICEF.

Chapter 8 wraps up the key points of the book with a list of symptoms of poor governance that would warrant urgent action. We follow with a list of ten management principles for effective IT governance. We also discuss how incentives and reward systems affect IT governance design and performance.

2

Five Key IT Decisions: Making IT a Strategic Asset

> The significant problems we face cannot be solved by the same level of thinking that created them.
>
> —*Albert Einstein*

THE DIFFERENCE between management and governance is like the difference between a soccer team running harder and practicing longer and the team stepping back to analyze its composition and game strategy. An analysis may reveal that the team needs to add coaches or allocate different decision-making responsibilities among the team leaders. Similarly, extracting greater value from IT is rarely a matter of just working harder or longer. Achieving more value may require involving different people in IT decisions, designing new ways of making IT-related decisions, or developing new techniques for implementing IT decisions. Managers make hundreds of decisions per week—some after careful analysis and others as part of the daily frenetic activity. Governance design and analysis requires stepping back from day-to-day decision making, taking Einstein's advice and focusing on identifying the fundamental decisions to be made and who is best positioned to make them.

As noted in chapter 1, effective governance addresses three questions:

- What decisions must be made?
- Who should make these decisions?
- How will we make and monitor these decisions?

This chapter focuses on the first question: What decisions? After reviewing the five decisions that must be made, we discuss the governance issues that enterprises face—not to describe how to make each decision but to identify the dimensions of these decisions and the key issues to consider when designing IT governance.[1] As you read this chapter, ask yourself, Who is making each of these decisions in my enterprise, and how qualified are they to do so? Also ask, How are we measuring and monitoring decision-making performance and business value?

What Decisions Must Be Made?

Every enterprise must address five interrelated IT decisions: IT principles, IT architecture, IT infrastructure, business application needs, and IT investment and prioritization. Figure 2-1 arranges these decisions to emphasize their critical interconnections. Principles decisions sit atop the framework because decisions on IT principles—by clarifying enterprise objectives for IT—establish the direction for all other decisions. If principles are not clear, it is unlikely that the other decisions will coalesce meaningfully. IT architecture decisions translate IT principles into requirements for integration and standardization and then delineate a technical road map for providing needed capabilities. IT investment and prioritization decisions marshal resources to convert principles into systems.

Decisions on infrastructure and applications can flow "top down" from the principles, the architecture, and the investment criteria. In that case, the infrastructure creates needed IT capabilities, and applications leverage the capabilities. Just as often, business needs and opportunities identify the need for IT applications, which "bubble up" to create new infrastructure requirements. Ultimately, investment decisions select and fund infrastructure and application initiatives, which implement an architecture designed to embody IT principles—and ultimately business principles.

FIGURE 2-1

Key IT Governance Decisions

<table>
<tr><td colspan="3">IT principles decisions
High-level statements about how IT is used in the business</td></tr>
<tr><td rowspan="2">IT architecture decisions
Organizing logic for data, applications, and infrastructure captured in a set of policies, relationships, and technical choices to achieve desired business and technical standardization and integration</td><td>IT infrastructure decisions
Centrally coordinated, shared IT services that provide the foundation for the enterprise's IT capability</td><td rowspan="2">IT investment and prioritization decisions
Decisions about how much and where to invest in IT, including project approvals and justification techniques</td></tr>
<tr><td>Business applications needs
Specifying the business need for purchased or internally developed IT applications</td></tr>
</table>

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Decision 1: IT Principles

Enterprises with clarity and focus generally produce better results in any endeavor. Gaining above-industry-average business value from IT is no exception. Study after study demonstrates that enterprises achieving superior business value from IT have a small number of clearly articulated IT principles.[2] IT principles are a related set of high-level statements about how IT is used in the business. Once articulated, IT principles become part of the enterprise's management lexicon and can be discussed, debated, supported, overturned, and evolved. MeadWestvaco, a large manufacturing firm that produces paper, packaging, consumer and office products, and specialty chemicals, provides an example of how a firm derived its IT principles by articulating its expectations for IT to support business strategy.[3]

To compete effectively in its target markets, MeadWestvaco implemented an enterprise resource planning (ERP) system to create efficiencies and a seamless supply chain. Following the ERP implementation, MeadWestvaco management wanted to preserve the efficiencies of the firm's more standardized business processes

but at the same time support valuable diversity among business units. Toward these objectives, management listed a number of business principles:

1. Leverage economies of scale
2. Standardize processes and technologies wherever appropriate
3. Common tools and business diversity (one ERP system)
4. Cost control and operational efficiency
5. Alignment and responsiveness to negotiated business requirements

These business principles led to the following set of IT principles (which MeadWestvaco refers to as its IT governance goals):

1. Benchmarked lowest total cost of ownership
2. Architectural integrity
3. Consistent, flexible infrastructure
4. Rapid deployment of new applications
5. Measured, improving, and communicated value and responsiveness

The hallmark of an effective set of IT principles is a clear trail of evidence from the business to the IT management principles. For MeadWestvaco, architectural integrity (IT principle 2) provides for both standardized processes and technologies (business principle 2) and cost control and operational efficiency (business principle 4); rapid deployment of new applications (IT principle 4) promotes alignment and responsiveness to negotiated business requirements (business principle 5); a consistent, flexible infrastructure (IT principle 3) should enable all five business principles. Combined, MeadWestvaco's business and IT principles provide clear direction for using IT to enable business strategy.

IT principles can also be used as a tool for educating executives about technology strategy and investment decisions. MetLife created a set of seven IT principles to "establish a shared understanding of strategic IT direction and to guide tactical decisions."[4] MetLife's IT principles communicate MetLife's IT values and goals. The principles establish an enterprise position that "can be translated into specific policies, standards and guidelines":

1. Enable the business.
2. Ensure information integrity.
3. Create a common customer view.
4. Promote consistent architecture.
5. Utilize industry standards.
6. Reuse before buy; buy before build.
7. Manage IT as an investment.

The chief technology officer at MetLife led a team to develop these principles to help the growing number of non-IT managers who needed to make IT-based decisions. The principles reflect the importance of knowledge-sharing across the enterprise, and they have led to increased awareness of how business value is achieved from IT. Each principle is further articulated. For example, for principle 7 about investment, "MetLife will manage IT and associated processes as an investment portfolio, adopting new solutions when cost effective and retiring existing technology that is no longer cost effective or risk acceptable." In the booklet used to articulate these principles and educate managers, each principle is supported by a rationale and a set of implications. For example, the implications for principle 7 include "organizational responsibilities for reviewing, managing, and maintaining the portfolio must be clearly defined" and "a dynamic change management process . . . includes the following stages: emerging, adopted/standard, rejected, exception, retired/sunset, and grandfathered."

IT principles should define desirable behavior for both IT professionals and IT users. For example, at MetLife, systems developers and their business partners learn from principle 6 that MetLife intends to reuse existing IT capabilities rather than buy new system components. Developers understand that proposing to purchase a system with capability similar to an existing system will demand a strong justification. Business users learn to accept that their technology choices are limited.

In addition to IT principles clarifying desirable behaviors, MetLife and MeadWestvaco have specific principles guiding management

choices. These principles are specific to individual firm strategies. We suggest that detailed IT principles should clarify at least three expectations for IT in an enterprise:

1. What is the enterprise's desired operating model?
2. How will IT support the desired operating model?
3. How will IT be funded?

The first two questions specify how an enterprise develops and delivers products and services and clarify the parameters for future infrastructure and applications decisions. Answers to these questions evolve to reflect organizational learning and new business strategies. The third question determines the broad criteria for IT investment. Specifically, IT investments can be funded centrally or within business units, or some combination of the two approaches can be applied. The funding model specifies whether enterprisewide priorities or business unit priorities take precedence in investment decisions.

In our experience, few enterprises provide this kind of clarity through their IT principles. Given that principles provide the direction for all IT decisions, equivocating on principles limits the efficacy of the other four decisions.

Decision 2: IT Architecture

By clarifying how IT supports business principles, IT principles state—implicitly or explicitly—the requirements for process standardization and integration in an enterprise. The IT architecture is *the organizing logic for data, applications, and infrastructure, captured in a set of policies, relationships, and technical choices to achieve desired business and technical standardization and integration.* By providing a road map for infrastructure and applications (and consequently investment decisions), architecture decisions are pivotal to effective IT management and use.

Enterprises need an organizing logic for data, applications, and infrastructure because integration and standardization shape IT capabilities. Process integration allows multiple business units to provide a single face to a customer or to move seamlessly from one function (for example, sales) to another (for example, service). The key to process integration from a technology perspective is data standardization—providing a single definition and a single set of characteristics to be captured with a data element. As standardized data are made available, business owners can effectively integrate their processes. Thus, the architectural requirement is data standardization—no easy task. Data standardization must be planned. This capability never happens by accident.

Process standardization is very different from process integration. The key to process standardization is discipline—adherence to a single, consistent way of doing things. Process standardization provides predictability and efficiency, like the process of cooking hamburgers at McDonald's. For knowledge work, process standardization requires that all individuals performing the process use the same system. Like data standardization, process standardization never happens by accident—it must be planned and explicitly implemented by explaining and demonstrating the value over and over again.

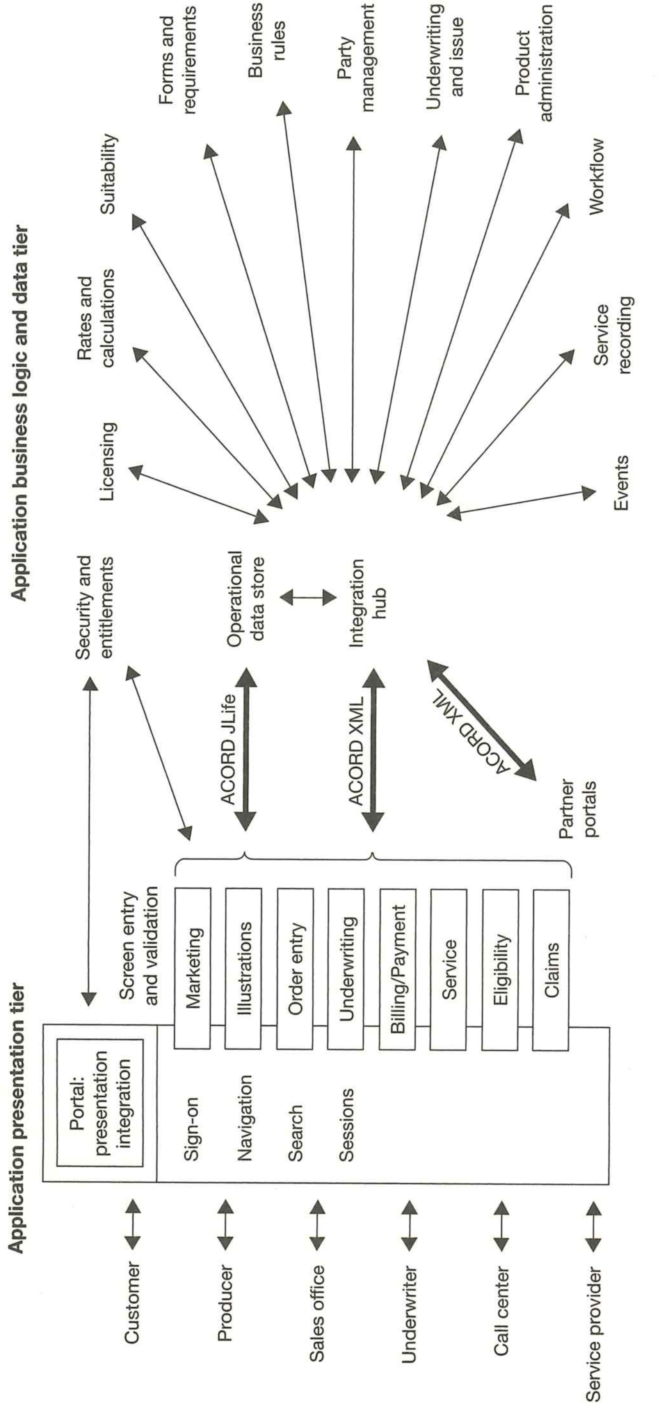
Process and data standardization are the defining characteristics of enterprise architecture. Some enterprises need a great deal of both process and data standardization. More diversified businesses may have much less need for standardization across organizational entities. These more diversified enterprises may nonetheless benefit from technical standardization. Technical standardization facilitates common objectives such as cost-effective processing, negotiated vendor agreements, and enterprisewide security. Choices about technical, data, and process standardization strongly influence IT architecture design.

MetLife's IT principles specify the need for a common customer view—a data standardization requirement. In addition, MetLife wants to ensure information integrity; use industry standards; and reuse before buy, buy before build. These principles determined MetLife's requirements for integration and standardization, forming the basis for MetLife's enterprise architecture. A simplified version of the enterprise architecture is shown in figure 2-2.

Because a common customer view is the key standardization requirement listed in MetLife's IT principles, data is at the center of its enterprise architecture. As an outgrowth of several large mergers,

FIGURE 2-2

MetLife's Enterprise Architecture



Source: Adapted from MetLife documents. Used with permission.

most of MetLife's data is locked into IT applications. The integration hub pictured in the enterprise architecture provides centralized access to data embedded in legacy applications. Together the centralized data and the integration engine provide the common customer view prescribed by the IT principles. Stakeholders will gain access to the data—typically the outputs of applications—using a standardized portal architecture, shown on the left side of the diagram.

MetLife's IT architects use this drawing to communicate with senior managers and business partners the underlying logic for IT development at MetLife. The enterprise architecture guides new application development by explaining how IT will deliver on the firm's IT principles. For example, MetLife's enterprise architecture embodies principles of reuse in its portal architecture—every application will apply the same standards for output to stakeholders. In addition to providing a common customer view, the centralized data stores and integration engine enhance information integrity by reducing redundancy. Thus, the enterprise architecture translates IT principles into a clear vision of how IT will enable business objectives.

Enterprise architectures capture the organizing logic in technical choices and policies. MetLife's enterprise architecture specifies only one high-level technical choice (an industry standard)—ACORD standards for data formats.[5] Most technical choices need not be conveyed to senior managers. They will be elaborated at lower levels of the architecture. MetLife's enterprise architecture elaborates an important policy—sign-on, navigation, and related concerns will be embedded in the portal rather than in applications. This policy has important implications for how new applications will be linked to existing applications.

A critical policy articulated by a high-level architecture is where the shared infrastructure stops and applications begin. The MetLife architecture shows that all applications share the channels, portal, data stores, and integration engine. The presentation and business logic applications are thus distinguished from infrastructure. Communicating where infrastructure stops and applications begin simplifies future infrastructure and applications decisions and promotes shared understanding of IT capabilities in the enterprise.

An enterprise architecture defines data and infrastructure as a stable platform supporting faster-changing applications. Business needs change constantly, so enterprises must build flexibility into their architectures. But applications need a base on which to build. Shared infrastructure and data provide the base. At MetLife the shared customer data and single-portal interface will support future applications without limiting the firm's ability to offer related services or seek new markets. Many manufacturing firms, in contrast, implement ERPs, which establish a set of standardized manufacturing and supply chain processes as the base for future applications. As long as an enterprise does not change its fundamental mission, the infrastructure defined by its enterprise architecture should support its business applications. The distinction between infrastructure and applications thus allows enterprises to leverage economies of scale while retaining flexibility to respond to change.

Currently, most enterprise architectures specify infrastructure, data, and applications. Increasingly, architectures will specify components. Components take an enterprise's applications and infrastructure and turn them into specified, reliable, and modular services. For example, an insurance company might have an underwriting component servicing multiple applications, while a manufacturing firm might develop a pricing service for multiple applications. Component architectures provide another layer of standardization, helping enterprises achieve business objectives for efficiency, economies of scale, and reuse. Early components tend to be enterprisewide infrastructure services, like MetLife's single sign-on. Over time, enterprises will identify the shared, recurring application needs of their processes and create components available to all business units.

The ability to design and build a component-based architecture will grow out of an enterprise's experience with specifying and then implementing technical, data, and process standards. Some enterprises are moving rapidly toward component-based architectures; others have barely begun the journey.

Decision 3: IT Infrastructure

IT infrastructure is the foundation of planned IT capability (both technical and human) available throughout the business as shared and reliable services and used by multiple applications.[6] Foresight in establishing the right infrastructure at the right time enables rapid implementation of future electronically enabled business initiatives as well as consolidation and cost reduction of current business processes. Overinvesting in infrastructure—or worse, implementing the wrong infrastructure—results in wasted resources, delays, and system incompatibilities with business partners. However, underinvesting in infrastructure results in rushed implementations to meet business deadlines, islands of automation meeting local needs without integration across the enterprise, and limited sharing of resources, information, and expertise. Thus, the focus and timing of infrastructure initiatives can have a significant impact on the enterprise's performance.

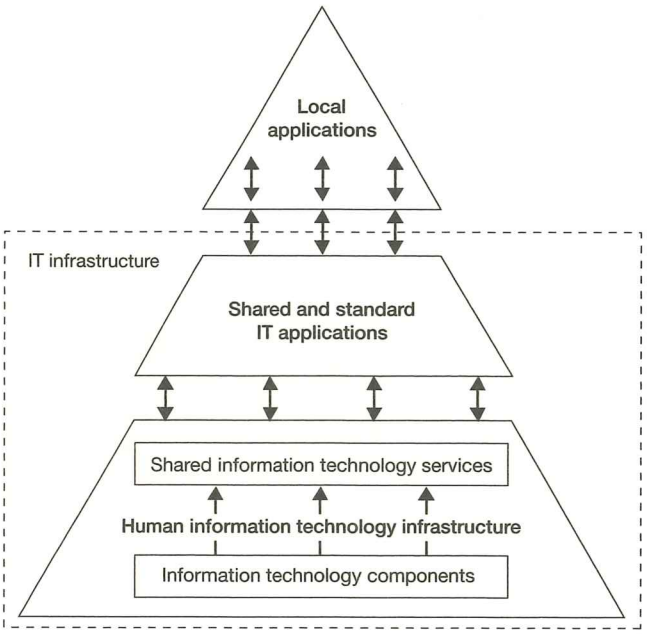
In the typical enterprise, infrastructure accounts for about 55 percent of the total IT investment. Figure 2-3 shows the various elements of IT infrastructure. At the base of figure 2-3 are the technology components, such as computers, printers, database software packages, operating systems, and scanners. These devices are commodities and readily available in the marketplace. The technology components are converted into useful shared services by a human IT infrastructure composed of knowledge, skills, standards, and experience.

An enterprise's infrastructure services often include telecommunication network services, provision and management of large-scale computing (such as servers or mainframes), management of shared customer databases, research and development expertise aimed at identifying the usefulness of emerging technologies to the business, and an enterprisewide intranet. These services can be provided internally or by outsourcers such as IBM Global Services, Accenture, and Hewlett-Packard. An enterprise's internal infrastructure often links to external industry infrastructures such as bank payments systems and to public infrastructures such as the Internet and telecommunications networks.

The services notion of IT infrastructure is very powerful, as managers can more readily value a service than a technical component such as a server or software package. In addition, the service of providing a fully maintained laptop computer with access to all of the enterprise's systems and the Internet can be specified, measured, and controlled in a service-level agreement. Perhaps most

FIGURE 2-3

IT Infrastructure as a Centrally Coordinated Set of Shared and Reliable Services



Fast-changing local business applications such as insurance claim processing, Web bank loan applications, customer complaints support system, phone order support systems

Shared and standard applications that change less regularly, such as accounting, budgeting, human resource management

Services that are stable over time, such as management of shared customer databases, PC/LAN access

Human infrastructure of knowledge, skills, policies, standards, and experience binds components

Commodities such as computers, printers, routers, database software, operating systems, credit card swipers

Source: Peter Weill and Marianne Broadbent, *Leveraging the New Infrastructure: How Market Leaders Capitalize on IT* (Boston: Harvard Business School Press, 1998).

importantly, managers can price services in the marketplace for comparison.

An increasing number of enterprises have an additional layer of standard applications used by all business units. We refer to these shared and standard applications as infrastructure applications. They include enterprise systems such as ERPs, customer relationship management systems (CRMs), and supply chain management systems (SCMs) as well as functional systems supporting shared services such as accounting, human resource management, and budgeting. Infrastructure applications are more stable, changing less with evolving business strategies than do the local applications. The local applications, which sit atop the infrastructure, represent the remainder of an enterprise's IT portfolio. These applications change frequently—often every time there is a new product or service feature or when implementing strategic experiments in response to sensing a market opportunity.

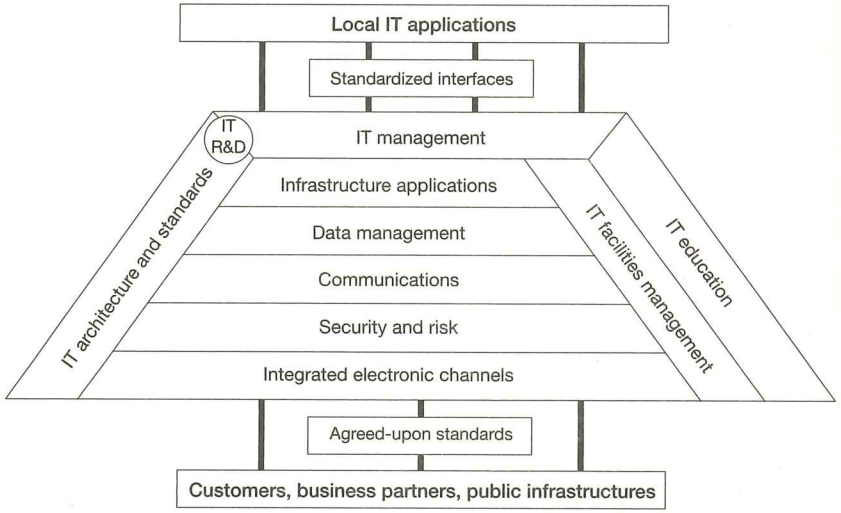
An integrated IT infrastructure combines all the enterprise's shared IT capability into a platform for electronically conducted business. An integrated infrastructure has ten capability clusters (figure 2-4) with sets of services in each cluster.[7]

An integrated infrastructure provides capability to the enterprise's local IT applications, depicted by the four short rods near the top of the infrastructure in figure 2-4. The infrastructure connects externally to business partners via agreed-upon standards, as illustrated at the bottom of figure 2-4. Business partners obtain electronic access via *integrated electronic channels*. Usually the channels include all or some of a physical outlet (for example, a store or branch with a point-of-sale device), the Web, e-mail, physical mail (scanned), interactive voice response, wireless devices such as cell phones, kiosks, and a direct point-to-point connection (a private network, for example). In most cases, enterprises try to make their applications "channel independent," meaning that consistent and up-to-date data are available regardless of how a customer makes contact.

All communications pass through a *security and risk* capability, which provides security through technologies (for example, firewalls and encryption) and policies (remote access, use of passwords, and so on), as well as disaster planning and recovery. The

FIGURE 2-4

IT Infrastructure Services in Ten Clusters



Source: Peter Weill, Mani Subramani, and Marianne Broadbent, "Building IT Infrastructure for Strategic Agility," *MIT Sloan Management Review* 44, no. 1 (Fall 2002): 57–65.

electronic interactions within the enterprise and with customers and partners occur via the set of *communications* services including broadband, intranet, and workstation networks. *Data management* encompasses database management, middleware management, and data exchange translations. Many IT units are isolating in master files enterprisewide data on customers, products, and employees so that critical data elements are accessible to individuals and applications as needed.

Closely aligned with data management are the enterprisewide *infrastructure applications* that capture, update, and access enterprise data. Operations and management of these applications constitutes another set of infrastructure services. *IT facilities management* spans the physical infrastructure layers described so far, providing services such as large-scale processing, server farms, and a common systems development environment.

The six preceding infrastructure capability clusters support the physical elements of infrastructure. The remaining four clusters are the management-oriented infrastructure capabilities. The *IT management* services coordinate the integrated enterprise infrastructure and manage relationships with the business units. Typically the management services include IS planning, project management, service-level agreements, and negotiations with vendors and outsourcers. The *IT architecture and standards* infrastructure services provide the migration plan for the detailed technical standards underlying the enterprise architecture. Architecture services include monitoring the effectiveness of the enterprise's standards and identifying when those standards are outdated or too costly to support. *IT education and training* includes training in the use of the enterprise's specific technologies and systems as well as general management education about how to envision, invest in, and use IT to create business value. *IT research and development* includes the enterprise's efforts in looking for new ways to use IT to create business value and to assess new technologies. R&D sits at the intersection of IT management and IT architecture services because R&D links development of standards to the needs of the business. Infrastructure capability is difficult to create because it is a complex fusion of technology and human assets. These capabilities require long lead times to develop and can therefore be a source of competitive advantage. Enterprises with greater infrastructure capability have faster times to market, higher growth rates, and more sales from new products but lower short-term profitability. In that sense, building a strong infrastructure is like purchasing an option.[8] If leveraged effectively through the implementation of new business applications, infrastructure can generate improved financial performance; otherwise, it will prove an unnecessary cost.

A superior IT infrastructure contains an integrated set of services in each of the ten capability clusters consistent with the enterprise's strategic direction. Enterprises that manage infrastructure as an asset and invest carefully each and every year typically perform better than enterprises that take a "big bang" approach to IT infrastructure. UPS, for example, has an infrastructure renewal strategy to balance infrastructure investment over time:

On the infrastructure I know that we must bite this off and do some each year. You can put things off, but eventually you're going to get caught. So I try to make sure funds are available to refresh continually, which is not a real popular thing.

—Ken Lacy, CIO, UPS

Individual IT infrastructure services can be located at an enterprisewide or business unit level. Many enterprises are shifting business unit infrastructure capability to enterprise level to achieve business objectives such as a single point of customer contact or economies of scale. Determining where to locate infrastructure services, how to price services, when to update services, and whether to outsource services are key infrastructure decisions. Getting infrastructure right means providing cost-effective services that position the enterprise for rapid adoption of new business applications.

Decision 4: Business Applications Needs

Although all five IT decisions are concerned with the business value of IT, it is decisions about specific business needs that directly generate value. Even as Schwab, Amazon.com, Cisco, and others demonstrate the potential benefits of strategic IT applications, spectacular failures of large systems implementations at companies like Hershey, Whirlpool, and Allied Waste serve as reminders that defining and delivering value through business applications remains a significant organizational challenge.[9]

Identification of business needs for IT applications often has two conflicting objectives—creativity and discipline. Creativity is about identifying new and more effective ways to deliver customer value using IT. Creativity involves identifying business applications that support strategic business objectives and facilitate business experiments. Discipline is about architectural integrity—ensuring that applications leverage and build out the enterprise architecture rather than undermine architectural principles. Discipline is also about focus—committing the necessary resources to achieve project and business goals. We will discuss the management decisions that lead to creative, disciplined business applications.

Fostering Creative Solutions

Finite resources—including IT skills, management attention, and business unit personnel—demand that new IT applications not only meet a minimum ROI test; they must contribute strategic value to the enterprise. At most enterprises, strategic applications focus on core processes. In large enterprises, core processes often span multiple functions and business units. For example, Partners Healthcare, a Boston-based umbrella organization of major hospitals and local clinics, is developing a Longitudinal Medical Record (LMR) system. Introduced in 1998, the LMR supports Partners' dual missions of medical research and practice. LMR requires physicians to enter electronically, in a standard format, all diagnosis and treatment information so the system can highlight key facts for physicians examining the patient in the future. The device also stores data on treatments and outcomes to facilitate research and inform future practice. The LMR is a strategic system for Partners.

Similarly, manufacturing firms continue to invest in ERPs to enable operating efficiencies and seamless supply chains. Financial services firms are implementing customer relationship management systems to enable a single view of the customer. Retail firms are integrating back-end processes to support their online stores and point-of-sale systems. These systems are all intended to fundamentally improve enterprises' business processes. Value results from their ability to change how the enterprise does business. Decisions about business application needs involve identifying core processes and determining what process and system changes can deliver significant benefits to the enterprise. Successful strategic system implementations demand business leaders with the vision to define and implement the change.

In addition to reinforcing the enterprise's core processes, decisions about business application needs are important for responding to market changes. Enterprises need a constant flow of experiments to seize new market opportunities and avoid obsolescence. Some experiments will develop into strategic systems; others will fold quickly. The flow of experiments generates creative energy and continually alerts managers to changing market conditions so that they can identify the next big thing.

The development of UPS's DIAD, the device that collects electronic signatures, is an example of how experiments can evolve into strategic systems. The initial objective of the DIAD was simply to provide a printed delivery record to replace the driver's handwritten delivery record. Version 1 of the DIAD delivered the intended functionality, but its value was limited because, although it delivered the printed record, it slowed the delivery process. However, the experiment revealed the potential of the DIAD to save drivers time and collect real-time data for other customer services. The DIAD ultimately saved each of more than fifty thousand UPS drivers about a half hour at the end of the day by accumulating information on each driver's deliveries. Subsequent versions of the DIAD tied into the continuously improving UPS tracking systems, eventually making the device a strategic platform for new customer services.

Identifying business experiments that have the potential to become strategically important may be more an art than a science. Enterprises such as Fidelity have created incubators and usability labs to test new technologies and to pilot new concepts. Since some experiments will necessarily fail, enterprises need approaches to identifying, funding, and assessing experiments so that they can sustain a constant flow of creative ideas but back out of unsuccessful projects before they have invested large amounts of money.

Disciplined Execution

Creative solutions can generate interesting technical challenges, particularly when enterprises purchase vendor packages intended to meet their needs. Traditionally, enterprises—and their IT units—were reluctant to establish technical standards that might limit business functionality. Increasingly, however, managers have found that 80 percent solutions can offer significant business value while reducing technical risks and project costs. Successful enterprises consistently demonstrate a willingness to sacrifice functionality to sustain architectural integrity. The CIO at MeadWestvaco described the model: "The role of my chief technology officer is to, in effect, oversee the architecture and to ensure that the architecture over time evolves to achieve our desired results. The default condition is you must choose applications that fit within the context of our architecture. If it's a compelling application, go find one that works with this. We'll have a conversation if you can't find one."

Of course, every enterprise encounters strategic business opportunities that challenge the architecture. Often the challenge helps to establish when an architectural design or technical standard has become outdated. Thus decision makers must recognize when architecture sensibly limits business application choices and when new business opportunities should lead to new architectures or changes in technology standards.

Sustaining architectural integrity, however, is not just a matter of monitoring the adoption of technical standards by individual projects. Large enterprises undertake hundreds of projects simultaneously. An enterprise's project portfolio invariably has multiple projects with similar or overlapping requirements. For example, a number of business units might simultaneously develop applications with requirements for tracking customer interactions, for managing the flow of documents associated with a process, or for computer telephony integration (the ability of a call center representative to view a Web page in use by a customer). The architecture of an enterprise may not address these new capabilities, so a set of applications can result in multiple disparate solutions to the same problem. Most firms have struggled to manage overlapping system requirements, and the net effect has been redundant capabilities, wasted resources, and slow time to market.

Sustaining architectural integrity thus demands coordinating the architectural demands of an enterprise's project portfolio. USAA, a diversified financial services firm, has designed this coordination responsibility into its Enterprise Business Operations unit, which reports to the CEO. This unit works with IT architects to identify common needs across the firm's several hundred business unit and enterprisewide projects. Each IT architect accepts responsibility for defining architecture components that can be shared by multiple projects. The enterprise architecture unit within IT commits to specifying standard products to address new capabilities by a specified date. Projects are then scheduled based on availability of needed infrastructure and business process components.

Specifying the functionality and architectural requirements of an IT project is only the first step in generating value from IT.

enables. Thus business application decisions also involve assigning accountability for the organizational change associated with an IT project. At Partners, for example, physicians "owning" responsibility for generating value from the Longitudinal Medical Record invest personal resources to use the system, provide constant feedback on its features, and encourage colleagues to sign on to the project.

The organizational changes associated with many systems are wrenching. They not only require that individuals change their habits, they typically require a new understanding of organizational processes. Changing compensation structures is often a requirement for motivating new behavior, but changing compensation is not enough. Employees implementing change must understand the new processes. They may need both training and structural support. Change management is a difficult challenge in environments where change is constant. New systems and processes may confuse rather than support employees regardless of their commitment to organizational objectives. Key processes in enterprises are often receiving multiple "fixes" at one time. To ensure that an enterprise and its people can absorb ongoing change, many enterprises have organized their projects into a finite set of programs. Typically, programs consist of all projects related to a major process initiative such as customer relations, product development, or financial management. Programs are headed by high-level managers who coordinate the system features, timing, training, and change management requirements of each project. Program managers are accountable for ensuring that new systems have the intended combined effect on the enterprise and that resources are used effectively.

Business application needs decisions require reconciling complex change and opposing organizational forces. Managers responsible for defining requirements must distinguish core process requirements from nonessentials and know when to live within architectural constraints. They must design experiments knowing that actual benefits could be different from anticipated benefits—or if there are no benefits, they must pull the plug. Most importantly, they must know how to design organizational change and then make it happen. Business application needs decisions require creative thinkers and disciplined project managers and are probably the least mature of the five IT decisions.

Decision 5: IT Investment and Prioritization

A leader of a $15 billion retail enterprise told us, "IT investments are like any other investment. You must make a decent return or you go bust. It just happens faster with IT!" The IT investment decision is often the most visible and controversial of the five key IT decisions. Some projects are approved, others are bounced, and the rest enter the organizational equivalent of suspended animation with the dreaded request from the decision makers to "redo the business case" or "provide more information." Enterprises that get superior value from IT focus their investments on their strategic priorities, cognizant of the distinction between "must have" and "nice to have" IT capabilities.

IT investment decisions address three dilemmas: (a) how much to spend, (b) what to spend it on, and (c) how to reconcile the needs of different constituencies. We will discuss each of these dilemmas, noting that IT governance is an invaluable tool for resolving differing views.

How Much to Spend

The IT investment process must determine how much to spend on IT. Given the uncertain returns on IT spending, many executives wonder whether they are spending too much—or perhaps even too little. They often look to industry benchmarks as a way of determining appropriate spending levels. But in the successful companies we have studied, benchmarks are only a starting point. Senior managers focus on the strategic role that IT plays in the organization and establish an enterprisewide funding level that will enable technology to fulfill its objective.

UPS and Federal Express provide a useful example of why benchmarks are only the starting point. Both companies report spending around $1 billion on IT each year, but FedEx, which has annual revenues of around $20 billion, is two thirds the size of UPS. The different spending levels reflect different strategic roles for IT.

The UPS IT strategy, which evolved from industrial engineering roots, focuses on introducing efficiencies into a business that demands consistency and reliability. In contrast, FedEx relies on IT to provide extraordinary responsiveness to unique customer needs. Of course, UPS also uses technology to meet the needs of individual customers, and FedEx uses technology to provide consistent service across customer segments. But the thrust of the two companies' IT and business strategies is different. Both are successful because they have matched their spending levels to their strategies.

How to Allocate IT Dollars: IT Investment Portfolio

As with any investment portfolio, managing the IT portfolio requires providers and consumers to agree on indicators of success. Different strategic contexts lead to enterprises having different levels of IT investment, different IT portfolios, and different indicators of success. We found that enterprises with better returns from IT pay particular attention to these indicators. In these enterprises each year, as part of the investment process, business and IT management agree on the appropriate indicators for the business value of the portfolio.

As a commercial lens on IT investments, many enterprises find it useful to think of an enterprise's IT investments as a portfolio, just as individual investors have portfolios of financial investments.[10] Portfolio management enables decision makers to align their portfolios with enterprise strategy and balance risk and return. Just as personal investment portfolios are reweighted as personal goals change (for example, approaching retirement), IT portfolios are also reweighted as conditions change.

Implementing an IT portfolio management approach requires the dollars for each project or budget line item to be classified into categories reflecting business objectives. Grouping proposed investments by business objective enables management to select projects that shape the portfolio to the enterprise's strategy. Having data on how an enterprise's investments in each category have performed historically helps make more informed future investment decisions—similar to knowing the historical return of bonds versus equities versus property.

One approach to IT portfolio analysis lists four IT asset classes, each supporting a different management objective: strategic (to gain competitive advantage), informational (to provide information), transactional (to process transactions and cut costs), and infrastructure (to provide shared services and integration).[11] Classifying the enterprise's annual investments into these four categories facilitates strategic analysis and raises questions about specific investment decisions. For example, in an economic downturn, do we really want to allocate 40 percent of this year's IT investment to the high-risk, high-return strategic asset class? Instead, should we reweight the portfolio toward the low-risk, solid-return transactional investment asset class? Alternatively, can we afford to have another year of low infrastructure investment?

Growing numbers of enterprises are using IT portfolio approaches as part of their enterprisewide IT investment and prioritization process.[12] These enterprises tailor the definition of the asset classes to fit their specific business and develop metrics to help assess the performance of their IT investments. The IT portfolio concept assists managers in balancing and realigning their investments when the enterprise's strategy or the economic climate changes. Comparisons of portfolios with industry benchmarks facilitate a discussion on how well aligned an IT portfolio is with the strategy and allow managers to make more informed investment decisions relative to the competition. A powerful question to ask is: Can we explain differences between our IT investment portfolio and the industry benchmark by our strategy? If the explanation is credible, the portfolio is a good fit. If the explanation is unconvincing, the IT investment process is failing.

Risks are inherent in any business investment decision, and senior executives are familiar with risk assessment. IT investments can expose firms to four kinds of risk: market, financial, organizational, and technical. Enterprises often have well-developed templates for IT investment proposals that require the articulation of each type of risk. In addition, the portfolio of IT investments carries risk—not unlike the risk of a portfolio of stocks. If well selected, the portfolio of IT investments, like that of individual stocks, can reduce overall risk to the owner.

How to Reconcile Differing Needs—Aligning IT Investment with Strategic Priorities

Probably the most important attribute of a successful IT investment process is ensuring that the enterprise's IT spending reflects strategic priorities. Investment processes must reconcile the demands of individual business units as well as demands to meet enterprisewide needs. Many enterprises value the independence of their business units and support their efforts to invest in IT according to business unit strategy. Most enterprises also emphasize the importance of enterprisewide efficiencies and even integration. Enterprises that attempt to persuade independent business units to fund shared infrastructure are likely to experience resistance. Instead, business leaders must articulate the enterprisewide objectives of shared infrastructure and provide appropriate incentives for business unit leaders to sacrifice business unit needs in favor of enterprisewide needs.

The IT investment decision-making process can be used to implement strategic change as illustrated at State Street Corporation.[13] Traditionally, IT investments at State Street involved some relatively small funding of central services. Each business then independently assigned additional funding based on business priorities. A disadvantage of this approach is that many similar initiatives could be funded in different businesses. Recognizing this limitation, State Street's senior leadership moved to enterprisewide IT budget management to achieve a better return on IT investment.

In 2001, State Street's Information Technology Executive Committee (ITEC) assumed responsibility for combining IT investment needs of individual businesses into an enterprisewide IT budget. The executives serving on the ITEC included the COO, the Chief Asset Officer (CAO), the CIO, and senior executives responsible for State Street's various business units. In the fall, the leaders of each business and the CIO identified key IT business and infrastructure projects for the coming year and classified them according to their contribution to the corporate growth targets and to the strategy of each business. The result of this analysis created an initial portfolio of all IT projects recommended for the coming year. The ITEC then negotiated to create the optimal enterprisewide IT portfolio that met the corporate growth targets within the operating budget allocated to IT. A member of the CIO's staff identified several advantages of using the ITEC for budgeting compared with earlier IT investment committees. "The negotiation of an enterprisewide IT budget encourages value in the use of IT rather than focusing on the needs of individual businesses. The business executives do not always appreciate the impact of enterprisewide infrastructure investment. By combining discussion of infrastructure investment with these business initiatives they understand the value of making that investment in enterprisewide infrastructure because they're all going to share in its use."

IT investment and prioritization puts money to work. If senior management has not clarified or communicated enterprise strategy or if strategy changes so frequently that it isn't worth investing in today's strategy, the IT investment process will break down. No framework or analysis can substitute for clear strategic direction. When the investment committee understands its business objectives, it can invest IT dollars to generate a significant return.

The five IT decisions we've discussed in this chapter cannot be isolated from one another. If governance is well designed, the decisions reinforce one another ensuring strategic objectives are successfully addressed. In the next section, we describe an IT-enabled transformation at Delta Air Lines. This case study provides an example of how one firm designed governance to consider the interactions of all five IT decisions.

Case Study: Making IT Decisions at Delta Air Lines

When Leo Mullin became CEO of Delta Air Lines in 1997, he took over the third largest U.S. airline in terms of revenues and passenger miles and the largest U.S. airline in terms of number of departures and passengers enplaned. Delta had 84,000 employees flying approximately 117 million customers to 45 states within the United States and 44 cities in 28 countries throughout the world.[14]

Mullin found that Delta's IT capability, which had been outsourced in the early 1990s, was functionally oriented. Each of the firm's approximately seventeen functional units was developing

and supporting systems in isolation from the rest of the firm. Mullin asked Charlie Feld, former CIO at Frito-Lay and Burlington Northern, to assess the IT capability at Delta. Feld reported that people at Delta could not obtain basic information from their systems. Given the nature of the airline business, the functional orientation of the firm's information systems was limiting the ability of employees to do their jobs. When a flight was delayed or changed for any reason, customer-facing employees could not always determine the whereabouts of planes, passengers, or bags. According to Feld:

> The reason they didn't know where anything was is that the systems infrastructure was so disconnected. There were thirty-five customer databases, dozens of flight databases. If a gate changed, they wouldn't know. The baggage handler would be standing there at the old gate waiting for the plane to show up. The passengers would be standing in the concourse looking at the displays, and they would have the wrong gate. You'd go into the Crown Room and there would be a different gate. And the poor gate agent was standing there and they didn't have any idea, because it was so disconnected from the information in real time. The physical event of a gate change was not reflected in the electronic system in a consistent, timely way.

Faced with imminent Y2K issues, Mullin persuaded Feld to take on the role of CIO at Delta until January 1, 2000. Rather than simply fix the technology to survive Y2K, Mullin and Feld committed to restoring IT as a strategic tool at Delta. They engaged a small team of senior executives—including the chief financial officer, the executive vice president of customer service, and the head of airline operations—to lead an organizational transformation built around the assumption of real-time information.

The executive team, which came to be known as the IT Board, took responsibility for defining the role of IT in the firm. They stated four principles:

- Adopt a process view of the firm.
- Build a corporate infrastructure to support cross-functional processes.
- Build and leverage a standardized environment.
- Focus on the customer.

Consistent with these principles, Feld worked with the Board to create an enterprise architecture (figure 2-5). First, the IT Board specified the firm's core processes: (1) customer experience, (2) airline operations, (3) digital dashboard for revenue management, and (4) wired workforce for administrative functions. Recognizing that they could not develop and implement IT support for all four core processes at one time, the Board chose to fix flight operations and customer experience, the two processes that ran on the firm's outdated airport-based technologies.

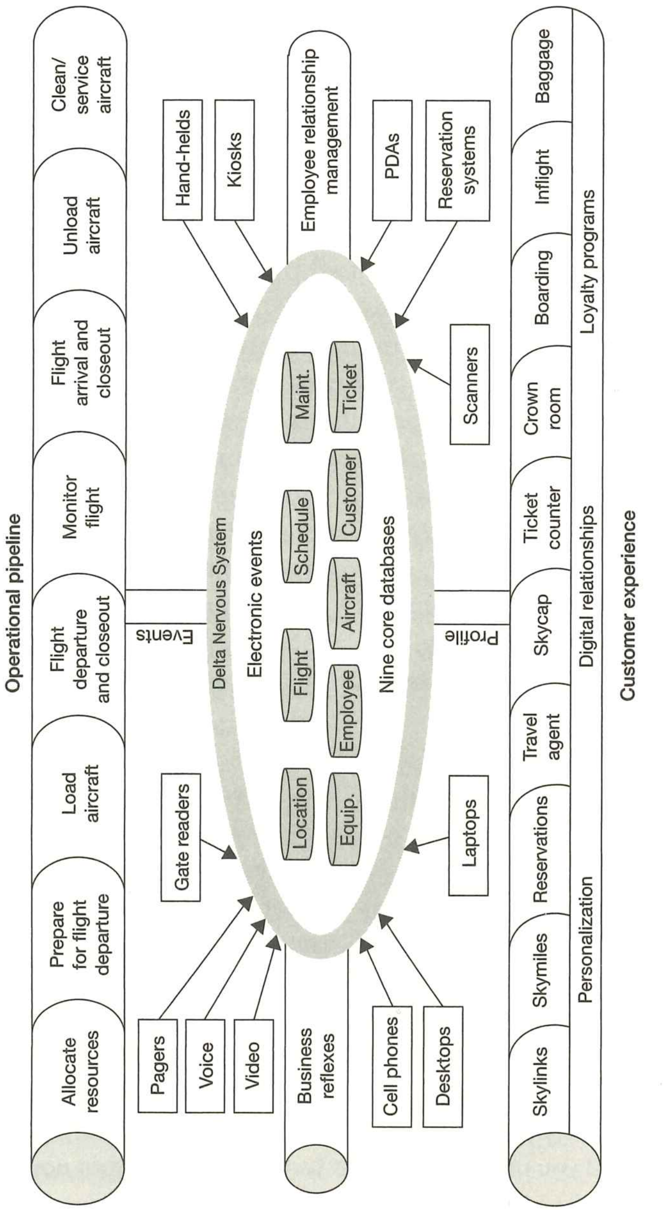
Management defined the information requirements for these two core processes in terms of nine databases: location, schedule, flight, maintenance, equipment, employee, aircraft, customer, and ticket. A key component of the architecture was the Delta Nervous System (DNS), a middleware environment that captured and disseminated data to employees and applications. The DNS used a "publish and subscribe" approach—applications subscribe to be notified whenever certain data items change so that employees always have current data, and applications respond to changes as needed. Vicky Escarra, Executive Vice President for Customer Service, explained:

> The whole notion around the Delta Nervous System is if we had a change in our operations control center—let's say a canceled flight—with one or two entries, that information would be pushed into all of the operating and customer groups without an individual or twenty-five individuals having to actually access or send that information. The information would come to the reservations call centers; it would go to the airports, . . . the Crown Room Clubs, . . . [and] customer PDAs, cell phones, beepers, even customers' laptops, giving them the information around the fact that "Flight 222 from Washington to Atlanta has canceled, and we've rebooked you on Flight 223 that leaves two hours from now."

The enterprise architecture in figure 2-5 reflected the core processes, the data driving those core processes, and the channels delivering data to employees, customers, and business partners.

FIGURE 2-5

Delta's Enterprise Architecture



Source: Jeanne W. Ross, "E-Business at Delta Air Lines: Extracting Value from a Multi-Faceted Approach," working paper 317, MIT Sloan School Center for Information Systems Research, Cambridge, MA, August 2001.

From this architecture, IT leaders could develop infrastructure requirements. The key infrastructure requirement was highly centralized, standardized, secure data accessible to a broad set of stakeholders through a wide variety of channels. Delta IT leaders designed channel management, communication, data, and security services to meet these requirements.

Although the enterprise architecture did not detail the applications required to support the core processes, it identified the key activities associated with both the customer experience and flight operations. The IT Board established priorities for application development projects.

The focus on a few projects enabled the enterprise to address Y2K concerns and fulfill their priorities for customer service and reliable operations. Senior Vice President and Chief Development Officer Keith Halbert noted that the IT Board's leadership enabled Delta to avert the Y2K crisis and incrementally address core process improvements: "Through their teaching and through their reinforcement in their staff meetings and through their direction in terms of prioritization, and more importantly, when their teams came through the back door to try to change their priorities, their reinforcement of the plan really made a big difference."

The enterprise architecture was only partly built out by January 1, 2000, but it was sufficient for surviving the Y2K transition. CEO Mullin credited Delta's infrastructure transformation with helping the firm develop strong financials (relative to its competitors). In a few years, Delta moved from last to first on key industry measures such as on-time departures and fewest customer complaints. The IT Board became a permanent fixture, responsible for specifying IT priorities. The Board invested simultaneously in infrastructure and applications. Infrastructure investments supported the cross-functional requirements of the core processes and provided a foundation for future applications. Delta continues to invest in the Delta Nervous System, which has proved a flexible platform for quickly implementing new strategic initiatives such as printing boarding passes at home and proactively rerouting passengers from delayed flights. Delta's success resulted, in part, from a clear strategic vision and from having the right people involved in each of the five key IT decisions.

Linking the Five IT Decisions

The Delta experience underscores the interrelationships of the five key IT decisions. Each of the five decisions requires individual attention, but none of them can be made in isolation. No wonder IT governance is hard! But while all decisions require management attention, a clearly articulated governance approach distributes the decision-making process to persons best positioned to understand the requirements—and their implications. In addition, formalizing input to decisions through governance processes ensures critical communication and feedback on these key IT decisions.

As a chapter summary and primer for governance design, we composed a series of questions representative of each IT decision (figure 2-6). Effectively answering these and similar questions is the job of the people tasked with making the decisions as designated by the governance design. Do you have the right people making these decisions? Are they well equipped to deal with the tradeoff? In the next chapter we discuss the options enterprises have for allocating both decision rights and input responsibilities for each IT decision.

FIGURE 2-6

Questions Key to Each IT Decision

IT principles	What is the enterprise's operating model?
	What is the role of IT in the business?
	What are IT-desirable behaviors?
	How will IT be funded?
IT architecture	What are the core business processes of the enterprise? How are they related?
	What information drives these core processes? How must the data be integrated?
	What technical capabilities should be standardized enterprise-wide to support IT efficiencies and facilitate process standardization and integration?
	What activities must be standardized enterprisewide to support data integration?
	What technology choices will guide the enterprise's approach to IT initiatives?
IT infrastructure	What infrastructure services are most critical to achieving the enterprise's strategic objectives?
	For each capability cluster, what infrastructure services should be implemented enterprisewide and what are the service-level requirements of those services?
	How should infrastructure services be priced?
	What is the plan for keeping underlying technologies up to date?
	What infrastructure services should be outsourced?
Business application needs	What are the market and business process opportunities for new business applications?
	How are experiments designed to assess whether they are successful?
	How can business needs be addressed within architectural standards? When does a business need justify an exception to standard?
	Who will own the outcomes of each project and institute organizational changes to ensure the value?
IT investment and prioritization	What process changes or enhancements are strategically most important to the enterprise?
	What are the distributions in the current and proposed IT portfolios? Are these portfolios consistent with the enterprise's strategic objectives?
	What is the relative importance of enterprisewide versus business unit investments? Do actual investment practices reflect their relative importance?

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