Chapter 1

Industrial Age Thinking for Information Age Problems

"No more investment unless there's a direct financial benefit."

Thus, an exasperated finance director or CFO (let's call him James) reacted to a seemingly endless stream of requests for enhancements to the comprehensive Enterprise Resource Planning (ERP) application which, he had been assured, would solve all of his problems. The results of these incessant requests were major cost over-runs and worse, from James' perspective, long delays in getting the system operational. It seemed as if he was signing an endless stream of checks and he had no idea what he was getting in return. Operating in the highly competitive retail sector, his company could ill afford the delays, errors, and customer dissatisfaction stemming from his system's problems.

He was obviously worried, but also felt somewhat "betrayed," as he described it. "We did everything possible," he complained, "brought in consultants to help us, did a detailed definition of requirements, spent months evaluating vendor responses, visited reference sites, paid top dollar for the application, and gave the users comprehensive training. What more could we have done?" What more indeed? We'll return to this shortly. James had to face what untold numbers of business

and information technology (IT) executives had faced before, are facing now, and will face again.

■ BUSINESS VALUE FROM INFORMATION TECHNOLOGY (BVIT)—A LARGE AND GROWING PROBLEM

Obtaining business value from IT investments continues to be among the top concerns of CIOs and CEOs, as evidenced by Gartner's annual survey of business and information technology executives. As they approve large and ever-growing expenditures on IT initiatives, executives are unsure when, or even if, there will be a return on these investments. Should they even briefly examine some relevant research findings, their confidence would be even further undermined. For instance, the research by Paul Strassman (one of the leading authorities in this area) shows no correlation between investment in IT and the overall performance of the firm. In other words, high spenders on IT did no better than those that spent comparatively little and, in case you are wondering, Strassman was careful to compare like with like (e.g., sector, size, location). One study by the Massachusetts Institute of Technology was even worse; it showed a negative return, that is, the more a firm spent on IT, the worse it did! Later, we'll see numerous examples of outstandingly successful IT deployments. What makes the difference?

In terms of failed projects (let's not address just what constitutes a failed project for the moment), different studies have suggested that the cost of such projects have to-date amounted to close to $200 billion in the United States alone. That is not only in terms of direct financial impact. Think of the business disruption that was endured in vain, the competitive opportunities missed, and the disillusionment in IT that such failures occasioned.

Despite all of this, we know that IT has also produced tremendous benefits. Automation in manufacturing has sharply reduced cost and lead times while increasing quality. Armies of paper-shuffling clerks have been released to perform higher value-adding activities (or have been fired!) by the deployment of technologies such as workflow while airlines, financial

services, and telephone companies (telcos) are wholly dependent on IT for their core transaction processing functions. On a more modest scale, individual users or business departments have used a variety of productivity tools to enhance and enrich their performances and operating environments.

Looking at the issue from another perspective, the poor returns from IT should not come as too much of a surprise. The introduction of breakthrough initiatives has historically taken a very long time to provide a return on investment (ROI). For example, after Edison's deployment of the first dynamo in New York in 1881 (the first industrial use of electricity), tangible productivity improvements did not emerge until the 1920s. An even longer productivity delay (about 50 years) followed the introduction of Watt's steam engine in the late eighteenth century. Similar delays were experienced with investments in railroads. Benefits don't occur until the technology matures and society has had sufficient opportunity to adapt to them. While it would be dangerous to make a direct comparison to IT, there is little doubt that businesses and society are struggling to adapt work patterns and processes. This suggests that those organizations that do manage to adapt will gain greater returns. The framework developed as we go through this book is one way of achieving these elusive returns *ahead of the curve.*

■ LEARNING FROM CASE STUDIES

What is the explanation? On the basis that we can learn more from our failures than our successes, let's look at some case studies of failed investments. we'll repeatedly return to these case studies to illustrate developments as we go through the book; please give them careful attention. To help you remember, I'll assign each one a name.

➤ Heavy Manufacturing Enterprise

Having sustained heavy losses for a number of years, this company was undergoing a program of radical change, led by a new CEO. In his view, the enterprise's manufacturing operations

had grown flabby and inefficient while its product line had not changed significantly for many years. He saw an immediate opportunity to increase sales by selling product at a number of intermediate stages of production rather than as finished goods, as had been the case heretofore.

As can be imagined, this initiative had IT implications. Among the more significant were the need to capture production costs at the relevant production stages, accommodate a new wholesale sales network, implement structural alterations to the general ledger, and manage more complex inventory control facilities. Although the CEO wanted quick results, a detailed definition of requirements was undertaken and reputable software developers were commissioned to begin the project. While some cost and time over-runs were incurred, the project basically met its goals. The Intermediate Product System (IPS) proved to be stable and secure, and provided accurate data and handling facilities that enabled new and profitable markets to be opened.

Sounds like a rare and unqualified success? Well, yes and no. By achieving the stated objectives, it was successful, but wider issues had not been considered at the time the project had been commissioned and these had a devastating impact on the investment. The enterprise's core transaction processing and finance systems were very old (about 10 years in operation) and both the operating system and hardware were of the same vintage. It was increasingly difficult and costly to maintain both the applications and the systems environment. But even worse for the CEO as he drove his transformation vision forward, it became increasingly clear that this environment was acting as an impediment, both in terms of flexibility and scalability. This is understandable when you realize that Customer Relationship Management (CRM), workflow, and supply chain integration were among the applications envisioned. All of these impose heavy demands on the IT infrastructure, call for close systems integration, and place heavy requirements for flexibility in the architecture.

There was no alternative but to fundamentally redesign the IT operational and application environment to support these objectives. The problem was that the Intermediate Product

System had been written to integrate closely with the existing applications and to run on existing platforms. Because of this, a virtually total rewrite would now be required—and it had been in operation for only a little more than 12 months! There was another problem. To speed up operations and to reduce errors (both had historically been major problem areas in this firm), every step of the intermediate product production and distribution process had been embedded in the software. The system called for a rigid set of activities to be performed throughout the process, and in strict order—in other words, the business process had been embedded in the software. While the stated objectives of speed and accuracy had been achieved, the CEO saw flexibility in work practices and business processes as essential to the corporate transformation exercise. In the first year or so of the system's operation, its inflexibility had little impact, but as business process redesign went into effect, it became clear that the Intermediate Product System was a major stumbling block. "The system won't allow us to do it any other way," became a common response from stakeholders, to the CEO's exasperation.

So, the IPS investment had to be written off after little more than a year in operation, and the required functionality was incorporated into a new set of integrated packaged applications running on an updated infrastructure. This occurrence we refer to as *benefits leakage.* As Figure 1.1 illustrates, projects often show an initial surge in value that tails off due to inadequate investment appraisal or benefits realization.

Let's refer to this case as *The Gung-Ho CEO.*

➤ Banking Corporation (1)

This bank had undergone structural change, most of it driven by technology and increased competition. Management now wanted to increase the number and value of the products each customer maintained with the institution. To do so, they needed to base their sales and marketing efforts on each prospect's individual behavior and activities. Like many other enterprises in this sector, the bank had no unified view of the customer and poor insight into key trends and patterns.

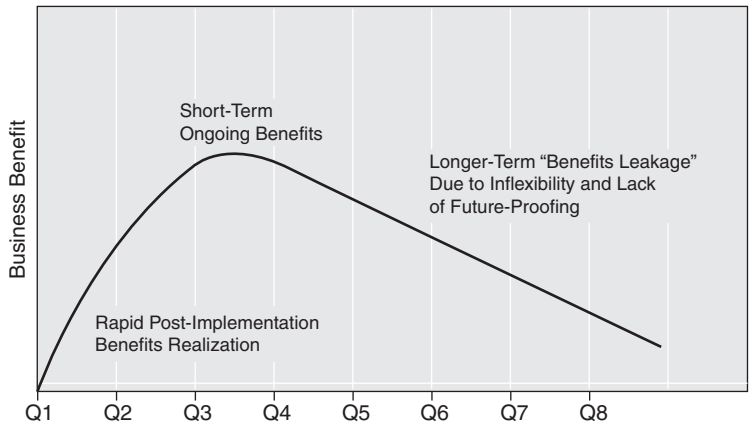

Figure 1.1 Benefits Leakage

Management saw the solution in the form of a data warehouse that would harvest, store, and disseminate the rich repositories of transaction data each customer generated. Marketing and pricing strategies would then be modified to accommodate the value contribution of key customer segments. A cost/benefit analysis was undertaken, and a clear ROI was identified.

A team composed mainly of marketing and IT members undertook a detailed study of the available alternatives. This was a high-level and well-resourced team that understood the key success factors in selecting and implementing a data warehouse. These factors included systems integration and performance, but also softer ones such as data ownership conflicts, process redesign requirements, and uneven contribution from different business units. After a thorough exercise lasting about eight months, the team recommended a solution based on two physical warehouses under one logical model. These are the strengths and weaknesses that determined the trade-off:

Strengths

- Allowed analysis between the business units.
- Provided a consistent set of data warehousing tools.

- Allowed independent implementation in coordination with each department's strategic needs.
- Shared analytics by business units to obtain a single baseline set of reports.
- Served as a stepping-stone to combine marketing programs.

Weaknesses

- Implementation would be more costly and complex than a single warehouse.
- Coordination between business units would be required for extension or enhancement.

Top management accepted the ROI calculations, gave approval for the project, and implementation began. Everybody got to work: extracting, cleansing, and normalizing data; putting the hardware and software in place; agreeing on analytics, and so on. However, a few months into the project, the enterprise's Board made an announcement that would have a devastating impact on the project. The Board announced it was in negotiations to take over another bank. The target's technical infrastructure, their data structures, the significantly increased data requirements plus a range of soft factors meant that the project had to be put on hold. In due course, it virtually had to be abandoned and a whole new integration exercise commenced.

We'll call this case *The Secretive Bank*.

➤ Banking Corporation (2)

In 1997, a regional bank in the United States that was fresh from a round of mergers looked to a data warehouse to provide more focused analyses of its most profitable customers with highly personalized direct-marketing campaigns. Prior to the implementation, this financial institution reorganized into four main market areas:

1. Retail and community banking.
2. Corporate banking.
3. Investments.
4. Consumer finance.

This reorganization provided a way to break down several business empires based on products and encourage the sharing of information across products. Different product groups and individual sales representatives were designing independent marketing campaigns that, in many cases, competed for the same customers as the bank. These campaigns were designed with gut-feel intuition and little hard data. The result was that the bank saw its profitability per customer decline and lag behind that of the industry leaders. To address the problem, the executive management team initiated a data warehouse study that indicated a clear ROI. The resultant project would gather all the information the bank possessed about its customers and prospects into a structured, accessible repository.

Data related to products, accounts, and revenue was managed in more than 40 different source databases which made it difficult to obtain data to perform analysis and support more intelligent decision making. The data warehouse implementation effort was initiated with the goal of providing support for several critical customer-driven areas of the bank including call center, finance, and marketing. Instead, the project focused on each of the specific application areas that has led this bank down the road of multiple data marts and not an application-neutral data warehouse.

Starting with a customer data warehouse to support the call center that was already in place, the second data warehouse effort focused on products and cross-selling opportunities. A third data warehouse was required to support the finance department and maintain the profitability data to be used in customer profitability analysis. Now the credit department required the deployment of a risk management application. With all the data in sight and available in the three data warehouses, the bank determined that yet another data warehouse would be required to support this new application because

none of the data warehouses could accommodate the additional data without a significant architectural rework. It also decided that it would take 18 months to implement this new data warehouse which prompted staff members in the credit department to believe that the initial data warehouses were failures and not living up to expectations.

With the application-specific approach taken to build the data warehouses, this bank built several data marts designed to support specific applications. These efforts each took 18 to 24 months to implement. Such an implementation lacked the flexibility to support changes (based on user and business requirements) to the applications or to support new applications that were not considered initially. This could lead to significant opportunity loss in the future and the inability to deploy new high-profile business intelligence applications (e.g., stakeholder relationship management) that have experienced shorter business value lifecycles.

While this bank received some benefits from implementing the marketing data warehouse with improved cross-selling at significantly less cost, the dynamic nature of the financial services industry has left this bank behind. Early warning signs occurred at the start of the third data warehouse effort, with data that was already present (but not in a usable model) in the first two data warehouses. The benefits of flexibility obtained from a cross-functional, application-neutral data warehouse have eluded this bank, which led to longer application deployment time frames and a business opportunity loss.

We'll call this case *Silo Myopia*.

➤ Telecommunications Equipment Provider

This telecommunications equipment provider undertook custom work for the design and development of hardware and software components for major telcos. When this enterprise's salesforce completed a sale, they had to enter the details on a technical order form, which was then submitted to engineering/manufacturing. However, the sales staff focused more closely on winning the deal rather than entering the order details correctly. Their carelessness created many problems and

inefficiencies once order processing and manufacturing started, among them production delays, cost over-runs, and lower quality. As various threats and inducements over a protracted period failed to change sales staff behavior, management decided to invest in a custom-built sales configurator application, estimating that the initial investment would be recouped in less than a year. A sales configurator deploys strong integrity and consistency checking and the chosen solution would eliminate the very problems experienced at order submission. Though the sales staff was represented on the team that developed the specifications, in practice participants from the engineering and manufacturing divisions did almost all of the work.

It was only when the users started training on the system that the problems began to appear. Users saw the application as complex and time-consuming and, more importantly, it did nothing for them. The net result was that they ensured the application wouldn't work. It was not that they refused to operate it—that would have resulted in disciplinary action—they just ensured that it became unworkable! It was eventually withdrawn, and the company is still working on a solution to the issue.

We'll call this case *Who Feels the Pain Must See the Gain.*

➤ Sporting Goods Manufacturer

This enterprise had a global manufacturing operation and implemented an Enterprise Resource Planning (ERP) system from a well-established vendor to address a range of requirements. These included:

- ➤ Gaining a consolidated financial view of worldwide operations, which were fragmented and nonintegrated due, in part, to a number of mergers and takeovers by the enterprise.
- ➤ Achieving major cost-savings and efficiencies through supplier management, using the ERP's purchasing, payments, and analytical modules.
- ➤ Achieving significant plant-level efficiencies by consolidating various islands of automation, electronic

document management, and better inventory management (mainly lower carrying costs, fewer stock outages, and less obsolete product).

When Gartner was called in, the application had been operational in one of the plants for about nine months and all parties agreed that, far from improving, almost everything had gotten worse. But this was all they agreed on. Business units, the internal IT department, the implementers, and the software vendors all pointed at one another. It was always somebody else's fault. Upon analyzing the situation, we found, for the most part, all the participants had carried out their agreed roles. But the plant was operating less efficiently and, in some people's opinion, was "slowly grinding to a halt." Another strange failure, and one that had senior management extremely worried.

This case we'll know as *The ZAPped Manufacturer.*

■ WHAT DO THESE CASE STUDIES HAVE IN COMMON?

What can we learn from these case studies? All of these investments failed and for very different reasons. Yet, what's remarkable is that none of the usual suspects associated with such failures was involved. Clear cost/benefit and ROI analyzes were undertaken, and the definition of requirements was reasonably competent in each case, as was project management. The technology choices were adequate and management support (and funds) was never a problem. What went wrong?

In a sense, that question is what this book is all about. IT investments are becoming much more complex as we enter the seventh decade of IT and investment techniques that sufficed in an earlier time no longer work today. Yet, crucially, management still approaches such decisions using these old techniques. This brings us all the way back to James, our CFO in the retail sector referred to at the start of this chapter. His demand that any further modifications be justified by financial payback demonstrates the problem in a simplistic but brilliantly clear way. Industrial Age solutions for Information Age

Problems. This (and a lot more) will become clearer as we look at a little history.

■ SOME HISTORICAL PERSPECTIVE

Before suggesting an Information Age solution, we need to gain a good understanding of how this challenge evolved. As Figure 1.2 shows, Gartner sees the history of IT as divisible into four Eras.

➤ Era I: Automation, Cost Control, and Efficiency

In this phase, computers were acquired to automate specific business or organizational functions, usually those involving large volumes of repetitive transactions. Typical applications would be payroll or order processing. Individual departments would specify their requirements, which would, in turn, have been derived from goals assigned to these departments at corporate level. Systems analysts would design the systems and programmers would write the code. A vast gulf separated the IT

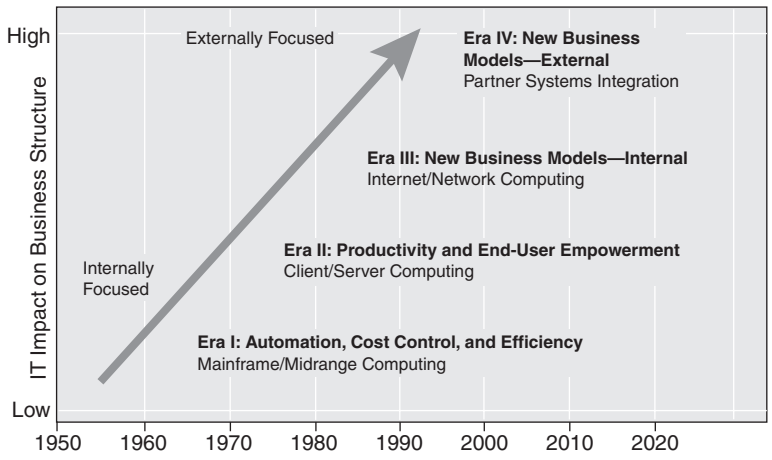

Figure 1.2 IT's Changing Destiny: Evolving IT Investment Drivers and Technology Cycles

(or Data Processing or DP, as it was known then) staff from their colleagues in the user departments. Denizens of the "glasshouse," as the computer room was often referred to, were strange creatures, best left alone. Not only was there a physical separation, but the DP staff knew virtually nothing about business issues. The users knew even less about computer matters and were not encouraged. This inevitably led to misunderstandings on both sides, but the problem was mitigated by the fact that the computer system invariably replaced its direct manual equivalent—even the forms and reports were often replicates of the manual versions. Despite the mutual incomprehension, therefore, once IT understood the mechanics of the task, the development of the resultant system was comparatively straightforward.

The systems developed during this phase were usually geared toward eliminating paper-based processing and (or, more accurately, replace paper with its computer-based equivalent) reducing headcount while increasing speed and accuracy. These factors would form the justification for each project, with the most significant factor being direct, tangible savings.

It was relatively easy to establish what could be automated and the impact of the automation in terms of savings. For instance, 20 clerks, many of whom would work overtime at peak periods, may have handled a company's payroll. Automating the process could mean that the manpower requirements might now be reduced to two clerks. The salaries, indirect labor costs (pensions, insurance, office space), and overtime payments of the 18 eliminated clerks would represent the system savings.

The corresponding costs of developing and running the resulting computer system were less rigorous. Even companies with sophisticated financial procedures usually confined costs to the direct and indirect labor expense associated with development, operations, data preparation and input, together with direct material costs such as stationery and, if applicable, punch cards. Amortizing the hardware, relating anticipated savings to opportunity cost, or evaluating in time/value terms (Internal Rate of Return, Net Present Value) were often not taken into account when cost-justifying a project during this

Era. These were indirectly addressed in some companies by the utilization of a throw factor, that is, a factor by which savings must exceed costs. In other words, a 40 percent throw factor (a common figure in my experience) would require savings of $200,000 where development and operational costs were estimated to be $140,000.

Normal standards would have applied to hardware purchases. In fact, exhaustive tests were performed on comparative hardware. Processor speeds, storage device capacity, input/output performance, and printer throughput were examined in detail, but individual application proposals were assessed in fairly basic terms. The emphasis was strongly on minimizing cost.

➤ Era II: Productivity and End-User Empowerment

This Era's most notable feature was the explosive growth in personal and distributed computing that followed the introduction of the PC by IBM in 1981. Prior to its introduction, users with dumb terminals could access computer-based data, but even the simplest tasks called for the mastery of a complex (by the standards of nontechnical staff) set of commands. Few anticipated the PC's impact—and that includes IBM! Its policy of making the operating system available on competitors' hardware meant that so-called clone manufacturers were in a position to produce machines much more cheaply than IBM. As prices plummeted, users, hardware manufacturers, software developers, and training specialists leapt on the PC bandwagon. Everyone, it seemed, was either using a PC or was in the PC business. This was understandable in view of the following:

- *A quantum leap in processing power:* Computer power exceeding in many ways. That of a 1960s mainframe could now be had for less than $10,000. Systems previously ruled out because of lack of capacity at the central computer facility now became feasible.
- *Readymade software:* Users, previously having had to endure lead times of up to a couple of years, could now buy off-the-shelf software packages, which often

possessed superior functionality to those produced in-house.

- *Cheaper software:* The cost of software underwent a similarly radical transformation. Typically, an integrated accounting package, which may have entailed up to 10 or even 20 years to produce in-house, (in financial terms, maybe up to half a million dollars) was now available for a few thousand dollars.
- *User-defined systems:* Within a couple of years of the introduction of the PC, simplified application development tools, designed for inexperienced computer users, became available. Expectations were high. The cultural chasm between computer specialists and users was to be eliminated, and the days of users specifying their requirements and being continuously disappointed with the resulting systems were about to end. The plummeting costs of processing power and disk storage meant that unprofessional development techniques were more tolerable. While reality fell far short of such high expectations, a major empowerment of the user did take place.
- *Faster and better information:* Monthly reports, presented three weeks after the event on continuous stationery, began to look hopelessly passé in the new world of the PC. Instantaneous screen-based inquiry became the order of the day and easily used report generators enabled customized, attractive printouts to be obtained and modified without difficulty.
- *Staff mobility:* The almost homogeneous world of the PC created a new breed of company-independent computer operators. The hitherto crippling dependence on specialists was vastly reduced. For example, a company running one of the well-known PC-based accounting packages would find it relatively easy and inexpensive to find staff experienced in the operation of the computer and the software package.

The main change from Phase 1 in assessing project feasibility appears to have been an increased application of discounting

techniques that addressed the concept of the time-value of money. In effect, this means that money is seen as having a cost, with the effect that earlier benefits and/or deferred costs should be attributed greater value than the discrete monetary amount—this is looked at in more depth later in this chapter. This could have been a reflection of the high inflation rates that applied at the time, and/or a realization that more sophisticated techniques were required. However, these failed to address some new issues that Phase 2 introduced.

For example, while the shared database referred to may have saved some time in eliminating the duplication inherent in the previous configuration, the main benefits might have related to the provision of more consistent and up-to-date data, benefits that did not lend themselves as easily to quantifiable analysis. Organizational matters, the ownership of data, faint blurring of functional boundaries, and information as a justification in its own right were identified as issues to be addressed. As a consequence, the concept of intangible benefits was introduced. I worked at Ford of Europe at this time and "intangible" was a dirty word in terms of identifying benefits. This was due mainly to the wide-scale practice using the intangible portion of the cost justification exercise as a balancing or residue figure to build to the required value case. This discrediting of the intangible concept was unfortunate, because the emerging potential for real, if nonquantifiable, organizational benefits was undermined.

➤ Era III: New Business Models—Internal

The most distinguishing feature of this Era is the transition of IT from purely transaction processing and user empowerment to becoming an enabler of new ways of doing business. There is increasing emphasis on viewing business as a series of processes that can and must be fundamentally redesigned and simplified by the imaginative application of IT. This approach is known variously as business reengineering, business process redesign (BPR), or business process transformation. Irrespective of the designation, it says that the old ways of doing

business and, therefore, the old ways of applying IT, will no longer suffice.

The implications for IT applications are immense. Speed and flexibility in applications development, in the context of user empowerment, have now become paramount, which in turn means that existing legacy systems often act as a liability. The requirements of speed and flexibility call for the widespread application of rapid-development software tools and software re-use. The resulting applications are also likely to have a shorter life. For example, in the financial services sector, some applications may have a life span as short as a few months. This arises when enterprises seek to capitalize on brief windows of opportunity arising from legislative or fiscal developments. The twin demands of rapid development and short life span call for an appropriate underlying systems architecture, usually one very different from those in place.

Era III also calls for closer internal integration and an end to fragmented systems and islands of automation. As information became an increasingly important determinant of success, information sharing and knowledge management assumed greater significance. Straight-through processing, having a single view of the customer, and the need to respond quickly to an increasingly unpredictable business environment also increased pressure for better internal integration. This means that the organizational and technical barriers that have impeded such integration have to be substantially altered, as do long-held attitudes.

The resulting IT impact has been immense. There has been wholesale replacement of legacy systems by enterprise resource planning (ERP) applications, while the deployment of knowledge-sharing applications such as workflow, groupware, data warehouses, and knowledge-management applications grew rapidly. Era III also saw an explosion in the use of outsourced IT services, to the extent that in many organizations the IT function became a broker of such services rather than a direct provider.

Era III brought the first real attempts at breaking away from accounting-based investment criteria. This stemmed from the

growing realization of their inadequacies and what progress there was stemmed largely from academic and research institutions. Michael Porter's Value Chain Analysis was a significant contributor in that it sought, by identifying and isolating the key components of a firm's value creation process, to break away from the straightjacket of cost/benefit analysis. Even though some critics argue that Porter had only repackaged traditional value-added techniques, his work did result in IT investments being seen in a new light. One of the most influential writers of this period was Paul Strassman, who broke new ground by shifting the focus for payback from technology to organizational, cultural, and people issues.

There was little evidence of the successful application of these new techniques in a business environment. Two causes appear to predominate in explaining this. The first is that a convincing, practical methodology had not been developed at this stage. For instance, one research study cited examples of companies that had tried as many as a dozen different methods for evaluating the benefits of an office automation project with minimal success. The study also showed that almost 90 percent of executives encountered "great difficulty" in quantifying intangible benefits, while about 60 percent found that "uncertainty of benefits" made justification methods hard to apply. The net result was that while new approaches had been developed, few had been successfully applied in practice.

➤ Era IV: New Business Models—External

The forces driving new business models with an external focus include:

- ➤ Proliferation of the number of customer universes that must be satisfied.
- ➤ Proliferation of marketing and delivery channels.
- ➤ Increased emphasis on time-based competition, which is enabled by high-velocity processes and data exchange, touch-based competition, in which technology is substituted for labor when human contact is not critical.

- The emergence of global shop floors and virtual enterprises.
- The increase in outsourced relationships.

Globalization, competitive pressures, mobile computing, and Internet-enabled connections are all contributing to changes in the enterprise structure and increased cooperation between trading partners. Virtual enterprises built on dynamic strategic partnerships, outsourcing, and fluid organizational boundaries demand tremendous investment in technologies for communication, coordination, and collaboration. Enterprises are being forced to rethink their vision and transform their strategies, structure, and processes to accommodate ever-closer links with their business partners. These partners perform key activities in a tightly synchronized fashion, often filling orders and assuming much of the risk of bringing products and services to market.

These forces require enterprises to become more externally focused in their business processes and integration architectures. However, internal integration (Era III) must also be completed and maintained for this to be achieved. Because of these changes, we expect all enterprises to undergo a dramatic increase in the demand for external data and process interfaces. In many enterprises, the number of externally connected interfaces will surpass internal process integration demand. This is reflected in a Gartner strategic planning assumption that estimates by 2004, 80 percent of enterprises will have moved integration priority focus from internal integration to external integration.

Gartner expects this evolution to take the form illustrated in Figure 1.3. This changing business model will result in distinct and challenging strategies and models for external integration. Some key areas of focus include:

- *Trading-partner integration focus:* To increase their agility and lower their capital investment costs, many companies are embracing the vertical disintegration model. In this model, a company focuses on key core competencies and relies on trading partners

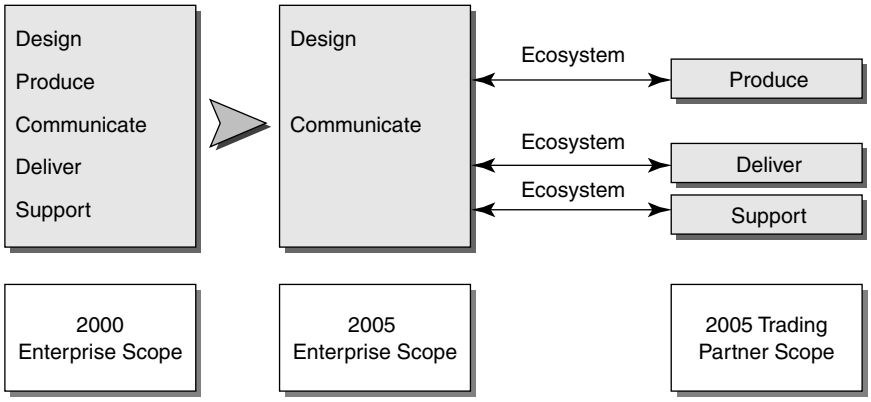

Figure 1.3 The Net-Liberated Organization: Shrinking Enterprises

for the rest. Increased outsourcing is an example of the move to vertical disintegration. Making this model work requires tight data and process-level integration with trading partners. For IS organizations, this means expanding the integration focus from integrating internal applications to include integrating external trading partners and leveraging Internet-derived technology.

Often, integration will be driven by a hub company integrating into its spoke providers to achieve tightly synchronized supply chain processes. External integration may be done through extranets, integration servers, and process ware, creating tightly coupled links for sharing real-time, event-driven information in a bi-directional business process context. EDI formats may be used to share data among trading partners, but in most cases additional forms of structured and unstructured data will also be shared.

Figure 1.3 shows how we anticipate the enterprise scope changing. Business partners increasingly undertake production, delivery, and support as part of a new ecosystem.

➤ *Value network integration focus:* Whereas the previous model is characterized by tightly coupled integration

between a relatively static set of business partners, another approach is a loosely coupled integration between fluid, dynamically changing business partners. This supports plug-and-play relationships where enterprises will be able to recombine their supply chain models dynamically, based on changing customer requirements and market conditions. Technology that can enable this model includes integration hubs and Web integration servers.

In the emerging virtual world, the ability to plug in (and link) new business partners, suppliers, customers, and business processes dynamically will be critical to maintaining global competitiveness. Enterprises will begin competing with one another, not just on the products and services they provide, but also on their business models. Enterprises that can rapidly configure new business models based on changing market dynamics will have a distinct advantage over enterprises lacking the technical and business process ability to alter business models on the fly. For instance, if a customer wants product A, a process may be automatically triggered with suppliers X, Y, and Z. Moreover, the company may never have done business with supplier Z before and may never do business with it again.

We refer to this integration strategy as *consequential interoperability*—where the consequences of a business process dynamically trigger integration. Electronic marketplaces, auctions, Internet-based dynamic trading-partner communities, dynamic trading environments, and supply chain portals are enablers of this model.

Two big technical hurdles of this model are that traditional IT architectures are inflexible and difficult to integrate. Global standards for the meaning, format, and presentation of information remain a distant dream. Extensible Markup Language (XML) and some new standards initiatives (e.g., cXML, BizTalk, vertical industry groups like Rosettanet) are enabling some advances to be made.

➤ *Changing business models create IS challenges:* Enterprises that wish to participate in the emerging Internet worked economy must add a formal application interface layer to their IT architecture to build in the required flexibility for external integration and to control future integration costs. Enterprise IS organizations will be challenged not only to connect back-office systems via extranets, but also to provide flexible, secured connectivity for both long-term, strategic business relationships and short-term, opportunistic relationships.

The cultural impact of these changes is illustrated in Figure 1.4, showing the transition from hierarchical lines and boxes to a more fluid, circular structure. Also underlined are greater information democracy and the central role of the customer.

The main difference in investment appraisal techniques between Eras III and IV is that the challenge has become even more complex in the latter. The decision-making process assumes far greater complexity when trading partners are involved, especially when it is remembered that Era III is very recent and, for many firms, still with us. When the vast array of

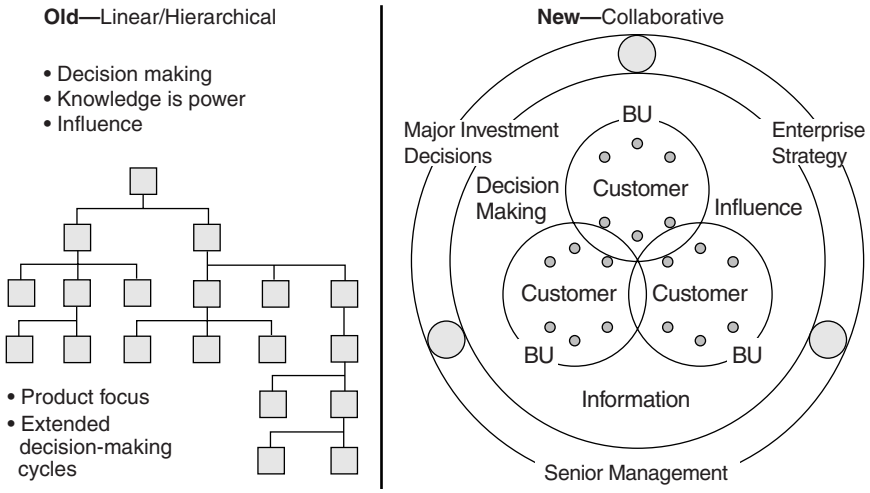

Figure 1.4 Deconstructing Traditional Culture

new technologies is added to the brew, it's not surprising that the net (no pun intended!) result is an absence of a systematic process to identify, track, and realize the benefits from IT investments and thereby derive business value from these investments. The business/IT convergence has also lead to a much greater need for a language that helps bridge the business/IT chasm and that enables its metrics to be incorporated into conventional management reporting systems. These requirements also call for governance processes to ensure that, in the event of good techniques being identified, they become institutionalized within the organization. Helping you to achieve this is the purpose of this book.

■ DRAWING CONCLUSIONS FROM THESE CHANGES

We have moved a long way in a relatively short time, although many organizations still retain Era I characteristics. A number of significant conclusions can be drawn from this evolution, all of which have a major impact on the way we handle IT investments.

➤ Sharp Growth in IT Expenditure Continues

The expenditure on IT continues to grow dramatically: The sheer speed with which IT has reshaped the global economy, challenged traditional business assumptions, and created new forms of knowledge expertise has rocked the foundation of enterprises everywhere. Gartner/Dataquest predicts that worldwide annual spending on IT will reach $1.7 trillion by 2003 ($3.2 trillion including voice communication). This spending has sharply increased over the four Eras and is likely to continue, despite the occasional downturn.

➤ Systems Integration (SI) Requirements Growing Even Faster

The demands for systems integration parallels and probably exceeds the overall growth in IT spending. This is driven by

requirements within the enterprise and by business partners. This creates the network effect of adding another node—the more you automate, the more integration will be required, and it will grow geometrically rather than linearly.

➤ Larger and More Complex IT Solutions

IT solutions are expanding in range, scope, and complexity. The Internet and the Web immediately spring to mind, but other areas, including the consolidation of electronic messaging (e-mail, workflow, document management), supply chain integration, and middleware, all pose new complexity challenges.

➤ Business Processes Are Transforming

Business processes are continually changing and this change is usually enabled, if not actually driven, by IT. Business processes are also extending to trading partners, demanding even greater flexibility and responsiveness.

➤ Sourcing Practices Are Changing

Over the four Eras, the scope and scale of outsourcing have changed dramatically. Whereas initially basic operational functions such as data center and infrastructure management would have been the main functions outsourced, today many organizations outsource virtually all of the IT activities, apart from high-level strategy, and even whole business processes. This, in turn, has resulted in much more complex contractual arrangements between vendors and customers.

➤ Accountabilities for Outcomes Less Clear

All of these developments have led to diffused and unclear responsibility for outcomes. Taking a typical Era I project, the design and development of, say, a payroll application that would have been justified by the replacement of a certain number of clerks and overtime. The developers would be given a budget to bring the project on-stream. When it went live, it was

expected to run in a way that replicated the functionality of the manual headcount. If the budget was exceeded, and/or if the system did not perform adequately, the responsibility was pretty clear.

Fast-forwarding to Era IV, a typical project (for example, a CRM initiative) could involve the implementation of a complex core application (e.g., Siebel or Vantive), significant systems integration (both internally and with customers), a data warehouse, computer telephony integration (CTI), redesigned business processes spanning the enterprise and its customers, plus infrastructural enhancements. If things don't work out as planned, who is accountable? Establishing such accountability has become far more complex.

➤ Death of the IT Project

The previous point suggests that there is no longer any such thing as a standalone IT project, and this is true. What we have is a variety of ongoing business initiatives supported to a greater or lesser degree by IT facilities. These initiatives do not stand alone. They often depend on one another, or even impede one another. Go back to the CRM project I referred to earlier. All the supporting technologies and process redesign initiatives could be projects in their own right, with their own full or partial justifications. But these must compete for financial funding, IT resources, and address the limitations in the organization's capacity to handle change. The sequence of implementation is also a potential problem area in that the CRM initiative might require a certain implementation sequence for each subproject. But this may not suit the proponents of these individual projects.

The common focus on IT obscures the reality that the IS organization will not operate the tools day-in, day-out once the implementation project is completed. Failure to deliver expected value will always be the IS organization's fault even though it has little control over the day-to-day operations. Business value is created through a combination of tools and business processes. The IS organization may be expert regarding the potential of IT tools, but the users are the experts on what business processes work best for them with the tools available. As

such, the users must take the lead in defining how they will use the tools to achieve their business activities. This is why we say that the enterprise (and the IS organization) must view each project as a "business change project" with "IT components."

This simple change in terminology not only places the focus on those users actually able to deliver the expected value, but the project itself is viewed in its business value context. The only reason to invest in IT tools is to gain the business value expected. Proper orientation is key.

➤ Quantifying Benefits Is Now Much Harder

The factors that give rise to the blurring of accountabilities referred to earlier also make it much harder to quantify the benefits from IT initiatives. Going back to the payroll example of Era I, it was very simple to identify and quantify the benefits. But what about the CRM initiative of Era IV? The potential benefits from CRM are enormous. Blended sales and service call centers, interactive selling tools, customer collaboration, and tools that let customers select and configure products without direct salesperson involvement are examples of effectiveness-focused benefits, while data rationalization and CTI offer efficiency improvements.

It is difficult to establish a causal relationship between these potential benefits and the original CRM initiative. It is equally difficult to establish why anticipated benefits were not realized. Suppose that customer satisfaction had actually decreased after the project was implemented. (This is based on the major assumption that measurements to judge this would have been taken.) Customer care staff might point to overload on the network as slowing response times, and/or a data warehouse designed in a confusing manner, populated with incomplete and inaccurate data. These assertions would be disputed by the relevant technical staff who might counterclaim that lower satisfaction levels were the result of too few sales support staff and a decline in product quality. In reality, the number of variables involved in such a project would be far greater than those enumerated here, but even those few underline the difficulties.

The question is: Does this matter? Once the system is in place, let's get it working as best we can and let's not get into the blame game. This sounds reasonable, but it is a dangerous fallacy. First, it's difficult to solve a problem if you don't know what went wrong and why. Second, the opportunity for organizational learning is lost. This is a vital consideration because the same mistakes are likely to be repeated with the next project. If a project fails to deliver, it is important to understand the causes. This should be seen as a learning and corrective process rather than one of blame allocation. If projects continue to go wrong, then clearly blame lies somewhere, and the problem should be found.

➤ IT Is Now a Strategic Resource

Finally, IT has, over this evolutionary period, become a key strategic enabler. Not only an enabler, but a driver of strategic initiatives in its own right, especially in telecommunications and financial services.

While our main focus has been on business impact of IT investments, we certainly don't want to create the impression that costs don't matter. They most certainly do. Cost goes beyond just what you pay for software licenses, hardware, training, and so on. The total ongoing costs of owning an asset often exceed the original acquisition costs, yet all too often they are ignored. For this reason, we cover the concept of cost in more detail in Chapter 3.

■ REVISITING THE CASE STUDIES

In the light of these conclusions, revisiting the failed projects we referred to earlier is instructive. Remember that, in all of these initiatives, management seemed to take the right actions. There was a good business case, no significant problems related to development, implementation, or project management. Analysis will show that management used Era I methodologies for what were Era III or even Era IV projects.

➤ The Gung-Ho CEO

The first problem stemmed from addressing the business need and the related technical solution in isolation, in particular from the IT architecture. An immediate and justifiable business need was identified, but the solution ignored the longer term business and technology ramifications. This meant that the key new application was developed on an architecture that lacked scalability and the capacity to support other essential modern systems and applications. Neither was the potential impact of business change on business processes taken into account and, as we now know, this was crucial. While there was a general recognition of the need to redesign business processes, the symbiotic relationship with key underlying systems was not appreciated. The IPS was given the go ahead on the vague belief that the redesign could be done later, if this aspect was considered at all. It is much more difficult to redesign processes once they have been embedded in the software. The end result was a common syndrome, called *benefits leakage*. That is, where an initial surge of value rapidly peters out due usually to inflexibility and lack of future-proofing. This was illustrated in Figure 1.1.

➤ The Secretive Bank

In relation to the bank and the data warehouse, the problem here was undoubtedly a disconnect between high-level business planning (that is, strategy) and the IT investment process. Top management took the view that having allocated the financial and technical resources, their job was done in relation to this project apart from occasional updates on progress. But, as we saw, this disconnect undermined the rationale for the whole project.

➤ Silo Myopia

The second bank's data warehousing project also failed, but for different reasons. Here the focus was on meeting an immediate business need/opportunity, to the detriment of other

aspects, or perspectives. In particular, the lack of attention given to the data and technical architecture perspectives undermined the value of the individual warehouses to such an extent that the whole exercise must, for all practical purposes, be redone.

➤ Who Feels the Pain Must See the Gain

The telecommunications manufacturer suffered because they did not fully evaluate the business risk of the proposed sales configurator initiative. The problem and the solution were both identified and identified correctly. However, management again felt that having achieved this, it was a case of "job done." Due to this, no formal or structured assessment of potential business risk was undertaken which had fatal consequences for the project. As we will see later, our framework identifies the factors involved in undertaking such a business risk assessment.

➤ The ZAPped Manufacturer

The global manufacturing operation's problems with their ERP system were more complex and abstruse. Remember that their difficulty was that they could not put their finger on the problem per se, they just knew that none of the anticipated improvements had occurred. Therein also lies the answer. Nobody had been given individual responsibility for ensuring that the improvements would be achieved and no before-and-after metrics were available against which to verify actual outcomes. There arose a situation where everyone was looking at everyone else saying in effect, "I did my job, don't blame me." Strictly speaking, they were correct. The problem lay in the investment and benefits realization process.

To give just one example, nobody had thought to back-load supplier history into the system so that trend analysis could begin immediately, nor had any before supplier performance metrics (e.g., unmet deadlines, inaccurate deliveries) been taken. The purchasing director could claim that supplier management benefits could not be realized because nobody had loaded the required data.

■ INDUSTRIAL AGE THINKING FOR INFORMATION AGE PROBLEMS

Those five cases are instructive. They underline how much more difficult it is to achieve the benefits from IT in Eras III and IV compared to earlier times. Today's environment is faster moving and more complex. It requires not only internal integration, but also integration with trading partners while IT initiatives depend for their success on a wide range of stakeholders. Yet, as these case studies illustrate, executives extensively use Era I methodologies to address Era III and IV challenges. Industrial Age thinking for Information Age problems.

Why do we equate Industrial Age thinking with the early Eras? We attribute it partly to the dominant influence of the finance department on IT issues that, though now in decline, dominated earlier Eras. The natural tendency in the finance department is to apply techniques that were familiar and consistent with investment appraisal in other areas. This tendency was reinforced by the difficulty in evaluating intangible benefits and the consequent disillusion among executives. This factor was one of the most significant in slowing the move toward more advanced evaluation techniques. We now discuss the limitations of purely financially based techniques and the consequent impact on gaining value from IT.

■ THE LIMITATIONS OF FINANCIAL METRICS

While IT is a strategic resource and alignment between IT and the business is essential, most executives continue to place enormous emphasis on financial metrics. For this reason, relegating such measures to their appropriate place in the IT investment evaluation framework assumes high importance.

Financial measures by themselves are not sufficient measures of enterprise performance, or a basis for justifying IT investments. Organizations need a more holistic, balanced set of measures to reflect those drivers that contribute to superior performance and enterprise strategic goals. Unfortunately, as we saw, most organizations still use outmoded finance-based

techniques when evaluating IT investments. These represent an essential component of the investment process, but are inadequate on their own and, in some instances, counterproductive.

➤ The Origins of Accounting

Accounting principles as we now know them originated as a mechanism for meeting legal and corporate reporting requirements. Yet, they are still used today (admittedly in a much tweaked and enhanced form) to support a range of executive decisions, including those relating to IT performance and investments—objectives that would have been far from the minds of the originators!

The accountancy-based methods such as payback, discounted cash flow, and internal rate of return reflect their Industrial Age origins, when benefits were measured in terms of enhanced input/output productivity—the factory paradigm. A wide range of elaborate attempts to apply these techniques to evaluating white-collar productivity have been undertaken, with very limited results. These attempts include accounting and financial data, stopwatch studies, task sampling, computer monitoring of keystrokes, and standard costing techniques. They all suffer from a fundamental misunderstanding of what constitutes white-collar productivity, which can be measured in such terms only when it directly parallels factory-style operations, for example, repetitive activities such as invoice production and pay calculations.

These tasks are now seldom undertaken manually, resources instead being directed toward providing faster and better data, decision support facilities, enhanced communication, and other benefits more appropriate to today's environment. Finance-based techniques also frequently equate efficiency with effectiveness. An example of this is a study that attempted to quantify management productivity. The study classified as "unproductive time" such activities as "time spent outside or within a building or waiting for meetings to start or a machine to become available."

This represents a classical Industrial Age, task-based approach to productivity. No attempt is made to evaluate the

possible insights or inspiration a manager may derive from taking a walk outside. Informal discussions with colleagues before or after meetings can, on occasion, be more productive than the meeting itself. Another good illustration is the case of a customer complaints system that greatly reduced the number of follow-up calls. This had the effect, based on strict accounting measures, of reducing productivity, as measured by number of calls handled per operator. Effectiveness improved, but efficiency dropped.

Conventional measurements may not only be inadequate, but may be misleading when it comes to establishing what makes an operation perform more effectively. Consider the following example.

➤ Misleading Capital Values

Traditional accounting is not geared to capitalizing applications development or databases. This reflects the discipline's original purpose, which was to measure physical systems for delivering products and services. Very often, vast sums of money may be spent on building such applications and databases, yet they may not appear on a company's balance sheet since the accounting systems might treat them as expense items. When we consider that a newspaper title has been deemed acceptable for capitalization, it seems strange that valuable, long-term software resources disappear into the black hole of expense accounting.

This question is not one of semantics. Even though they may not qualify as capital for tax purposes, capitalizing these assets can have significant impact. An important consideration is that senior management, through being appraised of the scale of the investment, may be more inclined to apply appropriate investment management resources to it. Gartner experience suggests that the amount of time spent by senior management on IT issues bears no relation to the ratio of capital tied up in IT. Including applications software and databases should have the effect of making management focus more attention on IT issues. While information now meets most of the qualifications as an asset as demanded by the U.S. Financial Accounting Standards Board, traditional accounting techniques are unsuitable for determining the value of information.

➤ Unsuited to Today's Integrated IT Environment

As IT becomes increasingly integrated into all essential business processes and end user involvement continues to grow, few applications can be classed as truly stand alone. Most integrate with the infrastructure or with other applications in some way, if only to share a database or a printer via a network. As a consequence, evaluating potential investments as discrete, stand alone events, as accountancy-based methods inevitably must, is likely to provide an incomplete or even misleading result.

➤ Militate against Medium and Long-Term Planning

Accountancy-based methods have a built-in bias against long-term investments because the longer it takes for the financial returns to be made, the lower the present value. Whereas this is correct in terms of the time-value of money, it tends to present potential investments in IT infrastructure in a relatively unfavorable light. This militates against the formulation of well-structured IT strategic planning, showing potentially crucial requirements such as infrastructure and security in an unfavorable light. Even at the applications level, short-term considerations are likely to predominate and benefits often take longer to achieve than was originally estimated.

➤ Creates Spurious Sense of Reliability

Accounting-based techniques bias the evaluation toward the tangible cost elements and those benefits that lend themselves to easy measurement. Because something can be readily quantified, it will be included. If it cannot be readily quantified, it may well be excluded. This need not be a problem if it is recognized. However, the sheer volume of statistics and the precision with which they are applied can generate a spurious appearance of reliability. This can, and does, translate into an equally spurious feeling of satisfaction among those responsible for the evaluation process. Key areas of value-added business such as customer satisfaction, quality, speed to market, and competitive response will never be approved on the basis of measures that focus on the financially quantifiable.

➤ Backward Focus

These techniques are focused on the past, that is, what happened rather than what is happening or even will happen. Too often past experience is used as the basis for making forecasts. Especially in volatile times, this is likely to be a most unreliable indicator.

This somewhat brief review of conventional accounting-based appraisal methods shows them to be inflexible, geared toward assessing efficiency rather than effectiveness, incapable of incorporating intangible or amorphous benefits, and weak on integration. They will generally favor the safe, short-term investments over the longer term strategic and infrastructure investments. Yet, these latter investments may be essential for business success. They also neglect a formal assessment of risk, which, as will be seen later, can be a major consideration. These qualities remarkably parallel those that gave rise to the present poor performance of IT as detailed earlier. This is to be expected, because they reflect their origins in hierarchical, task-oriented, organizational structures, stemming from another time, which are unsuited for today's business environment. Again, Industrial Age thinking for Information Age problems.

This is not to say that such methods do not have a role. ROI, based on realistic cost benefit analysis, is, particularly when discounted, a vital component of most evaluation exercises. However, it is only one component. The problem today is that the formalized evaluation process in so many organizations continues to rely on these methods—in particular, the cost-benefit analysis (CBA)—alone. The CBA has severe limitations that need to be recognized.

➤ Limitations of the CBA Approach

The CBA approach is:

- *Crude:* Before-and-after estimates of benefit are crude in that they will be accurate only if work patterns remain unaltered after the implementation of the system.

Apart from instances where faster hardware is installed to run an existing computer-based system, this is unlikely to apply. Work patterns almost always change, usually by the elimination of the more routine tasks. But does that work if you're measuring the end product rather than the intermediate steps?

- *Misleading:* The introduction of a new application involves additional expense in terms of software and software maintenance and possibly hardware and other costs. Except where these can be directly assigned to a specific user department, they must be absorbed as overhead. Frequently, this overhead will not be taken into consideration in estimating the costs and benefits. Even when it is, the allocation will be the subject of a certain amount of arbitrariness. For example, if there is spare processing capacity, will the new system be allocated a proportion of processor costs? Should it? In the absence of a consistent approach to these issues, misleading interpretations may result.
- *Inadequate:* Such measures are inadequate for certain types of work, particularly those in the service sector that is forming an increasingly large proportion of economic output. For example, in professional services, with computerized assistance, an accountant may be able to produce more sets of accounts, or a lawyer more opinions, in a given time. This would be seen as increased productivity. Yet, depending on the amount of work on hand, this could actually result in a net reduction in charged time and therefore reduced earnings for the practice. Depending on how we view the issue, productivity gains could range from negative to enormous!
- *Cannot accommodate the growth of overheads:* Direct material and labor, which previously represented an overwhelming proportion of the cost of production, have now been overtaken by overhead costs. Take the example of the microchip, for which material and direct labor now comprise only 11 percent of manufacturing costs—and this percentage will decline. This

trend renders the unit cost efficiency approach an increasingly less appropriate measure of business value.

- *Leads to incomprehensible complexity:* Paul Strassman has used the phrase "micromyopia" to represent what he saw as the tendency to break a problem down into increasingly smaller components when it could not at first be understood. This theory rests on the illusion that all office tasks can be broken down into minute, controllable elements. If this is accepted, all tasks can be evaluated individually, timed and controlled, and therefore measured in terms of productivity. This complexity undermines senior management's understanding and opens the way for manipulation by the cognoscenti. Although this danger is now receding as a better understanding of the dynamics of office productivity begins to take hold, the idea that deeper analysis leads to deeper understanding still has adherents.

■ THE VALUE OF FINANCIAL TECHNIQUES FOR IT INVESTMENT APPRAISAL

Having identified the limitations of these techniques, their valuable characteristics should not be overlooked. One of the most important of these is the time-value of money concept. This, in essence, states that the faster a given benefit is achieved, or the longer a given cost is deferred, the greater the value. This recognizes that, like any other resource, money also has a cost. Two techniques that accommodate the time-value of money are Net Present Value (NPV) and the Internal Rate of Return (IRR). These, and other financially related concepts, are reviewed in more detail in Appendix A.

■ WHAT ELSE DO WE NEED?

We've covered a lot of ground in this chapter, but hopefully the main objective has been achieved, namely, convincing you that financially based measurement, while playing a vital role in

evaluating IT investment, nonetheless represents only one role in the overall process of successfully investing and extracting benefits. What are the others? Our framework recommends that you assess potential investments through five perspectives (including the financial one), or as we prefer to call them, the *Five Pillars of Benefits Realization.* First a brief summary to set them in context, then a more detailed look in Chapter 2.

1. *Strategic Alignment:* The alignment of IT investment strategy with the realization of the organization's business goals and objectives.
2. *Business Process Impact:* The impact on the requirement for the company to redesign business processes, more closely integrate the supply chain, or similar process-intensive initiatives.
3. *Architecture:* The integration, scalability, and resilience of the databases, operating systems, applications, and networks that the company has and/or plans to implement.
4. *Direct Payback:* The conventionally understood benefits a project can deliver, such as cost savings and better information.
5. *Risk:* Identifying the exposure of the proposed investment to failure or underachievement.

At first glance, all of these considerations might appear intimidating to senior executives who may be dazzled by the immense opportunities successful IT deployment offers. The good news is that there is a way to successfully invest in IT. There is a way to derive the benefits in a way that keeps open a wide range of options to accommodate changes in your business and technology environment. There is an Information Age solution that you can deploy. Ultimately, it comes down to good management processes and a best-practice methodology that is fully understood and accepted by the key stakeholders. Gartner has such a methodology based on the Five Pillars. It's one that has been successfully used in a range of organizations and has provided a source of reassurance for business and technology executives worldwide. This book shows you how to deploy this

methodology in your organization and how to set up the governance processes to support it.

SUMMARY

We have seen from the case studies and the evolution over the four Eras that simplistic Production Age mechanisms are no longer appropriate. But we also know that they continue to be deployed extensively. Many organizations have made determined efforts to deploy appropriate techniques, often with considerable success, and Gartner has drawn from these examples to enrich the framework proposed here. This framework thus provides an approach suitable for both beginner organizations and those at a more advanced stage. The beginners will benefit from obtaining full guidance while the more advanced will gain by comparing their current practices against the comprehensive framework provided. The key starting message is: Each investment must be viewed through a broader range of perspectives than before. We discuss this in more detail in Chapter 2.