CHAPTER **6**

Lessons Learned and Best Practices

The previous chapters provided many lessons learned about how chief information officers (CIOs) are successful. As a result, we lay the foundation for the formation of "best practices" to formalize the necessary attributes for rising to the CIO level and, more important, sustaining a leadership role. First, it is important to define what we mean by best practices and specify what components comprise that definition. Best practices are defined as generally accepted ways of doing specific functions and/or processes by a particular profession or industry. Best practices, in the context of the CIO, are a set of processes, behaviors, and organizational structures that tend to provide successful foundations to implement and sustain success. We stated earlier that CIOs needed to help create organizations that use responsive organizational dynamism (ROD) to successfully deal with the volatility of advancing technologies—technologies that challenge the organization to manage a constant state of dynamic and unpredictable change. We also discussed the need for CIOs to integrate with their C-suite colleagues by using strategic advocacy concepts and build the kind of executive collaborations that would allow them to successfully implement ROD. The case studies in Chapter 4 showed that these two issues were consistently the key reasons for the successful accomplishments of the selected CIOs.

Five Pillars to CIO Success—Lessons Learned

In 2011, 30 new graduate students at Columbia University started their development toward becoming tomorrow's CIOs. During the four-day inaugural course, we had a number of notable CIOs, board members, and chief executives from such companies as BP, JetBlue, Russell Reynolds, ICAP, Sealed Air, and Atlas, to name a few.

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As we listened to each presentation, it became clear to me how consistent the messages were from these successful leaders with the results of our case studies in this book. The following are those five key issues discussed and why they are so important for CIO success and ultimately represent the lessons learned summarized best in Chapter 5:

1. **Communication is king**. No question, those CIOs that learn to effectively articulate information technology (IT) from a business perspective are winning the day. The discourse must be business lingo, not IT-converted speak. The more your language fits with those you support and help, the better you will integrate IT in the business. The question becomes how to speak the speak? CIOs recommend that CIOs spend time in the business. This is not just making trips, rather actually visiting the firm's clients and being part of production activities. In this way you can actually understand the true culture of the business and can develop insights to how IT can truly provide value. Typically, the more visibility you have as a CIO, the easier it is to sell your ideas and determine what you need to do to maximize support from the field.

2. **Help define your role**. This was an interesting point made by several CIOs. They stated that many chief executive officers (CEOs), chief operating officers (COO), and chief financial officers (CFOs) may not have the vision to understand what IT can really do to help the firm—and more important what your role needs to be to help accomplish your plan. CIOs need to help define their role—especially as a more strategic partner. We know that too many CIOs are viewed as the backend support function, keeping the lights on; however, firms need the strategic direction of how IT can make a difference competitively. Their point was simple: if you wait to be asked, you may never receive the call. You need to sell your plan to senior management on how the CIO function can be used to help the business on the front end as well as the back end. Inevitably, the acceptance of such a plan can lead to redefining the CIO role and especially where it reports.

3. **Be patient!** Change in organizations takes time. Integration can take longer than you expect. Organization culture evolves slowly, but if the change occurs organically it will be more permanent. Remember that IT is a disruptive force—meaning that it affects employees, especially their roles and responsibilities. We know that organizations do not like change—so it should be no surprise that a new innovation proposed by the CIO may not be openly embraced—but in time things can and will change. Those CIOs that are impatient and righteous do not last long.

4. **Persevere**. Don't think every idea will be accepted. More important, you likely don't get everything you ask for the first time. Every presenter spoke about their failures—and how much they learned from them. In many cases, it led the way to their success because they were able to rebound. Remember, anyone can sail a ship in calm waters, but you can never be a true captain until you sail through a storm! The most important aspect of perseverance is to always be impressive in how you handle yourself and explain your challenges to your C-level partners.

5. **Costs are important**. Many CIOs think that showing how IT can reduce costs is the name of the game. Perhaps, but our presenters were more focused on good fiscal control and sensitivity to expenditures than necessarily taking out costs for the sake of it. What your chief executive and board need to know is that you are a good businessperson, and establishing fiscal controls in your organization is the first test for any C-level person. The difference in fiscal control is that it does not necessarily rule out smart investment and acceptable risk taking. Remember the bottom line has two parts—revenues and expenses!

Thus, at Columbia University, the message was loud and clear. CIOs need to communicate to better integrate with the business, be patient and persevere over their failures, and never forget to be a good fiscal partner! The question then is: what are the set of things that need to happen to create a template for success?

Perhaps most important is that best practices can be obtained only by creating a learning organizations that can support the CIO, that is, it is not just the perfect CIO that makes organizations successful, but rather the CIO's ability to establish the necessary supporting cast of senior and middle managers. Therefore, Langer developed these best practices with the perspective that they must operate across the three key levels of any organization: the CIO, the CEO, and middle-management personnel.[1] However, these multiple tiers of best practices need to be integrated and to operate with one another in order to be considered under the rubric. Indeed, best practices contained solely within a discipline or community is limited in their ability to operate on an organization-wide level. It is the objective of this chapter, therefore, to formulate a set of distinctive yet integrated best practices that that can establish and support ROD by creating a balanced management structure. Each component of the set of best practice needs to be accompanied with a maturity arc, which defines and describes the stages of development and the dimensions that comprise best practices. Each stage will define a linear path of continued progress until a set of best practices is reached. In this way, organizations can assess where they are in terms of best practices, and determine what they need to do to progress.

Ultimately, each maturity arc will represent a subset of the overall set of best practices for the organization. This concept is important in that it suggests that the CIO alone cannot create a sustainable technology-ready organization. Does this mean that the successful CIOs we examined were only successful because they had the right support from their CEO and middle-management teams? Not exactly, but our philosophy does advocate the need to have the right CEO in place, or the ability as emphasized earlier to influence the CEO to understand what he or she needs to do to maximize the ability for the CIO to succeed. By middle management we mean what Langer defined as "line managers."[2] Line managers were defined as individuals who "usually manage an entire business unit and have return-on-investment responsibilities."[3] In other words, line managers run the day-to-day business. In some ways, the CEO and CIO can influence line management behavior and culture, however, in other ways they cannot without revolutionary patterns of change—typically meaning forced elimination of managers. Indeed, Langer's case study, "Ravell" concluded "the success of organizational learning will depend on the degree of cross fertilization . . . and the ability of the community to combine new concepts and beliefs to form a hybrid culture."[4]

The CIO or Chief IT Executive

Langer used the title "chief IT executive" to represent the most senior IT individual in an organization.[5] While these titles are distinct among themselves, he found that they are not consistently followed in organizations. However, it is important to understand these titles and their distinctions, particularly because an organizational learning practitioner will encounter them in practice. These titles and roles are listed and discussed next:

- **Chief information officer (CIO)**. This individual is usually the most senior IT executive in an organization, although not every organization has such a person. The CIO is not necessarily the most technical of people or even someone who has come through the "ranks" of IT. Instead, this individual is considered an executive who understands how technology needs to be integrated within the organization. CIOs typically have other top IT executives and managers who can report directly to them. As shown in the Siemens case study, there can be a number of alternate levels of CIOs, from corporate CIOs to local CIOs of a company division. For the purposes of this discussion, I take up the corporate CIO, who is considered part of the senior executive management team. My research on CEO perceptions of technology and business strategy shows that only a small percentage of CIOs report

directly to the CEO of their organization, so it would be incorrect to generalize that they report to the most senior executive. In many cases, the CIO reports to the chief operating officer, or the COO. As stated earlier, the role of the CIO is to manage information with business needs and strategy. Technology, then, is considered a valuable part of knowledge management from the strategic perspective as opposed to just a technical one.

- **Chief technology officer (CTO)**. This individual, unlike the CIO, is very much a senior technical person. The role of the CTO is to ensure that the organization is using the best and most cost-effective technology to achieve its goals. One could argue that the CTO is more of a research and development type of position. In many organizations, the CTO reports directly to the CIO and is seen as a component of the overall IT infrastructure. However, some companies like Ravell and HTC only have a CTO, and view technology more from the technical perspective.
- **Chief knowledge officer (CKO)**. This role derives from library management organizations because of the relevance of the word *knowledge*. It also competes somewhat with CIO when organizations view technology more from a knowledge perspective. In larger organizations, the CKO may report directly to the CIO. In its purist role, the CKO is responsible for developing an overall infrastructure for managing knowledge, including intellectual capital, sharing of information, and worker communication. Based on this description, the CKO is not necessarily associated with technology, but is more often considered part of the technology infrastructure due to the relevance of knowledge to technology.

In order to define best practices for this function, it is necessary to understand the current information and statistics about what these people do, and how they do it. Most of the statistical data about the roles and responsibilities of chief IT executives is reported under the auspices of the CIO.

From a best practices perspective, the following list from our case studies suggests what chief IT executives should be doing. The list emphasizes team building, coaching, motivating, and mentoring as techniques for implementing these best practices.

- **Strategic thinking**. Understanding the company's business strategy and competitive landscape to apply technology in the most valuable way to the organization.
- **Industry expertise**. Must have the ability to understand the product and services that the company produces.

- **Create and manage change**. Ability to create change, through technology, in the organization's operating and business processes in order to gain efficiency and competitive advantage.
- **Communications**. Ability to communicate ideas, to give direction, listen, negotiate, persuade, and resolve conflicts. Must be able translate technical information to those who are not technologically literate or are outside IT. Chief IT executives also need to be comfortable speaking in public forums and in front of other executives.
- **Relationships building**. Ability to interface with peers, superiors, and customers by establishing and maintaining strong rapport, bond, and trust between individuals.
- **Business knowledge**. Ability to develop strong business acumen and have peripheral vision across all functional areas of the business.
- **Technology proficiency**. Knowledge to identify appropriate technologies that are the most pragmatic for the business and can be delivered quickly, at the lowest cost, produce an impact to the bottom line (ROI), and have longevity.
- **Leadership**. Must be a visionary person, inspirational, influential, creative, fair, and open-minded with individuals within and outside the organization.
- **Management skills**. Ability to direct and supervise people, projects, resources, budget, and vendors.
- **Hiring and retention**. Ability to recognize, cultivate, and retain IT talent.

While the previous list is not an exhaustive, it provides a general perspective, and one that appears very generic; that is, many management positions in an organization might contain similar requirements. A survey of 500 CIOs (performed by *CIO* magazine) rated the top three most important concerns among this community in terms of importance:

1. Communications, 70 percent
2. Business understanding, 58 percent
3. Strategic thinking, 46 percent

What is very interesting about this statistic is that only 10 percent of CIOs identified technical proficiency as critical for their jobs. This finding supports the notion that CIOs need to familiarize themselves with business issues as opposed to just technical ones. Furthermore, the majority of a CIO's time today has been recorded as being spent communicating with other business executives (33 percent) and managing IT staffs (28 percent). Other common activities reported in the survey were:

- Operate the baseline infrastructure and applications.
- Act as technology visionary.

- Implement IT portions of new business initiatives.
- Design infrastructure and manage infrastructure projects.
- Allocate technology resources.
- Measure and communicate results.
- Serve as the company spokesperson on IT-related matters.
- Select and manage product and service providers.
- Recruit, retain and develop IT staff.
- Participate in company and business unit strategy development.

The previous set of results serves to further confirm that chief IT executives define best practices based on understanding and supporting business strategy.

This survey also reported common barriers that chief IT executives have to being successful. The overarching barrier that most IT executives face is the constant struggle between the business expectation to drive change and improve processes and, at the same time, to reduce costs and complete projects faster. The detailed list of reported problems by rank follows:

Lack of key staff, skills sets, and retention, 40 percent

Inadequate budgets and prioritizing, 37 percent

Shortage of time for strategic thinking, 31 percent

Volatile market conditions, 22 percent

Ineffective communications with users, 18 percent

Poor vendor support and service levels and quality, 16 percent

Overwhelming pace of technological change, 14 percent

Disconnection with executive peers, 12 percent

Difficulty proving the value of IT, 10 percent

Counterproductive office politics, 6 percent

Chief IT executives also feel that their roles are ultimately influenced by two leading factors: (1) changes in the nature and capabilities of technology; and (2) changes in the business environment including marketplace, competitive, and regulatory pressures. This can be graphically viewed in Figure 6.1.

Figure 6.1 has a striking similarity to ROD. It shows technology as an independent variable creating the need for ROD, which is composed of strategic integration and cultural assimilation, as shown in Figure 6.2.

The previous issues all suggest that the role of the CIO or chief IT executive is growing, and that their need to become better integrated with the rest of their organizations is crucial for their success. Much more relevant though is the need for ROD, and the role that the chief IT executive has as a member of the overall community. In order to create best practices
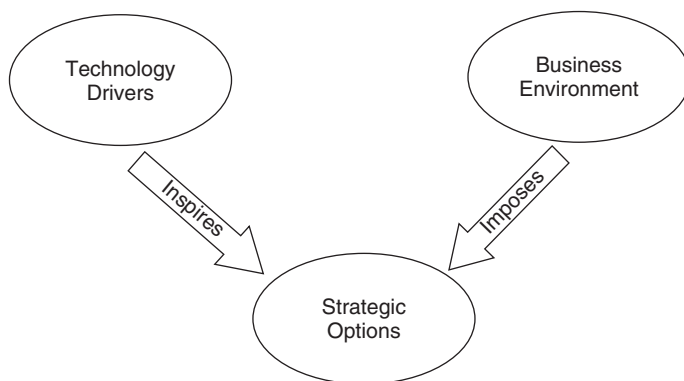
Figure 6.1   Chief IT Executive Role Influences

that embrace organizational learning and foster ROD, a chief IT executive maturity arc needs to be developed that includes the industry best practices presented above integrated with organizational learning components.

The Langer Chief IT Executive Best Practices Arc

The Chief IT Executive Best Practices Arc is an instrument for assessing the business maturity of chief IT executives. The arc may be used to evaluate a chief IT executive's business leadership by using a grid that measures competencies ranging from essential knowledge in technology to more complex uses of technology in critical business thinking. Thus, the Chief IT Executive Best Practices Arc provides executives with a method of integrating technology knowledge and business by providing a structured approach of self-assessment and defined milestones.

The model measures five principal facets of a technology executive: cognitive, organization culture, management values, business ethics, and executive presence. Each dimension or sector is measured in five stages of maturation that guide the chief IT executive's growth. The first facet calls for becoming reflectively aware about one's existing knowledge with technology and what it can do for the organization. The second calls for "other-centeredness" in which chief IT executive's become aware of the multiplicity of technology perspectives available (e.g., other business views of how technology can benefit the organization). The third is "Comprehension of the Technology Process" in which a chief IT executive can begin to merge technology issues with business concepts and functions. The fourth is "Stable Technology Integration" meaning that the chief IT executive understands
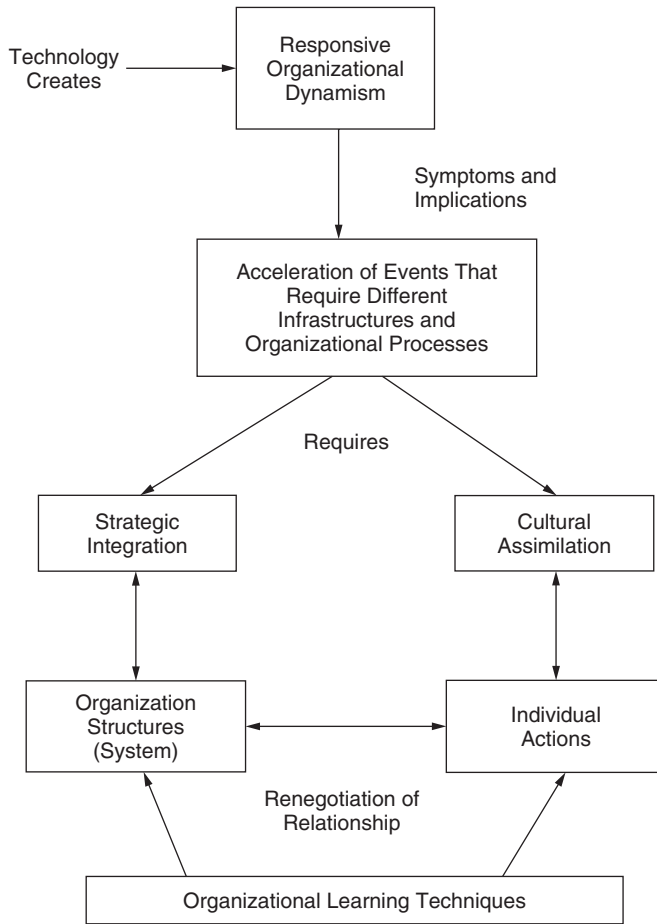
Figure 6.2   Responsive Organizational Dynamism

how technology can be used and is resilient to nonauthentic sources of business knowledge. Stage four represents an ongoing implementation of both technology and business concepts. The fifth is "Technology Leadership" in which chief IT executives have reached a stage where their judgment on using technology and business is independent and can be used to self-educate from within. Thus, as chief IT executives grow in knowledge of technology and business they can become increasingly more other-centered, integrated, stable, and autonomous with the way they use their business minds and express their executive leadership and character.

Definitions of Maturity Stages and Dimension Variables in the Chief IT Executive Best Practices Arc

Maturity Stages

1. **Technology competence and recognition**. This first stage represents the chief IT executive's capacity to learn, conceptualize, and articulate key issues relating to cognitive technological skills, organization culture/etiquette, management value systems, business ethics, and executive presence needed to be a successful chief IT executive in business.

2. **Multiplicity of technology perspectives**. This stage indicates the chief IT executive's ability to integrate multiple points of view about technology from others in various levels of workplace hierarchies. Using these new perspectives, the chief IT executive augments his or her skills with the technology necessary for career success, expands his/her management value system, is increasingly motivated to act ethically, and enhances his or her executive presence.

3. **Comprehension of technology process**. Maturing chief IT executives accumulate increased understanding of workplace cooperation, competition, and advancement as they gain new cognitive skills about technology, and a facility with business culture/etiquette, expand their management value system, perform business/workplace actions to improve ethics about business and technology, and develop effective levels of executive presence.

4. **Stable technology integration**. Chief IT executives achieve integration with the business community when they have levels of cognitive and technological ability, organization etiquette/culture, management values, business ethics, and executive presence appropriate for performing job duties not only adequately, but competitively with peers and even higher ranking executives in the workplace hierarchy.

5. **Technology leadership**. Leadership is attained by the chief IT executive when he or she can employ cognitive and technological skills, organization etiquette, management, a sense of business ethics, and a sense of executive presence in order to compete effectively for executive positions. This chief IT executive is capable of obtaining increasingly executive level positions through successful interviewing and workplace performance.

Performance Dimensions

1. **Technology cognition**. Concerns skills specifically related to learning and applying and creating resources in IT, which include the necessary knowledge of complex operations. This dimension essentially

establishes the CIO as being technically proficient and forms a basis for movement to more complex and mature stages of development.

2. **Organizational culture**. The knowledge and practice of proper etiquette in corporate settings, with regard to dress, telephone and in-person interactions, punctuality, work completion, conflict resolution, deference, and other protocols in workplace hierarchies.

3. **Management values**. Measures the individual's ability to articulate and act upon mainstream corporate values credited with shaping the work ethic: independent initiative, dedication, honesty, and personal identification with career goals based on the organization's philosophy of management protocol.

4. **Business ethics**. Reflects the individual's commitment to the education and professional advancement of other persons in technology and other organizations.

5. **Executive presence**. Involves the chief IT executive's view of the role of an executive in business and the capacity to succeed in tandem with other executives. Aspects include a devotion to learning and self-improvement, self-evaluation, the ability to acknowledge and resolve business conflicts, and resilience when faced with personal and professional challenges.

Figure 6.3 shows the chief IT executive best practices arc in chart form. Each cell in the arc provides the condition for assessment. The complete arc is provided in Figure 6.4.

Chief Executive Officer

When attempting to define chief executive officer (CEO) best practices, one is challenged with the myriad of material that attempts to determine the broad, yet important role of the CEO. As with many best practices, they are typically based on trends and percentages of what most CEOs do—assuming of course that the companies they work for are successful. That is, if their organization is successful, then their practices must be as well. This type of associative thinking leads to what researchers often call "false generalizations." Indeed, these types of inadequate methods lead to false judgments that foster business trends that are misinterpreted as best practices. Reputation is what would better define these trends, which usually after a period of time become ineffective and unpopular. We must also always remember the human element of success—certain individuals succeed based on natural instincts and talent, hard work and drive, and so on. These components of success should not be confused with theories that are scalable and replicable to practice; that is what best practices need to accomplish.

Dimension Skill	Technology Competence and Recognition	Multiplicity of Technology Perspectives	Comprehension of Technology Process	Stable Technology Integration	Technology Leadership
Technology Cognition					
Organization Culture					
Management Values					
Business Ethics					
Executive Presence					

Figure 6.3   Chief IT Executive Best Practices Arc

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Dimension Variable	Technology Competence and Recognition	Multiplicity of Technology Perspectives	Comprehension of Technology Process	Stable Technology Integration	Technology Leadership
Technology Cognition	Understands how technology operates in business. Has mastered how systems are developed, hardware interfaces, and the software development life cycle. Has mastery of hardware, compilers, run-time systems. Has core competencies in distributed processing, database development, object-oriented component architecture, and project management. Is competent with main platform operating systems such as UNIX, WINDOWS, MAC Has the core ability to relate technology concepts to other business experiences. Can also make decisions about what technology is best suited for a particular project and organization. Can be taught how to expand the use of technology and can apply it to other business situations.	Understands that technology can have multiple perspectives. Able to analyze what are valid versus invalid opinions about business uses of technology. Can create objective ideas from multiple technology views without getting stuck on individual biases. An ability to identify and draw upon multiple perspectives available from business sources about technology. Developing a discriminating ability with respect to choices available. Realistic and objective judgment, as demonstrated by the applicability of the technology material drawn for a particular project or task and tied to functional/pragmatic results.	Has the ability to relate various technical concepts and organize them with nontechnical business issues. Can operate with both automated and manual business solutions. Can use technology to expand reasoning, logic, can what-if scenarios. Ability to use the logic of computer programs to integrate the elements of nontechnological tasks and business problems. Ability to discern the templates that technology has to offer in order to approach everyday business problems. This involves the hypothetical (inductive/deductive) logical business skill.	Knowledge of technology is concrete, accurate, and precise, broad and resistant to interference from nonauthentic business sources. Ability to resist or recover from proposed technology that is not realistic—and can recover resiliently.	Methods and judgment in a multidimensional business world is independent, critical discernment. Knowledge of technology and skills in technology can be transferred and can be used to self-educate within and outside of technology. Can use technology for creative purposes to solve business challenges and integrate with executive management views.

Figure 6.4   Detailed Chief IT Executive Best Practices Arc

Dimension Variable	Technology Competence and Recognition	Multiplicity of Technology Perspectives	Comprehension of Technology Process	Stable Technology Integration	Technology Leadership
Organization Culture	Understands that technology can be viewed by other organizations in different ways. Uses technology as a medium of communication. Understands that certain technological solutions, Web pages, and training methods may not fit all business needs and preferences of the business. Has the ability to recommend/suggest technological solutions to suite other business needs and preferences	Seeks to use technology as a vehicle to learn more about organization cultures and mindsets. Strives to care about what others are communicating and embraces these opinions. Tries to understand and respect technologies that differ from own. Understands basic technological needs of others.	Can deal with multiple dimensions of criticism about technology. Can develop relationships (cooperative) that are dynamic and based on written communication and oral discourse. Ability to create business relations outside of technology departments. Has an appreciation of cyberspace as a communication space—a place wide open to dialogue (spontaneous), to give and take, or other than voyeuristic, one-sidedness. Ability to produce in teamwork situations, rather than solely in isolation.	Loyalty and fidelity to relations in multiple organizations. Commitment to criticism and acceptance of multiple levels of distance and local business relationships. Ability to sustain nontraditional types of inputs from multiple sources.	Can utilize and integrate multidimensions of business solutions in a self-reliant way. Developing alone if necessary using other technical resources. Can dynamically select types of interdependent and dependent organizational relationships. Ability to operate within multiple dimensions of business cultures, which may demand self-reliance, independence of initiative and interactive communications.

Figure 6.4   (*Continued*)

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Dimension Variable	Technology Competence and Recognition	Multiplicity of Technology Perspectives	Comprehension of Technology Process	Stable Technology Integration	Technology Leadership
Management Values	Technology and cultural sensitivity. Global communication, education, and workplace use of technology can be problematic—subject to false generalizations and preconceived notions. Awareness of assumptions about how technology will be viewed by other organizations and about biases about types of technology (MAC vs. PC).	Can appreciate need to obtain multiple sources ofi nformation and opinion. The acceptance of multidimensional values in human character	Can operate within multiple dimensions of value systems and can prioritize multitasking events that are consistent with value priorities. Ability to assign value to new and diverse technology alternatives—integrating them within a system of preexisting business and technology values.	Testing value systems in new ways due to technology is integrated with long-term values and goals for business achievement. Some concepts are naturally persistent and endure despite new arenas in the technological era.	Use of technology and business are based on formed principles as opposed to dynamic influences or impulses. Formed principles establish the basis for navigating through, or negotiating the diversity of business influences and impulses.
Business Ethics	Using technology with honesty re: privacy of access and information. Development of ethical policies governing business uses of the Internet, research, intellectual property rights and plagiarism.	The use ofi nformation in a fair way—comparison of facts against equal sources of business information. Compassion for business information for which sources are limited because of inequality of technology access. Compassion for sharing information with other business units from a sense ofi nequality.	Consistent values displayed on multiple business communications, deliverables of content, and dedication to authenticity. Maintains consistency in integrating values within technology business issues.	Technology is a commitment in all aspects of value systems, including agility in managing multiple business commitments. Commitment to greater openness of mind to altering traditional and nontechnological methods.	Technological creativity with self-defined principles and beliefs. Risk-taking in technology-based ventures. Utilizing technology to expand one's arenas of business freedom. Exploring the business-liberating capacities of technology.

Figure 6.4   (*Continued*)

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Dimension Variable	Technology Competence and Recognition	Multiplicity of Technology Perspectives	Comprehension of Technology Process	Stable Technology Integration	Technology Leadership
Executive Presence	Has accurate perception of one's own potential and capabilities in relation to technology in the business—the technologically realizable executive self.	Understands how other executives can view self from virtual and multiple perspectives. Understands or has awareness of the construction of self that occurs in business. Focuses on views of other executives in multiple settings. Understands that the self (through technology) is open for more fluid constructions, able to incorporate diverse views in multiple settings.	Operationalizes technology to unify multiple components of the self and understands its appropriate behaviors in varying executive situations.	Has regulated an identity of self from a multiplicity of executive venues. Methods of business interaction creates positive value systems that generate confidence about operating in multiple business communities.	Acceptance and belief in a multidimensional business world of the self. Can determine comfortably the authenticity of other executives and their view of the self. Can confirm disposition independently from others' valuations, both internally and from other organization cultures. Beliefs direct and control multidimensional executive growth.

Figure 6.4   (*Continued*)

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This section focuses on technology best practices of the CEO. These best practices will be based on my research, as well as other positions and facts that provide a defendable context of how and why they appear to be effective. However, as with the chief IT executive model, best practices cannot be attained without an arc that integrates mature organizational learning and developmental theories. Many of the CEO best practices are reconciled against previous interviews with CEOs. Other published definitions and support will be referenced in our presentation.

In February 2002, Hackett Benchworking, a part of Answerthink Corporation, issued its best practices for IT. Their documentation states: "In compiling its 2002 best practices trend data, Hackett evaluated the effectiveness (quality and value) and efficiency (cost and productivity) of the information technology function across five performance dimensions: strategic alignment with the business; ability to partner with internal and external customers; use of technology; organization; and processes."[6] Their findings as they apply to the CEO function provide the following generalizations:

- There was an 85 percent increase in the number of CIOs that reported directly to the CEO. This increase would suggest that CEOs need to directly manage the CIO function because of its importance to business strategy.
- CEOs that supported outsourcing did not receive the cost cutting effectiveness that they had hoped. In fact, most break even. This suggests that CEOs should not view outsourcing as a cost-cutting measure, but rather foster its use where there is identifiable business benefits.
- CEOs have found that IT organizations that have centralized operations save more money and have fewer help-line calls than decentralized organizations and without sacrificing service quality. This suggests the CEOs should consider less business-specific support structures especially when they have multiple locations of business.
- CEOs are increasingly depending on the CIO for advice on improving the business with technology. Their view is that IT professionals then should have advanced business degrees.
- CEOs should know that consistent use of IT standards has enabled firms to trim IT development costs by 41 percent, which has reduced costs for end-user support and training operations by 17 percent.
- CEOs need to increase support for risk management. Only 77 percent of average companies maintain disaster-recovery plans.

As we can see from these generalizations, they are essentially based on what CEOs are doing and what they have experienced. Unfortunately, this

survey addresses little about what CEOs know and exactly what their role should be with respect to overall management, participations, and learning of technology. These "best practices" are particularly lacking in the area of organizational learning and the firm's abilities to respond to changing conditions as opposed to searching for general solutions.

Langer formulated a list of 11 key planks that represent the core of what constitutes a technology CEO's set of best practices:

1. The chief IT executive should report directly to the CEO.
2. CEOs should be actively committed to technology on an ongoing basis, as opposed to a project-by-project involvement.
3. CEOs should be willing to be management catalysts to support new technology-driven projects. They, in effect, need to sometimes play the role of technology champion.
4. CEOs should focus on business concepts and plans to drive technology. In other words, technology should not drive the business.
5. CEOs should use consultants to provide objective input to emerging technology projects.
6. CEOs should establish organizational infrastructures that foster the creation of communities of practice. They need to create joint ownership of IT issues by fostering discourse between IT and business managers and staff.
7. CEOs may need to take control of certain aspects of technology investments such as setting milestones and holding management and staff to making critical project dates.
8. CEOs need to foster cultural assimilation, which may lead to reorganization since technology changes processes.
9. CEOs need to understand organizational learning and knowledge management theories and participate in organizational transformation.
10. CEOs need to understand how the technology life cycle behaves, with specific attention to the transition from driver activities to supporter functions. To that end, CEOs need to understand the short- and long-term investments that need to be made in technology.
11. CEOs should create organizations that can effectively operate within technological dynamism. This process will educate management and staff to handle the dynamic and unpredictable effects of emerging technologies. It will also foster the development of both middle-up-down and bottom-up management of technology.[7]

The issue is now to provide a linear development model for CEOs that enables them to measure where they are in relation to ROD and the best practices outlined earlier.

The CEO Best Practices Technology Arc

Similar to the Chief IT Executive Arc, the CEO Best Practices Arc is an instrument for assessing the technology best practices of CEOs. The arc evaluates a CEO's strategic uses of technology and leadership by using a grid that charts competencies ranging from conceptual knowledge about technology to more complex uses of technology and business and how they are integrated in strategic business planning.

As with all arc models, the CEO version measures five principal stages of a CEO's maturity with respect to business applications of technology: conceptual, structural, executive values, executive ethics, and executive leadership. Each dimension or sector is measured in five stages of maturation that guides the CEO's executive growth managing technological dynamism. The first stage is in being reflectively aware about their conceptual knowledge with technology and what it can do for the organization. The second is "other-centeredness" where CEOs become aware of the multiplicity of business uses of technology and the different views that can exist inside and outside the organization. The third is "Integration of Business use of Technology," where a CEO can begin to combine how business plans foster the need for technology. The fourth is "Implementation of Business/Technology Process," meaning that the CEO understands how business applications and technology are used together and is resilient to nonauthentic sources of emerging technology. Stage four represents an ongoing implementation of both technology and business applications. The fifth is "Strategic Uses of Technology" in which CEOs have reached a stage where their judgment on using technology and business is independent and can be used to self-educate from within. Thus, as CEOs grow in knowledge of business uses of technology they can become increasingly more understanding of the multiplicity of uses, more integrated in how they conceptualize technology, can manage its implementation from an executive position, and can apply new strategies to support new applications of technology in the organization.

Definitions of Maturity Stages and Dimension Variables in the CEO Technology Best Practices Arc

Maturity Stages

1. **Conceptual knowledge of technology**. This first stage represents the CEO's capacity to learn, conceptualize, and articulate key issues relating to business uses of technology, organizational structures available, executive value methods, executive ethical issues surrounding technology, and leadership alternatives needed to be a successful with technology applications.

2. **Multiplicity of business perspectives of technology**. This stage indicates the CEO's ability to integrate multiple points of view from management, staff, and consultants about technology applications in business. Using these new perspectives, the CEO augments his or her conceptual skills with technology, has an expanded view of what organizational structures might work best, expands his or her executive values about technology uses, is increasingly aware of the ethical dilemmas with technology, and enhances his or her leadership abilities.

3. **Integration of business uses of technology**. Maturing CEOs accumulate increased understanding of how technology can support the business, provide more competitive advantage and a more integrated understanding of how to use their conceptual skills about technology, the alternative organizational structures available, how to combine their business executive value and ethical systems, and develop effective levels of executive leadership.

4. **Implementation of business/technology process**. CEOs achieve integration when they can regularly apply their conceptual knowledge of technology, organization structures, executive values and ethics about technology, and executive leadership appropriate for performing their job duties not only adequately but at a level that provides a competitive advantage for the organization.

5. **Strategic uses of technology**. Leadership is attained by the CEO when he or she can employ conceptual skills, develop new organizational structures as necessary, establish new values and ethics that are appropriate for the organization, and create a sense of executive presence in order to lead the organization strategically. This CEO is capable of having new vision about how business and technology can be expanded into new endeavors.

Performance Dimensions

1. **Technology concepts**. Concerns conceptual skills specifically related to understanding how technology can be used in the business. This dimension essentially establishes the CEO as being technically proficient, conceptually, and forms a basis for movement to more complex and mature stages of business/technology development.

2. **Organizational structures**. The knowledge of the alternative organizational structures that can support the application of emerging technology in corporate settings, with regard to roles, responsibilities, career paths, and organizational reporting alternatives.

3. **Executive values**. Measures the CEO's ability to articulate and act on mainstream technological values credited with shaping the work

ethic: independent initiative, dedication, honesty, and personal iden-tification with career goals based on the organization's philosophy of management protocol.

4. **Executive ethics**. Reflects the CEO's commitment to the education and professional advancement of organization's behavior as it relates to business uses of technology.

5. **Executive leadership**. Involves the CEO's view of the role of an executive in business and the capacity to succeed in tandem with his or her organizational resources. Aspects include a devotion to organizational learning and self-improvement, self-evaluation, the ability to acknowledge and resolve business/technology conflicts, and resilience when faced with personal and professional challenges.

Figure 6.5 shows the CEO technology best practices arc in chart form.

Each cell in the arc provides the condition for assessment. The complete arc is provided in Figure 6.6.

Middle Management

Middle managers can represent a number of management tiers, and is perhaps the most challenging of the best practices to define. Langer stratified the different types of positions that make up middle managers into three tiers: directors, line managers, and supervisors.[8] The objective then is to create the set of technology best practices for managers so that they can effectively operate under ROD. It is also important for the CIO to attain these best practices to effectively establish the kind of organization that can integrate IT and non-IT personnel. That is, technology best practices must be designed to contain the eight insights and skills for effective management of technology.

1. Working with IT personnel.
2. Providing valuable input to the executive management team including the CEO.
3. Participating and developing a technology strategy within their business units.
4. Effectively managing project resources, including technical staff.
5. Leading innovative groups in their departments.
6. Incorporating technology into new products and services.
7. Proactive methods of dealing with changes in technology.
8. Investigates how technology can improve competitive advantage.[9]

As with CEO research, there is a myriad of best practices that have been offered as a method of dealing with the subject of "technology management."

Dimension Skill	Conceptual Knowledge of Technology	Multiplicity of Business Perspectives of Technology	Integration of Business Uses of Technology	Implementation of Business/ Technology Process	Strategic Users of Technology
Technology Concepts					
Organizational Structures					
Executive Values					
Executive Ethics					
Executive Leadership					

Figure 6.5   Developmental Dimensions of Maturing

Dimension Variable	Conceptual Knowledge of Technology	Multiplicity of Business Perspectives of Technology	Integration of Business Uses of Technology	Implementation of Business/ Technology Process	Strategic Uses of Technology
Technology Concept	Understands concepts and definitions about technology and how it relates to business. Has conceptual knowledge of the software development life cycle. Understands high-level concepts about distributed processing, database development, and project management. Understands the definition and role of operating systems such as UNIX, WINDOWS, MAC Has the ability to relate technology concepts to other business experiences. Understands that different technology may be required for a particular project and organization. Can conceptualize how to expand the use of technology and apply it to business situations.	Seeks to manage by appreciating that technology can have multiple perspectives. Able to manage a process that requires validation about different opinions about business uses of technology. Can manage the different objective ideas from multiple technology views without getting stuck on personal biases. Has an ability to identify and draw upon multiple perspectives available from business sources about technology, particularly from independent sources. Developing a discriminating ability to create an infrastructure that can operate with multiple views. Committed to creating an organization that can learn through realistic and objective judgment, as demonstrated by the applicability of the technology material drawn for a particular project or task and tied to business outcomes.	Creates an organization that has the ability to relate various technical concepts and organize them with nontechnical business issues. Can manage by operating with both automated and manual business solutions. Can use technology to expand business reasoning, logic, and what-if scenarios. Establishes business templates that allow technology to offer everyday business solutions. This involves the hypothetical (inductive/deductive) logical business issues.	Organization's use of technology is concrete, accurate, and precise, broad and resistant to interference from nonauthentic technology business sources. Ability to resist or recover from faulty uses of technology that is not realistic without a supporting business plan.	Methods and judgment as a multidimensional CEO is independent, has critical discernment. Conceptual knowledge of technology can be transferred and can be used to self-educate within and outside of technology. Can use technology for creative purposes to create new business initiatives and integrate them with short- and long-term business goals.

Figure 6.6   CEO Technology Best Practices Arc

Dimension Variable	Conceptual Knowledge of Technology	Multiplicity of Business Perspectives of Technology	Integration of Business Uses of Technology	Implementation of Business/ Technology Process	Strategic Uses of Technology
Organizational Structures	Understands that technology can be viewed by other organizations in different ways and may need different organizational structures. Can use technology as a medium of communication. Understands that certain technologies may need to be managed differently and need specific types of structures and expertise. Has the ability to comprehend recom-mended/suggested technological solutions to suite business needs and preferences	Seeks to manage technology as a vehicle to learn more about what alternative organization structures are available from others. Strives to create a learning organization that cares about what other staff perceive as solutions. Committed to cultural assimilation that can change the need to restructure the organization. Tries to understand and respect technologies that differ from what the organization is currently using. Understands that the organization has multiple and different technological needs.	Can deal with multiple dimensions of criticism about how technology can be used in the organization. Can develop relationships (cooperative) that are dynamic and based on written communication and oral discourse about how business can drive technological investments. Ability to create new business relations using technology with new and existing customers. Has an appreciation of cyberspace as a new market—a place wide open to dialogue (spontaneous), to provide new opportunities for business growth.	Commitment to open discussion of alternating opinions on technology and acceptance of varying types of structures to accommodate technology opportunities. Ability to sustain dynamic organizational structures.	Can design new structures to integrate multidimensions of business and technology solutions. Can dynamically manage different types of interdependent and dependent organizational relationships. Ability to manage within multiple dimensions of business cultures, which may demand self-reliance and confidence in independence of initiatives.

Figure 6.6 (*Continued*)

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Dimension Variable	Conceptual Knowledge of Technology	Multiplicity of Business Perspectives of Technology	Integration of Business Uses of Technology	Implementation of Business/ Technology Process	Strategic Uses of Technology
Executive Values	Understanding of technology and cultural differences. Conceptually understands that global communication, education, and workplace use of technology can be problematic—subject to false generalizations and preconceived notions. Management awareness of responsibilities to address assumptions about how technology will be viewed by other departments and customers.	Sets conditions that foster the need to obtain multiple sources ofi nformation and opinion about how technology values. The propagation organizationally of acceptance that there can be multidimensional values in human character.	Can manage multiple dimensions of value systems and can prioritize multitasking events that are consistent with value priorities. Ability to assign value to new and diverse technology business alternatives—linking them to legacy systems and processes.	Managing value systems in new ways because technology changes long-term values and goals for business goals and objectives. Recognition that some concepts remain unchanged despite emerging technologies.	Management of technology and business are based on formed principles as opposed to dynamic influences or impulses. Formed executive principles establish the basis for navigating through, or negotiating the diversity of business opportunities and impulses for investment in technologies.

Figure 6.6   (*Continued*)

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Dimension Variable	Conceptual Knowledge of Technology	Multiplicity of Business Perspectives of Technology	Integration of Business Uses of Technology	Implementation of Business/ Technology Process	Strategic Uses of Technology
Executive Ethics	Understands that there is a need to use technology with honesty re: privacy of access and information. Supports the development of ethical policies governing business uses of the Internet, research, intellectual property rights and plagiarism.	Committed to creating an organization that uses information in a fair way—comparison of facts against equal sources of business information. Understands and is compassionate that business and technology information may have different levels of knowledge access. Recognizes the need for sharing information with other business units from a sense ofi nequality.	Consistent management values displayed on multiple business goals, mission, and dedication to authenticity. Maintains management consistency in combining values regarding technology issues.	Business and technology are a commitment in all aspects of management value systems, including agility in managing multiple business commitments. Commitment to greater openness of mind to altering traditional and nontechnological management methods.	Technology management creativity with self-defined principles and beliefs. Risk taking in technology-based ventures. Utilizing technology to expand one's arenas of business development. Manages the business liberating capacities of technology.

Figure 6.6   (*Continued*)

Dimension Variable	Conceptual Knowledge of Technology	Multiplicity of Business Perspectives of Technology	Integration of Business Uses of Technology	Implementation of Business/ Technology Process	Strategic Uses of Technology
Executive Leadership	Conceptualizes the need to have a leadership role with respect to technology in the business—the business and technologically realizable executive self.	Understands how other executives can view technology leadership differently. Understands or has awareness of the construction of self that occurs when taking on the integration of technology in business operations. Focuses on views of other CEOs in multiple settings. Understands that the self (through technology) is open for more fluid constructions, able to incorporate diverse views in multiple technology settings.	Manages technology to unify multiple parts of the organization and understands how the process behaves in different business situations.	Has developed an executive identity of self from a multiplicity of management venues. Method of management creates positive value systems that generate confidence about how multiple business communities need to operate.	Acceptance and beliefi n a multidimensional business world of the how to lead with technology. Can determine comfortably, authenticity of organization's executives and their view of the self. Can confirm disposition on technology independently from others' valuations, both internally and from other organizations. Beliefs direct and control multidimensional leadership growth.

Figure 6.6   (*Continued*)

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Unfortunately, these practices usually are vague and intermingle management levels and departments, that is, it is difficult to know whether the best practice is for the chief IT executive, the CEO, or some other level of management. We know from the research from Bolman and Deal that middle managers feel torn by conflicting signals and pressures they get from both senior management and the operations that report to them.[10] "They need to understand the difference in taking risks and getting punished for mistakes."[11] According to a 2003 study performed by SRI Consulting Business Intelligence, best practices for middle managers need to cover the following eight areas:

1. Knowledge management
2. Alignment
3. Leadership and commitment
4. Organization
5. Human resources
6. Opportunity management
7. Leveraging
8. Performance assessment

The study covered more than 400 companies in the previous eight areas of concern (I extracted the following 10 middle-management-related best practices from the study results and concluded that middle managers need to):

1. Understand how to take a strategy and implement it with technology; that is, they need to create tactics for completing the project.
2. Establish team-building measures for linking technology with staff's daily operations.
3. Foster the aggregation and collaboration of business unit assets to form peer groups that can determine joint efforts for implementing new technologies.
4. Stimulate their staffs using innovative strategies of value propositions and reward systems.
5. Create multifunctional teams that can focus on particular aspects of how technology affects their specific area of expertise.
6. Follow common project management practices so that multitiered and department projects can be globally reviewed by senior management.
7. Form project teams that can respect and perform on an action basis, that is, teams that are action oriented.
8. Understand how to communicate with and use IT staff on projects.
9. Have a systematic process for gathering intelligence relating to pertinent technology developments.
10. Understands that customers are the drivers for technology tools provided by the organization.

Upon reviewing the different aspects of middle manager best practices with technology research, it appears that there are two focal points: (1) those best practices that address the needs of senior management, the CIO, and the CEO, and (2) those that are geared toward the management of the staffs that need to implement emerging technology projects. This makes sense, given that the middle manager, notwithstanding whether they are a director, line manager, or supervisor, needs to deal with executive productivity related issues and implementation staff related ones. They are, as Bolman and Deal stated, "torn" by these two competing organizational requirements. Table 6.1 represents the combined list of technology-based best practices organized by executive-level best practices and implementation best practices.

Table 6.1 Executive-Based Middle Manager Best Practices

Executive-Based Middle Manager Best Practices	Implementation-Based Middle Manager Best Practices
1. Provide valuable input to the executive management team including the CEO	1. Understand how to communicate with and use IT staff on projects
2. Incorporate technology into new products and services	2. Effectively manage project resources, including technical staff
3. Participate and develop a technology strategy within his or her business unit	3. Lead innovative groups in their departments
4. Act proactively when dealing with changes in technology	4. Understand how to take a strategy and implement it with technology
5. Focus on how technology can improve competitive advantage	5. Establish team-building measures for linking technology with staff's daily operations
6. Have a systematic process for gathering intelligence relating to pertinent technology developments.	6. Foster the aggregation and collaboration of business unit assets to form peer groups that can determine joint efforts for implementing new technologies
7. Understand that customers are the drivers for technology tools provided by the organization	7. Stimulate staffs using innovative strategies of value propositions and reward systems.
	8. Create multifunctional teams that can focus on particular aspects of how technology affects their specific area of expertise
	9. Follow common project management practices so that multitiered and department projects can be globally reviewed by senior management.
	10. Form project teams that can perform proactively

The matrix in Table 6.1 exemplifies the challenge that middle managers have in order to balance their priorities. In accordance with the research, the previous best practices are implemented using methods of knowledge management, alignment, leadership and commitment, human resources, opportunity management, leveraging, and performance assessment. As with the other best practices, the middle manager technology best practices are limited because they do not address the specific needs of ROD, particularly organizational learning theories (with the exception of knowledge management). This shortfall is integrated into another developmental arc model that combines these theories with the best practices defined earlier.

The Middle-Management Best Practices Technology Arc

This arc can be used to evaluate a middle manager's strategic and operational uses of technology by using a grid that measures competencies ranging from conceptual knowledge about technology to more complex uses of technology and business operations.

The five principal stages defined by the arc determine the middle manager's maturity with business implementations of technology: cognitive, organization interactions, management values, project ethics, and management presence. There are five stages of maturation that guide the middle manager's growth. The first is becoming reflectively aware about one's existing knowledge with business technology and how it can be implemented. The second is the recognition of the multiple ways that technology can be implemented on projects (e.g., other business views of how technology can benefit the organization). The third is the integration of business implementation of technology in which a middle manager can begin to combine technology issues with business concepts and functions on a project basis. "The fourth is the stability of business/Technology implementation" in which the middle manager has integrated business and technology as a regular part of project implementations. The fifth is technology project leadership in which the middle manager can use his or her independent judgment on how best to use technology and business on a project-by-project basis. Thus, as middle managers grow in knowledge of technology and business projects, they can become increasingly more open to new methods of implementation and eventually autonomous with the way they implement projects and provide leadership.

Definitions of Maturity Stages and Dimension Variables in the Middle-Management Best Practices Arc

Maturity Stages

1. **Technology implementation competence and recognition**. This first stage represents the middle manager's capacity to learn, conceptualize, and articulate key issues relating to cognitive business

technological skills, organizational interactions, management value systems, project management ethics, and management presence.

2. **Multiplicity of business implementation of technology**. Indicates the middle manager's ability to integrate multiple points of view during technical project implementations. Using these new perspectives, the middle manager augments his or her skills with business implementation with technology career advancement, expands his or her management value system, is increasingly motivated to act ethically during projects, and enhances his or her management presence.

3. **Integration of business implementation of technology**. Maturing middle managers accumulate increased understanding of how business and technology operate together and affect one another. They gain new cognitive skills about technology, and a facility with how the organization needs to interact, expand their management value system, perform business/technology actions to improve ethics about business and technology, and develop effective levels of management presence.

4. **Stability of business implementation**. Middle managers achieve stable integration when they have implemented all projects using their cognitive and technological ability; organization interactions with operations; management values with their superiors, peers, and subordinates; project ethics; and management presence appropriate for performing job duties not only adequately, but competitively with peers and higher-ranking executives in the organization hierarchy.

5. **Technology project leadership**. Leadership is attained by the middle manager when he or she can employ cognitive and technological skills, organization interactions, management, a sense of business ethics, and a sense of management presence in order to compete effectively for executive positions. This middle manager is capable of obtaining increasingly executive level positions through successful interviewing and organization performance.

Performance Dimensions

1. **Business technology cognition**. Concerns skills specifically related to learning, applying, and creating resources in business and technology, which include the necessary knowledge of complex operations. This dimension essentially establishes the middle manager as being "operationally" proficient with technology and forms a basis for movement to more complex and mature stages of development when managing technology projects.

2. **Organizational interactions**. The knowledge and practice of proper relationships and management interactions during technology projects. This pertains to in-person interactions, punctuality of staff,

work completion, conflict resolution, deference, and other protocols in technology projects.

3. **Management values**. Measures the middle manager's ability to articulate and act upon mainstream corporate values credited with shaping technology project work ethic: independent initiative, dedication, honesty, and personal identification with project goals based on the organization's philosophy of management protocol.

4. **Project ethics**. Reflects the middle manager's commitment to the education and professional advancement of other persons in technology and in other departments.

5. **Management presence**. Involves the middle manager's view of the role of a project-based manager during a technology project implementation and the capacity to succeed in tandem with other projects. Aspects include a devotion to learning and self-improvement, self-evaluation, the ability to acknowledge and resolve business conflicts, and resilience when faced with personal and professional challenges during technology implementations.

Figure 6.7 shows the middle-management technology best practices arc in chart form.

Each cell in the arc provides the condition for assessment. The complete arc is provided in Figure 6.8.

The challenge of the middle-management best practices arc is whether to emphasize executive management concepts (more organizationally intended) or event-driven concepts (project oriented). This arc focuses on project implementation factors and deals with best practices that can balance executive pressures with implementation realities. I suggest that senior middle managers, at the director level, who do not participate in implementation, set their own best practices on the model of the CEO maturity arc and best practices. In any event, yet another maturity arc appears to have too many overlapping cells.

Conclusion

The formation of best practices to implement and sustain ROD is a complex task for any CIO. It involves combining traditional best-practice methods (that is, what seems to work for proven organizations) with developmental theory on individual maturation. The combination of these two components provides the missing organizational learning piece that supports the attainment of ROD. Another way of comprehending this concept is to view the Responsive Organizational Dynamism Arc as the overarching or top-level model.

Dimension Skill	Technology Implementation Competence and Recognition	Multiplicity of Business Implementation of Technology	Integration of Business Implementation of Technology	Stability of Business/ Technology Implementation	Technology Project Leadership
Business Technology Cognition					
Organizational Interactions					
Management Values					
Project Ethics					
Management Presence					

Figure 6.7   Middle-Management Technology Best Practices Arc

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Dimension Variable	Technology Implementation Competence and Recognition	Multiplicity of Business Implementation of Technology	Integration of Business Implementation of Technology	Stability of Business / Technology Implementation	Technology Project Leadership
Business Technol-ogy Cognition	Understands how technology operates during projects. Has conceptual knowledge about hardware interfaces, and the software development life cycle. Has the core ability to relate technology concepts to other business experiences. Can also participate in the decisions about what technology is best suited for a particular project. Can be taught how to expand the use of technology and can apply it to other business situations.	Understands that technology projects can have multiple perspectives on how to implement them. Able to analyze what is valid vs. invalid opinions about business uses of technology. Can create objective ideas from multiple technology views without getting stuck on individual biases. An ability to identify and draw upon multiple perspectives available from project sources about technology. Developing a discriminating ability with respect to choices available. Realistic and objective judgment, as demonstrated by the applicability of the technology material drawn for a particular project or task and tied to functional/pragmatic outcomes.	Has the ability to relate various technical project concepts and organize them with nontechnical business issues. Can operate with both business and technical solutions. Can use technology to expand reasoning, logic, and what-if scenarios. Ability to discern the templates that technology has to offer in order to approach everyday technology project problems. This involves the hypothetical (inductive/deductive) logical business and technology skills.	Knowledge of technology projects are concrete, accurate, and precise, broad and resistant to interference from nonauthentic business and technical project sources. Ability to resist or recover from proposed technology that is not realistic—and can recover resiliently.	Methods and judgment in multidimensional technology projects are independent and use critical discernment. Operational knowledge of technology and project management skills can be transferred and can be used to self-educate within and outside of technology. Can use technology for creative purposes to solve business and project challenges and integrate with executive management views.

Figure 6.8   Middle-Management Technology Best Practices Arc

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Dimension Variable	Technology Implementation Competence and Recognition	Multiplicity of Business Implementation of Technology	Integration of Business Implementation of Technology	Stability of Business / Technology Implementation	Technology Project Leadership
Organizational Interactions	Understands that technology projects require the opinions of other departments and staffi n multiple ways. Understands that certain technological solutions and training methods may not fit all project needs and preferences of the business. Has the ability to recommend/suggest alternative technological solutions to suite other business and project needs and preferences.	Seeks to use technology projects as a vehicle to learn more about organization interactions and mindsets. Strives to care about what others are communicating and embraces these opinions on a project basis. Tries to understand and respect technologies that differ from own. Understands basic technological project needs of others.	Can deal with multiple dimensions of criticism about technology-based projects. Can develop relationships (cooperative) that are dynamic and based on discourse. Ability to create project relations with IT, other departments, and customers. Has an appreciation of project communication—to foster open dialogue (spontaneous), to give and take, or other than voyeuristic, one-sidedness about the project. Ability to produce in teamwork situations, rather than solely in isolation.	Loyalty and fidelity to relations in multiple organizations. Commitment to criticism and acceptance of multiple levels of IT and business relationships. Ability to sustain nontraditional types ofi nputs from multiple sources during projects.	Can utilize and integrate multidimensions of project solutions in a self-reliant way. Developing alone if necessary using other technical and nontechnical resources. Can dynamically select types ofi nterdependent and dependent organizational relationships. Ability to operate within multiple dimensions of business cultures, which may demand self-reliance, independence of initiative and interactive communications during project implementations.

Figure 6.8   (*Continued*)

Dimension Variable	Technology Implementation Competence and Recognition	Multiplicity of Business Implementation of Technology	Integration of Business Implementation of Technology	Stability of Business / Technology Implementation	Technology Project Leadership
Management Values	Technology and cultural sensitivity during project implementations. Global communication, education, and project use of technology can be problematic—subject to false generalizations and preconceived notions. Awareness of assumptions about how technology will be viewed by other departments and staff and about biases about types of technology used (MAC vs. PC).	Can appreciate need to obtain multiple sources ofi nformation and opinions during project implementations. The acceptance of multidimensional values in human character as value during project design and completion.	Can operate project within multiple dimensions of value systems and can prioritize multitasking events that are consistent with value priorities. Ability to assign value to new and diverse technology project alternatives—integrating them within a system of preexisting business and technology project implementation values.	Testing technology value systems in new ways during the project implementation is integrated with long-term values and goals for business achievement. Some project concepts are naturally persistent and endure despite new arenas in the technological era.	Use of technology and business during project implementation are based on formed principles as opposed to dynamic influences or impulses. Formed principles establish the basis for navigating through, or negotiating the diversity of business influences and impulses during the project.

Figure 6.8   (*Continued*)

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Dimension Variable	Technology Implementation Competence and Recognition	Multiplicity of Business Implementation of Technology	Integration of Business Implementation of Technology	Stability of Business / Technology Implementation	Technology Project Leadership
Project Ethics	Using technology on the project with honesty re: privacy of access and information. Development of ethical policies governing project uses of the Internet, research, intellectual property rights and plagiarism.	The use of information in a fair way—comparison of facts against equal sources of project information. Compassion for differences in project information for which sources are limited because ofi nequality of technology access. Compassion for sharing information with other business units from a sense of inequality.	Consistent values displayed on multiple project communications, deliverables of content, and dedication to authenticity. Maintains consistency in integrating values within technology business issues during project implementation.	Technology is a commitment in all aspects of value systems, including agility in managing multiple project commitments. Commitment to greater openness of mind to altering traditional and nontechnological methods on project implementations.	Technological project creativity with self-defined principles and beliefs. Risk-taking in technology-based projects. Utilizing technology to expand one's arenas of project freedom. Exploring the project management liberating capacities of technology.

Figure 6.8   (*Continued*)

Dimension Variable	Technology Implementation Competence and Recognition	Multiplicity of Business Implementation of Technology	Integration of Business Implementation of Technology	Stability of Business / Technology Implementation	Technology Project Leadership
Management Presence	Has accurate perception of one's own potential and capabilities in relation to technology projects—the technologically realizable manager.	Understands how other managers can view self from a virtual and multiple perspectives. Understands or has awareness of the construction of self that occurs in projects. Understands views of other executives and managers in multiple project settings. Understands that the self (through technology projects) are open for more fluid constructions, able to incorporate diverse views in multiple settings.	Operationalizes technology projects to unify multiple components of the self and understands its appropriate behaviors in varying management situations.	Has regulated an identity of self from a multiplicity of management venues. Method of project interaction creates positive value systems that generate confidence about operating in multiple organizational communities.	Can determine comfortably, authenticity of other managers and their view of the self. Can confirm project-related disposition independently from others' valuations, both internally and from other department cultures. **Has direct** beliefs and **controls** multidimensional management growth.[?]

Figure 6.8   (*Continued*)

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Organizational Dynamism: Best Practices and Maturity

Best Practices

- Strategic Integration
- Cultural Assimilation
- Organizational Learning Constructs
- Varying Levels of Mgmt Participation

Organizational Level Maturity Arc

Chief IT Executive Best Practices Maturity Arc

CEO Technology Best Practices Maturity Arc

Middle Management Technology Best Practices Maturity Arc

Underlining Best Practices

Strategic Thinking
Industry Expertise
Change Management
Communications
Business Knowledge
Technology Profieciency
Hiring and Retention
Innovation and
Outsourcing Leadership
Information Architect

Underlining Best Practices

Committed to Technology
Technology Catalyst and Champion
Business First, then Technology
Use Consultants for Objective Input
Support Communities of Practice
Set Project Milestones
Foster Cultural Assimilation
Understand Organizational Learning
Understand Technology Life Cycle
Have Chief IT Exec Report Directly
Support Organizational Dynamism

Underlining Best Practices
Management-Based:

Interact with Executive Mgmt
Incorporate Technology into New Products
Use Technology for Competitve Advantage
Process for Evaluating New Technologies
Understands Driver Role of Customers

Implementation-Based:

Utilization of IT Staff on Projects
Leading Innovative Groups
Effectively Managing Project Resources
Strategic use of Technology
Establish Team- Building Measures
Foster Aggregation and Collaboration
Stimulate Staff with Value Propositions
Create Multifunctional Teams
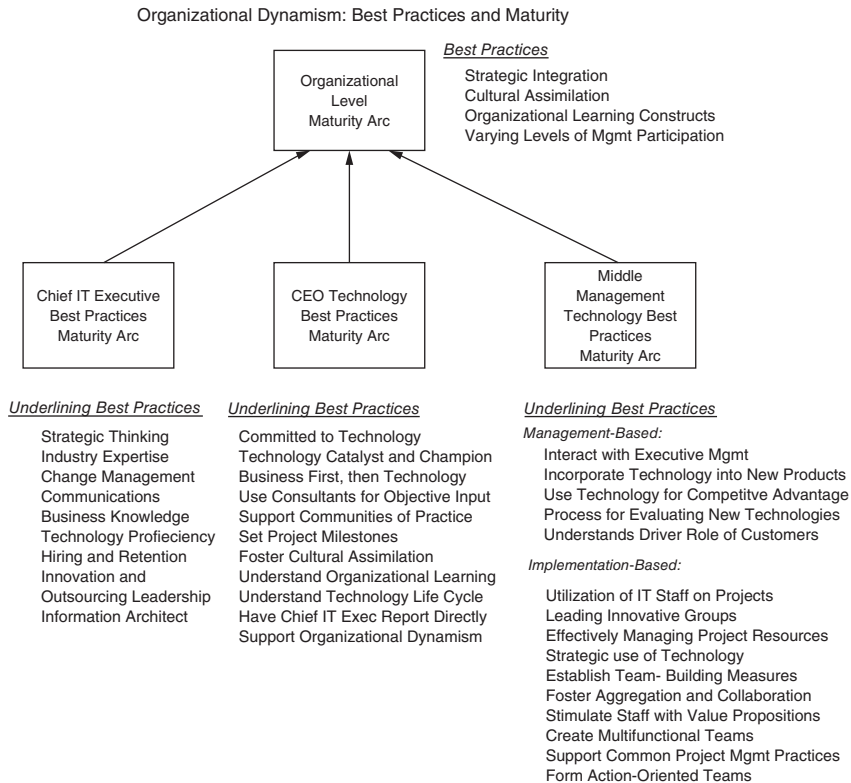Support Common Project Mgmt Practices
Form Action-Oriented Teams

Figure 6.9   Organizational Dynamism: Best Practices and Maturity

The other maturity arcs and best practices represent the major communities of practice that are the subsets of that model. This is graphically depicted in Figure 6.9.

Thus, the challenge is to create and sustain each community and at the same time establish synergies that allow them to operate together. This is the organizational climate required, where the executive board, senior and middle managers, and operations personnel must form their own subcommunities, while at the same time had the ability for both downward and upward communication. In summary, this particular model relies on the CIO to drive the key management interfaces that are needed to support rod.

Notes

1. A. M. Langer, *Information Technology and Organizational Learning: Managing Behavioral Change through Technology and Education*, 2nd ed. (Boca Raton, FL: Taylor and Francis, 2011).
2. Ibid.

3. Ibid., p. 111.
4. Ibid.
5. Ibid.
6. Hackett Benchmarking has tracked the performance of nearly 2000 complex, global organi-zations and identified key differentiators between world-class and average companies across a diverse set of industries. In addition to information technology, staff functions studied include finance, human resources, procurement, and strategic decision making, among others. Study participants comprise 80 percent of the Dow Jones Industrials, two thirds of the Fortune 100 and 60 percent of the Dow Jones Global Titans Index. Among the information technology study participants are Agilent Technologies, Alcoa, Capital One Financial Corporation, Honeywell International, Metropolitan Life Insurance, SAP America, and TRW (*Source*: PR Newswire, February 2002).
7. Langer, *Information Technology and Organizational Learning*.
8. Ibid.
9. Ibid.
10. L. G. Bolman and T. E. Deal, *Reframing Organizations: Artistry, Choice, and Leadership*, 2nd ed. (San Francisco: Jossey-Bass, 1997).
11. Ibid., p. 27.