Chapter 2: Personal Strategic Management by Projects

CHAPTER OUTLINE

Goals and Their Respective Measures of Performance
The Power of Alignment
A Strategy for Empowerment
Setting Direction
Goal Setting Basics
Goal Setting Methodology
Getting Organized
Summary and Conclusions
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In-class, Timed, Team Exercise
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Supplement 2.1: A Distillation of Senge's Five Disciplines

LEARNING OBJECTIVES

After reading this chapter, you will be able to:
1. Explain why a personal vision of ourselves and our companies is necessary.
2. Utilize our personal visions to align ourselves with organizations that will help us achieve our vision as well as that of the organization we choose to affiliate ourselves with.
3. Define empowerment and discuss how it is achieved.
4. Discuss the importance of goal setting and planning.
5. Describe how to set goals and measures of goal performance.
6. Analyze what professional excellence entails.
7. Plan, organize and follow-through on your professional pursuits.
8. Understand how systems thinking relates to project management, problem solving and professional excellence.
9. Understand the importance of time management and how to make better time estimates.

Box 2.1: People and Projects: How to be a Star Player within your Project

According to Kelley, author of *How to Be a Star at work: Nine Breakthrough Strategies You Need to Succeed* (Times Books, 1998), nobody can exactly define what a star at work is, but everybody knows one when they see one. There are some who believe that stars are smarter, more driven, and more self-motivated. Others believe that stars are derived from their inherent personalities, while still others believe that it is the chemistry between boss and star that is the trick. However, Kelley's research could not place a definitive checkmark on any of these. Kelley took stars and average performers into the back rooms of firms and gave them IQ (Intelligence Quotient) and attitude tests. He asked them questions like whether they liked their jobs, their bosses, their companies. But, none of these factors seemed to distinguish stars from mediocre performers.

So Kelley came up with a different theory, his so called "back of the T-shirt theory." Your IQ, your personality, your social skills, even things like where you went to school—that is all on the front of your T-shirt. You can think of that as **potential energy**. *The important thing is how you transform potential energy into kinetic energy*. If you want to know whether someone is a star or is going to become a star, focus on what is on the back of that person's T-shirt. In other words, it is not what people bring to the party that makes them a star—its knowing what to do with what they bring.

INITIATIVE: Doing those things that no one else will do because it doesn't fit their job description, yet is vital to the team's success, is where it's at. You must align yourself with the goals, the critical success factors, of your firm and your project. Determine what is important and do that, especially when no one else will, makes you a star performer. Often in projects, new work, new tasks are discovered as the work proceeds. These tasks are absolutely necessary to the successful completion of the project. But who will do them? Every team-member's plate is absolutely full. When you agree to do these newly-discovered tasks, you will become a star, provided you are doing your assigned work as well. But you likely won't get rewarded unless you negotiate your reward in advance of agreeing to take on the extra work.

NETWORKING: Find out what it is you need to know to do your job better and who already knows that. Go talk to those people; learn from them. Start talking with people who can advance your career. Offer to help them in return for their helping you. Barter with them in a sense.

SELF MANAGEMENT: This entails not only managing your time well, but completing your assigned tasks on time, managing your relationships with people well, managing your career well and managing your career assets over time well. Again, you must start by aligning yourself with the firm's critical success factors, the firm's vision and mission statements. Figure out how to get ahead of the game, rather than waiting for the game to come to you. In part, this chapter is concerned with self management.

These are just three of nine strategies identified by Kelley.

Projects are executed by ordinary people doing extraordinary work. This chapter is about how we, as individuals, can make ourselves more valuable within our teams and projects and hence make these more successful. But it starts with us as individuals. In the first place, we examine the importance of making personal and corporate goals explicit and measurable. Next, we investigate how people become empowered and why empowered people are effective workers. Then, we discuss the significance of having a vision to provide direction to firms as well as project professionals. Later, we explore the relationship between having clear-cut personal goals and being successful job holders. We then turn to a discussion of personal and professional excellence. We also provide a methodology for creating clear, measurable goals. The last section deals with the critical link between the organization and planning/establishing and meeting personal goals. Finally, in the Supplement, we present a distillation of the five disciplines

that Peter Senge, author of *The Fifth Discipline*, identifies as being essential to success in corporate life.

Box 2.2: Projects in Action: Projects and Consultants

In the decade of the 80's the big scare was that America would become a nation of hamburger flippers. At that time the thought was that we could maintain our standard of living by cutting one another's hair and feeding each other fat food. Manufacturing was out; service was in. Now the verdict is here and service is where "it's at" but not in fast food or hair styling. No, America has become a nation of consultants (*Fast Company*, 1996). As a society, we have engaged in the consultification of everything. This army of consultants lives in the glass towers of downtown U.S.A. With enthusiasm that is charismatic, they will tell you how best to flip burgers or cut hair. "*Our objectivity will help you see things in a new light," "Our methodology will help you analyze your business more efficiently." "We'll script it for you." "We'll even help you re-invent your culture."*

There are tasks that the experts who do this sort of thing day-in, day-out can do better than we can. It makes good sense to hire consultants as subcontractors for whom no overhead has to be paid, expended or set back. Unlike employees, these "knowledge workers" are paid by the hour. And the consultants' stay is not indefinite. They are around until the end of the ***PROJECT!!***

In this second chapter, we journey through the world of strategy for success at both a corporate level and a personal level. The tact we shall take is one of projects—their delineation and selection. Beginning with vision and mission statements, the strategic management process ultimately leads to a determination of what projects to pursue when.

We shall also make a case for a strong sense of personal and corporate vision as essential for extraordinary accomplishment. Teams and organizations with a strong sense of vision and mission significantly outperform those without such strength of vision. Survivors of concentration camps did so because they had a compelling, future-oriented vision as the primary force that kept them alive.

GOALS AND THEIR RESPECTIVE MEASURES OF PERFORMANCE

Maxwell Maltz (1957, 1970) asserts that each of us has a "success mechanism" that gives us feedback about how we perform relative to our self-defined standards. Using this feedback, we adjust our behaviors so that we can accomplish our goals.

Imagine that you have a very small electronic computer in your brain that you operate exactly as you would a personal computer. This device is your "success mechanism" designed specifically to help you move toward your goals. Its one overriding goal is your complete fulfillment as a human being (Maltz, 1957). Much as a professional programs a computer, you can program your brain so that its success mechanism knows what to work on. You can do this by giving your brain explicit, measurable goals. With the programming in place, the brain can use its success mechanism to help you achieve your goals.

Goals as Measures of Performance

To further our understanding of project management, we view goals as specific performance measures that can be assessed in terms of their value to the individual or the organization. For example, a vice-president of finance may determine that the firm's return on investment (see Table 2.1) must increase three percentage points by the end of the calendar year if the company is to show a profit. By establishing this goal, the company has a means of evaluating its financial

health. Using goals as measures of performance enable individuals and firms to assess their progress and change course as the need arises.

Table 2.1: Definitions of Financial Measures of Performance

Net profit—throughput (sales in dollars) minus costs
Cash flow—the net flow of cash into and out of an account
Return on investment—the percentage of earnings produced taken in relation to the amount invested
Return on equity—the percentage of earnings produced taken in relation to the actual equity contained in an asset
Internal rate of return—the rate at which the investment is repaid by proceeds from the investment

Table 2.2: Measures of Personal and Professional Productivity

No. of pages outputted/per day
No. of email messages sent/day
No. of hours on the job/day
No. of hours doing productive work/day
No. of hours working on the project/day
No. of problems solved/day
No. of contacts/day
No. of sales/day
Dollar volume of sales/day
No. of parts produced/day
No. of parts inspected/day
Dollars of revenue generated/day
Dollars of salary generated/day
Pages of text created/day
Pages typed/day
The time period could be something other than a day.

Table 2.2 lists goals that can be used as measures of personal or professional productivity, or both. At the corporate level, top management often uses collective goals to assess the performance of teams, groups, and organizations. These goals can be grouped into categories such as financial measures of performance and operational measures of performance. Table 2.1 contains terms that organizations use to assess financial measures of performance, and Table 2.3 lists terms that companies use as operational measures of performance.

Table 2.3: Definitions of Operational Measures of Performance

Inventory—stocks used to support production
Lateness—delivery date minus due date
Operating expense—in the theory of constraints, the amount of money spent to convert inventory into sales in a time period
Tardiness—for late jobs, the delivery date minus the due date
Throughput—total volume of production in a given time period; in theory of constraints, the rate at which the system generates money through sales

The operational measures will affect the financial measures and the measures of personal and professional productivity affect the operational measures. This is to say that better personal productivity can improve the operational measures, which will improve the financial

measures. The successful firm will provide motivation/incentives for the individual and operational measures that contribute to the corporate goals, creating alignment.

The success of projects is dependent upon the prior definition of **measurable business value** (MBV) to which the project's deliverable must make a substantial contribution. Up front and early on, the project and its ultimate deliverable must be driven by the measurable business value added that will accrue from that deliverable. In fact, the MBV will drive the scope of the project and the methodology used to bring the project deliverable to completion. The MBV should be stated as part of the project's initial statement of work, to be discussed in Chapter 11. An example MBV would be a statement like, "the project deliverable will add 10,000 new customers within the first year of operations and thus increase our revenue base by ten million dollars in the first year." In some circles measurable business value is referred to as the **value proposition**. We shall use these terms interchangeably.

THE POWER OF ALIGNMENT

In their book, *The Power of Alignment* (1997), Labovitz and Rosansky describe what working in an organization is like in which every member from top management to the most newly hired employee, shares an understanding of the business, its goals, and its purpose. In this environment, everyone knows how he or she contributes to the company's business strategy. Every member can clearly state the needs of the company's customers. **Alignment** entails focusing on the goals of the organization and conforming your behavior toward the achievement of those goals.

Consider what a pilot must do achieve the goal of landing a plane at the destination city. First, he must align the plane's direction of flight so that the plane flies to the city. Next, he must align the plane with the pre-specified runway. Finally, he must fly the plane down a narrow descent corridor that results in a safe landing. Throughout, he must focus on the goal of his flight—a safe landing at the right airport.

Alignment, according to Labovitz and Rosansky (1997), is about defining the "main thing[1]" as the essence of the business and articulating that so as to foster a shared vision around the main thing. They then suggest defining a few goals relative to the main thing, and tying performance measures to those goals. Rewards and recognition are then tied to the performance measures, and the performance of people is measured and reviewed to ensure that the goals are met.

More will be said about alignment in subsequent discussions throughout this chapter. Alignment is absolutely essential to take advantage of empowerment. Without it, empowerment is a disaster.

A STRATEGY FOR EMPOWERMENT

Empowerment is at the core of what happens within project management. Project stakeholders conceive a project, assign, and empower a project manager to bring it to completion. The project manager assembles a team and empowers the team members to complete specific work packages by specified due dates. Certain team members may empower suppliers to provide specific components. And so it goes.

[1] It was Covey, et al., who coined the phrase, "The main thing is to keep the main thing the main thing." in their 1994 book and used it as a chapter title.

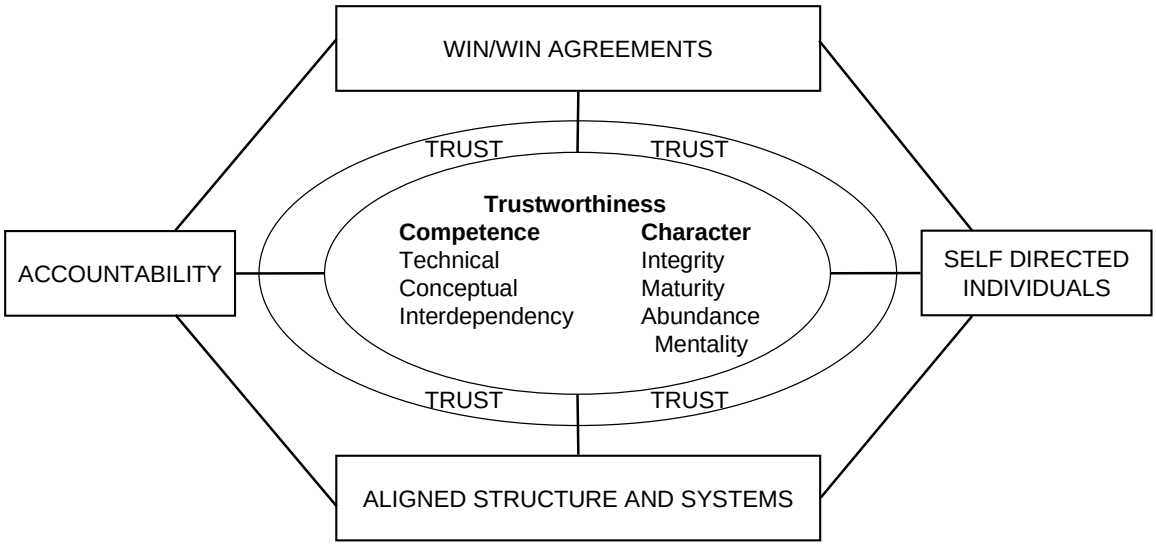

Figure 2.1: The Covey Empowerment Structure[2]

According to Webster's Dictionary[3], to empower is "to authorize, to warrant, to license ... " **Empowerment** as used in business today, is delegation with detachment in which subordinates are given significant responsibilities and expected to fulfill those responsibilities without detailed supervision or continual observation. The alternative is micromanaging, hovering over, checking up and taking control when crises occur. In this section, we will draw from Covey, Merrill, and Merrill (1994) because we believe that their paradigm is the basis for successful project management. An adaptation of their empowerment structure appears in Figure 2.1.

Covey, et al., (1994) suggest that the following six conditions are necessary to have empowered professionals:

1. *Personal and organizational trustworthiness*. Trustworthiness is at the heart of empowerment, as exhibited in Figure 2.1. Trustworthiness can be broken into the following two components: character and competence. Character implies integrity, maturity, and credibility. Character relates to who and what we are; competence refers to what we can do. Competence entails having the knowledge and skills to achieve agreed-upon results, knowing how to think through problems and find solutions, having the ability to see the big picture, to examine assumptions and shift perspectives, and having the ability to interact effectively with others. Character and competence make the other five conditions for empowerment possible. According to Covey, et al., character and competence drive everything else in the organization. Trust implies dependability. Trustworthy project professionals can be counted on to produce the required deliverable on or before the required due date. Their work does not have to be inspected or tested or checked. Someone else can begin where they left off and add a different kind of value to the product. The result is the product gets out quicker, at lower cost and with better quality.[4]

2. *Trust*. In today's organizational environment, companies increasingly have to trust one another. Trust is derived from trustworthiness, as depicted in Figure 2.1. Trust is the glue that holds organizations together. For example, firms must trust suppliers to ship defect-free

[2] Covey, S. R., A. R. Merrill, and R. R. Merrill, *First Things First*, New York: Simon & Schuster, 1989, p. 240.
[3] *New Webster's Dictionary of the English Language*, Deliar Publishing Company, 1984.
[4] For a discussion of the costs of poor quality, see Russell and Taylor, *Operations Management*, Third Edition, Upper Saddle River, NJ: Prentice Hall, 2000, pp. 95-102.

materials that will not require inspection upon arrival. And they must trust suppliers to ship product that will arrive at precisely the agreed-to time.

3. *Win-win agreements*. These written or unwritten contracts are made between two or more people who have a common interest in achieving a particular result. In software development project management, a team leader and a software developer may agree about when the developer will complete a particular piece of work. The team leader will hold the developer to the deadline and reward him when the work is done on time. Thanks to the agreement, both the team leader and the developer "win." The team leader wins because he gets the software he needs, and the developer wins because he is paid for his work and because his timely completion of the job will probably result in more work for him in the future. In win-win agreements, people can hold each other responsible for and even help them achieve their end of the bargain.

4. *Self-directing individuals/teams*. Self-directed work teams are not accountable to a higher authority. They have administrative responsibility for their work and thus they act as their own supervisors. Self-directed (sometimes called self-managed) teams gained prominence in the workplace throughout the 1990s. These work teams are in part the result of today's trend toward flat rather than hierarchical organizational structures.

5. *Alignment*. While alignment is essential for empowerment to work, empowerment also requires alignments to be functional. Performance measures must be aligned with stated goals, for example. Suppose that you, as project manager, were trying to encourage cooperation and collaboration among your team members, but you continued to reward competition. This results in a misalignment. Suppose your team members see their work as totally driven by due dates and urgency, but you want them to focus on the important stuff first. Again, there would be misalignments.

6. *Accountability*. In an empowered environment where trustworthiness, trust, win/win agreements, self-direction, and alignments are all present, accountability can exist only if it is self-enforced, based on the criteria of the agreement.

What, then, is the most difficult aspect of empowerment? From management's perspective, giving up control is the hardest thing to do. Relinquishing control goes against the grain of most managers. Still, management can ask, "How's it going?" "What are you learning?" What are your goals?" "What can I do to help?" (Covey, et al., 1994) All of these questions lead to an empowered worker because each acknowledges the worker as a person with strengths and weaknesses. These kinds of questions go a long way toward promoting trust in the workplace because they demonstrate that management is genuinely interested in each employee's well-being.

SETTING DIRECTION

The successful project manager should have a clearly defined direction to guide him in both his personal and professional life. When people know where they want to go (direction) and how to get there (goals), they are in a position to pursue excellence.

To set one's course or direction, one is well-advised to develop a personal vision statement. Vision statements, if carefully constructed and planned, are documents that actually drive personal behavior. Constructing them takes care and a great deal of introspection. Vision statements become the roadmap for a quality life.

When writing a vision statement, people should find a quiet place where they can be alone with their thoughts for an hour or more. Asking themselves the following questions will help people clarify their values: "What would I do if I could not fail? What have I always wanted to do,

but been afraid to attempt? What activities[5] give me the best feeling about myself? If I had infinite resources, what would I do? In what area do I excel, and what activities maximize my opportunity to demonstrate that excellence? Do I have a current personal vision? If so, is it helping me achieve my goals?"

Covey, Merrill, and Merrill (1994) suggest that people must have a strong personal vision to move in the direction of excellence. Without such a vision, they lead lives that are reactive in which they strive to meet society's expectations rather than their own. With a strong sense of personal vision, people can develop measurable goals with specific due dates. Covey et al., (1994) recommend that people set weekly goals. They suggest that people assess their lives in terms of their various roles, and designate specific, measurable weekly tasks for each role (wife, mother, worker, etc.). A vision establishes a basis for setting a goal which in turn determines the activities that we engage in, as illustrated in Figure 2.2.

Personal Vision

↓

Goals

↓

Activities

Figure 2.2: How Vision Relates to Goals and Activities

In this context, a *goal* is a vision or dream with a deadline, whereas an *activity* is a task we undertake to help us achieve a goal. For example, consider the plight of a woman who is a mother of two children, a doctoral student and a spouse. Her vision is multifaceted: two healthy well-cared for children that have a "smart" mother who is also looking after the needs of their father. Her goals might be to ensure her daughters well being during the next year, while completing her dissertation, while accommodating her husband during the year. Thus, the woman might list the following role-based activities for the coming week: (1) Take both children for their annual checkups (mother); (2) write ten pages of dissertation (Ph.D. student); (3) attend sales meeting banquet with husband (wife).

Thus, visions have facets or dimensions to them. Possible dimensions might include but would not be limited to health, home, spousal obligations, personal pursuits, professional pursuits, parental obligations, and possessions. Covey suggests that we set goals in each of these dimensions and that we plan activities that will take us toward the achievement of our goals. We can use our imaginations to project ourselves into our wants within each of these areas. Now, we are living out of our imaginations instead of our memories (Covey, et al., 1994). The dimensions eventually become goals. The goals, because they are measurable and have a due date associated with them, help people to measure how far they have come in achieving their goals and thus their personal visions.

Transport yourself ahead in time to your eightieth birthday and imagine what your guests are saying about you. Suppose that family, friends, loved ones, and associates from all parts of your life come to honor you. As each person pays tribute to you, he/she talks about the roles you are now playing in your life—parent, spouse, business professional, community leader. What would these people say? What qualities of character would you be remembered for? How do you feel about what they are saying? For each of your roles, write down the tribute statement you

[5] An activity is a task undertaken to achieve a goal. Studying for an exam is a task that enables a student to achieve the goal of an A on the exam, for example.

would like to have said about you. Now, take this picture of you in your future and use it as a basis for setting priorities for your goals. The relationships between that strong sense of vision, goals, and activities are depicted above in Figure 2.2.

GOAL SETTING BASICS

People who are systematic goal setters, who write, internalize, and talk about their goals, improve their job performance dramatically and immediately. Studies at Harvard University, MIT, Cornell, by Abraham Maslow, David McClellan and others all conclude that every peak performing man or woman is an obsessive goal setter[6].

With goals, people develop direction and purpose. They can channel their energy and accomplish more than they could have accomplished in years without goals. For example, in 1953, three percent of Yale University's graduating seniors developed written financial goals and planned how they would achieve these goals. In 1973, the three percent who had set goals were worth more financially than the remaining 97 percent combined. This study is consistent with every other longitudinal study of this type[7]. Intense goal orientation creates more success than talent, intelligence, family background, or any other attribute. Intensity of purpose, which is characteristic of people with compelling, internalized goals, is the single most important feature of the world's most successful people (Tracy, 1984).

Goals make it possible for people to change direction in their lives. For example, an insurance saleswoman may have had a lifelong interest in medicine. By establishing the goal of becoming a physician in eight years, this woman is able to change the course of her life. Because she knows what she wants to do professionally and when she wants to do it, she can set her course and move in the direction of obtaining a degree in medicine.

In the absence of goals, people often flounder about, hoping to find something that will interest them. Such people work just to pay the bills; they neither enjoy nor excel at their jobs. Without goals, people are driving down the road of life but they've taken their hands off the steering wheel. They become an accident looking for a place and time in life to happen. It is impossible for them to control the direction of their lives without goals. One of life's biggest problems is the absence of goals. If you're not working on your goals, then you will be working on someone else's goals, that is, if you're working at all.

If goals add so much to people's lives, why doesn't everyone have them? A few possible reasons follow. (1) When people don't come from families that promote intensity of purpose and goal setting, they don't understand the importance of goals. (2) Often, people don't know how to set goals. Our educational system may be partly at fault because many schools don't teach students how to set or achieve goals. (3) Fear of failure can prevent people from establishing goals despite the fact that most success is preceded by some degree of failure. Many thousand failed experiments later and counter to scientific thinking at the time, Thomas Edison was finally able to create electric light. Most high achievers have been able to recover from their failures and reach new and higher levels of success. People don't understand that all great success is accompanied by great failure.

When we set goals, we are programming the success mechanism we spoke of at the beginning of the chapter to begin work on the goal. This work is done by our subconscious minds, which find a sequence of steps that will lead to goal accomplishment. When we program a goal into our subconscious, that goal becomes a force that moves us rapidly toward its achievement. The subconscious is our cybernetic helper; it finds a way to make the goal reality. It makes us more alert to possible strategies for accomplishment. It gives us insights, ideas that

[6] Tracy, B., *The Psychology of Achievement*, Chicago: Nightingale-Conant Corporation, 1984.
[7] Ibid.

help us realize our goal. Every time we write down, think about, or visualize a goal, we are programming our subconscious minds for success and achievement.

In sum, we need to set explicit, measurable goals because goals define our view of the future. They give direction to our lives by programming us for success. Yet there really isn't any down side to goals; there is no down-side risk. Measurable goals provide the opportunity to assess one's progress.

Personal and Professional Excellence

To a considerable extent, people create their own destinies. In other words, people are in charge of their own lives. According to Senge (1990), we should be "continually clarifying and deepening our personal vision … Personal mastery starts with clarifying the things that really matter to us, of living our lives in the service of our highest aspirations." By increasing clarity of vision and values, it becomes easier for us to choose the career we want and the organization we wish to affiliate ourselves with. The more we know of our vision and values, the easier it is for us to choose a professional position with which we can be well-aligned.

Increased clarity is partially achieved when people learn as much as possible about their strengths and weaknesses, and likes and dislikes. In the process of learning about themselves, most people find that they have specific abilities or talents. These abilities can be viewed as gifts, because they enable people to pursue personal and professional excellence. For example, a man may find that he is an exceptionally good listener, that because he listens without judging, people tend to tell him their most private thoughts and feelings. In his pursuit of excellence, this man hones his listening skills by studying to become a psychologist. In his career as a therapist, he helps many people, becomes ever more effective at listening, and has a vocation that he enjoys and values.

Excellence is the process of becoming absolutely world-class in one or two areas of marketable expertise. It involves clarifying your vision and values relative to what you want to do with your life. A useful exercise is to ask yourself the following questions: "What do I love to do? What attracts my attention? What fascinates me? What do I value? What needs to be done?" If the answers to these questions lead you to work that is in demand in the marketplace, you may have found the niche that's right for you. If the answers to these questions lead you to the human resources department of a new e-commerce company, you may find work at which you excel. This is what we mean by excellence—finding our gift and using it. It is impossible to fully value ourselves unless we know there is at least one thing in the world that we are good at (Tracy, 1984).

GOAL SETTING METHODOLOGY

Because project professionals have multiple roles, they should maintain separate goals in each of their roles. A father is a head of household, a breadwinner, a community leader, a parent and a spouse. Distinct goals associated with each of these roles are appropriate. For example, this dad might set as a goal that of having lunch with each of his two sons once a week. As community leader, this dad might agree to meet with the city council at their weekly meeting Wednesday night. As breadwinner, this father might set a goal of acquiring at least twenty new accounts in the coming year. As spouse, this person would set of a goal of taking his wife out to eat and having time alone with her once a week.

While it is important for professional people to have a goal within each of their roles, they should have, additionally, an overall goal that is consistent with their personal vision. Then, they need several "why" goals, followed by "what" goals, and finally, "how" goals. All of these should be in alignment with each other, as illustrated in Figure 2.3. The "how" goals should contribute to

the achievement of our "what" goals, which should lead to the achievement of our "why" goals, which should lead to the achievement of our overall goal. For example, an MIS manager has this pervasive vision of being a prominent information technology person some day. She sets a goal to be a chief information officer (CIO) within five years. That is her "what" goal, her career or professional goal, at this time in her life. When we look at her "why" goals, it becomes clearer why this is her present career goal. She is a single parent with three daughters, ages 14, 13 and 11. Soon, these children will be of college age and she wants to be sure her children are well-educated. She has set a goal of putting all of her children through expensive private four-institutions. In order to reach her career goal, she has set a "how" goal of taking two courses in project management, of increasing her understanding of enterprise software and systems, etc.

Figure 2.3. The Personal Goals Hierarchy for Professionals

When setting their goals, people should make each goal statement clear, specific, and measurable. They should write their goals in the present tense, and begin with the infinitive "to." An example of a good goal statement is "To lose five pounds in one month" because this statement is specific and measurable. An example of a poor goal statement is "to lose weight" because this statement is not specific enough to be measurable and it has no target date.

People's goals must be balanced, as suggested in Figure 2.4. Imagine that each person rides on the "balance wheel" depicted in the figure. The spokes radiating out from the hub represent the important dimensions in life—work, learning, physical well-being, relationships with others, and so on. To lead a full life, people must have all of these dimensions in balance or harmony. If any of these dimensions are missing or are disproportionate to the others, people's ride through life will be bumpy and rough. Balance, then, is equivalent to a smooth ride on the wheel, a good life.

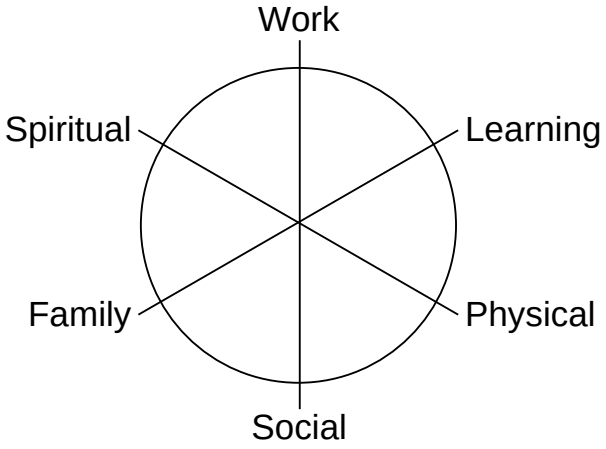

Figure 2.4: The Balance Wheel

Box 2.3: Processes in Action: Goal-Setting Methodology Specifics

1. Write down each goal. The vast majority of people never put their goals in written form, so they don't effectively begin the work of programming their subconscious minds. Describe each goal in precise detail. Begin to contemplate how you will feel once you have achieved the goal. Putting your goals in writing is the most important step you take.

2. Make your goals things you truly desire. Desire is the great motivator. Unless a person really desires something, he is unlikely to get it. Increase your desire by using mental simulation and visualization, by seeing yourself in the situation that will exist if you achieve your goal. Make a clear mental image of your goal and play that "picture" in the screen of your mind often. This exercise will help to increase your desire to achieve the goal. As Covey (1989) suggests, imagine what you would want people to say about you twenty years from now in relation to that role. Play that through the theater of your mind. This is truly "beginning with the end in mind.[8]"

3. Believe in the goal that you have set for yourself. If you set goals that are so unrealistic that your mind rejects them, your subconscious will not be able to assist you in achieving those goals. Your goals should be challenging, but attainable. For example, a seventy-year-old woman should not make "to become an astronaut" one of her goals because astronauts are chosen from the ranks of relatively young people; the job is, after all, highly physically taxing. The same seventy-year-old woman might, however, set a goal of completing her second bachelors' degree in art, say.

4. Determine how you will benefit from the accomplishment of your goals. If you will benefit financially, that is certainly a plus. However, you may benefit in less tangible ways. For example, getting an "excellent" on your term paper will probably increase your self-esteem, which is certainly one benefit of achieving the goal, "To write an exceptional term paper and turn it in a week before it's due." The more benefits you can think of, the greater your desire will be to achieve a given goal.

5. Measure your progress in relation to your goals. Again, your goals must be measurable for you to evaluate yourself relative to your goals.

6. Your goals should contain deadlines for their achievement. You want to create the feeling that you are winning, that you are making progress toward the achievement of your goals. Unless you can clearly measure the beginning points, the ending points and the points in between, it is hard to keep the momentum going in your mind and have the winning feeling with yourself.

7. Identify the obstacles you will have to overcome to achieve your goals. These might be inadequate education or a need for more education to increase your competence in a particular area that the economy values. However, the real obstacle is finding the funds and the time to get the education. It could also be that you need to strengthen certain facets of your character. Competence and character, these are what it takes.

8. Identify the people, groups and organizations you will need to achieve your goals.

9. Develop a plan, taking all the details elicited from the previous eight steps. List the activities you will engage in. For each impediment identified in step 7, create an activity that will overcome that obstacle. Once you've written out the activities, itemize and prioritize the list in terms of schedule and priority.

10. The best plan on earth will not work unless you do. So you must back your plan up with persistence and perseverance and resolve to never, never give up. All great attainment and achievement comes from overcoming setback after setback, obstacle after obstacle.

11. Effective time management is the last suggestion and the topic of the next section.

[8] This is the second of Covey's "The 7 Habits of Highly Effective People."

As we shall see, this goal setting methodology is similar to the methodology we will use to plan entire projects. The discipline with which we plan and organize our personal lives is the same discipline that we will apply to projects as project professionals. Excellence in project management begins with excellence in personal project management.

GETTING ORGANIZED

Covey asks, "What one thing could you do that you're not doing now that would make a substantial positive difference in your personal and professional life?[9]" He insists, write it down…NOW.

Today, people find their lives more cluttered with distractions than ever before. This set of circumstances has given rise to a multitude of books that purport to help individuals and companies use their time effectively. Steven Covey's *The Seven Habits of Highly Effective People* (1989) is one of the most highly regarded of these books. In this book, Covey proposes a way to reduce the time wasted on interruptions. He uses an urgency/importance matrix such as the one shown in Figure 2.5.

Important	**I** Urgent Important	**II** Not Urgent Important
Not Important	**III** Urgent Not Important	**IV** Not Urgent Not Important
	Urgent	**Not Urgent**

Figure 2.5: The Urgency/Importance Matrix (Covey, 1989)

Covey suggests eliminating the not-urgent, not-important activities altogether. He urges people to devote the time they spent on not-urgent, not-important activities to the not-urgent, important activities. Next, he proposes that time devoted to the urgent, not-important matters be compressed. The time saved is once again placed in the not-urgent, important quadrant. Finally, Covey suggests blocking out large chunks of time on one's calendar for the important matters, both urgent and not.

The result of managing one's time in this fashion is that interruptions fall into the slow, low productivity periods of the day. Moreover, long periods of time are available for getting productive work done on the important stuff. The disadvantage of breaking up important work into small blocks of time is that with the beginning of each block, a period of nonproductive setting up is involved that gets you to the point where productive work can begin. By creating large blocks of time, non-productive setups are eliminated and there is sufficient time to get the important work done. Intelligent people know that there is never enough time to get all of the work done. There is only enough time to get the important work done. This is why Covey says "Effective management is *putting first things first.*[10]"

Covey would suggest that people should live in quadrant II of the urgency/importance matrix as much as possible. Doing so results in time for vision, perspective, planning, balance, control and without crisis management.

[9] Covey, S. R., *The Seven Habits of Highly Effective People*, New York: Simon and Schuster, 1989, p. 146.
[10] Ibid, p. 148.

Dwelling in quadrant I is also undesirable according to Covey, and results in stress, burnout, crisis management, and fire-fighting. We all have some quadrant I crises or problems in our lives. But we should not focus on quadrant one. Doing so causes it to get bigger and bigger until it dominates our lives. Consequently, we become crisis managers, problem-minded people, and deadline-driven producers. Covey likens quadrant I to the pounding surf. A significant problem comes up and knocks you down and you're wiped out. You struggle back only to face another dilemma that slams you to the ground.

What about quadrants III and IV? Covey says some folk spend much of the time in quadrant III thinking they are in quadrant I. But the reality is these urgent activities they are engaging in are not important. The activities are not important to them; they may be to someone else; by and large their activities are often based on the priorities and expectations of others. Covey even goes so far to say that quadrant III and IV people basically live irresponsible lives[11]. Effective people stay out of quadrants III and IV because urgent or not, they aren't important.

Becoming effective in the style of Covey may mean that people do not go to the office every day, but instead work at home some of the time. During their most productive parts of the day, they don't answer the phone, but rather let their calls go into voice mail or answering machines. Later, during their low productivity periods, they return these calls. People communicate as much as possible via e-mail, and they keep their work space neat and free of distracting clutter.

Covey's recommendations are as useful for corporations and work teams as they are for individuals. Just as some personal activities are unimportant or not urgent, some *projects* are unimportant or not urgent. Accordingly, managers should focus on the important projects and eliminate those that are unimportant and not urgent.

In Covey's seminars, he demonstrates the importance of managing our time via a revealing exercise. A seminar participant stands before a table that has the following items on it: a bucket of sand, an empty bucket, and many large rocks with labels such as "household duties," "personal hygiene," "work responsibilities," "training," "project responsibilities," "spousal obligations," "children-related activities," "civic responsibilities," and so forth. Covey tells the participant that the sand represents the interruptions and other non-productive activity, which, according to the study discussed above, can consume nearly 80 percent of a worker's time. The participant is told that all the rocks and sand will fit into one bucket. The participant starts by trying to bury the rocks in the bucket partially filled with sand. After five minutes of this activity, the woman realizes that many important rocks will not fit. Frustrated, she gives up, leaving important rocks like "spousal obligations," "children-related activities," and "church/civic responsibilities" out of the bucket. Covey then demonstrates that if the woman had placed the rocks in the empty bucket first and then poured the sand from the other bucket into the bucket with all the rocks, everything would fit nicely. This exercise is immensely pertinent to the way people manage their time. We are well advised to put the big, important things on our calendars first and let the unimportant items fill up whatever space is left.

Returning to the original question, what is the most important thing we need to start doing now to greatly increase the effective productivity of our lives? Covey would say its quadrant II living. It is putting the important things on our calendars first. It is spending time planning so that the urgent fire-fighting stuff never happens. It is prioritizing and putting first things first.

[11] Ibid, p. 153.

Becoming Organized

Being organized is one of the most important life skills we can develop because it brings us so many benefits. When people are disorganized, they tend to feel stress, which can actually shorten their lives. Imagine that you can't find a report you need for a meeting that is to take place in a half hour. In all likelihood, you will feel panic (stress), which can be harmful to your health. When people are organized and not overloaded by stress, they live longer. Additionally, getting organized greatly increases your productivity. You spend less time looking for things and more time doing the important stuff. Being organized means being able to put your hands on a document while on the phone to a client, so you don't have to call him back. Being able to put your hands on something when you need it, being comfortable and confident in your environment, is what being organized is all about. It has little or nothing to do with neatness.

Planning is a key to becoming organized. People should get into the habit of planning their week one at a time, preferably on a Sunday before the work week begins. After filling their calendars with the important things they must do, they should refuse to do anything they haven't put on those calendars. People should put tasks they don't accomplish in one week on their calendars for the next week. Using their calendars in this fashion will help people to spend their time on vital rather than trivial matters. A well-planned calendar greatly increases people's productivity.

Not using this method of writing down their tasks is a recipe for insomnia. People often lie awake tossing and turning because they are unable to let go of what they must do the next day. By putting these tasks in writing, people un-clutter their minds and their sleep may be less disturbed.

Managing Commitments

An important part of being organized is learning how to manage commitments. In his book *Introduction to the Personal Software Process,* Watts Humphrey states that a commitment is more than just something you intend to do; there is also someone who expects you to do it. You may make a commitment to your manager, your professor, or more importantly, yourself. Humphrey gives four steps to managing commitments[12].

Analyze the job before agreeing to the commitment. You must be personally committed and really intend to do the job. You must examine the job to make sure you have the capability to do it.

Support the commitment with a plan. The way to responsibly make a commitment is to first make a plan of work.

Document the agreement. When two people make an oral agreement, words are often misinterpreted. It is important to make a written statement of the agreement, so both parties understand the agreement and what needs to happen in the event of a problem.

If unable to meet the commitment, promptly tell the other party and try to minimize the impact on that person. Even with the best plans, things may come up or the job may be more complex than expected. If this happens, it is important to tell the other party as soon as possible.

First Things First

[12] Watts S. Humphrey, *Introduction to the Personal Software Process*, Addison Wesley, 1997, p. 87-89.

People should set priorities. To help themselves prioritize, they should ask the following question: "What is the most valuable use of my time right now?" The answer will likely be the most important task, which people should tackle before moving to matters that are less vital. To ensure that they attend to that which is most important, people should look at the activities they've written on their calendars and ask themselves what they would do if they could work at only one of these activities. Once they've identified the most important activity, they should highlight it. Most high achievers focus on the important things because they know that there is not enough time to do everything. In *Eat That Frog!,* Brian Tracy states that "an average person who develops the habit of setting clear priorites and getting important tasks completed quickly will run circles around a genius who talks a lot and makes wonderful plans but who gets very little done.[13]"

We are well-advised to undertake one task at a time and stay with it until it is finished. In his book *First Things First* (Covey, et al., 1994), Stephen Covey states that "the main thing is keeping the main thing the main thing.[14]" Ineffective time managers pick up and put down, start and stop. Effective time managers find large blocks of contiguous time and use that time to stay with a project until it is complete. People should have a sense of urgency about getting their important work done and avoid procrastination. Procrastination is a huge thief of time. People are amazed at how much valuable work they get done if they adhere to these principles of time management.

As we said earlier, according to Covey, Merrill, and Merrill (1994), people should set aside a period each week, preferably Sunday afternoon or Monday morning, in which they plan their entire week. Covey asserts that this activity enables people to be guided by the "compass"[15] rather than the clock. Covey uses this compass as a marker that he puts into his weekly planner to remind himself of his roles and the specific goals he has established for each role. Covey recommends that people set aside blocks of time to accomplish specific tasks that will assist them in reaching their goals. By setting aside this time for planning, and not letting anyone or anything else interfere with it, people can be assured that they will have the time to get the important things done.

TIME MANAGEMENT

In *Introduction to the Personal Software Process*, Humphrey discusses the importance of time management[16]. Think about how you spent your time last week. You will most likely spend your time this week the way you spent it last week. To make realistic plans for the future, it helps to track exactly how you spend your time. People remember some things and forget others, so the only way to know exactly where your time goes is to keep an accurate record.

An important aspect of time management is the ability to estimate the time it takes you to complete a task. To check the accuracy of your estimates, you must document your estimate and later compare them with the amount of time it actually takes you. Once you have this comparison, you can use it to see whether you typically over- or under-estimate time spent on a task. This will help you make better time estimates in the future.

Once you know how to make better time estimates, it is important to plan out your time wisely and stick to your plan. There are two main benefits to sticking to your plan. First, you will

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[13] Brian Tracy, *Eat that Frog! 21 Great Ways to Stop Procrastinating and Get More Done,* San Fransisco: Berrett-Koehler, 2007, p. 1-2.

[14] Covey, S. R., A. R. Merrill, R. R. Merrill, *First Things First*, New York: Simon & Schuster, 1989, p. 75.

[15] A compass, according to Covey, is a template with all the roles identified that represents what is important to us. Roles are simply the various "hats" that we wear, such as parent, spouse, IT professional, home-owner, civic leader, and so forth.

[16] Watts S. Humphrey, *Introduction to the Personal Software Process*, Addison Wesley, 1997, p. 9-29.

learn where the plan was in error, which will help you better plan your next project. The second benefit is that you will do the job the way you planned to. Many problems are caused by ill-considered shortcuts, carelessness, and inattention to detail. Also, when you stick to a plan, you are less likely to waste time deciding what to do next.

When you see how you are spending your time, you can ask yourself if you are spending it the way you want to. Decide which activities are the most important and see if you giving them enough time. This will help you balance, schoolwork, jobs, recreational activities, etc.

Understanding How You Spend Time

Humphrey suggests four steps to understand how you spend time:

Categorize your major activities. To accomplish anything, we must focus on the few things that are most important. If you break down your time into too many categories, it becomes difficult to make sense of the data. Three to five main categories should be enough for tracking time for one course. These categories may later be broken down into subcategories, if needed.

Record the time spent on each major activity. It is important to keep an accurate record of your time. To do this, record the time at the start and end of every major category. In the beginning, it is common to forget to do this, but it will eventually become second nature.

Record time in a standard way. Since the volume of time data will grow rather quickly, it is important to standardize your time log. If you don't record and carefully store your data, it will get lost or disorganized. Without standardized data, your data may also become messy and confused, which can be hard to interpret.

Keep the time data in a convenient place. Since you will be recording time data consistently, it is important to keep your data in a convenient place.

Engineering Notebook

An engineering notebook is a useful tool for tracking time. It may also be used to record assignments, track commitments, and take class notes. An engineering notebook begins with a cover page. A sample cover is shown in Figure 2.6. At the top of the page, you should include a notebook number. After a few years, you will accumulate many notebooks, and this number will help you keep track of them. You should also label each notebook with your name and phone number. Finally, you should list the first date you made an entry in the notebook and, when the notebook is filled, list the date of the last entry.

Notebook Number: ___

Engineering Notebook
Company or University Name

Engineer's Name: _____

Phone/Email: _____

First Date: _____ Last Date:_____

Figure 2.6: Engineering Notebook Sample Cover (Humphrey, 1997)

The next two pages of the notebook should be set aside for a table of contents. In the contents, you should list any items you may want to find in the future, such as class assignments. A sample contents page is shown in Figure 2.7.

Engineering Notebook Contents 1

Page	Subject	Dates
3	CSI Assignments	9/9-16
4	CSI notes, lectures 1,2,3,4	9/9-13
8	Design notes. 1st program	9/9-13
9	Phone calls, etc.	9/11
11	CSI Assignments (continued)	9/23-

Figure 2.7: Engineering Notebook Sample Contents Page (Humphrey, 1997)

The rest of the notebook will be used for entries. Entries will include the entry date, a brief description, a due date, and any corresponding notes. An example of an entry page is shown in Figure 2.8.

		3
Date		
9/9	CSI Assignment, due 9/16	
		Make an engineering notebook
		Reference, page 206, textbook
		Read programming text
9/11	CSI Assignment, due 9/20	
		Do programming exercises, chapter 1

Figure 2.8: Example Engineering Notebook Page (Humphrey, 1997)

Time Recording Log

Another useful tool for tracking time is a time recording log, which is kept at the end of your engineering notebook. The form for a time recording log is shown in Figure 2.9. Each line of the log should include the following information

- Date. The date you performed the activity
- Start. The time you started the activity.
- Stop. The time you stopped the activity.
- Interruption Time. Any time lost due to interruptions.
- Delta Time. The time spent, in minutes, actually working on the activity. This is the amount of time between the start and stop times, minus the interruption time.
- Activity. A descriptive name of the activity.
- Comments. Any notes that may be helpful in the future.
- C (Completed). Check this column when you complete the activity.

- U (Units). The number of units in the activity when completed.

An example of a filled in time recording log is shown in Figure 2.10.

Student _____ Date_____
Instructor _____ Class_____

Date	Start	Stop	Interruption Time	Delta Time	Activity	Comments	C	U

Figure 2.9: Time Recording Log (Humphrey, 1997)

Student _____ Date 9/9/96

Instructor Mr. Z Class CS1

Date	Start	Stop	Interruption Time	Delta Time	Activity	Comments	C	U
9/9	9:00	9:50		50	Class	Lecture		
	12:40	1:18		38	Prog.	Assignment 1		
	2:45	3:53	10	58	Prog.	Assignment 1		
	6:25	7:45		80	Text	Read Text – Ch1 & 2	x	2
9/10	11:06	12:19	6+5	62	Prog.	Assignment 1, break, chat	x	1
9/11	9:00	9:50		50	Class	Lecture		
	1:15	2:35	3+8	69	Prog.	Assignment2, break, phone	x	1
	4:18	5:11	25	28	Text	Text Ch. 3, chat with mary	x	1
9/12	6:42	9:04	10+6+12	114	Prog.	Assignment 3	x	1
9/13	9:00	9:50		50	Class	Lecture		
	12:38	1:16		38	Text	Text Ch. 4		
9/14	9:15	11:59	5+3+22	134	Review	Quiz Prep, break, phone, chat		

Figure 2.10: Time Recording Log Example (Humphrey, 1997)

SUMMARY AND CONCLUSIONS

A strong sense of personal and corporate vision is essential for extraordinary accomplishment. A personal vision is necessary if people are to set the direction for their lives. Without it, most people simply react to society's expectations. Developing a personal vision enables one to set measurable, explicit goals for oneself, which lead to successful completion of group projects in

which several people work together on a single project goal. Employment recruiters will often ask you what you envision for yourself five years from now. Depending on your answer, they can assess whether you are a match for their organization.

Goal setting is absolutely necessary to be a peak-performing individual. Every time we write down, think about, or visualize a goal, we are programming our subconscious minds for success. Our goals should be measurable and targetable. By measurable, we mean that people can measure their progress toward achievement of a goal. By "targetable," we mean a date for completion of the goal has been set. In addition, the goal must be written in the present tense, and should begin with the infinitive "to." We must ensure that our goals reflect a balance among work, family, and the social, physical, spiritual and intellectual dimensions of our lives. To achieve a goal, we should create a definitive, step-by-step plan. Obstacles and opportunities should also be identified. Goals should be reviewed and measured. We should reach the goal by its specified date of completion. We should be balanced in our pursuit of goals, as suggested by the balance wheel.

We create our own futures. Every human being is endowed with ability, talent, and skill. We need to become excellent in at least one area. Attempting to achieve excellence is a lifelong pursuit and requires well-planned and used of our time. Effective time management requires that you organize your workspace to remove distractions, that you know how to manage the phone, and that you set aside sufficient time each week to accomplish the important tasks. We should be continually asking the questions, "What is the most valuable use of my time right now?"

As a team, the project manager assembles individuals and empowers the team members to complete specific work packages by specified due dates. Empowerment is delegation with detachment; that is, empowerment is assigning someone else to do it and then walking away from the task and letting them do it their way. Covey, et al., suggest that the following six conditions are necessary in order to have empowered professionals: 1) Personal and organizational trustworthiness, 2) Trust, 3) Win-win agreements, 4) Self-directing individuals/teams, 5) Aligned structure and systems, and 6) Accountability.

Trustworthiness is at the heart of empowerment and has two components—character and competence. Trust is something altogether different because it suggests commitment. That commitment puts two interactive firms in a position of interdependence. Win/win agreements are assertions of what one individual or team is to accomplish and what another expects based on that agreement. Self-directed teams are a way of life in modern organizations. They are important in the context of project management because they facilitate cooperation and collaboration, thereby helping groups of people to work together toward a common end. Aligned structure and systems ensure that organizational energy is focused on the right things—customers, products, and performance. Accountability means that each individual lives up to his or her agreement.

Systems thinking is discussed in the Supplement to this chapter. It is the glue that holds all of the pieces together. Systems thinking is a radical departure from conventional linear thinking in which people look to symptoms rather than underlying causes for solutions to problems. With systems thinking, the "learning disabilities" that often cause companies to decline and ultimately to fail are eliminated.

Time management is an important part of personal management. To manage your time effectively, you will need to plan your time and then follow your plan. To make realistic plans, you will first have to keep a record of the way you actually spend your time. You must also document your time estimates and compare them with the time it takes you to finish the task. This comparison will help improve future estimates and plans.

DEFINITIONS

Alignment
Goals
Empowerment
Measurability
Measures
Personal vision
Professional excellence
Self direction
Self-directed work teams
Shared corporate vision
Synergism
Team learning

EXERCISES

1 Write out your own personal vision statement. Use the methodology discussed in the goal setting section to write down your overall goal and to write down all the reasons why achieving this goal will benefit you and those you serve.

2. Pick a successful company with which you are familiar. Find out as much as you can about their corporate culture, their shared vision, their team learning, their systems thinking. Which among these is most responsible for their success today? Why? {For information, you can surf the Internet, go to your local library, or speak with the firm directly.}

3. Rank order[17] the following values using the relation "Is ____ more important to me than ____ in most cases." For example, suppose that, in response to the query, "Is challenge more important to me than accomplishment in most cases?" you answered NO. "Accomplishment "would then be placed ahead of "challenge" in the ranking. On the other hand, suppose that, in response to the query, "Is well being more important to me than individuality in most cases?" you answered YES. "Well being" would be ranked above or ahead of "individuality."

Challenge	Accomplishment
Well being	Individuality
Integrity	Love
Peace of Mind	Power
Honesty	Thrift
Self-respect	Charity
Creativity	Discipline
Responsibility	Dignity

4. In Chapter 1 the concept of core competency was introduced. Describe the similarities/dissimilarities between a core competency and the concept of excellence described in this chapter.

5. Do you have an identified area of excellence? Make a list of related competencies that you will need in order to compete in the marketplace. Design a strategy for developing the competencies that you do not have and capitalizing on the competencies that you do have.

6. Develop an intent structure that depicts your "how" goals supporting your "what" goals that support your "why" goals that support your "overall" goal. (An intent structure is simply a diagram showing all the entities—goals—and the edges—links, relationships—between them. An example appears below.)

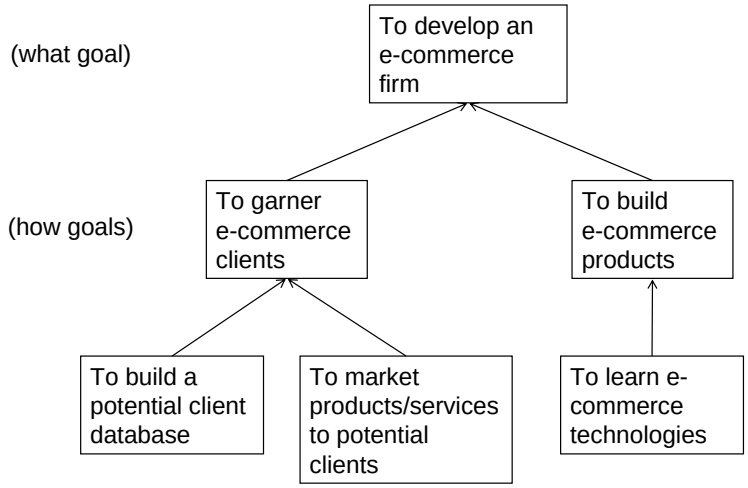

Figure 2.6: An Example Intent Structure

[17] A ranking or rank ordering is simply a hierarchical list of items that goes from most important to least important.

7. Referring to Figure 2.8 (Supplement), how does self-direction contribute to professional excellence? How does a shared vision contribute to team learning? How does goal setting and organizing contribute to shared-vision?

8. Civic leaders of a municipality wish to develop an intent structure (a tree-like structure showing what subordinate goals support what goals above) involving the following goals:

   WHY goals: To provide more jobs; to increase the tax base
   WHAT goal: To attract new industry
   HOW goals: To improve airport facilities; to provide an industrial park

   Create an appropriate intent structure for the municipality.

9. One can increase one's personal productivity by knowing one's own energy cycle. When is your slowest time of the day? For most persons, this is in the early afternoon, usually between 1:00 and 2:00 p.m. Energy levels for Saturday and Sunday are even lower than those for Monday through Friday (Kerzner, 1995). At what time of day do you perform your most important work? When do you do your best writing? Does your energy cycle vary according to the day of the week?

10. Using the relation "_____ is necessary for _____, in most cases" rank-order the following list.

Order	Equality
Privacy	Freedom
Education	Rationality
Social Adjustment	Personal integrity
Native talent/abilities	Quietness of environment
Pleasantness of environment	Efficiency and effectiveness of the organization

11. Use the Internet to find the vision or mission statement of a company of interest to you. Discuss how this does or does not correspond to your personal vision statement.

12. For the list in question 10 above, try drawing an intent structure showing what is necessary for what.

13. Classify the following 20 characteristics that constitute an effective team member into "most important," "important," and "not important."

    _____ Displays positive behavior
    _____ Participates in team meetings
    _____ States problems
    _____ Explores all viewpoints
    _____ Attends all meetings
    _____ Provides appropriate feedback
    _____ Criticizes ideas, not people
    _____ Listens effectively
    _____ Shares ideas
    _____ Encourages others for opinions
    _____ Gives praise
    _____ Is loyal to the team
    _____ Maintains confidentiality
    _____ Accepts ownership
    _____ Is honest
    _____ Avoids disruptive behavior
    _____ Operates within team rules
    _____ Understands team goals
    _____ Supports diversity
    _____ Provides accurate information

14. For your own personal benefit, rate yourself on a scale of zero to 10 for each of the characteristics listed in question 11 above.

15. In his book *The Seven Habits of Highly Effective People*, Covey says "the following seven habits are necessary for effectiveness." Map these seven habits onto the five disciplines described by Senge.

SEVEN HABITS	FIVE DISCIPLINES[18]
1. Be proactive	1. Systems thinking
2. Begin with the end in mind	2. Professional excellence
3. Put first things first	3. Mental models
4. Think win/win	4. Building shared vision
5. Seek first to understand, then to be understood	5. Team learning
6. Synergize	
7. Sharpen the saw[19]	

16. Determine each of your roles at this stage in your life and within those roles determine goals, both long-term and for the next week. For example, you might be a spouse, a parent, a teacher, a researcher, a consultant, or something else. For each of these roles, determine specific to-do "goals" that you will accomplish next week.

17. Visit the Covey Leadership Center at www.covey.com and print out the front page as well as the site map.

18. Develop a plan for reduction/removal of the not-urgent/not-important activities and the time set aside for such activities, and transfer that time to the important/not-urgent quadrant.

19. Create an engineering notebook for the work you will do in this course. You should include a cover page, table of contents, and an entry page containing course assignments.

20. Create a time log to track the time you spend on activities this week for this course.

[18] See the Supplement to this chapter.
[19] By this, Covey means to take time to rest, reflect, resuscitate, rejuvenate, and retrain.

IN-CLASS, TIMED, TEAM EXERCISE

This exercise is to be done in teams called "firms." Firms compete against each other. Your instructor will assign you to a firm. You will work in your firm to build and sell as many paper airplanes as possible. The firm with the most sales and the highest utilization factor (percentage of paper planes that actually fly) wins. The objectives of this team exercise are:

- to design the product (a type of paper airplane)
- to create a work process
- to work in teams
- to build a quality product
- to fully use all resources.

In addition to the firms, there are the following three other players in this exercise:

A. Supplier—provides all of your supplies to design and build the paper airplanes
B. Evaluator—determines which firm has the highest utilization factor and is the most profitable
C. Customer—purchases the paper airplanes

There are four tasks to this exercise. Each task is timed so that all firms have the same amount of time to accomplish the task. Your instructor will tell when you can begin a particular task as well as when you must stop work on that particular task. You may not begin any of the following tasks until you are told to do so:

A. Task 1—planning and design—20 minutes
B. Task 2—practice—10 minutes
C. Task 3—reengineering—5 minutes
D. Task 4—building and selling—10 minutes

<u>Task 1—planning and design</u>

In this task you design your airplane and develop an operation plan. You have 20 minutes to complete this task. You must take following steps to complete the entire task.

1. Create a design for your airplane. The design specifications are given below.
2. Determine the processes needed to run your operation. You may setup as many processes as your team feels are necessary to build quality products. At a minimum, you need purchasing, production, quality assurance, and materials control.
3. Briefly define the responsibilities for each process. Identify who will work the processes. There may be overlap in responsibilities.
4. Draw a simple flow diagram of your operation. Use diagrams to document how your business unit will operate.

<u>DESIGN SPECIFICATIONS</u>

The following are the design specifications for the model airplane. Use this checklist for your quality assurance processes.

Identical height, but no higher than eleven inches
Identical weight, but no heavier than two sheets of 8x11 paper
Identical length, but no longer than eleven inches
Identical markings
Identical point of balance
Flight test—must show evidence of ability to fly

Identify the processes you will use for your firm. At a minimum, your firm will have the following processes: purchasing, production, quality assurance, materials control. Additionally, you may have marketing and sales. The production process will take the raw material (sheets of paper in this case) and fold that into a paper airplane. Exactly what folds are required and who will do which folds must be determined. Briefly define the responsibilities for each process. Identify who will work the processes. There may be overlap in responsibilities.

WORK FLOW DIAGRAM

On a clean sheet of paper create your work flow diagram. Show the relationships between the functions you planned to produce and the paper airplane.

Do not begin task 2 until directed to do so.

Task 2—practice

In this task you will have an opportunity to test your operation. You will have 10 minutes to practice your operation. The following rules apply to this task.

1. You will have an unlimited supply of materials for practice.
2. You may make as many paper airplanes as possible in 10 minutes.
3. You must work according to your original plan. Do not make any changes to your operation at this time.
4. Dispose of all paper airplanes when you have completed this task.

Do not begin task 3 until directed to do so.

Task 3—reengineering

In the reengineering task, your firm will have the opportunity to rework your operation. The time allotted to this task is 5 minutes. The following steps are required for this task.

1. You may change your design if necessary, but remember you only have 5 minutes for this task.
2. You may redefine your operation, determine how existing processes can be reworked for added efficiency and add new processes, if necessary. Use your imagination; there are no constraints for this task.
3. You should redefine the responsibilities for each process, adding tasks or deleting them as needed. Identify who will work new processes that are created. Use a clean sheet of paper labeled “processes” to redefine responsibilities.
4. Draw a simple flow diagram of your new operation. Use a clean sheet of paper titled “Work Flow Diagram” to document how your firm will operate under the new plan.

Do not begin task 4 until directed to do so.

Task 4—building and selling

This production and selling task is allotted 10 minutes. In this task, your firm will build as many paper airplanes as possible. The goal of this task is to use your resources and be the most profitable operation. The following rules apply.

1. You must purchase your building materials from the supplier. Each sheet of paper costs $100K and one sheet is needed per airplane.
2. Your customer will buy as many airplanes as you can build to specification.
3. You may sell each airplane for $200K.

In this task, the customer will inspect each airplane and purchase all that meet specifications. The customer is allowed to refuse those airplanes that do not meet the quality requirements. The firm that has the greatest net profit is the winner.

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SUPPLEMENT 2.1: A DISTILLATION OF SENGE'S FIVE DISCIPLINES

In his book *The Fifth Discipline*, Senge introduces the five disciplines that he believes are essential to success in corporate life. These disciplines are: Personal Mastery, Mental Models, Shared Vision, Team Learning, and Systems Thinking (the one that ties the others together). We present, in what follows, a distillation of these important concepts.

Rather than being prisoners of our own thinking, rather than getting lost in the details, rather than misunderstanding reality, rather than failing to cope with the complexity, we are well-advised to assimilate, indeed inculcate these five disciplines. Figure 2.7 illustrates what has happened as a result of system integration that was discussed in Chapter 1. The integration has brought with it increased complexity and with it the potential for chaos and catastrophe. What is needed are tools for coping with the complexity. Systems thinking and the other four disciplines provide that.

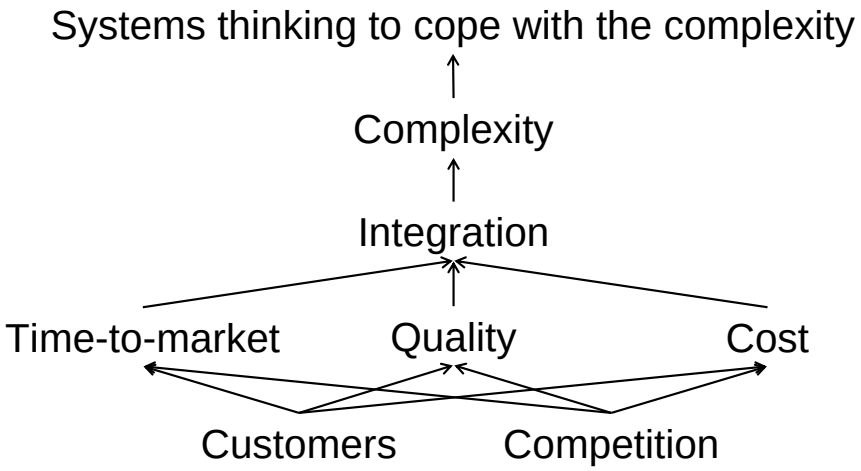

Figure 2.7: The Negative Consequences of Increased Integration

Personal Mastery

According to Senge[20], "Personal mastery is the discipline of continually clarifying and deepening our personal vision, of focusing our energies, of developing patience, and of seeing reality objectively." Although this concept is part of the tradition in both Eastern and Western religions, few organizations encourage the growth of their employees in this manner. This is the dimension in which people live through their aspirations, their dreams, and the future rather than the past. People with high levels of personal mastery will broaden and increase their ability to create the future they want. Among other advantages, such people learn faster.

Individual learning is necessary for team learning. The only really sustainable competitive advantage is the rate at which teams learn. Team learning enables employees to make better decisions about the issues and problems they face. The wrong decision by a company or a team can lead to financial ruin – bankruptcy. Yet teams can learn only as fast as the individual members learn. "The organizations that will truly excel in the future will be the organizations that discover how to tap people's commitment and capacity to learn at all levels in an organization[21]."

[20] Senge, P., *The Fifthe Discipline*, Doubleday, 1990, p. 7.
[21] Senge, P., *The Fifth Discipline: The Art and Practice of the Learning Organization*, New York: Doubleday, 1990, p.4

Continual clarification of what is important and what is not is inherent in this discipline, as is learning how to see current reality as clearly as possible. Using both of these practices to maintain a kind of "creative tension" will lead to motivation of the individual. Senge says people with high levels of personal mastery are more committed and take more initiative than people without high levels of personal mastery. They hold to their personal vision and maintain the creative tension that motivates them toward ever greater levels of excellence.

Mental Models

People carry pictures of their companies, markets, competitors, even of themselves in their minds. Because these pictures are subjective, they do not reflect objective reality. Often, people will reject a new idea because it doesn't "fit" with their mental model. Similarly, inaccurate mental models often stop companies from acting on ideas that might lead to better performance. Organizations must work on unearthing mental models, holding them up to scrutiny, and changing the ones that keep the company from learning and growing.

Mental models predetermine the actions and decisions we take when confronted with a problem. Problems arise whenever there is a perceived difference between *what is desired* and *what is*. In the language of the economist, when expectations differ substantially from results, a problem occurs. Problems serve as motivators for taking action. What is done must begin with a decision about what to do. Thus, our mental models about problems ultimately lead to decisions, as shown in Figure 2.8.

Some decision-making strives to mitigate or alleviate perceived problems. An individual or company's mental model determines what decisions are made. If a group makes a decision, then the consensus mental model determines what the decision is. One purpose of the business degree you are pursuing is to insert into the decision process more refined models of systems, so that the mental model of that problem you are endeavoring mitigate has a better chance of being close to valid, and you can make better quality decisions. Why did the budget "whiz-kid" of the Reagan era, David Stockman, fail to stop the debt crisis he saw coming[22]? Why did the NASA *Challenger* disaster take place in 1996, although engineers at the contracting companies reported safety problems ahead of time? In both cases, the people in charge of making decisions used the wrong mental model. Their penchant for use of the prevailing mental model prevented them from seriously considering other more realistic models.

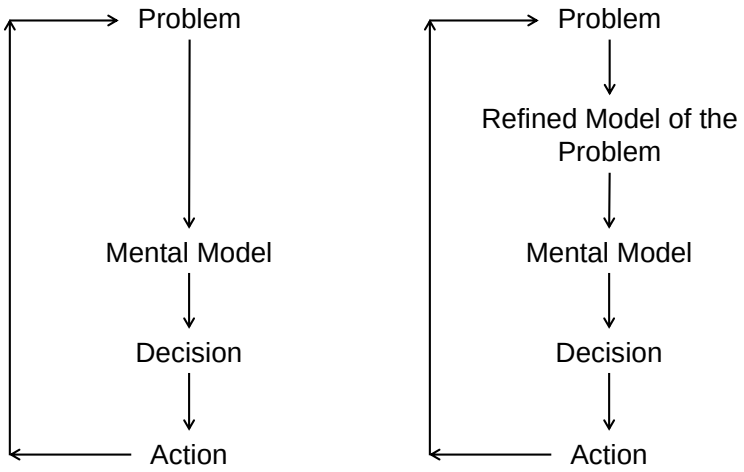

Figure 2.8: Relationships Among Models, Problems, Decisions and Systems

[22] During the Reagan era, government spending, especially on defense, exceeded government revenues and huge deficits contributed to the national debt year after year.

Shared Vision

A genuine vision motivates people to learn and excel because they are committed to working toward a common lofty goal. Senior management creates the firm's vision. As Senge (1990) points out, "Many leaders have personal visions that never get translated into shared visions that galvanize an organization." To inspire people and motivate them to change unproductive behaviors, senior management must communicate the shared vision frequently.

The shared vision must consider distinctive competencies that the organization brings to the marketplace. It should (1) be a guiding philosophy, (2) provide a sense of purpose, (3) incorporate consensual values and beliefs, and (4) create passion.

One excellent example of an organization whose employees believe deeply in its shared vision is Southwest Airlines (Freiberg, et al., 1996, Keating, 1997). Chief Executive Officer Herb Kelleher has been able to create a strong sense of identity, mission, and purpose among his employees with his freedom vision. Between 1990 and 1994, the airline industry lost $12.8 billion, more than it had made during the previous sixty years. Yet Southwest was profitable during every year of this period, as it has been since 1973. The company puts its employees first (above the customer) and consistently lives up to its promises to its employees. Mr. Kelleher seizes every opportunity to tell employees that he loves them.

In the early days, Mr. Kelleher, an attorney, personally had to win several court battles involving the young airline in which he believed that the very freedom of his customers was at stake. More to the point, the survival and freedom of the young airline was also on the line. Through idealism, perspiration, and inspiration, Mr. Kelleher personally fought and won those court battles. Since then, Southwest has consistently spoken out for freedom and in their advertisements, they underscore their name, "Southwest Airlines," with the words "a symbol of freedom." That is the viewpoint the company has ingrained in its employees and customers. Today, it is the number-one-ranked airline in the U.S., far surpassing United, American and Delta in terms of safety, baggage handling, on-time performance, customer service, and ease of reservations (Keating, 1997).

Team Learning and Corporate Culture

When people truly learn together, their combined intelligence can surpass the intelligence of any single individual. They can produce extraordinary results as a team, and each member learns more rapidly than he could on his own.

The most critical ingredient for a successful team is communication relative to the following—roles, goals, procedures, processes, and ground rules. Everyone must understand and agree to the same goal. Team members must know what management's expectations are, and individual roles must be clear. Additionally, the decision making process must be understood and everyone should know how issues and conflicts will be resolved.

Team learning, coupled with professional excellence, personal and shared vision, and the capacity for systems thinking should become part of an organization's culture. The best way to create permanent competitive advantage is to advance and mature the culture of the organization. Technological innovations and improvements cannot by themselves create *sustained* competitive advantage. Process improvements and innovations can and will be eventually replicated. Capital can be bought; information can be acquired. But a high-trust, empowered culture is always home grown (Covey, et al., 1989).

Southwest Airlines has a winning culture. Southwest's culture is made up of thirteen core values: profitability, low cost, family (by treating employees like family), fun, love, hard work, individuality, ownership (employees receive a share of the profits), legendary service, egalitarianism, common sense, simplicity, and altruism (Freiberg, et al., 1996, Keating, 1997). A culture committee of 100 individuals who embrace the company's values makes sure that the corporate culture comes alive in the company. With culture being so important to the company, it is no surprise that Southwest adds only two additional markets (cities) a year to its network. This slow rate of growth gives the company time to train new employees and inculcate them with the corporate vision, values, and culture. As an example of what happens to an air carrier that grows too fast and does not take the time to inculcate values and culture, consider the plight of Peoples Express Airlines. Peoples grew at the rate of more than 30 percent per year and one-third of its work force was comprised of temporary employees the year before it was sold to Texas Air (1986). In that year, it lost $133 million in the first six months alone.

Self-directed work teams have become commonplace in the corporate world. These teams perform work that is designed to give the team members a sense of ownership of a product or a service. Such teams engage in a spirit of cooperation, information sharing, flexibility, and fulfillment (Kerzner, 1995). Self-directed work teams are empowered, establish plans, determine schedules, control budgets, and monitor human resources. The results are in and the report card on self-directed work teams is excellent—improved quality, productivity, and service, greater flexibility, reduced operating cost, and faster response to technological change (Kerzner, 1995, Sage, 1977).

One reason for the popularity of teams is that firms began to organize around processes and projects, both of which are carried out by teams. Teams eliminate the slow pace and poor quality of the work that resulted from individuals working alone in different departments.

In a cross-functional team, management chooses representatives from, for example, marketing, manufacturing, engineering, and field service to work together as a group. Each group member is empowered and authorized to make decisions on behalf of the department she represents. The group can discuss issues and make decisions without having to go through the lengthy process of getting approval from each department head. The use of cross-functional teams, coupled with software like groupware, reduces the time required to get consensus on a decision from months to just days. Exhibited in Figure 2.9 is a commitment chart that can be used to gauge team-member positions relative to a particular decision.

	COMMITMENT LEVEL						
PLAYER	LOWEST	2	3	4	5	6	HIGHEST
Beth	XXX						
Betty					XXXXXXXXXXXX		
Bill						||	
Bob		----------→					
Brenda	←----------						
Bruce				***			
Becky	++						

Figure 2.9: A Typical Commitment Chart

Good teams possess synergism, something individuals working alone do not have. *Synergism* occurs when the whole is greater than the sum of the individuals working apart. Often, team members are amazed at what they can achieve working together as compared to what would not happen working separately. To achieve synergism, the people who comprise a team must bond with each other and be in alignment. People who have experienced synergism have been known to spend the remainder of their lives looking for similar team experiences.

Bill Russell, a former basketball player for the Boston Celtics, recalls that when he played basketball, there were times when every member's play rose to a new threshold. "When it happened I could feel my play rise to a new level. … It would surround not only me and the other Celtics but also the players on the other team, and even the referees. … The game would move so fast that every fake, cut and pass would be surprising, and yet nothing could surprise me. It was almost as if we were playing in slow motion. … I could almost sense how the next play would develop and where the next shot would be taken." This is an example of synergism in the extreme (Russell, et al., 1979).

To synergize is to put into practice one of Covey's seven habits. According to Covey (1989), "synergy is the highest activity in all life—the true test and manifestation of all the other habits put together." Two two-by-fours can hold more than twice the weight of one two-by-four. To synergize is to stretch oneself into the unknown, and to take risks in relationships. Teams who have experienced synergism will never be satisfied with anything less. Synergism requires deeper levels of communication. Team members must be willing to be vulnerable, to allow their mental models and underlying assumptions to be fully scrutinized and exposed. To accomplish this, team members must relinquish protective, isolationist and competitive leanings in favor of collaboration and the abundance mentality[23].

In addition to synergy, an important characteristic of teams is alignment. Alignments are indicative of a shared vision that is being realized. Without alignments, individuals may use their energies to work against one another. There must be a commonly held vision, and each individual's personal vision must be in alignment with the shared vision. As Figure 2.10 below illustrates, all the disciplines described in this chapter contribute to empowerment. But Figure 2.10 also suggests that team learning builds on a personal vision within each individual, a pursuit of professional excellence, and a shared vision. Starting with a commitment to self direction, the individual develops and continually refines his personal vision, sets goals, pursues professional excellence, aligns with the shared vision, contributes to and promotes team learning, and uses systems thinking. A technology for empowerment and learning is then in place.

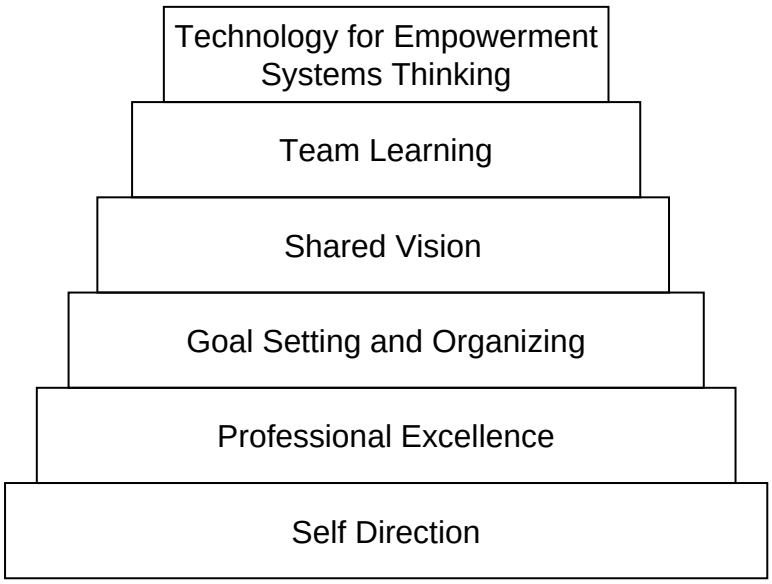

Figure 2.10: Technology of Learning and Empowerment Hierarchy

[23] The absence of selfishness, the abundance mentality is a world view in which there is enough for everyone. Those who subscribe to it tend to be altruistic, rather than self-serving.

Companies have increasingly aligned themselves with the customer or customer base. Using processes and projects to integrate enterprises and dissolve organizational boundaries, companies have created a customer focus; they now direct their energies toward the customer. Previously, energy and information ran up and down isolated, non-integrated silos (stovepipes) and perpendicular to the customer. Contemporary organizational thought holds that these non-aligned kinds of activities do not add value. Alignment as proposed by Labovitz and Rosansky (1997) entails 1) crafting the essence of their business and determining its shared purpose which is called THE MAIN THING; 2) defining strategic goals and imperatives and deploying them throughout the organization; 3) tying performance measures and metrics to those goals; 4) linking these measures to a system of rewards and recognition, and 5) reviewing the performance of employees to ensure goals are met.

Systems Thinking[24]

Systems thinking uses knowledge and tools to study patterns and events so as to decide how to change them for the better. Business behavior is derived from events and patterns whose impact may take years to see. Linear thinking focuses on one piece of the pattern; it fails to solve the problems of the entire system. Systems thinking is the final or capstone discipline because it is the key that unlocks the others. It is a radical departure from the past that does away with the old linear ways of thinking. Linear thinking holds that problems have simple solutions when, in reality, most problems are more complex than we suspect. With linear thinking, problems may disappear for a while but then almost always return; systems thinking seeks to determine the underlying structure, where the true underlying causes are found and the most effective responses are determined. According to Senge, healthy companies fail because of "learning disabilities" as many as one-third of all companies fail in any given thirteen year period; the average lifetime of a firm is 40 years or less.[25]

Learning disabilities include such thinking as: *the enemy is out there; if we do our own job to the best of our ability, management cannot blame us*. In fact, the enemy is not out there but is within most often, within the collective thinking of the organization. Some additional disabilities are*: last quarter's earnings are the whole picture; people_must not carry a longer-term point of view.* In fact, results of decisions usually do not come to light until weeks, months, or even years after the decision is made. One final collective mental disability might be*: managers must handle the entire problem*. In fact, managers must empower their subordinates and coach them in problem solving.

If sales are off this quarter, the reason may be last quarter's highly successful rebate program[26]. The harder a company pushes to increase its revenues and profitability, the harder the system will push back. Firms will engage in aggressive marketing and pricing strategies to bring back customers. Meanwhile profitability goes down the tubes, so the firm cuts corners on its quality only to lose customers in the end. Efforts to correct the U.S. trade imbalance by letting the value of the dollar fall in the mid-1980s were compensated for by foreign competitors who let prices of their goods fall in parallel. When companies remedy symptoms rather than looking for the root of a problem, they may feel relieved in the short run, but the problem still exists and quite possibly is getting worse. The cure can be worse than the disease. One way companies address problems is by hiring consultants, and one result of hiring consultants can be that companies don't train their own staff in important areas. The company now becomes increasingly dependent

[24] Many of the concepts in this section are adaptations of material found in Senge's book, *The Fifth Discipline*, Doubleday, 1990.
[25] Senge, P., *The Fifth Discipline*, Doubleday, 1990.
[26] If an automobile company offered a $2,000 rebate on each of its automobiles last quarter, that rebate may have attracted all of the buyers for several months to come. People will decide to buy at the time the rebate is offered rather than postpone their purchase until later. Consequently, demand will be exhausted for a time until more cars wear out and more buyers have the funds to purchase an automobile

upon the consultants. The consultants stronghold on the firm grows as the company becomes ever more dependent upon them.

Cause and effect are not often closely related in time or space. For example, a food shortage in Moscow might manifest itself in Miami via higher prices for bread six months later. Delays in the food system[27] can result in the effects of an action not manifesting themselves until well after those effects were needed. What happens here is that grain gets sold to Russia, which eventually raises the prices of grain everywhere, including in Miami.

All systems representations use two building blocks--reinforcing loops and balancing loops. **Reinforcing loops** tend to build momentum and grow stronger as time progresses. Reinforcing loops are the engines of growth. Reinforcing loops produce a kind of behavior that is referred to as "exponential growth." Figure 2.11 shows a reinforcing loop that occurs between savings and interest that is allowed to compound in a savings account. The interest gets added to the savings and interest is earned on interest. When the loop is reinforcing, a movement in one direction leads to more movements in the same direction. Conversely, less movement in one direction leads to even less movement in the same direction.

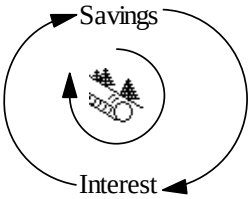

Figure 2.11: A Reinforcing Loop Structure Involving Savings and Interest

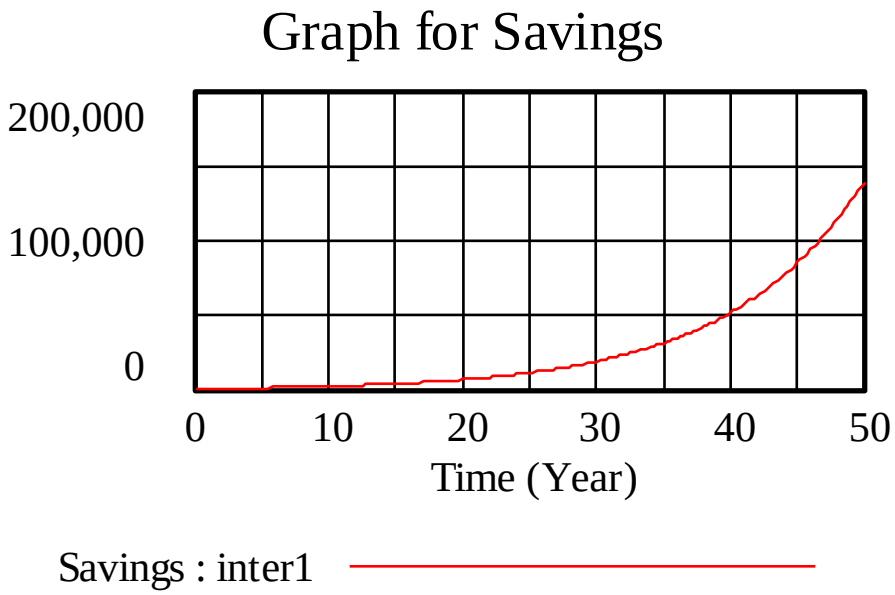

Figure 2.12: Behavioral Plot of How $1,000 Would Grow Over Time at 10% Interest

[27] or any system, for that matter.

In Figure 2.12 is exhibited the behavior we would expect from the reinforcing loop exhibited in Figure 2.11. This kind of behavior is called exponential growth. After 50 years, the savings account would be worth nearly $140,000, assuming interest at 10% per annum is compounded quarterly.

Balancing loops tend to lose momentum over time. They generate the forces of resistance that eventually limit growth. Balancing loops always are driven by a goal or target. Regardless of where the system starts, it moves toward the goal or target. The system could be above or below the target; it still moves toward the target, even if the target itself is moving. An example would be actual productivity taken in relation to desired productivity. A project professional adjusts his or her actual productivity toward the desired productivity. The goal or target is desired productivity; the actual condition is actual productivity. The action that is taken is the adjusting that is done to move actual productivity toward desired productivity. The structure of such a balancing loop is exhibited in Figure 2.13 below.

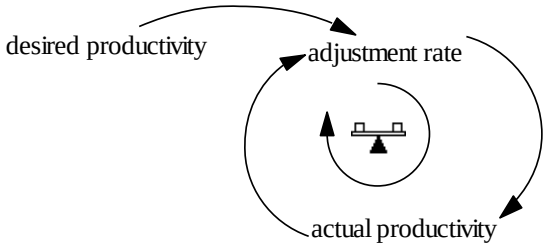

Figure 2.13: A Balancing Loop for Adjusting Actual Productivity Toward Desired Productivity, the Goal.

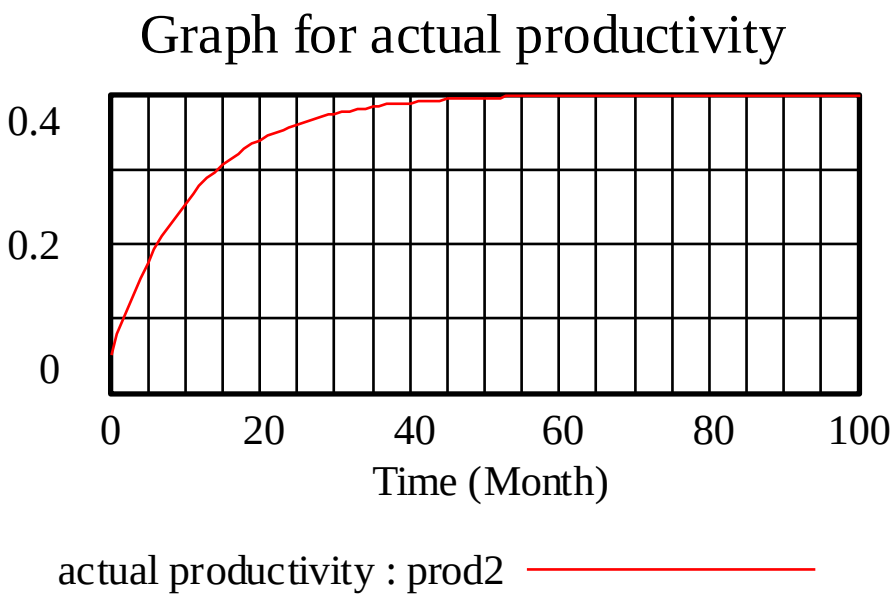

Figure 2.14: Plotted Behavior for a Balancing Loop Involving Actual Productivity and its Adjustment Rate

In Figure 2.14 above, the project professional moves his productivity up to his target level of four tenths of a project completed each month from one tenth of a project completed each month. Observe the slowing growth that is taking place over time; however, as the biggest gains in productivity occur at the beginning.

Systems thinking enables individuals and companies to shift from thinking about the parts to thinking about the whole. It enables people to see the forces that shape change. From a systems perspective people see themselves as immersed and embedded in the system and part of the looping process, as opposed to standing apart from it. This is a paradigm shift that enables people to see themselves as continually influenced by as well as influencing reality. People begin to perceive themselves as partly responsible for the behavior of the system rather than seeing another part of the system as to source of the "problems." With this perspective, everyone shares responsibility for problems generated by the system, according to Senge.[28]

The first step in breaking out of the reactive mindset that often characterizes linear thinking is to understand cycles of influence. We are accustomed to thinking of systems as straight paths of causality, instead of cycles or loops. Consider the process of filling a glass with water. As the eye observes the level of water in the glass, it sends messages to the brain. These messages result in impulses being sent to the hand, which begins to close the faucet and reduce the flow of water into the glass so that it does not overflow. The eye in turn observes the result (the full glass) and sends additional messages to the brain that result in the hand turning the faucet off completely. Understanding a loop like the hand-to-brain, brain-to-hand loop in this example helps people to overcome deeply ingrained ideas such as "I am filling a glass of water", which implies one-way causality. Clearly this only describes a part of the feedback process. The other part of the process is the "the level of water in the glass is controlling my hand. Both statements are incomplete. A more complete statement would be "my intent to fill a glass of water creates a system that causes water to flow in when the level is low, then shuts the flow off when the glass is full." In other words, the structure causes the behavior.

Structure and behavior are opposites of the same two-sided coin. Structure leads to the behaviors that we observe. Too often, people see just the behavior and miss the structure underlying the behavior. Consequently, solutions to the undesirable behaviors that we observe are not readily discerned and we feel helpless. Senge[29] asserts that all casual attributions made in everyday English are highly suspect because most are embedded in old linear ways of thinking.

Thus, systems thinking is a radical departure from the old paradigms and ways of thinking. Systems thinking leads us to believe that the relationships we have with the world outside ourselves are more complex than we originally suspected. In systems thinking, all teams, organizations, projects, and individuals find themselves victims of structures (within these relationships) of which they are unaware. In the following chapters, we will describe tools for understanding these structures.

This "tool set" is known as systems thinking and system dynamics. These are fundamental to a deeper understanding of all the major disciplines being taught today—science, history, mathematics, social studies, health, even project management. Indeed, systems thinking and system dynamics can be used in biology, zoology, physics, chemistry, sociology, demography, and geography to improve students' understanding of the structure and behavior of the models used in these courses. In addition to underlying and supporting these disciplines, systems thinking is integrative; that is, it allows knowledge about structure and behavior within one discipline to interact with knowledge about structure and behavior within other disciplines.

[28] Ibid, p. 78.
[29] Ibid, p. 78.

System dynamics is a vehicle for taking verbal models into more sophisticated causal, mathematical, and simulation models. For example, systems thinking synthesizes data and knowledge to create a view of the organization or process as a whole. Together, system dynamics and systems thinking enable professional people to see both the forest and the trees. They allow users to see the big picture and to understand the interaction between seemingly disparate parts of the system.

The frenetic pace of change today is creating a need for ever greater levels of integration, as exhibited in Figure 2.7. This integration has a positive impact on the major forces driving the marketplace, specifically, lower cost, improved quality, and shorter times-to-market. But with the integration comes increasing complexity leading to possible chaos and catastrophe, as discussed in the beginning of this Supplement. Companies are under increasing pressure to successfully cope with the growing complexity of today's marketplace. Systems thinking and system dynamics are coping methodologies that can alleviate these ever-increasing levels of complexity, chaos, and the potential for catastrophe.

Systems thinking goes beyond linear thinking because it looks at organizational problems in terms of the causality inherent within them. As we have said, causes are separated spatially and temporally from their effects. But to truly understand why, we must 'get a handle' on the inherent causation. Such causation tends to involve loops as we have said. The type of loop will suggest the kind of behavior that the system will exhibit. A reinforcing loop will create a growth process, whereas a balancing loop will have a slowing effect on overall process behavior. Finally, it is entirely possible for systems to possess both reinforcing loops and balancing loops working together in interaction with each other. But we will more fully explore these possibilities again in the Supplement to Chapter 6.