A Concise Guide to Program Management

Fundamental Concepts and Issues

Dr. Mitchell L. Springer, PMP, SPHR

Purdue University Press

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Acknowledgments

Over this last year or so, I've spent a fair amount of time studying the discipline of gerontology—the study of biological, psychological and sociological changes as they relate to the aging process. In doing so, I've reawakened to many realities, long since forgotten or simply pushed to the background, some of which I'll share here: (1) Attitude is everything. (2) Put past events behind you; learn from them, but look to the future. (3) Figure out what you're passionate about, because in that passion there exists the opportunity for total personal contribution, which in turn can produce tremendous gratification and contentment. (4) Take risks, albeit calculated risks. (5) Live a little, laugh a lot. (6) When stressed, visualize the worst case scenario, and determine how best to deal with that. Of course the worst case will never materialize, and you'll feel more in control and the stress will subside. (7) Live as though there is accountability; you may be a different person. (8) Discover or rediscover love. (9) Above all else, recognize that our short time on earth is to prepare for the eternity that follows. There'll always be another chapter in the book of eternal life.

I know this all sounds philosophical and perhaps a little reflective, but I've always had a love for life . . . and certainly no more than now.

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book. In the end, the material was clearly better and her suggestions proved to be the premise for so many of the positive comments we've received on our books. Margaret, just like my family, made me a better writer and person. I sincerely appreciate her intelligence and relentless pursuit of perfection (to borrow a phrase).

No acknowledgment is complete without thanking those closest to you; Matthew, Christopher and Jonathan. They make my life worth living. They each bring a different and diverse perspective to what otherwise would be a very boring and mundane, although forever optimistic, me. My children have made me a better person, and I'm not sure you can pay anyone a greater compliment than that. I'd like to especially thank my wife Susan. She is absolutely phenomenal! I have learned endlessly from her. I'm constantly amazed at her intellect, attention to detail and acute sense of pragmatism. Susan's strengths fill the crevices of my weaknesses. With no theatrical intentions implied, she complements and completes me. I am truly blessed.

Introduction

Program Management or Project Management, which we will use synonymously and later differentiate between, has been around since the beginning of time. The only difference between 300 B.C. and now is that we have crystallized and subsequently formalized our understanding of the many activities we must perform if we wish to bring continuity to our program management practices and therefore increase our opportunities for success.

Many times over my years of teaching program management, the class participants have discovered that program management is not necessarily for rocket scientists—although they ideally adhere to the basic principles of it. Instead, the basic activities and products of the program management process are followed, or at least thought about, in every single decision made. It's true! As we move through the program management process, it will become increasingly obvious that we do, in fact, at least think through the various activities of the process, if perhaps for only a few seconds at each point along the way.

Let's take the example of planting a garden. One of the first things we do is to think about how nice a garden might look if planted in that ideal spot in our back or front yards. This concept of "visualizing" is what we might call our "operational perspective." In other words, at this point we are simply collecting our thoughts on why we might want to plant such a garden.

At some point, once we've decided that a garden would indeed look just fine, especially as the neighbors drove by, we begin to think about what type of plants might look really special and what other, supporting plants might bring out the colors we're trying to emphasize. This activity, while still only a daydream, is the beginning of our requirements analysis efforts. That is, we are beginning the process of figuring out exactly what we want to do, what plants would be needed, how many plants might look most acceptable and the like. We might even consult with an organization that specializes in landscaping. The landscaper, incidentally, is what we would call a specialist organization or function. Function in this sense is

an organization with some special knowledge, skills or abilities that behaves as an expert in the field. In this case, our specialist function is our landscaper.

As we get a little more serious, we begin to make a list of what we might want to purchase; perhaps we even assign out some of the tasks associated with the garden. For example, we might write down that the ground needs to be turned and a mixture of black dirt and fertilizer be added and tilled in. We might also be thinking that our brother-in-law, Tom, has a tiller and could help us do that. We might also be thinking that our garden should have some type of special stone, and that the stone could be purchased and delivered by the local garden center. The process of defining all of our work and separating it into chunks to be worked by different individuals or organizations is what we would refer to as breaking our work down in a "Work Breakdown Structure."

Note that up to this point we may only have been doodling on a piece of scrap paper. We've made no formal notes, written any formal proposals, asked for any formal quotes from outside vendors or even our brother-in-law Tom. We've done nothing more than perhaps eat our lunch and jot down a few thoughts. Yet, even with nothing more than a few loose thoughts and a scribbled-up piece of scrap paper, we have proceeded clearly through the beginning phases of the program management process.

The point is that program management is a process with a set of attendant products. Its purpose is to bring consistency, uniformity and continuity to our program management practices, should we consciously decide to follow them. Even in the case where we do not intentionally follow every activity or generate every formal product, our simply being aware of the process helps us to better move in a uniform direction. The value in moving uniformly through the process, whether consciously or unconsciously, is that we minimize the chances for making mistakes and potential rework. For example, had we known that certain plants favor shade over sunlight, we might not have spent the money on them, only to have them die in the heat of the summer months.

The point of this book, therefore, is to bring a very logical and proven effective process, the program management process, into our daily lives so that each of us may benefit from having gained insight into it. In this way, perhaps during our next project, we might stop and think, "I'm beginning to collect requirements and it might behoove me to think this through a little bit before I begin. . ."

Having knowledge is better than not having knowledge. Knowing is better than not knowing. When making any basic decision, understanding that our thoughts are actually well documented in terms of the activities to perform and the paper documents to generate is better than making the same mistakes over and over again for lack of understanding. The intent of this text, therefore, is to at least turn the unknown unknowns into known unknowns, if not entirely known knowns (we'll discuss this cutesy little statement later).

Chapter 1

Process Management: What Is It?

A process is, quite simply, a series of activities which, when followed, produce a desired result. We have processes for nearly everything we do in life. Even when I wake in the morning, I have a process I follow for showering, shaving and getting dressed.

Is a process similar to a routine? The answer is yes. A routine is defined by my desk copy of the American Heritage College Dictionary as "a prescribed detailed course of action to be followed regularly; a standard procedure . . . a set of customary procedures or activities."

A process is an activity or group of activities that takes an input, adds value to it, and provides an output.

The key in having a good process resides in:

1. The clearness of the definition of the many activities that make up the process,
2. The degree of adherence to the process activities, and
3. The adequacy of the process activities to satisfy the desired outcome.

Let's look at an example. Every morning for breakfast I eat cereal and toast. Although it sounds somewhat compulsive, I have worked for years to perfect a process, based on the geographical location of items in my kitchen, to create a breakfast process which maximizes efficiency. The process I use looks like the following:

1. Place bread in the toaster.
2. Obtain butter from the refrigerator.
3. Obtain cinnamon from the spice cabinet.

4. Obtain plate for toast (which is in a different cabinet than the bowl for cereal).

5. While toast is browning, obtain bowl for cereal.

6. With bowl in hand, obtain spoon from drawer and cereal from cabinet.

7. Place cereal in bowl (at this time toast pops up from toaster).

8. Place toast (one piece at a time) on toast plate, butter, and sprinkle with cinnamon.

9. When second piece of toast is buttered, place it upside down on the first piece of toast.

10. Holding both pieces of toast, gently tap plate over sink to remove excess toast crumbs from plate.

11. On the way to the table, grab milk from refrigerator.

12. Place toast on table, pour milk on cereal.

13. Replace milk in refrigerator, while milk is softening cereal, remove clean dishes from dishwasher.

14. Return to softened cereal and enjoy breakfast.

Now, as compulsive as it sounds, this process is so engrained in my routine that I perform these activities without even thinking about them. My movements around the kitchen are swift and efficient as I proceed from one activity of my breakfast process to the next. The end result is an efficient process, because I have minimized my movements throughout the kitchen, and it is an effective process because I have gained the benefit of a nutritious morning breakfast.

By definition, then, the many activities of a process, when executed successfully, produce a consistent end result.

Process management is concerned with making sure the defined process is still efficient and effective, in that it minimizes the activities of the individuals performing the process, and produces an end result that is desired. Process management, then, is simply managing the existing process.

Creating an efficient process involves the elimination of non-value-added activities. In other words, once we identify all of the activities to be performed and the order in which we intend to perform them, we must then look to see if some activities:

1. Are redundant and can be deleted,

2. Are best performed in another sequence,

3. Can be combined with previous or subsequent activities, and

4. Are potentially missing and could enhance the efficiency of the entire process.

In the business world, process management provides management with:

1. A way of thinking systematically about the behavior of people at work in an organizational setting;

2. A vocabulary of terms, concepts, theories, and methodologies that allow work experiences to be clearly analyzed, shared, and discussed; and

3. Techniques for dealing with many of the problems that commonly occur in the work setting.

Process management is not a new concept. Process management originated as part of the production-oriented statistical quality control movement in the late 1920s and early 1930s. What is relatively new, however, is the transition of process management methods from a manufacturing environment to a total company orientation.

Process management is a continuous effort that recognizes that the work done in an organization is accomplished through a series of processes and charges the organization's managers with ensuring that these processes are clearly defined, healthy, and competitive. It is a comprehensive approach whose goal is to increase the effectiveness, efficiency, control, and adaptability of a given organization.

Business process management represents a break from some of the traditional concepts of organizational authority (Stinnett 1992). It requires a new way of looking at, and thinking about, long-established assumptions concerning hierarchies and organizational structure. For instance, in a conventional organization it would be most unusual for the vice president or director of one group or division to become directly involved in the activities taking place in another group or division. Because process management involves managing processes across divisional and organizational boundaries, as well as within these boundaries, it requires a more flexible management strategy. It also requires close cooperation among managers in diverse functional and operational units to ensure that the process flow is not interrupted by conflicts over lines of authority (King 1992).

Process management relies on process definition, elimination of non-value-added activities, customer/supplier orientation, and a team approach (Hoban 1992; Price 1992). Process management processes utilize continuous process improvement (CPI), which assumes that a measurement baseline has been established. Through CPI, the process is measured forever. CPI accounts for error elimination, innovation, and business changes. All activities of a process are questioned; nothing is sacred.

Process management offers organizations a means of applying to non-production functional organizations the same quality improvement and defect reduction techniques used in manufacturing processes. Many engineering, service, and business processes offer an organization the greatest untapped potential for cost savings through quality and productivity improvement (Welsh 1992). Process management, with its emphasis on business process quality, is the most meaningful way to apply the principle of quality throughout an enterprise (Zells 1992).

The basic steps in creating an efficient process are:

- Determine what end result is desired.
- Identify the activities currently used to accomplish this process.
- Determine how the current activities are ordered (we call this the interrelatedness of the many activities).
- Identify from your flow chart of activities and their ordering which activities do not seem to add value, could be merged, or seem inappropriately placed in time.
- Create a new flow chart depicting the ideal scenario (don't worry about who currently does which activities or how).

- Identify measurement points in the new process which will allow you to determine how well the new process is working. In my breakfast scenario above, does the toast pop up before I am ready to butter it? If it does, then either the toast will get cold, or I need to modify my process to get me back to the toast in a more timely manner.

- Test the new process. In a business environment, this may mean making people assignments to the activities. It may further mean reassigning individuals or work in a manner not previously assigned.

As stated above, it is only through proper measurement that we can make required changes to an existing process to increase either efficiency or effectiveness. Proper measurement requires that we identify sufficient measurement points throughout our process, and that these measurement points are reflective of how the process is running.

For example, if I were to choose to measure how long it takes to grab the milk from the refrigerator, that would not be as meaningful as determining how long it takes to grab a bowl, spoon, and cereal and pour the cereal into the bowl, because, if the toast pops up before I can get the cereal into the bowl, then perhaps pouring the cereal into the bowl should be done after the toast is buttered.

We can also choose too many measurement points. Too many points can lead to excessive measurement-taking so that all we accomplish is taking measurements.

Chapter 2

What Type of Contract Should I Enter Into?

There are numerous forms a contract can take on between a buyer and a seller. The three we are going to discuss in this chapter are:

1. Fixed price contracts,
2. Cost reimbursement contracts, and
3. Time and materials contracts.

In program management, the program manager will always have certain amounts of risk in the program. How those risks are financially dealt with is determined through the type of contract between the organization and its customer. Early in the bidding phase of the program, the program manager will make many decisions regarding who will assume the cost implications of the potential risks. How risks figure into the equation will be discussed shortly.

In general, contracts are grouped under the heading of two broad categories:

1. Fixed price contracts, and
2. Cost reimbursement contracts.

When determining which type of contract to select there are many factors involved. Those factors are discussed in the next section. In general, however, and probably more than anything else, the question to ask is "can you estimate the amount of effort it takes to complete the tasks?"

If the answer to the above question is "yes," then a fixed price contract is in order. If the answer to the above question is "no," then a cost reimbursement contract is probably more applicable.

Understanding, or not understanding, the amount of effort to perform the task does not necessarily mean the work is less defined for one individual than for another. It simply means it's more difficult for one person to estimate the level of

work than it is for another. There is a subtle but significant differentiation in the above statement. Two different contractors may see the same detailed specification but yet have very different perceptions of what is involved in performing the work to accomplish the tasks. Their differences may be based on experience, understanding of the end-user's operational requirements, or whatever.

For example, I was obtaining estimates to have a patio extension placed onto my deck in the backyard. Two contractors were solicited for this estimate. One said he had done many of these type of jobs in the past and figured it would cost X dollars. The other said this really was not something he felt comfortable with estimating, but felt he could do a very good job at it, and suggested I pay his labor by the hour for whatever period it took to do the job. The first, therefore, was offering a fixed price to do the job, while the latter was opting for reimbursement of his time (costs).

Factors in Selecting a Contract Type

There may be many factors involved when selecting a type of contract. Some of the more prevalent ones include:

1. Price competition,
2. Type and complexity,
3. Urgency of the requirement, and
4. Contractor's accounting system.

Price competition—normally, effective price competition results in realistic pricing. The quantity of competitors has a direct relationship on what type of price an organization can charge. The more competitors there are, the more realistic the price would be expected to be. This is true, unless, of course, a contractor is attempting to buy into a contract. As an aside, why might an organization "buy" into a contract? There may be many reasons for this, but some of the more prevalent ones include the following:

- Pursuing a new business venture or product line,
- Believing there is significant follow-on business,
- Protecting an existing business service or product, and
- Simply having excess cash.

The following is a first-hand example of an organization buying into a contract. During the consolidation of the defense industry in the late '80s and early '90s, bigger organizations began to bid on government programs that were once bid on and owned entirely by smaller defense contractors. Sometimes, the bigger organizations didn't have the existing product line but firmly believed there was sufficient business opportunity to support the organizations' internal efforts to play catch up. To this end, the larger defense contractors would offer to share the cost of the proposed contract with the government agency. This was a win-win for both the contractor and the government. The government obviously made out by virtue of having to pay less than would normally be required, and the contractor made out by obtaining a foothold into a new market niche.

One might ask, "Why couldn't any of the other smaller contractors have also 'bought' into the contract?" The answer is that the bigger organizations had deeper pockets. They had considerably greater cash reserves, therefore affording them a greater degree of latitude in their marketing pursuits. To this end, the smaller or-

ganizations frequently became subcontractors to the larger prime contractors, who themselves were now answering directly to the government agency.

Type and complexity—remember that the more accurate an organization can be on estimating the level of effort of the task, the more the contractor can move towards a fixed price contract versus a cost reimbursable contract. Therefore, as the requirement recurs, or as quantity production begins, the cost risk should shift to the contractor, and a fixed price contract should be considered.

Further discussion is in order here. If you or I were to ask someone to build us a home, they most generally would quote us a fixed price. Say, for example, a two story, four bedroom, 2½ bath home might sell for $150,000. If, on the other hand, we ask our friendly builder to build us a non-standard home, perhaps a log cabin or dome, he/she might not want to quote us a fixed price contract. But if there is a significant demand for log cabins and our builder has built a number of them, he/she would be more inclined to provide us a fixed price to build that home. The point is that the cost risk associated with performing a task repetitively should be transferred to the contractor, as the contractor now has a firm understanding of what is required to perform the task. A cost reimbursement type of contract, by earlier definition, is used predominantly when the contractor does not have a firm understanding of the level of effort to perform the task.

Let's address cost risk more specifically. A fixed price contract places a risk of cost overrun on the contractor, not the customer. When the builder says your home will cost $150,000, you can generally believe that that is the cost of your home. If there is a cost overrun, that overrun will come from the builder's profits. If, on the other hand, the builder is working under a cost reimbursable type of contract, the risk of cost overruns falls directly on the customer. In this case, if the price of lumber goes up, the customer will be billed the additional costs, not the contractor.

Urgency of the requirement—if urgency is a primary factor, the customer may choose to assume a greater proportion of the risk, or the customer may offer incentives to ensure timely contract performance.

With urgency may come incomplete specifications or an ambiguous statement of work. A contractor might also expect to see frequent changes as the requirements of the customer begin to evolve in real time. Under these circumstances, it may be prudent to lock into a cost reimbursement type of contract if you are the contractor.

On the other hand, if you are the customer and you lock into a cost reimbursement type of contract, you should be prepared to incur additional costs as you change the definition of the type of work you wish to have performed.

To demonstrate this concept, let's assume you are having some landscaping done and the contractor agrees with you to be paid for whatever hours it takes to do the job. Now, up front you both agreed to some level of maximum effort required to do the job. But halfway through the job, you decided to switch tree types, from a one-inch maple to a six-foot blue spruce. As a customer, you should be prepared to not only incur the additional cost of the tree, but the time required to deal with the bigger tree.

Contractor's accounting system—cost reimbursement types of contracts require a somewhat elaborate and, perhaps more importantly, accurate internal cost collection system. Under a cost reimbursement contract format, the customer is reimbursing the contractor for efforts expended. It is only fair then to expect that the contractor can produce detailed records, which may only exist because of rig-

orous procedures. Under the fixed price contract format, the customer does not care what the costs of the contractor may be. The agreement under the fixed price form of contract simply says that any cost overrun will be the responsibility of the contractor.

Many would argue, and justifiably so, that no matter which type of contract a contractor has, the accounting system should be equally rigorous. This would seem to be a good argument. But from the customer's perspective, only a cost reimbursable contract requires the finer attention to detail and subsequent support records. The purpose of having a rigorous system under a fixed price contract scenario is that the contractor can keep more accurate records of expenditures and therefore produce a more accurate bid on future and similar work.

Fixed Price Contracts

A firm fixed price contract provides for a price that is not subject to any adjustment on the basis of the contractor's cost experience in performing the contract. Under this form of contract, a price provided by the contractor to the customer is made up of two components, a cost and a profit. As an aside, price equals cost plus profit. A contractor can reduce the price without suggesting the agreed upon work be modified. But for a contractor to reduce the cost implies either a modification to the defined work or a further assumption of risks on the part of the contractor. Given this type of contract, if the contractor experiences a cost overrun, then the contractor has to pay for that overrun with profits.

In our house building example, if the builder determines that he/she has made an error in the required square footage on the ground level, then that cost to extend the ground level should be the responsibility of the contractor, not the future home owner. The contractor may, however, find another way to make it up later—for example, through customer requested modifications to the original floor plan.

A short story typifies this scenario. When I was building my first home, I received a firm fixed price for the home. In this case the builder did, as just described, underestimate the ground floor square footage requirement as prescribed by the housing addition. He told me that he would simply incur the cost of this error and I was in fact getting a really good deal. Later, as building progressed, I realized I would like to have a ladder installed in my garage for the attic above it. The builder said that would be no problem and the price of this effort, plus material, would be $300. It seemed a little high but I agreed nonetheless. Another change I wanted to make was to add glass doors to the front of the fireplace. He again agreed to the change and quoted me a price of $300. Again, I agreed and construction continued. I couldn't help eventually realizing that each of the other changes I had requested—patio sliding doors being replaced with French doors, recessed lights versus extended lights, and a windowless full steel garage service door instead of the windowed steel garage service door—had all cost $300 each. I found this either very coincidental or in fact very intentional, perhaps to recover the ground floor estimate made earlier in the construction process. The builder was bent on recovering the earlier cost overrun. So even though he acted in good faith by eating the original overrun to the ground level, his longer-term intentions were to recover his profits and get financially healthy.

A firm fixed price type of contract provides the maximum incentive for the contractor to control costs and perform effectively.

Cost Reimbursement Contracts

Unlike fixed price contracts, where the contractor quotes a firm fixed price for the activities of the program or project, cost reimbursement type contracts allow for the contractor to recover actual costs incurred plus some predefined profit. This type of contract is suitable for use when uncertainties involved in the contract performance do not permit costs to be estimated with sufficient accuracy to use any type of fixed price contract.

The conditions of reimbursement are premised on the costs being allowable. In other words, a contractor cannot install in his/her personal home marble flooring and charge the customer—unless, of course, the customer agrees that putting marble flooring in the contractor's home is part of the overall contracted effort.

Time and Materials Contracts

Time and materials type of contracts are used predominantly when it is not possible at the time of placing the contract to estimate accurately the extent or duration of the work or to anticipate costs with any degree of confidence.

This type of contract allows for the acquisition of products or services on the basis of:

- Labor hours at predetermined rates, and
- Material costs.

Time and material contracts are somewhat limited in their use. They do not provide the customer with any real control over the contractor's work efficiency, nor do they incentivize the contractor to control costs. This does not mean, however, that the contractor has an open pocketbook to expend resources without ramification. An initial "best estimate" or "expected value" is agreed to up front as part of finalizing the contract.

Exercises

Exercise #1: Your customer has asked you to submit a bid to develop a new product. While you have built similar products, you have never built one this complex. The customer has provided a detailed specification and a required finish date. What type of contract will you propose?

Answer: A firm fixed price contract would be most appropriate in this case. The determining factor is whether you have enough information to accurately estimate what it will take to accomplish the task. With a detailed specification and prior experience you should be able to accurately estimate the cost. Knowing the cost, you can provide a price.

Exercise #2: Assume the scenario of exercise #1, but in this case the customer does *not* have a detailed specification to provide you. The customer does have, however, a one-page list of desired stuff. What type of contract will you propose?

Answer: Propose a cost reimbursement type of contract. You no longer have sufficient information to be able to accurately estimate the job. Determining the requirements is essential.

Exercise #3: Your company produces ink pens. In a typical year you manufacture and produce 100,000 pens. A new chain of business supply stores has asked you to submit a proposal to have your pens featured in its stores. What type of contract will you propose?

Answer: Since you can accurately estimate the level of effort to produce this item, a firm fixed price type of contract would be appropriate.

Chapter 3

Obtaining a Price Quote

My wife and I were standing in the backyard a while back, looking at the general appearance of the landscaping, and decided we should do some additional landscaping with stone and the like. Realizing that this is not my expertise, she suggested we get some estimates to have the work performed. This process of identifying contractors, asking for something to be done, evaluating the contractors' proposals and agreeing to have the work done is what we call "the bidding process."

The bidding process begins, therefore, with my wife and me identifying a need—in this case the need to have additional landscaping done. Our first step is to define the overall thoughts we have on what we would like to have done; this step is called requirements identification and will be discussed in the next chapter.

Once we have the general requirements defined, we can call one of the many landscapers in the telephone directory and ask for a cost estimate to perform the work. In this step, we are issuing a "request for proposal." Request for proposal (RFP) is something the customer provides to a potential contractor. The more completely we can describe the work to be done, the more accurate the contractor can be in determining a price for the work. As an aside, note that price is what is presented to the customer, and it is made up of the contractor's cost plus profit.

The contractor, with the provided details, will generate a proposal. The proposal may be as simple as a one-page list of materials with number of hours of labor and a total cost, or it may be more elaborate, packaged in a notebook or folder with company history, major projects or customers and a discussion of why this contractor is better at performing this type of work than others. In either case, we, the customer, will have something to review and compare to other contractors.

We talk about comparing one contractor's proposal to another contractor's proposal. To do this requires that the proposals be similar. That means the proposals must address the same work to be performed, the same materials (if any were

specified by the customer) and the same time period to perform the work. Time period can be especially important, especially in the landscaping scenario. For example, if the landscaper has a slow period during the year, then he/she might be more willing to perform the work for a lower price than during a more demanding time of the year. It's important, therefore, that all contractors get the same instructions for bidding purposes.

Sometimes, as we talk with a contractor, we learn more about what we really want. In fact, sometimes as we learn more, we may want to go back to the original contractors who already bid the job and ask for an updated bid. Or if we think the contractors might consider doing the job for less, then we might want to give them a call or ask in writing for a best and final offer to do the work. Frequently we ask this question of contractors: "Is that the best price I can get?"

Once the contractors who bid the job submit their proposals, they go on with other work while waiting for our (the customer's) decision. It's not uncommon during this waiting period for the contractor to call us and ask if they can supply any additional information. This is obviously more common in some cases than others. For example, when looking at cars, it is more likely that a car salesperson will call the customer before a landscaper. Recently I have been receiving a number of calls about cemetery plots. If you even show an ounce of interest, I noticed, the salespeople tend to be rather persistent.

It is even possible that we, the customer, after having made the decision, are asked by a losing contractor why they were not chosen. It may be as simple as price or even the more delicate issue of personality. This type of conversation is what we call the "post-decision conference."

Below depicts the above discussion and overall process.

The Overall Bidding Process
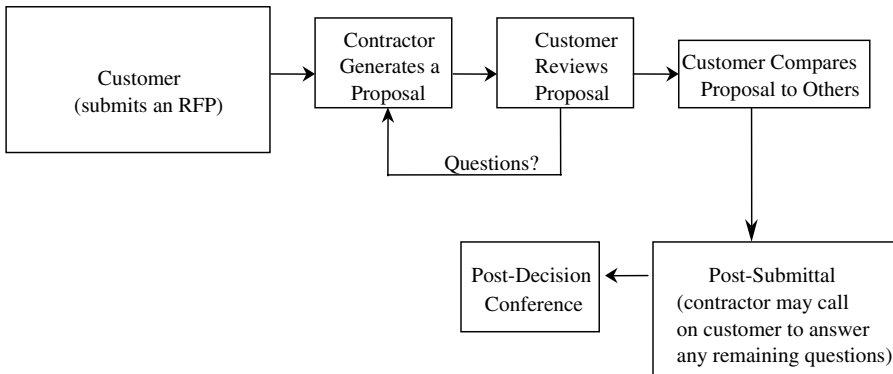
Chapter 4

What Work Is There to Be Done?

Defining the work means being able to identify and manage what needs to be done. We call this process "requirements management."

Requirements management involves five steps:

1. Identification,
2. Analysis,
3. Allocation,
4. Verification, and
5. Traceability.

Requirements identification is the process of collecting stated and derived requirements from both internal and external sources. External documentation that provides a source for program-stated and -derived requirements includes the customer-supplied description of what is needed (the "request for proposal"). Internally, even though the customer never asked for, as an example, a specific gauge of wiring, the electricians are required by code to install only a certain gauge of wiring. This, therefore, is considered an internal requirement, meaning it came from the contractor, not the customer.

An explicitly stated requirement is one which is stated directly by the customer—for example, "I want a four bedroom house with 2½ baths." In this case, the two stated requirements are: (1) four bedrooms, and (2) 2½ baths. Now, as a contractor, you know that creating four bedrooms requires a whole lot of other activities, namely, many of those depicted in the figure.

Derived Requirements Related to Building a Four Bedroom House

Build House

Landscaping	Concrete	Framing	Roofing	Electric	Plumbing	Interior Design
Obtain Building Permit	Set Frames for Slab	Obtain Lumber Materials	Install Plywood	Install Breaker Box	Install Water Lines	Install Drywall
Rent Heavy Equipment	Dig Footers	Set Wall Supports	Install Felt Paper	Install 110v Power Lines	Install Drains	Install Wallpaper
Cut Trenches for Leach Bed	Set Frames for Footers	Set Trusses	Install Shingles	Install 220v Power Lines	Install Water Heater	Paint Walls & Ceilings
Lay Gravel for Leach Bed	Set Drains	Set Frames for Doors/Windows	Install Siding	Install Outlets	Install Toilets, Baths & Sinks	Lay Carpet & Flooring
Install Pipe for Leach Bed	Pour Concrete for Footers	Set Doors	Install Gutters		Install Furnace	Install Cabinets
Connect Leach Bed	Pour Concrete for Slab	Set Windows				
Cover Trenches		Build Floors				
Dig Well						
Install Water Pipe						
Clear Brush for Foundation						

These other activities are what we call "derived requirements." They are derived because the customer did not explicitly ask for them, but they are required to provide the customer what he/she actually did ask for.

Requirements analysis separates similar requirements into groups of higher-level requirements. This activity creates a hierarchical depiction of related requirements. For example, when building a house, major functional organizations might include electrical, plumbing, masonry, framing, landscaping, etc., as depicted in the above figure.

Requirements allocation is the assignment of a given requirement or family of requirements to a functional group of the system for implementation. For example, the requirement to do the wiring of our house would most logically be given to the electricians. The understanding is that the electricians will be responsible for ensuring that this requirement is satisfied. Within the electrical group, the requirement may be further allocated to a specific subset of individuals, such as a younger electrician who might wire only garages. All requirements for each functional organization, therefore, would be associated with that functional organization.

Further, it's during the proposal preparation phase where the requirements are initially identified, analyzed and allocated. Once requirements are assigned, functional organizations are responsible for the initial proposal costing, all phases of design, and any/all activities associated with satisfying those requirements.

Staying with our current example, the electricians will also identify the type of testing required to demonstrate that the requirement has been satisfied. This verification method may fall into one of four categories: analysis, demonstration, inspection, or test.

Analysis as a verification method can perhaps best be thought of as performing a desk analysis of a schematic, perhaps a verification of the electrical flow based on schematic drawings.

Demonstration is a form of verification which allows for a physical demonstration of the item to be tested. For example, turning the switch on seems to be a popular test for proper wiring.

Inspection implies a visual inspection of the entity for compliance, and test implies testing the entity against some predefined standard. In my kitchen, I have nearly the maximum lighting load on a single switch. This makes the switch get hot on occasion, but the switch is manufactured to handle this level of lighting.

The last item dealing with requirements management is requirement traceability. Requirement traceability is the process by which a requirement is traced from its original statement in a contract or request for proposal to the actual piece of the total system that is responsible for implementing a means to satisfy the requirement.

Chapter 5

Ready, Fire, Aim

In the expression "Ready, Aim, Fire," the "ready" part is in reference to the upfront planning that takes place, "Aim" refers to having common goals, perspectives and focus, and "Fire" refers to the execution of the previously detailed plan.

But have you ever been in a conversation where someone said, "Why did they do it that way? . . . They should have reversed the order . . . The way they did it was like putting the cart before the horse." All of these expressions and many more are in reference to the sequencing of the activities of the project in question. The culminating tongue-in-cheek phrase for the above is "ready, fire, aim," meaning, "Act before thinking."

Thinking before acting is what this chapter is about. We refer to this step as planning. We plan, so when we begin to implement our plan, our execution of the activities is more defined and therefore more efficient. The end result, of course, is a more effective project, one that satisfies what we were trying to accomplish and does so within a planned budget and timeline.

Thinking before acting begins with a basic understanding of the work to be performed. To do this, we begin by listing what we think we have to do (requirements identification). The next step is to create a breakdown of the work, and structure it in such a manner that it can be easily understood. This breakdown of the work into some form of structure is what we call a "Work Breakdown Structure" or "WBS" for short.

To provide further insight into how work might be organized, the following figure depicts the work breakdown structure for hosting a Thanksgiving.

Hosting a Thanksgiving Dinner

```
                        ┌───────────────────────────┐
                        │   1.0 Thanksgiving Dinner  │
                        └───────────────────────────┘
      ┌────────────────────┬──────────────────────┬───────────────────┐
┌──────────────┐    ┌──────────────┐      ┌──────────────────┐
│ 1.1 Pre-Dinner│    │  1.2 Dinner  │      │  1.3 Post-Dinner │
└──────────────┘    └──────────────┘      └──────────────────┘
```

1.1.1 Number of Guests	1.2.1 Food Preparation	1.3.1 Repackaging
1.1.2 Type of Food		1.3.2 Clean-Up
1.1.3 Grocery Shopping	1.2.1.1 Id Activities	1.3.3 Football Game Selection
1.1.4 ...	1.2.1.2 Determine Order of Preparation	1.3.4 Nap Details
	1.2.1.3 Id Long-Lead Items	1.3.5 ...
	1.2.2 Food Consumption	
	1.2.2.1 Serving Containers	
	1.2.2.2 Giving Thanks	
	1.2.2.3 ...	

Notice we defined the work in three basic groupings: pre-dinner, dinner and post-dinner. This is obviously not the only way to organize the work, but it works for the manner in which this person thinks and intends to accomplish the work.

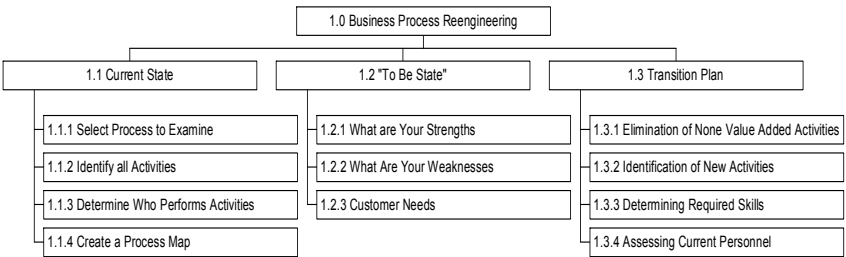Let's look at another example. Suppose you were asked to redesign a process in your company. This type of task is called "business process reengineering" and was very popular in the early '90s. The WBS for what has to be done might look like the following.

Business Process Reengineering WBS

```
                    ┌────────────────────────────────────┐
                    │ 1.0 Business Process Reengineering  │
                    └────────────────────────────────────┘
      ┌─────────────────────┬─────────────────────┬──────────────────┐
┌──────────────────┐  ┌──────────────────┐  ┌──────────────────┐
│ 1.1 Current State │  │ 1.2 "To Be State"│  │ 1.3 Transition Plan│
└──────────────────┘  └──────────────────┘  └──────────────────┘
```

1.1.1 Select Process to Examine	1.2.1 What are Your Strengths	1.3.1 Elimination of None Value Added Activities
1.1.2 Identify all Activities	1.2.2 What Are Your Weaknesses	1.3.2 Identification of New Activities
1.1.3 Determine Who Performs Activities	1.2.3 Customer Needs	1.3.3 Determining Required Skills
1.1.4 Create a Process Map		1.3.4 Assessing Current Personnel

Again, as in the Thanksgiving dinner example, we have chosen to organize our work into three basic buckets: the current state, the to-be state and the transition plan for moving between the two. This coincides with the order in which we intend to do work, but is not necessarily the case in all WBS depictions.

Let's discuss another example. Assume you are a builder and have been asked to build a residential home with two floors, four bedrooms, 2½ baths and a basement. You have identified all of the requirements and now wish to depict

the work to be performed in WBS format. How might the WBS look? The figure depicts one manner in which the work might be graphically depicted.

WBS for Building a House—by Function
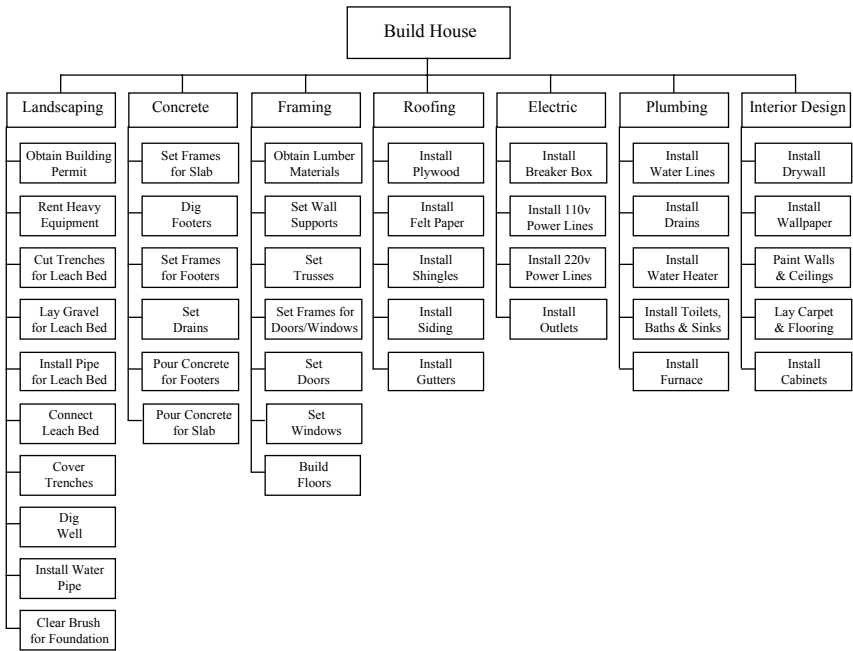
Notice that the above WBS has been organized by function. In other words, each major function/discipline involved in home building has been identified and work appropriately assigned.

But perhaps our builder thinks differently. Perhaps our builder would have preferred to organize the work by phases in which he/she will perform the work. This is altogether normal, and perhaps most appropriate for this builder. A depiction of the same work organized by planning phase is depicted below.

If we look at the above Thanksgiving example, one of the things we notice is that each box of our WBS has a unique identifier. For example, 1.1 is Pre-Dinner, 1.2 is Dinner and 1.3 is Post-Dinner. The idea when creating a WBS is to uniquely identify each box so that we can later reference each box by number as opposed to by name. It doesn't really matter whether our numbering system is entirely numeric, alphabetic or some combination of the two. For example, the three different approaches would look like the following:

|		
1.0	A	A
1.1	A.A	A.1
1.1.1	A.A.A	A.1.A

It is important we label our WBS boxes (which we call "elements"), because our next step is to write descriptions for each of our WBS elements.

These descriptions are called "dictionaries." Since dictionaries are written for each element of our WBS, the formal and full name of each dictionary is a WBS element dictionary. Therefore, once the work is organized and properly depicted in graphical form as above, then for each WBS element—for example, "AA," "ACC" or "AF"—a written description should be created. Ideally, the dictionary description should include such items as:

- WBS alphanumeric identifier (1.0, 1.1, 1.1.1, etc.),
- Title of the WBS element (Pre-Dinner),
- Revision date representing the most recent date changes were made to this description,
- The WBS description (this is the description of the element), and
- Reference to which customer requirement caused this element to come into existence.

WBS for Building a House—by Phase
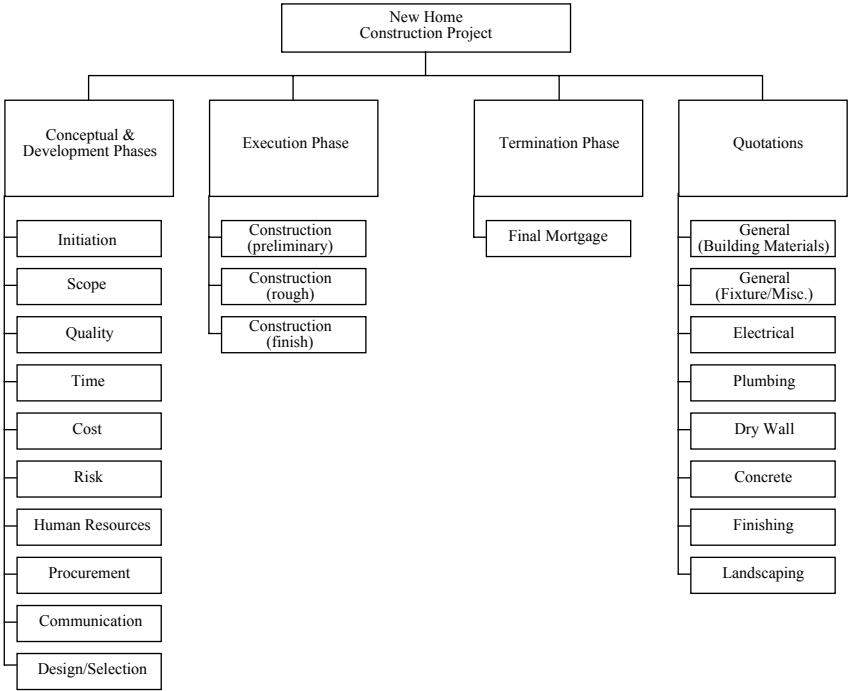
Once we have tentatively identified the work to be performed and written dictionary elements for each WBS element, we now must take a stab at identifying who will be tasked to do the work. The result of this activity is called a "Responsibility Assignment Matrix" or "RAM." If there is only one person doing all of the work, such as my landscaper, then the RAM is easy—all work is assigned to that one person. But if there happen to be multiple individuals or

organizations involved in accomplishing the work, then it makes sense at this point to assign out the work to those most capable of performing the activity.

Let's look at another example, which will pull together the whole concept of defining the work (WBS), describing the work (WBS Dictionaries) and assigning responsibility for the work (RAM).

Let's assume there is a future bride talking with her future husband. She has provided the following request for proposal (RFP).

> She says, "Snookims, I want to get married. I want a church wedding with my family, bridesmaids, rehearsal dinner, reception with music and dancing and all the trimmings." He replies, "Sweetie, how about we elope?" "Nooo!" she replies. "I want a real wedding. You wouldn't want me to feel cheated out of having a pearl and ivory wedding with all the memories, would you?" She adds, "and every time I think of how special our wedding was, I'll have warm and snuggly feelings about you and how caring you are. That's worth something, isn't it?" she asks. "Of course it is, Pumpkin," he replies. "I want my little pinky stinker winker bean to be happy. We'll have as big a wedding as you like," he says. "Thank you my little Pooh Bear, we're going to be happy forever," she concludes.

Our future husband, being fairly astute, decides to enlist the help of an organization known as Heaven On Earth (HOE) Wedding Planners. Following our process as we have defined it so far, HOE begins to identify our future bride's stated requirements. These requirements are typically identified in the request for proposals or statement of works as "shall" statements. As in, ". . . the contractor shall do. . ."

> She says, "Snookims, I want to *get married*. I want a *church wedding* with my family, bridesmaids, *rehearsal dinner*, *reception with music* and dancing and all the trimmings." He replies, "Sweetie, how about we elope?" "Nooo!" she replies. "I want a real wedding. You wouldn't want me to feel cheated out of having a pearl and ivory wedding with all the memories, would you?" She adds, "and every time I think of how special our wedding was, I'll have warm and snuggly feelings about you and how caring you are. That's worth something, isn't it?" she asks. "Of course it is, Pumpkin," he replies. "I want my little pinky stinker winker bean to be happy. We'll have as big a wedding as you like," he says. "Thank you my little Pooh Bear, we're going to *be happy forever*," she concludes.

Our italicized portions of the above represent what HOE and our future husband consider to be mandatory, or explicitly stated, requirements. To list them, we would have:

- Traditional church wedding,
- Rehearsal dinner,
- Reception,
- Honeymoon, and
- Happily ever after

Further examining these stated requirements, HOE and our future husband determined that there were some other, derived requirements. These are:

- Lots of $$$—money is not necessarily an issue,
- Local site—not 1,000 miles away,
- Christian church of some type—perhaps Lutheran, Catholic, Methodist, etc.,
- Photographer (maybe video so she can remember how caring I was), and
- Nice hotel—for beginning of happily ever after part!

HOE then creates a work breakdown structure for the many activities to be performed. It is depicted in the figure below.

Heaven On Earth Wedding Planners—WBS
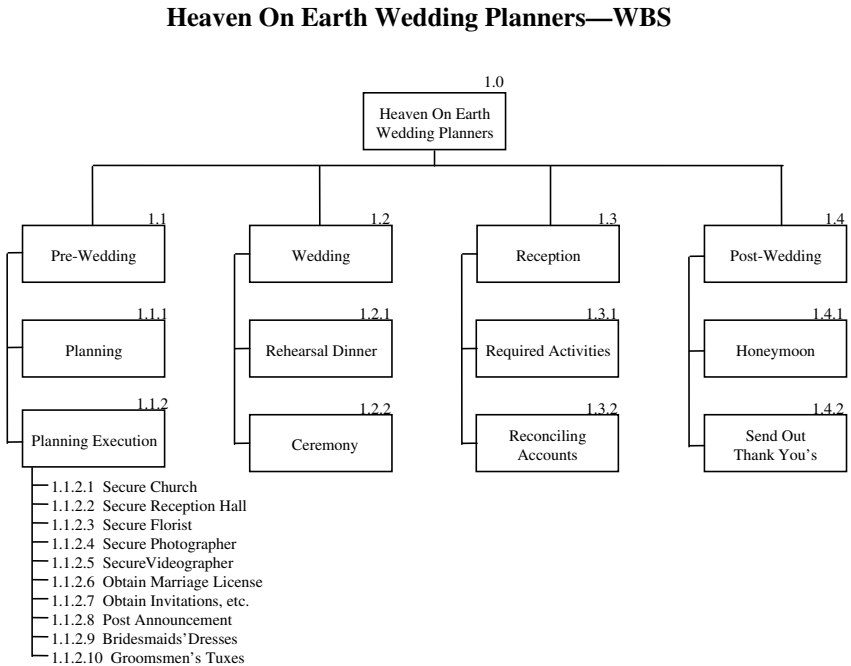
HOE further continues to define dictionary elements for each element of our WBS. A couple of those dictionary element descriptions are defined below.

1.1 Pre-Wedding: This element involves all discussions, activities and events that lead up to the wedding itself. It does not include the wedding day or any of its activities or events.

1.1.1 Planning: This element includes those items listed below.

- The participation in a Myers Briggs Personality Assessment as administered by a certified professional. Meals where last review of personality preferences are examined for compatibility. It is anticipated that there will be a maximum of 10 lunches/dinners of ~ $20 each.

- The purchasing of cases of Coke or Pepsi for late-night continuing discussions of mutual goals and aspirations. It is estimated that no more than 20 cases of Coke/Pepsi will be purchased at $4 each (assumes use of coupons).
- Additional discussion topics under this WBS element include, but are not limited to, the when, where, how and why of the actual event.
- The outcome of this WBS element is a detailed requirements document, which includes both stated and derived requirements, to be reviewed and mutually agreed to by both the bride and groom.

HOE, with the above work breakdown structure and attendant dictionaries, creates a preliminary responsibility assignment matrix as depicted below.

Heaven On Earth Responsibility Assignment Matrix

							Groom	Bride
Approval Signatures (Bride and Groom)						Date		
January Baseline (01 Feb 20xx)								
Page 1 of 2			**Rev A**				Groom	Bride
				Total Cost of Wedding		$8,335	6,500.00	1,835.00
1.0 -- Heaven on Earth								
	1.1 -- Pre-Wedding					2,300.00		
		1.1.1 -- Planning				300.00	300.00	
		1.1.2 -- Planning Execution				2,000.00		
			1.1.2.1 -- Secure Church			0.00		
			1.1.2.2 -- Secure Reception Hall			0.00		
			1.1.2.3 -- Secure Florist			500.00		500.00
			1.1.2.4 -- Secure Photographer			300.00		300.00
			1.1.2.5 -- Secure Videographer			250.00		250.00
			1.1.2.6 -- Obtain Marriage License			100.00		100.00
			1.1.2.7 -- Obtain Invitations			150.00		150.00
			1.1.2.8 -- Post Announcement			100.00		100.00
			1.1.2.9 -- Obtain Bridesmaids' Dresses			400.00		400.00
			1.1.2.10 -- Obtain Groomsmen's Tuxes			200.00	200.00	
	1.2 -- Wedding					600.00		
		1.2.1 -- Rehearsal Dinner				400.00	400.00	
		1.2.2 -- Wedding				200.00	200.00	
	1.3 -- Reception					2,400.00		
		1.3.1 -- Required Activities				0.00		
		1.3.2 -- Reconciling Accounts				2,400.00	2,400.00	
	1.4 -- Post-Wedding					3,035.00		
		1.4.1 -- Honeymoon				3,000.00	3,000.00	
		1.4.2 -- Send Out Thank Yous				35.00		35.00

In this preliminary RAM, HOE has uniquely identified by name who has what activities to perform as well as the initial budget estimate to perform those activities.

From the above, one can see that $8,335 has been allocated to activities of this project. Suppose $10,000 has been set as the maximum to spend. Then

$1,665 has been set back in case it is needed. This money set back is called a "reserve," or in the business world "management reserve."

Management reserve is for in-scope but unanticipated changes to the overall program or project. This money still forms a part of the overall cost of the project and has been set aside. "In-scope" means that the money will still be used for the wedding, as opposed to buying a new TV with it. "Unanticipated" means that costs happened that weren't expected. In summary, then, "in-scope unanticipated" basically refers to costs that are related to the project, but were not seen during the early stages of planning.

With all requirements defined, work organized, costs determined and tentatively assigned out to be performed, the only thing left of significance is to create a set of schedules. Scheduling is discussed next.

Chapter 6

Scheduling the Work

Scheduling the many activities that make up your project sounds simple. And to a large extent, it is. It becomes increasingly more difficult, however, as the number of activities becomes greater. In this section we will look at some "pure" scheduling techniques.

To this point, we have identified stated and derived requirements. From our requirements we created an organization of the work: a work breakdown structure. Attendant to our work breakdown structure we created a dictionary with element descriptions for each work breakdown structure element.

Somewhere in parallel or sequential to the work breakdown structure, we must begin to lay out the work identified into a series of increasingly more detailed schedules: master, intermediate, and detailed. Once the work is defined and scheduled, we can create a human resource plan. The human resource plan is a time-phased depiction of resources required to perform the work and accomplish the goals of the program.

Types of Schedules

There are many different types of tools available to help in program/project scheduling. These tools range in price from very inexpensive to very expensive. Prices can be as low as $10 to as much as $50,000 or more. The price varies, typically, in accordance with the level of functionality of the tool. Simpler tools may only do simple bar charts, while the more complex tools will:

- Depict schedules in network diagrams using multiple formats (discussed later in this chapter),
- Allow for resources to be identified against schedule activities,
- Create human resource plans automatically from the data,

- Allow for costs to be associated with the scheduled activities,
- Support the creation of a cost and schedule baseline,
- Allow the cost and schedule baseline to be statused, and
- Generate reports identifying cost and schedule deviations from the plan.

To say the least, there are literally hundreds of tools with incalculable permutations of the above capabilities. One tool which I use in my Program Management classes is Microsoft Project 98, or its most recent version. It supports all of the above mentioned capabilities to some degree.

When discussing scheduling techniques we usually refer to the pure techniques:

- Program Evaluation and Review Technique (PERT),
- Critical Path Method (CPM),
- Gantt Charts, and
- Milestone Charts.

Generally, however, no tool uses a pure technique. Instead, most tools use some permutation of one of the pure techniques. Fundamentally, when we discuss schedules, there are really only two primary schools of thought:

1. Scheduling techniques that depict the interrelatedness of scheduled activities, and
2. Scheduling techniques that do *not* show the interrelatedness of scheduled activities.

Over the succeeding paragraphs, we are going to examine the pure techniques in more detail, looking at the advantages and disadvantages of each.

Gantt Charts

Gantt charts were developed by Henry Laurence Gantt (1861-1919), during the WWI period. Fundamentally, they depict scheduled tasks with hollow bars over a horizontal time scale. The many activities are on the vertical axis and their corresponding hollow bars are filled in to reflect progress of the activity.

Gantt charts exhibit many advantages and disadvantages, as identified below. An example of a typical Gantt chart also follows.
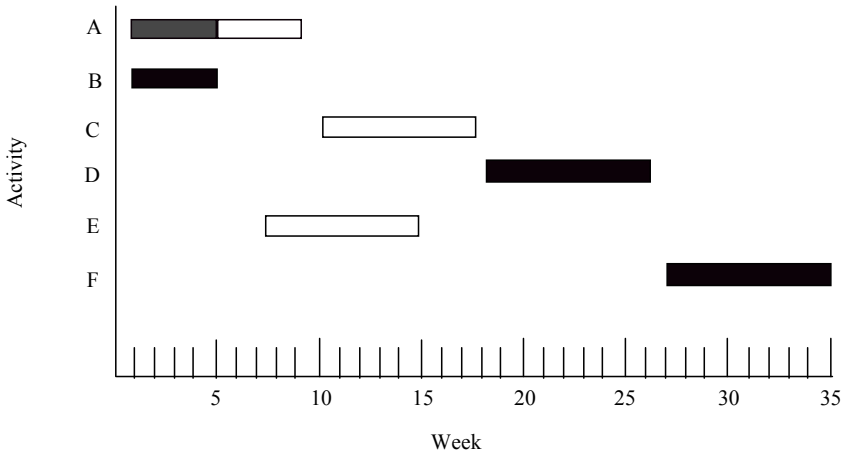
Advantages
- Easy to understand
- Inexpensive to prepare
- Ideal for repetitive work that can be measured quantitatively

Disadvantages
- Potentially subjective
- Interrelationships among the schedule activities are not depicted
- No follow-on implications from schedule movements

Basic Gantt Chart

Gantt charts, as indicated above, are very inexpensive to prepare and easy to read. In fact, a good spreadsheet tool typically allows for some form of drawing that enables one to create Gantt charts on spreadsheets. In this scenario, an individual wouldn't even have to buy a scheduling tool, if Gantt charts were the only form of scheduling required. Depicting repetitive work which can be counted accurately with some form of quantitative measure is a good use of Gantt charts. All that needs to be done to status an activity is to count the items produced, delivered, or completed. Once counted, the scheduler simply fills in the hollow bar as appropriate.

As can be seen from the above example, however, if the activities being statused are not quantitative in nature, then the measure becomes quite subjective. For example, as a young software engineer in a discipline which was just beginning to come into existence, I would routinely provide my status in non-quantitative measures. When asked how we were doing in meeting our schedule dates for software being designed and developed, we would simply say, "Everything seems to be pretty much on schedule . . ." What did this mean? In reality, it might mean, and frequently did, that even though only 20 percent of the work remained, it probably represented 80 percent of the total effort. In our earlier years, we didn't realize this, of course, but as time went on, it quickly became evident from our historical data.

The biggest disadvantage of Gantt charts is that the activities are not depicted in such a manner as to represent their interrelatedness. In other words, how the activities are tied together is not represented in the Gantt chart. This being the case, if one activity were to slip in schedule, we would not know what impact that might have on the other activities. If the program is small enough, and the activities are relatively few, then we intuitively may know the answer to this.

Milestone Charts

Where Gantt charts are activity-oriented, milestone charts are event-oriented. Key program/project milestones are identified and placed on a schedule at the time at which they are due to occur. Then, at a predefined time—daily, weekly or monthly—the milestones are statused as either being completed or not.

Milestone charts have their own set of symbols to describe the status of the many milestones. The following two figures depict symbols used in milestone charts and an example with the use of those symbols.

Basic Milestone Symbols

Basic Symbol	Meaning
	Schedule completion
	Actual completion
	Previously scheduled completion—still in future
	Previously scheduled completion—date passed

Representative Uses	Meaning
	Anticipated slip—rescheduled completion
	Actual slip—rescheduled completion
	Actual slip - actual completion
	Actual completion ahead of schedule
	Time span action
	Progress along timespan
	Continuous action

From the figure below, notice that framing has experienced an actual schedule slip with a rescheduled completion date. Notice as well that the concrete pouring has actually been completed ahead of schedule.

Again, "pure" milestone charts may appear somewhat confusing to read, but once a scheduler gets used to the symbols, milestone charts are quite easy to use.

The many advantages and disadvantages are identified below.

Advantages

- Effective method of communication
- Symbology is standard and simple to use
- Presents actual progress against a baseline plan

Disadvantages

- There may be surprises when there are too few milestones
- Doesn't show schedule activity interdependencies
- No follow-up on implications from schedule activity movements

Example Milestone Chart

Activity	2001				2002												2003							
	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	S
Begin the Work	■																							
Soil Test		⌂																						
Ground Survey		⌂																						
Concrete					■			◇																
Framing				◆					⌂															
Roofing										⌂														
Plumbing												⌂												
Electrical														⌂										
Interior Design																⌂								
Landscaping																			⌂					
House is Complete																								⌂

Now
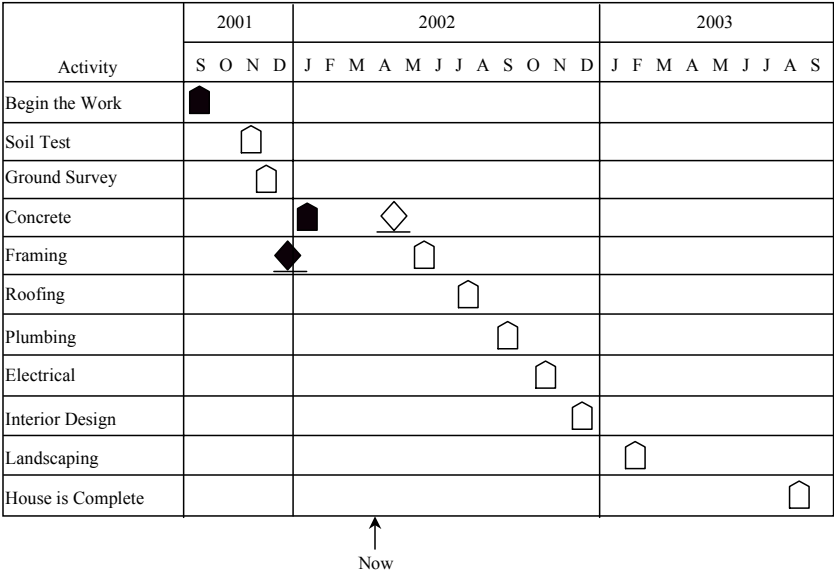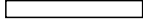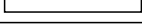
Looking at the symbology used in creating milestone charts, it appears that there are only a handful of commonly used symbols. For individuals using this type of scheduling technique, it really does not take long for them to get used to this basic set of symbols. From the outside looking in, however, the symbols seem somewhat confusing and awkward to grasp. As well, milestone charts suffer from the same problem as did the Gantt charts. That is, neither of them shows the interrelatedness of the many schedule activities. Therefore, just as in the case with the use of Gantt charts, if one schedule activity slides in time, the parties involved would have no idea of what the impact to the remaining schedule activities would be.

It is perfectly natural to combine the Gantt chart with the milestone chart. The next figure depicts this permutation of the pure forms of each.

Network Schedules

Network scheduling involves identifying the schedule activities in such a way that the activities are tied to each other. In this manner, if one activity is moved in one direction or the other, then all related/dependent activities are also moved accordingly.

Permutation of Gantt and Milestone Chart

Activity	Year 1	Year 2	Year 3
	S O N D	J F M A M J J A S O N D	J F M A M J J A S
Begin the Work	▲		
Soil Test	███▭		
Ground Survey	▲		
Concrete	████		
Framing	███▭		
Roofing	███▭		
Plumbing	▭		
Electrical	▭		
Interior Design	▭		
Landscaping	▭		
House is Complete			⬠

Now

When talking about network schedules, two dominant techniques are discussed:

1. Program Evaluation and Review Technique (PERT), and
2. Critical Path Method (CPM).

PERT was developed in 1958 under the sponsorship of the United States Navy Special Project Office. It was developed as a special management tool for scheduling and controlling the Polaris Missile program. The Polaris Missile program involved 250 prime contractors and more than 9,000 subcontractors. PERT is credited with saving the program over two years in schedule and bringing the Polaris Missile submarine to combat readiness.

PERT basically works by computing the mode of the beta distribution using three estimates:

1. Most optimistic time,
2. Most likely time, and
3. Most pessimistic time.

PERT was intended to increase control in situations where time estimates were difficult to make with confidence.

PERT experienced a rapid rise, then an abrupt decline in usage around the 1970s. Two reasons were often cited for this:

1. PERT was over-applied, and
2. PERT was combined with cost data or other non-scheduling aspects of program management and it became cumbersome to manipulate.

Over the last five or so years, PERT has experienced a resurgence in use, primarily due to software running PERT on personal computers.

CPM was developed in 1957 by J.E. Kelly of Remington-Rand and M.R. Walker of DuPont. CPM was developed to aid in scheduling maintenance shutdowns in chemical processing plants.

CPM is superior to PERT when time can be estimated closely and labor and material costs can be calculated quite accurately early in the program.

In CPM, two time and cost estimates are given for each activity in the network. These estimates are:

1. Normal estimate—the cost of finishing the program in normal time, and
2. Crash estimate—the time required to finish an activity if special effort is made to reduce program time to a minimum and the cost of performing the effort on a crash basis in an attempt to minimize time to completion.

Network Approaches

Network approaches to scheduling generally fall into two basic categories:

1. Activity-on-Arrow, and
2. Activity-on-Node.

Activity-on-arrow (AOA) is most closely associated with PERT, but can be applied to CPM as well. This method is sometimes called activity-on-arc or arrow diagramming method.

Activity-on-node (AON) is most closely associated with CPM and is the basis for most computer scheduling applications. This method is sometimes called precedence diagramming method.

Activity-on-arrow is based on three rules.

1. Each activity is represented by one and only one arrow in the network.
2. No two activities can be represented by the same head and tail events.
3. To ensure correct representation, the following questions must be answered as each activity is added to the network:
    - Which activities must be completed immediately before this activity can start?
    - Which activities must immediately follow this activity?
    - Which activities must occur concurrently with this activity?

AOA Rule #1—One and Only One Arrow in the Network

Each activity is represented by one and only one arrow in network
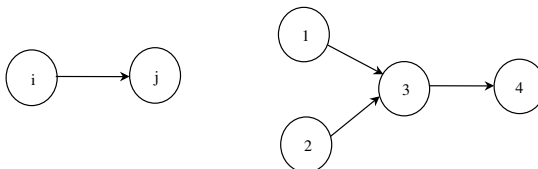
The figures above and below depict rules number one and two, respectively: Each activity is represented by one and only one arrow in the network and no two activities can be identified by the same head and tail event.

AOA Rule #2—No Two Head and Tail Events

No two activities can be identified by the same head and tail event
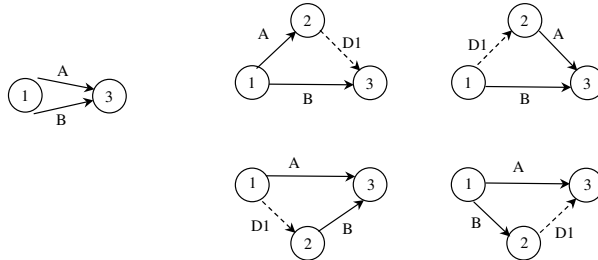
Dummy activities are a way to show parallel activities without violating rule number two. In the figure below, suppose tasks "A" and "B" must precede "C," while "E" is preceded only by "B." Note the wrong way to depict this scheduling requirement on the left, while the right accurately depicts the requirements with the addition of the dummy activity "D1."

Dummy Activities Are Like One-Way Water Pipes Full of Data

Wrong Way   Right Way

Let's try an example. In exercise #1 below, suppose we had to draw the activity-on-arrow diagram so that the following precedence relationships are satisfied:

- "E" is preceded by "B" and "C"
- "F" is preceded by "A" and "B"

Superficially, the below figure would seem to satisfy these two requirements.

Is "E" Preceded by "B" and "C" Alone?
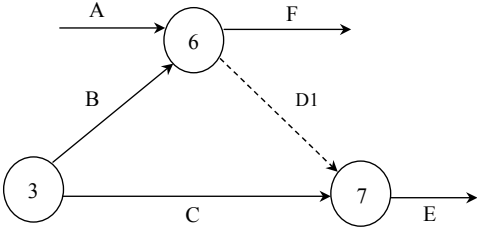
What we discover in the above is that "D1" was inserted to allow "B" to precede "E." However, "A" now also precedes "E." Below is the correct solution.

Exercise #1 Correct Solution
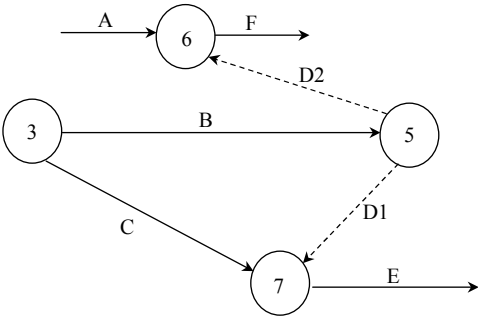
Let's try exercise #2. Suppose we were asked to draw the precedence diagram for the following conditions:

- "G" is preceded by "A"
- "E" is preceded by "A" and "B"
- "F" is preceded by "B" and "C"

Is the figure below correct?

Exercise #2 Correct Solution?
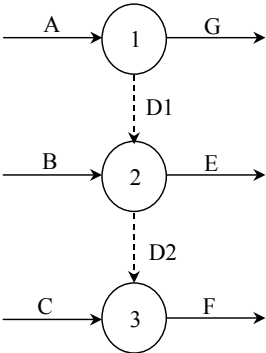
The above figure is not correct. It implies that "A" also precedes "F." That is, the pipeline "D1" also allows "A" to flow through "D2" on its way to "F." The correct solution is depicted below.

Exercise #2 Correct Solution
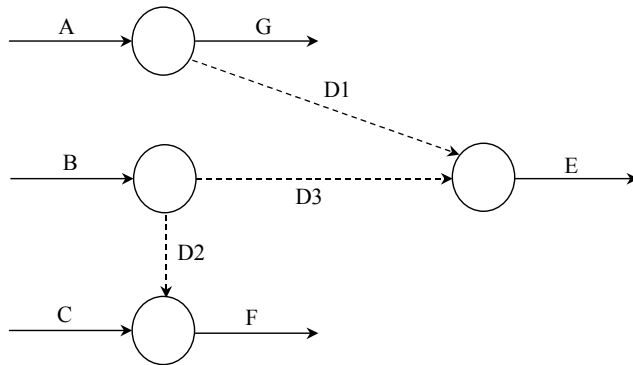
The activity-on-node scheduling method is characterized by the following.

- AON is the basis for most computer scheduling applications.
- Arrows are used to denote precedence relationships among activities.
- There is no need for dummy activities.
- All nodes with the exception of the terminal node must have at least one successor.
- All nodes, except the first, must have at least one predecessor.
- There should be only one initial and one terminal node.
- No arrows should be left dangling. Notwithstanding rules number 4 and 5 above, every arrow must have a head and a tail.
- An arrow specifies only precedence relations; its length has no time duration significance relative to either of the activities it connects.
- Cycles or closed loop paths through the network are not permitted. They imply that an activity is a successor of another activity that depends on it.

Activity-on-node and activity-on-arrow share the same formula for calculating early start and early finish times. Early start is the earliest the activity can start given the latest finish time of the activity's predecessor. Early finish is the earliest the activity can finish and is based on when it can start and how long the activity is. Early start and early finish times are determined by calculating forward through the schedule's activities.

Forward pass

ES(J) = max[EF(I), where I is an immediate predecessor of J]

EF(J) = ES(J) + L(J)

The schedule activity's latest finish and latest start times are based on the successor's latest start time. Formulas for calculating latest finish and latest start times are:

LF(J) = min[LS(I); where I is the successor of J]

LS(J) = LF(J) – L(J)

The below figure depicts an example of early start, early finish, latest finish and latest start times.

Example of Early/Late Start and Finish Times

Activity	Length	Early Start	Early Finish	Latest Finish	Latest Start
A	5	0	5	5	0
B	3	0	3	6	3
C	8	5	13	13	5
D	7	5	12	13	6
E	7	0	7	13	6
F	4	13	17	17	13
G	5	17	22	22	17
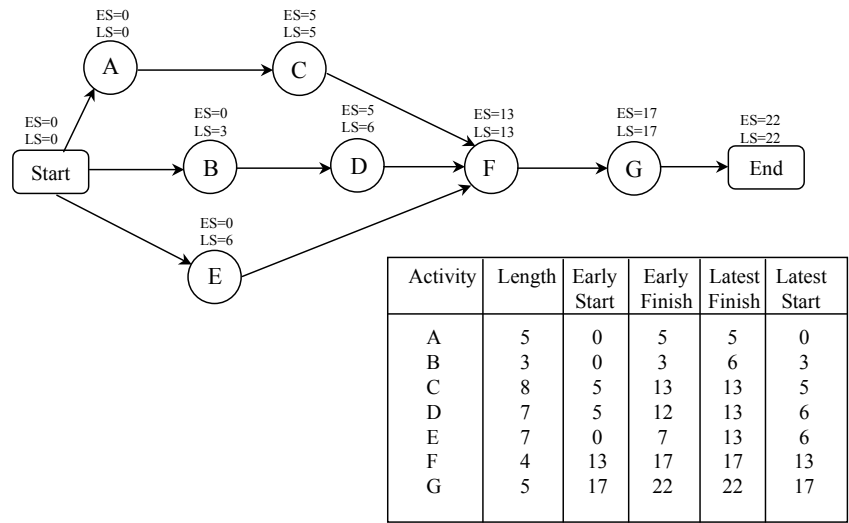
Total slack of an activity is calculated as the difference between its late start (or finish) and its early start (or finish). The free slack is the difference between the earliest among the early start times of its successors and its early finish time. That is, for each activity J:

TS(J) = LS(J) – ES(J)

FS(J) = min[ES(I); where I is the successor of J] – EF(J).

Activities with zero total slack fall on the critical path. The below figure provides an example with slack time calculated. Notice the critical path runs through nodes "A," "C," "F" and "G."

Example with Total Slack Calculated

Activity	Length	Early Start	Early Finish	Latest Finish	Latest Start	Total Slack
A	5	0	5	5	0	0
B	3	0	3	6	3	3
C	8	5	13	13	5	0
D	7	5	12	13	6	1
E	7	0	7	13	6	6
F	4	13	17	17	13	0
G	5	17	22	22	17	0
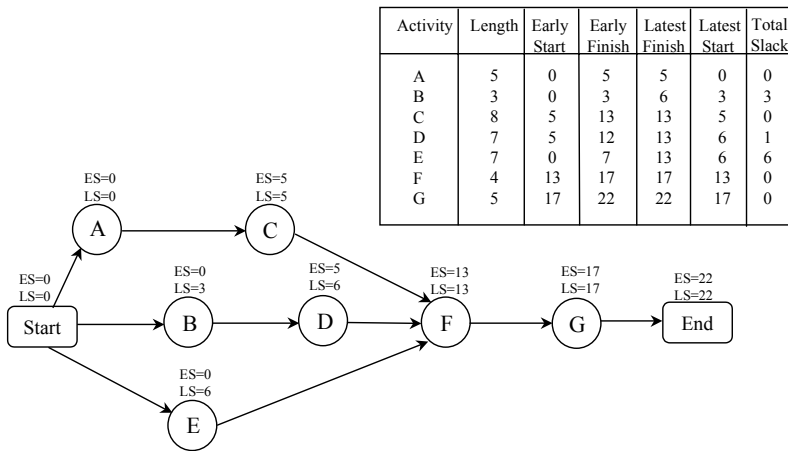
Closing Thoughts on Developing a Network Diagram

Although CPM and PERT are conceptually similar, symbols and charting techniques vary. PERT historically has utilized probability techniques, while, in general, CPM has not. The following procedures apply to both CPM and PERT.

1. Identify all individual tasks comprising the program.
2. Determine the expected time to complete each activity.
3. Determine precedence and interrelationships among activities.
4. Develop a network diagram presenting these activities in proper sequence reflecting any dependency relationships:
   - Activities indicated by lines,
   - Events or milestones by circles, and
   - Dependencies or sequencing on separate paths by dotted lines.
5. Complete and annotate the cumulative time required to reach each milestone along the paths. This will indicate the earliest time work can start on the next activity. The final time will indicate the total time required to complete a particular path.
6. Identify the critical path. This is the sequence of events taking the longest time to complete.
7. Starting at the program completion milestone on the farthest right, begin working backward and compute latest time an activity can start without delaying the overall program. For example, if the total program takes 40 weeks and the last activity takes 5 weeks, then the final activity cannot begin later than 35 weeks. The difference between the earliest start time and the latest time for each activity is the slack time or float. The critical path contains no slack time, i.e., free time.

The advantages and disadvantages of network diagrams are listed below.

Advantages

- Network diagrams organize what otherwise would be confused.
- They are essential for complex systems, such as ship construction, missiles, etc.
- They allow managers to predict shortages and act on them early in the program.
- Once prepared, network diagrams are easy to update and rework.
- Network diagrams provide more control over activities and events.

Disadvantages

- The activity times are only as good as the estimates provided.
- Sometimes the network diagrams are hard to follow, as they possess too many lines and intersections.
- Sometimes the network diagrams become the focus of too much attention, while other issues may be the root cause of the problems, e.g., management/labor relations.

Master Schedule

Schedules provide the time frame for resource allocation and establish a baseline for current status and forecasts of completion dates. A program contains a hierarchy of related levels of schedules, beginning with the master program schedule, and with each succeeding, lower level more fully identifying and expanding the activities necessary to meet the program requirements.

Management of these activities begins with the master program schedule, incorporates the intermediate schedule, and culminates in the detailed schedules. As a management tool, the intermediate schedule and detaileded schedules are typically depicted as an interdependency network, a network diagram that depicts the interrelationships among the numerous program activities.

A program's master schedule is incrementally created, beginning with the identified activities and milestones specified in the contract.

The below figure depicts a typical master program schedule.

Example Master Program Schedule

Activity/Event	Year x												Year y		
	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M
Begin Building House	^														
Concrete Inspection				^											
Framing Inspection							^								
Wiring Inspection								^							
Final Walkthrough Inspection														^	
Perform all Masonry Activities	�e	▓	▓	▓											
Frame the House				▓	▓	▓									
Install all Wiring					▓	▓	▓								
Install all Plumbing	▓	▓	▓	▓	▓	▓	▓	▓							
Install all Drywall										▓	▓	▓			
Perform Finishing												▓	▓	▓	▓

Remember, generating the Master Program Schedule means that we already know what work has to be done. This implies that we already know what our stated and derived requirements are. Again, stated requirements are those things explicitly asked for, while derived requirements are those things we must do to satisfy the stated requirements. Derived requirements are those requirements we place on ourselves to do the work we believe is being asked of us.

Intermediate Schedule

The intermediate schedules are a hierarchically lower resolution of the work to be performed than initially depicted in the master program schedule. The intermediate schedules simply continue to separate the activities depicted in the master program schedule into lower-level subactivities. This further evolution of identified work culminates in the lowest level of schedules produced, detailed schedules.

Below depicts a typical intermediate schedule.

Example Intermediate Schedule

Activity/Event	Year xx											
	J	F	M	A	M	J	J	A	S	O	N	D
Begin Building House	^											
Concrete Inspection				^								
Framing Inspection							^					
Wiring Inspection								^				
Install Plumbing in Slab		▓▓▓▓										
Install Plumbing in Garage								▓				
Install Plumbing in Kitchen								▓				
Install Plumbing in Baths								▓				
Install Plumbing in Utility Room								▓				
Finish Plumbing Activities								▓				

Notice in the above intermediate schedule that the plumbing activity, which was a single line item in the master schedule, has now been expanded. This is the intent of the intermediate schedule: to expand on the higher-level master schedule activities.

Notice also that the above intermediate schedule is easy to read, but does not provide sufficient detail to show what happens when one of the activities slips in time. In other words, what is the overall impact to the whole schedule, if, say, the plumbing installation in the kitchen happens to slip?

The above, then, is a good depiction of a combination Gantt and milestone chart, and is easy to read, but does not show the interrelatedness of the many activities.

Detailed Schedule

Detailed schedules are the bottom-most schedules in the schedule hierarchy. The purpose of developing lower-level schedules is to identify small, manageable elements of work.

The detailed schedules expand each intermediate schedule summary/subproject into multiple activities, to the extent necessary or desired, and adds schedule events that satisfy the requirements of the intermediate schedule. The detailed

schedules are working schedules that depict horizontal dependencies and are therefore used on a daily basis by the managers to manage their work.

The figure below depicts a typical detailed schedule.

Example Detailed Schedule

Activity/Event	Year xx											
	J	F	M	A	M	J	J	A	S	O	N	D
Begin Building House	^											
Concrete Inspection				^								
Framing Inspection							^					
Wiring Inspection									^			
Install Plumbing in Slab		░░░░░										
Detail Plan for Plumbing		░░										
Trench Stone			░░									
Lay Required Pipe			░░									
Connect Pipe				░░								
Level Stone			░░░									

Notice again that just as we did in transitioning from master to intermediate schedules, we have again dug one level of detail to the next in transitioning from the intermediate to detailed schedules.

Notice as well the overlapping of activities in the above detailed schedule. Notice how trenching, laying pipe, connecting pipe and leveling stone seem to have some degree of overlap. One can only guess that this is acceptable. But again we have to wonder what would happen if one of these slipped in time.

When defining how the activities of a schedule are related, we typically refer to one of three basic relationships: (1) start-to-start, (2) finish-to-start, and (3) finish-to-finish.

Lead and Lag Relationships
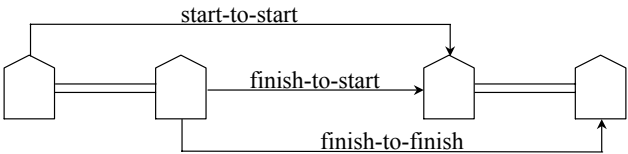
Start-to-Start means that the second activity cannot start until the first activity starts. Finish-to-Start means the second activity cannot start until the first activity finishes. And Finish-to-Finish means the second activity cannot finish until the first activity finishes. The most popular relationship, and the one most scheduling tools assume you want and therefore applies, is the Start-to-Start relationship.

Human Resource Plan

As discussed in the above detailed schedule, there are numerous overlapping activities. What we want to know is whether this represents one person working a lot of hours, or many people each doing their specific part of the whole job.

The objective of generating a human resource plan is to formulate a concise, meaningful, and practical program-level strategy for managing human resources in the manner most suitable to fulfill the program goals.

Resource planning as a philosophy requires that resources be identified for each detailed schedule activity and assigned in the program's scheduling tool. The human resource plan, then, is a time-phased report by activity, WBS element, or program.

The figure below depicts an example of a human resource plan.

Example Human Resource Plan

Person or Group Name	Function/Discipline		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Project Name: Build a House									Status Date: December 18, 20xx						
									Run Date: January 23, 20xy						
Mike Gradle	Plumbing		1	1	1	1									4
Sally Smith	Plumbing		0.25	0.25	0.25	0.25									1
George Angus	Plumbing Designer		0.5	0.5											1
Sara Likert	Plumbing Stone Trencher			0.25	0.25										0.5
Miguel Alvarez	Plumbing Pipe Layer			0.25	0.25										0.5
Mike Gradle	Plumbing				0.25	0.25									0.5
Sara Likert	Plumbing Stone Leveler				0.25	0.25									0.5
															0
			1.75	2.25	2.25	1.75	0	0	0	0	0	0	0	0	8

This human resource plan is for the plumbers only. Notice that the individuals in the human resource plan are tied to the detailed schedule in the above section. Now, in answer to our opening question, "Is this one person working a lot of hours, or many people each doing their specific part of the whole job?" we can readily see that there are numerous people doing different tasks. We can also see when these individuals are expected to perform their efforts and what percent of their time will be dedicated to this activity.

Chapter 7

Risk Management

Risk management is really a permutation of the words risk and management. That is, risk management is really a formal process for managing program risks.

Risk can be defined as the probability of an undesirable event or situation occurring and the significance of the consequence of the occurrence.

For example,

- A stock price drop causes a paper loss;
- An interest rate increase causes higher home payments; or
- A plane crash causes multiple casualties.

When discussing risk we must also address rewards. There must always be some potential gain from successfully executing an activity with risk. As the potential gain increases, so does the acceptability of higher levels of risks. If the consequence of the risk occurrence decreases, the acceptability of assuming the risk increases.

The next figure reflects this relationship.

Gain versus Acceptability of Risk

Not linear, very personal, i.e., at what point is the gain worth every bit of the risk? The reverse may be true, i.e., I don't care what the gain is, the risk isn't worth it.

Gain

Low

Acceptability of Risk

Additionally, we consider the consequence versus acceptability of the risk. In this trade-off, the higher the consequence of the risk, the lower the acceptability of the risk, and vice versa. The below figure reflects this relationship.

Consequence versus Acceptability of Risk

Not linear, very personal, i.e., at what point is the consequence not worth the risk?

Consequence

Low   **Acceptability of Risk**
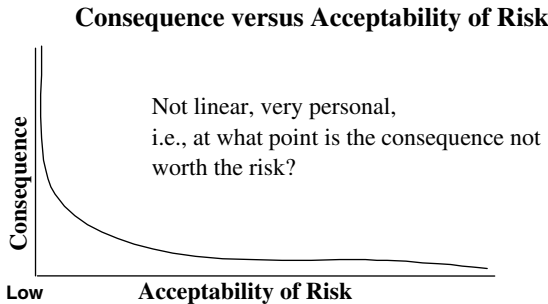
Risk management is a process composed of four distinct yet dependent activities. Risk management is composed of:

1. Risk planning,
2. Risk assessment,
3. Risk analysis, and
4. Risk handling.

Risk Planning

The intent of risk management planning is to force organized intelligent thought on the tasks of identifying risks and, subsequently, eliminating, minimizing or controlling the expected consequences of risk occurrences.

The planning aspect of risk management requires some basic support from other individuals/functional organizations as well as a focused effort.

- Management buy-in; management must provide the necessary resources to perform the required program risk planning. In other words, managing risk is not free. There is effort involved in identifying, quantifying, prioritizing and monitoring potential risks. Even if you are a one-person show, running your own program and performing all of the activities, there is still some level of risk in what you do. For example, if I'm my own landscaper, I might decide to buy gloves to minimize the risk of getting blisters from shoveling. The act of buying gloves was a risk mitigation activity. The fact that I recognized the risk of blisters was a conscious decision on my part to think through the blister risk.
- Functional management buy-in; functional management represents the most knowledgeable individuals on discipline-specific risks. Staying with our landscaping example, suppose I wanted to know what the risk was of planting a certain type of tree in

the fall. I would most likely ask an expert at a nursery or at a local university.

- Key areas should be targeted for the risk management process. In our landscaping example, key areas might be risks associated with trenching or risks associated with bedding or bricklaying. A key area is a set of activities which, in and of itself, forms a major initiative.

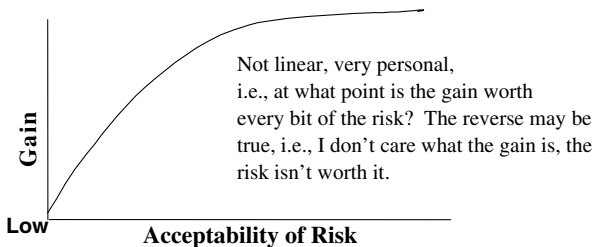Risk, again, is defined as the probability of an undesirable event occurring and the significance of the consequence of the occurrence. The below figure depicts this relationship.

Probability versus Seriousness of Risk

		SERIOUSNESS		
		HIGH	**MEDIUM**	**LOW**
PROBABILITY	**HIGH**	**SIGNIFICANT RISK** Formal Risk Mitigation required	**SIGNIFICANT RISK** Formal Risk Mitigation required	**MODERATE RISK** Formal Risk Mitigation should be considered
	MEDIUM	**SIGNIFICANT RISK** Formal Risk Mitigation required	**MODERATE RISK** Formal Risk Mitigation should be considered	**NEGLIGIBLE RISK** Manage Risk through routine processes
	LOW	**MODERATE RISK** Formal Risk Mitigation should be considered	**MODERATE RISK** Formal Risk Mitigation should be considered	**NEGLIGIBLE RISK** Manage Risk through routine processes

Notice from the above matrix that if the probability of the risk is low and the seriousness is equally low, then the risk is basically negligible. In other words, if it occurs, we will handle it through normal decision making. As the probability of occurrence goes up and the seriousness of the occurrence goes up, risks move from moderate to significant.

Formal risk mitigation is the process of determining what preventive actions should be made to reduce the probability of the risk occurring, what type of risk monitoring systems exist to detect whether the risk occurs, and what contingent actions can be applied to reduce the seriousness should the risk materialize.

Risk Assessment

Risk assessment is concerned with identifying the risks and then quantifying them, so as to be able to address only those that pose the greatest probability of occurrence and the greatest seriousness should they occur.

Risks can be identified through any number of sources, such as:

- Expert opinion,
- Analogy comparisons, and
- Evaluation of program plans.

Quantification is characterized as:

- Creating a rating system for identified risks,
- Getting all parties to agree on the rating system, and
- Keeping the rating system relatively simple (high, medium, low).

In general, at the highest level, we are attempting to move risks through various known states as follows.

- Knowns—an event or situation containing no uncertainty.
- Known unknowns—we know they exist, but don't know much about them. For example, I know the scientific discipline of bioengineering exists, but I don't know much about it.
- Unknown unknowns—typified as an event or situation that could not have even been imagined. For example, diseases.

Further, risks exist in every discipline or function (eg. plumbing, electrical, framing, etc.)

Risk Analysis

Risk management analysis is concerned with further definition and description of the identified risks. During this phase of the risk management process we determine:

1. The likely causes of the risks,
2. Variation of the risks,
3. Magnitude of the risks,
4. Consequences of the risks, and
5. Possible ways of dealing with the risks.

There are many ways to analyze the risk, ranging from making a quick assessment based on past experience to more scientific techniques. One technique I like is called decision analysis.

Decision analysis, also known as expected monetary value technique,

1. Computes the expected value for each alternative, and
2. Uses decision trees to depict the relationships.

For example, as an organization, should we conduct 100 percent of the tests of our 500 widgets we have to produce?

Givens:

- Field failure rate is 4%.
- $10,000 per widget for testing (500 widgets × $10,000 = $5 million).
- If tested, there are reassembly costs of $2,000 for each passed widget.
- If tested, the cost to repair a failed widget is $23,000.
- A fielded failed widget costs $350,000 to repair.

Below depicts a decision tree for this problem.

Decision Analysis Decision Tree
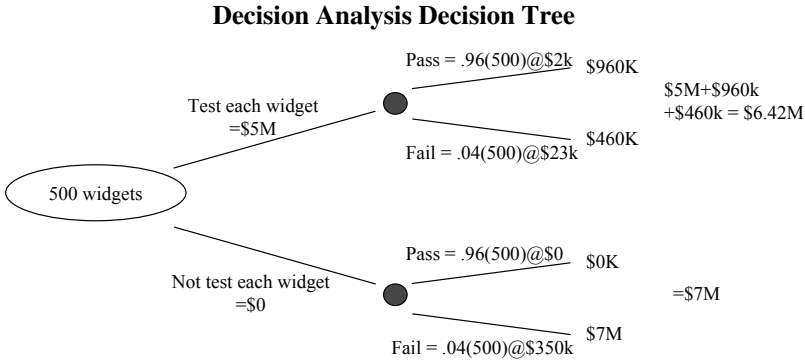
If our objective is to minimize cost, then we would select the alternative with the lowest expected cost. In this case, that would be to test each widget.

In transitioning from risk management analysis to risk management handling, we must remember there are three basic things we need to focus on:

1. Preventive actions—those things we can do to reduce the likelihood of the problem occurring;
2. Risk monitoring systems—those systems put in place to raise a red flag should the problem begin to occur; and
3. Contingent actions—those actions we need to take should the risk actually occur.

A model depicting the interrelatedness of these items is depicted below.

Risk Management Analysis to Handling
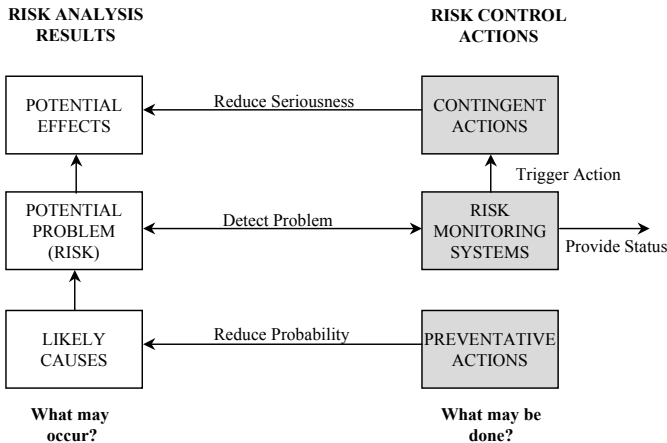
As depicted above, preventive actions help us to reduce the probability of the risk occurring. Risk monitoring systems help to detect the risk should it materialize. Contingent actions help to reduce the seriousness of the occurred risk.

Risk Handling

Once risks have been identified and quantified, there are four ways to handle the risks.

1. Avoidance—accept a lower-risk choice. Avoid the higher-risk choice.
2. Control—best stated as "I am aware of the risk, and will do my best to mitigate the occurrence and effect."
3. Assumption—accept the consequences should the risk occur. One mechanism to minimize the impact of assuming the risk is to share the risk with the customer. In the home building example, the builder might suggest that should the price of lumber go up, the customer kick in half of the total cost impact.

Knowledge and research—this is a continuing process to be understand the risks and their impacts, as well as how to curb the events which might trigger the risk's occurrence.

Chapter 8

Managing Program Costs

In this chapter, we are most concerned with managing a program's overall cost. To manage a program's cost means we have to:

1. Define an initial budget. This entails identifying the cost for each of the activities that are to be performed, including labor and material.
2. Determining how we are performing against the original work on our program's activities.
3. Keep track of actual costs and be able to compare them against the original budgeted costs.
4. Determine if we are on schedule and within cost, and, if not, why not and how we can get back on schedule and within our original cost.

Defining the Initial Budget

Let's begin by assigning a cost to each activity we are going to perform. For example, let's assume we are building a house. Further, building the house will be accomplished in three phases. At the end of each phase, the bank will pay the builder some fixed, previously agreed-to amount of money. At the end of the third phase, the bank will have paid the builder the total amount agreed to between the buyer and the home builder.

The following figure reflects this scenario.

In the figure, the builder has established that the first draw is worth $40,000. This number came from looking at labor and material cost for the work required to get to the first draw. The second draw is valued at $60,000 and the third draw is valued at $80,000.

Setting the Cost Baseline—Identify the Value of Each Activity

	1 month		2 months		2 months		
Begin		1st Draw		2nd Draw		3rd Draw	Cost of Scheduled Work
$	40K		60K		80K		
$		40K		60K		80K	Amount Paid for Performed Work
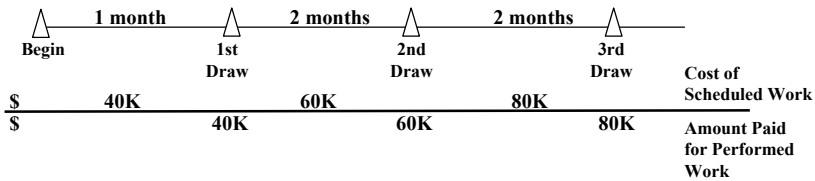
Here's What We're Saying:

> •It will take 1 month of effort to get to the 1st draw
> -- 1st draw milestone is valued at $40K.
> •It will take 2 months of effort to get to the 2nd draw
> -- 2nd draw milestone is valued at $60K.
> •It will take 2 months of effort to get to the 3rd draw
> -- 3rd draw milestone is valued at $80K.

When the builder successfully accomplishes the work for the first draw, the bank sends out an inspector to verify the work was successfully completed. If the work meets building code, then the bank will pay the builder the agreed-to amount.
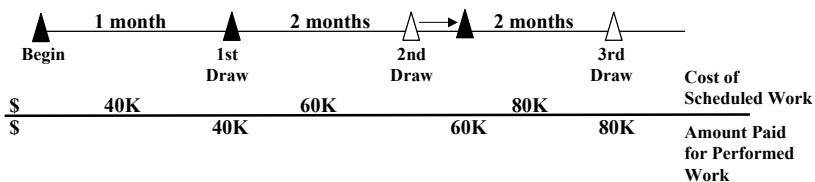
Let's assume that at draw three, the inspector comes out to the house at the five-month date, and the work is not complete. Will the builder receive the $80,000? The answer is no. The builder will only receive the $80,000 when the work is accomplished successfully and inspected.

So if we were to take this concept to the next logical step, at each build date (milestone) we should be able to determine if the builder is on schedule or not by knowing whether the bank paid the builder for the successful completion of the work identified for that milestone or not.

Determining How We Are Performing against the Initial Budget

The next figure reflects how the builder will actually be paid as work is completed.

The Builder Gets Paid as Work Is Accomplished—Even If It Slips

	1 month		2 months		2 months		
Begin		1st Draw		2nd Draw		3rd Draw	Cost of Scheduled Work
$	40K		60K		80K		
$		40K			60K	80K	Amount Paid for Performed Work

Here's What We're Saying:

> •It took 1 month of effort to get to the 1st draw
> -- 1st draw milestone was paid at $40K.
> •It was supposed to take 2 months of effort to get to the 2nd draw
> -- 2nd draw milestone actually took 3 months and was paid at $60K.
> -- But, was paid at 3 months not the original 2 month milestone.

As reflected in the figure, the builder will be paid the second draw when the work is successfully accomplished. In this case, the builder will be paid the second draw one month later than expected.

Again, we can determine if the builder is on schedule or not simply by looking at how much the builder has been paid at the time when each bank draw is supposed to be made. In this case, at month three, the builder should have been paid $100,000 in total, but actually was paid only $40,000. This tells us directly that the builder is behind schedule.

In fact, if we look at each time the builder is to be paid a draw from the bank, and subtract what the builder should have been paid from what the builder actually was paid, we can determine if there is a schedule variance from the original plan. The formula would look something like:

Amount paid for work performed – Cost of scheduled work = X

In this formula, if X is negative, then the builder is behind schedule. But if X is positive, then the builder is ahead of schedule. And if X is zero, then the builder is on schedule.

Keeping Track of Actuals

Up to this point we have focused on what the original cost was to perform the work and when the builder would be paid for performing the work. Notice that what the builder receives for performing the work is the actual original estimate to perform the work. In other words, the builder received a fixed amount to perform the work, which was the originally agreed-to amount, not necessarily the amount it actually cost to do the work.

This concept of being paid a fixed amount to do a job versus what it actually costs was discussed earlier in chapter 2.

Below depicts a continuation of our example, only this time we add the final concept of actual costs.

A Look at the Actual Cost to Do the Work
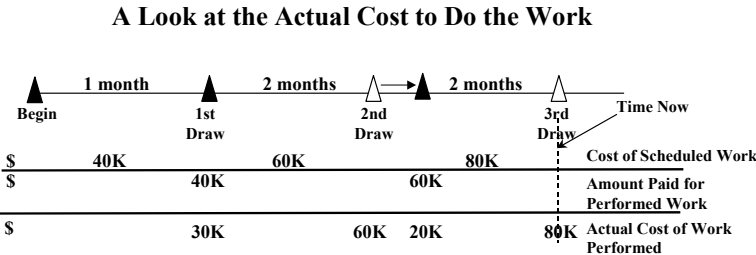
Here's What We're Saying:

•The builder received $40K for accomplishing the 1st draw on schedule
  --The builder only spent $30K. Therefore, pocketing $10K
•The builder received an additional $60K for accomplishing the 2nd draw late
  --but the builder spent an additional $80K ($20K more than planned). The builder is now $10K overspent
•The builder is performing to accomplish the 3rd draft and is behind schedule
  --but the builder spent an additional $80K (out of the planned $80K).
•Schedule is behind, and the builder is overspent.

Notice that the builder only actually spent $30,000 to reach the first milestone, draw #1. That means the builder had actually gained an additional $10,000 over original projections to perform this quantity of work.

By draw #2, however, the builder had actually spent $80,000 more, but had only received $60,000 more for performing the work as originally defined and agreed to.

This means the builder at this point had received a total of $100,000 as agreed to, but had actually incurred costs of $110,000. That's a $10,000 overrun in costs.

Now look at "Time Now." According to the original schedule, the builder should have been done with all the work at this point and should have received the final bank draw of $80,000. The builder did spend the planned $80,000 to get to "Time Now," but unfortunately has not finished all of the work agreed to. Without doubt, then, the builder has a serious cost issue, in that the builder has incurred actual expenses of $190,000 to date and is not yet done. And, further, the builder has only received $100,000 in bank draws. Obviously, the builder has a problem, which, if the builder doesn't have deep pockets to absorb the overrun, might become the buyer's problem. This is what court cases are made of.

A new formula to look at, then, is the difference between "Amount Paid for Work Performed" and "Actual Cost of Work Performed." If this difference is negative, then the builder (program/project manager) has a cost overrun. If this difference is positive, then the builder is making money. And if this difference is zero, then the builder is on budget.

Getting Back on Schedule and Within Cost

Summarizing our two formulas, we have:

Schedule variance = "Cost of Scheduled Work"
    – "Amount Paid for Work Performed"

Cost variance = "Amount Paid for Work Performed"
    – "Actual Cost of Work Performed"

The question then is, "If we have a cost or schedule problem, how do we get back on track?" The answer may be:

- We can assign more people to work the job, which of course would have cost consequences.
- We can simply work faster.
- We can become more efficient.
- We can get lucky and have no more problems.
- We don't. Which simply means we have to deal with the realities of having a cost or schedule overrun.

Let's look at the bigger picture. The figure below reflects the whole story so far.

In the figure we can see our previously defined schedule variance and cost variance. What's been added is an estimate to finish the job. This is what we refer to as an estimate to complete. When we add our actual costs to date and our new estimate to complete the job, the end result is an estimate at complete for all work performed.

Estimate at Complete = Actuals + Estimate to Complete

TIME
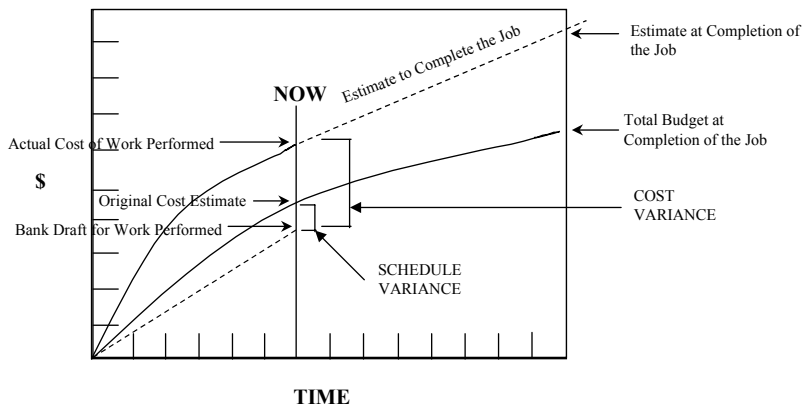
Therefore, on a periodic basis, we may be asked as program or project managers to supply an estimate to finish the job. Depending on the type of contract we have, that estimate to finish the job, plus the actual costs already incurred, may come as a surprise to the buyer of the home.

Chapter 9

Managers, Leaders and Entrepreneurs

Over the many years I have been involved with teaching, instructing and facilitating courses and sessions on management and management methodologies and practices, there has always been an interest in discussing the differences between managers, leaders and entrepreneurs. Perhaps it's a natural curiosity to better understand these types of people, their roles and responsibilities and the like, as we reflect on our particular strengths and aptitudes.

The following discussion, therefore, is merely meant to heighten our awareness to what exists in the way of material from research and practice, such that each of us can make his/her own conclusions and subsequently draw parallels of similarities and differences.

Defining Management

Management refers to the process of getting activities completed efficiently and effectively with and through other people.

- Efficiency is defined as getting more output from the given input yields. And getting more output from the given input increases efficiency.
- Effectiveness is defined as achieving organizational goals—in other words, doing the right things.

Efficiency is concerned with the means, while effectiveness is concerned with the ends. Is it possible, then, to be efficient, but not effective? Sure. An individual can be highly efficient, can do a great deal of work, and can do it with minimal resources. But that does not mean that what got done was what was intended to be done. On the other hand, one can do what is intended to be done, but do it with

considerably more resources (money, people, equipment, etc.) than another, thus the inefficiency.

Pictorially, one could create a chart that depicts this relationship based on resources used versus goal attained. The below figure reflects such a relationship.

Efficiency versus Effectiveness Matrix

Inefficient Ineffective		**Inefficient Effective**
Efficient Ineffective		**Efficient Effective**

Resource Usage (waste) — Low — Goal Attainment
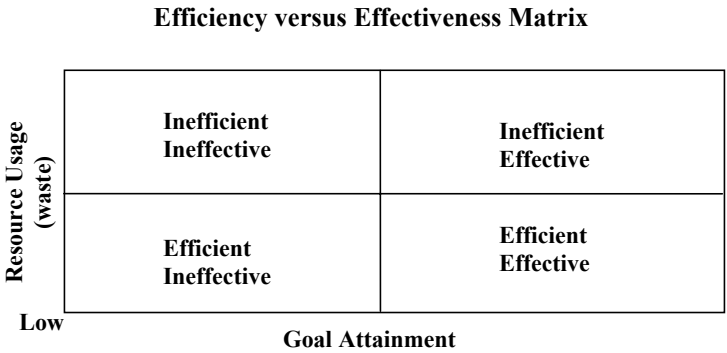
From the above figure, it can be seen that as goal attainment increases, we move from ineffective to effective. As resource usage increases, i.e., we waste more resources to accomplish the same objective, we move from efficient to less efficient. The results, then, when looking at the extremes, are low goal attainment with low resource utilization (an efficient/ineffective rating) in the lower right corner and, in the opposite diagonal corner, high goal attainment and high resource utilization (an inefficient/effective rating).

Is there an ideal? High goal attainment with low resource utilization would be ideal. This combination would yield an efficient/effective rating.

Management Functions

In the early part of the twentieth century, a French industrialist by the name of Henri Fayol proposed that all managers perform five management functions: plan, organize, command, coordinate and control. In the mid 1950s, two professors at the University of California–Los Angeles drew upon Fayol's work and used the functions of planning, organizing, staffing, directing and controlling as the framework for a management textbook that for 20 years was the most widely sold text on the subject (Robbins 1999, 11).

In the context of program/project management, we frequently do not include the management function of staffing. Staffing, from a matrix or project management organizational design perspective, is performed by the functional managers. The program manager simply provides the requirements to the functional managers, who then provide the required resources.

For example, as a contractor responsible for the overall construction of a new home, I might provide the blueprints to the electricians for pricing and performing the work. As the program manager, I am interested, of course, in the quality, timeliness and cost of the work, but I have little interest in the labor grade of the individuals performing the work. Neither do I care about how many individuals it takes

to perform the required tasks, so long as it does not affect the overall quality, schedule or price of the effort.

Each of the four management functions that I discuss below is performed during both the planning and execution phases of the program life cycle. In other words, during planning of a program, we perform all of the functions of planning, organizing, leading and controlling. During the planning phase we are applying these basic functions to the planning team for purposes of planning the program. During execution, we perform these basic management functions again, only this time, it's for the ever-changing aspects of execution.

Planning

The planning function involves the process of identifying the work to be performed, determining which of the requirements of the job are required by the customer (stated requirements) and which are required by internal processes or required in support of the customer's stated requirements (derived requirements). The basic premise is to identify what is required to satisfy the program's overall goal and objectives.

In traditional management terminology, planning consists of defining goals, establishing strategy, developing plans and coordinating activities.

Organizing

Organizing, from a program management perspective, involves grouping similar work together into some form of work breakdown structure. Then the work, which is organized into a work breakdown structure, is described in a dictionary of some form and subsequently assigned to an individual or organization to be performed. Organizing the work is based on a sound definition of what requirements are needed to accomplish the overall objectives of the program. These requirements were identified in the planning function.

In a traditional management sense, organizing is determining what needs to be done, how it will be done and who is to do it.

Leading

Leading is used, generally, when we're talking about oversight of program personnel. The terms *managing, directing, influencing, motivating* or whatever are all synonymous with the term *leading.* A large but less discussed part of leading is conflict resolution.

Controlling

Controlling is concerned with establishing, collecting and reviewing metrics. The purpose of metric collection and review is to be able to better determine the overall health of the program during the execution phase. Identification of applicable reflective metrics will significantly aid in the management by exception or management through thresholds, types of management control mechanisms.

Management Roles

In the late 1960s, Henry Mintzberg performed a detailed study of five top managers at work. What he discovered challenged several long-held notions about the manager's job. In contrast to the predominant views at the time—that managers

were reflective thinkers who carefully and systematically processed information before making decisions—Mintzberg found that his managers engaged in a large number of varied, unpatterned and short-duration activities. There was little time for reflective thinking because the managers were constantly interrupted. Half of these managers' activities lasted less than nine minutes each. In addition to the insight on what managers did, Mintzberg divided their activities into three broad categories, representing a total of 10 different but highly interrelated roles (Robbins 1999, 13). The three categories are interpersonal, informational and decisional.

Interpersonal

All managers are required to perform duties that involve people who are subordinates and people who are outside of the organization. These duties are categorized as interpersonal, ceremonial or symbolic in nature. They can basically be broken into three subcategories: figurehead, leader and liaison.

A figurehead is a symbolic head. In this capacity the manager performs routine duties of a social nature, such as greeting guests, signing documents and the like.

As a leader, the manager is responsible for motivating and moving people towards a common goal. This might involve performing a staffing function as well as ensuring adequate training for subordinates.

As a liaison, the manager acts as a go-between between the organization and the outside world. In the case of a manager being a liaison between the company as a whole and the outside world, the manager might sit on other companies' boards of directors, or university committees.

Informational

The informational role that a manager plays is involved with the monitoring and disseminating of information as well as acting as the organization's spokesperson.

As a monitor of information, the manager acts as the nerve center for the collection of related and applicable information. This information may come from many sources, including magazines, books, seminars, conferences and the like. The manager then must disseminate this information to the appropriate individuals within the organization.

As the spokesperson for the organization, the manager must communicate information to outsiders about the organization's plans, actions, intent and positions as appropriate and applicable.

Decisional

In the decisional role, the manager must act as an entrepreneur, disturbance handler, resource allocator and negotiator.

As an entrepreneur, the manager is responsible for visualizing and bringing to reality visions of greater opportunities. Identifying, seeking out and acting upon potential opportunities typifies this activity.

As a disturbance handler, the manager must maintain a level of harmony among the organization's participants. Disturbances may take on many forms, including problems with personnel as well as impacts from outside forces, such as competitive forces. Another form of disturbance which is not readily discussed is that which

originates from a parent organization and is manifested through short-term demands and ultimately crises. The adage "A lack of planning on your part does not constitute a crises on my part" is not applicable when the lack of planning originates from a parent organizational authority.

As a resource handler, the manager must allocate sufficient resources, such as people, facilities and equipment, to perform the many activities of the organization or program.

And finally, as a negotiator, the manager may be called on to represent the organization's interest in some form of contract negotiation. An example could be a union negotiation.

Management Skills

Generally, it is accepted that a manager requires certain skills that may be categorized into three broad groupings: technical, human and conceptual.

Technical Skills

Technical skills are those that support the knowledge or actual doing of the tasks to be performed. This is especially true of middle management and, even more, of first-line supervisors. These individuals are more involved with the day-to-day operations of the organization.

For example, I have spent many years in the discipline of software engineering. Because of this, I am versed in the many forms of programming languages, design methodologies and terminology in general. This would more readily allow me to provide valuable insight into this discipline. As time progresses, however, our technical skills begin to become obsolete and somewhat antiquated. For this reason, continuous lifelong learning is required if we wish to stay abreast of our technical disciplines.

As we move into higher and higher levels of management, it is not expected that we maintain such sharp skills. Instead, we are expected to contribute in a different manner and apply a different set of skills: human and conceptual skills.

Human Skills

Human skills are those skills that allow us to work harmoniously with others inside and outside of our organization. These skills help us to work not only with individuals, but also with groups. There is a significant body of training and education available to help managers to develop these skills. Aside from the obvious and readily available training associated with effective listening and communicating, group problem solving and motivation, I have a particular fondness for personality instruments which allow managers to better understand their personality preferences and those of their teams (see chapter 12).

Conceptual Skills

Conceptual skills are those that we would use to think and conceptualize about abstract situations. The frequently heard term "thinking outside the box" is more likely to materialize when the manager has strong conceptual skills.

Relationship of Skill Types to Management Levels
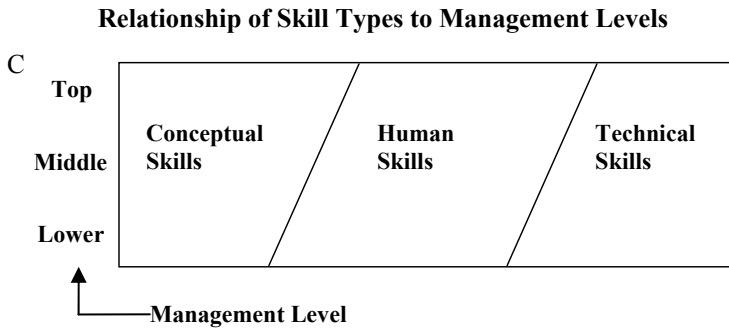
onceptual skills allow individuals to: (1) focus on connections between data, and (2) focus on patterns, meanings or theoretical explanations of the data. Managers with strong conceptual skills tend to be visionary and imaginative, have an accurate feeling for what is going on, and make decisions based on theoretical projection of future possibilities of what they "see."

The figure above depicts the relationship between conceptual, human and technical skills as a manager moves through the lower, middle and top layers of management.

Leaders

Managers are appointed. Their ability to influence is based on their formal authority, inherent in their positions. Leaders, on the other hand, may be appointed or may emerge from within a group. Leaders influence others to perform beyond what might normally be expected.

All managers should ideally be leaders. This enhanced capacity can increase the efficiency of performing their tasks.

Not all leaders necessarily have skills in other management functions, such as planning, organizing and controlling.

Numerous studies and detailed works have addressed leaders and leadership. Basically, these efforts fall into three categories of efforts: trait theories, behavioral theories and contingency theories.

Theories of Leadership

During the 1920s and 1930s trait theories of leadership evolved. These theories focused on those characteristics of leaders that might be used to differentiate a leader from a non-leader. The process was really quite simple: select recognizable leaders, isolate traits, and make recognizable generalizations.

Traits thought to be indicative of a good leader included the following:

- Drive—leaders have a high effort level;
- Desire—leaders have a strong desire to influence others;
- Honesty and integrity—leaders build trusting relationships and they are truthful and not deceitful;

- Self-confident—leaders seem to lack self-doubt; and
- Intelligence—leaders are sufficiently intelligent to gather, synthesize, interpret and apply large amounts of data.

When all was said and done, it became obvious that traits alone could not adequately define who might make a good leader and who would not. Therefore, researchers refocused their attention to behaviors.

Note that if trait theorists had been successful, it would have created a basis for selecting the right people to assume formal leadership positions in organizations. In contrast, if behavioral studies had discovered key behavioral determinants of leadership, people could be trained to be leaders.

There are four primary behavioral studies in this category of leadership studies: University of Iowa, Ohio State University, University of Michigan and the Blake and Mouton Managerial Grid.

The University of Iowa identified three behavioral dimensions:

1. Autocratic—a leader who centralizes authority, dictates work methods, makes unilateral decisions and limits subordinate participation.
2. Democratic—a leader who involves subordinates in decision making, delegates authority, encourages participation in deciding work methods and goals, and believes firmly in feedback as an opportunity for coaching.
3. Laissez-faire—a leader who gives groups complete freedom to make decisions and complete work in whatever way they see fit.

Results from the University of Iowa studies were mixed, although it was expected that the democratic style of leadership was most effective.

The Ohio State studies sought to identify independent dimensions of a leader's behavior. The researchers began with over 1,000 dimensions and ultimately settled on two: initiating structure and consideration.

1. Initiating structure—is the extent to which roles are structured to attain goals. Initiating structure organizes work, relationships and goals. It assigns tasks, expects standards of performance and the meeting of deadlines.
2. Consideration—is the extent to which a person has job relationships characterized by mutual trust and respect for subordinates' ideas. It also provides for a high regard for subordinates' feelings.

In the Ohio State studies, a high-high leader—that is, high in initiating structure and high in consideration—achieved high subordinate performance and high satisfaction. But like the University of Iowa studies, the results were mixed and therefore inconclusive.

About the same time as the Ohio State studies, researchers conducted studies at the University of Michigan. These studies attempted to measure leaders along two axes: employee orientation and production orientation.

1. Employee orientation—is premised on interpersonal relationships.
2. Production orientation—focuses on task or technical aspects of the job.

The University of Michigan studies found that employee-oriented leaders were generally associated with high group productivity and higher group satisfaction. But like studies before it, they were unable to provide consistent results to make conclusive findings.

The behavioral findings of these earlier studies formed the basis for the Blake and Mouton Managerial Grid. The Managerial Grid uses "concern for people" and "concern for production" as the X and Y axes. It uses nine possible positions along each axis, creating 81 different categories of styles. The five key positions include:

1. Impoverished management—low concern for people and a low concern for production. Leader exertion of minimal effort to attain organizational goals is all that is required to maintain a successful workforce.
2. Task management—high concern for production and a low concern for people.
3. Country club management—high concern for people with a low concern for production. In this scenario, the focus is on the people to the exclusion of the tasks.
4. Middle of the road management—this scenario maintains adequate task efficiency and employee morale.
5. Team management—Typified by a high concern for people and a high concern for production.

The managerial grid generally demonstrated that managers performed best when they had a high concern for people and a high concern for production. The next figure reflects the relative positions of these management positions.

In general, the behavioral theories of leadership:

- Provided little success in identifying patterns of leadership behavior;
- Failed to create consistent generalizations;
- Had varied results based on circumstances; and
- Demonstrated that the problem was more complex than isolating traits or preferred behaviors

Managerial Grid

Concern for People — Concern for Production

(Country Club, Team, Middle of the Road, Impoverished, Task)
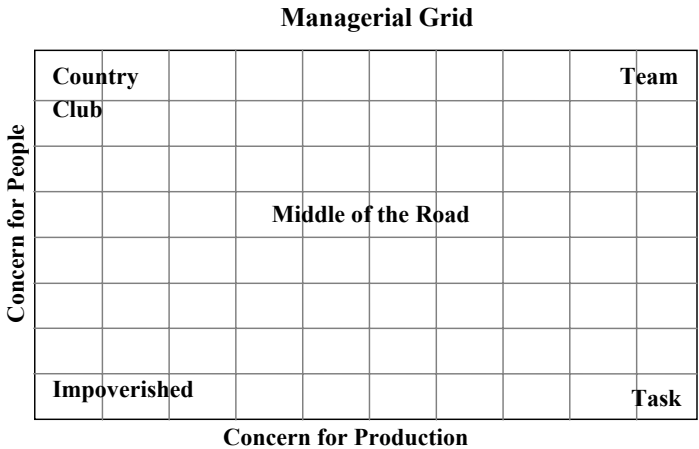
The next wave, and the current thinking, is referred to as contingency theories of leadership. Contingency theories focus on the leader's ability to change leadership styles based on situational specifics.

One contingency theorist was Fred Fiedler. Fiedler believed that we should not attempt to change the leader's style, but instead attempt to match the leader to a more compatible organizational situation. According to Fiedler, leader-member relations, task structure, and the position power of the leader are the three primary factors that should be used for moving leaders into situations appropriate for their leadership style.

Leader-member relations are the degree to which a leader feels accepted by his/her followers. Task structure is the degree to which the goals and tasks to be performed are outlined clearly. Position power is the degree to which the leader has controls over the rewards and punishments the followers will receive.

Hersey-Blanchard was another model premised on situational theory. This model focuses on task and relationship behaviors with an implication as to the maturity of the followers. This model identifies four basic quadrants representing four leadership styles:

1. Telling—representative of a high task and low relationship situation. In this quadrant, the leader defines roles and tells people what, how, when and where to perform the various identified tasks.
2. Selling—representative of a high task and high relationship situation. The leader provides both directive and supportive behaviors.
3. Participating—representative of a low task and high relationship situation. In this scenario, the leader and the followers share in the decision making.
4. Delegating—representative of a low task and low relationship situation. In this scenario, the leader provides basic direction.

Another contingency theory was House's Path-Goal theory. This leadership theory assumes four leadership styles.

Directive
- leader tells subordinates what is expected of them
- leader schedules work to be done
- leader tells how to do it
- similar to the initiating structure of the Ohio State studies

Supportive
- leader is friendly and shows concern for the needs of the subordinates
- synonymous with the Ohio State dimension of "consideration"

Participative
- leader consults with his/her subordinates
- leader uses subordinates' suggestions when making decisions

Achievement oriented
- leader sets challenging goals
- leader expects subordinates to perform at their highest level

In conclusion, in deciding the best leadership style, contingency theory recognizes the three key elements of any leadership situation:

1. Leader's style—stems from trait theories
2. Leader's behavior—how the leader interacts with subordinates —stems from behavioral theories
3. Leader's situation—stems from work of contingency theorists

Power

A discussion on managers and leaders would not be complete without some reference to power and its implications. There are five generally accepted sources of power.

1. Legitimate power—legitimate power is the result of a position of formal authority in the organizational hierarchy.
2. Coercive power—coercive power is based on fear and negative results which might occur if the subordinate does not obey.
3. Reward power—reward power is the opposite of coercive power. Reward power is the ability to distribute fair and equitably rewards for positive performance that the receiver views as valuable.
4. Expert power—expert power is influence possessed as a result of an individual's expertise. It consists of special skills or knowledge. Expert power is earned, not awarded.
5. Referent power—referent power arises from identifying with a person who has desirable resources or personal traits. For example, "if I admire and identify with you, you can exercise power over me because I want to please you."

Military Leadership Fundamentals

I have spent nearly my entire professional career servicing the defense industry. It is only natural that many of my acquaintances and friends have a military background. I asked them for information on how the military trains and prepares leaders for command. One of the books they recommended that I found to be a wonderful source of information is *Taking Charge: A Practical Guide for Leaders,* by Perry Smith.

In his book, Smith refers to twenty military fundamentals identified below.

1. Leaders must trust their subordinates.
2. Leaders must be good teachers.
3. Leaders should rarely be a problem solver; a leader should facilitate problem solving, but let subordinates solve the problem.
4. Leaders must be good communicators.
5. Leaders must manage time well and use it effectively.
6. Leaders should trust their intuition.
7. Leaders must be willing to remove people for cause.

8. Leaders must take care of their people. "He who receives a benefit should never forget it, he who bestows should never remember it."
9. Leaders must provide vision.
10. Leaders must subordinate their ambitions and egos to the goals of the unit or institution which they serve.
11. Leaders must know how to run meetings.
12. Leaders must understand the decision-making and implementation process.
13. Leaders must be visible and approachable.
14. Leaders should have a sense of humor.
15. Leaders must be decisive, but patiently decisive.
16. Leaders should be introspective.
17. Leaders should be reliable.
18. Leaders should be open-minded.
19. Leaders should establish and maintain high standards of dignity. Dressing well, being well-mannered, avoiding profanity, helping subordinates, conducting ceremonies, welcoming newcomers with a personal letter all help to keep performance and morale high.
20. Leaders should exude integrity. Of all qualities, integrity is the most important.

To further help these potential military leaders, the book contains checklists that quickly summarize things to think about in a given situation. The checklist for a leader's self-examination is summarized below:

- Do you allocate time to visit areas you control?
- Does everyone know what your priorities are?
- Are you reliable?
- Who tells you all the news? Good and bad?
- How well do you listen?
- Do people fear you, like you, distrust you, love you?
- What is your body language like?
- Are you considered a communicator?
- Are you considered to be a disciplinarian?
- Do you enjoy your job?
- Are you an innovator?
- Are you flexible?
- Do you maintain physical and intellectual fitness?
- Are you a deflector of pressure from above or a magnifier of pressure?
- Are you tuned in or are you out of touch?
- Are you a delegator?
- Are you a non-drinker, drinker or alcoholic?
- Are you an optimist or a pessimist?
- Are you religious?

- What are your ethics and values?
- Are you a writer?
- Are you ambitious?
- Are you secure or are you insecure?
- Are you a philanderer?
- What is your integrity level?
- Are you intense or are you relaxed?
- Are you decisive or are you a decision ducker?
- Are you conceptually oriented?

The military also provides a number of operational checklists for leaders. Some of these are outlined below.

- Transition checklist
- Communications checklist
- Integrity checklist
- Hiring checklist
- Counseling checklist
- Hang-up checklist
- Firing checklist
- Thank you checklist
- Planning checklist
- Divestiture checklist
- Decision-making checklist
- Executive skills checklist
- Meeting checklist
- Introspection checklist
- Promotion board checklist
- Antenna checklist
- Phrases to avoid checklist
- Congressional visit checklist

The transition checklist contains useful questions to ask when you have been selected to assume a leadership position.

- What is the mission?
- What are the organization's goals, priorities, plans, programs and budgets?
- What is the size and structure of the organization?
- What means of communication will I have (newspaper, radio, television, social gatherings, etc.)?
- Who reports directly to me? How many? Why? Why not others?
- Who is my boss? What is his/her leadership/management style? What is his/her means of communication to me?
- Am I responsible for geographically separated units? Do they report directly to me? Do they report indirectly to me?

- Which organizations, staff agencies or individuals should I visit? In what order? How often for subsequent visits?
- What is the standard of integrity? Have there been recent violations of these standards? How frequent and what was the outcome?
- What are the standards of performance? How are they measured? What are the results of recent outside inspections, self-inspections or audits?
- What documents should I read? In what order? Is there an annual organizational history? If not, why not?
- Are there procedures and regulations? What are the most important plans? Is there a long-range plan? If not, why not?
- What skeletons are in the closet?
- Where are the personnel shortages/weaknesses?
- What are the toughest problems I should expect to face during the first few months?
- How often do the top leaders and their subordinates go to offsite seminars together?

Entrepreneurs

Entrepreneurs can be defined as individuals who recognize and pursue opportunities where others see chaos or confusion.

Entrepreneurship is a process by which individuals recognize and pursue opportunities.

Entrepreneurs are typically associated with forming external new ventures. Intrepreneurs possess the same basic characteristics, but apply their knowledge and drive to internal opportunities to the company they work for.

The most frequently reported characteristics of an entrepreneur are listed below.

- High need for achievement
- Believe they control their own destiny
- Frequently take only calculated risks
- Independent
- Prefer to be personally responsible for solving problems
- Not afraid to take chances
- They have a willingness to work hard
- Self-confident
- Optimistic
- Determined
- High energy levels
- Are not likely to be content in typical large bureaucracies

Managers versus Entrepreneurs

Not all small business owners or managers are entrepreneurs. Some small business managers simply operate their businesses; they don't necessarily innovate.

A few noted, theoretically accepted differences between managers and entrepreneurs are detailed below:

- Entrepreneurs actively seek change. Managers tend to be more custodial.
- Entrepreneurs often put their own personal financial security at risk. Managers tend to be more conservative and assume only conservative risks.
- Entrepreneurs accept risks. Managers tend to avoid risks.
- Entrepreneurs are motivated by independence and the opportunity to create financial gain. Managers tend to be more motivated by career promotions and corporate rewards such as office location, size, staff and power.
- Entrepreneurs look at business growth over the longer term. Managers tend to be more oriented to the achievement of short-term goals.
- Entrepreneurs tend to be directly involved in all phases of their organization's operational activities. Managers tend to delegate tasks and supervise those performing the tasks.
- Entrepreneurs tend to accept mistakes as the normal part of doing business. Managers tend to avoid putting themselves in situations where they may fail or make a mistake.

How Do Entrepreneurs Get Their Ideas?

In a survey of 100 highly successful entrepreneurs

- 71% replicated or modified an idea gained from previous employment;
- 20% built temporary or casual jobs into a business;
- 5% were inspired by the PC revolution; and
- 4% conducted systematic research for opportunities.

Entrepreneurial Strategic Planning

The entrepreneur is driven by the perception of opportunity rather than by the availability of resources. Managers ask a different set of questions with different priorities than does the entrepreneur.

The manager might ask:

- What resources do I control?
- What structure do we have or need to compete?
- How can I minimize the impact of others on my ability to perform?
- What opportunity is appropriate?

The entrepreneur might ask:

- Where is the opportunity?
- How do I capitalize on it?
- What resources do I need?

- How do I gain control over them?
- What structure is best?

Note the difference in order and emphasis. Entrepreneurs tend to be more concerned with what and where opportunities are, then how they can capitalize on it, and finally, how they can accomplish the work. The manager, being more attuned to performance, would naturally be more concerned with how to do it.

Continuing with entrepreneurial strategic planning, entrepreneurs tend to:

- Risk financial security,
- Bypass career opportunities,
- Risk family relations,
- Believe hard facts about new business startups are not applicable to them; namely:
  - 40% of new businesses fail in the first year
  - 60% fail by the end of the second year
  - 90% fail by the end of the tenth year, and
- Entrepreneurs believe they will be in the 10 percent that do not fail.

Evolution of the Entrepreneurial Firm

The entrepreneurial firm develops through a natural evolution based on size.

- The firm becomes bigger than one person can handle.
- The entrepreneur hires people to perform functions (accounting, marketing, HR, etc.) Notice here the introduction of the traditional functional organizational design.
- The entrepreneur learns to delegate and manage people—or not.
- The entrepreneur tries to maintain the original small company atmosphere as the firm continues to grow.

Concluding Thoughts

The purpose of this section was to provide insight into some the most recent thinking, theory, methodologies and practices as they relate to managers, leaders and entrepreneurs. The purpose was not to make culminating sound generalizations.

To this end, it would appear on the surface that every one of us has performed as a manager, leader or entrepreneur at one point in our lives or another. I would suggest that the traits and behaviors that make one or the other are present in all of us, and further, they are more or less prevalent as we each enter into and out of different situations. I would suggest that sometimes, given the situation, we might behave as a manager, leader or entrepreneur. I would further suggest that perhaps it might be more useful to look at our personality preferences than looking at our own traits or behaviors. This is exactly what we do in chapters 11 and 12.

Chapter 10

Communication Skills

In its broadest sense, communication may be considered a chain of events in which the message serves as the basic link. The chain connects the transmitter to the receiver. Feedback provides some assurance of consistency in the encoding and decoding process.

Looking back through time provides some fascinating communication milestones.

20,000 BC—approximate date of earliest prehistoric cave drawings

3500 BC—Egyptians developed hieroglyphics

2500 BC—Egyptians invented papyrus

1800 BC—first true alphabet developed in Middle East

540 BC—first public library in Athens

300 BC—Hindus invented numerals

63 BC—shorthand system invented

105 AD—Chinese developed paper

1477 AD—first printing press

1591 AD—first post office in England

1822 AD—first phonograph

1837 AD—telegraph invented

1876 AD—telephone invented

1877 AD—phonograph invented

1923 AD—television invented

1965 AD—first telecommunications satellite system launched

1975 AD—Sony introduced Betamax

1978 AD—Magnavox introduced the first laser video disc player

A few observations related to our advances in communications technology:

- Communication is a basic human activity.
- The world has become smaller because of advances in communications technology.
- Communication is not always accomplished successfully.
- To communicate effectively requires clarity of mind and singleness of purpose.
- Conviction produces authoritative statements that can be carried into the hearts of receivers.
- Effective communication between two or more people requires a meeting of the minds.

The figure below reflects the basic communications model.

Communications Model
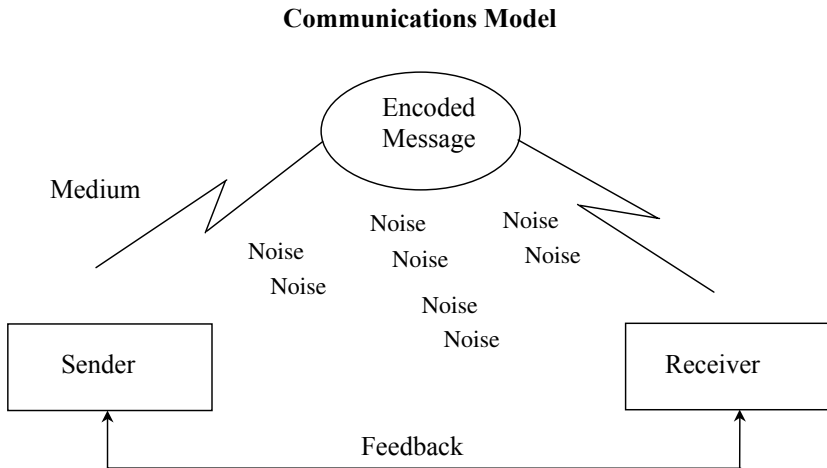
The above model illustrates how a message is sent through some form of communication medium to the receiver. Notice that the message is encoded by the sender and decoded by the receiver. The process of encoding and decoding is very specific to the individuals involved.

Numerous aspects of an individual's life impact the ability to encode and decode a given message. For example, recently during a negotiation, we were all on edge, looking for some form of hidden meaning in what was being said. This obviously taints our perspective of the incoming message. And further, anything that gets said might be interpreted in a manner inconsistent with the intent of the sender. It is easy to see, therefore, how anger, fear, uneasiness, and even joy, happiness or any other emotion can cause disruption in the manner in which the message is encoded or decoded. How often have we heard another party say ". . . that's not quite what I meant . . ."? This type of statement clearly indicates a miscommunication, in that

the intended message was either encoded incorrectly or simply decoded differently than that intended.

Encoding and Decoding Skills

Encoding skills include writing and speaking. Decoding skills include listening and reading.

Written Communication

When involved in written communication:

1. Determine the purpose of the message;
2. Collect and evaluate the facts needed;
3. Organize the material into principal topics;
4. Prepare first draft using conversational style of writing (i.e., write like you speak);
5. Consider the intended receiver (who is the audience?); and
6. Review the text.

Major advantages of written communication include:

1. Displays authority;
2. Usually more accurate than verbal communication;
3. Verifiable;
4. A degree of permanence;
5. High retention rate by receiver; and
6. Makes for accurate and speedy reproduction.

Major disadvantages of written communication include:

1. If the situation is changing, the written text may be outdated soon.
2. It may not take into account the reading ability of the recipient.
3. Slower feedback than oral communication.

Speaking Skills

When making a presentation or simply speaking with another individual, the following should be considered.

1. What are you selling?—This asks why you are making the presentation.
2. To whom are you selling it?—Know your audience!
3. Against what are you competing?—Consider the emotional needs of your audience. For example:
    - If there exists fear on the part of the listener, the message might curtail his/her prestige, authority or advancement opportunities.
    - The listener might be unwilling to take on something new.
    - The listener might be unwilling to leave the beaten path.

4. In what environment is the message to be received?—Is it friendly, supportive, hostile, or is there organized hostility? Organized hostility is the worse kind of environment to speak in. If the organization has properly done its homework, the message is already anticipated, and appropriate or inappropriate responses are most likely waiting.

Basic Rules for Addressing an Audience

Talking in front of people can very intimidating, to say the least. Even the most experienced speaker has about two to five minutes of initial adjustment. During this time, frequently, the speaker is looking for a friendly member of the audience to look to for reassurance that things are progressing well. When I speak in front of people, I routinely look for those individuals that smile or nod in a positive manner. Seeking out these people and looking to them during the speech helps to make me feel more comfortable with the presentation. Body language on the part of the audience, the speaker's self-confidence, the speaker's knowledge of the subject matter, time of day/night, physical aspects of the speaker (is he/she hungry, etc.) all affect the overall quality of the speech by the presenter.

Basic rules when addressing an audience that will help to make the presentation a more meaningful experience for the receivers include:

- Keep the presentation simple and brief.
- Rehearse the presentation.
- Speak clearly.
- Keep your back to the wall.
- Speak at an even rate of speed.
- Maintain eye-to-eye contact.
- Stand erect and control nervous habits. I forever had a bad habit of playing with the change in my pocket. Once this was brought to my attention, I immediately ceased this annoyance.
- Use pauses for effect.
- Relax and smile. Chances are that you know as much and most generally more than most everyone in the room. There will always be someone with comparable knowledge to yours, but that's generally the exception, not the rule.
- Avoid excessive statistics.
- Avoid jargon.
- Reaffirm your points in closing.
- Allow time for questions.

Remember:

- Visual contact, facial expression, body language and clothing account for 55% of the entire presentation.
- Tone of your voice accounts for 38% of the presentation.
- The content of the presentation, i.e., the words themselves, account for only 7% of the presentation.

Questions after the Presentation

After any presentation there will generally be two categories of questions asked:

1. Probing—"What are your thoughts about . . .?" or "I'm wondering what your reaction might be to . . .?" These types of questions cause the speaker to think more deeply about the subject matter.
2. Confrontational—These types of questions are a deliberate attempt to focus the speaker on an area she/he might be avoiding. Confrontation can be positive, if handled openly and honestly without it becoming personal. I remember once, as a young engineer, addressing a group of very senior program managers with the intent of offering instruction on our latest process modifications to our program management process. Only moments into the training session, a very senior and very brash program manager, who I swear had been around since Moby Dick was a minnow, leaned back in his chair, balancing on the back two legs and said, "I have forgotten more about program management than you will ever know." My only response, having been trained in andragogy, was to simply respond, "I'm sure there is a great deal of truth to that." And, "I hope by the time we leave here this afternoon that all of us can gain something from your advanced knowledge on this topic. That's what makes teaching adults as much fun as it is. We all have real-life experiences to share." He leaned forward and never said another word.

Probing questions, which require something other than a "yes" or "no" response, fall into three basic groupings:

1. Open-ended—"What is the most effective way to read, write, speak, listen, observe and visualize?" These type of questions seek something other than a "yes" or "no" response.
2. Means-ends—"How do I get the time, energy and budget to do what is important?" This type of question is looking for how to do something while conveying the ultimate end objective.
3. Means only—"What do I look for . . .?" "Where would I find . . .?" This type of question is similar to the above, only it does not provide insight into the final outcome.

Non-Verbal Communication Skills

Non-verbal communication skills, as the words imply, are those skills that are basically seen as opposed to heard. They generally fall into four broad categories.

1. Physical—includes facial expressions, sense of touch and smell, and body motions;
2. Aesthetic—creative expression; playing instrumental music, dancing, painting and sculpturing;
3. Signs—mechanical in nature; signal flags, 21-gun salute, horns and sirens; and
4. Symbolic—makes use of religious entities or other status.

Listening Skills

Effective listening is very difficult. It takes a special form of patience. Most of us tend to be thinking about what we are going to say when the speaker is done, and therefore miss some of what is being said. This is complicated by the fact that we can generally think faster than an individual can speak. This "down time" allows our mind to wander in a different direction, rather than to be focused on the speaker. Our ability to context switch between what we are thinking about and the speaker is directly related to our being able to participate in an effective communication exchange.

Attributes of a good listener are discussed below. A good listener:

- Usually makes more informed decisions, because inputs received are more thorough;
- Learns more in a given period of time, therefore saving time; and
- Encourages others to listen to what he/she says because the listener appears more attentive and better mannered.

Listening is hard work. It is characterized by:

- A faster heart rate;
- Quicker blood circulation; and
- A small rise in body temperature.

A set of guidelines to follow when listening are:

- Prepare to listen—you can't listen if you are talking.
- Recognize your own biases—understand your personal frame of reference. This also implies that you not only understand your frame of reference, but that of the speaker as well.
- Resist distractions—good listeners look and act interested.
- Keep an open mind—don't feel threatened or insulted.
- Find an area of interest—find ways to make the message relevant to yourself.
- Acknowledge the speaker—let the speaker know that he/she has your attention.
- Show some empathy—create a climate which encourages others to communicate openly and honestly.
- Hold your fire—be patient, don't interrupt. Let the speaker finish his/her thoughts completely.
- Listen critically and delay judgment—thorough listening produces enlightened judgment.
- Judge the content, not the delivery—ask for clarity when you don't understand. Remember, however, that we stated above that only 7% of the presentation is content-related.
- Capitalize on thought speed—we think four times faster than the communicator speaks, so what do we do with the extra time?

Reading Skills

Effective reading skills are essential to our very existence, and provide a depth of understanding. Efficient reading skills, the speed at which we read, are taught in numerous speed reading seminars around the globe. Key factors to consider when reading are:

- Comprehension—our ability to understand what is read.
- Determine the writer's point of view.
- Determine whether you accept or reject the thesis of the argument.
- Be discriminating in what you read—effective managers read only the most applicable material. It is not uncommon that I will receive as many as forty email messages and twenty phone calls in a day. To be honest, I do not have time to read every email. Therefore, it is only natural that I might spend more or less time on a given email depending on its perceived applicability at the time.

Skipping Judiciously

When confronted with having to read large amounts of information, it is important to be able to read enough information to become knowledgeable on the subject, but not have to read every word. To this end, skimming or skipping through the material becomes necessary. Below identifies a process that many have found to be of value for this purpose.

1. Scan the table of contents for a rough idea of what the book or material is all about;
2. Read the first couple of sentences or paragraphs of those sections with greatest applicability; and
3. Read thoroughly those sections which require greater understanding.

Communication Barriers

In the communications model presented earlier, the message that was sent from the sender and encoded was passed through some medium of communication. As the message passes through this medium, there is noise and the like, which permutes the message into something potentially different from that which was sent. This noise may be identified as barriers to effective communication. Below identifies other barriers to effective communication.

- Noise—noise can be actual static or anything that distracts from the intended message.
- Lack of feedback—one of the most detrimental effects on a speaker can be a lack of feedback. Even as an employee, we want to know what others think of our performance; whether it is good or bad, at least we know. With knowledge about how we are performing, we can make informed decisions on how to enhance our performance or simply take other action.

- Incorrect medium of communication—all too often we want to send a message and choose a medium that may be inappropriate. For example, if we were to ask our boss for a raise, we probably would choose a personal medium where we set up a meeting time and sit down to discuss our concern. It would be less effective if we were to ask for our increase through an email or the like.
- Mental barriers, which include:
  - arrogance of the sender;
  - assumption about the sender's logic or rationality;
  - sender assumes that he/she is logical or rational;
  - sender's misconceptions, self-interest or strong emotions;
  - receiver not ready to receive;
  - problems with word selections;
  - use of abstract words; the more specific one can be, the more doubt that gets removed during the decoding process;
  - time and space barriers—finding out the ship is sinking after we are vertical is of less value than knowing earlier; and
  - empathy and other relationships—seeing ourselves through the eyes of others.

Organizational Communication

When we talk about communication channels within an organization, we are usually referring to one of three basic categories.

1. Formal—formal channels are those channels established by virtue of the organization's design hierarchy. They are usually clearly identifiable and have a strong relationship to the reporting relationships of the managers and supervisors in the organization.
2. Informal—informal communication channels are those typically between peers, or others in the horizontal portion of the organization. In this category are work groups.
3. Unofficial—these are typically socially oriented groups. That is, friendships, cliques and the like.

Overloading is a concept used to describe too much information being passed through a given channel. Going back to an earlier example, it's easy for our email basket to overflow. When I receive forty emails in a given day, it's not possible to effectively manage that quantity of input and tend to other daily matters. Therefore, one might suggest that my email medium is overloaded.

It's also important to recognize the audience's needs and the benefits to them of receiving the message. The more relevant a message to the receiver, the more likely the message will be focused on and subsequently understood as intended.

Conducting an Effective Meeting

In a nutshell, conducting an effective meeting can be simply stated in a few quick steps.

1. Establish meeting objectives.
2. Prepare meeting agenda.
3. Determine timing and physical arrangements.
4. Identify and invite people who can make a contribution.
5. Brief participants in advance.
6. Consider matters of protocol.

Chapter 11

Further Understanding Ourselves and Others—A Nurture-Based Perspective

Have you ever found yourself wondering "Who am I?" I mean really, "Who am I?" Perhaps you've even asked the eternal question, "Why am I here? What is my purpose in life?"

There are numerous literary works which attempt to help us to better understand ourselves; in fact, bookstores are loaded with psychological and self-help materials dedicated to these very questions.

What I would like to do in the next two chapters is to look at who we are from two basic perspectives.

1. From the philosophical underpinnings of "we are who we are due to our environment," we will examine the social, cultural, economic and political changes of our society, which in turn formed our beliefs, behaviors and ingrained personality characteristics.
2. From the philosophical underpinnings of "we are fundamentally born with certain personality preferences," we will examine the work of Carl Jung, a Swiss psychiatrist who developed a theory that describes human consciousness.

Nurture-Based Perspective

The purpose of this section is to merge management philosophies, organizational designs, gerontological phases of human life and similar groups of employees in the workforce into a single cohesive discussion, placed in the context of American economic circumstances. Bringing together these diverse topics under one um-

brella is an essentially unprecedented effort and enhances our understanding of all the topics.

Simply stated, management philosophies, since the late nineteenth century, have been dominated by four basic categories of thinking: (1) classical/scientific management, (2) behavioral sciences, (3) contingency approaches, and (4) systems theory. While each differs from the others in basic philosophy, they are actually intuitive when viewed from the bigger picture of the economic circumstances from which they evolved.

Organizational designs are those many ways in which we organize our workforce to gain the greatest productivity given the product or service we produce. Although on the surface one might guess that our organizational designs actually evolve from well-thought-out strategic planning based on our current management philosophies, the reality is quite the opposite. We will discuss how economic circumstances force successful organizations to permute themselves into more efficient and effective entities.

When we talk about gerontological phases of human life, we are actually talking about changes to our biosocial, cognitive and psychosocial development as we mature over time. These three perspectives can be thought of as domains of human development.

1. Biosocial changes are those changes having to do with physical growth and development, as well as the family, community and cultural factors which affect that growth and development.
2. Cognitive changes addresses the mental processes through which the individual thinks, learns and communicates.
3. Psychosocial changes include emotions, personality characteristics and relationships with other people.

Our discussion of like groups within the workforce centers on groups having similar ages and therefore sharing similar experiences and defining moments (Levinson, 56). Defining moments are those instances where something catches the attention and hearts of hundreds, if not thousands, of individuals at the same basic time in their formative lives.

The list below combines life phases (gerontology) with similar age-related cohort groups in the workforce:

- Late Adulthood (60+ years old); veterans
- Middle Adulthood (40–60 years old); baby boomers
- Early Adulthood (20–40 years old); generation Xers
- Adolescence (10–20 years old); nexters
- The School Years (7–10 years old)
- Early Childhood or Preschool (2–6 years old)
- Infants or Toddlers (0–2 years old)

Note that our discussion will focus on Adolescence (nexters) through Late Adulthood (veterans).

The discussion of similar age groups within the workforce is in and of itself quite interesting, but is even more enlightening when coupled with the basic phases of human development discussed above. When the two lines of thought—similar age groups and basic developmental phases of human development—are placed in

the context of organizational designs and management philosophies, and then nestled in the overall picture of American economic circumstances, the whole picture evolves nicely into a single cohesive and coherent discussion.

The figure below forms the premise for all subsequent discussion.

Overall Contextual Framework
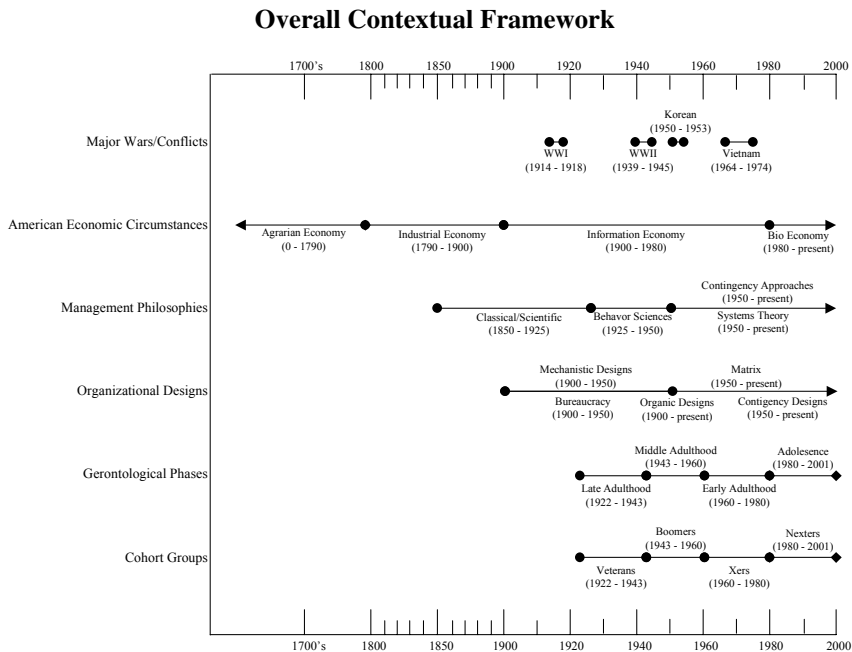
The following sections are organized by time period. This strategy provides the easiest mechanism for discussing the many facets we wish to address. The sections are:

1. Prior to 1920
2. 1920 to 1945
3. 1945 to 1960
4. 1960 to 1980
5. 1980 to Present

Not all sections discuss management philosophies, organizational designs, gerontological phases or cohort groups to the same extent. The reason for this is quite simply that not all of these factors apply to each of the economic circumstances being discussed. For example, it wasn't until the industrial economy, or industrial period in time, that management philosophies and organizational designs became a documented intentional focus of attention. As well, when talking about gerontological phases or cohort groups in the workplace, it generally does not add value to our discussion to go beyond 80 years. This is because the primary focus of this text is on those individuals who still have an impact on our workplaces. Late adulthood, therefore, ranges back to about 1922, which picks up just after our discussion on the Industrial Revolution.

Again, it should be stated that the intent of this chapter is to advance the basic bodies of knowledge of the collective dimensions being discussed. To this end, the

various aspects being discussed originate from numerous sources and will be referenced so that the readers may formulate their own interpretations of the data. The information on core values, seminal events, cultural memorabilia, heroes and generational personalities of the age groups in the workforce, while discussed in many articles and books, comes predominantly from the work of Zemke, Raines and Flipczak in *Generations at Work*. The seminal work on developmental phases most likely belongs to Levinson in his 1978 book, *The Seasons of a Man's Life*.

Prior to 1920

American Economic Circumstances

Agrarian Economy—Agriculture is the systematic raising of useful plants through human oversight and intervention. The production of food is the main reason for agriculture, but cultivated plants also furnish substances useful as textile fibers, dyestuffs, medicines, and ornaments. Gathering wild plants for food or other purposes is not agriculture. The crucial innovation that separates wild-plant gathering from true agriculture is the deliberate planting of seeds and other plant material. Cultivation, harvesting, and processing were byproducts of this innovation.

In a broad sense, "agriculture" can include animal husbandry, which is closely associated with plant raising. On the other hand, "agriculture" can be used in a limited technical sense to refer only to raising field crops; in this usage it is differentiated from horticulture (gardening) and arboriculture (orcharding).

Humans have lived by farming for only a short time. For most of their existence, now believed to extend to forms as much as 2 millions years old, humans lived as wild-plant gatherers and hunters. Deliberate plant raising began only about 10,000 years ago. In this relatively brief period, farming has made possible revolutionary changes in human life. Human population has greatly increased, partly because more people could be fed. Moreover, agriculture has been a major factor in transforming human societies from small, primitive local bands into huge, technologically advanced nations. Agriculture does not by itself create civilization, but without agriculture early civilization would not have developed.

Hunting and gathering was sufficient for the world's small human population until 12,000 to 10,000 years ago. The melting of the continental ice sheets of the last glaciation brought a return of milder climates and led to rises in sea level and major shifts in plant and animal life. Several important game animals became extinct, and the growing scarcity of game appears to have caused a shift to more intensive harvesting of wild seeds and roots. Improved seed-collecting methods, storage baskets, and seed grinders developed near the beginning of what archaeologists call the Neolithic, or New Stone Age. Evidence of a stage between gathering and systematic agriculture comes from Owens Valley in eastern California, occupied by the Paiute Indians. The Paiutes increased the yield of wild grasses by building rock and earth checkdams to slow the runoff of water and by harvesting seeds. The fundamental difference between this and true agriculture is that the grass was not planted, but seeded itself.

The first real cultivation was probably incidental and casual, begun by people having no notion that they were embarking on a momentous phase of cultural evolution. It was during the Neolithic period that the actual change from hunting and gathering to food production, the so-called "Neolithic revolution," occurred. This "food-producing revolution," the incipient phase and the interval between the

achievement of agriculture and the advent of urban life, lasted almost 4,000 years. The establishment of permanent agricultural villages had (and still has) certain disadvantages:

- Farming peoples who are overly dependent on a single starch staple often suffer from nutritional deficiencies.
- Closely built villages promote communicable diseases.
- Stored surpluses invite enemy attack, and growing crops are subject to destruction by storms, floods, or insect ravages in ways that wild resources are not.
- Cleared tropical forests spread malaria.
- Irrigation farming in tropical areas favors transmission of liver flukes from snails to barefoot farmers.

Because of such factors it is probable that the development of agriculture brought about significant biological changes in humans, apart from its effect in promoting population expansion.

Plant gathering did not cease with the advent of farming. Nuts, berries, various greens, fruit, and mushrooms are still gathered wild even in the most advanced agricultural countries. Moreover, most of the world's wood products still come from wild forest growth, although replanting (or "tree farming") is increasing.

There are no written records of the actual beginnings of agriculture, but it is clear from archaeological findings that the earliest agriculture, in the Middle East and in the New World, preceded pottery making, one of humanity's ancient crafts. The carbonized remains of clearly domesticated plant forms have been unearthed in early sites. Finds of farming tools are another line of evidence, although early stone or wooden implements may also have been used by non-farming food collectors. In later times hoe blades were made of polished stone, bone, or shell. Plows, the unambiguous evidence of farming, appeared no earlier than about 3000 B.C. in the Middle East. In some areas traces of old field patterns exist, but the best evidence of farming is found around the buildings where crops were stored and processed.

Botanical evidence, based on studies of the distribution range of plants, indicated fairly conclusively that wheat, barley, and rice originated in the Old World and that maize, potatoes, and manioc (a large starchy root plant) came from the Americas. With the advent of writing, records became important evidence. Certain ancient peoples left well-illustrated documents, the earliest of which come from Egypt and Mesopotamia. Many crops and farming methods are described in the Old Testament. The ancient Greeks and later Romans compiled treatises on plant life.

Despite the variety of archaeological and historical evidence, however, it is difficult to trace the geographical diffusion of early cultivated plants. Conclusions about dates and routes by which plants were spread in ancient times remain conjectural. Only in recent times have precise records become available. For example, a recent instance of plant diffusion involving the Brazilian rubber plant is well documented. The seeds of the rubber plant were smuggled from Brazil to the Royal Botanical Gardens at Kew, near London, in the 1870s. From there they were taken to Ceylon and the East Indies.

The first immigrants to America in the 17th century went not to set themselves up in farming, but to trade fish to the natives and search for gold. Trading and fishing from the outset absorbed the attention of some, but most immigrants were soon

forced to turn to agriculture, which continued to be the mainstay of colonial life thereafter. The agriculture they practiced was very different from that found anywhere in the Old World. English practices influenced colonial agriculture everywhere, particularly in New England, but in the middle colonies the Dutch, Germans, Welsh, Scotch-Irish, and Swedes and in the southern colonies the French contributed to the developing agricultural pattern. All these groups brought with them agricultural practices, seeds, crude farm tools, livestock, cuttings and plants that varied widely, and assured a diverse mixture of methods, techniques, plants and livestock. More important in shaping the growth of agriculture in the New World was the great abundance of land, its cheapness and ease of acquisition, the diversities of soil and climate, the freedom of enterprise, the initiative of the settlers, and finally the heritage of new commodities acquired by the Indians.

Agricultural education trains people to produce, process, and distribute food or fiber, and spreads scientific and technical information related to all phases of such work. It strives to help the people of the world improve the quantity and quality of products indispensable to human life.

Agricultural education is concerned with one of the oldest and largest areas of work. In many countries of Latin America, Asia, and Africa, 50 to 80 percent of the working force is employed in farming. These countries face the need to multiply the productivity of their farms if their increasing populations are to escape undernourishment or outright famine. In the highly industrialized nations the proportion of the labor force engaged in farming may be relatively small, perhaps 10 percent, but agriculture continues to be a major industry. In such countries it entails far more than the work done on the traditional family farm, not only raising crops and livestock, processing the crops, and marketing them but also providing many of the goods and services that farmers use. Agriculture must continually increase its productivity in industrial countries also, so that industrial countries can feed their own expanding populations, provide raw materials for the textile, plastics, and other industries, and ship surpluses abroad.

Agricultural education takes many forms, from children's classes in village schools to graduate study in university laboratories. Much of it goes on outside of school. Some of the most useful training is given by men and women who work directly with farmers to demonstrate new crops, techniques, and machines. All forms of agricultural education can be illustrated by descriptions of programs in the United States.

The United States is one of the highly industrialized nations in which farmers are a relatively small group. The comparatively small number of farmers in the nation represents a great change from the middle of the 19th century, when about 85 persons lived on the land for every 15 who lived in cities. In the course of a century these figures were reversed, and only about one-seventh of the total labor force remained in agriculture. But while people moved away from the farms, the productivity of agricultural labor increased by more than 600 percent between 1870 and the mid-1960s. Four-fifths of the increase occurred after 1945.

The number of farmers in the United States has decreased at each census while the total population has increased. For these reasons, agricultural workers have needed to acquire the technical skills and scientific knowledge that would enable them to meet the rapidly expanding demand for their products. Agricultural education has grown rapidly to meet this need.

In the United States, organized agricultural education began toward the end of the 18th century. The Philadelphia Society for the Promotion of Agriculture was organized in 1785, with George Washington and Benjamin Franklin as members. Similar societies were established in South Carolina (1785), Maine (1787), New York (1791), Massachusetts (1792), and Connecticut (1794). In addition to publishing bulletins and encouraging the establishment of agricultural fairs and exhibitions, these societies furthered agricultural instruction in the common schools. The Philadelphia Society, for example, in 1794 prepared a plan to promote agricultural instruction through the University of Pennsylvania and, at a lower level, through the common school system of that state.

The earliest specialized school of agriculture in the United States was the Gardiner Lyceum, founded at Gardiner, Maine, in 1821. In 1823 the state legislature appropriated $1,000 for the maintenance of the school, in what was probably the first instance of state aid for agricultural education. By 1840 agricultural instruction in the schools was being encouraged in Maine, Massachusetts, Connecticut, New York, and Michigan. In the domain of higher education there was considerable agitation early in the 19th century for the establishment of state colleges of agriculture. In 1818, Governor De Witt Clinton of New York recommended that the state legislature take steps "by which means a complete course of agricultural education would be taught." By the time of the American Civil War some states already had created colleges of agriculture. The state constitution adopted in 1850 by Michigan required that a college of agriculture be established and maintained. The Michigan Agricultural College (now Michigan State University) was dedicated on May 13, 1857. In Pennsylvania the Farmers' High School was founded in 1855 and became, in 1862, the Agricultural College of Pennsylvania (now Pennsylvania State University). The Maryland Agricultural College was chartered in 1856 and became part of the University of Maryland in 1920.

The year 1862 was a milestone in the development of agricultural education in the United States. On May 15, 1862, Congress created the Department of Agriculture. Among other functions, the department was "to acquire and diffuse among the people of the United States useful information on subjects connected with agriculture..." On July 2, 1862, President Abraham Lincoln signed the Land-Grant College Act, called the Morrill Act after its original sponsor, Justin S. Morrill. Under the provisions of the act, each state was offered 30,000 acres of public land (or its equivalent in scrip) for each of its senators and representatives who were then in Congress. Proceeds from the sale of these lands were to be used for the establishment of at least one college "where the leading objects shall be...to teach such branches of learning as are related to agriculture and the mechanic arts." By this act, higher education was placed within the reach of the growing number of youths from all walks of life who sought training in scientific, agricultural, and industrial pursuits.

The land-grant colleges and universities created with the help of the Morrill Act are in a central position in agricultural education. They offer a threefold program of resident instruction, research, and extension education service. Moreover, the curricula of these institutions have greatly influenced the development of farming in the 50 states. Federal aid for land-grant colleges and universities is administered, for resident instruction, by the U.S. Office of Education and, for research and extension, by the Department of Agriculture. This aid, however, represents only a

small proportion of the total institutional expenditures. State and local governments contribute more than twice as much as the federal government.

Industrial Economy—This period is characterized by scientific management theories, mechanistic models of organizational design, and orientation toward production efficiency and effectiveness.

The Industrial Revolution in the United States appears to have been the catalyst for the earliest forms of organizational design and management philosophies. Three advances in technology launched the period: the steam engine (1790–1810), the railroads (1830–50), and the telegraph (1844). These technologies are thought to have been responsible for the proliferation of U.S. entrepreneurship by 1860. Along with these technologies came increasing demand for manufactured goods and industrial markets. During the last half of the 19th century, the U.S. economy entered an explosive transition from an agricultural nation to an industrial nation.

With the transition into an industrial society came demand for more efficient and effective production techniques. The goal of this period was to meet demand.

WWI (1914–1918)—World War I, the name commonly given to the war of 1914–1918, which began in Europe and was fought principally on that continent, but eventually involved all of the continents of the world. While the wars between Great Britain and France from 1689 to 1815 had been extended to North America, Africa and Asia, they remained wars between European governments. The term World War is properly applied to the conflict of 1914–1918 because the various parts of the British Empire in all continents as well as many countries in Asia, North and South America participated in it. For the first time, all of the great powers of the world were engaged; Austria-Hungary, France, Germany, Great Britain, Italy and Russia in Europe; Japan in Asia; and the United States in America. It is estimated that by the end of the war about 93 percent of the population of the world was in greater or less degree involved.

War costs are of two kinds, direct and indirect. Direct costs embrace all expenditures made by belligerents in carrying on hostilities. Indirect costs include the economic losses resulting from deaths attributed directly or indirectly to the war, the value of property damaged or destroyed, the loss of production arising from the transfer of civilians to military pursuits, expenditures from war relief work, the costs of war to neutral nations and the like. The direct costs of WWI, based on the most reliable statistics, were $186,333,637,000; the indirect costs have been estimated at $151,646,942,560, making the total war bill $337,980,579,560. It has been possible to appraise the direct cost fairly accurately, but the indirect cost can only be estimated, for there is no unit of measurement by which they may be definitely fixed. Notwithstanding the many figures purporting to show how much money was spent to carry on the war, the fact is that it was fought mainly on credit, since the gold available at the outbreak of hostilities was not sufficient to have kept it going for more than forty to fifty days. During the first three years of the war the average daily cost was $123 million, and in 1918 it rose to $225 million.

The number of casualties in World War I exceeded by far those of any other war before World War II, in which almost 17 million men of the armed forces perished. Civilian deaths from military action, massacre, starvation, and exposure in the war between 1914 and 1918 are estimated at 12,618,000 (*Encyclopedia Americana,* Vol. 29, 258).

Management Philosophies

In this period, quality and price frequently gave way to availability. During this time, scientific management unfolded through the efforts of Frederic W. Taylor (1856–1915). Taylor was credited with the scientific management philosophy, which sought to increase productivity and make work easier by scientifically studying work methods and establishing standards.

Taylor did most of his work at the Midvale and Bethlehem Steel Companies in Pennsylvania. As a mechanical engineer with a Quaker and Puritan background, he was continually appalled by workers' inefficiencies. Employees used vastly different techniques to do the same job They were inclined to "take it easy" on the job, and Taylor believed that worker output was only about one third of what was possible. Therefore, he set out to correct the situation by applying the scientific method to shop floor jobs. He spent more than two decades passionately pursuing the "one best way" for each job to be done (Robbins, 1999).

Scientific management, as developed by Taylor, was based upon four main principles (Rue 1989):

1. The development of a scientific method of designing jobs. This involved gathering, classifying, and tabulating data to arrive at the "one best way" to perform a task or series of tasks. This "best way" was to replace the old rule-of-thumb.
2. The scientific selection and progressive teaching of employees. This was not a generalist perspective, but instead a matching of the job or single task to a single worker. Taylor also emphasized the need to study worker strengths and weaknesses and to provide training to improve employee performance. Previously, workers chose their own work and trained themselves as best they could.
3. The bringing together of scientifically selected employees and scientifically developed methods for designing jobs. Taylor believed that new and scientific methods of job design should not merely be put before an employee; they should also be fully explained by management. He believed that employees would show little resistance to changes in methods if they understood the reasons for the change and they saw a chance for greater earnings for themselves.
4. A division of work resulting in an interdependence between management and the workers. If they were truly dependent on one another, Taylor felt, then cooperation would naturally follow.

The scientific study of work also emphasized specialization and division of labor. In time, the need for an organizational framework became more and more apparent. The concepts of line and staff were developed. In an effort to motivate workers, most scientific management programs developed wage incentives. Once standards were set, managers began to monitor actual performance and compare it with standards. Thus the management function of control was launched.

Summarizing scientific management as a managerial philosophy, Taylor saw equal benefits for both management and workers: management could achieve more

work in a given amount of time, and workers could produce more and earn more, with little or no additional effort (Rue 1989, 38). Taylor believed that economic rewards could motivate employees, provided that those rewards were linked to individual performance.

Other scientific management pioneers followed in Taylor's footsteps. Morris Cooke applied scientific management principles to educational and municipal organizations. Henry Gantt created a scheduling technique for production control that utilized a bar chart, coined the "Gantt chart." The Gantt chart is still widely used today. Frank and Lillian Gilbreth combined the study of motion and work methods with psychology. The Gilbreths' work contributed significantly to research in the areas of fatigue, micromotion, and morale.

Frank Gilbreth, a construction worker by trade, gave up his contracting career in 1912 to study scientific management after hearing Taylor speak at a professional meeting. Gilbreth is probably best known for his experiments in reducing the number of motions in bricklaying. By carefully analyzing the bricklayer's job, he reduced the number of motions in laying of exterior brick from 18 to 5. On interior brick, the 18 motions were reduced to 2. Using Gilbreth's techniques, the bricklayer could be more productive and less fatigued at the end of the day.

The Gilbreths also created a microchronometer that recorded time to 1/2000 of a second. They placed it in a field of study being photographed and were therefore able to determine how long each hand motion took. Wasted motions missed by the naked eye could be identified and eliminated. The Gilbreths also devised a basic classification scheme to label 17 different hand motions; search, select, grasp, hold, etc., which they called therbligs. This scheme allowed the Gilbreths a more precise way of analyzing the exact elements of any worker's hand movements.

It was Henri Fayol who first issued a complete statement on a theory of general management. In Fayol's primary work, he introduced 14 principles of management:

1. Division of work—specialization increases output by making employees more efficient.
2. Formal positional authority—managers must be able to give orders. Authority gives them this right. Along with authority, however, goes responsibility.
3. Discipline based on obedience and respect—employees must respect and obey the rules which govern the organization. Good discipline is the result of good leadership, a clear understanding between management and workers regarding the organization's rules, and the judicious use of penalties for infractions of the rules.
4. Unity of command—every employee should receive orders from only one supervisor.
5. Unity of direction—each group of organizational activities that have the same objective should be directed by one manager using one plan.
6. Subordination of the individual interests to the general interests—the interest of any one employee or group of employees should not take precedence over the organization as a whole.
7. Dependence of wages on many factors—workers must be paid a fair wage for their services.

8. Centralization of authority—refers to the degree to which subordinates are involved in decision making. Whether decision making is centralized (to management) or decentralized (to subordinates) is a question of proper proportion. The task is to find the optimum degree of centralization for each situation.

9. Scalar chain (line) of authority—the line of authority from top management to the lowest ranks is the scalar chain. Communications should follow this chain. However, if following the chain creates delays, cross-communications can be allowed if agreed to by all parties and superiors are kept informed.

10. An ordered and ensured place for everything—people and materials should be in the right place at the right time.

11. Equity—managers should be kind and fair to their subordinates.

12. Stability of tenured personnel—high employee turnover is inefficient. Management should provide orderly personnel planning and ensure that replacements are available to fill vacancies.

13. Initiative—employees who are allowed to originate and carry out plans will exert high levels of effort.

14. The building of harmony and unity within the organization—espirit de corps promoting team spirit will build harmony and unity within the organization.

Organizational Designs

During the early twentieth century—a time of fairly rapid industrialization that encouraged public and private organizations to emphasize production and efficiency as criteria of effectiveness—mechanistic design evolved. Mechanistic design is informed by the hierarchically structured management philosophies of the time. Mechanistic organizational design promotes an effective organizational structure characterized by highly specialized jobs, homogeneous departments, narrow spans of control, and relatively centralized authority. Classical design theory presupposes a single best way to structure an organization to achieve these ends (Gibson 1988).

Max Weber, in describing applications of the mechanistic model, coined the term "bureaucracy." Because authority involves the legitimate right to exact obedience from others, organizational design involves domination. Weber's search for the forms of domination that evolve in society led him to the study of bureaucratic structure (Gibson 1988, 497). Gibson says, "According to Weber, the bureaucratic structure is superior to any other form in precision, stability, stringency of its discipline and its reliability. It thus makes possible a high degree of calculability of results for the heads of the organization and for those acting in relation to it. The bureaucracy compares to other forms of organizations as does the machine to other non-mechanical modes of production" (1988, 498).

Weber's description of bureaucratic organizational design has the following characteristics:

• Division of labor—jobs are broken down into simple, routine, and well-defined tasks.

- Authority hierarchy—offices or positions are organized in a hierarchy, each lower one being controlled and supervised by a higher one.
- Formal selection—all organizational members are to be selected on the basis of technical qualifications demonstrated by training, education or formal examination.
- Formal rules and regulations—to ensure uniformity and to regulate actions of employees, managers must depend heavily on formal organizational rules.
- Impersonality—rules and controls are applied uniformly, avoiding involvement with personalities and personal preferences of employees.
- Career orientation—managers are professional officials rather than owners of the units they manage. They work for fixed salaries and pursue their careers within the organization.

The nature of Weber's characteristics of an organizational bureaucracy is identical to Fayol's management theory principles. Both describe an organization that functions mechanically to accomplish the organization's goals in a highly efficient manner.

1920 to 1945

American Economic Circumstances

The Great Depression of 1929 saw unemployment in excess of 25 percent. Afterward, unions sought and gained major advantages for the working class. In this period, known as the golden age of unionism, legislatures and courts actively supported organized labor and the worker. Graff (1968) described this event:

> The collapse of the stock market was the initial stage of the long and bleak great depression. Unemployment which had been growing since the previous July, continued to increase at an alarming rate following the crash on Wall Street. Spending by consumers, which had been declining since July, continued to slacken. As businessmen stopped building new plants, the number of jobs available decreased. Income was not distributed well enough to keep people employed through an increase in spending by consumers. Farmers found prices lower than ever; millions of working people could neither buy factory goods nor find employment. Middle-class people everywhere could not meet the time payments on their cars, refrigerators or houses. The "prosperity decade" had ended with a sickening thud.

During these times of greater employee supply and lesser demand, employers easily solicited efforts from employees. As was the case when quality and price frequently gave way to availability in production decisions during the industrialization period, so too did employers sacrifice the human aspects of the employer-employee relationship during the lean years of the Depression.

Recognizing this problem, emphasis during this time had shifted to attempts at understanding the needs of workers.

WWII (1939-1945)—World War II is the name commonly given to the global conflict of 1939–1945. It is the greatest and most destructive war in history. Whereas military operations in WWI were conducted primarily on the European continent, WWII included gigantic struggles not only in Europe but in Asia, Africa, and the far-reaching islands of the Pacific. More than 17 million members of the armed forces and the belligerents perished during the conflict. Its conduct strained the economic capabilities of the major nations and left many countries on the edge of collapse.

WWII spread death and devastation throughout most of the world to an extent never before experienced. The loss of life can only be generally summarized; an attempt to express the value of property and livelihoods destroyed in terms of money is futile. The resulting sums reach astronomical figures that have little if any practical meaning. The U.S. armed forces total numbers in WWII were estimated at 292,131 battle deaths, 115,187 deaths from other causes, 671,801 wounded and 139,709 captured or missing. In terms of civilian casualties, 146,777 were killed or seriously injured from bombs or artillery fire.

The U.S. budget expenditures from 1940–1945 were $336.7 billion dollars (*Encyclopedia Americana,* vol. 29, 530).

Management Philosophies

The human-relations movement arose in the early 1930s, and no activity better exemplifies this philosophy than the famous Hawthorne studies (1924–32) conducted by Harvard University psychologist Elton Mayo. The Hawthorne studies led to an increased interest in the human problems in the workplace and a refocusing on the human factor of production.

Without question, the most important contribution to the developing field of understanding human behavior in the workplace came out of the Hawthorne studies conducted at the Western Electric Company Works in Cicero, Illinois. The studies started in 1924 but expanded and carried on through the early 1930s. The studies were initially created by Western Electric industrial engineers as a scientific management experiment. They wanted to examine the effect of various illumination levels on worker productivity. Control and experimental groups were established, in accordance with scientific practices. The experimental group was exposed to various lighting intensities, while the control group worked under a constant lighting intensity. Engineers had expected individual output to be directly related to the varying intensities of the light. They found, however, that as the intensity of the light increased for the experimental group, the level of output for both groups had increased. To the surprise of the engineers, as the light level was decreased in the experimental group, productivity continued to increase in both groups. In fact, productivity decrease in the experimental group was observed only when the light was decreased to that of a moonlit night. The engineers concluded that illumination intensity was not directly related to productivity, but they could not explain the results they had observed.

In 1927, the Western Electric engineers asked Harvard professor Elton Mayo and his associates to join the study as consultants. This began a relationship that would last through 1932 and encompass numerous experiments in the redesign of jobs, changes in workday and workweek length, introduction of rest periods, and individual versus group wage plans.

The Hawthorn studies did receive criticism. Attacks were made on procedures, analyses of findings and the conclusions (Robbins, 49). From a historical standpoint, however, it's of little importance whether the studies were scientifically sound or their conclusions justified. What is important is that they stimulated an interest in human behavior in organizations. The Hawthorne studies played a dominant role at the time of changing the perspective that humans were no different than machines, whose sole purpose was to help the organization meet its production goals.

Again, as was the case with the efforts of Frederic Taylor, many followed in Mayo's humanistic footsteps to better understand, describe, and document the intangible human relations of the time. One such person was Mary Parker Follett, who from 1920 to 1933 espoused a basic theory that the fundamental challenge for any organization was to build and maintain dynamic, yet harmonious, human relations within the organization. In 1938, Chester Barnard, another follower of Mayo, effectively integrated traditional management and the behavioral sciences. Barnard viewed the organization as a social structure and stressed the psychosocial aspects of organizations.

This whole period, coupled with the many studies and examinations into human performance in the workplace, spurred the efforts of great thinkers to capture what motivates humans to perform more efficiently and effectively in the workplace.

What motivates individuals to produce? Why is it that what seems to motivate one person does not necessarily motivate another? I remember many times in my career where I said, "Man, if I made that amount of money, I'd work all the hours anyone ever asked," then I did make that amount of money, and it didn't seem enough after a period of time. I remember thinking, "If they would pay me $10 per hour for every hour of overtime worked, I'd work all the hours I could get." But then, after a few weeks of making that kind of money, the money didn't seem so important to me anymore, and I didn't want the hours.

The field of motivation seeks to understand the causation of specific actions. Motivation theorists do not necessarily agree with each other about the cause. For example, take a shooting incident. There may be three different perspectives on the cause for the incident:

1. The shooter had a bursting loose of furious anger, perhaps pent up for many years and originally directed at the parents.
2. The shooter had a history of reinforcement for violent actions. The incident was probably caused by a lack, or absence, of reinforcement at the present time.
3. The shooting incident was a result of reasoned, if not rational decision making. The individual simply decided that people were the cause of his misery.

Motivation may be formally defined as:

The willingness to exert high levels of energy toward organizational goals, conditioned by the effort's ability to satisfy some individual need (Robbins, 50).

Top Motivation Theories—the theories we are going to discuss are identified below.

- Need theories
- Goal setting theory
- Reinforcement theory
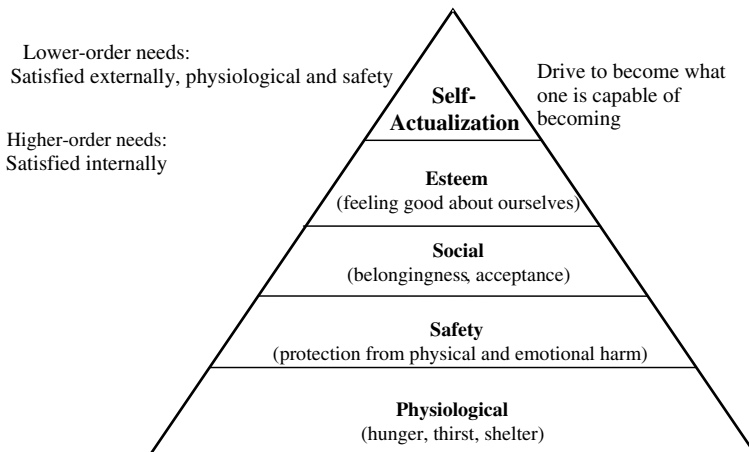- Equity theory
- Expectancy theory

Need Theories

Need theories are designed to explain and predict job satisfaction. In this category there are three theories that we will examine:

1. Maslow's hierarchy
2. Motivation-Hygiene
3. McClelland's need theory

Abraham Maslow (1908–1970) was a humanistic psychologist. Maslow's hierarchy is perhaps the most widely recognized theory of motivation. The hierarchy is depicted below.

Maslow's Hierarchy of Needs

Lower-order needs:
Satisfied externally, physiological and safety

Higher-order needs:
Satisfied internally

Drive to become what one is capable of becoming

Self-Actualization

Esteem
(feeling good about ourselves)

Social
(belongingness, acceptance)

Safety
(protection from physical and emotional harm)

Physiological
(hunger, thirst, shelter)

Maslow's hierarchy assumes that we must pass through each phase before we can begin the next. At any point in time we may fall back to a previous phase, but we must satisfy that phase before we can continue. The theory further says that as each lower-level need is satisfied, it ceases to be a need and the next-higher level need is active.

An excellent example of this is the story of a company president who was trying desperately to build morale and a sense of family in his organization. He had just initiated two kindler and gentler policies, namely, casual dress and 9/80. 9/80 meant that the employee could work 80 hours in nine days and take the tenth day (Friday) off.

The organization, however, was on its third owner in as many years and had seen a reduction in workforce from 8,600 people ten years earlier to about 2,000 people. At that rate, the reduction averaged 660 people per year. In this type of climate the employees were terribly concerned about their jobs and ultimately their long-term well being.

During this time, an employee entered into a discussion with a member of the human resources organization. The employee had bachelor's and master's degrees in engineering and ten years of experience. The employee was nearly in tears when he explained that he was afraid to purchase a new lawn mower for fear he may not have a job.

Aside from the obvious concern this individual was experiencing, he was basically at the physiological level in Maslow's hierarchy. That is, he was concerned about being able to pay the bills and provide basic shelter for his family. The organization's president, on the other hand, was trying to satisfy a need at the social level, that is, he was trying to create a sense of belongingness and acceptance.

The organization's president, on hearing this from the human resources organization, decided to change his upcoming presentation to the employees, to now address the brighter future that he saw by way of the opening up of key markets, and how the organization was going to invest in the technology to allow entry into these markets. The employees unanimously applauded this newly revealed direction, and then the 9/80 and casual dress program had meaning and value.

The Motivation-Hygiene theory was proposed by psychologist Frederick Herzberg in the late 1950s. Believing that an individual's relation to his or her work is a basic one and his or her attitude toward work determines success or failure, Herzberg investigated the question "What do people want from their jobs?"

Herzberg, after significant research, determined that there existed two categories; motivators, which were factors that increased job satisfaction, and hygiene factors, which were factors that eliminated job dissatisfaction. These are depicted below.

Motivators	*Hygiene Factors*
achievement	supervision
recognition	work conditions
work itself	salary
responsibility	relationship with peers
advancement	status
growth	security

Motivators contribute to job satisfaction or no satisfaction. Hygiene factors contribute to job dissatisfaction or no dissatisfaction. Removing dissatisfaction factors does not necessarily make the job satisfying, i.e., making a hygiene factor better does not make us more motivated, it simply makes us less dissatisfied.

According to Dessler (Dessler 408), David McClelland and John Atkinson agree with Herzberg that higher level needs are most important at work. They have studied three needs that they believe are especially important: affiliation, power and achievement.

People who are high in the need for achievement have a predisposition to strive for success. They are highly motivated to obtain the satisfaction that comes from accomplishing a challenging task or goal. They prefer tasks which they have

a reasonable chance of accomplishing, and avoid tasks which are either mundane or too difficult.

People with strong need for power desire to influence others directly by making suggestions, giving their opinions and evaluations, and trying to talk others into things. They enjoy roles requiring persuasion, such as teaching or public speaking, as well as positions such as leaders or clergymen.

An individual's need for power is manifested and visible through an understanding of his/her other needs. For example, a person with a high need for power but a low need for warm supportive relationships might become dictatorial, while one with a high need for relationships might become a clergymen or social worker.

People with a strong need for affiliation are highly motivated to maintain strong, warm relationships with friends and relatives. In meetings they try to establish friendly relationships, often by being agreeable or giving emotional support.

Goal Setting Theory

Goal Setting Theory believes that specific and difficult goals lead to higher levels of performance. Research shows:

- Specific goals increase performance
- Difficult goals, when accepted, result in higher performance than do easy goals
- Feedback leads to higher performance than does non-feedback

Goal Setting theory proposes that an individual's purpose directs his or her actions. An example of this theory is: "do your best" versus "strive for 85 percent or higher." The more quantifiable the goal, the more specific the goal and the more likely the motivation to perform to higher levels.

Reinforcement Theory

Whereas Goal Setting theory proposes that an individual's purpose directs his or her actions, Reinforcement theory believes that behavior is externally caused. That is, if an act is positively reinforced within a reasonable period of time the behavior is more likely to reoccur. In other words, behavior is a function of its consequences.

Reinforcement theory has an impressive record of predicting factors like quality and quantity of work, persistence of effort, absenteeism, tardiness and accident rates. It does offer much insight into employee satisfaction or the decision to quit.

Summarizing Reinforcement theory:

- Behavior is a function of its consequences
- Behavior is environmentally caused
- Ignores the inner state of the individual, focuses solely on the consequences of the action.

Equity Theory

Equity theory was developed by J. Stacy Adams. It proposes that employees perceive what they get from a job as outcomes, in relation to what they put into it (inputs). The employees then compare their inputs-outcomes ratio to other applicable parties.

Equity theory says that the employee can make four referent comparisons:

1. Self inside—an employee's experience in a different position inside his or her current organization
2. Self outside—an employee's experiences outside his or her current organization
3. Other inside—an employee's experience to an individual or group inside the organization
4. Other outside—an employee's experience to an individual or group outside the organization

Below depicts this relationship and summarizes this theory.

Perceived Comparisons

$O/Ia < O/Ib$ Inequity under rewarded

$O/Ia = O/Ib$ Equity

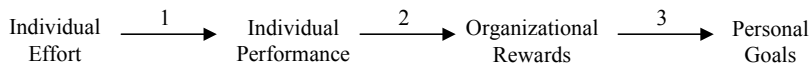$O/Ia > O/Ib$ Inequity over rewarded

Expectancy Theory

Expectancy theory offers the most comprehensive explanation of motivation to date. It was created by Victor Vroom. The theory basically states that the strength of an individual to act in a certain way depends on the strength of an expectation that the act will be followed by a given outcome and on the attractiveness of that outcome to the individual.

Basically it focuses on three relationships:

1. Effort–Performance—probability that exerting a given amount of effort will lead to performance.
2. Performance–Reward—performing at a particular level will lead to a desired outcome
3. Reward–Personal goals—degree to which a reward satisfies a personal goal

Below depicts this relationship.

Expectancy Theory

Individual Effort $\xrightarrow{\quad 1 \quad}$ Individual Performance $\xrightarrow{\quad 2 \quad}$ Organizational Rewards $\xrightarrow{\quad 3 \quad}$ Personal Goals

1 = Effort–Performance Relationship
2 = Performance–Reward Relationship
3 = Reward–Personal Goals Relationship

$$\text{Performance} = f\ (A \times M \times O),$$
Where   A = ability
M = motivation
O= opportunity

Again, the concept is that individual effort will lead to individual performance, which will lead to organizational goals and ultimately personal goals. Performance, however, is a function of the individual's ability, motivation and opportunity. If any one of the three is insufficient, then the individual may not be able to perform satisfactorily enough to merit organizational rewards perceived necessary to achieve personal goals.

A good example of this is where there is a set of identified and documented abilities, skills and knowledge necessary to move into the next-higher job grade. However, there is not the opportunity to fill a job that requires this level of job grade. The individual, therefore, may have all of the necessary personal tools to move up, but simply lacks opportunity. If this condition lasts for a prolonged period of time, the individual may seek other employment because he/she cannot satisfy personal goals. This is a very real challenge in today's flatter organizational models. The solution to this is to provide peer-level, horizontal opportunities which will allow the individual the opportunity for personal growth and financial gain without having to move vertically in the organization.

Organizational Designs

During the human-relations era, an alternative to mechanistic design theory developed and was sustained by the growing interest of behavioral scientists in the study of management and organization. This alternative theory, termed "organic design," proposed that the more effective organization has relatively unspecialized jobs, heterogeneous departments, wide spans of control, and decentralized authority. Such organizational structures, Gibson argues, achieve not only high levels of production and efficiency but also satisfaction, adaptiveness, and development (1988, 526).

The two organizational models, mechanistic and organic, are probably best characterized by their orientations to organizational complexity and their degrees of centralization and formalization. The mechanistic organizational design tends toward highly complex organizations because of its emphasis on the specialization of labor. It is centralized because of its emphasis on authority and accountability, and it is formal because of its emphasis on function as the basis for departments. In contrast, the organic organizational design is relatively simple because of its deemphasis on specialization and its emphasis on increasing job range. It is relatively decentralized because of its emphasis on delegation, authority, and increasing job depth, and it is relatively informal because of its emphasis on product and customer as its basis for departments. The mechanistic and organic organizational models prevailed until the late 1960s.

Gerontological Phase (Late Adulthood)

For purposes of this book, when we refer to gerontological phase we are referring to the scientific study of human development. The scientific study of human development is the science that seeks to understand how and why people change, and how and why they remain the same as they grow older (Berger, 4).

To help individuals to better understand the developmental changes we experience as we grow older, there have been established three domains of human development: biosocial, cognitive and psychosocial.

Biosocial includes all of the growth and changes that occur in a person's body, and the genetic, nutritional and health factors that affect those developments, as

well as motor skills, everything from grasping a rattle to driving a car. Social and cultural factors that affect these areas, such as duration of breastfeeding, education of children with special needs, attitudes about ideal body shape, and health habits that extend or shorten human life, are also part of biosocial development.

Cognitive development includes all the mental processes that are used to obtain knowledge or to become aware of the environment. It can include perception, imagination, judgment, memory and language—the processes people use to think, decide and learn. Education, including the formal curriculum within schools, informal tutoring by family and friends, and the results of individual curiosity and creativity, is also part of this domain.

Psychosocial development includes development of emotions, temperament and social skills. The influences of family, friends, community, culture and the larger society are particularly central to the psychosocial domain. Thus, cultural differences in views concerning the value of children, or in ideas about "appropriate" sex roles, or as regards the ideal family structure are primarily explored in this domain (Berger, 5).

This group of individuals goes by many names: senior citizens, sunset group, the veterans, and the like. All of these names refer to this set of individuals born between 1920 and 1945, which at this writing would be between 59 and 84 years of age.

Let's first define a few terms. Ageism is a term that refers to prejudice against aged individuals. Its effects are similar to racism and sexism, in that ageism reduces opportunities for elder individuals which might not normally be withheld, had they not been classified as such.

Gerontology is the study of the aging process. It is one of the fastest-growing fields of study, especially in light of the large number of boomers quickly moving toward their sunset years. Some gerontologists attempt to draw a distinction between the young-old and the old-old. The young-old are those seniors who make up the large majority of the old. They are generally financially fit, basically healthy and well integrated into their families and communities in which they live. The old-old are those who suffer major physical, mental or social losses and are the most likely to require support in one form or another as they continue to age.

Primary aging entails irreversible changes to living organisms as they grow old. Secondary aging, on the other hand, refers to physical illnesses or conditions that are more common in aging but are caused by health habits, genes and other influences that vary from person to person. Recently, however, there has been significant research which indicates that perhaps primary aging can be slowed or, even more interestingly, reversed. This topic is discussed in more detail in later sections.

As seniors age, their hearts begin to beat more slowly, the arteries begin to harden, the digestive organs become less efficient, the lungs lose capacity, sexual responses become slower, sensory organs begin to slow, and the like. These changes and more take place over many decades. It's not uncommon, for example, for seniors in this age category to have vision problems. Vision diseases in the elderly account for over half the cases of legal blindness in the United States (Berger, 611). As this group ages, the pace of these declines increases.

In fact, the death rate for this age group is significantly higher than that of their younger counterparts in the 8 leading causes of death:

- 9 times more likely to die from heart disease
- 5 times more likely to die from cancer
- 8 times more likely to die from stroke
- 9 times more likely to die from pneumonia/flu
- 7 times more likely to die from diabetes
- 10 times more likely to die from arteriosclerosis

However, this age group is only 2 times more likely to die from accidents and only 2 times more likely to die from suicide.

Cognitive discussion begins with an understanding of our sensory system. The sensory register is a part of our memory system that functions for only a fraction of a second during our sensory processing. It retains a fleeting impression of a stimulus that has just been introduced into one of our sense organs. For example, if a person looks at something for a moment and then closes his/her eyes, the image remains briefly. For further processing, a significant portion of what gets temporarily stored in the sensory register is transferred to our working memory.

As we age, our sensory registers take longer to store sensed stimuli, and once stored they fade more quickly. This, coupled with a general overall decline in our sensory systems (eyes, hearing, touch, etc.), leaves some information not only undetected, but also unregistered. Another effect of aging is that we tend to lose our working memory (it's like the RAM in our computers at home). As well, our short-term and long-term memory begin to diminish with age. As we pass through the decades that compose this period of life, we also experience difficulty in processing multiple simultaneous inputs, i.e., our ability to parallel process is slowed.

At this time in our lives, our decision making begins to slow as we take longer to interpret the data we have in memory. This is caused by the gradual dying off of our brain neurons. Brain neurons do not reproduce—they die throughout our lives, and at an increasing rate after the age of 60. During this time, the brain's communication processing slows noticeably, especially after the age of 50. This causes a general slowing of thought reaction time. As individuals, we can slow the deterioration of the brain by increasing the blood flow to the brain. This can be done by eating the right foods and exercise.

Some studies have shown that antioxidants such as vitamins C and E and replacement of estrogen in women help maintain brain function. In addition, studies of certain individuals who have taken anti-inflammatories such as aspirin and ibuprofen for extended periods show that these medications may have an unexpected side effect: better and longer-sustained cognitive function in old age (Berger, 641).

From a psychosocial perspective, those in late adulthood who are still working, or even retired, usually remain active. Their activities may include volunteering, pursuing additional education or being politically involved.

On the whole, married elders tend to live longer and experience happier and healthier lives than unmarried elders. The single greatest stress for elders is the loss of a spouse. The surviving spouse more likely than not experiences some form of health problem.

One of the biggest problems facing elders, which also has a large potential impact on the families of elders, is their frailty—that is, the elder's inability to care for his/her daily needs.

Cohort Group (Veterans)

It is argued that one of the greatest challenges in our workforce is reconciling varying values, ambitions, views and mind-sets. From a casual reading of this chapter and the next, however, one might argue that there have always been multiple generations in our workforces at the same time. The difference between past and present conditions lies in the type of work that was performed.

In past times, we were an industrialized nation. This directly implies the use of a mechanistic management philosophy coupled with a very structured organizational design. Our styles of management were very much command and control, with significant formality. Most seniors worked in the front offices, whereas middle-aged employees worked in the higher-skilled jobs, and the youngest and most physically fit were relegated to the factory floor. Today, this is not the case in our post-industrial, information-oriented, high-tech, and skill-based society.

Seniors today are living and working longer. According to the U.S. Census 2001 survey, men are living to an average age of 74, while women are living to an average age of 80. That's compared to 66 and 72 in 1950. As a direct result of this longer life span, a number of seniors are staying in the workforce longer. Factors contributing to their retiring later include the following:

- Changes in life expectancy (74 and 80)
- Healthier life styles
- Work is knowledge-based, versus more physically oriented
  work previously
- Technology can be learned by old and young alike

Because of the period in which they matured, veterans have been subjected to significant struggle and strife. The fathers of this age group were most likely impacted in some way by World War I, and individuals in this age group themselves may have been impacted by World War II. The core values of this age group, therefore, might best be summarized as follows:

- Dedication and sacrifice
- Hard work
- Conformity
- A belief in law and order
- Having a respect for authority
- Exercising patience
- Delaying rewards
- Believing in duty before pleasure
- Adherence to rules
- Above all, honor

Events that shaped this age group include:

1927—Lindbergh completes first transatlantic flight
1929—Stock market crashes
1930—U.S. depression deepens
1931—"Star Spangled Banner" becomes the National Anthem
1932—FDR elected
1933—The Dust Bowl

1933—The New Deal
1934—Social Security system established
1937—Hindenburg tragedy
1937—Hitler invades Austria
1940—U.S. prepares for war
1941—Pearl Harbor

Cultural memorabilia for this age group includes:

- Kewpie dolls
- Mickey Mouse
- Flash Gordon
- The golden era of radio
- Wheaties
- Charlie McCarthy
- Tarzan
- Jukeboxes
- *Blondie*
- *The Lone Ranger*

Heroes of this period include:

- Superman
- Franklin Delano Roosevelt
- MacArthur, Patton, Montgomery, Halsey and Eisenhower
- Winston Churchill
- Audie Murphy
- Joe Foss
- Babe Ruth
- Joe DiMaggio

The personality of those individuals in this age group is reflective of the events of this period. These events include World War I, World War II, the industrial economy in general and the type of command and control management style prevalent of the time. Their personalities can be summarized in the following:

- They prefer consistency and uniformity.
- They like things on a grand scale—trains, larger automobiles.
- They are conformers. They learned this from their Boy Scout leaders, drill sergeants and President Roosevelt.
- They believe in logic, not magic. They tend to avoid "personal" conversations. They would rather watch violence on TV than love scenes or sexually explicit content. Some of this, coincidentally, may not necessarily be simply because of the violence they were exposed to in the war, but also because our attention to sexually oriented media in general tends to wan as we chronologically mature.
- This group is very disciplined. They created the term "SNAFU," which stands for "situation normal, all fouled up." They are also more willing to put up with frustrations than their

younger cohorts. They tend to suffer silently, which is why this age group has occasionally been referred to as the "Silents."

- This group tends to be past-oriented and history-absorbed. They tend to look to the past to find successful precedents, i.e., what worked and what didn't.
- They believe in law and order; the chaos of war and thuggery of the depression taught them the value of law and obedience. They also generally favor stricter laws and longer jail sentences as deterrents to crime.
- This group's spending style is generally very conservative. They would rather save and pay cash than use credit. They tend to have strong brand loyalty; in other words they will generally stay in a product line—Chevy to Cadillac, Ford to Lincoln.
- Their preferred reading is *Reader's Digest, USA Today, Time, Wall Street Journal.*

The most enduring workplace legacy of this particular group is likely to be the command and control style of management. This is something most familiar to them, and what they learned from their wartime experiences.

On the job, this age group is tremendously strong. As assets, they:

- Are stable with a stick-to-it mentality
- Are detailed-oriented and generally not afraid to "dig" into it
- Are very thorough
- Are loyal
- Are hard working and tend to value obedience over individualism.
- Gain satisfaction through the work itself, as opposed to any other form of office politicking.

Their liabilities stem directly from their experiences and their desire to be obedient and conforming. Best stated, they seem:

- Awkward with ambiguity and change
- Reluctant to buck the system
- Uncomfortable with conflict

Messages that motivate this particular group include such phrases as "your experience is respected here," "it's valuable to the rest of us to hear what has and hasn't worked in the past" and "your perseverance is valued and will be rewarded."

About this generation, the baby boomers would say "they're dictatorial," "they're rigid and need to learn flexibility and adapt better to change," "they're inhibited," "they're technological dinosaurs," and "they're too narrowly focused." The Xers would say "they're too set in their ways," "jeez, learn how to use your email, man," "they too shall pass," and "they've got all the money." Finally, the Nexters would say "they are trustworthy," "they are good leaders," and "they are brave."

Note that the Nexters, who are the children of the boomers, favor their grandparents more than their parents favor their own parents. Some of the reasons for this might be that the Nexters have really had to grow up with both parents working, more so than any other generation. The grandparents may thus have played a more active role raising or sitting these young individuals.

Key things to think about when recruiting, orienting, providing opportunities for, developing and motivating these people include the following:

Recruiting:
- Use older employees as part-time employees.
- Speak to family, home, patriotism and traditional values.
- Let them know their age and experience are assets.
- Use good grammar. Say please and thank you and avoid profanity. Note also that younger employees seem to be moving in this direction.

Orienting:
- Allow lots of time to orient. This group prefers to know what is expected, what the policies are and who is who.
- Convey the company history. This shows the bigger picture.
- Emphasize long-term departmental and organizational goals. Show them how they will contribute to the long-term strategies of the organization.

Opportunities:
- Stress the long haul, months and years, not weeks.
- If your customers are seniors, then your workforce should be too.
- Keep gender roles in mind. The '60s,'70s and '80s men's and women's lifestyles differ more than any other group. Veteran men die younger and the women often remarry. And men are most likely to be married.

Developing this age group:
- You're likely to need to train this group in the use of current technology.
- This group appreciates logic, but the logic of technology isn't always obvious, as they did not grow up with it.
  - 1 in 10 has a PC at home (Gen X—3 of 10 has one at home)
  - less than 1 in 10 watch videos regularly (Xers—5 in 10)
  - 2 of 10 have ATM cards (Xers—6 of 10)
- Use older trainers. They share a common language, move, talk and think at a common pace.
- Use large print in text materials.
- Once trained, Veterans like to continue their learning. They are very patient and persistent.

Motivating:
- Use a personal touch. They prefer humans to email or voice mail.
- Provide traditional perks—visual symbols of status such as plaques or a photo with the CEO work best.

To reiterate, average life expectancy is quickly approaching 80+ years of age (Bee, 394, Sheehy, 9). This group can expect to live 20–25 years beyond what is traditionally called "retirement." And half of all retirees would prefer to continue to work. A final thought on the fact and fiction of this age group.

Myths	Facts
• They have more accidents and they get sick more often.	• Older persons have fewer on-the-job accidents, and insurance claims by older workers are not different than for all employees.
• They can't learn technology.	• Seniors are willing students when the training is done right (respectfully, with low stress).
• They don't want to work.	• Many retirees say they'd prefer to be working, at least part time.
• They're not as productive as younger employees.	• The U.S. Department of Health and Human Services reports that older workers are every bit as productive as younger ones.
• They're not as bright as their younger counterparts.	• The American Management Association reports that psychologists find that intelligence remains constant until at least age 70.

1945 to 1960

American Economic Circumstances

What do foreign trade zones, free ports, in-bond arrangements, and economic trade zones have in common? What do the European Community, the European Free Trade Association, the Andrean Common Market, and the Afro-Malagasy Economic Union have in common? Each of these groups represents an attempt to organize individual countries to take positive steps to reduce trade and tariff barriers among the participating countries.

As Norman Scarborough points out:

> Agriculture, manufacturing and services account for the majority of jobs in our economy. [As pointed out above], early in American history the United States relied primarily on an agricultural economy. Then, at the turn of the twentieth century, our economic base moved towards manufacturing. Heavy industry,

steel, automobiles, railroads and others became the foundation for our growing nation. But beginning around 1970 the U.S. economy had begun another shift, away from manufacturing and towards services. The U.S. Department of Labor predicts that, of the new jobs created by 1995, 90 percent will be in the service industry. Roughly seventy-seven million people are service industry related workers. Examples of service providers are banks, consulting firms, hotel chains, restaurants and airlines. One challenge for firms in declining industries is to find growth opportunities in the service industries. The shift towards services means that fewer manufacturing jobs are being created. While the number of service jobs are growing rapidly, they tend to be lower paying positions. Having difficulty competing on a global basis, many American firms are becoming "hollow corporations"—farming out the actual manufacturing of their goods to low-cost foreign producers. In addition to losing manufacturing jobs, this trend poses a danger to creating even higher standards of living. Improving productivity, the ratio of output of goods and services to the inputs . . . required to produce them, is essential to reaching higher living standards. The problem is that significant productivity gains are harder to achieve in a service economy (1992, 27).

N. Jonas (1986) states that "the idea that a post-industrial America can become increasingly prosperous as a service-based economy appears to be a dangerous myth." This position of an increasingly lower standard of living, from what we know today, as we shift from an industrial economy to a service-based economy is readily supported by many noted authors. In their book *American Business: A Two Minute Warning,* C. Jackson Grayson and Carla O'Dell make a series of alarming revelations: "(1) U.S. competitiveness is seriously eroding, (2) the international competitive challenges are far greater than most realize, (3) the U.S. response to-date is inadequate to meet the challenges, and (4) not only can the United States lose its world economic leadership, but at the moment it is losing" (1988, 4). Nathan Rosenberg and L. E. Birdzell (1986) also address the wealth of a nation being primarily derived by the value added to its output products, something generally accepted as being only possible in an industrial society.

It should be noted, however, that not everyone agrees that the United States is tending toward a lower standard of living as a result of our reductions in industrialization. John Naisbitt proposes that the United States is not in a decline, and that while it is true we are moving away from an industrial economy, we are moving toward an information economy, not a service economy. Naisbitt suggests that the myth of the United States' decline and the attendant low-wage thesis were promoted by prolabor attempts to unionize industrial workers in 1986 (1990, 26). Naisbitt goes on to suggest that while the middle class is indeed diminishing, it is moving upward, not downward, as many suggest. Further, the poor are not getting poorer; in fact there are fewer poor today than in 1959.

Whether or not the United States will suffer an increasingly lower standard of living, or whether the United States is capable of capitalizing on Naisbitt's proposed information society is an interesting topic that is, however, not within the

scope of this account. Our point is that never before have American businesses been so deeply involved in, and affected by, international trade. Philip Cateora states that "four long term trends are affecting U.S. businesses, small or large, domestic or international. The first trend is the internationalization of U.S. markets; second, interdependence of world economies; third, the emergence of international competitors all over the world; and fourth, the globalization of world markets" (1990, 2).

Korean War (1950–1953)—the war was an armed conflict that began on June 25, 1950, when the forces of the Democratic People's Republic of Korea (North Korea) invaded the Republic of Korea (South Korea). Two days later, on June 27, the United States introduced a resolution in the Security Council of the United Nations urging UN members to contribute such assistance that might be needed to repel the aggressors of Korea. Because the Soviet Union was boycotting the world organization, and hence its delegate was not present to exercise the Soviet Union's right to veto resolutions in the Security Council, the resolution passed. Later that day President Harry Truman announced that he had ordered American air and naval forces to provide combat support to the South Koreans. Three days after that, as the route of the South Korean army continued, he committed American ground forces to the Korean battle zone.

The Korean conflict exacted a heavy toll. The Koreans and the Chinese absorbed the most substantial losses. It was estimated that 520,000 North Koreans, 900,000 Chinese, and 1,300,000 South Koreans were killed or wounded in combat or died of injuries and diseases related to the war. About 1 million South Koreans who died or suffered wounds were South Korean civilians. American dead in the war totaled 54,246 (*Encyclopedia Americana,* Vol. 16, 553).

Management Philosophies

In this changing context, organizational design and management philosophies are attempting to combat these newly perceived international opportunities or threats. The predominant management philosophies of this period are the systems, contingency, and Total Quality Management (TQM) approaches.

The systems approach (late 1960s to early 1970s) to management analyzes how the different elements of a corporation function and operate. This model is based on a simple concept: inputs get processed, which in turn result in outputs. The inputs are from the environment: human, physical, financial, and informational resources. The organization's technology processes these inputs, resulting in products/services, behaviors, and profits/losses. The systems approach provides five useful contributions (Van Fleet 1993):

1. Interaction with the environment is a concept based on the open systems concept.
2. Subsystem interdependency is the realization that systems exist within larger (or outer) systems. A change in the inner system most likely will result in a change to the outer system.
3. Synergy suggests that two people or units can achieve more working together than separately.
4. Entropy, the steady degradation of a system, happens when organizations take a closed system perspective in today's tougher economic times.

5. Equifinality is the idea that two or more paths may lead to the same place.

James Higgins describes the early evolution of the contingency approach:

> Fayol and other early theorists searched for general principles of management that might be applied to all situations. However, while many of these principles worked in most situations, none could be applied to all situations. In the 1970s, it became evident that a manager's actions should be contingent on the various key elements of a given situation. This led to the development of the contingency approach. (1994, 62)

The contingency theory of management is closely tied to the numerous works on leadership styles. Fred E. Fiedler, an early leadership theorist, in 1967 was the first to undertake major research on the contingency approach to management. Until this time, leadership styles had been characterized as either production-oriented or people-oriented. Fiedler found that managers and leaders should exhibit varying degrees of concern for both production and people, depending on three things: the quality of the leader-member relations, the degree to which a task is defined, and the degree of the managers'/leaders' power.

The contingency approach to management argues that the appropriate managerial actions in a situation depend on, or are contingent on, certain major elements of that situation. Proponents believe that there is no one best way to manage; the best way depends on the specific circumstances. Leslie Rue and Lloyd Byars state that "contingency theorists have often gone much further than simply to say 'it all depends.' Many contingency theorists outline in detail the style or approach that works best under certain conditions and circumstances" (1989, 50).

Contingency theory in its purest form would attempt to define all factors in a given situation and prescribe appropriate behaviors. As one might guess, however, there are numerous potential factors in any given situation. Thus the contingency theory of management has evolved into yet another management philosophy, situational management. Situational management involves reviewing the key factors in a situation before determining what action to take.

Total Quality Management (TQM) encompasses the entire spectrum of quality initiatives used in business today. TQM origins actually date back to statistical quality control in the United States in the 1920s and 1930s. Its real emphasis came only after the Japanese implemented its concepts after World War II under the leadership of W. Edwards Deming, a statistician at the Massachusetts Institute of Technology.

TQM relies on a strategic commitment to quality and on employee involvement, materials, methods (processes), and technology to achieve improvements in quality. The starting point for any real TQM effort is a strategic commitment by top management to quality improvements in all aspects of the corporation. A superficial attempt to promote a quality initiative usually leads to unsatisfactory results and can cause more damage to the firm's reputation than if the firm had not initiated the attempt at all.

Employee involvement is also a key characteristic of TQM. Numerous concepts flow from this aspect, including, but not limited to, employee participation, employee empowerment, operational work teams, department quality teams, and quality circles. Regardless of which concepts or terms are employed, the general

underlying principles are to give the employees more information regarding the applicable operations and to support their autonomy in making informed decisions.

Materials are also a part of TQM initiatives, and efforts are made to secure a limited number of highly dependable suppliers of critical components. These suppliers are required to support the daily operations of the firm with materials of superior quality. Quality can also be enhanced through the use of more efficient and effective methods of operation. The concept associated with this effort is to identify the steps in a given process and then reduce or eliminate any unnecessary steps or combine steps. In addition to improvements in material and processes, there are also improvements to be gained from advances in technology. Buying new equipment and investing in automation can provide a higher degree of standardization with fewer defective units.

Organizational Designs

Organizational design during this period has evolved through various levels of organic design. Characteristics of organizations in this period are outlined by Rensis Likert (1967, 197–211):

- Leadership process includes perceived confidence and trust between superiors and subordinates. Subordinates feel free to discuss job problems with their superiors, who in turn solicit their ideas and opinions.
- Motivational process taps a full range of motives through participatory practices. Attitudes are favorable toward the organization and its goals.
- Information flows freely throughout the organization—upward, downward, and laterally. The information is accurate and undistorted.
- Interaction process is open and extensive; both superiors and subordinates are able to affect organizational goals, processes, and activities.
- Decision process occurs at all levels through group processing and is basically decentralized.
- Goal-setting process encourages group involvement in setting high, yet realistic, goals.
- Control process is dispersed throughout the organization and emphasizes self-control and problem solving.
- Performance goals are high and are actively sought by superiors, who recognize the necessity of making a full commitment to developing and training the human resources of the organization.

Contingency organizational design theories simply ask questions as to which of the two primary organizational designs, mechanistic or organic, are suited to a given situation. To answer these questions corporate officials must specify the factors in a situation influencing the relative effectiveness of a particular design (Gibson 1988, 503).

Matrix organizational designs overlay product or project departments on existing functional organizations or departments. Matrix organization designs attempt to

minimize the weaknesses of both the mechanistic and organic designs. Matrix structures are found in organizations that require responses to rapid change in two or more environments, such as technology or markets; face uncertainties that generate high information-processing requirements; and must deal with financial and human resource constraints (Gibson 1988, 518–19).

There are many advantages to the matrix organization: efficient use of resources, flexibility in conditions of change and uncertainty, technical expertise, freeing top management for long-range planning, improving motivation and commitment, and providing opportunities for personal development (520). The differing forms of increasingly greater matrix organizational design include task forces, product teams, product managers, and product management departments.

James Gibson, John Ivancevich, and James Donnelly state, "Organizational design remains an important issue in the management of organizational behavior and effectiveness. . . . organizational design will become even more important . . . strategies that have been effective in the past will prove ineffective in the face of new international competition, technological change, and shifting patterns of industrial development. As organizations experiment with new management theories they will be forced to experiment with new organizational design" (1988, 525).

Process management, as a management philosophy, has evolved most notably in this era of internationalization. Process management crosses over both management philosophy and organizational design concepts, as discussed below.

Process management, as characterized by R. Choyce (1992) and J. Gioia (1992), provides management with:

- A way of thinking systematically about the behavior of people at work in an organizational setting,
- A vocabulary of terms, concepts, theories, and methodologies that allow work experiences to be clearly analyzed, shared, and discussed.
- Techniques for dealing with many of the problems that commonly occur in the work setting.

Process management is not a new concept. Process management originated as part of the production-oriented statistical quality control movement in the late 1920s and early 1930s. What is relatively new, however, is the transition of process management methods from a manufacturing environment to a total company orientation.

Process management is a continuous effort that recognizes that the work done in an organization is accomplished through a series of processes and charges the organization's managers with ensuring that these processes are clearly defined, healthy, and competitive. It is a comprehensive approach whose goal is to increase the effectiveness, efficiency, control, and adaptability of a given organization.

Process management represents a break from some of the traditional concepts of organizational authority (Stinnett 1992). It requires a new way of looking at, and thinking about, long-established assumptions concerning hierarchies and organizational structure. For instance, in a conventional organization it would be most unusual for the vice president or director of one group or division to become directly involved in the activities taking place in another group or division. Because process management involves managing processes across divisional and organizational boundaries, as well as within these boundaries, it requires a more flexible man-

agement strategy. It also requires close cooperation among managers in diverse functional and operational units to ensure that the process flow is not interrupted by conflicts over lines of authority (King 1992).

Process management relies on process definition, elimination of nonvalue-added activities, customer/supplier orientation, and a team approach (Hoban 1992; Price 1992). Process management processes utilizes continuous process improvement (CPI), which assumes that a measurement baseline has been established. Through CPI, the process is measured forever. CPI accounts for error elimination, innovation, and business changes. All activities of a process are questioned; nothing is sacred.

Process management offers organizations a means of applying to non-production-functional organizations the same quality improvement and defect reduction techniques used in manufacturing processes. Many engineering, service, and business processes offer an organization the greatest untapped potential for cost savings through quality and productivity improvement (Welsh 1992). Process management, with its emphasis on business process quality, is the most meaningful way to apply the principle of quality throughout an enterprise (Zells 1992).

Gerontological Phase (Middle Adulthood)

This group of individuals represents the cohort group called the baby boomers. They are far and away the single largest group of people in our workforce today. According to the Government's U.S. Census 2001 data, 27.6 percent of our population fall into this age group, compared to 19.6 percent age 60 and over, 26.5 percent from 20 to 40 years of age and 26.3 percent from 0 to 19 years of age. Collectively, the 35 to 60 age group may account for as much as 34 to 35 percent of our total population.

This can be a trying age group. It's generally around the age of 40 that most people begin to notice that they aren't as young as they once were. Nobody can attest to that more than I. At forty, I required bifocals for the first time. And after I had showed my son how to high jump for middle-school track, he reminded me (while I was still gloating about my best height) that my best height was not even the starting height for middle-school girls. I might add that I was sore for days afterwards. Perhaps others have also noticed how we seem to forget things that we would not have before, such as names, telephone numbers, and where we'd parked the car.

This phase of our lives generally begins the decline of our sensory systems (Berk, 489). Our abilities to hear and see seem to be the first to diminish. Hearing in women begins to show a decline by age 50, while in men it begins much earlier, at age 30. Relative to vision, our eyes lose elasticity, therefore impacting our depth perception and our ability to adapt to darkness. Both of these are noticeable by the age of 50 (Berk, 490).

Our vital body systems show noticeable declines in efficiency. Our heart, lungs, digestive systems and immune systems begin to show declines. Perhaps most noticeable to women and men alike are changes to our sexual reproduction systems. Between the ages of 42 and 58 most women will reach menopause; their menstrual cycle stops, ovulation ceases and levels of estrogen are reduced. In men, sexual responses continue to slow, and it sometimes takes them longer to respond to a given sexual stimulus (Bee, 397).

Cognitively, overall intelligence improves through early middle adulthood, and intelligence remains stable through middle adulthood. Fluid intelligence, our speed of thinking, experiences small decrements which continue through our early 40s. The speed of decrements increases in later middle adulthood. Crystallized intelligence, which is our practical intelligence, continues to improve with experience, education and social interaction through the age of 60.

Relative to our psychosocial development:

- We recognize midlife, which is as many years remaining as have already passed.
- If we haven't already, we tend to reexamine our goals, accomplishments and commitments. This sometimes leads to the infamous mid-life crisis. At one point, a women pointed out to me how many red sport cars were lined up in our middle/senior management parking spaces (translated, 40 to 60 year olds).
- Our family dynamics are frequently unique, in that we have growing children and aging adult parents. This has caused this generation to be coined the "sandwich generation."
- There tends to be a general shift towards self-improvement. By that, we may enroll in classes at the local universities to take piano lessons or cooking and the like.
- There tends to be a gender crossover within this age group. Women become more assertive while men are able to express tenderness or sadness more openly.
- Generally, middle adulthood women are less likely to find another spouse than earlier in life, as there are fewer available men.

Cohort Group (Boomers)

This boomer group was actually named because they represent the largest population of individuals in the current workforce. Their birth years actually span from 1946 to 1964, but, in terms of similar experiences and defining moments, this period of 1943 to 1960 is used (Smith, 42).

This particular group of individuals grew up in much different circumstances than did their parents (Veterans). The last documented war for this group was the Korean War, when the oldest among them was 10 years old. The country had just gone through some of its most difficult times; with WWI, WWII and Korea behind us, there was a pent-up demand for products and services that had never before been seen. During this, our nation experienced its greatest economic expansion to date. Therefore, the environment that this particular group was raised in was one of extreme optimism and positive sentiment. Some of the major events shaping this group include the following:

1954—McCarthy HCUAA hearings began

1955—Salk vaccine was tested on the public

1955—Rosa Parks refused to move to the back of the bus in Montgomery, Alabama

1957—First nuclear power plant was built

1957—Congress passed the Civil Rights Act

1960—Birth control pills were introduced
1960—John F. Kennedy was elected President of the United States
1961—Kennedy established the Peace Corps
1962—Cuban Missile Crisis
1962—John Glenn circled the earth
1963—Martin Lutheran King led a march on Washington, D.C.
1963—John Kennedy was assassinated
1965—Combat troops were sent to Vietnam
1966—National Organization of Women was founded
1967—American Indian movement was founded
1968—Martin Lutheran King and Robert Kennedy were assassinated
1969—First lunar landing
1969—Woodstock
1970—Kent State University shootings

This generation's heroes include the following:

- Gandhi
- Martin Luther King, Jr.
- John and Jacqueline Kennedy
- John Glenn

Boomer cultural memorabilia includes the following:

- *The Ed Sullivan Show*
- Quonset huts
- Fallout shelters
- Poodle skirts and Pop Beads
- Slinkies
- TV dinners
- *The Laugh-In*
- Hula Hoops
- *The Mod Squad*
- The peace sign

This generation, as briefly alluded to earlier, believed wholeheartedly in growth and expansion. They were very optimistic and believed in infinite possibilities. Their sheer numbers required that they understand and deal effectively with teamwork. This group of individuals were basically raised with a traditional perspective of family; in other words, they had a working dad and a stay-at-home mom. Because of the size of this group, they experienced new everything, from hospitals to elementary and high schools (Dychtwald, 68). This whole scenario caused this group to think of themselves as stars of the show. They basically experienced it all—endless growth, prosperity, new everything and only good times.

The boomers were also the first to pursue their own gratification, uncompromisingly. If their marriages didn't work out, then they divorced and found another spouse. If they didn't like their jobs, they found another. If they got caught in a shady deal, they apologized, shed a tear, blamed circumstances, and moved on.

Their core values can be summarized as follows:

- Optimism
- Team orientation
- Personal gratification
- Health and wellness
- Personal growth
- Youthfulness
- Solid work ethic
- Extreme involvement in everything

How does this group differ from their parents?

- Their parents followed traditional roles (male/female ethic)—this group redefined roles and promoted equality.
- Their parents were loyal to their marriages and companies—this group left unfulfilling relationships for more fulfilling ones.
- Their parents were disciplined and patient, waiting for their rewards—this group sought immediate gratification.
- Their parents played by the rules—this group manipulated the rules to meet their own needs.

About halfway through the boomer period were born what is sometimes referred to as the late boomers (Goldberg, 87). These individuals represent about 3 million more babies than in the first half of the boomer period. In fact, this group of late boomers represents the single largest boom segment.

Where the older boomers drive BMWs, the late boomers drive Accords. These two groups also see parenting entirely differently. Earlier boomers were basically workaholics, whereas this later group of boomers saw parenting as being involved and emotional. This later group is predominantly made up of college-educated individuals, as compared to the earlier boomer group. This later group is the Reagan era of boomers. They also were the first group to see the largest corporate downsizings since the Great Depression.

All of this makes the later boomers more cynical and less gung-ho about management than their earlier siblings. They recognize that economics are blind, and firmly believe that hard work and a positive attitude may not always be rewarded. They sometimes feel "here comes another management fad, consultant, reform, reorganization, vision or plan. . ." They would be the first to suggest "this too shall pass."

On the job, earlier boomers are tremendous assets:

- They are service oriented.
- They are driven.
- They are willing to go the extra mile.
- They are good at relationships.
- They want to please.
- They are good team players.

Their liabilities include:

- Not naturally budget minded
- Uncomfortable with conflict

- Reluctant to go against peers
- May put process ahead of result
- Overly sensitive to feedback
- Judgmental of those who see things differently
- Self-centered

Messages that motivate this group of individuals include: "you're important to us," "you're valued here," "your contribution is unique and important," "we need you," and "you're worthy." All of these will stroke this group in accordance with their being the stars of the show.

The boomer leadership style is not that much different than their parents. Boomers grew up in a command and control environment, and as such, have difficulty with listening, understanding another's perspective, communicating, motivating and delegating. They tend to preach participatory management, but find it hard to do.

When recruiting these individuals, let them know their experience is valued. Challenge them to make a difference in your organization. Stress your organization as a warm and humane place to work. Show them where they can excel; after all, this is the group that built this country after the war years. Don't forget to promote the leading-edge nature of your company.

When orienting these individuals to your company discuss the near future of the company. Boomers tend to be future-oriented. And focus on the challenges. This group wants to solve problems and turn things around.

The key items to focus on when thinking about developing this group are:

- strategic planning, budgeting, coaching and soft skills;
- development exercises, as opposed to simple book teaching;
- lots of attaboy's and attagirl's; remember, they like attention;
- reading business books, as they tend to constantly look for ways to get ahead. This is especially true of the early boomers.

When considering motivating techniques for this group, consider giving them lots of public recognition, providing them with material items such as cars, expense accounts, first class travel and the like. Help this group to gain name recognition and most importantly, reward their long hours and solid work ethic.

Current and future issues associated with group include:

- They are the biggest buyers of everything from toothpaste to financial services (Wallace, 82).
- Many of the boomers have a poor savings record. We can therefore expect them to work longer into their senior years.
- This group is the group that instituted most of the policies, procedures and structures that govern organizations today.
- One in ten will turn 50 every 7.5 seconds over the next ten years.
- Work, especially for the later boomers, is slowly slipping down on their list of priorities.

In general, markings of a boomer might include designer glasses, cell phones, whatever's trendy, BMWs, designer suits and/or bodies and vintage wines. Their spending style is generally buy now and pay later—usually with credit cards. They

tend to read *Business Week* and *People* magazine, and their sense of humor is reflected in Doonesbury.

Veterans would say that boomers "talk about things they ought to keep private . . . like the details of their personal lives" and "they are self-absorbed." Gen Xers would say "they're self-righteous," "they're workaholics," "they're too political, always trying to figure out just what to say, to whom and when," "they do a great job of talking the talk, but don't walk the walk," "get outta my face," "lighten up, it's only a job," "what's the management fad this week," and "they're clueless."

The Nexters would say "they're up on the music we like" and "they work too much." Keep in mind the Nexters are the children of the late boomers, and as discussed in the Nexters section, were very much wanted and coddled by their boomer parents.

Myths and facts concerning this group are:

Myths	Facts
• They're on their way out.	• The average age for women is currently at 80 and 74 for men.
• They'll grow up.	• Harley-Davidson sales doubled in the early '90s and the majority of buyers were boomers.
• They've always had it easy; they're assured of a comfortable retirement.	• Boomers have the largest credit card debt of any working current generation. They have on average 20 years left on their mortgages, and they have the largest gap between what they should be saving and what they are saving.
• They've quit learning.	• Enrollment in education programs is up significantly, primarily due to this age group.
• Boomers are workaholics.	• For the past 30 years boomers worked grueling hours. Today boomers are working fewer hours and are committed to a slower pace, especially as they approach 50.

1960 to 1980
American Economic Circumstances

Richard Oliver, in his book *The Coming Biotech Age*, probably best describes the information economy which prevailed most noticeably during this and the next period in American economic history. He presents the following from the perspective of the next economic era, the bio age.

During the last three decades of the twentieth century (although this text shows the information age actually stretching back as far as 1900), it was commonplace to refer to our economy as the information age, and to a whole set of companies in computer, telecommunications, digital electronics, software indus-

tries, and the like as "hi tech." As the value and availability of information grew, it became rather fashionable for commentators to extol the glorious future of these technologies and argue that we are "at the dawn of a new era of information."

They were right for this period. But as we begin the new millennium, it is becoming more evident daily that we are at the end, not the beginning, of the information age. Information is important, and always will be. However, in the coming era, information will be like electricity, cheap and ubiquitous. In this new era, information will be a valuable tool, but only a tool, and one that has receded into the background. Again, like electricity, it will be conspicuous only by its rare absence.

There are three overarching technologies at the heart of today's rapidly maturing information economy. The first is digitalization, or the converting of content, whether voice, data, video or image, into a common digital form that can be sent individually or collectively over a common set of transmission media. The second is software, to manipulate, control and direct the flow of this information. The third is a microprocessor or computer chip, the core driver and storage device for the other two. Essentially, these three technologies rapidly drove down the cost of information, while simultaneously driving up its functionality and ease of use at an equally accelerating pace. Each of these technologies is maturing rapidly. We have the internet, for example, because each of these technologies is maturing, not new.

The basic product life cycle goes through fixed periods generally referred to as introduction, growth, maturity and decline. To say that a product has a life cycle is to assert four things:

1. Products have a limited life.
2. Product sales pass through distinct stages, each posing different challenges, opportunities and problems to the seller.
3. Profits rise and fall at different stages of the product life cycle.
4. Products require different marketing, financial, manufacturing, purchasing, and human resource strategies in each stage of their cycle.

Most discussions of product life cycle portray the sales history of a typical product as following a bell-shaped curve. This curve is typically divided into four stages: introduction, growth, maturity and decline.

1. Introduction—a period of slow sales growth as the product is introduced into the market. Profits are non-existent at this stage because of the heavy expenses incurred with product introduction.
2. Growth—a period of rapid market acceptance and substantial profit improvement.
3. Maturity—a period of a slow-down in sales growth because the product has achieved acceptance by most potential buyers. Profits stabilize or decline because of increased marketing outlays to defend the product against competition.
4. Decline—the period where sales show a downward drift and profits erode.

It is often difficult to identify where each stage begins or ends. Usually the stages are marked where the rates of sales growth or decline become pronounced.

Given that the above product life cycle is applicable to technology, at the end of the technology or product life cycle, the reverse is true. The product is inexpensive, widely available from many suppliers, and advertising messages are about its many uses. Competition among suppliers is on the basis of brand image, typically describing the differences or new, varied uses for the same product.

Despite being only about fifty years old, it is obvious that the core product of the information age, the computer chip, is aging. Everywhere around us the signs of a maturing computer/information economy are obvious. In 1999 the number of chips made for devices other than computers (cell phones, appliances, etc.) exceeded those going into computers. Even now, as computer sales seem to have slumped, every part of life, economic and non-economic, is alive with an abundance of computer power.

The cost of information has also declined rapidly, and is so widely available, that many have been heard to complain that they are drowning in information. Classes, seminars and books are written which help individuals to better deal with the significant information influx. Computers, once scarce and very expensive, are now found in nearly every office and distributed widely across manufacturing floors, controlling functions such as reordering and process flow. The next generation computer is expected to drop well below $800, while the software continues to perform increasingly greater functionality. In fact, even as much as I use my Microsoft Suite of software, I realize that I only really utilize a small fraction of its total capabilities. The capabilities of each software product so much overlap that they are beginning to blur in distinction to each other.

Rather than being hard to find, the microprocessor, and indeed the computer, have become ubiquitous, that is, available from nearly every vendor. And many information services have become nearly free, in that for a nominal fee (about $20 per month) one can gain unlimited access to the wealth of information available through the internet. Along these same lines, long distance telephone connections are now available for about ten cents a minute anywhere in the country. It will probably not be long before a call to anywhere in the world will be considered a local call—after all, I can already communicate anywhere in the world for free through the internet. We will continue to make basic advances in microchip design, making them smaller, lighter in weight, and more powerful in capability and capacity, but all in all, this is simply advancing the basic frontier which has already been discovered. As new science goes, we are building an existing body of knowledge. We have moved from the unknown unknowns, where it was inconceivable to us that such things even existed, through the known unknowns, where we knew about it, but didn't know much about it, to our current state of known knowns, where we not only know about it, but know nearly every aspect of it and how to make it better.

By virtually every definition, then, information technologies and the companies that spawned them are rapidly maturing. Information technologies will continue to be important to the maturing of our society, similar to cars, steel, oil and electricity. But on the basis of availability, cost, use, further development and potential, these technologies and their permutations are not going to be considered what we used to refer to as "hi tech." Information technology is still very exciting, its applications are increasing, and its importance in our lives is unquestioned; however, it is being upstaged by the next economic era, bio economics.

Vietnam (1964–1974)—The Vietnam War, also called the Indochina War or Second Indochina War, may be said to have started in 1957 when communist-led rebels began mounting terrorist attacks against the government of the Republic of Vietnam (South Vietnam). The rebel forces, commonly called Vietcong, were later aided by troops of the Democratic Republic of Vietnam (North Vietnam). American combat personnel were formally committed to the defense of the south in 1965.

An agreement calling for the cease fire was signed in January 1973, and by March the few remaining military personnel were withdrawn. However, the war between the two sides persisted inconclusively for two more years before South Vietnamese resistance suddenly and unexpectedly collapsed. Saigon, the capital of South Vietnam, fell to the communists on April 30, 1975.

By the time of their completed withdrawal in 1973, U.S. forces had participated in the Vietnam conflict longer than any other war. A total of 57,605 Americans had lost their lives in combat, compared with 33,629 in the Korean War. An additional 303,700 U.S. military personnel were wounded in battle. The United States spent an officially acknowledged $165 billion on the Vietnam War; only in WWII were U.S. direct military expenditures higher (*Encyclopedia Americana,* vol. 28, 112).

Management Philosophies and Organizational Designs

The contingency managerial approach as well as the systems managerial approach continued to prevail and evolve through this period.

The contingency organizational model and the matrix model also continued to evolve through this period from the last. In looking at matrix models, however, we can examine permutations of the pure matrix model.

Theorists have devised many ways to partition an organization into sub-units, with the intent of improving efficiency. Additionally, the intent of partitioning an organization is to decentralize authority, responsibility and accountability. The mechanism through which partitioning is accomplished is called "departmentalization." In all cases, the objective is to arrive at an orderly arrangement of interdependent components.

Many basic management courses refer to the three variable formulae below:

Accountability = Authority + Responsibility,

Where

Authority is the power granted to individuals (possibly) by their position in the company, so they can make decisions for other individuals to follow.

Responsibility is the obligation incurred by individuals in their roles in the formal organization in order to effectively perform assignments.

Accountability is being totally answerable for the satisfactory completion of a given assignment.

According to the above formula, they teach us in management school, if you are given any two variables without the third, there is a high probability of some form of failure. Certainly, this seems most obvious when we are given responsibility and held

accountable, but have no formal authority to execute. Likewise, authority and responsibility, without accountability, seems to promote subjectivity in decision making.

In the *traditional organizational structure,* organizational units are based on distinct common specialties, such as engineering, manufacturing and finance. The figure below depicts an example of a traditional organization structure.

There are many advantages to the traditional (functional) structure:

- Easier budgeting and cost control is possible. This is true, for example, because all costs related to the above finance organization are rolled-up to a single functional manager.
- Efficient use of collective experience and facilities.
- Institutional framework for planning and control. Under this type of organizational structure, planning as well as control is administered from a single functional stovepipe at the division level.
- All activities receive benefit from the most advanced technology. In this type of structure, great strength comes from focusing at the top the most state-of-the-art methodologies, technologies and practices, and then disseminating these throughout all organizations utilizing functional resources.
- Allocates resources in anticipation of future business. When using a functional organization structure, the functional manager has responsibility for allocating resources based on immediate needs as well as future needs.
- Effective use of production elements.
- Career continuity and growth for personnel. Under a single functional umbrella, the functional manager can assure that all personnel under that umbrella receive like education and can assure that, for example, more senior personnel are assigned projects with increasingly greater responsibility or visibility, thus aiding in career opportunities and development.
- Well suited for mass production of items.
- Communication channels are vertical and well established.

Example of a Traditional Organizational Structure
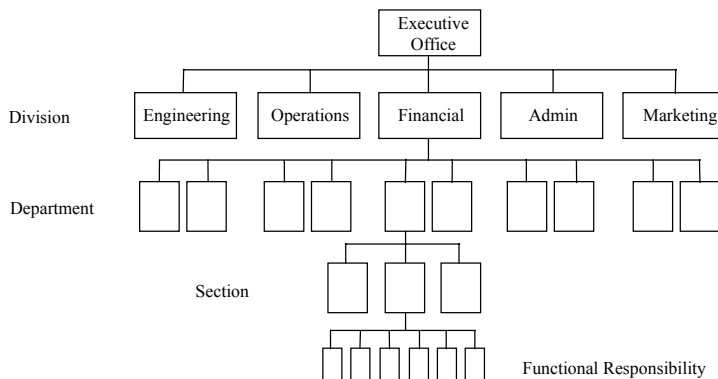
The traditional (functional) organization has many disadvantages as well:

- There is no central project authority. With this type of organizational structure, the many functions simply come together, usually centered around the type of program, and contribute to the accomplishment of the program's goals.
- Little or no project planning or reporting. Without a single program manager to be held accountable for the program's overall tasks, the functional managers simply concern themselves with their functional responsibility, therefore causing potential programmatic concerns.
- Weak interface with the customer, no single focal point. While this may not always be true, the absence of a program manager may cause multiple interfaces through functional managers.
- Poor horizontal communication across functions. Employees whose care and feeding comes from a functional stovepipe will generally take great care to nurture those individuals in that stovepipe who have supervisor control. Naturally, a stronger bond with functional management will occur over interfaces with horizontal functions.
- Difficult to integrate multidisciplinary tasks.
- Tendency of decisions to favor strongest functional group. This is true especially if the functional group is taking the lead on a given program.
- Response to customer needs is slow, primarily because functions are more concerned with functional activities than program activities.
- Ideas tend to be functionally oriented.
- Projects have a tendency to fall behind schedule. This stems from a lack of a single program manager tending to programmatic concerns.

In a *product organizational structure,* distinct operating units are organized around, and given responsibility for, a major product or product line. Below depicts a typical product-oriented structure.

Product organizational structures are centered around major product or brand lines. For example, if an organization produced dish soaps, toothpaste, facial tissue, etc., each might become a product structure and have its own product manager. Worth noting is that other functions are replicated within each product organization. This is discussed further below.
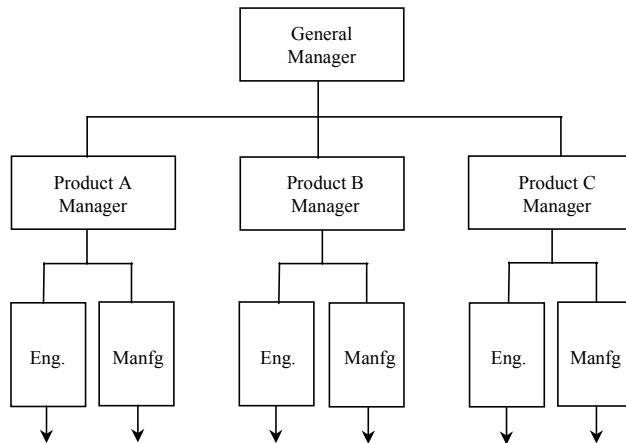
Advantages and disadvantages of this type of organizational structure are discussed below.

Advantages

- Strong control by a single product authority.
- Rapid reaction time. The product manager has all of the resources he/she needs to be successful, and can command these resources in any way required to satisfy the customer's changing needs.
- Encourages performance, schedule and cost tradeoffs.

- Personnel are again loyal to a single individual. Where that individual was the functional manager in the traditional structure, it is the product manager in this type of structure.
- Interfaces well with outside units. Here a single product manager is given primary responsibility for interfacing with other units, both externally and internally.
- Good interface with customer.
- Strong communication channels. It helps in this type of structure that all employees have a common goal; to produce a single product or brand of product. This builds a unified allegiance to a single cause.

Product Organizational Structure

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                        ┌─────────────┐
                        │   General   │
                        │   Manager   │
                        └─────────────┘
                               │
        ┌──────────────────────┼──────────────────────┐
  ┌─────────────┐        ┌─────────────┐        ┌─────────────┐
  │  Product A  │        │  Product B  │        │  Product C  │
  │   Manager   │        │   Manager   │        │   Manager   │
  └─────────────┘        └─────────────┘        └─────────────┘
      │     │                │     │                │     │
   ┌────┐ ┌─────┐         ┌────┐ ┌─────┐         ┌────┐ ┌─────┐
   │Eng.│ │Manfg│         │Eng.│ │Manfg│         │Eng.│ │Manfg│
   └────┘ └─────┘         └────┘ └─────┘         └────┘ └─────┘
     ↓      ↓               ↓      ↓               ↓      ↓
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Disadvantages

- Inefficient use of resources; duplication of effort. This may be the single greatest argument against this type of organizational structure. The fact that, in the above example, engineering, finance, etc., are duplicated for every product line implies full-time employees are being used where only part-time employees may be required.
- Does not develop strong functional technology. Single individuals performing a single function on the product do not have the time or the breadth of exposure to see what the latest and greatest methodologies, techniques and practices may be.
- Does not prepare for future business. Without functional oversight, the entire product organization is focused on design, development and delivery of a single product or brand. If greater vision does exist, it typically is limited to similar, or like, products.
- Less opportunity for technical interchange among projects.

- Minimal career opportunity and continuity for project person-
  nel. In other words, there may be limited growth potential.
- Difficulty in balancing work loads as projects phase in and out.
  Individuals may not have work in a particular time frame, but
  must be kept busy doing something until that specific type of
  function is again in demand.

The *matrix structure* is a hybrid organization that attempts to balance the use
of human resources as people are shifted from one project to another. It can be
viewed as a project organization superimposed over a functional organization. Be-
low is an example of a typical matrix organizational structure.

Matrix Organizational Structure
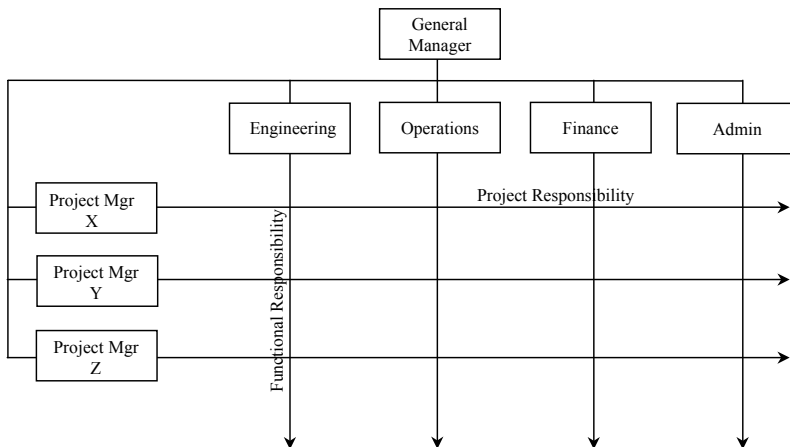
The matrix structure is more complex than either the traditional or product-
oriented structures. To this end, it requires some basic ground rules to be success-
ful.

- Participants must spend committed time on a project; this en-
  sures a degree of loyalty.
- Horizontal as well as vertical channels must exist for making
  decisions.
- There must be quick and effective methods for conflict resolu-
  tions.
- There must be good communication channels between managers.
- All managers must have input into the planning process.
- Both horizontal and vertical managers must be willing to nego-
  tiate for resources.
- Horizontal line must be willing to operate as a separate entity
  except for administrative purposes.

Project management is more behavioral than quantitative. Interpersonal and
communicative skills are extremely important attributes of the project manager.

In a matrix organizational structure:

- There should, ideally, be no disruption due to dual accountability.
- A difference in functional management judgment should not delay work in progress.

Advantages:

- Combines the strengths of both project and functional organizations.
- Provides a good interface with the outside customer.
- Promotes effective interdisciplinary task integration.
- Promotes an efficient use of production resources.
- Promotes effective project control, as programmatic concerns are assigned to a single individual.
- Promotes career continuity and professional growth, as each functional individual has a home after project completion.
- Perpetuates technology. By this, functional resources gain the benefit of a functional strength, which can be transferred to the program of the day.
- Functional knowledge is available for all projects on an equal basis.

Disadvantages:

- Dual accountability of personnel. This is perhaps the biggest threat to this type of structure. Personnel will generally favor whoever it is that performs their performance review and subsequently has control over their income adjustments. Confusion here can derail a unified effort.
- Conflicts between project and functional managers. This issue will be discussed in more detail below.
- Profit and loss accountability is more difficult.
- There are continuously changing priorities, especially on the part of the functional managers, who control the resources.
- The balance of power between functional and project managers must be watched. Later we discuss their respective perspectives of what is important.
- Functional managers might be biased towards their own priorities.
- Because of the duality of authority, employees may not feel a strong commitment to a single source.
- Employees may feel confused about loyalty.

Project managers have different concerns than do functional managers. A project manager is concerned with:

- What is to be done
- When will the task be done
- What is the importance of the task
- How much money is available to do the task
- How well has the total project been done

The functional manager, on the other hand, has a more hands-on concern, as listed below.

- How will the task be done
- Where will the task be done
- Who will do the task
- How well has the functional input been integrated into the project

The *project management structure* attempts to further organize the project/functional (matrix) structure by providing a single point of authority, responsibility and accountability for all projects, in much the same manner as a functional manager.

Below depicts the typical project management structure.

Example of a Project Management Organizational Structure
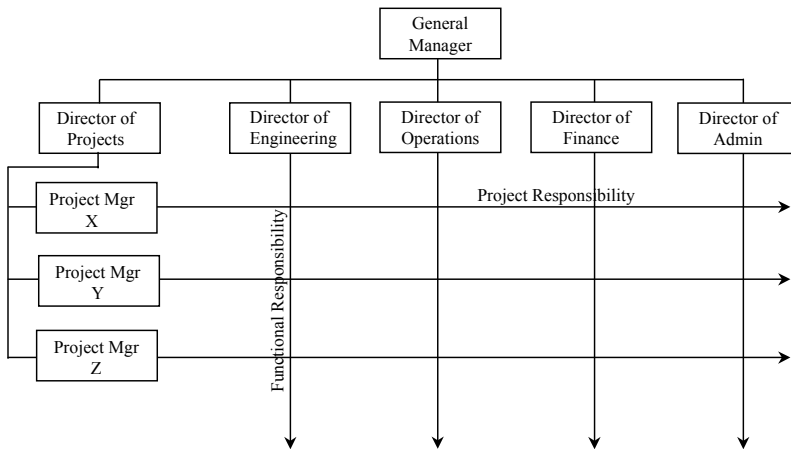
The advantages and disadvantages of this form of organizational structure are listed below.

Advantages

- Better overall control of projects. A single Director of Projects can work with the numerous project managers to ensure uniformity in execution.
- More consistent customer relations.
- Better overall project visibility. The director of projects can ensure that all programs report the same information in the same manner.
- Improved coordination among company divisions.
- Accelerated development of managers due to breadth of project responsibility.

Disadvantages

- May be too much shifting of personnel from one project to another.

- May be potential conflict with functional managers. The conflict should be less between the individual functional managers and the director of projects than between the individual functional managers and the individual program managers.
- Functional managers may resist taking direction from a Director of Projects because to do so would imply an admission that the project manager might be next in line to the division manager.

Criteria for Selecting an Organizational Structure—When looking at the reasons why an organization might select one form of organization versus another, three points are applicable:

1. Technology—Functional organizations tend to have greater process and technology focuses.
2. Communications—Traditional and Product organizational structures tend to provide clearer communication paths.
3. Responsibility—Product structures very clearly identifies the responsible party; matrix structures are not as clear.

Concluding Remarks—Just to summarize in a few remarks in hopes of providing additional guidance:

- No single structure is optimal for all organizations.
- Organizational structure may, and will, change to meet changing requirements.
- There is no such thing as a good or bad organizational structure, there are only appropriate and inappropriate ones.

Gerontological Phase (Early Adulthood)

In this age group of 20 to 40 year olds, we begin to experience what is referred to as senescence. Senescence is the state of physical decline in which the body gradually becomes less strong and less efficient with age.

In males, boys typically reach their maximum height by age 18, whereas girls may reach their maximum height by age 16. Our body systems are at optimum levels of efficiency in early adulthood. Our digestive system, respiratory, circulatory and sexual-reproductive systems are all functioning at optimum capacity. During this period, however, collagen, connective tissue in the body, begins to decrease. The result of this is more wrinkles and generally thinner skin. Our lung capacity tends to begin to drop. It drops at about 5 percent per year beginning around age 20. As well, our eyes begin to change and our hearing becomes more sensitive to changes.

Homeostasis refers to the adjustment of the body's systems to keep physiological functions in a state of equilibrium. As the body ages, it takes longer for these homeostatic adjustments to occur, making it harder for older bodies to adapt to stresses. For example, when we are active, our breathing and heart rate increase to bring more oxygen to our cells. As we age, these systems become strained to reach comparable levels as when we were younger. As we age, we are also less capable of recovering from a poor night's sleep, and it's more difficult to bounce back from a previous day's heavy exertion.

In terms of our sexual-reproductive systems, one study found that sexual intercourse generally occurs about 12 times per month at age 20; about 7 times per month at age 40 and about 1 time per month at age 70. As men age, they require more explicit and prolonged stimulation to initiate sexual excitement. As women age, they are more likely, rather than less likely, to become aroused and experience orgasm during love-making. This may very well be attributed to the male's slowing responses, which creates a longer period of female stimulation, which many women need to reach orgasmic plateaus.

Relative to cognitive development, with age comes experience and opportunity for advanced education. Experience and advanced education provide the framework for making more informed decisions. In general, college educated people tend to be less threatened by conflicting views. Maturity also decreases our requirement for absolute truths, and acknowledges the relativity of each situation. Our continued learning heightens our cognitive development, especially during this phase.

In terms of psychosocial development, there is a strong need for affiliation during this generational phase. Friendships are important, especially to single individuals. It is worth noting that marriage success is directly related to our age on first marriage. Between 20 and 30 years of age, 60 percent of the men and 46 percent of the women have never been married. Between 20 and 30 years of age, 3 percent of the men and 5 percent of the women are divorced and not yet remarried. There is a strong need for achievement during this age group. This age group's achievement may be satisfied by either parenthood or work. This age group expects several job changes over their working lifetime, and this group recognizes the need for continual learning.

Cohort Group (Xers)

The generation Xers are those individuals who today range from 21 to 41 years of age and are the children of the boomers. The parents of these children were the movers and shakers who helped our nation to evolve economically, socially and in every other manner. These children, therefore, grew up in their shadow. There are considerably fewer Xers than boomers, 51 million versus 76 million. This group received many economic luxuries, but they have also seen many negative events in their time. Their circumstances caused this group to develop a "survivor mentality." In other words, "just tell me if it's going to be on the test."

Defining moments for this group include:

> 1970—Women's liberation protests and demonstrations
> 1972—Arab terrorists at Munich Olympics
> 1973—Watergate scandal
> 1973—Energy crisis began
> 1976—Tandy and Apple marketed PCs
> 1978—Mass suicide in Jonestown
> 1979—Three Mile Island nuclear reactor accident
> 1979—U.S. corporations began massive layoffs
> 1979—Iran held 66 Americans hostage
> 1980—John Lennon was shot and killed
> 1980—Ronald Reagan inaugurated

1986—Challenger disaster
1987—Stock market plummeted
1988—Terrorist bomb blew up flight 103 over Lockerbie
1989—Exxon Valdez oil tanker spill
1989—Fall of Berlin Wall
1991—Operation Desert Storm
1992—Rodney King beating videotaped, L.A. riots

Generally speaking, when looking at the events which shaped this group's life, most are somewhat negative, leaving an impression quite different from that which their boomer parents grew up with.

In determining how to tell a Xer from a boomer, ask the question, "Where were you when John F. Kennedy was shot?" If they can remember, then they are probably a boomer; if not, then they are most likely more in the Xer age group.

The generation Xer's heroes list is short, namely, none.

Cultural memorabilia indicative of this age group includes:

- *The Brady Bunch*
- Pet Rocks
- Platform shoes
- *The Simpsons*
- *Dynasty*
- *ET*
- Cabbage Patch dolls

Their core values would include:

- Diversity
- Thinking globally
- Balance—as they have seen their parents working endless hours, only to be, perhaps, downsized
- Techno-literacy—this group has seen it all, technologically speaking
- Fun
- Informality
- Self-reliance
- Pragmatism

In terms of generational personality, this group is very self-reliant. Remember, nearly half of their parents' marriages ended in divorce (Santrock, 407). This group, therefore, grew up with joint custody, visitation rights and weekend parents. With this self-reliance and independence came maturity. The earlier we assume responsibilities, the sooner we are required to learn about things that we might not normally get an opportunity to learn, and therefore, the sooner we must mature. Those that do not mature as required to handle this new level of independence usually end up in some form of trouble.

This was the first generation with a predominance of two-income families. A result of this is what has been coined "latchkey" kids. These are children who come home after school, let themselves in the house and begin doing whatever they do until their parents get home from work. They are accustomed to being

alone. The result of their parents coming home late from work and pulling dinner together in the last minute is that less time is available for quality time.

This group is seeking a sense of family. They tend to have a close group of friends in lieu of a close supportive family. They also would like a sense of balance in their lives. They have seen their workaholic parents bringing work home and expending vast amounts of energy on work related issues, only to be not fully appreciated by their companies, and perhaps even laid off. Where their parents lived to work, this generation would prefer to work to live.

This generation also appears to have a non-traditional orientation to time and space. It doesn't matter to them how and when work gets done, as long as it gets done. They may even show up late to work or leave early, still getting the work done, but being very focused. This has caused some to label this generation as slackers.

This generation prefers informality. They believe their parents are too serious and need to lighten up. They prefer to wear jeans and T-shirts to work, they feel more comfortable and productive. Anything that makes work less "corporate" is good. For example, Ben & Jerry's has a "Chief Fun Officer," known as the Grand Poobah.

The Xer approach to authority is very casual. They're not against authority; they are simply not impressed with it. In their lifetimes, they have seen presidents, politicians and reverends all fall from their respective graces. A story in a book I read talked about a new young Generation Xer who was walking into work with the corporate CEO. On inquiring where the CEO lived, the new young Xer suggested that perhaps the two of them could carpool to work.

Xers tend to be skeptical. They are careful with their loyalties and commitments. They've seen individuals, as indicated above, fall from grace and social contracts change. With all of this, they recognize that there are no guarantees. They've learned that perhaps the only constant in life is change.

Xers tend to be attracted to the edge. At work, their job is just their job. But in their personal lives, they are attracted to higher-risk activities. In fact, on television there are "sporting" events under the nomenclature of The X-Games. I was watching one such exhibition the other day. Individuals would ride their bicycles down a ski slope and while air-borne would perform death-defying tricks, just prior to landing on the snow below. This was so new to me that I couldn't help but watch for a while. I also couldn't help but wonder why anyone would do such a thing. A common trick appeared to be removing their hands at the peak of their jump and ultimately landing with no hands on their handlebars. Those that survived and landed successfully were applauded endlessly. Those that crashed and ended up in a pile at the bottom of the snow slope still got rounds of applause, but also received some level of pain. One individual, according to the announcer, had broken over 360 bones in his body, as if this were something to be proud of.

This group is also very technologically savvy. They generally have excellent computer skills, are familiar with high-tech games and understand easily how to program their VCRs.

On the job, their assets are that they are adaptable, techno-literate, independent, unintimidated by authority and creative. Their liabilities are that they are impatient, have poor people skills, are inexperienced and tend to be cynical. Worth noting, however, is that 80 percent of all new businesses over the last three years were started by this generation of individuals.

The Generation Xer leadership style is one of being skilled at supporting and developing a competent team who can change direction quickly. They are used to being challenged. They tend to ask "why" frequently. They are fair, competent and straightforward. In fact, sometimes they are to honest, especially on performance review of others. This suggests that they could be a little more feeling.

In terms of recruiting this generation:

- Let them know your company has fun.
- Stress that their ideas are evaluated on their merit, not their seniority.
- If the organization is undergoing change, let them know; they tend to see opportunity in change.
- They prefer a relaxed environment, not necessarily a warm or humane one.
- Stress technological innovation as being important.
- Stress hands-off management, i.e., let them know you do not micromanage.

In terms of orienting this generation as new hires, show them your website, let them take it for a spin. Provide a list of people they may call if they have any questions. Let them know you want them to have fun.

Relative to opportunities, this generation tends to look out for No. 1, and realize that nothing is forever. They are self-reliant, which implies you should give them plenty of freedom. They tend to find satisfaction in moving horizontally as opposed to vertically. They like to be trained. And they perceive their value to be in their skills, not their politics.

In terms of developing this generation, training and development are absolutely essential from their perspective. They are self-learners and prefer brief and multiple stimuli. As an employer, always promote the value of learning to this group. They tend to like leaving every day knowing more than when they arrived.

When mentoring this group, suggest that office politics are a way of getting around the rules, not an essential element of moving in the organization. Xers like mentors. Mentors are sort of like surrogate parents to this group. Xers like to be challenged to find alternative solutions to a given problem. Use them in this capacity whenever possible.

What others have to say about this generation:

Veterans:

- They're not educated
- They don't respect experience
- They don't follow procedures
- They don't know what hard work is

Boomers:

- They're slackers
- They're rude and lack social skills
- They're always doing things their own way
- They spend too much time on the internet and email
- They won't wait their turn

Nexters:

- Cheer up! It's not so bad.

Markings of this generation include nose rings, navel rings, functional clothing, tattoos and Japanese cars. Their spending style is generally cautious and conservative. They read such material as *Spin* and *Wired* and spend time in chat room dialogue. *Dilbert* is typical of this generation's humor.

Facts and fiction associated with this group:

Myths	Facts
• They're materialistic.	• Many are struggling to make ends meet. This is the first generation which may not be able to improve on their parent's lifestyle. Many simply want to get out of debt.
• They're whiners.	• They face real challenges; college loans, health care costs, etc.
• They have a "you owe me" attitude.	• No more so than other generations.
• They're not willing to work hard.	• This group is willing to work very hard. They are simply not willing to work 70 hours for 40 hours of pay. They want a life outside of work.
• They're living on easy street.	• In 1950, the average monthly mortgage payment was 14 percent of adjusted household income. Today, it is 40 percent of adjusted household income. If you are over 60 years of age you will get back $200 for every $100 put into Social Security; Gen Xers will lose more than $100 for every $450 contributed.

1980 to Present

American Economic Circumstances

While it is quite clear that information technologies increasingly became the major economic engine of the past five decades, a whole new set of technologies, biology and advanced materials, are poised to become the new engine expanding and driving our economy, as the following news stories demonstrate.

USA Today, May 25, 1999, "Of Transgenic Mice and Men"—in 1980 genetics in general and mouse genetics in particular took a leap forward when researchers at Yale transplanted foreign genes into mice. Jon Gordon, Mount Sinai School of Medicine, injected genetic material from two viruses into freshly fertilized mouse

embryos fixed under a microscope. The genes he inserted originally took root only in a small percentage of mice. But scientist have perfected the process with new tricks, chiefly including "promoters" to tell the new genes to turn on. How do scientist create transgenic mice?

1. First researchers isolate a gene they want to study. Typically they find the gene exists in many members of the family with the same illness, such as breast cancer, but not in healthy people. To find out what the gene does they place it inside a mouse via the transgenic procedure.
2. To gather eggs for the transgenic procedure, researchers feed fertility drugs to a female mouse, causing her to ovulate large numbers of eggs.
3. The researchers inject the isolated human gene into the mouse eggs. The eggs are fertilized with sperm taken from male mice and conception occurs.
4. A mouse host mother received the transgenic embryos in which the foreign gene has slipped into the normal mouse genetic package.
5. The mouse mother gives birth to transgenic offspring.

Fort Wayne, Indiana, *News Sentinel,* April 27, 2000, "Cloned Cows Show No Signs of Premature Aging"—". . . they look like regular cows, but they harbor a secret: put their cells under a microscope and they look astoundingly young. Massachusetts scientists have cloned six cows that are causing a stir because their cells show none of the worrisome premature aging that researchers previously found in Dolly the cloned sheep. The finding could ease fears that cloned cells age too fast to be useful against diseases."

In fact, the cloned cows have cells that appear as young as those of newborn calves. Unlike Dolly, the cows were cloned from cells nearing the end of their lifespan. If even old cells can have their aging clock rewound, then scientists might be able one day to clone customized replacement tissues for patients suffering from diabetes, Parkinson's or other diseases.

Time, May 22, 2000, "Economy"—". . . get ready for the bioeconomy which will supplant our infoeconomy. Bioeconomy will give new meaning to the smell of money."

Best known are the dozens of bioengineered drugs already on the market. Most of these save lives by treating existing problems. One of the biggest shifts in biotech in the decades to come will be the way it transforms the healthcare paradigm from treatment to prediction and prevention. Health care today is really sick care. The sick-care business model made money by filling hospital beds. Currently, we're in the managed care model. It is transitional, lasting one or two decades. Here, you make money by emptying beds. In the bioeconomy, health care will work on a preventive model, making money by helping people to avoid having to enter a hospital in the first place.

Problems will spread as much as benefits do. Each era produces its own dark side. The industrial era was accompanied by pollution and environmental deregulation. The major problem of the information age is privacy. In the bioeconomy, the

issue will be ethics. Cloning, bioengineered foods, eugenics, and genetic patenting are just a few of the many developments that are just beginning to create a storm.

All of this will make baby boomers a unique generation. They will be the first to span three unique economies. Born at the end of the industrial period, they will spend their entire careers in the information age and will end their days watching their grandchildren negotiate the bioeconomy.

Generation Xers will be different. During their working years, they will experience two major economic shifts: first, from the crunching to the connecting halves of this information economy, and second, from a microwave-based connected universe to a cell-based world of biologic and bionomics. Those in generation Y (Nexters) may have to go through three.

Money, September 2000, "Everyone into the Gene Pool"—"You won't find many beakers and Bunson burners in J. Craig Venter's labs, where 50 scientists recently sequenced 3.12 billion letters of the human genetic code. Instead, Celera Genomics, with its Star Trek-like command center, used supercomputers and robotic instruments to do the job. It took Venter's crew nine months and an estimated $200 million. He notes that a competing effort led by the U.S. Government was supposed to cost more than $3 billion and take 15 years."

". . . investors are waiting to see if the company can make money as a for-profit library of gene information. So far its customers include Amgen, Immunex, Pfizer, Harvard and the Australian Government. Celera is also considering mining its own data to develop cancer vaccines."

Popular Mechanics, October 2000, "Can We Achieve Immortality?"—"Cancer cells share a similar characteristic, they are immortal. Not so for healthy cells, where a kind of timer built into the end of chromosomes limits the number of times a cell can replicate itself. These timers are called telemeres. Think of them as the plastic caps on the ends of shoelaces that prevent the lace from unraveling. Each time a cell reproduces, a tiny bit of the telemere is knocked off. When it is gone, the cell stops dividing. With 46 chromosomes, humans have 92 of these life-span clocks.

This is the cancer connection. One of the enzymes found in 90 percent of cancer cells is a compound called telemerase. It replaces the bit of telemere clipped off after each cell division. If telemerase production can be turned on in normal cells, it seems reasonable that normal cells could become immortal. Experimental work done by the University of Texas South-Western Medical Center and Geron, a California biotechnology company, has confirmed this does indeed occur.

Normally cells stop dividing about their 70th generation. Telemerase activated cells are now up to over 100 population doublings, and there is no evidence that they will slow down soon. And, perhaps most importantly, although the telemerase production has been turned on long enough for the telemeres to grow to their original length, there is no indication that the cells have become cancerous.

Interfering with telemerase production can also be effective when combating cancer, by depriving cancer cells that remain after conventional treatment of their immortality. Earlier this year, lab mice with cancer successfully underwent this treatment using a synthetic anti-telemerase inhibitor. Over time, it is believed that this will have a significant effect on our health and our lifespans."

Discover, October 2000, "Killer Bees, Injected with Rottweiler Genes to Emit a Tiny Bark that Chases Insect Pests from Crops? Don't Bet Against It"—"The bio-geniuses at SuiteSciences Incorporated titillated show attendees with their perpet-ual chewing gum, a super secret formula reportedly combining the fundamental genetic codes of sugar, peppermint, and latex rubber for locked-in flavor and rumi-nant pleasure limited strictly by the durability of the chewer's jaw bone."

But that's not the only surprise about to spring from the soil. Anyone for deco-rator zucchini? Bio-Martha Labs, a division of Martha Stewart Incorporated, has just bio-designed a whole new line of that once dowdy fruit in polka-dot plaid and Harris tweed turning any ho-hum forty acres into a tasteful riot of colors and pat-terns.

The Journal-Gazette, November 6, 2000, "Scientists find there is life after death in stem cells"—"Scientists have coaxed new life out of dead brains."

It turns out that even cadavers can supply the incredible versatile brain stem cells, master cells that can turn into different kinds of brain and nerve cells, once thought to be available only from fetal tissue.

So can skin. And it appears that just about every bone stem cell can be tweaked to produce brain cells.

New Scientist, October 14, 2000, "Raising the Dead: Extinction Needn't Be the End of the Line"—An extinct species could soon be brought back from the dead. Advanced cell technology at Worcester, Massachusetts, plans to clone the bucardo, a species of Spanish mountain goat that died out earlier this year.

The company has already shown that it can be done by cloning a wild ox called a guar using the eggs of domestic cows. When "Noah" is born next month, he will be the first animal ever created by putting the DNA of one species into the eggs of another.

The Spanish mountain goats will be cloned using tissue samples from the last surviving female, which was killed in January by a falling tree. But all the animals created this way will be female. Chromosomes from closely related species would be needed to create male goats.

The lack of diversity among clones of a single animal could be another prob-lem. If you produce lots of animals that are identical, you get inbreeding. They can't adapt to stresses, which is what evolution is about and why you need biologi-cal diversity.

Time, February 19, 2001, "Renegade scientists say they are ready to start applying the technology of cloning to human beings. Can they really do it, and how scary would that be?"—Author Nancy Gibbs invokes a number of debatable questions:

1. What if a child dies and one parent wants to clone but the other doesn't? Who owns the right to a dead person's DNA?
2. What if people don't want to be cloned after they die? Will they be able to insert a do-not-clone clause in their will?
3. What if it becomes acceptable to clone a person once? What about 10 times? One hundred?
4. What if cloning becomes popular and supplants natural selec-tion? Will that skew the course of human evolution?

5.   What if a clone develops unforeseen abnormalities? Could he sue his parents or the cloners—for wrongful birth?

In the same article is a detailed account on how to clone a human being. The steps are detailed below.

1.   Doctors harvest up to 15 eggs each from up to 40 donors who have injected with fertility drugs. About 400 eggs are produced.
2.   Cells are taken from the male cloning candidate.
3.   The nucleus of each egg is sucked out with a fine needle. Then the DNA-free eggs and the donor cells are placed next to each other and zapped with electricity, which causes them to fuse. Some of the rebuilt eggs divide to form embryos.
4.   Because embryos often fail to implant, each surrogate mother gets many eggs at once. Even so, up to 50 surrogates could be needed (not necessarily all at once) to ensure nine or ten pregnancies. Of course, most will terminate early by miscarriage or by abortion when abnormalities are found. The single viable baby may be normal, or maybe not.

From a Time/CNN poll taken by telephone on February 7 and 8:

- 67% felt it was a bad idea to clone animals such as sheep.
- 90% felt it was a bad idea to clone human beings.
- 34% felt their main reason against cloning was religious beliefs.
- 22% felt their main reason against cloning was it interfered with human distinctiveness.
- 22% felt their main reason against cloning was it may be used for questionable purposes like breeding a superior race.
- 14% felt their main reason against cloning was the technology was dangerous.
- 68% felt cloning was justified to create vital organs to save other human beings.
- 74% felt cloning was justified to save the life of the person being cloned.
- 76% felt cloning was justified to help infertile couples to have children.
- 88% felt cloning was justified to allow parents to have a twin child later.
- 88% felt cloning was justified to allow parents to create a clone of a child they lost.
- 86% felt cloning was justified to allow gay couples to have children.
- 92% felt cloning was justified to create genetically superior human beings.
- 93% said that they would clone themselves if they had a chance.

Forbes, April 26, 2004, "The Immortal Pill"—Lipitor, with $9.2 billion in sales, the best-selling drug in the world, loses patent protection in six years, threatening the single most important business of drugmaker Pfizer. Its answer: Combine Lipitor with a powerful new drug in the hope of getting an even bigger impact. The

new compound, torcetrapib, is aimed at reducing heart attacks far more than the one third or so seen with Lipitor alone. It is the first in a wave of drugs aimed at raising the good cholesterol, or HDL, the protein that helps truck chunks of cholesterol away from the arteries. Pfizer is spending a staggering $800 million putting the combo pill through final-stage trials in a hell-bent effort to show it prevents both plaque buildup and heart disease deaths.

Fortune, June 14, 2004, "This Man Would Have You Live a Really, Really, Really, Really Long Time"—If a mouse can survive the equivalent of 180 years, why not us? Or our kids? Scientific provocateur Aubrey de Grey has a plan.

Jet-lagged and wide awake at 4:00 a.m., the British scientist posed himself a simple question: "What would it take to bioengineer a nonaging human?" It seemed that only seven things had to be prevented, mainly toxic byproducts of metabolism that accumulate in the body over time. De Grey's vision is arguably no wilder than, say, predicting in 1950 that some decades thence we'd create goats that make spider milk. (In case you haven't heard, goats implanted with spider genes secrete the stuff of the stronger-than-steel in their milk.) As spider goats show, biology is becoming ever more like engineering—a field whose problems yield to methodical attacks with known tools. Run that trend forward a few decades, argues de Grey, and you could see medical engineers sprucing up our bodies much as handymen replace dislodged roof shingles to prevent minor leaks from leading to collapsed ceilings. What makes de Grey truly arresting, however, isn't how far out he goes, but how he gets there—he builds close-knit arguments that aren't easy to rip apart.

De Grey thinks many of us could see solutions in our lifetime. At that point de Grey thinks we may reach "escape velocity"—the happy state in which ongoing medical advances will be able to add years of life faster than they can be subtracted by the passage of time, letting us elude the Reaper indefinitely. Or at least until we're killed by accidents, which de Grey figures will limit life expectancy to about 5,000 years.

BusinessWeek, May 24, 2004, "Biotech Frontier, Repairing the Engines of Life"— Regenerative medicines—A growing cadre of scientists in academic and biotech labs across the world are pioneering a new approach to curing disease. Their goal isn't to develop new drugs that slow down the brain's decline or to fight heart failure by formulating copycat cholesterol-lowering pills and telling people to eat fewer potato chips. Scientists on this frontier hope to reprogram the human body to heal itself. Regeneration is biotech's Holy Grail—and the ultimate scientific conundrum. Most living creatures are hard-wired for healing. But when it comes to regrowing entire body parts, humans are curiously deficient. Sure, if we scrape a knee we sprout new skin. Our livers can also regenerate to some degree. Even a severed fingertip will grow back under the right circumstances. But that pales in comparison to, say, a lowly newt, which can regrow a leg, tail, jaw, intestine, spine, and even parts of an eye.

Current and future innovations in regenerative medicine will never be risk-free. And they may not come fast enough for those now in the grip of degenerative disease. But neither politics nor funding hurdles are likely to dam the swelling stream of knowledge in regenerative medicine.

Fortune, April 19, 2004, "Drugs that might extend human life are one of the hottest topics in biotech. Some of them are already here"—Over the past few years the

area of anti-aging has become a hot topic in science. A raft of studies on anti-aging drugs are getting underway, thanks to a project recently launched by the federal National Institute on Aging. The goal isn't to find youth pills, but to identify drugs that foster a healthier old age; compounds that lengthen the lives of mice might well ward off ills like cancer, which shorten the lives of mice as well as people.

The message is already plain: drugs that extend human life and promote a healthier old age are probably coming—perhaps not fast enough to make much difference to the baby-boom generation, but probably soon enough to have a big impact on people now under 30. How many more years of life might such drugs grant us? Looking at mice, one of gerontology's boldest optimists, Aubrey de Grey at Britain's Cambridge University, predicts that in a decade or so, scientist should be able to reverse the effects of aging on mice.

Mouse rejuvenators may not do the same for us. But even a drug that modestly slows human aging—extending the average life-span by, say, 15%—would change everything.

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The term "biotechnology" is generally used to describe a wide range of technologies and businesses whose aim is to understand, alter, or direct the function of a wide set of organic cells, including plant, animal and human.

Biomaterials are in wide use in the health care field to describe those technologies related primarily to human tissues.

"Bioterials" is used to describe the combination of two fields, biology and new materials (Oliver, 14).

Regardless of terminology, it is becoming increasingly obvious that the next few decades are going to be tremendously exciting as we continue to explore the known unknowns. There isn't a week that goes by that some magazine or text isn't documenting our increasingly greater knowledge in this amazing new world of science, that forms this period in time, and our current economic circumstances.

Management Philosophies and Organizational Designs

Following from the previous period in time, the contingency and systems managerial approaches continue to prevail. As well, the contingency organizational design model and the matrix and matrix permutations described earlier continue to date through this period.

Gerontological Phase (Adolescence)

All systems go! This phase of the maturing female and male adolescent is probably the most pronounced phase of physical maturation, short of our own noticeable declines in late adulthood. Everything changes, from our physical appearance to our social habits and perception of ourselves as human beings. During this period both female and males will experience rapid physical growth and associated sexual changes that make reproduction possible. Both will also experience a relatively rapid and sudden physical growth over every part of the body.

Many teenagers will commit their time, dollars and well-being to attain that ideal model appeal or male hunk physique. Even those who already have relatively attractive physical appearances will strive for that one physique better than their

own. Those that are so blessed may become very self-critical, while those who inherit a shape or size far from the culturally acceptable ideal one may suffer excessive self-consciousness or even depression.

There is a noticeable difference in this age group's cognitive development. Having a conversation with a 14- or 15-year-old is quite different from having a conversation with a 7- or 8-year-old. Because of advances in their cognitive abilities, adolescents are increasingly aware of both external concerns and their own internal needs. Adolescents are also considerably more capable of reasoning, logic and rational thinking (Santrock, 406).

For many developmentalists, the single most important distinguishing feature of adolescent thought is the capacity to think in terms of possibility rather than only in terms of reality. This allows adolescents to fantasize, speculate, and hypothesize on a much grander scale than in their earlier years. Pre-adolescent thinking tends to tie children to the here and now (Berger, 412).

The physical changes of puberty initiate biosocial changes by transforming the childish body into an adult one. Cognitive changes enable the young person to begin to transcend the realm of concrete thought and to think abstractly and hypothetically. However, it's the psychosocial growth, relating to parents with new independence, to friends with new intimacy, to society with a new commitment and to oneself with new understanding that eventually brings the young person adult status and maturity. Taken as a whole, psychosocial development during adolescence can best be understood as a quest for self-understanding and for a new identity. That is, the adolescent searches for answers to questions that seldom arise in younger years, such as "who am I?"

Indicative of this search for oneself are such things as body markings of one form or another, such as body piercing or tattoos. It is also not uncommon for individuals of this developmental stage to wear what others might consider unusual clothing, or clothing only made for this age group. Hair is yet another identifying characteristic of this transitional age group. Colored hair, spiked hair, shaved heads and the like are all indicative of this aspect of finding oneself.

Cohort Group (Nexters)

Nexters, at this writing, are roughly between newborn and 20 years of age. They have also been called Generation Y, the internet generation, Nintendo generation and the Millennials.

The Nexters are those children born to the late boomers and early Xers. These parents are the ones that demand that they provide nothing but the best for their children and exercise perfection in their rearing process. The parents of this generation insist on only the best early childhood care facilities, elementary, middle and high schools, and insist on being intimately involved in almost every aspect of their children's lives.

The parents of this generation planned to have these kids, sometimes elaborately decorating their newborns' rooms and cuddling them endlessly. These kids were wanted, to say the least.

It is not uncommon, at a very early age, that these kids might have televisions and VCRs in their rooms, computers, CD players and/or Gameboy. Technology that to some of us might seem difficult to manage at first is second nature to this generation.

In a 1995 survey, an unprecedented 93 percent of 10- to 13-year-olds queried said they felt loved by their parents. This generation is wanted in an ever increasing service-oriented job market, on all shifts. The parents of this group want their children to experience the job market but are not afraid to pull them out of work in a heart beat if the parent feels there is nearly any reasonable cause to do so.

Joan Ryan, a *San Francisco Chronicle* columnist, says, "We Mappies (Middle-Aged Professional Parents) have elevated child-rearing to a sacrament. We arrange our schedules around our children's soccer games, volunteer as much as we can put in the classroom, hover over every science project and book report, and take our kids with us to restaurants and on outings with a frequency that makes our own parents snort and roll their eyes.

"We're told we will produce a generation of coddled, center-of-the-universe adults who will expect the world to be as delighted with them as we are. And even as we laugh at their knock-knock jokes and exclaim over the refrigerator drawings, we secretly fear the same thing."

Major events and phenomena that have formed, and continue to form, this young group include:

- A cultural focus on childrearing: everything from cartoons to toys to movies
- Violence; Oklahoma City bombing and schoolyard shootings
- Technology
- Busy, over-planned lives
- Stress
- Clinton/Lewinsky
- Columbine High School massacre

Their cultural memorabilia include such items as:

- Barney
- Teenage Mutant Ninja Turtles
- Tomagotchi and other virtual pets
- Beanie Babies
- Pogs
- American Girl dolls
- Oprah and Rosie
- The Spice Girls
- The X Games

Unlike the previous generation, the Xers, this age group has lots of heroes.

- Michael Jordan
- Princess Diana
- Mark McGwire, Sammy Sosa
- Mother Teresa
- Bill Gates
- Kerri Strugg
- Mia Hamm
- Tiger Woods
- Christopher Reeves

Perhaps one of the best attributes about this generation, from my experience of having two teenage children myself, is that they believe their parents may actually be cool. Parents of this generation wear similar clothing, small logos on T-shirts and jeans, as an example. This generation also shares common music with their parents, to name a few, "Mambo No. 5," "Leaving on a Jet Plane," "Thong Song," "Who Let the Dogs Out" and "Oar's Revolution." I recall, a few weeks back, my oldest son and I were in the car going somewhere and the song "Leaving on a Jet Plane" came on. He was floored when I began singing the song along with him. He said, "I didn't know you listened to [whoever]," where [whoever] was the name of the modern group who, in his opinion, created the song. He was equally floored when I told him how old the song actually was and who the original group was that sang it. Aside from music, this generation shares the same taste in movies with their parents, again to name only a few: "Matrix," "The Rock," "James Bond," "Austin Powers," "Toy Story II" and "Con Air."

At work, this generation has significant assets. They form collective action, they're optimistic, have tenacity, possess a heroic spirit, have significant multi-tasking capabilities and are technologically savvy. Their liabilities, which might be expected given their age, include their need for supervision and structure, and their inexperience, particularly with handling difficult people issues.

Messages that motivate this group include such sayings as "you'll be working with other bright, creative people," "your boss is in his or her sixties," "you and your co-workers can help turn this company around" and "you can be a hero here."

Identifying characteristics include polyester and retro clothing, and pagers. Their spending style can typically be described as spend your parent's money as fast as you can, and of course, we let them. They tend to read Goosebumps, Baby Sitter's Club, Matt Christopher, American Girls and chat room conversation. Their humor is typically on the order of *Calvin and Hobbes.*

Facts and myths related to this group:

Myths	Facts
• The youth of this country is going to hell in a handbasket.	• Experts believe this is a fine new crop of young people who could quite easily make heroes of themselves.
• Today's kids are getting a good education.	• There is a widening gap between the haves and the have-nots.
• Kids need to spend more time reading, and less time watching TV or playing video games.	• Kids are spending more time reading. Video games are cutting into TV, not reading time.

The table below summarizes the four generations discussed in the above paragraphs (Strauss, 56).

Comparison of Perspectives

	Veterans	Boomers	Xers	Nexters
Outlook	Practical	Optimistic	Skeptical	Hopeful
Work Ethic	Dedicated	Driven	Balanced	Determined
View of Authority	Respectful	Love/hate	Unimpressed	Polite
Leadership by	Hierarchy	Consensus	Competence	Pulling Together
Relationships	Personal Sacrifice	Personal Gratification	Reluctant to Commit	Inclusive
Turnoffs	Vulgarity	Political incorrectness	Cliché, hype	Promiscuity

Traditional arguments of nature versus nurture hinged on whether an individual's behavior was essentially predetermined at birth, or the result of environmental factors. Although one might reasonably argue that our behavior is the result of both, there are some who argue endlessly for either end of the spectrum. This chapter focused on behavior being predominantly determined by the environment in which we developed, i.e., the "nurture" perspective.

In the following chapter, we will discuss the "nature" component of the personality.

Further Understanding Ourselves and Others: A Nature-Based Perspective

Have you ever been in a meeting where you or another person might have suggested an idea only to have it abruptly shot down by someone else? Their reason for shooting it down may have been that the budget just didn't exist, or the resources weren't available, or even that it simply did not compute given other considerations. Perhaps during this same meeting you sailed another test balloon, only to have it shot down by the same person. Then, continuing in this vein, you floated another idea and again it too was popped. After a number of these failed attempts to spur support for your bigger idea, you may have looked over at the individual and thought how really negative that person has been. And further, you may have thought that there was something about this other person that sort of rubbed you the wrong way and perhaps, to continue, you began to not like that other individual for so quickly shooting down your ideas. Perhaps you even began to think that the other individual was intentionally deflating your ideas.

Preferences and Psychological Typing —The Nature Side

In this section we learn how to understand ourselves and subsequently others better. In doing so, we begin to realize that others may not be doing things just to irritate us, but instead are doing what comes most natural to them, which is thinking differently than ourselves. Perhaps they collect, organize and present data in a manner different than we do. That does not make their methods less right; on the contrary, it brings to the table a potentially different perspective which, when combined with our own way of doing things, creates a significant synergy.

The role of nature in determining personality was propounded by the Harvard zoologist Edward O. Wilson, who claimed the study of human behavior is not the sole province of social scientists, whose perspective of human development is that it is generally environmentally based. Human beings are not born a blank slate as some say, argued Wilson, with their behavior being totally a response to their environment. Wilson viewed a large part of our behavior, why we organize ourselves as we do, act as we do, and even behave as we do, to be part of our genetic makeup. Genetic makeup helps to guide and create culture; and culture, in turn, operates directly on the genes.

Wilson believed that by selecting and controlling our genetic makeup, we could significantly increase SAT scores and produce employees with higher internal motivation. The study of topics like stress, perception, learning and creativity would be analyzed in physiological terms. Stress would be evaluated in terms of neurophysiological perturbations and their relaxation times. Perception would be translated into brain circuitry. Learning and creativity would be defined as the alteration of specific portions of the cognitive machinery regulated by input from the motive centers (Robbins, 1998, 24). In fact, a series of references made to genetic engineering and this evolving discipline were discussed above.

A much simpler, and yet statistically sound, approach to the "nature" side of the argument is through personality assessments, such as the Myers-Briggs Type Indicator.

Carl Jung, a Swiss psychiatrist, developed a theory that, he believed, described human consciousness. He believed that humans are born with certain mental and emotional possibilities. Jung's thoughts were along the following lines. Humans have:

- The ability to gather, store and retrieve information by observing the world around them as well as their own memories and inner states.
- The ability to reflect upon that information and organize it coherently to understand and make decisions.

Jung believed that although all humans have these capacities to observe and to organize, there are natural, inborn differences in the ways people prefer to use these capacities.

Isabel B. Myers and Katherine Briggs studied and applied Jung's theories to their understanding of individuals for eighteen years. In 1941, they began developing and testing questions that they hoped would assist people in self-understanding and increasing their understanding and appreciation of others. The eventual result was the Myers-Briggs Type Indicator (MBTI) personality inventory. The MBTI instrument operationalizes Jung's theories and makes it possible to develop practical applications. Using the instrument, and the theory, provides a structured, systematic way of recognizing individual differences—one's own and those of other people (Fitzgerald 1997, 4).

Jung believed that people had very natural ways of performing or thinking, which he referred to as preferences. Preferences are best thought of through an example. When we write our names, we typically use one hand or the other. If we try to use the opposite hand to write our name, we may be successful to some degree, but don't necessarily feel as comfortable in doing so. Another typical example is when we cross our arms in front of our bodies. In performing this task one

hand comes up from the bottom, while the other tucks down and inward. If we try to switch our cross to cross over in the opposite direction, most of us have to stop and think about exactly how to do that. This hesitation, or our sloppiness when writing with the other hand, is an indication of our less preferred capability. It doesn't mean that we cannot perform the act, it simply means that it is not our preferred approach to performing the act. This concept is extrapolated into our abilities to gather, store, retrieve, reflect, organize and ultimately present or act on data around us.

Opposites, then, are two different ways of doing things. Jung identified two opposite preferences:

1. Perception (gathering information) may be performed through "sensing" or "intuition."
2. Judgment (structuring or prioritizing) may be performed through "thinking" or "feeling."

Jung further felt that we do not use our opposites with equal ability. We learn early to select an approach that we feel most comfortable with. When we take the nurture argument into consideration as well, we can start to determine how we are encouraged, pressured, or otherwise led to select and develop a less capable characteristic.

Whatever our personal conviction and therefore argumentable belief, there are overwhelming documented perspectives and attempts to collate into a single cohesive and coherent argument the two pure positions and many other permutations. I find them all quite interesting and their reading enthralling, as we continue to advance our basic understanding of our human development.

Sensing (S) and Intuition (N)

From a sensing, "S", perspective, people who prefer to gather information through sensing:

- Focus on what is actual; they tend to focus on the present, the here and now.
- Focus on data available to the senses; sight, smell, touch, feel, hearing.

As leaders, they tend to be:

- Realistic and pragmatic
- On top of what is happening in their organizations
- Use factual data in forecasting the future and making decisions

From an intuition, "N", perspective, people who prefer to gather data through intuition:

- Focus on connections between data
- Focus on patterns, meanings or theoretical explanations

As leaders, they tend to:

- Be visionary and imaginative
- Have an "accurate" feel for what is going on

- Make decisions based on theoretical projection of future possibilities that they "see"

In terms of potential blind spots:

- People with a strong sensing preference are so focused on the present and their own experiences, that they may find it difficult dealing with changing environments and radical rethinking of possibilities.
- People with a strong intuitive preference are so convinced of future possibilities that they may fail to consider current realities.

Individuals with a strong "sensing" preference, then,

- Rely on their senses
- Pay particular attention to details
- Are present-oriented
- Practical
- Factual
- Like clear directions
- Are conservative in nature
- May be literal
- Focus on the real-actual
- Trust their experience

Individuals with a strong "intuition" preference:

- Look for patterns in data
- Are future-oriented
- Tend to be imaginative
- Are generally innovators
- Rely on hunches
- Look for change
- Are more figurative than their sensing counterparts
- Focus on the "big picture"
- Trust their inspiration

What's interesting to do at this point as an exercise is to break the sensing "S" group out from the intuitive "N" group. Show both groups a brightly colored leaf and ask each group to talk about it. The sensing group will invariably describe the physical characteristics of the leaf, such as its size, shape, color, and other things they see with their eyes. The intuitive group, on the other hand, will jot down phrases of things such as "football games," "the smell of leafs burning," "Charlie Brown and Lucy," "hot apple cider with cinnamon sticks." Their descriptions are indicative of their preferred way of gathering and thinking about the data. The sensing group is much more focused on detail, while the intuitive group is more pattern or "blue-sky"–oriented.

Thinking (T) and Feeling (F)

When we talk about ways of making decisions, the opposites here are "thinking" and "feeling."

People who make decisions using a "thinking" perspective tend to apply logical principles to their decision making. As leaders they tend to:

- Take a detached analytical approach to problem solving
- Value clarity and accuracy
- Like to ask tough questions

People who make decisions using a "feeling" perspective tend to make decisions through a process of valuing; their own, others' and organizations to which they feel a commitment. As leaders:

- They encourage participation and consensus
- Value the contributions of others
- Routinely put themselves in others' shoes

Both "thinking" and "feeling" are rational processes for deciding what information to use in decision making, and how much weight to give different kinds of information.

Thinking decision-makers include information directly relevant and objective by their standards. Feeling decision-makers, on the other hand, include everything that is important in the situation, without requiring it to be logical.

In terms of potential blind spots, thinking leaders may focus so much on logical analysis and tasks that they:

- Don't give enough weight when making decisions on the impact to other people
- Can be overly competitive
- May not find it important to find common ground for compromise

Feeling decision-makers, in terms of blind spots, may focus so much on including others and empathizing that they:

- Lose track of tough decisions that they should be making
- Over-identify with people who are important to them
- Allow their decisions to be biased or personal

Individuals with a strong "thinking" preference, then:

- Tend to be thinking-oriented—rational, methodical and analytical—in their decision making
- Tend to think with their head
- Are generally objective
- Prefer a sense of justice
- Are typically perceptually cool
- Are sometimes impersonal
- Tend to critique
- Analytical
- Precise
- Tend to be principle-oriented
- Look for reasonableness
- Are frequently considered tough-minded

Individuals with a strong "feeling" preference, on the other hand,

- Tend to be feeling-oriented and concerned with the impact and values of other people
- Tend to think with their heart
- Are more subjective
- Like harmony
- Are more caring
- Typically are more personal
- Are more appreciative
- Tend to empathize
- Are persuasive
- Favor values over principles
- Are more compassionate than reasonable
- Tend to be more tender-hearted

One can usually tell the difference between someone who prefers thinking to feeling in their decision making by asking a very simple question, ". . . tell me about. . . ." The individuals with a thinking preference will generally respond with something on the order of ". . . I think . . ." whereas those with a feeling preference will say ". . . I feel. . . ." Thinkers, as well, will be more object- and activity-oriented, where as feelers will generally be more people-oriented.

Extraversion (E) and Introversion (I)

Aside from the way in which we gather information, "S" or "N," and the way in which we structure, prioritize and make decisions, "T" or "F," there are differences in our orientation to the outside world and direction of energy. These differences are identified as extraversion, "E," and introversion, "I."

People exhibiting a strong preference for extraversion focus their energy and attention primarily to the outside world, while people with a strong preference for introversion focus their energy and attention to the inner world of ideas, values and experience.

Individuals with a preference for extraversion:

- Are drawn towards people and things
- Actively pursue external interaction
- Draw mental and emotional energy from exchanges

As leaders, extraverted individuals tend to:

- Initiate contact
- Seek out others; be action-oriented
- Process thought out loud
- Be gregarious, enthusiastic and expressive

Individuals with a strong preference for introversion:

- Are reflective
- Draw energy from quiet, introspective time

As leaders, introverted individuals tend to:

- Like to receive information in written form
- Like time to process before replying
- Prefer one-on-one interactions
- Be perceived as contained and reserved, hard to "read"

Blind spots for individuals with a preference for extraversion are:

- They may act without sufficient reflection
- Their external processing may be confusing to others
- They may not give sufficient time for introverted internal processing

Blind spots for individuals with a preference for introversion are:

- They may continue to reflect when it's time for action
- Their internal processing may exclude others who have a right to participate in the decision making
- Their eventual decision may seem to evolve out of the blue due to a lack of extraverting with others
- They may seem aloof or snobbish; subordinates may feel they are being judged by their leader

Have you ever been to a party of some type and on leaving the other person in the car began a series unending questions before you may even have had a chance to respond? The other person may have said, "What did you think of the party? Did you like it? How about that garden in the back? Wasn't it really cool? I thought the party went pretty well. I couldn't believe . . ." Perhaps at this point you may have said, "Enough already! Will you just shut up for a while?"

Extraverted people tend to think out of their head in the area just above, sort of like a cartoon caption. Introverted people, however, like to internalize and reflect on what was said. Where extraverts tend to live by the sequence ready, fire, aim, introverts tend to collect, assimilate, reflect and when ready speak. This very sequence causes me to listen when an introvert wishes to say something. I know when my introverted friends have something to say, that they generally have thought it through pretty well beforehand.

Extraverts, on the other hand, formulate their final opinions as a matter of verbal discussion outside of their heads. So when an extraverted individual says something, he/she is most probably waiting to formalize the thought once a series of exchanges has taken place between the sender and the receiver. If the receiver is an introverted individual, the extraverted individual saying something he/she may not mean causes confusion unnecessarily. For example:

Extravert: "blah, blah, blah, blah blah."
Introvert: "what did you just say?"

Extravert: "I don't know, what?"
Introvert: "you just said, blah, blah, blah, blah."

Extravert: "I did? I didn't mean it."
Introvert: "Well if you said it you must certainly feel that way."
Extravert: "No. Not really. I was just talking out loud."

> Introvert: "Well if you didn't mean it why did you say it?"
> Extravert: "I don't know! I guess I was just talking. I really didn't mean it."
>
> Introvert: "Well if you are going to be saying things just to be saying things, how will I know when you mean what you're saying and when you don't?"
> Extravert: "I don't know. Just ask me, I guess."

The point is that extraverted people will routinely formulate their opinions out loud as part of a normal dialog with another. Introverted individuals, however, will internalize and reflect, ultimately forming their opinions without such open discussion.

Extraverted individuals, then:

- Tend to be active communicators
- Are more outward
- Sociable
- Enjoy people
- Favor many
- Are expressive
- Have a breadth of interests
- Tend to speak first, reflect later

Introverted individuals, on the other hand:

- Are less active and more reflective
- Are inward-oriented
- Are more reserved
- Private
- Favor few as opposed to many
- Are less expressive and more quiet
- Have a depth of interests
- Tend to reflect before speaking or acting

Judging (J) and Perceiving (P)

With some individuals their decision-making process (thinking or feeling) is directed toward the outside world (regardless of their extraversion or introversion). MBTI terms these individuals as judging. Individuals with a judging preference prefer their outside world to be orderly, clear, planned and scheduled.

As leaders, judging individuals:

- Are uncomfortable with ambiguity
- Are impatient with process
- Focus on achieving results as quickly as possible
- Like to plan and stick to plans
- Trust their ability to get things done

With other individuals, it is their information-gathering process (sensing or intuition) that is directed toward the external world (regardless of their extraversion or introversion). MBTI terms these individuals as perceiving. Because information-

gathering is the mental model they prefer to direct to the outside world, they like to keep their external environment as open and unstructured as possible, thereby allowing as much information as possible to enter and mold the potential solution.

As leaders, perceiving individuals:

- Want a great deal of information
- Want decisions to emerge from the information-gathering process
- Perceive goals as moving targets, temporary and changeable
- Enjoy flexibility and spontaneity
- Trust their ability to respond quickly to changing circumstances

Potential blind spots of individuals with a preference for judging:

- They can push for closure and decisions before enough information has been gathered
- They sometimes oversimplify for the sake of clarity
- Their overemphasis on following plans and adhering to time-frames can feel controlling to others, especially perceivers

Potential blind spots of individuals with a preference for perceiving:

- They sometimes continue to gather information when decisions need to be made
- They trust their ability to respond quickly to crisis, but by delaying to do so, can actually encourage crisis
- Their spontaneity and flexibility can cause undue stress on others, especially judging types

Both the perceiving and judging types can be overly critical of the other's type, especially if the individual with the perceiving or judging type is strong in that type.

Individuals with a judging preference, then:

- Are methodical
- Prefer structure
- Appreciate control
- Are decisive
- Are deliberate
- Are organized
- Like to plan
- Value deadlines
- Are perceived to be productive
- Are systematic

Individuals with a perceiving preference, then:

- Are flexible
- Tend to move with the flow
- Trust their experience
- Are curious
- Are spontaneous
- Are more open-ended

- Adapt readily
- Enjoy discovery
- Are receptive to new information
- Are more casual in their approach

Type Combinations

The MBTI personality inventory has four sets of opposites that result in 16 possible combinations. The number identified through participating in the assessment depicts the strength the individual favors a particular opposite. A table can be drawn which depicts the 16 possible combinations of types. The table reflects these combinations.

	S	S	N	N	
I	ISTJ	ISFJ	INFJ	INTJ	J
I	ISTP	ISFP	INFP	INTP	P
E	ESTP	ESFP	ENFP	ENTP	P
E	ESTJ	ESFJ	ENFJ	ENTJ	J
	T	F	F	T	

MBTI Type Combination Table

The types share a preference for ways of gathering information (sensing/intuition) and ways of making decisions (thinking/feeling).

Combinations of Sensing, Intuition, Thinking and Feeling

The far left column of the table consists of the four ST types; the next column consists of the four SF types; the next column consists of the four NF types and the far right column consists of the four NT types. Even though the pairs in each column differ on their extraversion/introversion and judging/perceiving preferences, the fact that they share preferences for the way they gather information and the manner in which they make decisions means they generally will exhibit similar behaviors. For example:

- STs (ISTJ, ISTP, ESTP, ESTJ) tend to share a focus on the bottom-line realities. They are practical, logical and tend to be drawn to technical concerns.

- SFs (ISFJ, ISFP, ESFP, ESFJ) tend to share a focus on practical service to people. They tend to be sympathetic, friendly and warm, and tend to be drawn to areas where they can help people on a day-to-day basis.

- NFs (INFJ, INFP, ENFP, ENFJ) usually focus on people more globally, wanting to help improve the long-range well-

being for all. They tend to be insightful, enthusiastic and value effective communication.

- NTs (INTJ, INTP, ENTP, ENTJ) tend to focus more on developing and using conceptual frameworks. Their strength is in analyzing systems and seeing ways to improve them.

Combinations of Extraversion, Introversion, Judging and Perceiving

Each row of the above type table shares the same preference for extraversion/introversion or judging/perceiving. The four types in a particular row, therefore, have similar orientations to the world (E/I) and similar preferences for organizing their external environment (J/P). For example:

- IJs (ISTJ, ISFJ, INFJ, INTJ) are generally decisive introverts. They take time to process new information in their inner world. If their new data fits their inner world then they move ahead in an organized manner. If new data does not fit their inner world then they can become immovable.

- IPs (ISTP, ISFP, INFP, INTP) are generally flexible and tolerant. They prefer to keep their external environment open. They will take new data inwards to evaluate with their preferred judging function (thinking/feeling). The data must pass logical analysis for thinkers and value standards for feelers.

- EPs (ESTP, ESFP, ENFP, ENTP) are resourceful and energetic. They make excellent networkers and gathers of information. Their enthusiasm carries others along with them. They handle new ideas by trying them out, to see how they work.

- EJs (ESTJ, ESFJ, ENFJ, ENTJ) love to take action to organize and structure the environment. They are decisive and energetic in making things happen. They tend to respond to new information by focusing on the goals, making plans and proceeding according to plan.

Type and Organizational Change

In discussing organizational change, Fitzgerald (Fitzgerald 1997, 12) provides the following.

- In the top left-hand quadrant of a type table are four types that share preferences for introversion and sensing. The quick phrase to describe the IS reaction to proposals for change is, "let's keep what we have."

- The types in the top right-hand quadrant of the type table share preferences for introversion and intuition. The quick phrase to describe the IN proposal for change is, "let me go away and think about it—I'll get back to you."

- In the bottom left-hand quadrant of the type table are types that share preferences for extraversion and sensing; these types respond to change proposals by saying, "let's just do it."
- The types in the bottom right-hand quadrant of the type table share preferences for EN and typically respond to change by saying, "whatever there is, let's change it."

The four types in the corner squares of the type table share a preference for thinking and judging; these types have been referred to as "tough-minded." The combination of thinking and judging means that these types extravert their thinking, using it to plan, structure and systemize their external environment. They rationally analyze likely consequences of various alternatives and make quick decisions based on logic.

Type Dynamics

The synergy that evolves from combining the individual preferences is referred to as type dynamics. The Myers-Briggs Type Indicator® provides relative preferences on four scales:

1. Extraversion (E)/Introversion (I)
2. Sensing (S)/Intuition (N)
3. Thinking (T)/Feeling (F)
4. Judging (J)/Perceiving (P)

It is natural to conclude that each combination is simply a summation of each individual type preference. This, however, is not the case.

What follows is a method to order our preferences, or, in other words, create a hierarchy of type preferences. This hierarchy indicates those preferences we use most efficiently and those we use least efficiently.

Our type sequence is composed of four letters:

1. First letter is our preference for extraversion or introversion, which represents attitudes
2. Second letter is our preference for our perceptive mental functions of sensing or intuition
3. Third letter is our preference for mentally making judgments, either thinking or feeling
4. Fourth letter is our orientation to the outside world, either judging or perceiving

Everyone has and uses the four mental functions of sensing, intuition, thinking and feeling every day. People simply differ in the order in which they prefer to use them and the order in which they tend to develop them as they grow. For example, for some people logical closure (thinking) is the most important activity, then they attend secondarily to the facts and details (sensing). These individuals might give less weight to the many potential possibilities (intuition), and the least weight to the people impact of decisions (feeling).

Using MBTI's type theory, the order in which we favor these preferences is inborn. The four-letter type formula is a shorthand mechanism for telling us the order in which an individual prefers to use the four mental functions. The figure below depicts the order of preferences for each of the 16 type combinations.

Priority of Preferences by Type

ISTJ	ISFJ	INFJ	INTJ
Sensing	Sensing	Intuition	Intuition
Thinking	Feeling	Feeling	Thinking
Feeling	Thinking	Thinking	Feeling
Intuition	Intuition	Sensing	Sensing
ISTP	**ISFP**	**INFP**	**INTP**
Thinking	Feeling	Feeling	Thinking
Sensing	Sensing	Intuition	Intuition
Intuition	Intuition	Sensing	Sensing
Feeling	Thinking	Thinking	Feeling
ESTP	**ESFP**	**ENFP**	**ENTP**
Sensing	Sensing	Intuition	Intuition
Thinking	Feeling	Feeling	Thinking
Feeling	Thinking	Thinking	Feeling
Intuition	Intuition	Sensing	Sensing
ESTJ	**ESFJ**	**ENFJ**	**ENTJ**
Thinking	Feeling	Feeling	Thinking
Sensing	Sensing	Intuition	Intuition
Intuition	Intuition	Sensing	Sensing
Feeling	Thinking	Thinking	Feeling

Extraverted Type Dynamics

For extraverted individuals, the four steps for determining the order of preferences is as follows.

1. Step 1. Look at the fourth letter; if it is a "J" it points to the third letter; if it is a "P" it points to the second letter. For example:

    ESTJ—J points to T; in ENFP—P points to N

2. Step 2. J/P points to one of the preferred functions which is typically extraverted. The other preferred function will typically be introverted. For example:

    ESTJ—T is extraverted, S is introverted; in ENFP—N is extraverted, F is introverted

3. Step 3. For extraverted types, the extraverted function is dominant and the introverted function is auxiliary. For example:

    ESTJ—T is extraverted and dominant. S is introverted and is second or auxiliary
    ENFP—N is extraverted and dominant. F is introverted and is second or auxiliary

4. Step 4. For all types the third function is opposite the second, and the fourth or inferior is the opposite of the first. For example:

    > ESTJ—T is No. 1, S is No. 2, N is No. 3, and F is No. 4
    > ENFP—N is No. 1, F is No. 2, T is No. 3, and S is No. 4

Introverted Type Dynamics

For introverted individuals, the four steps are nearly the same as for extraverted individuals. These steps are as follows.

1. Step 1. Look at the fourth letter; if it is a "J" it points to the third letter; if it is a "P" it points to the second letter. For example:

    > ISTJ—J points to T; in INFP—P points to N

2. Step 2. J/P points to one of the preferred functions which is typically extraverted. The other preferred function will typically be introverted. For example:

    > ISTJ—T is extraverted, S is introverted; in INFP—N is extraverted, F is introverted.

Extraverts show their first, or best, function to the outside world. Introverts, however, show their second-best function to the outside world, saving their best function for the inner world of ideas.

3. Step 3. For introverted types, the extraverted function is auxiliary and the introverted function is dominant. For example:

    > ISTJ—T is extraverted, so is second. S is introverted and is first
    > INFP—N is extraverted and second. F is introverted and first

2. Step 4. For all types the third function is opposite the second and the fourth, or inferior, is the opposite of the first. For example:

    > ISTJ—S is No. 1, T is No. 2, F is No. 3, and N is No. 4
    > INFP—F is No. 1, N is No. 2, S is No. 3, and T is No. 4

Having an understanding of our order of preferences allows us to more readily see the potential reasons for conflict in an organization, team or even our personal lives. Below depicts two types indicative of this potential problem.

Potential Areas for Conflict
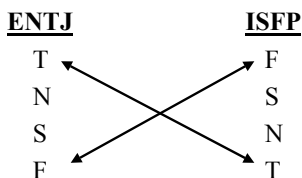
In this example, the greatest strength, or most preferred function, for an ENTJ is thinking. The least preferred function is feeling. For an ISFP, however, the most

preferred function is feeling, whereas the least preferred function is thinking. This type of combination has the potential for conflict in many situations. For example, between two spouses, one might suggest that they should buy a new home because it feels like the right time to do so. While the ENTJ spouse might suggest that the budget, being reviewed over time, does not support the additional expense of the new home, the ISFP, on the other hand, might argue that money is not everything, and that sometimes you simply have to proceed based on what feels like the right thing to do. The ISFP spouse might continue the discussion by reminding the ENTJ that everything has worked out in the past and it will be all right.

This type of conflict between the ENTJ's logical, rational and methodical position is in stark contrast to the ISFP's spontaneous, heart-felt, value-ladened approach.

Summary Thoughts by Type

What follows are summary comments in seven areas for each of the sixteen types. The areas for each type are: at their best, characteristics, how others see them, areas for growth, under stress, managerial practices and type dynamics.

ISTJ

At Their Best:

- Have a strong sense of responsibility to organizations, family and relationships
- Work with steady energy to fulfill commitments as stated and on time
- Prefer to work alone and be accountable for results; however, feel comfortable in teams when it's necessary to do the job right

Characteristics:

- Practical, sensible, and realistic
- Have a profound respect for facts
- Systematic
- Clear and steadfast in their opinions because they have used logical criteria based on their experience and knowledge

How Others See Them:

- Calm, reserved, and serious
- Consistent and orderly
- Valuing traditions
- Only share their wealth of rich sensing observations and memories with close friends

Areas for Growth:

- If they've not developed their Thinking, ISTJs may not have reliable ways for dealing with the world and instead may be preoccupied with their internal memories

- If they've not developed their Sensing, they may rush into premature judgments and actions without considering new information
- If ISTJs do not find a place where they can use their gifts and be appreciated for their contributions, they may:
  - Become rigid about time, schedules, and procedures—go "by the book"
  - Be critical and judgmental of others
  - Find it hard to delegate—to trust anyone else to do the job right

Under Stress:

ISTJs may be unable to use their customary calm, reasonable judgment and get caught up in "castastrophisizing"—imaging a host of negative possibilities for themselves and others.

Managerial Practices:

- Management-by-concentrated-desk time (MBCD), perseverance and personal distance
- Fact gathering is most important business; wealth of information may be hidden at first; appreciates here and now tangibles
- Decides in logical, objective modes; task-focused
- Organized, preplanned activity; control-oriented

Type Dynamics:

Serious, quiet, earn success by concentration and thoroughness. Practical, orderly, matter-of-fact, logical, realistic, and dependable. See to it that everything is well organized. Take responsibility. Make up their own minds as to what should be accomplished and work toward it steadily, regardless of protests or distractions.

ISFJ

At Their Best:

- Dependable and considerate, committed to people and groups with which they are associated
- Work with steady energy to complete jobs fully and on time
- Focus on what people need and want and establish orderly procedures to bring these about

Characteristics:

- Practical and realistic
- Concrete and specific
- Cooperative and thoughtful of others
- Kind and sensitive

How Others See Them:

- Quiet, serious, and conscientious

- Considerate, good caretakers
- Honoring commitments, preserving traditions

Areas for Growth:

- If they've not developed their Feeling, ISFJs may not have reliable ways for dealing with the world and instead may be preoccupied with their Sensing memories
- If they've not developed their Sensing, they may rush into premature judgments and actions without considering new information
- If ISFJs do not find a place where they can use their gifts and be appreciated for their contributions, they may:
    - Become rigid in supporting hierarchy, authority, and procedures
    - Feel underappreciated, resentful—complain a lot
    - Be overly focused on immediate impacts of decisions on people

Under Stress:
ISFJs can get caught up in "catastrophisizing"—imagining a host of negative possibilities. They may then express these without their usual consideration for the impact on people around them.

Managerial Practices:

- Management-by-concentrated-desk time (MBCD); perseverance and one-to-one discussion
- Fact gathering is the most important business; wealth of information may be hidden at first; values here-and-now tangibles
- Decides in terms of own priorities/loyalties and employee needs/wants; people-focused; historical perspective
- Organized, preplanned activity; control-oriented

Type Dynamics:
Quiet, friendly, responsible, and conscientious. Work devotedly to meet obligations. Lend stability to any project or group. Thorough, painstaking, accurate. Their interests are usually not technical. Can be patient with necessary details. Loyal, considerate, perceptive, concerned with how other people feel.

INTJ

At Their Best:

- INTJs have a clear vision of future possibilities and the organization and drive to implement their ideas
- Love complex challenges and readily synthesize complicated theoretical and abstract matters
- Value knowledge highly and expect competence of themselves and others

Characteristics:

- Insightful, creative synthesizers
- Conceptual, long-range thinkers
- Clear and concise
- Rational, detached and objectively critical
- Long-range planners

How Others See Them:

- Private, reserved, hard to know, even aloof
- Conceptual, original, and independent

Areas for Growth:

- If they've not developed their Thinking, INTJs may not have reliable ways for translating their valuable insights into applications that can be realized
- If they've not developed their Intuition, they may not take in enough information or take in only information that fits their insights. They then make ill-founded decisions
- If INTJs do not find a place where they can use their gifts and feel appreciated for their contributions, they may:
    - Become aloof and abrupt, not giving enough information about their internal processing
    - Be critical of those who do not see their vision quickly; then they become single-minded and unyielding in pursuing it

Under Stress:
INTJs can overindulge in Sensing activities—watching TV reruns, playing cards, overeating—or become overly focused on specific details that they normally do not notice or usually see as unimportant.

Managerial Practices:

- Management-by-concentrated-desk time (MBCD); perseverance and personal distance
- Potentials, theory, the big picture and the future are most important business; insight and knowledge may be hidden at first
- Decides in logical, objective modes; task-focused
- Organized, preplanned activity; control-oriented

Type Dynamics:
Have original minds and great drive for their own ideas and purposes. Have long-range vision and quickly find meaningful patterns in external events. In fields that appeal to them, they have a fine power to organize a job and carry it through. Skeptical, critical, independent, determined, have high standards of competence and performance.

ESFP

At Their Best:

- Exuberant lovers of life
- Live in the moment and find enjoyment in people, food, clothes, animals, the natural world and activities
- Focus on meeting human needs in creative ways
- Excellent team players, oriented to getting the task done with maximum amount of fun

Characteristics:

- Practical, realistic, and specific
- Observant; focused on current realities
- Generous, optimistic, and persuasive
- Warm, sympathetic, and tactful

How Others See Them:

- If they've not developed their Feeling, ESFPs may get caught up in the interactions of the moment, with no mechanism for weighing, evaluating, or anchoring themselves
- If they've not developed their Sensing, they may focus on the sensory data available in the moment. Their decisions may be limited to gratification of their sensual desires

Areas for Growth:
- If ESFPs do not find a place where they can use their gifts and be appreciated for their contributions they may:
    - Become distracted and overly impulsive
    - Have trouble accepting and meeting deadlines

Under Stress:

ESFPs may feel overwhelmed internally by negative possibilities. They then put energy into developing simplistic global explanations for their negative pictures.

Managerial Practices:

- Management-by-walking-around (MBWA); frequent contact with others and doing/acting as soon as possible
- Fact gathering is the most important business; talks about details; responsive to the here and now
- Decides in terms of own priorities/loyalties and employee needs/wants; historical perspective
- Responsive to new data; flexible approach; inquisitive and laid-back attitude

Type Dynamics:

Outgoing, accepting, friendly, enjoy everything and make things more fun for others by their enjoyment. Like action and making things happen. Know what's going on and join in eagerly. Find

remembering facts easier than mastering theories. Are best in situations that need sound common sense and practical ability with people.

ISTP

At Their Best:

- Carefully observe what is going on around them
- Move quickly to get to the core of a problem and solve it with great efficiency and the least effort
- Resist regimentation and rules, thrive on variety and novelty, enjoy the challenge of solving a new, concrete, extensive problem

Characteristics:

- Detached and objectively critical
- Analytical and logical problem-solvers
- Practical and realistic
- Factual and pragmatic
- Expedient and believe in economy of effort—doing only what's needed with the least possible discussion or fuss

How Others See Them:

- Others sometimes have trouble "reading" ISTPs
- Adaptable, action-oriented risk-takers
- Confident, independent, and self-determined

Areas for Growth:

- If they've not developed their Sensing, ISTPs may have no reliable way of getting accurate data about the external world or of translating their thoughts into action
- If they've not developed their Thinking, they may get caught up in the realities around them and not take time to do the internal logical processing they need to make good decisions
- If ISTPs do not find a place where they can use their gifts and be appreciated for their contributions they may:
    - Become cynical and negative
    - Withdraw their attention and energy
    - Put off decisions

Under Stress:

ISTPs may erupt outwardly in inappropriate displays of emotion. The resulting explosive anger or hurt tearfulness is quite unnerving to others and embarrassing to the usually calm and controlled ISTP.

Managerial Practices:

- Management-by-concentrated-desk time (MBCD); perseverance and personal distance

- Sees details of cause-and-effect chains; exhibits practical realism; present orientation; a flair for seeing funny angles
- Deciding in logical, objective and efficient modes is the most important business; task-focused
- Responsive to new data; flexible approach; inquisitive and laid-back attitude

Type Dynamics:

Cool onlookers—quiet, reserved, observing and analyzing life with detached curiosity and unexpected flashes of original humor. Usually interested in cause and effect, how and why mechanical things work, and in organizing facts using logical principles. Excel at getting to the core of a practical problem and finding the solution.

ESTP

At Their Best:

- Energetic, active problem-solvers, responding creatively to challenging situations
- Develop easy ways to do hard things and make their work fun
- Flexible, adaptable, inventive, resourceful, and are good team players

Characteristics:

- Practical and realistic
- Observant
- Focused on immediate experience
- Make decisions by logical analysis and reasoning
- Analytical, rational problem-solvers
- Straightforward and assertive

How Others See Them:

- Gregarious, fun-loving, and spontaneous
- Adventurous risk-takers
- Pragmatic trouble-shooters

Areas for Growth:

- If they've not developed their Thinking, ESTPs will not have a useful way of selecting amongst the barrage of incoming sensory data. They may make ill-founded decisions and have difficulty setting priorities
- If they've not developed their Sensing, they may focus on the Sensing data that are immediately available. Their decisions may be limited to gratification of their sensual desires
- If ESTPs do not find a place where they can use their gifts and be appreciated for their contributions, they may:
  - Have trouble accepting structure and meeting deadlines

- Focus entirely on excitement and activity, get completely caught up in external activities
- Put enjoying life ahead of important obligations

Under Stress:

ESTPs may experience negative fantasies inside. They may imagine that others do not really care about them, then marshall and distort their Sensing data to provide themselves with "evidence" of this neglect.

Managerial Practices:

- Management-by-walking-around (MBWA); frequent contact with others and doing/acting as soon as possible
- Fact gathering is the most important business; talks about details; responsive to the here and now
- Decides in logical, objective modes; task-focused
- Responsive to new data; flexible approach; inquisitive and laid-back attitude

Type Dynamics:

Good at on-the-spot problem solving. Like action, enjoy whatever comes along. Tend to like mechanical things and sports, with friends on the side. Adaptable, tolerant, pragmatic; focused on getting results. Dislike long explanations. Are best with real things that can be worked, handled, taken apart, or put together.

INFJ

At Their Best:

- INFJs have a gift for intuitively understanding complex meanings and human relationships
- They have faith in the insights, which often take on a sense of sureness, of "knowing"
- Empathetically understand the feelings and motivations of people even before the others are themselves aware of them

Characteristics:

- Insightful, creative, and visionary
- Conceptual, symbolic, and metaphorical
- Idealistic, complex, and deep
- Sensitive, compassionate, and empathetic
- Deeply committed to their values

How Others See Them:

- Private and mysterious
- Intense and individualistic
- Show compassion and caring for others; but share their internal intuitions only with those they trust

Areas for Growth:

- If they've not developed their Feeling, they may not have re-liable ways of accomplishing their goals. Then their valuable insights and creativity stay locked inside.
- If they've not developed their Intuition, they may not take in enough information or take in only what fits with their inter-nal pictures. Then they will make ill-founded decisions based on distorted or limited information
- If INFJs do not find a place where they can use their gifts and be appreciated for their contributions, they may:
    - Not give others the information they used to arrive at a decision, and thus seem arbitrary
    - Base their judgments on little data, on a sense of "knowing" that has little basis in reality
    - Become resentful and critical

Under Stress:

INFJs may become obsessed with data they usually consider ir-relevant or overindulge in Sensing activities, such as watching TV reruns, overeating, or buying things with little meaning to them.

Managerial Practices:

- Management-by-concentrated-desk time (MBCD); persever-ance and one-to-one discussion
- Potentials, theory, the big picture and the future are the most im-portant business; insight and knowledge may be hidden at first
- Decides in terms of own priorities/loyalties and employee needs/wants; people-focused; historical perspective
- Organized, preplanned activity; control-oriented

Type Dynamics:

Succeed by perseverance, originality, and desire to do whatever is needed or wanted. Put their best efforts into their work. Qui-etly forceful, conscientious, concerned for others. Respected for their firm principles. Likely to be honored and followed for their clear visions as to how best to serve the common good.

ISFP

At Their Best:

- Live in the present with a quiet sense of joyfulness
- Want to have time to experience each moment
- Faithful in fulfilling obligations to people and things that are important to them

Characteristics:

- Trusting, kind, and considerate
- Sensitive and gentle

- Observant
- Realistic, practical, concrete, and factual

How Others See Them:

- Quiet, reserved, and private—hard to know well
- Spontaneous and tolerant
- Prefer not to organize situations, but instead to observe and support; they have little wish to dominate

Areas for Growth:

- If they've not developed their Sensing, they may have no reliable way of getting accurate data about the external world or of actualizing their values. Their decisions will be based on little information and be overly personal
- If they've not developed their Feeling, they may get caught up in Sensing realities and not take time to do the internal valuing process by which they make their best decisions. They may avoid decision making, allowing others to decide for them.
- If ISFPs do not find a place where they can use their gifts and be appreciated for their contributions, they may:
    - Withdraw from people and the situation
    - Passively resist structures and rules
    - Be excessively self-critical
    - Feel unappreciated and undervalued

Under Stress:
ISFPs can, under extreme pressure, become uncharacteristically critical of themselves and others, verbalizing harsh and negative judgments.

Managerial Practices:

- Management-by-concentrated-desk time (MBCD); perseverance and one-to-one discussion
- See details of cause-and-effect chains; use data and practical realism to back up priorities and loyalties; present orientation
- Deciding in terms of own priorities/loyalties and employee needs/wants is the most important business; people-focused; historical perspective
- Responsive to new data; flexible approach; inquisitive and laid-back attitude

Type Dynamics:
Retiring, quietly friendly, sensitive, kind, modest about their abilities. Shun disagreements, do not force their opinions or values on others. Usually do not care to lead but are often loyal followers. Often relaxed about getting things done because they enjoy the present moment and do not want to spoil it by undue haste or exertion.

ESTJ

At Their Best:

- Like to organize projects, operations, procedures, and people, and then act to get things done
- Live by a set of clear standards and beliefs
- Value competence, efficiency, and results

Characteristics:

- Logical, analytical, objectively critical
- Decisive, clear, and assertive
- Practical, realistic, and matter-of-fact
- Systematic and pragmatic

How Others See Them:

- Conscientious and dependable
- Decisive, outspoken, and self-confident
- Because they are straightforward in their communication, people seldom have to wonder where they stand

Areas for Growth:

- If they've not developed their Sensing, they may decide too quickly before taking in enough information. Then their decision will reflect their previously formed judgments or biases
- If they've not developed their Thinking, they may not have a reliable way of evaluating information and thus end up making inconsistent or overly harsh decisions
- If ESTJs do not find a place where they can use their gifts and feel appreciated for their contributions, they may:
    - Become rigid and dogmatic
    - Become intrusive, "know-it-all" experts, overpowering others and refusing to listen
    - Get picky about details and be impatient with those who do not follow procedures exactly

Under Stress:
ESTJs may feel alone and unappreciated, and be unable to communicate their inner feeling of distress and despair.

Managerial Practices:

- Management-by-walking-around (MBWA); frequent contact with others and doing/acting as soon as possible
- Sees details of cause-and-effect chains; uses practical realism to back up conclusion; present-oriented
- Deciding in logical, objective and efficient modes is the most important business; talk-focused
- Organized, preplanned activity; control-oriented

Type Dynamics

Practical, realistic, matter-of-fact, with a natural head for business or mechanics. Not interested in abstract theories; want learning to have direct and immediate application. Like to organize and run activities. Often make good administrators; are decisive, quickly move to implement decisions, take care of routine details.

INFP

At Their Best:

- INFPs want to be involved in work that contributes to their own growth and inner development and that of others
- Make priority in living in congruence with their values

Characteristics:

- Sensitive, concerned, and caring
- Loyal to people or a cause
- Likely to be curious and creative
- Have long-range vision
- Capable of great concentration and output when fully engaged in a project

How Others See Them:

- Sensitive, introspective, and complex
- Original and individual
- Reserved about sharing their most deeply held values and feelings

Areas for Growth:

- If they've not developed their Intuition, they may not have reliable ways of taking information and will then fail to notice realities. Then they make decisions based solely on personal values and find it difficult to translate their values into action.
- If they've not developed their Feeling, they may not take time to do the inner valuing process by which they make their best decisions, instead going from one exciting possibility to another, achieving little.
- If INFPs do not find a place where they can use their gifts and be appreciated for their contributions, they may:
    - Have uncharacteristic difficulty expressing themselves verbally
    - Withdraw from people and situations
    - Not give enough information to others, especially about important values

Under Stress:
> INFPs may begin seriously doubting their own competence and that of others, becoming overly critical and judgmental.

Managerial Practices:
- Management-by-concentrated-desk time (MBCD); perseverance and one-to-one discussion
- Options and possibilities for improved or new situations and relationships come easily; future orientation
- Deciding in terms of own priorities/loyalties and employee needs/wants is the most important business; people-focused; historical perspective
- Responsive to new data, flexible approach; inquisitive and laid-back attitude

Type Dynamics:
> Quiet observers, idealistic, loyal. Important that outer life be congruent with inner values. Curious, quick to see possibilities, often serve as catalysts to implement ideas. Adaptable, flexible, and accepting unless a value is threatened. Want to understand people and ways of fulfilling human potential. Little concern with possessions or surroundings.

ENFP

At Their Best:
- Life for an ENFP is a creative adventure full of exciting possibilities
- Experience a wide range of feelings and intense emotions
- Keenly perceptive of people and the world around them and insightful about the present and future

Characteristics:
- Curious, creative, and imaginative
- Energetic, enthusiastic, and spontaneous
- Warm, friendly, and caring
- Cooperative and supportive

How Others See Them:
- Personable, perceptive, and persuasive
- Enthusiastic, spontaneous, and versatile
- Giving affirmation and wanting to receive it

Areas for Growth:
- If they've not developed their Feeling, they may go from enthusiasm to enthusiasm, never committing the energy necessary to actualize their insights
- If they've not developed their Intuition, they may overly rely on personal value judgments and fail to take in enough in-

formation. They then will not trust their own insights, be uncertain, and accept others' perceptions too quickly.

- If ENFPs do not find a place where they can use their gifts and be appreciated for their contributions, they may:
    - Become scattered, have trouble focusing, be easily distracted
    - Become rebellious, excessively nonconforming
    - Ignore deadlines and procedures

Under Stress:

ENFPs may become overwhelmed by detail and lose their normal perspective and sense of options. They then tend to focus on an unimportant or distorted detail, letting it become the central fact of their universe.

Managerial Practices:

- Management-by-walking-around (MBWA); frequent contact with others and doing/acting as soon as possible
- Options and possibilities for improved or new situations and relationships are the most important business; breadth and depth of knowledge; future orientation
- Decides in terms of own priorities/loyalties and employee needs/wants; people-focused; historical perspective
- Responsive to new data; flexible approach; inquisitive and laid-back attitude

Type Dynamics:

Warmly enthusiastic, high-spirited, ingenious, imaginative. Able to do almost anything that interests them. Quick with a solution for any difficulty and ready to help anyone with a problem. Often rely on their ability to improvise instead of preparing in advance. Can usually find compelling reasons for whatever they want.

At Their Best:

- Independent problem-solvers who excel at providing a detached, concise analysis of an idea or situation
- They ask hard questions, challenging others and themselves to find new logical approaches

INTP

Characteristics:

- Logical, analytical, and objectively critical
- Detached and contemplative
- See possibilities beyond the present and obvious
- Mentally quick, insightful, and ingenious
- Intensely curious about ideas and theories

How Others See Them:

- Quiet, contained, calm, and detached observers
- Independent,valuing autonomy
- Prefer not to organize people or situations

Areas for Growth:

- If they've not developed their Intuition, they may not have a reliable way for taking in information and be immersed in their internal logical systems. They then find it difficult to communicate or actualize their ideas.
- If they've not developed their Thinking, they may go from insight to insight, never analyzing them with a critical eye or integrating them into a whole.
- If INTPs do not find a place where they can use their gifts and be appreciated for their contributions, they may:
    - Become cynical and negative
    - Be sarcastic and destructively critical
    - Isolate themselves and put off action
    - Engage in verbal sparring and arguments

Under Stress:

INTPs may erupt outwardly in inappropriate displays of emotion. The resulting explosive anger or hurt tearfulness is quite unnerving to others and embarrassing to the usually calm and controlled INTP.

Managerial Practices:

- Management-by-concentrated-desk time (MBCD); perseverance and personal distance
- Options and possibilities for improved or new situations and relationships come easily; future orientation
- Deciding in logical, objective and efficient modes is the most important business; task-focused
- Responsive to new data; flexible approach; inquisitive and laid-back attitude

Type Dynamics:

Quiet and reserved. Especially enjoy theoretical or scientific pursuits. Like solving problems with logic and analysis. Interested mainly in ideas, with little liking for parties or small talk. Tend to have sharply defined interests. Need careers where some strong interest can be used and useful.

ENTJ

At Their Best:

- Natural leaders and organization builders
- Conceptualize and theorize readily to translate possibilities into plans to achieve short-term and long-term objectives

- Strong urge to organize people and situations to get them moving in the right direction

Characteristics:

- Analytical, logical, and objectively critical
- Decisive, clear and assertive
- Conceptual
- Innovative theorizers and planners
- Uninterested in routine maintenance activities, preferring the stimulation of new challenges

How Others See Them:

- Direct, challenging, and decisive
- Objective, fair, and stimulating
- Their verbal fluency, decisiveness, self-confidence, and urge to organized others can overpower people at times

Areas for Growth:

- If they've not developed their Intuition, they may make decisions too quickly, without considering alternatives or exploring possibilities
- If they've not developed their Thinking, they may not have a reliable way to evaluate their insights and make plans. Then their decision making will be inconsistent and changeable
- If ENTJs do not find a place where they can use their gifts and be appreciated for their contributions, they may:
    - Become overly impersonal and critical
    - Be intrusive and directive—giving orders without listening
    - Become abrasive and verbally aggressive

Under Stress:
ENTJs can be overwhelmed by self-doubt, feel alone and unappreciated, and feel unable to express their distress to others.

Managerial Practices:

- Management-by-walking-around (MBWA); frequent contact with others and doing/acting as soon as possible
- Options and possibilities for situations and relationships come easily; future orientation
- Deciding in logical, objective and efficient modes is the most important business; task-focused

Type Dynamics:
Frank, decisive, leaders in activities. Develop and implement comprehensive systems to solve organizational problems. Good in anything that requires reasoning and intelligent talk, such as public speaking. Are usually well informed and enjoy adding to their fund of knowledge.

ESFJ

At Their Best:

- Like to organize people and situations and then work with others to complete tasks accurately and on time
- Conscientious and loyal
- Sociable and outgoing
- Want to be appreciated for themselves and for what they give to others

Characteristics:

- Warm, sympathetic, and helpful
- Personable, cooperative, and tactful
- Practical, realistic, and down-to-earth
- Decisive, thorough, and consistent
- Sensitive to the needs of others and good at providing practical caring

How Others See Them:

- Sociable, outgoing, enthusiastic, and energetic
- Organized and orderly
- Committed to preserving traditions
- Value family and social ties

Areas for Growth:

- If they've not developed their Sensing, they may not take in much information before making decisions and will then jump to conclusions before fully understanding a situation
- If they've not developed their Feeling, they may be tentative and uncertain, accepting the judgments of others too quickly
- If ESFJs do not find a place where they can use their gifts and be appreciated for their contributions, they may:
    - Doubt themselves and focus their attention entirely on satisfying the needs of others
    - Worry and feel guilty
    - Become controlling in their push for harmony—"we *will* all get along"

Under Stress:

ESFJs may find themselves uncharacteristically critical of others and of themselves. Their negative thoughts and opinions often trouble them greatly.

Managerial Practices:

- Management-by-walking-around (MBWA); frequent contact with others and doing/acting as soon as possible
- Sees details of cause-and-effect chains; uses practical realism to back up conclusions, present-oriented

- Deciding in terms of own priorities/loyalties and employee needs/wants is the most important business; people-focused; historical perspective
- Organized, preplanned activity; control-oriented

Type Dynamics:
  Warm-hearted, talkative, popular, conscientious, born coopera-tors, active committee members. Need harmony and may be good at creating it. Always doing something nice for someone. Work best with encouragement and praise. Main interest is in things that directly and visibly affect people's lives.

ENFJ

At Their Best:

- Highly attuned to others, using empathy to quickly under-stand emotional needs, motivations, and concerns
- Focus on supporting others and encouraging their growth
- Can be inspiring leaders as well as loyal followers

Characteristics:

- Warm, compassionate, and supportive
- Loyal and trustworthy
- Imaginative
- Like variety and new challenges

How Others See Them:

- Sociable, personable, congenial, and gracious
- Expressive, responsive, and persuasive
- Like their lives organized and will work to bring closure to ambiguous relationships or situations

Areas for Growth:

- If they've not developed their Intuition, they may not see possibilities, making decisions too quickly without taking in enough information or considering factors beyond their own personal values
- If they've not developed their Feeling, their decisions may be inconsistent and poorly formulated. They may then accept the judgments of others too readily
- If ENFJs do not find a place where they can use their gifts and be appreciated for their contributions, they may:
    - Worry, feel guilty, and doubt themselves
    - Become inconsistent and controlling in their desire for harmony
    - Become overly sensitive to criticism—real or imag-ined

Under Stress:

> ENFJs may find themselves suddenly and uncharacteristically critical and fault-finding with others. They generally keep these negative opinions to themselves, but they find such thoughts troubling and upsetting.

Managerial Practices:

- Management-by-walking-around (MBWA); frequent contact with others and doing/acting as soon as possible
- Options and possibilities for situations and relationships come easily; future orientation
- Deciding in terms of own priorities/loyalties and employee needs/wants is the most important business; people-focused; historical perspective

Type Dynamics:

> Responsive and responsible. Feel real concern for what others think or want, and try to handle things with due regard for the others' feelings. Can present a proposal or lead a group discussion with ease and tact. Sociable, popular, sympathetic. Responsive to praise and criticism.

ENTP

At Their Best:

- Constantly look to the environment for opportunities and possibilities
- See patterns and connections not obvious to others and, at times, seem able to see into the future
- Good at understanding how systems work and are enterprising and resourceful in maneuvering within them to achieve their ends

Characteristics:

- Creative, imaginative, and clever
- Theoretical, conceptual, and curious
- Analytical, logical, rational, and objective
- Assertive and questioning
- Enterprising and resourceful

How Others See Them:

- Independent, autonomous
- Lively, enthusiastic, and energetic
- Assertive and outspoken

Areas for Growth:

- If they've not developed their Thinking, they may not have reliable ways to evaluate their insights and make plans to

carry them through. They then go from enthusiasm to enthusiasm with little to show for it.

- If they've not developed their Intuition, they may not take in relevant information and have "insights" unrelated to current reality
- If ENTPs do not find a place where they can use their gifts and be appreciated for their contributions, they may:
    - Become brash, rude and abrasive
    - Criticize others, especially those who seem to the ENTP to be inefficient or incompetent
    - Become rebellious and combative

Under Stress:

ENTPs can be overwhelmed by detail, losing their ability to generate possibilities. Then they focus on a minor or distorted detail, think that it is supremely important.

Managerial Practices:

- Management-by-walking-around (MBWA); frequent contact with others and doing/acting as soon as possible
- Options and possibilities for improved or new situations and relationships are the most important business; breadth and depth of knowledge show early; future orientation
- Decides in logical, objective modes; task-focused
- Responsive to new data; flexible approach; inquisitive and laid-back attitude

Type Dynamics:

Quick, ingenious, good at many things. Stimulating company, alert and outspoken. May argue for fun on either side of a question. Resourceful in solving new and challenging problems, but may neglect routine assignments. Apt to turn to one new interest after another. Skillful in finding logical reasons for what they want.

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