1.4.3. **Information Richness—Vincent Van Gogh**
1. BACKGROUND

1.4. THEORY

1.4.4. FOUNDATION CONCEPTS IV
1.4.4.1. **Yet Another Set of General Concepts Defined Quickly**
1.4.4.2. Define Information Richness

Information richness is the potential information-carrying capacity of data, and some media carry richer information than others.

Not all information is created equal. Some information is better than other information. What does better mean? Information that leads to successful decisions resulting in actions to improve performance of the organization is better. What kind of information is that?

Richard L. Daft and Robert H. Lengel respond to what information leads to ultimate success in an organization in their article Information Richness: A New Approach to Managerial Behavior and Organization Design (Organizational Behavior, vol. 6, 1984, pp. 191-233.). Their premise is that the “accomplishment of these information tasks [equivocality reduction and the processing of a sufficient amount of information] as well as the ultimate success of the organization are both related to the balance of information richness used in the organization.” (p. 191.) Webster defines equivocal as “subject to two or more interpretations and usually used to mislead or confuse; of uncertain nature or classification.” (Webster’s Ninth New Collegiate Dictionary)

The issue of balance, or fit, rises again. The implication here is that information of different richness is best for different needs. Richer information is probably harder to come by, and we need to fit richness of information to the need and use of the information. We want to reduce equivocality to the point that when people communicate they establish a shared view of events, especially external events affecting the organization.

Daft and Lengel set the scene by saying, “Organizations face a dilemma. They must interpret the confusing, complicated swarm of external events that intrude upon the organization. Organizations must try to make sense of ill-defined, complex problems about which they have little or unclear information (Weick & Daft, 1982). Inside the organization, more confusion arises. Departments pull against each other to attain diverse goals and to serve unique constituencies and technologies (Lawrence and Lorsch, 1967). Divergent frames of reference, values, and goals generate disagreement, ambiguity and uncertainty. In response to the confusion arising from both the environment and internal differences, organizations must create an acceptable level of order and certainty. Managers must impose structure and clarity upon ambiguous events, and thereby provide direction, procedures, adequate coupling, clear data, and decision guidelines for participants. Organizations must confront uncertain, disorderly events from within and without, yet provide a clear, workable, well defined conceptual scheme for participants.

How do organizations perform this miracle? Through information processing.” (p. 192.) Managers must deal with the forces for disorganization (entropy) by developing structure—in this case, a structure for information and a structure of the organization for better use of better information.

Daft and Lengel and others, most notably Jay Galbraith in his book Designing Complex Organizations, model the organization as an information processing system. Clearly, some organizations, like government oversight agencies, are exactly that—information processors. However, all organizations have at least an information overlay to everything they do. So, in my mind, the conceptual model of an
organization as an information processor is a good one. Also, since I’m most interested in management tools, which convert data to information, the information processor model works right into my hands. Daft and Lengel’s premise is “that organizational success is based on the organization’s ability to process information of appropriate richness to reduce uncertainty and clarify ambiguity.” (pp. 194-195.) If success is one of our performance criteria in the illustrative/conceptual model in Module 1.1.29.1., then we need an information-based organizational model in the center box to best view success from Daft and Lengel’s perspective. As information processors, organizations must solve the problems of interpreting the environment and coordinating diverse internal activities. One problem is external, the other internal.

In defining information richness, Daft and Lengel first address language. “Daft and Wiginton (1979) proposed that human languages differ in their ability to convey information. The concept of language was used in the broadest sense to encompass various ways to transmit ideas, emotions, and concepts. High variety languages are those in which symbol use is not restricted and the language can communicate a wide range of ideas. Examples include art, music, and painting, which are subjective in interpretation. Low variety languages have symbols that are restrictive in their use, and the languages communicate a narrower range of ideas. Low variety languages include mathematics and statistics, which convey exact, unequivocal meaning to users. Daft and Wiginton argued that high variety languages were appropriate for communicating about difficult, ephemeral, social phenomena. Low variety languages communicate effectively about well understood, unambiguous topics.

The notion of language seems plausible, but it doesn’t explain information processing in organizations. Managers typically don’t use art, poetry, or mathematics to communicate about organizational phenomena. The range of language used within organizations is typically limited to natural language and simple numbers.” (p. 195.)

Engineers, who spend at least half their time communicating, and indeed managers (supervisors), who spend much more of their time communicating, are taught to use low variety languages at best. (Mintzberg shows that managers spend over 80 percent of their time communicating (Daft and Lengel, p. 201.)) Math and statistics and even the spoken language leave us well short of the mark in rich information for rich communication, especially when dealing with the systems approach. Since communication skills are fundamental to both the engineering and management processes, we must learn high-variety languages and transfer what we learn to our attitudes and behaviors, especially in regard to those people who excel at high-variety languages.

Daft and Lengel define richness as “the potential information-carrying capacity of data. If the communication of an item of data, such as a wink, provides substantial new understanding, it would be considered rich. If the datum provides little understanding, it would be low in richness. ..... [The] communication media used in organizations determines the richness of information processed. ..... Communication media include face-to-face discussion, phone calls, letters, written documents and numeric documents. The face-to-face medium conveys the richest information while formal numeric documents convey the least rich information. ..... Face-to-face is the richest form of information processing because it provides immediate feedback. With feedback, understanding can be checked and interpretations corrected. ..... Each medium is not just a source, but represents a difference in the act of information processing. Each medium utilizes differences in feedback, cues and language variety. Richness is a promising concept for
understanding information behavior in organizations.” (pp. 196-198.)

Daft and Lengel include a figure to characterize the different media in terms of information richness and the contributors of that media to richness. I’ve reproduced the figure here as Figure 1.4.4.2. Daft and Lengel talk about the uses of information of different richness. Sometimes less-rich information is better. “... rich media are needed to process information about complex organizational topics. Media low in richness are suited to simple topics. ..... Factors such as inventory control or employee attendance are not difficult to conceptualize. Managers can communicate about these phenomena through paperwork and quantitative reports. Other variables, such as organizational goals, strategies, managerial intentions or employee motivation, are intangible. These factors are not clear and discreet, and they can be difficult to interpret. Making sense of these factors requires a rich medium that provides multiple information cues, immediate feedback and a high variety language. Rich information enables managers to arrive at a more accurate interpretation in a short time.” (p. 200.)

Precise, clear information isn’t always best for decision making. “Memos, reports and other written media can oversimplify complex problems. They do not provide a means to convey personal feelings or feedback. These media do not transmit the subtleties associated with the unpredictable, messy, emotional aspects of organizations. On the other hand, extensive face-to-face meetings for simple phenomena may also be inefficient. Face-to-face discussion sends a variety of cues, which may not always agree with one another. Facial expression may distract from spoken words. Multiple cues can distract the receiver’s attention from the routine message.” (p. 200.)

In face-to-face communication people receive most of their information non-verbally. Body language is more effective than spoken language. Mehrabian (1971) showed that in face-to-face communication only seven percent of the context was transmitted by verbal language. Ninety-three percent of the content was transmitted through facial expression, tone of voice, gestures and other nonverbal means. Suppose I say to you “That was a great piece of work you did!” You’ll interpret my meaning differently if I use a sarcastic tone and angry facial expression then if my tone is enthusiastic and my expression happy. (A. Mehrabian, Silent Messages, Belmont, CA: Wadsworth, 1971)

The key to information richness is communication. Is the richness of information more in the portrayal of that information or in the perception of that information? If richness has to do with the potential information-carrying capacity of the communication, does sending or receiving deliver most on that potential? Communication has to do with the transfer of information. So, both the sender and the receiver of the information participate in the richness of the information transferred. Look at the feedback column in Figure 1.4.4.2. The more connected the sender and the receiver are during the transfer of information, the richer the information. So, the richness is not in the information, but in the process and mechanisms by which that information is transferred. Notice also that the more biased the format of the information and of the process for transferring the information, the richer the information is. Richness, biasedness, and ambiguity tend to go together. How valuable is biased information? How valuable is rich information?

Daft and Lengel relate information richness to management tools. They say management information systems are at the low end of the richness continuum in Figure 1.4.4.2. The conclusion is that computer-based manage-
ment information systems aren’t very useful to managers. The computer has the lowest variety language. Indeed, the computer strips the specifiers from data and stores fact in one place and meaning in another. To get even low-variety information, you have to search the data stores for fact, meaning, and reference points and then construct information. Daft and Lengel say, “Tushman and Nadler (1977) believe that information designers are more concerned with fitting data to their hardware than with understanding the overall information needs of managers. Information system designers lack a theory about manager needs and behavior. By limiting data to those things amenable to machine hardware, information designers miss the root causes of manager information processing. Most managerial tasks are too ill-defined for quantitative data, yet system designers assume that computer output is sufficient for management decisions. MIS systems are able to capture and communicate about the stable, predictable activities, but not about the important, subjective, ill-defined events relevant to decision making.” (p. 204)

<table>
<thead>
<tr>
<th>Information Richness</th>
<th>Medium</th>
<th>Feedback</th>
<th>Channel</th>
<th>Source</th>
<th>Language</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>Face-to-Face</td>
<td>Immediate</td>
<td>Visual, Audio</td>
<td>Personal</td>
<td>Body, Natural</td>
</tr>
<tr>
<td></td>
<td>Telephone</td>
<td>Fast</td>
<td>Audio</td>
<td>Personal</td>
<td>Natural</td>
</tr>
<tr>
<td></td>
<td>Written, Personal</td>
<td>Slow</td>
<td>Limited Visual</td>
<td>Personal</td>
<td>Natural</td>
</tr>
<tr>
<td></td>
<td>Written, Formal</td>
<td>Very Slow</td>
<td>Limited Visual</td>
<td>Impersonal</td>
<td>Natural</td>
</tr>
<tr>
<td></td>
<td>Numeric, Formal</td>
<td>Very Slow</td>
<td>Limited Visual</td>
<td>Impersonal</td>
<td>Numeric</td>
</tr>
</tbody>
</table>

**Figure 1.4.4.2.** The characteristics of media that determine richness of information processed show us reasons why some information carries more information to decision makers than other information. The decision maker wants the amount of information needed for a particular situation. We can have information overload from too rich a medium when used for a very structured decision. (taken from Daft and Lengel)
1. **Background**

1.4. **Theory**

1.4.5. **Frameworks**
1.4.5.1. THE NEED FOR FRAMEWORKS

Frameworks help you characterize your domain of responsibility.

What kind of domain of responsibility (management system) do you have? How is your domain like those of others? What tools work well for domains like yours and may or may not work for you? Why? Which tools work well for domains unlike yours and will not work for you? How do you tell the difference?

In the next several modules, I’ll describe four frameworks to classify what you do and put your domain of responsibility in context. Systems and their components have attributes. The frameworks get at the attributes (characteristics) of the management system and its three components.

The frameworks look at 1) pursuits in terms of uncertainty, 2) endeavors in terms of comprehensiveness, 3) decisions in terms of unstructuredness, and 4) stages in terms of maturity. These frameworks are management tools supporting a manager or a consultant in diagnosing an organization. The frameworks are what I would use today to observe, diagnose, and classify the organization as described in the “vision” part of module 1.1.13. The first and fourth frameworks are mine, and the middle two are adapted from R. N. Anthony and H. A. Simon, respectively. These frameworks will help you answer questions like: I know I have a critical path, but why can’t I determine slack time? Why do I need query systems when I can’t yet get good data into the system? Shouldn’t I data-log in my process before I try to optimize it?

Unlike the models or frameworks that describe the mechanics or internals of your domain, such as the Management System Model (MSM) or the earlier work of Forrester, Blumenthal, and Dearden, now I’ll describe the context or externals of your domain. The contextual and mechanical frameworks reinforce one another; together they strive to provide a full and accurate description of any manager's domain of responsibility.

Each framework shows a dimension for characterizing an organization. Like human characteristics, you don’t have a good view of the organization until you see as many of its characteristics as possible. Also like human characteristics, the organization may show one version of a characteristic now and another version later. A person may act like a sensor today and an intuitive tomorrow. But beneath it all, one version dominates, at least in terms of tendency or preference. That is also true for an organization.

For the organization, the visibility stage of the maturity dimension is but one characteristic of many. The organization may display this version today, and look like the control stage tomorrow. I like to think the organization is both but in different proportions.

In studying nuclei we can develop spectra; that is, different behavior of the nucleus at different energy levels, for example. The spectrum looks like Figure 1.4.5.1. Depending on the energy level, the nucleus looks different. If I show a dimension for maturity of the organization, I say the organization looks different for different maturity levels. Figure 1.4.5.1. is a maturity spectrum for an hypothetical organization.

I don’t know how to describe or operationalize maturity (for decision making) of the organi-
The organization represented in Figure 1.4.5.1. displays all three levels of maturity; although relatively more visibility and relatively less control. I’d start developing management tools for visibility before tools for control because they’d be used more in this organization. Another organization with a different spectrum would lead me to develop a different set of management tools.

Thorngate has a postulate of commensurate complexity. For theories of social behavior, he states that the theory, model, or framework can’t be simultaneously simple, accurate, and general. (W. Thorngate, ‘In general’ vs. ‘It depends’: Some comments on the Geigen-Schlenker debate, Personality and Social Psychology Bulletin, 1976, pp. 404 - 410.) The frameworks I’ll describe in the next set of modules are simple and general. The fact that we can argue about how I’ve approximated continuous variables as discrete variables speaks to the accuracy of the frameworks.

Using our understanding of the maturity of the organization for decision making together with our understanding of the other dimensions helps us figure what management tools to select or build to support decision making. Looking only at the spectrum for maturity in the hypothetical organization in Figure 1.4.5.1., we need tools for visibility most of the time and tools for control or optimization some of the time. Other organizations would have different spectra supporting different needs for tools. Clearly, we’d like a host of tools, each matched to its support of a need in one of the levels of organizational maturity. If we consider the importance of the instances of visibility, control, and optimization as being equal, we should put our first energies into building and using visibility tools (strong sensor capability) for the organization represented by Figure 1.4.5.1.

For Figure 1.4.5.1., I’ve addressed stages in terms of maturity, one of the four dimensions described in my four frameworks. No dimension is necessarily more important than others. Importance depends on what you’re looking for. Within a given dimension, one of the levels, or discrete pieces, dominates as shown in Figure 1.4.5.1. for the hypothetical organization.
Figure 1.4.5.1. This spectrum for the maturity dimension for an hypothetical organization shows that we might simplify the characterization of the organization as being in the visibility stage; however, the organization at different times and in different places displays characteristics throughout the spectrum.
1. **Background**

1.4. **Theory**

1.4.5. **Frameworks**

1.4.5.2. **The Framework of Pursuits**
1.4.5.2.1. CHARACTERIZING THE DOMAIN BY UNCERTAINTY

Uncertainty has to do with not knowing Where We Are, Where We Want To Be, nor How To Get There.

Sometimes You Know Where You Are Going, and Sometimes You Don’t.
In my first framework, I classify your responsibility by uncertainty (or lack of definition). I use Jay Galbraith’s definition of uncertainty: “Uncertainty is defined as the difference between the amount of information required to perform the task and the amount of information possessed by the organization.” (Jay Galbraith, Designing Complex Organizations, Addison Wesley Publishing Company, 1973, p. 5.)

I define uncertainty simply as the ratio of the information you need to the information you have. If you need a lot of information and have a little, your domain is uncertain. Relatively speaking, if you need a little information and have a lot (enough), your domain is certain. You need relatively more information if you 1) have a diverse set of complex products and services and processes for producing the products and services, 2) use diverse and complex inputs from diverse suppliers, 3) the aim of your system is difficult to achieve, 4) the consequences of your activities are severe, and 5) if your work is highly visible to diverse stakeholders.

Galbraith says, “It is information processing, and specifically information processing during actual task execution, that is the key concept.” See also Michael L. Tushman and David A. Nadler, Information Processing as an Integrating Concept in Organizational Design, Academy of Management Review, July 1978, page 616. “As work related uncertainty increases, so does the need for increased amounts of information, and thus the need for increased information processing capacity.”

Later, in Module 2.1.9.3., we’ll discuss the differences among bad, good, and relevant data and information. If information lacks accuracy or timeliness or both, it’s bad information. If information is both accurate and timely, it’s good information. To be relevant, good information must also be relevant to the decision being made. I believe relevant information adds the most to certainty. Therefore, uncertainty is the ratio of the information you need to the relevant information you have.

In Figure 1.4.5.2.1., I define five classifications of pursuits, depending on uncertainty. I call the major, broad efforts for which you’re responsible pursuits. The engineering approach includes knowing where you are, where you want to be, and how to get there from here. I define a perplexity as a pursuit in which you know neither where you are, where you want to be, nor how to get there. I define a process as a pursuit in which you know all these things. I use the word pursuits as opposed to functions or activities because I use these other words to mean other things.

The Five Pursuits
A process is a pursuit that routinely and repeatedly achieves the same known end through well-defined intermediate steps from start to finish. An example of a process is a bottling plant for soft drinks or preparing an annual budget.

A process is very certain in that I know where I am, where I want to be, and I’m refining how to get there so I can get there better and better each time. I defined process very carefully in module 1.1.16.5. You can now see why I distinguish a process from a system (unlike
Scherkenbach) because your management system can have a process in it or one or more of the other pursuits I’ll describe now.

A project is a pursuit for which you know the starting point (where you are) and have full quantitative specifications for the end (where you want to be). In a project, you do a given pursuit once. Although it is the first of its kind (not a process), you have drawings and detailed specifications for the end. An example of a project is the first version of a plan or a prototype instrument or constructing a new production plant. In a project, figuring out how to get there is relatively straightforward because you know where you are and where you want to be. When you do a project, you’re always changing a process. Your project changes the process from what it is now to what you want the process to be.

A program is a pursuit with a definite starting point but for which you have only a qualitative fix on the end. Programs include research and development programs or pursuits where you evaluate alternatives, each of which provides a different solution to the given problem. An example of a program is an economic analysis for choosing between new product lines or research and development on high-level radioactive waste disposal. In the first example, the qualitative end is to maximize profit and satisfy customers; in the second example, to isolate all high-level waste from the biosphere. Figuring out how to get there is difficult because you don’t have a definitive fix on the end. You don’t know exactly where you want to be. Research (as in research program) involves discovery—discovery of the end and of how to get there. After you discover the end, you can make a project out of a program.

A problem is a pursuit with a definite starting point but a completely unspecifiable end. In emergency response you can define the beginning, but you can’t define where the emergency might take you and what else it might affect. An example of a problem is the resolution of the Three Mile Island incident, the highjacking of TWA Flight 847 from Athens to Rome, or the introduction of a competitive product on the market.

At the highest level of uncertainty, a perplexity is a pursuit for which you can specify neither the start nor the end, and hence nothing in between. In emergency management you must be ready to manage whatever comes along without any (or much) forewarning. Federal emergency managers may receive a call on a situation similar to Three Mile Island, Love Canal, Mount St. Helens, the Cuban refugees in Florida, the errant re-entry of a Soviet spaceship, or some incident totally unpredictable. They just have to manage it, whatever it is. The classic example of a perplexity is emergency preparedness.

Your Domain Includes All Classifications of Pursuit to Some Degree.

A comment regarding all four frameworks is in order. As you review the classifications of the framework (e.g. the different pursuits) you will realize that you really have some of all (or almost all) of the classifications in your domain of responsibility. Indeed, in your domain, you have a spectrum of responsibilities across the classifications. Therefore, you need many management tools so you can use the right tool for the right thing. You’ll also realize that to a greater or lesser extent, one of the classifications dominates and that predominance should influence the priorities in obtaining and improving your management tools.

As I showed in Figure 1.4.5.1. for the maturity dimension, you’ll have a spectrum of pursuits for the uncertainty dimension in your domain of responsibility. The person responsible for emergency preparedness may feel their whole life is a perplexity. But they go through a budget process once a year, a hiring process
every time they add a new person to their staff, and so on. In a similar fashion, the person responsible for a bottle manufacturing plant may feel their whole life is a process, but they’re not certain that the line might not break down tomorrow or a worker won’t show up today, or were perplexed with the problem of materials having to be back ordered yesterday. In short, each domain has its unique spectrum of pursuits across the uncertainty dimension. The emergency manager needs different management tools from the bottle plant manager most of the time, but when he or she does the hiring process they need tools like anyone else doing a process. I’ve used some thought to divide the continuous variable for uncertainty into five discreet categories. Because the categories are an approximation, you can expect the dividing line between the categories to be fuzzy.

<table>
<thead>
<tr>
<th>FIVE PURSUITS RANGE FROM UNCERTAIN TO CERTAIN.</th>
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</thead>
<tbody>
<tr>
<td><strong>UNCERTAINTY</strong></td>
</tr>
<tr>
<td>PERPLEXITY - Can specify neither the start nor the end.</td>
</tr>
<tr>
<td>PROBLEM - Can specify the start but not the end.</td>
</tr>
<tr>
<td>PROGRAM - Know the start and have a qualitative fix on the end.</td>
</tr>
<tr>
<td>PROJECT - Know the start and have the specifications for the end.</td>
</tr>
<tr>
<td>PROCESS - Repeatedly achieve the same known end.</td>
</tr>
</tbody>
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**Figure 1.4.5.2.1.** Uncertainty is a matter of what you know and what you don’t.
1.4.5.2.2. **How to Manage Pursuits**

How you manage your domain of responsibility and the tools you need depend on the mix of pursuits and the resulting degree of uncertainty in your domain. You want to reduce the uncertainty.

**Pursuits without a Defined End**

Note from Figure 1.4.5.2.1. that for the top three pursuits, the end isn’t well defined. Many of you do or will manage pursuits where the end isn’t specified. You may have an uncertain task in a structured environment (e.g. some government organizations). Uncertain tasks are most easily managed in flexible environments. For those of you in some form of government organization, notice how much of what you do involves the top three pursuits. National defense, disease control, environmental protection, and welfare aren’t exactly well defined with well-defined ends.

If you look at Figure 1.4.5.2.1. and draw an imaginary line between programs and projects, the pursuits above the line are prevalent in government organizations. For such pursuits, how do you do networking and apply CPM and PERT? How do you do life-cycle costing? How do you do personpower and resource loading? How do you do scheduling? You can’t, because the end must be specified to apply any of these techniques.

If you find yourself unable to use the traditional techniques just listed, your frustration is that you still need to deal with bottlenecks, cost projections, resources, and time. The management consultant response to your plight is, “You don’t manage right!” The truth of the matter is that you manage something different. You’ve already surmised that tried-and-tested techniques successful for one pursuit will probably fail for another.

**Rule for Managing Undefined Pursuits**

Without detailed discussions of how to develop techniques for the uncertain pursuits, a single sentence can describe how these pursuits should be managed. *Drive the management of the uncertain pursuit to the next more certain pursuit.* For example, we manage emergency preparedness (a perplexity) by defining and planning for responses to as many contingencies as possible; and, by considering the various contingencies, we determine a generic response. Of course, contingency-specific responses are used wherever possible. By looking at emergency preparedness as hypothesizing responses to different classes of problems (flood, fire, chemical releases, security incident), we try to drive the perplexity to a problem and then manage the problem.

In a program we research as many alternatives as possible—the best researcher being the one who can effectively limit the number of alternatives that must be studied. We research the alternatives and ultimately, based on the research results, choose one or more alternatives to prototype (i.e., make a project out of the program).

Over the long haul then, we begin with a perplexity, such as “I wonder what the customer might need someday?” Then we move the perplexity to a problem, such as “The customer needs a product or service for moving heavy luggage through airports.” We move the problem to a program, such as “We must do research and development to see what the possibilities are for energized luggage.” Then we move the program to a project, such as “Let’s build a prototype for an electric-motor-driven wheeled suitcase meeting certain size, weight, speed, and other specifica-
tions.” Finally, we move the project to a process, such as “We’ll build and operate a manufacturing line to produce intelligent mechanized suitcases for finding their way through airports.”

Choosing Tools for Pursuits
I’m always amazed at how many organizations admit that 25-50% or more of their time is spent in managing brush fires (especially information brush fires), which lead to discontinuity of organization, and whose management tools (organization structure, plans, information systems) are modeled after those that work well for processes. For one sponsor, consumed by information brush fires as part of their perplexities and problems, I designed an organization structure which considered brush fires as routine. Part of the organization would be responsible for brush fires and these situations would be handled routinely as the rest of the organization continues with its other responsibilities.

Many algorithms and quantitative models fail for uncertain pursuits. In quantifying the concepts, tools like material requirements planning (MRP) and critical path method (CPM) have been constrained. Even though MRP and CPM packages don’t work for perplexities or programs, the qualitative concepts behind these techniques are general and apply to all pursuits. If we consider the concept in its general form, different models can be developed that will work for other pursuits. We must be careful not to quantify a qualitative model too soon or inappropriately.

I like to describe a tongue-in-cheek history of critical path. I imagine that critical path was figured out by a caveman who recognized that he had activities in his domain that caused bottlenecks. In Figure 1.4.5.2.2., he couldn’t eat until he killed his dinner, and he ate whatever he killed. He focused his attention on the bottlenecks to most effectively manage his existence. That way of thinking helped cave-men manage for years. The bottleneck concept was exercised in its purest form.

Then one day an academician decided to quantify the concept of bottlenecks into minimum slack time—a parameter which depends on duration of activities and knowing the end of the pursuit. This quantification restricted the concept (as trying to write equations for highly nonlinear concepts does). Now we think in terms of quantifiable slack times instead of qualitative bottlenecks. We have to know what dinner is going to be and when dinner is going to be before we can network the process of preparing it.

Jay Forrester, in his book *Industrial Dynamics*, emphasizes the dilemma of trying to work with only quantifiable data. “Many persons discount the potential utility of models of industrial operations or the assumption that we lack adequate data on which to base a model. They believe that the first step must be extensive collecting of statistical data. Exactly the reverse is true. . . . A model should come first. And one of the first uses of the model should be to determine what formal data need to be collected. . . . What is the relative importance of the many different variables? How accurately is the information needed? What will be the consequences of incorrect data? These questions should be answered before much time or money is expended in data gathering.

Much of the value of the mathematical model comes from its ‘precision’ and not from its ‘accuracy.’ Constructing a model implies nothing one way or the other about the accuracy of what is being precisely stated. . . . There seems to be a general misunderstanding to the effect that a mathematical model cannot be undertaken until every constant and functional relationship is known to high accuracy. This often leads to the omission of admittedly highly significant factors (most of the ‘intangible’
influences on decisions) because these are unmeasured or unmeasurable. To omit such variables is equivalent to saying they have zero effect—probably the only value that is known to be wrong!

Our verbal model, when converted to precise mathematical form, may be inconsistent with the qualitative nature of the real world we observe around us. We may find that cherished prejudices cannot, by any plausible combination of assumptions, be shown to have validity. Through any of these we learn.

A model must start with a ‘structure,’ meaning the general nature of the interrelationships within it. Assumptions about structure must be made before we can collect data from the real system.” (pp. 57-58.)

For my real-world program example of the high-level radioactive waste disposal research and development program, by anecdotal observation the critical path includes public acceptance, congressional approval, and environmental impact—activities for which we cannot develop minimum slack times. The basic concept of bottlenecks applies but isn’t now receptive to quantification because the quantification that exists is too restrictive. So, we can’t use critical path. Recognizing this and dozens of other limitations in definition, structure, and quantification uncovered by viewing domains of responsibility according to this uncertainty framework, Management Systems Laboratories concentrates on tools for pursuits without defined ends for organizations which enjoy a high level of scrutiny—that is ill-defined problems with potentially severe consequences.

For the more certain pursuits, we can concentrate on management tools for productivity and efficiency, which Peter Drucker says means doing things right. For the more uncertain pursuits we must attend to performance or effectiveness, which Drucker says means doing the right things.

Regardless of the pursuit, you need management tools to work with four entities: resources, schedule, quality, and critics. For example, if your resources are cut, either the schedule must slip or the quality must suffer, or both, and the result will affect your critics.

**Changing Pursuits Means Changing Tools.**

During their careers, many managers find that their responsibilities change among the pursuits. Most often their programs develop into projects requiring an entirely different set of management tools. Sometimes the manager changes jobs or is reassigned to a responsibility involving a pursuit different from his or her experience.

As the manager is organizationally moved around, the characteristics of the manager may or may not fit well with the type of pursuit for which he or she is responsible. I worked with a government manager who was responsible for the high-level nuclear waste research and development program. A consultant convinced him to get control of his effort he needed a very expensive, elaborate networking system. After spending three million dollars installing the system and tying to convert his practices to align them with his new management tool (the means driving the ends rather than visa versa), the manager was frustrated, angry, and had learned critical path and networking were expensive useless tools. The computer-based networking model failed because, for a program, we don’t know the end and the model required specifications for the end. Several years later, a new President of the United States (Reagan) caused the research and development program to choose an alternative and proceed to a project. The plant to deal with a high-level waste was to be built. Guess who was put in charge of the project for building a plant for which we now had speci-
fications? The same manager who had learned painfully of the uselessness of networking. Guess what tool was exactly right for the project? The computer-based networking model. The program had become a project and the end was known. The manager wouldn’t touch the right tool with a ten-foot pole. Had the manager understood the difference between the spectra of pursuits between the two domains (the program before Reagan and the project after Reagan) he would have been able to choose the right tool.

Effective leadership style depends on pursuit. According to Fred Fiedler, task-oriented leaders are best in very certain and very uncertain environments. For uncertain environments, the leader doesn’t have time for relationships and must get the task done. For certain environments, the task is clear and the leader must concentrate on it. Relationship-oriented leaders are best in the other environments. I draw the simple correlation between Fiedler’s environments and my more structured pursuits, and the relationship between leadership style and pursuits applies.

Obviously what is managed, who manages, and especially what is used to manage are different for successfully managing different pursuits. As we briefly view the other three contextual frameworks we’ll note the same results.

Figure 1.4.5.2.2. “The shortest path between here and dinner is a dead mastodon.”
1.4.5.2.3. Origins of the Pursuits Framework
1.4.5.3. We Begin with Visibility—Rembrandt Van Rijn
1. Background

1.4. Theory

1.4.5. Frameworks

1.4.5.4. The framework of endeavors
1.4.5.4.1. Characterizing the Domain by Endeavor

Sometimes you solve problems and sometimes you figure out which problems to solve.

A Broad Effort Extends Your Effect and Limits Your Support.

The second framework is adapted from the work of R. N. Anthony. I classify the things you do in your domain of responsibility as levels of endeavors. (I save the word activity for another meaning and another purpose.) I define endeavors as your serious determined efforts directed toward a result. These endeavors, which are performed at sequentially greater levels of broadness of perspective, generality in direction, and responsibility (answerability), are shown in Figure 1.4.5.4.1. In the framework of pursuits, you really have a range of pursuits with one dominating your domain. In this framework of endeavors, you have a spectrum of endeavors, for which you’re responsible and in which one predominates.

Often the same word (e.g., activity) is used to mean several slightly different things. Problems occur when we try to discuss two of those things at the same time or to compare them. At those times we substitute another word for one of the things (task, effort, endeavor, undertaking) and what we mean by that thing becomes more confused rather than clearer. Therefore, I’ve taken some pains to choose words I can use consistently throughout the discussion on management systems engineering. Sometimes I’ve had to make distinctions between words that are synonyms in the dictionary.

Anthony’s framework, intended for thinking about management planning and control systems, categorizes organizational activities as strategic planning, management control, and operational control. His interest was in the purpose of management activities (endeavors). Most information system problems have occurred when managers try to be successful with a management information system (MIS) at the strategic planning level based on successes of the MIS at the operational control level. I’ve adapted Anthony’s framework to include strategic, tactical, operational and clerical endeavors.

Anthony specifically stayed away from equating management control with “tactics” because “a military tactical maneuver has a definite beginning and end, whereas the management control process relates to recurring cycle of operations.” (Robert N. Anthony, Planning and Control Systems: A Framework for Analysis, Graduate School of Business Administration, Harvard University, 1965, p. 56.) I choose the term tactical to describe those endeavors within the recurring cycle of operations which are carried out to meet more quantifiable results using smaller efforts, fewer resources, and more specific guidance than for strategic-level endeavors.

Strategic Endeavors

Your strategic endeavors are of greater importance within your integrated efforts; they embrace all considerations, entail greater risks and consequences, and are global in nature. The resources required are more substantial, more varied, and are not easily integrated. There are fewer precedents upon which to base decisions. There are few, if any, higher-level rules or directions upon which to base decisions. The strategic endeavors are aimed at directing and organizing the operation. In short, you do strategic endeavors when you’re figuring out which problem to solve or when
you’re figuring out what kind of problem you really have.

Be careful not to confuse strategic-level endeavors with strategic-level managers. The corporate president is a strategic-level manager whose domain of responsibility should be dominated by strategic endeavors. However, he or she still has many endeavors at the tactical, operational, and even the clerical levels. For performing clerical endeavors (e.g., finding the bathroom or operating the new phone system) a management tool for strategic endeavors (e.g., policy for constructing skyscrapers or for corporate communications) is far removed from the needs of the clerical endeavors. A strategic tool (like a corporate communications policy) is only helpful in dialing the telephone under the new phone system in as much as the instructions you need to dial the phone relate to the organization’s communications policy. Simple, highly specific, constrained tools are needed for the clerical endeavor (e.g., a map or list of instructions).

Just as the strategic-level person does some clerical endeavors, the clerical-level person does some strategic-level endeavors. The janitor finds a mess and has to figure out what kind of problem he or she has before he or she can determine what cleaning tools and solvents or cleansers he or she needs to clean up the mess.

Recall in Module 1.1.14.3. I indicated that the difficult endeavor of determining your unit of interest was a strategic endeavor. If you work on the wrong unit of interest you’re solving the wrong problem.

Recall also that I’ve discussed how we don’t teach people how to figure out what the problem is. We end up with people working hard on wonderful solutions to the wrong problem. (See, for example, module 1.1.14.3.) We don’t help people learn about doing strategic endeavors. That’s why strategic endeavors seem so hard to do. In grade school, both math teachers and students hate to do word problems. We don’t like word problems because we’re not sure exactly what the problem is and what method we should use to solve the problem. We prefer number problems where everything is given and we plug numbers into the formula we know we’re supposed to use. We teach people how to do clerical endeavors.

Tactical Endeavors
Your tactical endeavors are aimed at controlling your operation. Plans are critical in tactical endeavors even though planning is done at all levels. Organizing and effectively using resources and controlling the operation are tactical endeavors. In short, given that you’ve figured out what problem you have when doing the strategic endeavor, in a tactical endeavor you now figure out what resources you need and what controls you need so you can solve that problem.

Operational Endeavors
Of the four types of endeavors, the top three are supervisory in nature. The operational endeavor is the lowest level of supervision. This level assures that specific tasks are carried out effectively and efficiently. Operational endeavors focus on execution and on staffing of workers to carry out the operations. For operational endeavors, you schedule and control individual tasks rather than appraising the performance of the operation; you procure needed items rather than supervising procurement; you staff your tasks rather than doing personnel management; and you control costs rather than develop budgets. In short, given that you’ve figured out what problem you have when doing the strategic endeavor, in an operational endeavor you now figure out what resources you need and what controls you need so you can solve that problem.
Clerical Endeavors
The clerical endeavor is a doing endeavor rather than a supervisory one. The word clerk relates to keeping records, working at a sales counter, or assigning hotel guests to their rooms; but, used generally, the clerical endeavor includes all hands-on effort to generate the goods and/or services of your operation. We could also call a clerical endeavor a worker endeavor. In short, now that you know the right problem by doing a strategic endeavor, the right resources to apply to the problem by doing a tactical endeavor, and the right steps to take by doing an operational endeavor, you use clerical endeavors to apply the resources to the steps and solve the problem. If done properly, people doing clerical endeavors are the problem solvers, whereas people doing the strategic endeavors are the problem figure-outers.

Different Endeavors Require Different Tools.
On a production line in a manufacturing plant, the operator does a preponderance of clerical endeavors, as does a secretary. However these people do have operational endeavors involving staffing, scheduling, and procurement. From time to time they may plan procurement or measure performance—tactical endeavors. The foreman on the same production line is concerned with scheduling maintenance and keeping the line at peak performance and has a preponderance of operational endeavors. The shift supervisor has production goals and considers product changeover and other mostly tactical endeavors. The plant manager is concerned with profitability and long-range planning. These endeavors are strategic.

Business computers and their predecessors were employed historically to solve problems at the operational and clerical levels of the organization. They focused upon the day-to-day, transaction-oriented functions which were structured, definable, had specific input and output, were repetitious, and were very precise.

Computers were capable of doing these functions better than people because they were faster, more accurate, and more predictable than people. Therefore, people displacement (or automation) was the primary justification for computer applications addressing operational and clerical endeavors in an organization.

Two factors have changed this early view of how computers could be used to best advantage. The first factor is that because of the rapid and unceasing increase in technology since computers were conceived, more data could be maintained in more flexible databases, information could be displayed in formats resembling accepted manual reports, and the time saved in overseeing operational tasks could be spent on endeavors requiring more judgment. Thus, we could begin to focus on tactical endeavors and on resource allocation problems which had considerably greater impact on profitability than merely automating the transaction processing procedures.

The second factor is that for higher levels of endeavors, and especially the strategic endeavors, the logical question to ask was, “Since I’m spending so much money on computers, why aren’t they solving my problems?” The answer is “Because tactical and strategic levels of management include a different mix of the kinds of endeavors.” Strategic-level people with a preponderance of strategic endeavors want help with their work too. But we haven’t developed computers to figure out which problem to solve or what kind of problem we really have. So, for strategic-level people, we use computers to help them do clerical endeavors and sometimes operational endeavors just like we do for operational-level and clerical-level people. By helping strategic-level people with their clerical and operational endeavors we
preserve more of their time for strategic endeavors.

The Endeavor Spectrum
Just as you did for pursuits, you can determine how much of each endeavor you do in your domain. Since comprehensiveness is a continuous variable, I’ve approximated the situation by developing four endeavor categories for comprehensiveness. If you could measure comprehensiveness precisely and you distributed what you do against a comprehensiveness dimension, you’d find a spectrum. Typically, your spectrum would peak somewhere and that somewhere would determine which category of endeavor dominates in your domain.

Figure 1.4.5.4.1. Your endeavors are more comprehensive and take broader understanding of the issues involved and relationships with other endeavors at the strategic level of effort (not necessarily of the organization) than at the clerical level.
1.4.5.4.2. **DISTINGUISHING BETWEEN ORGANIZATIONAL LEVEL AND ENDEAVOR**

A manager at any organization level can do any of the endeavors. We expect strategic-level people to do more strategic endeavors than tactical-, operational-, or clerical-level people; but the reverse may occur, depending on the person and the situation.

I want to distinguish between levels in an organization and what managers do (endeavors). At any level in an organization, people do a mix of endeavors, although a level is characterized by the relative amounts of endeavors a person does at that level. For example, a person at a strategic level in the organization does strategic, tactical, operational, and clerical endeavors, but he or she does (or should do) more strategic endeavors than people at other levels in the organization. A strategic-level manager figures out how to deal with new competition or if the organization’s culture should change and which is more important at the moment (strategic endeavors); but they may also dial their own phone and open their mail (clerical endeavors). As a strategic-level manager finds ways for clerical-level people to do more of his or her clerical endeavors for him or her, he or she gains time to spend on strategic and other endeavors.

The spectrum of endeavors is continuous, but can be approximated by discrete categories, and four categories are conventional from the literature. Work is planned from the top down and executed from the bottom up. So the bottom organizational level, clerical, is a doing level, not a supervisory one. Strategic, tactical, and operational levels are supervisory levels. Management is decision making. So all endeavors are management endeavors. But not all levels are supervisory.

On the right side of Figure 1.4.5.4.2, you can see Anthony’s strategic planning, management control, and operational control activities. You can see the triangle representation for organizational hierarchy everywhere. The idea is to show the top manager on top doing the general management (broad global efforts), middle management in the middle, and the large number of workers at the bottom doing the work. This representation is dangerous. Be careful.

The reasons the representation in Figure 1.4.5.4.2 is dangerous are: 1) top management is separated from the workers, 2) middle management is seen as span breakers, and 3) the endeavors look like they’re exclusively level oriented. Deming, who dislikes hierarchical-level representations of the organization prefers process-oriented representations like the one in Figure 1.1.16.5.3. The idea is that middle managers have more important things to do than delay and distort communication up and down the hierarchy. Everyone in the organization shares in all the endeavors. As we move more and more decision making from a select few to all the people in the organization.
organization, we realize people everywhere make strategic decisions about strategic endeavors.

Referring to what’s wrong with Figure 1.4.5.4.2., not only do operational managers (a title showing level in the organization only) do some strategic endeavors, so do the workers who would be shown on the triangle below them. I recognize that the chief executive officer usually has a lot of experience and proven ability, thereby making him or her well equipped for doing strategic endeavors. We hope that the chief executive officer does more strategic endeavors than others. That’s why we pay them so much. But, unfortunately some top managers spend too much time on operational and clerical endeavors they should be delegating to others.

I worked with a top manager in government who was incensed when I said top managers should do strategic endeavors; that is, figure out what problems to solve and what the problems really were. He said, “But, I’m a problem solver.” He had an engineering background, and engineers pride themselves on being problem solvers. Sure, he solved problems. But who was figuring out the right problems to solve? This story raises two issues: 1) too many people work on solutions without having done the strategic endeavors, thereby solving the wrong problems and 2) strategic-level managers do tactical, operational, and clerical endeavors too. Strategic endeavors are difficult to do and lack immediate gratification. Anyone would want to do the problem solving and see results. But we pay strategic-level managers to do difficult things.

Today, we don’t separate levels of management. I define management as decision making; and everyone makes decisions. We want to empower our people and empowerment means we move the right types of decisions to those who have the right experience and capability and are closest to the information they need to make the decisions. We recognize that top managers aren’t at the top: managers are everywhere and they deal with endeavors throughout the endeavors framework as does anyone with a domain of responsibility. In the foreword of Max DePree’s book Leadership Is an Art, James O’Toole describes his first visit to a Herman Miller factory. “I was given carte blanche to go anywhere and talk to anyone, managers and workers. The only problem was that I couldn’t tell one from the other! People who seemed to be production workers were engaged in solving the ‘managerial’ problems of improving productivity and quality. People who seemed to be managers had their sleeves rolled up and were working, side by side, with everybody else in an all-out effort to produce the best products in the most effective way. ‘The signs of outstanding leadership are found among the followers,’ Max writes in this wonderful little book.” (Dell Publishing, 1949, p. xxii.)
Figure 1.4.5.4.2. The classical illustration for organizational levels implies endeavor corresponds one-on-one with organizational levels. Not! (taken from Zachman)
The four endeavors help us figure out what contribution we’re making to problem solving and what management tools we need to help make our contribution.

Clerical endeavor decisions are structured, automatable. Information to support clerical decisions is primitive (straight-forward comparisons with a simple static, well-defined reference). The decisions we make in doing the other endeavors are more and more complex combinations of the automatable decisions as we go up the hierarchy. The complexity and type of combinations of automatable decisions distinguish among the upper endeavors. Information to support upper decisions is more sophisticated (complex comparisons with many dynamic, ill-defined references). As we go up the endeavors, the automatable decisions fit into complex combinations, with some left over. That’s why strategic-level managers have some clerical endeavors to do. Those particular ones haven’t been assembled into operational, tactical, or strategic combinations or haven’t been delegated. Two objectives of supervisors are 1) to delegate endeavors down organizational levels and 2) to intuitively combine automatable decisions and/or endeavors to make higher-level endeavors.

No research has defined and operationalized the endeavors to the degree that we can measure them and thereby study who does what and why and what information and tools they need to do it with. So we can study information and tools in the upcoming modules, I’ve developed working definitions of the endeavors. As we research what managers do and what management tools they need to do their work best, we can verify or update these definitions. For now the definitions are assumptions and this module is the reference. I’ll now carefully define the endeavors. My recognition of the definitions as working definitions to be verified through study and test also applies to the other frameworks.

I’ve identified a few functional criteria for the four types of endeavors. I show these criteria in Figure 1.4.5.4.3.

Strategic Endeavors
The strategic endeavor is the most comprehensive, complex, and complete (global) with internal and external (to the unit of interest) range. The strategic endeavor consists of global efforts aimed in a general direction using qualitative measures to evaluate the efforts. You set (planning) and meet (executing) goals using policy for guidance. You distinguish types of efforts by different pursuits (the uncertainty framework) and provide relationships among plans, which guide tactical endeavors.

A manager doing a strategic endeavor: 1) chooses the outcomes, opportunities, problems, and thereby the implied tasks to deal with, 2) sets priorities of outcomes and implied tasks based on importance and urgency, 3) uses the organizational environment and the internal and external forces as forcing functions, 4) uses a knowledge of resource availability and requirements for implied tasks as constraints, and 5) interfaces with the time, people (number and type), materials, and other resources required to do implied tasks to see if some outcomes and implied tasks are feasible within resource constraints. In short, managers doing strategic endeavors figure out which problems to solve or which opportunities to
take advantage of.

In doing strategic endeavors, you see tasks as names, or ideas, and you consider the implied outcomes of tasks. Your job is to choose needed outcomes to meet policy, culture, etc. and to change policy, if necessary. Peterson (Improving Academic Planning, 1980) 1) says strategic planning focuses on an institution’s relationship with its large environment (p. 140) and 2) shows the activities of institutional, values, and environmental assessment and master planning (p. 130) as part of strategic planning.

**Tactical Endeavors**

The tactical endeavor is oriented toward figuring out what inputs (resources) get what outputs (results), looking internally at the organization. The tactical endeavor consists of wide efforts directed toward a tangible result using quantitative measures to evaluate the efforts. You set (planning) and meet (executing) objectives using plans for guidance. You distinguish types of efforts by different activities and provide frameworks among procedures, which guide operational endeavors.

A manager doing a tactical endeavor: 1) chooses the outputs to satisfy the desired outcome, the challenges to meet to take advantage of the appropriate opportunity, and the resources to solve the designated problem, and thereby the implied resources to deal with tasks, 2) sets priorities of time allocation and people and other resource allocation based on outputs (results) needed to meet outcomes and implied tasks to do and based on availability of people, materials, equipment, etc. and time to do tasks, 3) uses the chosen outcomes, organizational goals, and priorities in importance and urgency as forcing functions, 4) uses a knowledge of the steps needed to implement the resources in carrying out implied tasks as constraints, and 5) interfaces with the designs and processes for doing tasks and the procedures for delivering outputs to see if it’s feasible to do the job with available resources. In short, managers doing tactical endeavors figure out what resources are needed to solve a given problem or to take advantage of a given opportunity.

In doing tactical endeavors, you see tasks as outcomes and consider the implied outputs, or results, of tasks. Your job is to choose needed outputs to achieve the outcomes and meet plans and to change the plans, if necessary. Peterson 1) says tactical planning focuses on an institution’s internal planning issues and 2) shows the activities of program planning, priority setting and resource allocation, and program review as part of tactical planning.

**Operational Endeavors**

The operational endeavor is oriented toward how to convert inputs to outputs—the transformation processes, their design (planning) and implementation (executing). The operational endeavor consists of limited efforts focused on a fixed outcome and output using restricted methods to accomplish the efforts. You set (planning) and meet (executing) missions using procedures for guidance. You distinguish types of efforts by different tasks and provide the value of instructions, which guide clerical endeavors.

A manager doing an operational endeavor: 1) chooses the path to transform inputs to outputs (resources to result) and thereby the implied steps to deal with tasks, 2) sets priorities and sequence of steps based on efficiency of tasks, 3) uses the knowledge of where we are and where we want to be as forcing functions, 4) uses a knowledge of the work needed to carry out the steps for implied tasks as constraints, and 5) interfaces with the actual effort to do the job to see if the steps and their sequence are feasible. In short, managers doing operational endeavors figure out what steps to take to use the designated resources to solve a given prob-
endeavors do the designed steps to use the designated resources to solve a given problem or to take advantage of a given opportunity and figure out whether the work they’ve done accomplishes the step.

In doing clerical endeavors, you see tasks as inputs and outputs and consider the implied steps to get the outputs from the inputs. Your job is to choose needed processes, steps, sequences, tools, and methods to get the outputs and to meet procedures and to change the procedures, if necessary. Peterson doesn’t discuss clerical planning.

Clerical Endeavors
The clerical endeavor is oriented toward how to do the steps and use the tools, looking at each step or instruction individually. The clerical endeavor consists of local efforts constrained to an explicit path using specific steps to accomplish the efforts. You set (planning) and meet (executing) jobs using instructions for guidance. You distinguish types of efforts by different actions and provide yes-no evaluations on the steps, which determine the success of the tasks.

A manager doing a clerical endeavor: 1) chooses to use a tool in a step and decides if the step did what it was supposed to do, 2) monitors and implements priorities in material availability, equipment maintenance, and throughput, 3) uses the knowledge of the steps and their sequence as forcing functions, 4) uses the knowledge of the status of the work as constraints, and 5) interfaces with the materials and machinery to see if the work is going smoothly. In short, managers doing clerical endeavors do the designed steps to use the designated resources to solve a given problem or to take advantage of a given opportunity and figure out whether the work they’ve done accomplishes the step.

In doing operational endeavors, you see tasks as inputs and outputs and consider the implied steps to get the outputs from the inputs. Your job is to choose needed processes, steps, sequences, tools, and methods to get the outputs and to meet procedures and to change the procedures, if necessary. Peterson says operational planning is implementing programs.

The Parallel Structure for Researching Endeavors
Note that the long sections describing the endeavors each contain three paragraphs and that the second paragraph has five ideas set off by commas. I’ve tried to make the thoughts in the paragraphs parallel for the endeavors and to be consistent with Module 1.4.5.4.1.

Each first paragraph contains four thoughts. The second sets of thoughts tie in Figure 1.4.5.4.1., and the third and fourth sets of thoughts tie in the five different categories of tools I’ll describe soon. At the end of each discussion on the endeavors, I’ve referenced Peterson who doesn’t say anything about clerical endeavors because he writes about planning. I can write parallel sentences on the endeavors reflecting other literature in addition to planning.
<table>
<thead>
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<th>FUNCTIONAL CRITERIA</th>
<th>STRATEGIC ENDEAVORS</th>
<th>TACTICAL ENDEAVORS</th>
<th>OPERATIONAL ENDEAVORS</th>
<th>CLERICAL ENDEAVORS</th>
</tr>
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<tr>
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<td>Decide What Problems to Solve</td>
<td>Decide What Resources to Use</td>
<td>Decide How to Solve the Problem</td>
<td>Solve the Problem</td>
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<td>WHAT THEY MANAGE</td>
<td>Outcomes</td>
<td>Outputs</td>
<td>Transformation Path</td>
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<td>WHAT IS ACCOMPLISHED</td>
<td>Goals</td>
<td>Objectives</td>
<td>Missions</td>
<td>Jobs</td>
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<tr>
<td>SETS PRIORITIES FOR</td>
<td>Outcomes and Implied Tasks</td>
<td>Allocating Resources</td>
<td>Steps</td>
<td>NONE (They Monitor and Implement Priorities)</td>
</tr>
<tr>
<td>TYPES OF EFFORT</td>
<td>Pursuits</td>
<td>Activities</td>
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<td>FORMULATION TOOL OR GUIDANCE</td>
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<tr>
<td>INTERFACES</td>
<td>Time, People, Materials, and Other Resources</td>
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<td>CONSTRAINTS</td>
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<td>Steps Needed to Allocate Resources</td>
<td>Work Needed to Carry Out Steps</td>
<td>Status of the Work</td>
</tr>
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</table>

Figure 1.4.5.4.3. The four types of endeavors help us find the right problem and solve it.
1. **Background**

1.4. **Theory**

1.4.5. **Frameworks**

1.4.5.5. **The Framework of Decisions**
Which Decisions Are Based on Definite Procedures?
As managers, we all must make decisions; and these decisions should result in actions that affect what is managed. For different domains of responsibility, different types of decisions predominate. These types are classified in Figure 1.4.5.5.1.

Originally, H. A. Simon distinguished two polar types of decisions: programmed decisions and unprogrammed decisions—those decisions made based on a definite procedure and those decisions for which there are no specific procedures. Gorry and Scott Morton used “the terms structured and unstructured for programmed and unprogrammed because [the new words] imply less dependence on the computer and more dependence on the basic character of the problem-solving activity in question.”

In the structured situation, all of Simon’s phases of the decision-making process—intelligence, design, and choice—can be automated. In the unstructured situation, the human decision-maker must provide judgment, intuition, and insights into the decision. Gorry and Scott Morton added a semi-structured classification for those decisions just below unstructured decisions but not yet structured decisions. As our ability to automate improves, the semi-structured decisions will become structured. I’ve adapted the three classifications as follows.

Structured Decisions
A structured decision is one that can be arrived at by routine analytical procedures. The structured decision is easily susceptible to automation; or, in the case of a non-computerized information system, the structured decision can confidently be left to people who follow clearly established instructions. Typical examples include inventory management, manufacturing control, and some forms of financial analysis.

Semi-structured Decisions
Decisions involving information and requiring management judgment (i.e., some people-input needed) are semi-structured and can be supported by management information systems. Semi-structured decisions involve tasks such as tactical and financial planning, budgeting, forecasting, and project evaluation. The techniques that apply to semi-structured decision making include financial modeling, risk analysis, statistical analysis and simulation.

Unstructured Decisions
Decisions involving judgment alone are known as unstructured decisions (i.e., only people input) and exceed the powers of current management information systems. An unstructured decision requires human judgment and intuition; it cannot be programmed because the decision is highly non-routine and cannot depend on any firm basis of established knowledge or rules. Unstructured decisions normally involve tasks such as strategic and long range planning. Artificial intelligence and perhaps porpoises aside, the only proven judgmental source is the human being.

Management Tools Ultimately Support Decisions.
Historically, the biggest problem with the management information system concept has
been the application of a structured-decision approach to cases where judgment is necessary.

Your decisions will range over a spectrum from structured to unstructured. The management tools that will work best are those that make decisions for structured situations and support your decisions for semi-structured and unstructured situations.

The framework for decisions has enormous and practical consequences in light of the Management System Model. The mix of decision types regularly required within a domain of responsibility for a given pursuit or endeavor indicates the parts of that domain to be delegated to various subordinates and to machines to effectively accomplish the manager’s needs. In other words, these frameworks help answer the question, “Who decides what, and with what kind of information?” The idea is to free as much managerial time as possible for the making of the least-structured decisions. In short, a manager’s responsibility is to accomplish his or her objectives in what Frederick Taylor called the “one best way,” by configuring the people (who manages), the information tools (what is used to manage), and the interface between people and tools so 1) every element of the domain works efficiently in his, her, and its sub-responsibility, and 2) all work together effectively as a system.

Even for types of decisions, the unstructuredness dimension represents a continuous variable. The division into three discrete ranges of decisions is arbitrary but convenient. When we learn about a given decision and move the decision from unstructured to semi-structured, there’s no point where we know we’ve moved from one type to the other.

**Figure 1.4.5.5.1.** You need different information from different management tools to support the different decisions you make.
1.4.5.5.2. The Framework of Gorry and Scott Morton.
Yesterday’s human expert becomes today’s expert system, which is destined to become tomorrow’s automation. That’s because expert systems help managers move from unstructured to structured decisions. The expert system is the management tool that helps the manager make semi-structured decisions.

I’ll show how we can diagnose what management tools are needed by describing a situation involving at least two of the frameworks—the framework for decisions in terms of unstructuredness and the framework for stages in terms of maturity. This situation involves conditions in plants making cigarettes in the 1970’s. By diagnosing the situation as moving from making unstructured decisions through semi-structured decisions on the way toward structured decisions, we realize that expert systems is a type of methods tool that helps the manager at the time he or she needs to make semi-structured decisions.

My description of the situation shows the relationship of the expert system, a management tool in the methods category, to semi-structured decisions in our attempt to move from visibility to control in the front part of the cigarette factory. I’ll describe the characteristics of the methods category of management tools and of expert systems as an example tool of the methods category in Module 1.5.1.3.4. In this discussion, I’ll reinforce the notion that the expert system, as a management tool, converts data to information as opposed to being a computer-related thing in which some expert systems are housed.

I choose to believe that the automation line in the local plant evolved through a stage of semi-structuredness requiring the help of an expert system. Forsyth (Richard Forsyth, Expert Systems: Principles and Case Studies, Chapman and Hall, Ltd., 1984, p. 7.) says, “[an expert system]... actually works. It does a job that takes a human years of training.” I note the word “training” instead of “education” and think of all the jobs that have been automated that took years of training to learn in years past. The expert system and then the automation system support the “who manages” in a very limited, well-defined management system.

Describing automation is as difficult as describing an expert system. Remember the following definitions of automation so you can compare automation to the definition of an expert system. “A scientific definition of the place of automation in the development of technology can not refrain from taking into account, on the one hand, the inseparable bond connecting automation with the entire history of the gradual strengthening and extension of the power of man over the forces of nature, and on the other, the qualitatively novel features which distinguish automation from the preceding stages of technological development. .... Therefore, the conversion to automation completes the liberation of man from the immediate participation in the industrial process and changes abruptly the entire character of human labor. Up to now, the machine replaced the hands and the muscles of man; at present, it begins to replace, within certain limits, his brain and nervous system.” (Jan Averham, Automation and Society, Moscow, USSR, 1960, U.S. Joint Publications Research Service, Washington, DC, July 1961, p. 2.) James Bright indicates that some authors equate automation with “decision-making machinery.” (James R. Bright, Automation and Management, Division of Research, Graduate School of Business Administration, Harvard University, Boston, 1958, p. 4.) He emphasizes that
“Automation has a way of shifting with time. Yesterday’s ‘automated’ plant is surpassed today, but how else except by something ‘more automatic’?” (p. 7.) Bright suggests this definition: “...automation simply means something significantly more automatic than previously existed in that plant, industry, or location.” (p. 6.)

Simply stated an expert system 1) captures an expert’s facts and rules, 2) applies the facts and rules to a limited domain of responsibility, 3) leads the user toward intelligent advice or solution about that domain, and 4) is able to replicate the line of reasoning from which the advice or solution evolved.

At one time, even today’s best defined, most routine, and very likely highly-automated domain of responsibility needed an expert to manage it. By expert, I mean someone with years of training who has made intelligent decisions based on facts and inferences related to their limited domain. By following the same facts and inferences, the expert would repeat the same decisions. We couldn’t immediately replicate the expert because we couldn’t quantify and measure the expert’s experience, judgment, and insight. We considered the decisions of the expert largely unstructured, or non-programmable, or at least semi-structured.

I have many times experienced a sequence of events in replicating an expert, and will share one such experience for illustration. In the leading part of a cigarette factory, the tobacco is moistened, dried, and blended to just the right consistency for compaction. In the following part of the factory, the infinite cigarette rod is compacted and cut into proper lengths. In this leading part, an old man of many years experience would sift the tobacco blend through his fingers close to his face and decide if the tobacco was ready for compaction in a cigarette rod. See the old man in Figure 1.4.5.5.3. Is he tasting the tobacco? Looking at it? Feeling it? Smelling it? The old man couldn’t tell you what he did; but, he did it everyday. He was making unstructured decisions because the variables were undefined, and he couldn’t identify any information as the basis for his decisions.

When the old man said the blend was right, the blend was right. He intuitively knew what he was doing. But he couldn’t tell you what he detected or the rules he used to determine if the tobacco was ready to go to the maker floor. A key question in all this was how to train someone to take the old man’s place when he retires.

The tobacco company would hire someone new to work with and learn from the old man. The new person would follow behind and sift the tobacco close to his face. The younger person would keep on trying through many “nopes” and “yeps” until one day there were almost all “yeps.” After years of being corrected by the old man, the younger person could replicate what the expert did. But he or she didn't know how he or she did it. The younger person had replaced the old man, both in ability and mystery. (In the old days, many recipes were handed down through families this way.) The younger person had picked up the judgment, intuition, and experience to do the job. How in the world could you develop an expert system to replicate the old man?

With much data logging, many wrong guesses, and studying cause-and-effect relationships among variables (gaining visibility), we found the old man was measuring moisture history of the blend. He was recognizing when moisture should be added and removed at various times during the blending process.

We couldn’t depend on finding younger people to be mentored by and learn from the old man. So, we developed an expert system to contain
the facts and inferences of the expert. To replicate that expert, we used sensors and computers, consistently reported variables (indicator data), and compared them to reference points for decision making. We made an expert system. Then we used the reported information to make repeatable decisions, to control actuators, and to debug and maintain the process by repeating the facts and inferences leading to decisions. The expert system could not only report things based on the expert’s knowledge, but could do things based on the expert’s knowledge. We automated the whole thing and have progressed to the point where what we once considered expert is now only automation. The decisions are now all structured, or programmable.

Whether we have an expert system or automation depends on where we stand in perspective and maturity. Gorry and Scott Morton point out that perspective and maturity affect whether a decision is unstructured, semi-structured, or structured. They realized decisions would evolve from unstructured toward structured as the facts and inferences used by the decision maker were defined and structured. So will go expert systems. As the expert’s facts and inferences became known and replaced intuition and experience, we produced an expert system.

The old man in the cigarette factory saw his domain of responsibility evolve from where he just maintained visibility of his operation. Now, through measurement and understanding, we not only have controlled but optimized the old man’s expertise; we call this computer optimization, or automation. The expert system led to automation. In any new problem, it starts out fuzzy, but when we understand it—turns intuition into information, facts, and inference rules—becomes simple and clean.

From the system perspective, the leading part of the cigarette factory is a relatively closed system which, together with the rest of the factory, forms a larger, relatively-open system with many complex social, economic, and legal implications of the world outside the factory. From the systems approach, we see each domain as part of a larger domain. Therefore, the automation of a simple domain shifts our attention to a larger, less-defined domain with more unstructured decisions and another opportunity for expert systems.

Which expert shall we replicate for the management expert system, for example? Whose bias do we want? The one that best fits the software/hardware package? The one with the best defined line of logic? The one whose premises we like the most? Anthony Stevens asks, “Does anyone these days admire anyone who can dig a hole or paint a car quickly? We shall soon feel the same dullness about brain work.” (Richard Forsyth, *Expert Systems: Principles and Case Studies*, Chapman and Hall, Ltd., 1984, p. 39.) Is there no brainwork in painting a car? Have you tried it? How about determining if the blended tobacco is ready to go to the compaction process in a cigarette factory? For years, we couldn’t figure out what the worker who decided the right blend was doing or measuring. Nevertheless, the process is now automated.

Are we talking about “professional expertise” here or just “expertise?” We have automated much of what people were trained to do and what people were trained to report. Expert systems are focusing on what people are trained to advise: law, medicine, and accounting. They are moving from blue-collar to white-collar activities. We’ll still have these counselors, because we pay most for their judgment and insight—and also their experience (a characteristic future expert systems are supposed to accomplish through learning). In my opinion, in regard to judgment, above the advisors are the teachers, leaders, and perhaps the clairvoyants. To learn from teachers, leaders, and
clairvoyants, we must first develop a global scheme to ask questions to represent, if not capture, their intuition and judgment in a structured package. The bottom line: experts are specialists—they know more and more about less and less—and leaders are generalists—they know less and less about more and more. The connections among all the specialties are what stumps our thinking and the future expert systems.

Figure 1.4.5.3. “Yep, it’s ready. I feel it in my bones.”
1. Background

1.4. Theory

1.4.5. Frameworks

1.4.5.6. The Maturity Framework
1.4.5.6.1. Characterizing the Domain by Maturity

You can’t improve or optimize a system until you have visibility and control.

Your Management System Matures through Three Sequential Stages.

The fourth framework deals with the maturity of your management system. Figure 1.4.5.6.1. illustrates the three stages. Your management system, your operation, and your management tools must mature sequentially through these stages. To try to skip a stage is to fail. The internal driving force for maturity is who manages and requires the three essential components of the MSM be in balance for a preceding stage before the succeeding stage can be successful.

For a successful management system, the components of the MSM must be in balance. We essentially have an impedance matching problem, which we will someday model mathematically to observe cause-and-effect relationships and conduct sensitivity analyses.

If the information from an information system is accurate and timely but too sophisticated for the decision maker, the elements are not in balance and the management system fails. The interfaces keep the components in balance.

When the components are in balance, the manager is happy and successful. Then, he wants more. Then the manager’s manager wants more. This series of demands induces a dynamic, always-maturing system.

We can define the stages through which managers mature with a successful management system. Managers first gain visibility of their physical operation. They learn how to control their domain by being able to reduce the number of changes that occur and hold the operation constant. Finally, they optimize their domain to get the most out of the operation that they can. A management system matures through the stages of visibility, control, and optimization.

Visibility

Visibility is gained by effective presentation of key information based on complete, comprehensive, coordinated, accurate, and timely data. Key information varies throughout the life of an organization. Without effective visibility, management action is not completely informed.

All elements of the system must be monitored and assessed to judge the critical elements in cause-and-effect relationships. In a manufacturing plant, we data-log.

Often, a few parameters are indicators of the throughput of the system. In making bottles, the temperature history in the furnace indicates the quality and amount of material that flows from the forehearth. Once monitored, these parameters are related to the elements to be controlled to stabilize the system. Then, in bottle-making, only the temperature of the furnace and the mix of the batch may be the important control parameters.

Visibility is the first stage in the approach required for effective management. Visibility leads to control which, in turn, leads to optimization. Those of you with very uncertain pursuits typically aren’t in balance because you lack visibility.

Control

An operation is stable when it can be held to steady-state and decisions don’t have to be made based on variations outside unpredictable limits. Even if the throughput is held within control limits—not at the best throughput experienced—the stability provides im-
proved performance. In bottle-making, if the fraction of molten glass gobs which comes from the forehearth and becomes bottles packed for shipment remains stable at a relatively low fraction of four-fifths, performance is improved.

Managerial control depends upon visibility and is based upon managerial planning. Managerial control is the monitoring and measuring of performance of the operation for comparison with pre-established plans and standards. Control means taking corrective action if performance deviates too far from plans and standards and, thus, integrates activities by keeping them all within established bounds.

When I worked for Citibank they had just acquired majority interest in a small midwestern management consulting firm. In they moved with their “control book,” a loose-leaf binder in which they daily updated all operating, personnel, financial, logistical, and production data. They spent as much as half their time measuring what they did with the rest of their time. After a while they saw what was needed and moved to set things right. I claim their book was really a “visibility book.” After they logged all possible data to observe cause-and-effect relationships, they used the key relationships to act and stabilize and then improve the operation. Of course, with the key relationships in hand, much less time and effort is needed to measure and control the important parameters.

Only after visibility can the manager move to control—the “prescription” stage in which he or she keeps the system on track through direction and correction. Finally, the manager optimizes the system to get the most possible out of the pursuit.

Optimization
Optimization is the accomplishment of maximum effectiveness, efficiency, and/or usefulness. Optimization is accomplished by varying plans and standards as a result of experience and controlling to the new plans and standards.

Obviously, a system can’t be controlled without visibility; and optimization requires control.

Scott Sink describes the steps to productivity as measurement, evaluation, control, and improvement. (“You can’t manage what you can’t evaluate and you can’t evaluate what you can’t measure.”) The parallel between Sink’s steps to productivity and the maturity stages is clear, for measurement and evaluation together are equivalent to visibility. “Lord Kelvin said we do not really understand until we can measure. But before we measure, we should name the quantity, select a scale of measurement, and in the interests of efficiency we should have a reason for wanting to know.” (Forrester, page 59.)

I find that data reflect the same maturity stages. Data can be kept current to yield status or used with historical data to generate forecasts. This kind of data represents the visibility stage. If management input is part of the database in the form of reference points, goals, strategies, and priorities, we can obtain plans. Including planning data, the database reflects the control stage. Note that we often have trouble writing plans because our data haven’t matured to the point where they support plans. To determine variations and exceptions, measurement and evaluation criteria are needed in the form of data. These data, together with the others just described, constitute the optimization stage.

However, in general, we’re frustrated with our plans because we can’t really write them and can’t really use them. When our data have matured to the control level, planning should be easy.
THREE MATURITY STAGES MUST PROCEED IN SEQUENCE.

MATURETY

OPTIMIZATION - Modification of the plan and control to improved performance

CONTROL - Steady state achieved by eliminating variations

VISIBILITY - Complete cognizance of cause and effect relationships

Figure 1.4.5.6.1. Your management system, your operation, and your management tools must mature sequentially through three stages. To try to skip a stage is to fail.
1.4.5.6.2. Origins of the Maturity Framework
1.4.5.7. Considering the Frameworks Together

Taken together, the frameworks for characterizing your domain give you a sense for what management tools will fit you and your operation.

My favorite example of how a person usually deals with management tools is choosing a tool for time management. In my lifetime, I’ve unsuccessfully tried dozens of different tools for helping me manage myself over time. Something will happen that highlights the fact that I’m out of control with respect to time. I’ll go to the office supply store and browse through their shelves of calendars, reminders, priority planners, and other such tools. I’ve been known to respond to one of the many ads in the airline magazines for a corinthian leather-bound executive-style holder for slightly-adapted 3”x5” cards for identifying and sorting my tasks to set or change priorities and schedule my work. I’ve even tried a computer package or two for scheduling.

I usually choose either a tool that’s totally different from the one that most recently failed me or a tool that’s similar to the one my friend said the other day that he or she is most recently excited about. I take the time to setup the tool to apply to me and my domain of responsibility. The tool starts to live up to its advertising.

Then a crisis hits. I have too many things to do in too short a time. The urgent starts dominating the important. Now my new tool can show its stuff and keep me straight in getting through my time and priority crunch. Right? Wrong! The tool falls by the wayside. I don’t have time to diddle with the thing. I have work to do and I’m getting farther behind every minute. Not to fear. Before long my problems will be overcome by events and I’ll get time to breathe again. Remembering the pain, I’ll resolve to fix the situation and when next at the office supply store or reading the airline magazine I’ll try another tool. I’ll start the entire sequence again. Since I can find hundreds of versions of time management tools, I won’t run out of opportunities to fail again.

I’m old enough where through dumb luck I’ve worked out some tools and associated guides that work for me. Clearly, I’ve found the answer. I think that since other younger people are going through the pain of my younger years, I can make a contribution and get rich at the same time by manufacturing and selling the solution I’ve found. Now, what I’ll do is put the latest version of a time management tool in the shelves for someone to try at random when they’re searching through the office supply store.

My story exemplifies the issue of fit. How do we find the tool (what is used to manage) to fit both the user (who manages) and the user’s work process (what is managed)? Not any tool at random will work. There has to be a better way than dumb luck. Don’t depend on the computer salesperson with a dollar to make. Don’t depend on the specialist with a stock answer searching for an application.

I believe the answer is that we have to be able to characterize our domain of responsibility in terms of dimensions that lead us toward an existing or new tool that will fit the domain and meet its needs. We can try information-related dimensions like uncertainty (ratio of information needed to information processed). We can try endeavor-related dimensions to distinguish among the things we do. We can try other dimensions related to the operation, the
decision maker, the management tools and their process for converting data to information, and the status (such as maturity) and progress of our efforts to manage our domain. I’ve described four frameworks to provide a guide or aid for you to characterize your domain and to choose the tool you need. You can choose the tool you need either deductively or inductively. These frameworks work best at reducing the pool of alternatives by showing groups of tools you don’t want. This way of approaching the decision is called strong inference. (John R. Platt, “Strong Inference,” *Fundamental Considerations in Organizational Research*, Science, 1964, 146, 347-353.) The idea is that you’ll get to the answer faster by reducing feasible alternatives than by trying to identify the single best answer.

I show the four frameworks together in Figure 1.4.5.7. Taken together, the frameworks look at the organization, not just the decision maker or the operation. I’ve not determined a firm linkage among the frameworks as the figure might suggest. However, some frameworks clearly are affected by the same issues in the organization.

Individually, the purpose of the frameworks is to characterize the organization in standard ways; for example, we can transfer, or generalize, what we know about perplexities from one domain to another. Collectively, the purpose of the frameworks is to guide the manager or the management tool builder more to eliminate the tools that don’t work than to find the perfect tool. An example of the elimination is saying CPM won’t work for perplexities.

Collectively, the frameworks also help you search for the meaning behind the tools that do work. For example, CPM works for projects, the meaning behind CPM is bottlenecks, and people responsible for perplexities have bottlenecks too. If we can strip away the constraints on bottlenecks (e.g., We must define the end.) as applied to projects through CPM, we can then apply different constraints to bottlenecks to design a tool to help people manage perplexities.

How many frameworks are enough? I’ve shown four frameworks in Figure 1.4.5.7. I’ve shown a framework for what managers do in relation to endeavors in Figure 1.3.1. I’ve also shown the ABC model as a way of characterizing what a manager does. We can address a couple of questions about how the ABC model relates to the effort of finding the management tools that fit your domain. Does the ABC model help you choose tools? Do A, B, and C activities relate to the pursuits? Are the activities related to the maturity framework? Do you use visibility tools for C, control tools for A, and optimization tools for B? Is the Macintosh and Daft model another framework we can use to help choose management tools? I discussed that model in Module 1.4.2.6.2. How many other frameworks are out there that we can use to find the tools we need?

When you characterize a person (who manages) for cognitive style, for example, you can use a number of dimensions. MBTI uses four dimensions. To use what you learn from the four dimensions of MBTI, you have to holistically view the person in terms of their experience, capability, and education as well as personality type. That’s why you’d see my wife as the person who can do extrovert tasks better than I can and at the same time respect the energy required for her to do that task so well and how the expenditure of energy affects her and her relationship with you. Now, you’re holistically integrating experience, capability and the four dimensions of MBTI as measures of cognitive style.

You want to be able to characterize the organization much like you characterize a person. In my discussion of the vision for this book in Module 1.1.13. I emphasized my desire to develop instruments to characterize organiza-
Scholars discussed conceptual frameworks like those shown in Figure 1.4.5.7, during the 1960’s and early 1970’s. Conceptual frameworks represent attempts to more clearly and completely structure our domain of responsibility. In the 1980’s and early 1990’s, the conceptual frameworks were abandoned after the progress of the 1960’s and 1970’s to concentrate on managerial frameworks.

Henry Lucas is a scholar of conceptual frameworks. He says, “We’ve shifted from conceptual to managerial frameworks. We now are into Hersey and Blanchard’s how do you do it rather than what it is. We’re now more practical than theoretical. The conceptual frameworks give us the big picture; now we use managerial frameworks to figure out how to do it.” (Personal Communication, Henry Lucas).

The fact that our tools still aren’t working for us tells me we haven’t yet successfully evolved our conceptual frameworks. In many cases, the managerial frameworks are telling us how to do the wrong things well. We’re coming up with elegant solutions to the wrong problem. Of course, the answer is balance. Deming implores us to develop a foundation of theory and profound knowledge; then we can answer the question, “By what method?” So, our progression is from conceptual frameworks (what it is) to managerial frameworks (how to do it) to results (what we got). Many people today are looking at and acting on results (what we got) without any understanding of the theory (what it is) and without relating to and acting on the process (how to do it).

Figure 1.4.5.7. Whereas we can interrelate four frameworks holistically, the four together may not show the complete picture or provide firm linkages among frameworks.
1.4.5.8. **Exercise on Developing a Spectrum for One of the Frameworks Characterizing Your Domain**

Based on analyzing your domain for one of the frameworks for characterizing your domain, you can develop a spectrum representing the distribution of effort you spend against the categories of the framework.

**Explanation**

Each of us have several subdomains in our set of responsibilities. Choosing one of your subdomains for analyzing the domain against one or more of the frameworks is easier than analyzing everything you’re responsible for. You have subdomains for your work, school, family, personal life, community service, professional service, and other sets of responsibilities.

You can evaluate your subdomain against any number of frameworks. I’ve emphasized four frameworks in this section of the book, including endeavors, decisions, pursuits, and stages. I’ve recalled a few others in Module 1.4.5.7., including the ABC Audit. Whereas, the frameworks aren’t totally independent, I suggest you evaluate your subdomain against one framework at a time and then try to integrate what you learn.

Within each of your subdomains you do things you can classify against each of the categories for any of the frameworks. In the example below, I’ve listed a few activities a college student might do for each category for the pursuits framework as applied to his or her personal subdomain (as opposed to subdomains for school or community service, for example). You’ll notice that being a student, two activities in the example relate to school. They are what to do after graduation and changing majors. I show them in the personal subdomain because they each have far-reaching effects on the who manages’ personal life.

Your subdomains are each systems within the larger system of your domain of responsibility. Evaluating your subdomain by frameworks and dividing the frameworks into categories is an analysis activity. You should try to keep the aim of the domain and the subdomain in mind as you analyze them. You’ll want to view your subdomain holistically too, but I don’t know a structured approach for doing that. Be careful of over-weighting what you discover analytically to be more important than what you feel holistically just because your analysis is more structured and tangible.

**Example**

Consider activities of the personal subdomain categorized by the pursuits framework.

Process: brushing teeth, paying bills, eating, bathing.

Project: buying a computer, repairing the car, renting an apartment, choosing a job.

Program: what to do after graduation, what to do now that the dog ate your homework.

Problem: changing majors, ending a relationship.

Perplexity: health status (disease, accident), financial security (loss of job, stock market crash), status of a relationship.

**Exercise**

Choose one of your subdomains. You’ll need to delimit, or scope, the domain both for yourself so you can analyze the domain and for your audience so they know what you’re dealing with. Write a 50-word (or less) paragraph to describe the domain you’re analyzing. Rec-
ognize that you’re the who manages for the subdomain you choose.

Choose either the endeavors or the pursuits framework. I want you to use one of the four frameworks that has more than three categories representing its continuous variable.

Make a representative list of things you do in your school, work, service, or personal subdomain. If you choose pursuits for your personal domain list things you do in addition to or instead of the ones I listed in the example.

For the framework you’ve chosen and based on the list you made, divide 100 points among the categories. Use the 100 points to show emphasis for that category. Even though what you’re doing is rather analytical, you can use your gut feeling to help divide the 100 points and allocate them to your categories. Don’t give any two categories the same number of points. Make sure your allocations for all of the categories add up to 100.

Write down the decisions you made in dividing the 100 points. Write down the questions you have as you work through the process and make the decisions.

Draw a spectrum for your framework as applied to your subdomain. Write a 25-word (or less) paragraph describing your spectrum. Summarize your 25-word paragraph with a sentence (subject, verb, and object) in ten words or less. Use the short sentence as the title for your spectrum.

If I draw a spectrum for the pursuits in my earlier example, I first need to divide 100 points among the categories. I feel that even though I don’t spend a relatively large amount of time on activities like eating in the process category, those activities are important to me. So, I choose 25 points for process. Long ago, I figured out what I want to do after graduation, I have no dog, and I’m not so concerned about other activities I’d classify as a program. So, I choose 5 points for program. Based on the kind of gut feeling for the other activities in my categories, I choose 15 points for project, 20 points for problem, and 35 for perplexity.

In making sure my points total 100, I’m not comfortable with as much as 35 points for perplexity. I’ll adjust my points to be: 30 for process, 20 for project, 5 for program, 25 for problem, and 20 for perplexity. Oops; I have two categories with the same number of points. Now, I’ll have to choose whether to give more points for project or perplexity. I believe perplexity needs a few more points. My final spread for my spectrum is: 30 for process, 18 for project, 5 for program, 25 for problem, and 22 for perplexity, for a total of 100 points.

My spectrum in Figure 1.4.5.8. shows me that I need management tools at both ends of the spectrum. Knowing how hard it is to find management tools that work for any one purpose, I probably can’t find one tool to serve both processes and perplexities. So, I guess I’m in for an expensive tool set. I think I’ll start with tools for process first and get that part of my responsibility under control. Then I’ll work to see if I can find something that will work for problems and perplexities.
Figure 1.4.5.8. My pursuits indicate that my largest need for management tools is for use at both ends of the spectrum.