# *Managerial and Leadership Think-Work Functions*

***and***

***Associated Concepts and Practices***

## Analyzing

### Addendum

**to Original Series Booklet on *Analyzing***

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Third Edition

***R. D. Cecil and Company***
Human Resources Development

# Addendum to Original ANALYZING Booklet

## Human Limitations and How to Compensate for Them

## Introduction

All managers solve some sorts of problems and make some sorts of decisions. Most managers formulate some goals and plans. A few, however, do not really analyze the situation first. And, according to Richard A. Swanson (1996), most of those who *do* tend *not* to analyze it as correctly and completely as they should. Through working in or for more than one hundred twenty organizations over many years, the author has concluded that *"analyzing" tends to be the least effectively performed—if not least often performed—integrative function*. Why? Because analyzing situations well is not easy. While some might believe that anyone can analyze anything, being highly analytic is not really natural. Indeed, C.S. Fleisher (2002) found that analyzing properly must be learned through training, experience and repetition. Consequently, it is advisable to give "analyzing" a good deal of attention.

This addendum supplements the orginal booklet on analyzing by further describing human thinking limitations and how to compensate for them. The limitations include (a) lack of knowledge of factors to analyze; (b) personal values, interests, and goals; (c) limited knowledge of facts; (d) limited time; (e) the mind's oversimplification of information; and (f) a cultural limitation.

The addendum goes on to describe analytic tools and knowledge management tools that help personnel think about situations in greater depth and breadth, but still deal with the many details involved. It discusses (a) checklists of variables to consider, (b) "qualitative information bases," and (c) "diagrammatic knowledge bases" for helping our minds visually handle the details inherent in complex global markets and modern organizations.

### Basic Rules for Effectively Analyzing a Situation

First, let us review three major rules for analyzing situations effectively.

*Rule 1*

Analyze the situation *thoroughly* first—before going on to the second and third phases of the analytic approach, or before going on to goal setting and planning. Many individuals are aware of this tenet, but still cannot break the bad habit of jumping back and forth between (1) analyzing the situation, (2) formulating a number of alternative solutions or alternative sets of goals/plans, and (3) decision making (evaluating, comparing, and choosing among alternatives). *The most chaotic group planning, problem-solving, and decision-making sessions tend to occur when participants jump around among the major steps*.

That said, it should be acknowledged that performing such an organized, orderly, and systematic approach is not necessarily most appropriate for brainstorming sessions, which are generally aimed at developing new ideas, products, methods, and so forth. Brainstorming a situation involves free-wheeling, freely associative, creative mental processes.

*Rule 2*

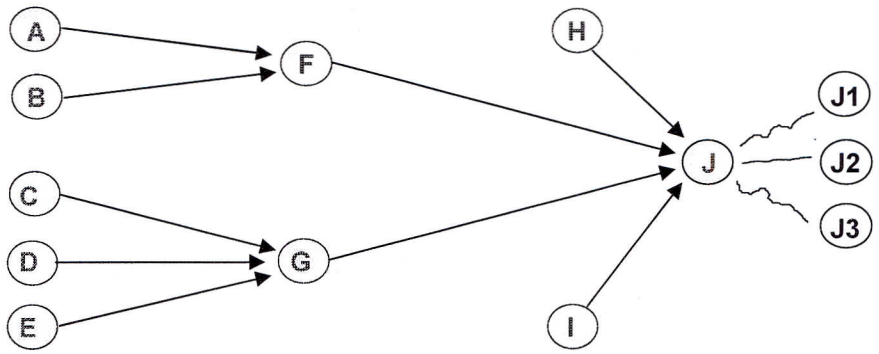
Do a *qualitative* analysis initially—before doing a *quantitative* analysis. In other words, it is not wise to start "pushing numbers" right away. It is first necessary to *explore* the situation and "line up the ducks" by identifying possibly significant causal or influential variables involved. This helps ensure that one will be collecting and pushing the right numbers. The "right numbers" are those that correspond to the most influential variables or to the real, underlying causal factors. This means doing the following:

- Reviewing checklists of relevant factors, making sure that one has "covered all the bases"—that is, has identified all the significant, potentially causal or influential factors involved.

- Analyzing the factors to determine which are significant enough to warrant researching, collecting, and massaging the data that relate to them. Keep in mind the principle of *multi-causality*. There is no single cause for anything happening. In a given situation, there can be hundreds and possibly even thousands of factors that somehow influenced what occurred. And tens to even hundreds of those factors may need correcting or improving in order to not only "solve a problem," but to also prevent it from ever happening again.

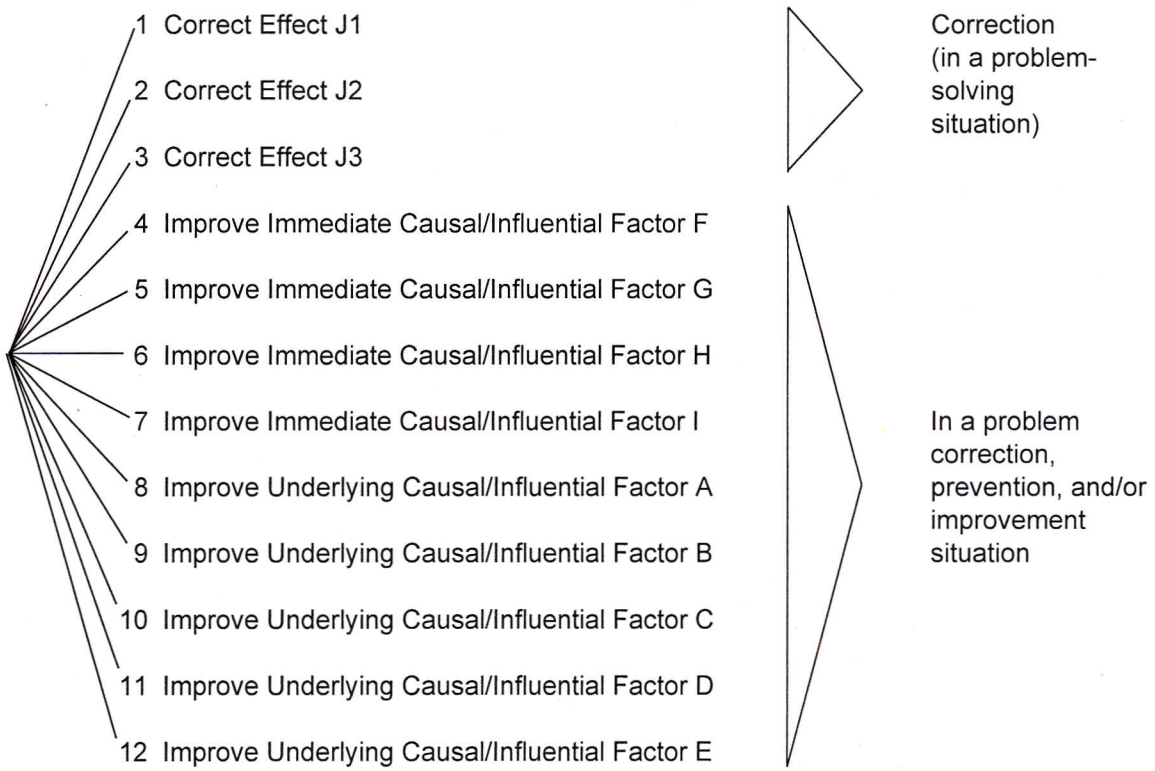
***Figure 1: Example of a Multiple Choice Decision in a Problem-Solving, Problem Prevention, or Improvement Situation***

**Chain of causes and effects involved in a (simplified) Problem Situation**




**Real, Underlying Causal Factors** | **Immediate, Superficial Causes** | **Symptomatic Effects**

**Act Fork indicating various non-exclusive alternative courses of action for solving and/or preventing a problem or improving a situation**



Here is an example: **Figure 1** shows a problem situation that involves several *symptomatic effects* J1, J2, and J3 (which involve factors J1, J2, and J3). This might be a situation where, for example, two employees are having an argument. Underlying the situation itself are *immediate and obvious "superficial" causal factors* H, F, G, and I. But behind them, further back in the cause-and-effect sequence, are *the real, underlying, not-so-obvious causal factors* A, B, C, D, and E. This is a case where one has a *multiple choice decision*, because there are numerous causal or influential factors involved. To "resolve the problem situation," one must perform both corrective and preventive actions. First, to correct or stabilize the situation, one would take at least three courses of action to remedy effects J1, J2, and J3. Then, to prevent the situation from occurring again, one would take several courses of action to deal with (solve for, correct, or improve) immediate causal factors F through I, and also take several courses of action to correct or improve underlying causal/influential factors A through E. If all the factors—F, G, H, I, A, B, C, D, and E (and perhaps many others)—are not changed or improved, the situation may redevelop and surface again, perhaps in a variety of guises.

In other words, in a problem-solving situation, one should not necessarily be asking, "Should I do something concerning A or not do something concerning A, or should I do something concerning A, or B, or C?" Rather, one should normally be asking, "Should I be doing several or even all of the above?" In many if not most cases, the answer should be, *do all of the above* (taking into account constraints such as available people, time and money). In other words, *solving a problem situation calls for a* ***system of solutions*** *for dealing with a* ***system of underlying causes.*** Put another way, *multiple causes call for multiple solutions*.

This, in fact, explains why so many managers are constantly "fighting fires." They fail to deal with enough of the real, underlying causes, so the same (or very similar) problems keep coming back—over and over.

*Rule 3*

Use visually oriented diagrams or models to help do the initial qualitative analysis of "systems of factors." The following are several examples. Cause-effect and sequential relationships among entities, variables, process steps and so forth can be indicated by lines and arrows.

- Develop an "industry/market/business environment model" by indicating these and other factors and their relationships: (a) industry competitors, their segments or specialties, and their strengths and weaknneses; (b) sources of inputs such as labor, materials, services; information; (c) the various channels of distribution, how they operate, and the consumer segments they serve; (d) the various consumer segments, their decision-making behavior, and their purchasing behavior; and (e) external influences on the industry and marketplace, such as government, the economy, technology, society, and other forces or factors.

- Develop systems or processes models by indicating these and other elements, perhaps on a time line: (a) steps in the process and by whom they are performed; (b) which steps must be completed before others can begin; and (c) the informational, materials, or services inputs to each step or function performed.

- Use maps to indicate geographic relationships involving, for example, these and other elements: sales territories; production and warehousing facilities; competitors' facilities; and distribution systems/routes.

- Develop organization charts that show, for example, line and staff units or jobs, vertical reporting relationships, spans of control, specialized units, and horizonal working relationships.

- Develop work area models or diagrams that show the (relative) locations of machines, tools, raw materials, work in process, finished goods, materials handling routes, people, desks, and office machines. Such diagrams help illustrate flows of information, materials and services.

Next, when appropriate, use mathematically oriented models and tools to help do quantitative analyses. All such analytic tools enable the human mind to do what it is incapable of doing alone: keep track of, juggle, manipulate, and relate an enormous amount of numeric data.

Since most managers are already using tools such as spreadsheets to deal with numbers, we emphasize using visual models or diagrams initially to illustrate possibly significant variables and their interrelationships. Then, at some point, the quantitative data can be added to the qualitatively oriented visual diagrams.

The resulting integrated diagrams enable individuals to view literally hundreds of important factors and associated facts at one time. Just as important, because the diagrams free managers' minds from having to juggle large amounts of information on their own, managers can identify phenomena that they have never recognized before: the natures of the factors (for example, the characteristics of the organ-

***Table 1: Checklist of Major Factors That Influence Organizational Behavior***

**TASK FACTORS**

**Job descriptions**
- **Objectives**
- **Activities**
  - Technical/functional
  - Managerial/supervisory
    - analyzing, goal setting,
    - planning, budgeting
    - problem solving
    - decision making
    - organizing, staffing
    - directing, coordinating
    - reporting, evaluating
- **Equipment or tools**
- **Material inputs/outputs**
- **Information inputs/outputs**

**Work load -- work flow**
**Communication facilities**
**Working conditions**
**Task interrelationships**
**Technology**
**Job input requirements**
- General/basic abilities
- Specialized skills
- Knowledge/experience
- Other behavior patterns

**General Natures**
- (Mechanistic or Organic)
- Complexity
- Variability
- Clarity of definition
- Amount of change
- Certainty of information
- Time to outputs/results
- Tangibility/measurability (of outputs/results)

**ENVIRONMENTAL INPUTS**

**Business-Oriented Factors**
- Customers, suppliers
- Competitors
- Industry associations
- Worker unions

**Institutions**
- Government agencies
- Religions
- Capital markets
- International institutions

**People-Oriented Factors**
- Families, peers
- General public, community
- Social norms and customs
- Religious affiliations
- Social/recreational groups
- Interest groups

**Other**
- Technology, economy
- Transportation facilities
- Nature, weather, energy
- Goods and services

**INDIVIDUALS' CHARACTERISTICS**

**Motivators**
- **Basic needs or drives**
  - physiological, safety
  - social, self-image
  - self-actualization
- **Values**
  - intellectual, economic
  - social, political
  - aesthetic, religious
  - practicality, achievement
  - variety, goal-orientedness
  - orderliness, decisiveness
  - support, conformity
  - recognition, independence
  - benevolence, leadership
- Interests (occupational)
  - mechanical, outdoor
  - computational, scientific
  - clerical, persuasive
  - artistic, musical, literary
  - social service
- Goals and expectations

**Capabilities**
- **Abilities**
  - academic intelligence
  - vocabulary, social insight
  - mechanical visualization
  - mechanical i
  - clerical speed & accuracy
  - physical coordination
  - reading, communication
- **Specialized (job) skills**
- **Knowledge & experience**
- **Physical traits**

**Personality traits**
- self-confidence
- dominance, sociability
- social conscientiousness
- adaptability, maturity
- original thinking, vigor
- responsibility, self-control
- emotional stability

**SOCIAL VARIABLES**

**Group Formation**
- People's needs & drives
- Tasks' interdependence
- Proximity & work flow
- Frequency of interactions
- Members' characteristics
- Valued/shared traits

**Intra-Group Relationships**
- Group norms & customs
- Members' status & roles

**Group Maintenance**
- Enforcing sanctions
- Conflict resolution
- Image reinforcement
- Membership norms

**Sources/frequency of conflict**
**Interaction w/ other groups**
**Influence on organization**

**ORGANIZATIONAL INPUTS**

**History and traditions**
**Key elements of success**
**Objectives and strategies**
**Resources**
**Structures**
- Key integrative points
- Key decision-making points
- Formal Structure
  - Units/departments
  - Vertical relationships
  - Horizontal relationships
  - Levels/spans of control
- Informal structure

**Policies, rules, procedures**
- Formal
- Informal

**Inter-unit interactions**
- Sources of conflicts

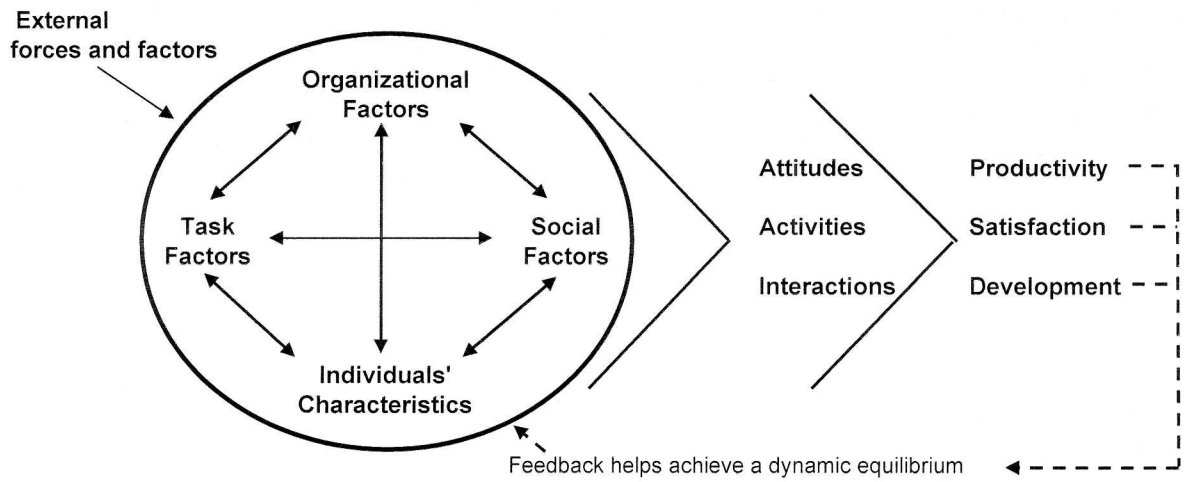
**Contacts with environment**
**Systems**
- Information Systems
- Control Systems

**Practices**
- Performance evaluation
- Wages/salaries/benefits
- Hiring/selection/promotion
- Training and development

**Natures of tasks**
**Natures of people**
**Managerial/leadership styles and practices**
- Authority base (position vs. expertise)
- Formality to subordinates
- Nature of communications
  - advice and information
  - instructions and decisions
- Degree of control
- Specificity of subordinates' responsibilities & authority
- Conflict resolution
- Subordinates' participation:
  - Goal setting & planning
  - Problem solving
  - Decision making
  - Development of methods, procedures, policies
- Assumptions/facts about subordinates
- Task orientation
- People orientation

**General nature of organization** (mechanistic/organic)

*Figure 2: The Socio-Technical System — A Multi-Factor Model (by Eric Trist)*






izations, entities, people, tasks, and so on); cause-effect and/or sequential relationships among the factors; interdependencies and interactions among factors; and complex flows of materials, services, or information between various jobs or units.

As a result, it also enables them to do the following: identify previously unrecognized problem situations and their causes; discover opportunities to improve situations; develop insights into how to gain competitive advantages; and identify ways to integrate tasks and people more effectively, thereby contributing to more effective individual, unit, and organizational performance.

## Major Human Limitations and How to Compensate for Them

Many of the limitations discussed here involve the factors that people are inclined to analyze and how effectively they do so. To discuss these phenomena more understandably, it will first necessary to introduce a sample "analytic frame of reference" consisting of numerous factors that could be analyzed. The example used below is shown diagrammatically in **Figure 2**. Called the "Socio-Technical System" (or Model), it was developed at London's Tavistock Human Relations Institute by Eric L. Trist (1960). It can be used during planning, decision-making, and problem-solving processes where people's behavior requires insightful analysis.

The figure illustrates interactions among five categories of factors that can directly or indirectly influence people's motivation, attitudes, behavior, interactions, and performance: task-related or technological; organizational; individual; social; and external. Each of the five categories can be thought of as a separate "construct," because it involves a group of terms, concepts, principles, and phenomena that are closely related. Trist's model is essentially a "meta-construct," because it integrates separate technological or engineering constructs, organizational phenomena constructs, individual traits and behavior constructs, social phenomena constructs, and business environment constructs into a more all-encompassing construct.

About 150 specific socio-technical factors are listed in **Table 1**.

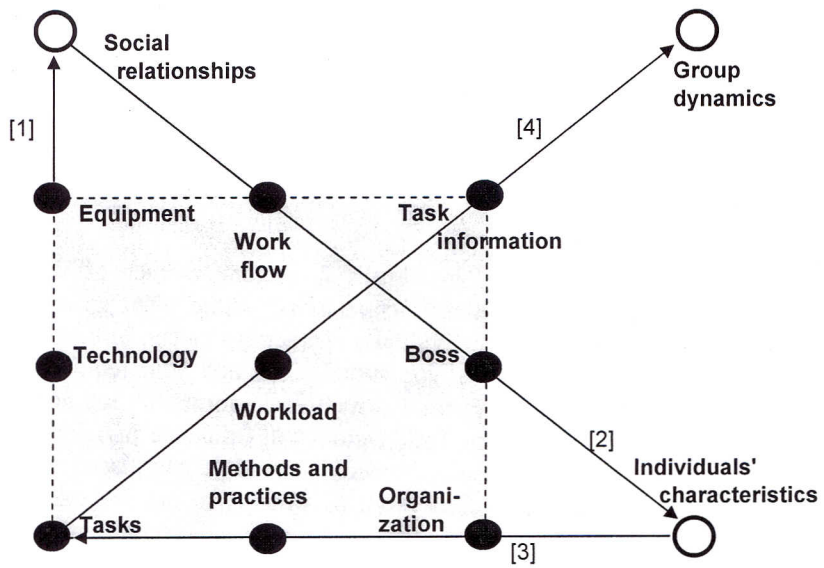
As shown in **Figure 2**, factors in each of the five groups can affect factors in all of the other groups. For example, an individual's characteristics can influence task factors (such as job descriptions and skill requirements) and social phenomena (such as the formation and norms of social groups). Task factors can influence individual factors (such as the characteristics of people placed in jobs) and social factors (such as whether or not several people are seated closely enough to communicate and establish a social group). Social factors can influence task factors (such as whether or not people in two interdependent jobs communicate and cooperate with each other) or organiza-

***Table 2: Mental Constraints and Their Effects on Think-Work***

| | | What should do |
|---|---|---|
| 150 | Major factors or variables actually operating | |
| - 50 | Unknown factors | Use checklists (OB) |
| 100 | Factors left to consider | |
| - 50 | Factors thought unimportant (due to values, interests, goals) | Use checklists (Mktg) |
| 50 | Factors left to consider | |
| - 25 | Factors for which associated facts are unknown or unavailable | Get info |
| 25 | Factors left to consider | |
| - 15 | Factors for which there is not enought time to consider | Take time |
| 10 | Factors left to consider | |
| - 5 | Factors that mind cannot handle at once | Use large diag. surfaces |
| 5 | Factors left to consider | |
| - 4 | Factors eliminated due to cultural tendency toward single causality ("the problem is") | |
| 1 | Factor actually considered | |



***Figure 3: An Authoritarian Manager's or Leader's "Box of Considerations"***



tional factors (such as how much power or influence a supervisor or manager actually has). And so on.

As all of these factors interact with and on each other, the results are people's attitudes, activities, and interactions. For example, what is going on around managers—subordinates', bosses', and colleagues' behavior—affects their managerial behavior; and their behavior, in turn, can affect the attitudes, activities, and interactions of those other people.

Since most of the factors in **Table 1** can be broken down into many more finite factors, what we are looking at are *extraordinarily complex systems of interacting factors or variables*. ***All these factors are operating in or on every organization. The facts or information associated with each factor, however, can differ from person to person, group to group, company to company, or industry to industry—but they are* all *operating***.

Now look at the top of **Table 2**, which helps illustrate what human beings actually tend to do in most thinking situations. The following sections describe how various "limitations" tend to eliminate one chunk of factors after another from people's consideration.

*Limited Knowledge of Factors to be Considered*

Say that a problem could possibly involve the 150 factors on the checklist in **Table 1**. Most people are not necessarily going to know all these 150 factors, although they might understand or at least recognize many of them. As Will Rogers said, "We're all ignorant, just on different subjects." In fact, *no one* can possibly know *all* the variables that may be involved in any given situation.

One's knowledge of factors is a function of education and experience concerning various subjects. One's "knowledge and experience field" is like the "box" managers hear about in management seminars. For example, a plant engineer's "box" will include considerable knowledge of engineering principles, machine capabilities, equipment layout, and materials flows, but can easily contain relatively less knowledge of organizational factors, individual factors, and so on. A salesperson's box will include considerable knowledge of factors relating to products, customers, and production schedules, but can easily include less knowledge of factors involving plant and equipment. A human resources manager's box will include considerable knowledge of behavioral concepts, pay and benefits, organizational structures, and job descriptions, but is likely to include considerably less knowledge of factors relating to financial matters, marketing practices, and so forth.

Since everyone is "boxed in" by their lack of knowledge of variables across the breadth of possible knowledge, management gurus exhort managers to "think outside the box." But that is not so easy to do, because many if not most human beings have little if any idea what it is they do not know. Thus, it is difficult for them to think outside "their own box" without help. That is why checklists of factors, including many that are not already in one's box, are so useful. It is also a reason why group think-work processes are so useful. The more people involved, the more "boxes of information" that are available for consideration.

So, as shown at the top level of **Table 2**, let us say—rather conservatively—that "person A" does not know 50 of the 150 variables. That leaves 100 that he or she is able to consider.

*Limitations Due to Values, Interests, and Goals*

For examples of these limitations, consider two different types of managers.

As discussed in detail elsewhere in this series, very authoritarian or "high task, low people" managers tend to be highest in these values: the economic value (concern for money, material things, career success, and practical-mindedness) and the political value (concern for power, authority, and influence over others). Because of these values, which groups of variables in Table 1 do you think authoritarians are most likely to consider? If you said the task/technological factors and organizational factors, you are correct. As shown in **Figure 3,** such managers will think about task-related factors inside the shaded box—for example, the mechanical aspects of their operations and how to integrate tasks with tasks. They will also think about the political implications of their decisions—for example, "What might my boss think about the decision I'm making." However, because they are much lower in people-related values such as the social or altruistic value (concern for or love of people) and related values, they are generally much less concerned about, and therefore usually give much less if any thought to, individuals and their social relationships. Thus, authoritarian managers pay less attention to people, often do not recognize motivational, attitudinal, behavioral, and interpersonal problems, and do not resolve people problems very well even when they do recognize them. **Figure 3** shows that these factors are essentially "outside their box"—but for attitudinal rather than knowledge-related reasons.

On the other hand, very permissive or "low task, high people" managers are just the opposite. Being high in the social value and related values, they think individual and

social phenomena are important to consider, and therefore tend to integrate people with people. However, being much lower in the economic and political values, they tend to attach much less importance to task-related and organizational factors. Thus, permissive managers pay less attention to the mechanics of operations and do not recognize and solve problems in those areas very well.

So both individuals' "boxes" are limited by the motives, attitudes, or interests in which they are relatively lower. Is it any wonder, then, that in organizations where all managers are not taking all four socio-technical areas into account, they do not behave in a "high task, high people," participative and developmental or team manner? Or that personnel are not being integrated with their jobs, each other, and the organization more fully? Or that people-related problems seem to occur over and over again? Or that plans for dealing with people's motivation, attitudes, behavior, interactions, and performance seldom seem to maximize them?

Thus, as a result of motive and attitudinal constraints, many if not most managers might think that, say, 50 particular factors are not important enough to consider. That would leave 50 factors (out of the original 150) that they can think about.

Here again, checklists of variables are useful because they get people thinking about factors that, because of their (lower) values or interests, they might not otherwise consider.

*Limited Knowledge of Associated Facts*

It is highly unlikely that anyone could have all the facts or information that relate to the remaining 50 factors. This can result in several consequences. First, they may not bother to analyze the factors for which they have no information. Second, if they do not bother to obtain information relating to particular factors, they will not be able to analyze them.

Therefore, let us say that, for these reasons, the person skips over another 25 factors. That leaves him or her with only 25 factors that can be analyzed effectively.

*Limited Time*

Time is almost always a problem. With so many other things to do, let us say that our manager is unwilling to take the time to consider, say, another 15 factors. So now he or she is down to 10 factors.

*The Mind's Oversimplification*

Research by G.A. Miller (1994) showed that human beings can mentally handle only five to nine bits, chunks, or items of information (or variables) at a time. *As a result, we very often end up considering only four or five factors at the most—regardless of how much we know and could otherwise consider*. So now our manager is down to possibly considering just five factors.

*A Cultural Limitation*

Then there is the tendency to identify only one cause rather than many causes (single causality rather than multicausality). This is both a cultural phenomenon and a human phenomenon. Have you noticed in business and social situations that we have a tendency to say, "I think the problem is _____, and here's what we ought to do about it." In other words, we basically cite *one single cause*. Another person might disagree, saying, "No, I think the problem is _____, and this is what should be done to correct it." The second person has also cited a single cause. The irony? They are probably both right. Both causes could easily be involved. But the individuals will probably argue back and forth about *who's right rather than what's right*. However, they are both going to be wrong to the extent that they did not identify at least 148 other possible causes of the situation. It could very well be that a number of factors could stand some correction or improvement in order to *maximize* the motivation, attitudes, behavior, interactions, performance, and ultimate results of the people involved.

The bottom line? What is likely to happen when we deal with even four or five factors involved in a situation? If there are actually another twenty or thirty significant variables also involved, and we do not take action to correct them even though their influences may be relatively slight, then *the solutions we do implement with respect to the four or five we did addressed can be overwhelmed if not contravened by the operation of those we did not address*.

And that is exactly what is constantly happening in many if not most organizations. Managers are quite often "*satisficing*" rather than *maximizing*. One result is constant fire-fighting. Too many managers are constantly busy refighting the previous fires that they themselves never entirely put out, because they seldom if ever utilize a system of solutions to deal with a complex system of causes. Thus, if all of the most significant factors affecting personnel's motivation, attitudes, activities, interactions, and performance are not corrected or improved, an organization can never maximize its viability and success over time. And it will always have serious problems, many of which will keep coming back over and over again.

***Table 3: Significant External/Environmental Factors That Influence Organizations***

**Economic**

**General**
Employment
Inflation/deflation

**Consumer-Related**
Job market
Disposable income
Consumer savings
Consumer debt
Consumer price index
Consumer spending
  Durable goods
  Services
  Consumables
Consumption patterns

**Business/Industry**
Production
Shipments
Inventories
  Raw materials
  Work in process
  Finished goods
Finished goods prices
Wholesale prices
Distribution mark-ups
Profits
Dividends
Employment
Spending on . . .
  Capital projects
  Services
  Labor
  Raw materials
  Energy

**Financial**
Interest rates
  Discount rate (Fed)
  Mortgage rates
  Prime rate
  Consumer loan rates
Money supply
Velocity of money
Multiplier
Markets . . .
  Stocks/bonds prices
  Commodities prices
  Foreign exchange rates

**Government-Related**
Monetary policies
Fiscal policies
Trade policies
Taxes
Government Spending
  Defense
  Social welfare
  Revenue sharing
  Budget deficit/surplus

**Political/Governmental**

(Federal/State/Local)

**Executive Branch**
  Departments / agencies

**Legislative Branch**
  Legislation
    Incorporation
    Anti-trust
    Unions
    Taxation

**Dept./Agency Regulations:**
  IRS; OSHA; EPA; EEO
  Federal Trade Commission
  Interstate Commerce Comm.
Codes

**Judicial Branch**

**International Relations**
  Treaties / agreements

**Political Parties**

**Technological**

Agricultural
Medical
Engineering
Aviation
Computers
Robotics
Materials
  Catalysis
  Semiconductors
  Plastics
  Fiber optics
Mathematics
Sciences
  Physics
  Chemistry
  Bioengineering
  Biology
  Biophysics
  Neurophysics
  Astrophysics
  Electronics
  Genetics
  Climatology
  Mechanics
  Metalurgy
  Optics
  Psychology

**Resources**

**Raw Materials**
  Reserves
**Energy**
  Petroleum reserves
  Refining capacity
  Production capacity
  Nuclear

**Social/Cultural Variables**

Population demographics
Population growth
Population migration
**Social Norms/Customs**
  Morality/ethics
  Work ethic
  Socialization of the young

**Other Factors/Variables**

**Foreign Entities**
  Governments
    Domestic policies
      Monetary policies
      Fiscal policies
    Trade policies
  Competitors
    Products
    Marketing practices
    Costs / prices

**Sources/Suppliers**

**Transportation**
  Modes
  Facilities

**Communications**
  Modes
  Facilities

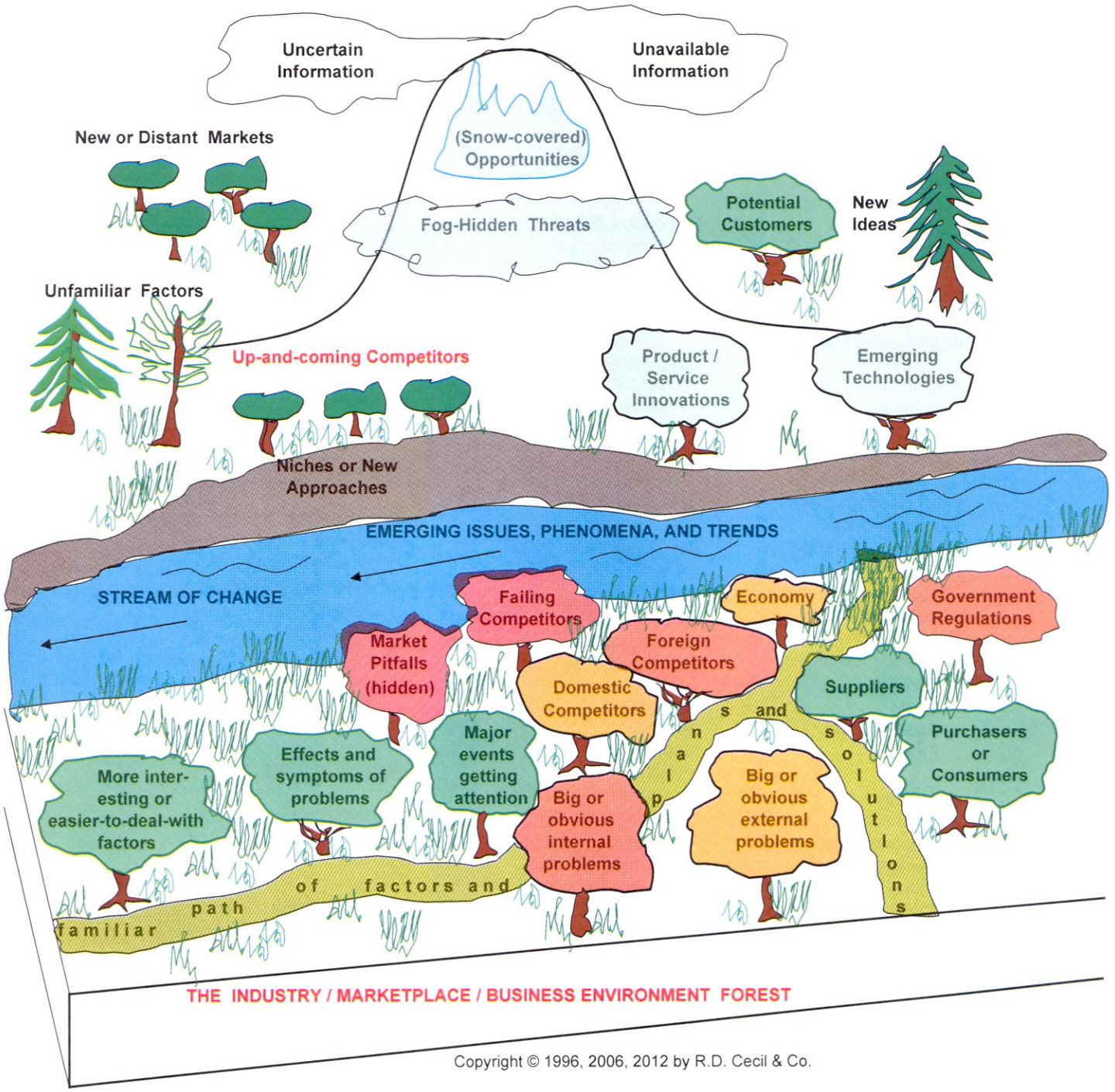
**Labor**
  Work force (#, skills)
  Unions

**Industry Associations**

**Special Interest Groups**
  Environmental
  Political action

**Natural Phenomena**
  Weather
  Geography

## *Figure 4: A Strategic Planning "Forest of Variables"*



**Analytic and Knowledge Management Tools**

In order to describe these tools more effectively, it will first be useful to introduce frames of reference (checklists of variables) for analyzing industries, their marketplaces, and their external environments during strategic planning processes.

*Marketplace and Environment Analysis Tools*

Exhibit A on page A-4 of the main *Analyzing* booklet lists many major industry, marketplace, and marketing mix variables. **Table 3** on page AA-9 lists many significant external forces and factors that can affect organizations over time. The latter is provided here to give readers a basic idea of the extraordinary degree of complexity that can actually be involved in strategic planning processes (and in analyzing organizational behavior during those processes).

**Figure 4** visually summarizes many of the countless variables ("trees") in a "planning forest"—entities, groups, phenomena, issues, problems, and other variables listed in **Table 3** (and Exhibit A).

First, notice the path near the edge of the forest. It is the "path of familar factors, phenomena, and issues"—the path that managers travel all the time. They are accustomed to analyzing many of the factors associated with consumers, suppliers, the economy, government regulation, domestic competitors, foreign competitors, important internal problems, and the really big and often-discussed industry problems and issues. Most managers will tend to consider the more interesting or easier-to-deal-with factors. And they will look at the effects or symptoms of problems and the major phenomena receiving industry and marketplace attention. These are all "foreground factors"—the "easy-to-see factors." But behind the nearby trees and bushes are a number of not-so-obvious variables and phenomena that also need attention. Note the "stream of change" running through the forest. It represents a constant flow of impending or emerging issues, phenomena, and trends that will make themselves felt over the years. Along the close edge of the stream are important elements such as hidden market pitfalls and slowly failing competitors. Across the stream and farther away are other less visible or obvious factors, including emerging technologies, product or service innovations, and up-and-coming competitors, who are beginning to stake out niche markets or new approaches in order to gain foot-holds in the marketplace. Perhaps many managers also fail to see numerous unfamiliar factors, new or distant markets, potential customers, new ideas, not-so-obvious opportunities, and hidden threats or problems. And perhaps they only have available very uncertain or inaccurate information about the variables to which they actually do give some thought.

So, if managers are just thinking about the familar considerations that are easy to see because they are close to the well-worn path, and fail to take the path to the edge of the stream so that they might at least try to look beyond the foreground vegetation in the forest, they are going to overlook many things that could be or become opportunities, threats, and problems. Right now, they may think that the little seedlings and sapplings in the background may not look too important. But the bigger trees in the foreground, which seem important now, are someday going to be gone, and the little trees will have become the forest.

The point: *Deal with more variables, dig deeper into the details, and look much further ahead into the future in order to (a) identify what the competition has not noticed yet (hopefully), and (b) more quickly and effectively position the organization to take greater advantage of opportunities and deal more effectively with threats or problems*.

*How to Develop a Checklist-Based "Qualitative Information Base"*

As indicated in **Table 2**, checklists of variables help managers supplement their knowledge of factors and deal with other limitations such as the influences of motive and attitudinal traits, the mind's tendency to oversimplify, and the cultural inclination toward single causality. As a result, they enable managers to analyze situations in greater depth and breadth.

It is also possible and extremely beneficial for them to utilize a checklist in the following organized, orderly, and systematic manner.

As a group walks through a printed out checklist of variables category by category (preferably on wide-format "greenbar" paper), ask the following: "Is this category or sub-category of factors worth looking at further (should we turn over the rock and look underneath or not)?" and "What is the unit's or organization's situation with respect to this category of factors, or to this more finite factor within that category or sub-category?" Participants can each write very brief answers to these questions on their own copies of the checklist, or a "recorder" can do so on a master version. The answers are essentially (qualitative) observations, insights, assumptions, and conclusions regarding the customers, suppliers, competitors, and other entities that operate in, or exert influences on, their business world. Of course, not all the factors on any particular checklist are going to apply to all organizations or all industries. However, even though it may not be necessary for the group to "turn over all the rocks," they should still make sure that they have not missed some "needle in the haystack"—

some competitive advantage perhaps—that competitors might not yet have noticed.

Do managers want to analyze things in such detail? Of course not—for all the reasons mentioned in the main booklet on *Analyzing* and in the "limitations" section earlier in this addendum. Nevertheless, using a checklist has these and other important advantages. First, it gets group members to think about a particular situation in an organized, step-by-step manner instead of jumping around from one topic to another. Second, it is designed to take them deeper and deeper into the checklist's details and lead them to insights that they might never have arrived at on their own. Third, a checklist provides a certain discipline, because it keeps participants moving along during a session. Fourth, it helps them think about things that are "outside their existing boxes."

With respect to the last point, take, for example, the marketing executives of a mid-size manufacturing company. When the group came to a checklist of consumer/customer variables, they balked at starting into it, saying, "We sell through several channels of distribution and don't need to analyze the ultimate purchasers or users." They were asked to take at least thirty minutes to get into the checklist and then see what they thought. Not only did they finish that factor index, but, as a result of the insights they gained, they also significantly modified their marketing strategies and tactics (in order to more effectively utilize their distribution channels to reach targeted market segments). Furthermore, they were glad they had done a really detailed analysis, because they felt they "had a better handle on what needed to be done and when and how to do it."

Not only are checklists excellent analytical tools, but they can also be very beneficial learning and knowledge managements tools. They can help get "tacit information"—qualitative, nonnumeric, or subjective information, such as observations, insights, and conclusions—out of people's heads and into some sort of database. Delphi Group's Tom Koulopoulos (1997) pointed out the importance of doing so, saying, "On average, organizations believe that 42% of corporate knowledge is housed exclusively in the brains of employees." That knowledge is usually qualitative rather than quantitative, because numeric data is already in databases (which can store and manipulate it most efficiently). Delphi Group has also mentioned another reason for the importance of qualitative information: *about 80% of top management decisions are based on qualitative rather than quantitative considerations*.

When observations, insights, and other qualitative bits of information are written on a printed out version of a (spreadsheet-based) checklist, and are then entered directly into that spreadsheet, the spreadsheet version becomes a searchable "Qualitative Information Base" (QIB). Developing a QIB has many advantages. First, by writing down brief answers to the question, "what is the situation with respect to this variable," people must crystallize, sort out, and sift what they "know." This, in turn, helps them identify what they actually know and what they may have to learn or even research. Second, getting all this information out of people's heads and into a spreadsheet helps protect it from possible loss through turnover, retirement, and terminations. Third, the process itself stimulates participants' mental activity and leads them to many fresh insights and innovative ideas. Fourth, it enables participants to share and verify information among themselves. In other words, *the process is a powerful learning experience for everyone involved*.

### *Developing a Diagramatic Knowledge Base™ to Handle Complexity (Instead of Using a More Simplistic Approach)*

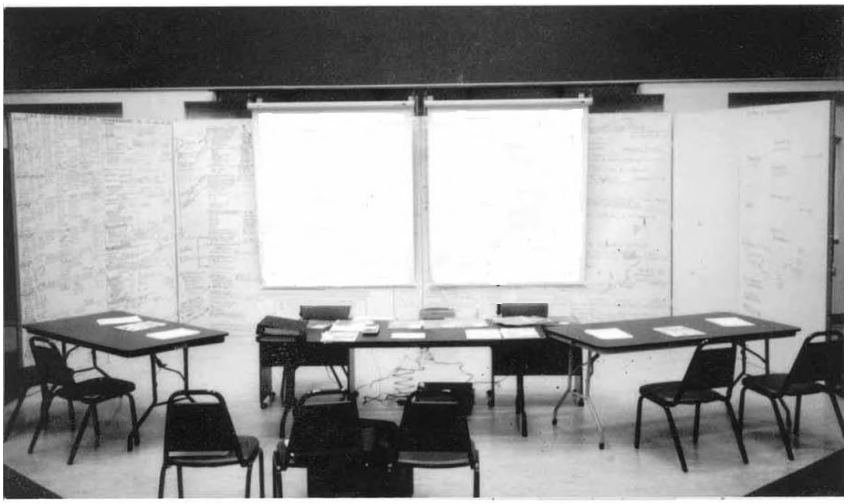
One might ask, "If it's such a good idea to use checklists to analyze situations in considerably more detail than ever before, how are we to deal with the complexity?" Different groups of people use different approaches, one of which is much more powerful and beneficial than the other.

One group, who essentially want to ignore complexity and not get "bogged down in details," are advocates of the K.I.S.S. Principle—or "keep it simple, stupid." This approach largely stems from a concept now called "Occam's Razor." It was first proposed in the 14th century by William of Occam, an English theologian, who believed that "the simplest explanation tends to be the best."

Granted, applying a simplistic approach might sound quite sensible to many harried individuals. However, it would mean, for example, that out of all the possible solutions indicated in **Figure 1** on page AA-2, some one simple solution would be best.

Another group, including the author, could not disagree more, because we are convinced that *it takes a system of solutions to remedy a system of causes*. H. L. Mencken (1949) would certainly disagree as well. He said, "For every complex, knotty problem there is one solution that is simple, neat, and *wrong*." A European consulting firm, ThinkTools AG, would disagree, too. They have run full-page magazine ads that proclaim in huge letters, "Keep It Complex, Stupid." Moreover, based on research that utilizes programs called "machine learning systems," computer scientist Geoffrey Webb (1996) concluded the following: (a) complex decision-making processes generally yield better decisions, and (b) following Occam's concept can cause people to overlook hidden knowledge and draw faulty conclusions.

***Exhibit 1: Example of a "TeamThink Wall"***



Nevertheless, while simple analyses are clearly dysfunctional for modern management in a complex world, Occam's Razor and "KISS" are still popular for two main reasons.

First, many managers are afraid of becoming too enmeshed in details and suffering from "paralysis by analysis." Their theory is that the more information we attempt to consider, the more muddled the decision becomes and the more we hesitate to make a decision. That does happen. The phenomenon was once called the "55-45 Syndrome," where, for example, 55% of the analysis could indicate "do A," but 45% of the analysis might auger for "not do A" (or perhaps "do B").

Second, managers very often want much more information, hoping that it will make the best decision more apparent and somehow less risky. Nonetheless, it is the job of effective managers to make decisions in the face of complexity and uncertainty.

Here is a recommendation for dealing with these kinds of situations: Once a well-conceived decision has been made, do not be timid. Shift your mental gears and then "run with the ball." The main reason: the complexity of global markets, modern organizations, and world economies is staggering, and that complexity cannot be wished away. In fact, not only is complexity not going away, it is going to continue getting *worse*. So, running off the battlefield in the war with complexity yelling "KISS! KISS!" will accomplish relatively little.

A more effective way to handle real-world complexity is to use the technological tools at our disposal. The following are suggestions for developing a management and knowledge tool called a Diagrammatic Knowledge Base.

As participants in, say, a strategic planning process are working their way through a checklist of relevant variables, the group leader or facilitator can diagram the most significant variables on a large surface. (Specially constructed "teamthink walls," such as the one shown in **Exhibit 1**, have measured 32+ feet wide by 8 to 10 feet high—or over 256 square feet.) A large (wall) diagram can contain hundreds of qualitative factors, including entities, phenomena, and other variables. Lines and arrows are used to indicate cause-effect and sequential relationships among the variables. Relevant quantitative data can be written in beside many of the qualitative objects on the diagram.

Similarly, large diagrams can be used to illustrate (a) the ways in which many socio-technical factors are affecting motivation, attitudes, behavior, and performance within the major units of an organization, and (b) how those phenomena are influencing job interactions and the flows of information, materials, and services—both vertically between organizational levels and horizontally between units. They can also be used to diagram and analyze facility layouts and other complex situations that lend themselves to visual analysis.

Such diagrams are powerful analytic tools because they *visually integrate* the qualitative aspects of the analysis (the variables and their relationships) with the quantitative aspects (the data associated with the variables) right in front of a group. They enable managers to consider both nonnumeric and numeric information in a blended manner that

maximizes their ability to handle large amounts of information, make greater sense of it, and thereby gain a better understanding of what is going on and why in the complex systems and sub-systems involved. They also help managers (a) think in a more organized manner, (b) be more insightful and innovative, (c) better grasp the "big picture," (d) think more clearly about the future, (e) identify more hidden or previously unrecognized problems, (f) deal with problem situations more completely and permanently, and (g) simply "work smarter."

Subsequently computerizing a wall model enables managers to update and use it on a continuing basis. (Many types of software can be used, but none are yet capable of performing all aspects of "situational diagramming" both effectively and efficiently. Each type has advantages and disadvantages.) Once a wall diagram has been computerized it becomes a *Diagramatic Knowledge Base* or "DKB." It enables users to click on any object and drill down into either a qualitative information base (QIB) or a strategic planning database. Clicking on an object can also pop up a map or graph of relevant information. This makes a tremendous executive information system tool, because it enables managers to view almost every internal and external aspect of their organization's "theatre of operations."

Using existing software and custom-configured hardware, it is also possible to project a computerized DKB back onto a 256 square foot wall (or screen) seamlessly and in its entirety—in what might be called a "strategic planning warroom." This enables managers to do real-time strategic planning with an entire 256 square foot "situation illustration" right in front of them.

The most important advantage is that a DKB—and even an uncomputerized wall model—enables participants in a planning, problem-solving, or decision-making session to *handle 50 to 100 times more strategic information than they have ever been able to handle before*. It enables them to *deal with both qualitative and related quantitative information in a visually integrated manner that maximizes their ability to gain insight into, and deal more effectively with, the complex systems of variables surrounding them*.

In fact, that is almost exactly what a strategic planner at a top five company said: "We have mountains and mountains of data, but no way to make sense of it all. This is a way to make it more meaningful." The CIO of a major chemical company said: "We are inundating our people with data, but they can't handle it all. These methods and tools can help us make our information more useful." The coordinator of a major computer company's groupthink centers, who is a professional facilitator and consultant as well as a manager, said, "Companies need this badly, but they are still just short of the point where they can recognize it."

Once a DKB has been either shown or described to managers, they often ask, "Doesn't it blow people's minds when they come into the room and see a 256 square foot wall covered with hundreds upon hundreds of bits of information?" The answer is that "it depends." Those managers who have participated in the step-by-step development of the wall diagram are totally familiar with all the systems and sub-systems of variables and the illustrated relationships among them—because they took part in identifying them. When the diagram is complete and their minds no longer need to juggle so much information on their own, they can then sit back, look at and explore the entire diagrammatic analysis of systems of variables, and then identify possible strategies, tactics, solutions and improvements that had never occurred to them before. When the group is ready to brief top management (or anyone else), the wall can be completely covered initially, and then be exposed and discussed one section at a time.

**Concluding Remarks**

Whether during planning, problem-solving, or decision-making processes, analyzing situations in greater depth and breadth is key to better goal-setting, planning, decision-making, organizing, and other managerial or integrative functions. Two major tools that improve mental effectiveness by dealing with mental limitations are (a) checklists of factors that help compensate for limited knowledge and limiting attitudes, and (b) "situation analysis diagrams" that help people's minds handle the complex interrelationships among variables operating in organizational, marketplace, and other situations. Once such situations have been analyzed thoroughly, both individuals and participants in group processes are better prepared to perform planning functions. These functions, which involve formulating plans—such as goals, strategies/tactics, programs/projects, action plans, and budgets—are discussed in the *Planning Phase* and *Planning* booklets.