Coming to Grips With the Future

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An awareness of the corporation's external environment and longer-term future is becoming increasingly important in technology planning. Building an internal futures competence is the most promising way to gain this awareness. It involves, at the outset, understanding what futures research is and what it is not, and what futurists can deliver and what they cannot. Based on this, management can proceed to staff a futures unit, assign the tasks it will perform, monitor progress, communicate the results, and assess their implications for the business.

A few years ago, I received a phone call from the director of planning at a *Fortune* 100 company. "We're in the midst of our strategic planning," he explained, "and we forgot to look at the future." After we both laughed, he continued, "The lapse is easily understandable. We do our strategic planning in a three-year time frame."

Actually, I wasn't surprised. In my experience with large, research-based corporations, strategic planning is often short-term: three to five years. Moreover, the future does not play a significant role in most strategic planning. Management's attention is directed principally at already-existing activities, current products and established plans. It is perfectly reasonable, therefore, that from the planner's point of view, any examination of the future should be conducted as a marginal exercise.

I shall illustrate the corporate approach to thinking about the future with brief anecdotes from five recent clients. These will be followed by some general principles for thinking about the future before moving on to how to actually do it.

Five Stories

Company A requested a particular futures project but neglected to specify boundaries. So the first thing we did was to request those boundaries. The client quickly produced a list of items like, "within *Y* years, a market of *X* million dollars," "nothing that intrudes in the human body," and others for a total of ten constraints. From our point of view, these formed an intellectual corral and we would not be interested in any potential product or service outside of that corral.

Next, we discussed time horizons and agreed on 10-15 years for the project. My experience had been that acceptable time horizons have been growing longer since the 1980s, when a 10-year look toward the future was relatively long-term. In recent years, looks as far out as 20 and 30 years have become common.

Two things prevented this company from conducting the work internally: first, it did not have an established mechanism to stimulate new and creative thinking, to harvest ideas, and to evaluate them; second, without such a mechanism it was uncertain how to begin.

Company B wished to find new R&D-based opportunities. Going through a similar process as with company A, we generated 200 concepts. Then we met with the client's review board and it was a massacre: "out, out, out, out, maybe, out, out, maybe, out, maybe, maybe, out, out." The 200 items collapsed to 20 survivors.

Presentation of the concepts evoked from the reviewers points that should have been an explicit part of our intellectual corral. This reflects the tendency for large organizations not to fully think through and make explicit the assumptions basic to their activities and their decision making.

For each of the 20 survivors, we produced a brief paper covering four points:

- What is the research and subsequent business opportunity?
- What is the supporting evidence?
- What are the implications for the client?
- What should be done in the next year or so?

It was important that these be pithy so that the review group would be able to quickly understand what was proposed and focus their attention on what had merit for them. Of our 20, four survived and were introduced into early stages of the client's R&D cycle, an outcome that both we and the client deemed a success.

Company C had an *ad hoc* system in place in which a small group of people were selected from several levels of the company. Bright, hardworking and enthusiastic, they certainly had the company's interests in mind and were eager to get on with their futures task, scanning and monitoring.

The group ran into two problems, however: First, they had no clear sense of the quality of the information they collected. More significantly, their lack of practice and guidance made it difficult for them to interpret the information they found in terms of trends and then in terms of implications for the business. Useful scanning and monitoring calls for practice, practice, practice, and more practice.

Company D had conducted an internal solicitation of concepts for future business opportunities and it yielded scores of ideas. The subsequent review of concepts had to be credible, because it is only when the process is credible that people will continue to participate. Consequently, they called on their own Fellows, who organized themselves in such a way that each had a packet of concepts that he or she had to evaluate and become the advocate for. This was to ensure that each proposal got a fair and balanced hearing and was not dismissed because it seemed irrelevant, kooky or simply undoable. When the Fellows came together, the briefings on each of the topics and the subsequent discussions were followed by electronic voting, which had the great value of anonymity.

This interesting approach to dealing with future opportunities illustrates the importance of making exploration of the future a routine and continuous activity rather than *ad hoc,* episodic.

Company E is an electric utility, and our assignment was to discuss, among other topics, the future of energy. At one workshop of about 25 people, I informed the group of the then-current level of energy consumption in the United States as measured in quads (quadrillion British thermal units) and asked them to estimate what it would be in 20 years. A plot of the responses was chaotic—varying from a 50 percent decline to 300 percent growth.

In discussing these bizarre results, it became clear that the group had never developed an organizational point of view on the future of energy. This is an illustration of the not-uncommon failure to be either systemic or systematic. For a company that depends upon the production and consumption of energy as its business, one would think that assumptions about the future of energy would be high on their strategic agenda and permeate their planning. Yet, like many companies I have encountered, it was not.

Taking a Systems Approach

Sometimes the company is not the best focus for an exploration of the future. The better choice is the industry, because that highlights many factors that are indirectly important to the company, but not necessarily in the forefront of their thinking. For example, we looked at packaging on a worldwide basis, which made this multi-client study the first of its kind to include everything in the packaging system from raw materials to consumers and waste disposal.

Figure 1 (*see next page*) is the basic diagram used throughout the study. We developed it early and it was judged a great success in showing people for the first time where they stood in the complex context of the whole system.

In *Figure 1*, many of the points are laid out temporally or in a cycle. They are actually catch-phrases or labels for many points of detail too numerous for so small a diagram. One basic use of the systems diagram is as a multidimensional checklist asking the user if he or she has really paid enough attention to each of the areas, categories, items and so on. The systems diagram is so crucial to comprehensive systemic thinking that *Figure 1* should be seen as a model for any project in any field. Obviously structure and details will differ from topic to topic.

The diagram highlights where any enterprise stands in the system and what is proximate to it, both in time and in business, and what is so remote from it that one is less likely to be attentive to developments and their possible economic, technological, social, business or environmental effects.

While proprietary to the clients, the project used no confidential information from any company; in no way were the interactions with and among the clients limited.

General Principles

Let us turn now to some general principles about exploring the future before getting down to the nitty - gritty of how to keep up with the future. The author's practice is based on three assumptions:

- We have the capability to see the future, whether it is 5 or 50 years ahead, with enough clarity and confidence that it is useful for planning.

FIGURE 1

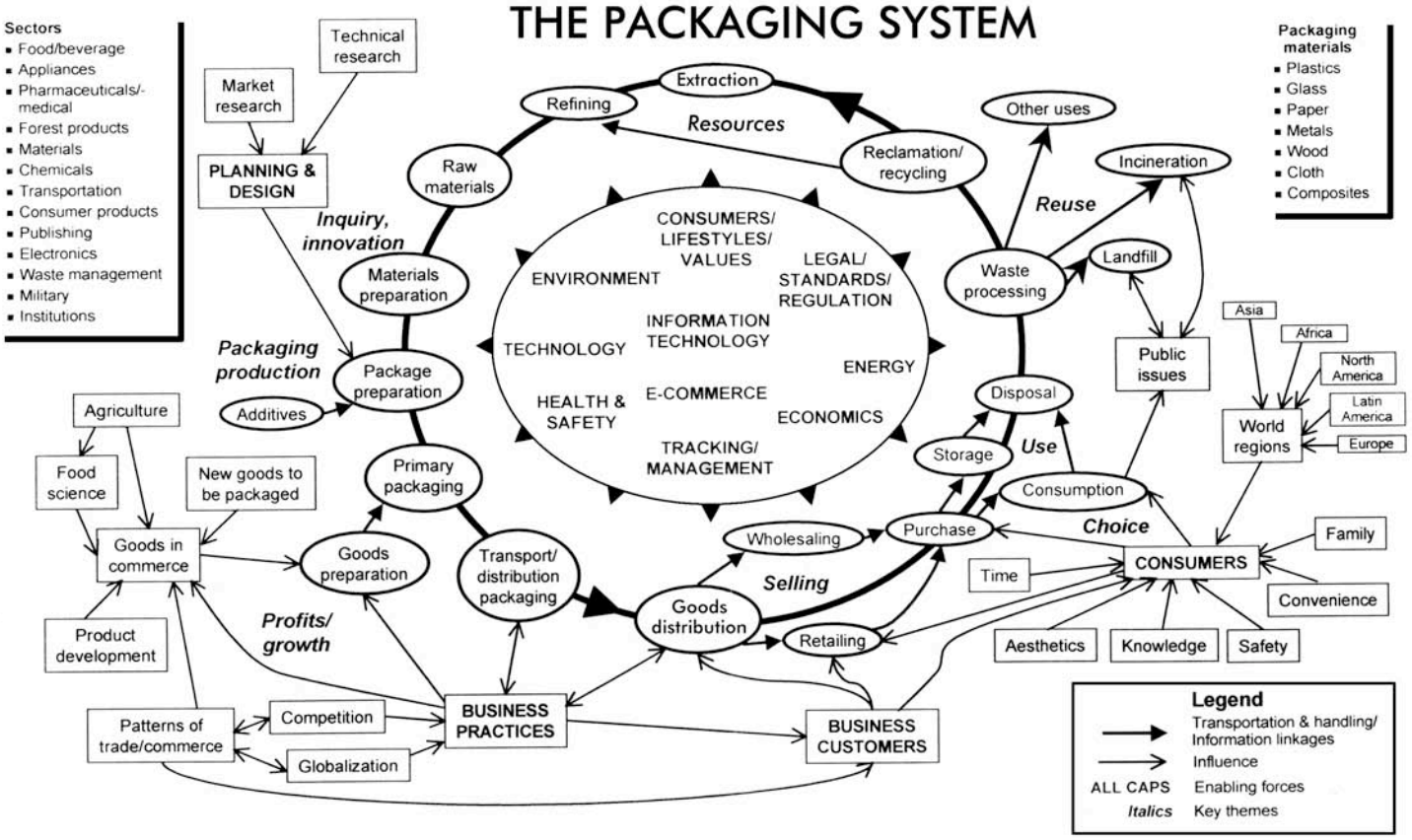

Figure 1 The packaging system is a typical systems diagram in that it pulls together all the elements comprising a system, including the trend areas affecting it, and the organizational units making it up, which feed into and flow out of the central activities of the enterprise. Key themes (activity clusters) such as Choice, Reuse, Resources, Inquiry, and Profits/Growth are also indicated. The diagram is prepared early in a project to guide the detailed study, and often changes as the work identifies new elements or relationships. A systems diagram for another topic would differ in system components and the trends at play.

- We have the capability to intervene in the evolving future to make the undesirable less likely and the desirable more likely.
- We have the obligation to use those capabilities to anticipate and influence the future.

These assumptions, however bold, make no claim for omniscience nor for omnipotence. They only say that the exploration of the future will enhance insights or understanding and improve the effect of actions that are taken. Another underlying notion in our exploration of the future—which may surprise some readers—is that our primary purpose is not to tell our client what will happen. We of course do that by telling them that with some probability by year *X* such and such will occur. A study report might very well have anywhere from 25 to 500 of these predictions.

However, forecasts are principally a means of evoking the client's assumptions about the future. Well, you can say, why not ask? Asking does not evoke a full answer. Most of us go about our activities loaded with latent, dormant, rarely-if-ever-spoken assumptions about the future. When a client sees some statement and reacts negatively to it, we see that negativity as based on underlying, usually unspoken, assumptions.

We will ask, "Charlie, considering your uncertainty or rejection of this notion, could you tell us a bit more about why you feel that way?" If the client takes that bait, we have him hooked. One cannot reject a statement about the future without revealing some of

one's own assumptions. That revelation is the primary goal of exploring the future. To help people to better understand what they believe will allow them to examine, evaluate, modify, add to or drop some assumptions.

The common feature of all organizational failure is that some individual or small group at the top had assumptions about the future that were unsound. Any study of the future, to be useful, has to be deliberated over, discussed, talked about, and most important of all, thought about.

The smart recipient of a futurist's work, concept, paper, workshop, or lecture always has two concerns: legitimacy and credibility. Who are you and why should I believe you?

The key to both legitimacy and credibility, particularly as one moves up the organizational hierarchy, is that the work be transparent, meaning that the recipient, the user, the reader, comes away from the work with three beliefs:

- I understand what was done.
- If I had the time, I could have done it.
- If I had done it I would have come up with similar results.

If futures work cannot meet those three conditions in the mind of the user, the game is lost.

Strategic Futures

The material that follows and what has already been discussed are about "strategic future studies," looking out 5 to 50 years and, more realistically, 10 to 30 years. Strategic futures identify developments which are seminal, at their early stages, or just beginning to come together, in order to formulate their consequences for the client.

All large organizations, certainly all *Fortune* 500 companies, have people who are tending to the short-term future, let us say three months to three years, primarily around production, markets and economic variables. In financial services it is often an even shorter time horizon.

This article has nothing to do with that short-term forecasting. While such forecasting uses some of the most sophisticated, quantitative, mathematically-based modeling anywhere in business, and is replete with endless volumes of data and large historical databases, it is largely irrelevant to strategic futures and longer-term implications for business and industrial organizations.

Staffing a Futures Unit

Hiring or deciding to designate a staff person as the company's futurist is a crucial decision, because one must find in that person a complex of characteristics that are not necessarily readily visible, widely understood or easily identified in a conventional interview.

"The Effective Futurist" (*see box*) lists the characteristics and skills that are essential to being an effective futurist. In addition, the futurist must also recognize another primary function: to make other people successful. The egomaniacal personality, the showoff, the person who wants endless rounds of acclamation and credit, is the wrong person for the job.

I consider one to three full-time people the absolute minimum. Three may be put in place either immediately or over a period of a year. The key person to employ is an already professionally established futurist, perhaps poached from another organization, or from a futures consultancy, by seeking candidates through the recently established Association of Professional Futurists[1] or a headhunter.

That staff has to report to someone. An ideal is the executive suite or, in an R&D organization, some one organizationally close to, but not, the top person.

After some time, it may be worthwhile to establish a facility, perhaps a large conference room or open space, for the futures team to use. General Motors has had substantial success with this. Its first suite, which was wallpapered with a report on *The Future of American Business,* was such that immediately upon entering the room, one knew it was a special environment for something special, thinking about the future. It eventually expanded into a suite of rooms, with toys, gadgets, playthings, Lego blocks and other appointments, all of which were directed at loosening people up. The rooms became so popular that scheduling problems arose.

It would be a mistake to initiate the function with a

junior person graduated from one of the schools giving Masters degrees in future studies, but the second or third person on the staff might usefully be from that background.

The Effective Futurist: Skills, Characteristics and Mental Outlook

1. Lots of reading and listening.
2. Appreciation of information—you should see it as fun.
3. Playfulness is crucial to the interpretation of information.
4. A worldview or conceptual framework to relate new and old information to old and emerging patterns.
5. Analytical ability.
6. Looking, seeing, touching, smelling, listening to, and interpreting everything you encounter. Thinking about the future should be as routine and natural as breathing.
7. Understanding of the basic facts in the following areas is essential:
   - Demography
   - Changing social values
   - Organizational change
   - Information technology
   - Other scientific and technological developments
   - Global, social and cultural characteristics
   - Business practices
8. A questioning mind.
9. High tolerance for ambiguity and uncertainty-this is key to seeing, generating and interpreting alternative futures.
10. Willingness to keep an exploration open until closure; that is, reaching conclusions is necessary.
11. Willingness to learn from other organizations, other businesses, other countries and other cultures.
12. Vision of where the organization might, could or should go.
13. Openness to experimentation, simulation and "what if" thinking.
14. Enjoyment of extended conversations, as conversation is one of the most successful ways to identify and explore trends.
15. Delight in telling your story.
16. Willingness to receive as well as offer criticism.
17. Treat every futures topic as a system.
18. Cherish diversity.
19. Acknowledge and honor sources.
20. Practice, practice, practice.

Information Gathering and Interpretation

Having formed a futures group or team, there are three general activities for it:

- Scanning and monitoring.
- Conducting futures studies on specific topics.
- An indeterminate range of duties, including briefings, consultations, sitting in on other teams' meetings, arranging for visitors, or a speaker series, finding external support, attending external meetings and training-all to show that the organization is becoming more futures-oriented.

To get started and to publicize that something new is afoot, and to build a clientele and constituency for futures, hold a series of ten or more one-hour workshops with about 10 to 15 people each, mixed from throughout the organization at various levels. Hit them with only two questions: What are the trends affecting the future of the business, and what are the issues the enterprise faces?

Don't worry that the group won't give clean crisp answers. After doing this with ten to 15 groups, two things will have been accomplished: first, a clear understanding of what the staff believes the trends and issues are, and second (just by the number of responses), a sense of how they judge their relative importance. The participants will talk about the workshops and look forward to the results. This process is also constituency-building.

After this, run that same exercise, without any previous feedback, with the executive suite to see what their sense of trends and issues is. Almost surely you will find that the more senior executives will see those things that affect the economic viability of the company as their top priority concerns. The substantive concerns about the business will be lower down. On the other hand, the staff, in general, will reverse those priorities. This will have didactic value when you brief the senior managers on the internal views of the future.

Next, set up a scanning and monitoring function. An organization of any size will need to monitor 75 to 150 publications, plus cable, television, movie films, and books, as well as government, association, and academic reports for material relevant to the broad range of interest of the company. Frequent sources include *The New York Times, Foreign Affairs, American Demographics,* the *New Scientist,* and similar publications and sources in Europe and, to some extent, South and East Asia.

The scanning function is primarily a way of gathering information that relates to the trends and issues.

Much of it will call for critical examination and thought by the futures team in order to interpret what the information means to the business, directly or indirectly. Rarely does publicly-generated information directly address the future, and even less often does it directly address the future of a particular organization.

Any attempt to computerize the information collected is risky because that process gets in the way of actually reading, thinking about and interpreting the material collected. Paper files are the best place to put the material, clipped, pasted up, printed out, or put out there in any form. Ripping a magazine apart is an excellent step toward filing information.

After a while, there may be 100 to 200 file categories. And after one gets onto a specific project, one of those categories will blow up into 25 or 50 subcategories. None of that is mind-boggling, nor should it be.

Another stage in gathering information is to arrange a lecture series. Anywhere from two to eight times a year, bring in some outsider who is either to talk substantively about an issue whose future concerns you, or a futurist who will talk about the future in general or about topics of particular interest to you.

The value of the outside speakers is that they draw a large audience. This informs people throughout the organization of serious interest in the future, and it is both a stimulus and a check on the internal futures group's work. It is often useful to film the lecture for a future internal viewing.

Information services can also be useful. I consider the best one in the U.S. dealing with the future to be *Future Survey,* published monthly by the World Future Society[2]. It gives informative and meaty summaries of a wide range of futures material. It is the sort of thing that, in multiple copies, should be available to the team and other people around the organization who would find value in it. I recommended numerous print and Internet sources in two recent issues of *Research Technology Management*[3].

As the futures team develops and becomes more rigorous in its understanding of the future, there still are uses for outside consultants, including:

- Helping you to get started.
- Training in particular techniques or methods of interpretation.
- Picking up overload if you run into the need to look at too many topics.
- A check on your internal work.
- An alternative voice that keeps you from becoming ingrown.

Communicating Results

A large amount of futures-related material will quickly become available. The group's critical concern is how to distribute it, in what form and to whom. A routine publication announcing material and giving brief summaries of results is close to useless. The single most important communication tool of the futures team is shoe leather. Three, four or five minutes, or maybe an extended meeting of ten minutes, with a particular person, laying in front of him or her some material and suggesting and discussing its implications is the most valuable function that the futures group performs.

A second function of monitoring and scanning is to prepare issue briefs on particular topics. An issues brief should address four points:

- What is the issue? By no means is that obvious and straightforward. The fact that something is in the public discussion, the fact that something is receiving press notice, the fact that you have six or seven articles dealing with it, doesn't mean that it is framed as an issue in terms of importance to your organization. Framing the issue is critical.
- Supporting information.
- The implications for your firm.
- Potential actions in the short run.

Issue briefs should be distributed routinely down through several levels of management and feedback should be sought as to their usefulness. Again, the most important person or small group for a specific issue brief should be dealt with personally. The relative amount of proprietary information and the control of dissemination are internal matters to be decided upon in terms of the corporate culture and customary practices.

The third big activity for the futures group will be topical projects. It might be the "The Future of…," where the three dots can be anything. It might be the professional workforce or a chemical or a class of

chemicals or a new form of communication, or China. It might be business opportunities in some part of the world.

For topical studies, one has to go back to the concept of a systems diagram to see if the topic links to the systems diagram you have already created for the firm, or whether you need to create a new systems diagram. For example, if you were looking at the future of the scientific workforce, you would certainly want to create a separate conceptual diagram for that, expanding on what may have already appeared in your general industrial or company systems diagram.

The team might also be asked to do tasks along the lines of the future of the whole organization—"Acme in 2030"—or you might be asked to look at the future of either the company's industry or a particular industry with which it works or to which it sells, for example, the future of forest products or the future of paints and coatings, if you are in the furniture business.

Getting on with a topical study, the next thing to do is to mine your own files, your own library. Do a quick search on the Internet. Next, find anyone inside the company who has a particular interest or familiarity with the subject. If it is a large enough group, six or seven people or more, bring them together for an hour or two's work. If it is just one or two specialists coming to you from your knowledge management program, interview them.

Having the above background, you are now ready to look at the trends or the discontinuities that could affect the elements of that system.

In any such analysis, there is a group of more or less universals one wants to look at and then a complementary list, often much longer, of trend areas that are specific to the topic under study.

The universals that appear in virtually any future task are:

- *Demography*. This is a complex subject including births, deaths, marriages, age cohorts, immigration, geographic locations, regional differences, ethnicities, race, and more.
- *Social value changes*. This is extremely important because some values are changing rapidly, while others are almost rock stable. You can easily miss some substantial change in values and the associated behaviors in as few as five years. Many of the most important trends are qualitative.
- *Information technology*. This is a universal, affecting every enterprise and organization from the individual up through businesses, nonprofits, foundations, government agencies, competitors, and foreign countries. The large amount of material in this field can lead to a feeling of being overwhelmed, so focus is called for.
- *Other areas of science and technology*. These are limitless, and can be anything from the physical, biological or social sciences.
- *Business practices*. By no means is business stable. Are there innovations going on in your sector? Are there innovations going on in other sectors that could be transferred to the firm or to its competitors?
- *Globalization*. This requires you to be both systemic and systematic in your thinking.

With those general trend areas in hand, you have to look at the other areas that might influence the topic you are investigating.

Figure 2 (*see next page*) shows one schema for this kind of approach. Having gathered your information and putting it all together, you must move on to the question of how might the system change? It is important to reject the concept of *"the* future," simply because the number of components entering into any complex situation, and the number of factors influencing it, make it unrealistic to talk about *"the* future." Instead, you want to consider alternative futures, the various ways the future can evolve, and define two, three, four, or more of them. The criterion for selecting them is that they should be policy rich; that is, they should stimulate thinking about implications for the enterprise.

Next, with the alternative futures in mind, you need to get to the implications of each of them for the business. Some implications may repeat across several of the alternative futures, and these are often most important. Then, having looked at the implications, for each alternative future you need to identify the actions that are robust and appropriate to take.

That pretty much completes the study of the future except for two other considerations. One is wild cards: what normally unanticipated, unexpected or rare event could occur that could upset the analysis?

It is not uncommon to identify 25 to 75 such wild cards. The most efficient way to deal with them is to consider them as perturbations on the analysis you have already completed and to tease out their specific implications. Wild cards might include depression,

FIGURE 2

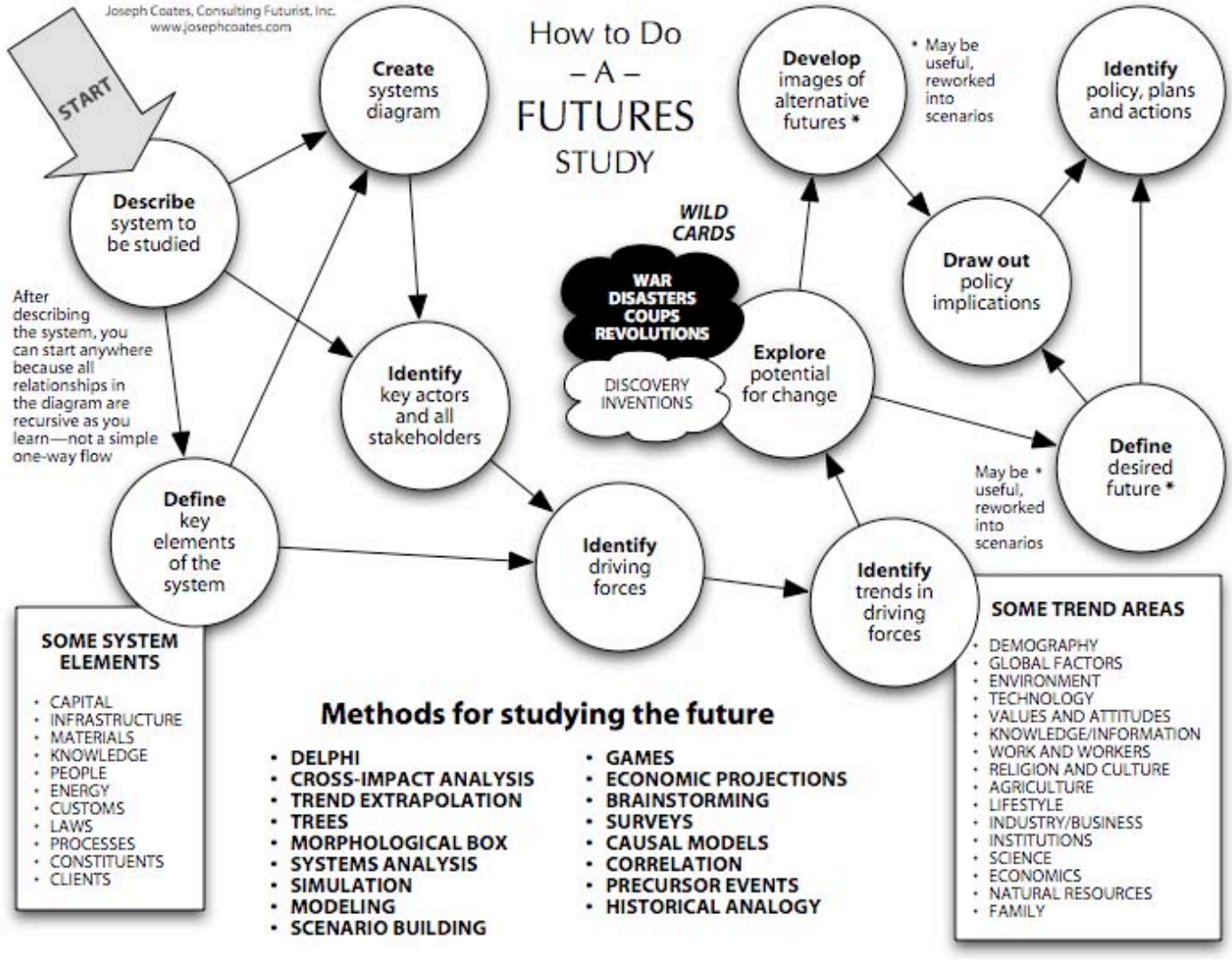

Figure 2 The components and flow of a futures study begin with a systems description (see figure 1) and move through the stages described. There is a wide range of methods for dealing with each of the stages.

runaway inflation, crop failure, an earthquake, or massive credit card defaults.

Stakeholders are the other factor that has to be taken into account. A stakeholder is anyone who either affects the system or is affected by it. Stakeholders include labor, management, customers, suppliers, government regulators, competitors, public interest groups, and so on. The analysis should state their concerns, what motivates them, why they are or will be interested in the topic that you are studying, what their positions could be and, most importantly, what their coinage is—that is, what could influence their behavior, so you could either neutralize them if they are hostile to your interests or win them over if they are neutral.

Tools and Techniques

The tools for doing the work outlined in *Figure 2* are numerous and serve different purposes. Depending on how you count, there are anywhere from 30 to 150 tools and techniques for exploring the future. Keep in mind that the study of the future is not a science and never will be—it's an art form that draws upon all of the sciences, technologies, disciplines, and arts. But there are methods and techniques that are almost exclusively tools of the futurist. Those are the ones described in "Tools for Exploring the Future" (*see sidebar*). The details of how they operate are beyond the scope of this article, but sources cited will give the details.

There is currently a great deal of activity within the futures community to identify and develop new tools, both to provide new capabilities and to respond to the changing complexity of the world with which business and government must deal. For example, virtually nothing has been done with regard to the use of films, cartoons, radio, contests, or the understanding of individual people's response to change, to better understand future developments and their consequences.

Getting Started

To set up a futures study program, consider the following:

- Acknowledge that you have not been fully aware of forces, factors, trends, and developments influencing your enterprise.
- Make a commitment for at least three years in manpower and budget.
- Select a leader, or hire one. Make clear what his or her functions, scope, and power may be. Include a plan for expansion of his or her function by one or two people within a year.
- Publicize the new development.
- Conduct some of the start-up activities discussed earlier, e.g., internal survey of trends and issues, a lecture series, expectation of attendance at futures conferences.
- Agree with your futurist on how to distribute scanning and monitoring information, e.g., on the internal net, personally, by issue briefs, or other means.
- Plan an annual futures event, perhaps bringing in a group of key customers for their edification.
- Expect—that is, require—explicit attention to the future in all proposed plans and programs.
- Encourage participation by the general staff in scanning and monitoring.
- Be prepared to hire outside help on an as-needed basis to augment or complement staff, to check on staff work, to keep horizons widening.

Putting the activities discussed in this article into play in your organization will, in a year or two, give you new and continuing insights into the complex forces shaping the enterprise. Clearer images of the future imply better long-term planning, wider choices for action and fewer surprises. Your planning will not be perfect-just a lot better than it is now.

Tools for Exploring the Future

Tools that futurists use today fall into six categories: background information, concept generation, methods of exhaustion, advice, trend identification and analysis, modeling, and presentation and communication.

Background Information
Background begins, as it does in any other form of study, with historical surveys and a compilation of prior work. It is an unusual futures field for which there is no prior work (shoes, for example), but it is valuable to review prior work or to establish that there is none.

Concept Generation
Concept generation is central to thinking about the future and is the topic with the greatest number and most diversified range of tools. Those tools also may overlap with the other categories below. Prominent among them are the following:

Expert panels and workshops are productive. In many cases, one would want panels and workshops without experts in order to gather lay opinion of unorganized stakeholders. The most popular way of reaching out to experts and stakeholders is to set up a mail panel and conduct a Delphi Survey. A special feature of the Delphi Survey is that all of the questions are answered quantitatively in terms of importance, time of development, and critical factors influencing the subject under consideration. Quantification lends itself to rapid, crisp analysis and presentation.

Hearings, while unlikely to be conducted by a corporation, can be conducted in moot-court form in which

members of the corporate community play-act roles. This can be in the form of a Congressional hearing, an actual moot court, or some other situation that will call upon the participants to think through the roles they are playing. This is a powerful educational and consciousness-raising tool.

The *Morphological Box,* developed by the prominent aeronautical engineer Fritz Zwicky, is in part a method of exhaustion of the technological possibilities for achieving a goal as well as a tool for creative thinking. Conceptually, the Morphological Box is trivial: One sets up a chart, and lists down the left side the six or eight critical questions that must be answered with regard to the technology or venture under consideration. Horizontally, one creates all the conceivable answers to each of the questions. One then goes down those columns of answers and selects one response from each row (six or eight in all) to create a potential system for further study.

Many of the permutations will be impossible because they involve logical contradictions, or for other reasons. But the process is extremely productive and led Zwicky to several aeronautical inventions.

Historical analogies are often sought for insight into the future. I know of few cases in which that has been of any significant value, the principal reason being that historical analogies are only analogous in terms of two or three dimensions of the issue under consideration. It is likely that one of the dozens of other elements of the past and current situation differ so much that they blunt the significance or even the possibility of a true analogy.

Brainstorming and its closely related tool *brain-writing,* are valuable in concept generation. Each technique is the same in that the group is charged with a question, asked to generate responses to that question, and forbidden to make any negative or critical comments during that generative process. All participants are encouraged to build upon each other's ideas as well as to offer new ones. Brainstorming is spoken, brain-writing is written with the ideas on paper, passed from hand to hand. Both are cheap, easy and quick techniques.

Trend Identification and Analysis

Trend identification and analysis in part comes about from the look at prior work. More important, though, is the ability to look at a large amount of information and discern a qualitative or quantitative trend. Organizations are strongly biased in favor of quantifiable trend analysis, but the qualitative analysis is often the key to the significance of emerging possibilities and also in the longer term to what may evolve.

Consider for example: 20 years ago, who would have seen the trends in a quantitative way leading to the ban on smoking in restaurants and in public buildings? Rather, one had to go through a group of qualitative trends in order to be able to anticipate those developments.

There are outstandingly useful and valuable tools to the quantitative handling of trend data, to a large extent coming out of the experience of the military, electronics, aerospace and other industries.

In the work discussed in this paper, a primary tool for trend identification comes out of the development of the systems model for the enterprise and the subsequent application of systems analysis to that model, highlighting places where one needs to look for trends in order to understand how the system operates.

Having identified a group of trends influencing a situation, the question comes up: can they be cross-related? Can one trend influence another? *Cross-impact analysis* is a tool for beginning that analysis. If, for example, one had five trends, A through E, one would systematically go through asking and answering the following questions: If trend A continues, how will it affect trends B, C, D, and E? If trend B continues, how will it affect trends A, C, D, and E? And so on.

This has several purposes. It stimulates thinking where one previously might not have done much. Second, it suggests areas of ignorance that need to be explored. And third, it becomes the prototype of what may later be developed into a formal computer-based model of the situation being studied.

Methods of Exhaustion

It is always desirable to be sure that one has covered all the bases. The simplest, almost trivial, form of that is the checklist. As mentioned earlier, the systems diagram can be one basis for expanding this checklist. The formal techniques, usually as fault or decision trees, are widely used, not only for concept generation but to be sure that all possible alternatives have been examined. The Morphological Box has already been mentioned.

Advice
No futurist or futures team either wants to or should operate in isolation. Researchers need advice on almost every aspect of what is being explored. Some of the tools mentioned above under *concept generation*. such as interrogating experts, will lead to advice. There are other more formal processes that can help one understand the decisions and alternatives one has to deal with, such as decision theory and judgment theory.

Modeling
Modeling, as mentioned above, may either be qualitative or quantitative and computer-assisted. Professor Jay Forrester at MIT pioneered systems dynamic models, emphasizing their application to understanding the structure and function of cities. The famous book (infamous in the minds of some), *Limits to Growth*. is an example of quantitative modeling. In that case, working with only a few variables, the team came to dramatic conclusions about the global future.

There is also a role for physical models. A particular technological development may call for a look at physical models as a way of understanding what might happen, much in the way we use physical models to understand the effects of crash impacts on automobiles. But most physical models are now being rapidly replaced by computer-based models, which in turn are based upon broad databases and highly sophisticated sub-models.

Simulation and gaming are related to modeling but distinctly different. The first allows one to use the model to systematically or arbitrarily make changes in the variables and determine the consequences. Gaming is an extremely effective but often expensive tool for both training and evaluation. In the military, war games are routinely played to prepare statesmen and military leaders for war, conflict or international power politics. The games can easily run to a half million dollars and be operated over several days, often with more than 20 people. Obviously, not all games need be that sophisticated, complex or expensive in order to be useful.

Presentation and Communication
Futurists as far back as 20 years ago began to learn that the ability to communicate results is as important as the quality, completeness and credibility of what they do. The message that remains misunderstood is no message at all. A great deal of attention has been given to presentation, and one of the most effective tools is the scenario.

Scenarios about the future of an organization take essentially two forms. The first looks at the external world. There may be three, four or five of these scenarios. Their function is to show how the external environment might evolve. These scenarios are used as a provocation, a probe, a prod to internal discussion about the future. The critical feature of these policy-provoking scenarios is that they involve the pre-establishment of the critical variables and the identification of potential outcomes of those variables, and then the building of a systematic, integrated picture of the future. These pictures are the scenarios; they go beyond the traditional list of bullets by showing how the bulleted items shaping the future are likely to interact.

The other principal use of scenarios occurs after coming to policy conclusions about the future: "In 2005 Acme will be…". After filling in those dots, one then creates a scenario to use internally with management, staff and workers, and externally with customers, owners and the market to show what Acme will be like at some specific future time.

Graphics are another powerful presentation and communication tool, with PowerPoint one of the most powerful. However, PowerPoint has already been subject to such massive misuse amounting to abuse that it more often than not evokes an audible ho-hum from the audience. One must be careful in using graphic tools that the tools enhance rather than merely repeat what is spoken.

An excellent futures guide to forecasting techniques is Joseph Martino's *Technological Forecasting for Decision Making*[4]. Under the auspices of the Millennium Project of the United Nations University, Jerome C. Glenn and Theodore J. Gordon have put together presentations on 27 futures techniques, half of which are discussed by their inventor or a principal contributor[5]. — *J.C.*

References

1. Association of Professional Futurists, *www.profuturists.com*
2. *Future Survey.* 12 issues a year, subscribe at *www.wft.org*
3. "Keeping Up With the Future—I and II." *Research Technology Management,* Nov.-Dec. 2003, pp. 6--8 and March-April 2004, pp. 7-8.
4. Martino, J. *Technological Forecasting for Decision Making,* 3rd edition, McGraw Hill, 1993.
5. *Futures Research Methodology,* version 2, at *www.acuna.org*

Further Reading

The experience of seven large corporations has been described in a special issue of *Futures Research Quarterly,* issue editor Joseph F. Coates, Fall 2001, Vol. 17, No.3. Copies are available from the World Future Society, or from the editor.
Andy Hines, a futurist at the Dow Chemical Company, has published "An Audit for Organizational Futurists: Ten Questions Every Organizational Futurist Should Be Able to Answer," *Foresight,* Vol. 5, No. 1,2003, pp. 20-33.
Jay S. Mendell, editor, *Nonextrapolative Methods* in *Business Forecasting,* Quorum Books, Westport, 1985, emphasizes non-quantitative techniques.