PLANNING THE COOPERATIVE RESEARCH PROGRAM

CHAPTER 5

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STRATEGIC PLANNING

There are several good reasons to bring some degree of disciplined strategic planning to cooperative centers. Strategic planning communicates an organization's intentions and elicits feedback which promotes coordination. Cooperative research centers are much more complex than the typical academic research project. Centers include dozens of participants, stakeholders, and long-term, multi-year project initiatives. Without strategic thinking I/UCRCs are likely to fail.

Plans also serve a public relations and marketing function. Centers need to communicate with and influence a variety of outsiders. For instance, plans help inform the public and prospective members about organizational intentions and persuade them to support I/UCRC efforts. Well articulated plans often become the basis for recruitment presentations, press releases, articles in alumni magazines, and presentations to community or scholarly audiences.

Academic culture is often at odds with industrial culture. Planning can bridge the gap between industry's need for using proven technology and keeping proprietary information secret, and academia's need to publish and innovate.

Most important, strategic planning leverages the available resources of a program. One can easily have a $1 million center program in which $500,000 is wasted on poorly selected projects

and in foolish thrust areas. Industrial participants will not tolerate a chaotic research program for very long. In fact, data collected as part of I/UCRC process/outcome assessment confirms this. The strongest single predictor of intention to renew membership is satisfaction with research program planning!

Although strategic planning is relevant to recruitment, budgeting, staffing, diversification, etc., this discussion concentrates on the center's research program. First some background on how planning is approached conventionally and how this approach can be tailored to the unique characteristics of an industry/university cooperative research center is presented. Then behaviors and products used by successful centers for strategy formulation and programming are discussed. In a companion chapter (see Chapter 6), we discuss how to implement center research plans.

Planning and the Industry/University Relationship

At an operational level, planning of cooperative R&D relationships that involve university researchers and industrial supporters and 'customers' in fast changing research areas may appear contradictory. At the outset, it should be acknowledged that we will not rely much on the practice and wisdom literature of R&D management. That literature is indeed vast (Clarke and Reavley, 1993). Unfortunately, less than one percent of it is even remotely applicable to the situation that concerns us: the case of multiple academic researchers involved in a cooperative relationship with multiple industrial partners.

There are good reasons why this might be so. Most academic research programs neither are planned nor managed in the same way as industrial research. The university culture of academic freedom promotes relative autonomy for professors and graduate students to pursue their research projects with minimal outside supervision. In contrast, industry research teams are subject to frequent management review.

Cultural diversity on the research-performer side is matched by many degrees of freedom on the industrial participant side. A consortium-based cooperative research center is likely to involve as many as 25 companies active in a rapidly changing business environment with international markets and corporate operations, necessitating careful and quick changes in corporate R&D priorities. Each I/UCRC company member wants to maximize the business and technology interests of its firm, but frequently cannot be forthcoming about preferences or priorities because of proprietary

concerns. Often, company representatives will only be candid during one-on-one dialogues with center management or individual researchers. Accurately assessing research needs of I/UCRC members under these circumstances is challenging, to say the least.

When these factors are taken into account, there is reason to believe the university-industry cooperative research center cannot be planned in a traditional sense. Nor probably should it be. Planning is necessarily much more dynamic, informal, participatory, and approximate.

What Is Planning?

Henry Mintzberg (1994) defined planning as "a formalized procedure to produce an articulated result, in the form of an integrated system of decisions." It is a highly formalized, deliberate, analytic, quantifiable reductionist decision-making process.

Unfortunately, the results of conventional planning have often fallen far short of their promise for several reasons. Many planners have become too single-minded in their approach to planning. Strategic planning requires both strategy and planning. However, planners often ignore or short-change strategy formulation. The results are a well-executed plan with little direction.

Further, planning is effective in circumstances of stability, industrial maturity, large size, elaborate structure, simple operations and external control, but is ineffective in dynamic and less structured environments. Again in the words of Mintzberg (1994): "Managers don't always need to program their strategies formally, sometimes they must leave their strategies flexible, as broad visions, to adapt to a changing environment" (p. 112). Planning and all its formalities may impede or obstruct strategic thinking or promulgate an incomplete strategy.

Does this mean I/UCRCs, which operate in a dynamic and unstructured environment, shouldn't plan? Certainly not! However, they might want to adopt what Mintzberg labels a soft approach to planning, with emphasis on creative and strategic thinking; collection, analysis and reconnaissance about emergent strategies; loose and flexible targets and milestones; and implementation which emphasizes organizational learning. This is the planning approach Mintzberg recommends for project-driven adhocracies like NASA, and it is the approach we recommended for I/UCRCs. In the next section we will try to flesh out some of the important characteristics of this approach.

Defining a Soft Planning Approach

Conventional planning generally is described as a process which involves a series of tasks, often arranged in a linear manner as steps. Models of varying detail have been used to describe that process. Figure 5-1 presents a simplified center planning process: strategy formulation, strategy programming, and implementation.

Figure 5-1 The center planning process simplified.

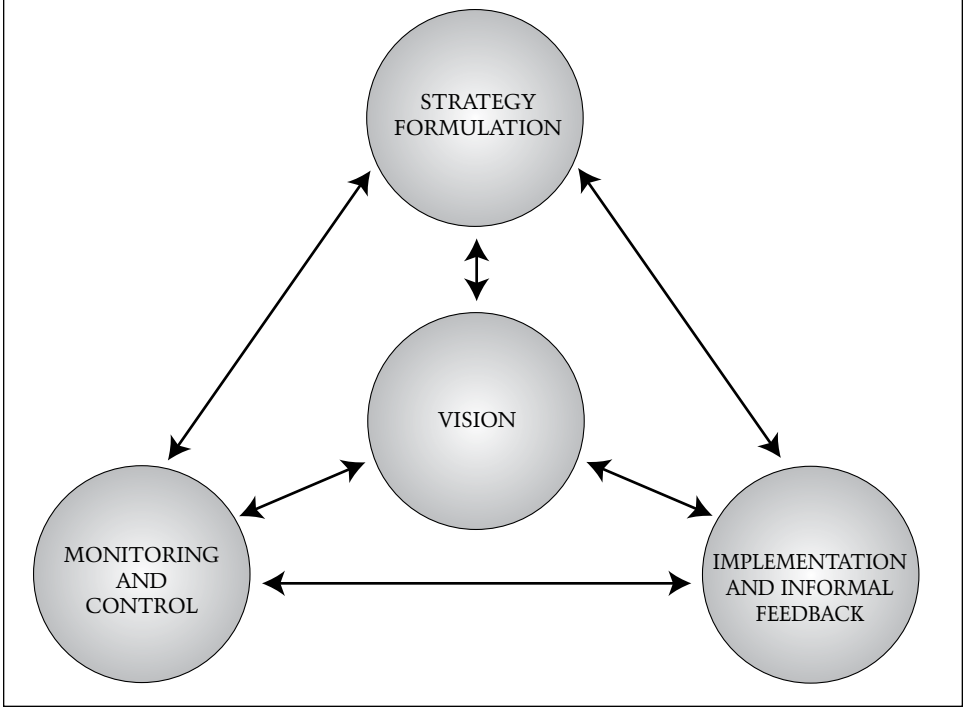
Stage	Activity
Strategy Formulation	Visioning and Mission
Strategy Programming	Defining Program and Thrust
	Defining Goals and Objectives
Implementation	Developing Research Projects
	Review, Evaluation and Selection
	Project Management

While this schema provides a useful model, it also provides a simplistic and misleading picture of how planning is and should be carried out within an I/UCRC. While the best-in-class programs tend to cover most of the key issues and do certain things before others, we would argue that the tasks and characteristics of planning in a cooperative center are much too dynamic to permit such an ordered approach.

A soft planning approach will differ in a number of respects. First, the process will not be linear (see Figure 5-2). For instance, some centers must implement their research program before they have an opportunity to articulate their vision and strategy, but conducting and getting feedback on their research program may allow them to find rather than formulate a strategy that makes sense.

Another way in which a soft planning approach (Figure 5-2) differs is the regularity of the tasks performed. Planning can include a one-time organizational event or task like launching a new center, or regularly occurring events or continuous tasks. Conventional planning is dominated by tasks performed in one to three-year cycles. Soft planning gives greater emphasis to continuous

Figure 5-2 The soft planning process.



tasks. Concomitantly, the time frames covered by cyclical tasks will be much shorter. In addition, the formality of activities and products, at least with respect to strategy formulation and programming (but not implementation), will be much lower when engaged in a soft planning approach.

The traditional distinction between strategic planning and operational planning also loses its salience: in conventional planning, strategic planning tends to be long-term, conceptual, general, and more important than operational planning. Operational planning tends to be short-term, detailed, and subordinate to strategic planning. Because the time frames are so much shorter in a soft planning approach, these distinctions tend to be blurred, with tactical plans often leading to strategic insights and changes in direction.

Finally, soft planning will involve different center functions. Conventional planning activities primarily involve top management. Soft planning, particularly in a customer-driven organization like a center, tends to be broader in scope with many planning tasks involving everyone including the customer and affecting everything.

While all this might seem a bit abstract, and perhaps chaotic, planning can be made more concrete by focusing on the basic building blocks of planning: planning activities and planning products.

Planning Activities and Behaviors

Good planning depends upon a strategy, and creative strategy formulation requires integration and synthesis. Learning how to think out of the box and envisioning possibilities that do not currently exist is perhaps the most important element of a center's planning process.

Planning involves gathering information external and internal to the organization. Information relevant to soft planning may include facts, data, opinion, beliefs, and myth. It may encompass technical or market trends, outcomes, competitive intelligence, or political events. It provides the intellectual grist that undergirds other planning activities. Consolidation, documentation, aggregation, or analysis of information is also assumed.

Planning involves deciding. Information in itself is useless unless participants prioritize which outcomes or directions are more desirable, or which activities need to be linked and coordinated. In soft planning, decision making will involve short time-cycles and greater participation.

Planning involves communicating. Planning demands a huge amount of discussion, debate, writing, presenting, and revising. Center leaders who are not comfortable communicators in these ways will be at a distinct disadvantage.

Planning Tasks and Products

Planning products vary in formality from a formal written mission statement or project plan to a presentation overhead or a motto on a business card. While these products will be addressed in more detail in the balance of the chapter, some of the more important include a center name, a technical vision or mission, defined research areas, goals and objectives, proposal solicitations, project research plans, and project evaluations.

The Planning Process

When most people think about planning, they think about an orderly process that starts with Step 1 and proceeds in a lockstep manner to Step n, and involves conventional boundaries and

responsibilities. While this process might work well in some organizations, typically it will not suit the needs of dynamic boundary-spanning organizations like centers. Based on I/UCRC experience, centers will benefit most from using a soft approach to planning. It is a highly recursive process, which is very heterogeneous in nature, involves shorter feedback cycles, emphasizes continuous improvement, requires a catalyst more than a programmer, and results in products that often are quite informal in nature. In spite of these differences, it is planning nonetheless.

The next section describes how to formulate and program a soft research strategy for your center. Later, in Chapter 6, we will discuss strategy implementation; recruiting investigators; and developing, refining, and prioritizing projects. Some cooperative research center directors may find that implementing an informally articulated plan is a more pressing need for them at this particular time. We recommend that these individuals skip ahead to the next section and return here when time and circumstances permit.

FORMULATING AND PROGRAMMING A RESEARCH STRATEGY

Most industry-university cooperative research centers follow a similar strategy of marketing pre-proprietary research to a consortium of industrial members. However, each center must also devise a unique research strategy and develop a portfolio of research projects tailored to their capabilities and the needs of a specific segment of industry.

The following section provides practical advice on how to formulate and program a strategy for developing a successful research portfolio including creating a vision, information gathering, defining research areas, goals, objectives, implementation, and products. While we will cover these topics in a conventional sequence, there is no rule for the order of stages.

Vision and Mission

A vision, an idea of a possible future to achieve, is probably the most important ingredient in a successful strategy. I/UCRCs should spend some creative energy on it and an associated mission statement. Vision and mission statements should be reviewed and recast periodically in the evolution of a center program. In fairness, it should be noted that many cooperative research centers

may neglect to do so and may develop a mission statement only after three to four years of operation.

Vision and mission statements:

- Define what is in bounds and what is not.
- Define a future to attain.
- Facilitate easier external communication about what the center is and does.
- Drive strategy development.

The boundary-spanning, multi-stakeholder nature of a center dictates that one approaches this process in a participatory manner. This does not mean vision and mission statements are written by committee, but all stakeholders must be given an opportunity to shape the technical direction the center will take.

Vision

Words influence behavior and effective leaders are able to paint "word pictures" of a vision for a desired future. A center vision describes a future scenario or an optimal or highly desirable set of hypothetical events. Vision may predict technical accomplishments or research. It usually depicts a scenario that extends outside an affected industry or regional economy.

> HYPOTHETICAL VISION STATEMENT
>
> *A ceramics composites industry in which the volume of use is 100-fold greater than current levels, and in which products extend beyond high temperature application into structural materials and high volume consumer goods. Ceramic composites will be characterized more completely through a robust body of theory and empirical knowledge. Design and development of new applications routinely will be accomplished via simulation and the computerized application of design algorithms. The Center for Ceramics Composites will be a preeminent university-based research center with an annual volume of research that exceeds $10 million and with 40 member companies. It will on average yield annually ten patents and have a highly diverse portfolio of funding sources and research relationships.*

One of the more useful features of vision statements is that it is often extremely enlightening to dig these out every few months and assess how current developments compare to what was projected.

Techniques for Developing Vision Statements

The various ways in which vision statements can be created include developing a draft to solicit feedback, building on existing models, storyboarding, and other group-based, including computer-mediated techniques. It is not clear whether any of the more intensive or expensive approaches are significantly better than the more commonplace approaches discussed above. In all of this, the key is to not over-program the process and to have knowledgeable and creative people involved.

Solo Draft

Center Director drafts statements which are then reviewed and refined by members of the core planning team.

Build on Existing Models

Assemble sample vision statements from existing R&D centers, or from corporations as good models. Corporate members of the core team are often excellent leads for identifying samples.

Storyboarding

The core team, in a one to two-hour session, composes sentences and sentence fragments which are then pieced together. Typically these fragments are pinned or stuck to a board. A facilitator rearranges, eliminates, and enhances the fragments into a meaningful whole which everyone can support. (See Kuhn, 1988, for a more detailed discussion of this methodology.)

Group and Computer-Mediated Techniques

Computer-based groupware and other interpersonal approaches foster new associations and new ideas (see Tornatzky and Ostrowiecki, 1994).

The Mission Statement

Writing a mission statement or establishing goals is relatively easy once there is a vision statement. A good mission statement rarely

HYPOTHETICAL MISSION STATEMENT

To advance the field of glass science and engineering through research, education, and technology exchange among academe, industry, and government.

exceeds two to three sentences. It is pithy, straightforward, and easily understood.

Mission statements contain four elements:

Who: Center for Glass Research.

What: Advance the field of glass research.

Means: Through research, education and technology exchange.

Participants: Academe, industry, and government.

More complicated and lengthy mission statements are counterproductive, confuse the reader, and send a message to industry that the center doesn't have its act together.

Some useful addenda to mission statements can be free-standing chunks of prose. A statement of organizational philosophy or values is an example. These can convey to readers (both external and internal to the center) a powerful statement about the organization.

HYPOTHETICAL AGENDA

The Southern Technology Council serves a regional constituency in a style that is hands-on, action-oriented, businesslike and practical. The emphasis is on cooperation and collaboration in accomplishing the mission.

Interestingly, many corporations have developed fairly involved value statements which cover not only how they deal with customers, but how employees and managers treat each other. It might be overkill for a university-based research center to go this far, but some expression of philosophy or values will be well-received by corporate partners.

Finally, it is often useful to boil down the mission into four to six-word motto or credo, e.g., *better living through chemistry* for business cards, stationary, and marketing materials.

Strategy Programming

Once a research vision and mission is articulated it is time to figure out how to get there. This is where, as Mintzberg (1994) labels it, strategy "programming" comes in. We begin by discussing information gathering.

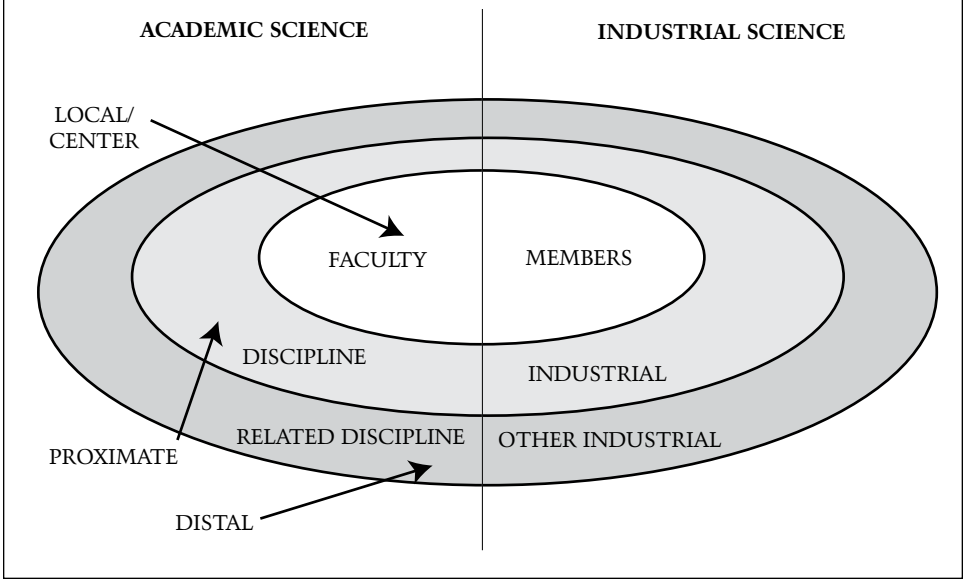
Information Gathering

All planning-related tasks can be strengthened by thoughtful information gathering and analysis. Most information gathering will be focused on a few major questions including the state of the science, needs, trends, opportunities, and threats. As a boundary-spanning organization, an I/UCRC must be aware of needs and developments in both the academic and industrial communities. This might involve what is going on in one's discipline and related disciplines and in your industry and related industries. Since this can be an overwhelming task, centers must focus on local environment, faculty, and current or pending members. Then, if warranted, extend to the proximate environment, faculty at other institutions, knowledge in related fields and firms, and knowledge from the same industry as your members. And finally to one's distal environment or faculty, knowledge, and firms, and from unrelated disciplines or industries. (See Figure 5-3.)

Informal Information Gathering

Valuable information about local environment can be gathered informally from the center's faculty, industrial members, and their associated networks. This information can often be collected *on the fly* from IAB members, new prospects and other stakeholders in the context of other business. For instance, in the course of reviewing and prioritizing new proposals, members often point out unmet needs and new directions. (See "Formulating and Programming a Research Strategy" for a more detailed discussion of how to capitalize on this opportunity.) This information can provide a basis for midcourse corrections and adjustments or a new plan.

Figure 5-3 Center data-gathering environment.



In order to benefit from informal information gathering, it is important that such data be documented. Much of this information will be gathered during project review, evaluation, and new project selection, and during informal meetings and phone conversations. Center Directors should make a habit of jotting down notes during or after these events, and collating member LIFE forms. These notes can simply be stuck in a folder or filing box or kept in a computer file, and then examined every few months. They often yield interesting themes or common issues.

Another valuable setting for informal data gathering is conferences and meetings. Attendance at conference industrial meetings or meetings for other disciplines often has the biggest payoff.

Primary Data Gathering Via Surveys and Structured Interviews

Surveys and phone interviews are quite time-consuming but can prove valuable if one has the resources. It should involve only key informants in your local environment, such as members of industrial advisory boards. Some of the data collected by NSF I/UCRC evaluators provide a useful example of this kind of data (see Chapter 8).

There also is some utility in conducting a limited series of one-on-one interviews with members of the planning team or external stakeholders. These might be conducted by the Center Director, or by someone who has responsibility for facilitating the planning effort. A typical format is to have three to six open-ended questions in the context of a half-hour interview (see Chapter Appendix 5-1). The interview may be conducted in person or by phone. It is important to take good notes or ask permission to record the session. Such sessions often uncover strategic issues (or solutions!) that may not be expressed in a group meeting session. They can confirm or reject conclusions reached in a group setting. An important role for the interviewer is to extract either common or novel themes and share them with the planning team.

Mining Reports, Data Bases, and other Secondary Sources

When trying to gather information about one's proximate or distal environment, as one must during the start-up phase or when one is engaged in a major change of directions, the most efficient approach involves reading the work of others. For instance, one might want to find out the number of firms in a sector or R&D expenditures. A particularly rich source of reports is the federal government. NSF, the National Academy of Sciences and its constituent organizations, the National Academy of Engineering and the Institute of Medicine, various professional organizations and associations, e.g., Electronic Industries Association, Association for Manufacturing Technology, U.S. Bureau of Economic Analysis, and Bureau of the Census, publish industry-specific trends, economic analysis, and research data.

Electronic data-bases are also available (Figure 5-4). Since the information gathering needs of each center are likely to vary considerably, center staff are urged to consult an appropriate librarian. Internet browsers are another tool. The more thought and time spent on the front end of the information gathering process, the more useful the mining of secondary sources.

In summary, there are a variety of ways to gather information and an almost unlimited number of sources of information that may be relevant to your planning needs. While center staff should consider all of these options, our emphasis on a soft planning approach argues for heavy but not exclusive reliance on informal data gathering from one's local environment. In other words, keep your eyes open and your ears to the ground.

Figure 5-4 Electronic business and technology databases.

ABI/Inform. Worldwide literature in business and management, accounting economics, finance, taxation, marketing, etc. Abstracts of principal articles from over 1,000 journals (full text from over 550).

American Business Disc. A compilation from the Yellow Pages, selected portions of corporate annual reports and SEC filings.

Automated Patent Service. A full-text database consisting of U.S. patents from 1971 to the present.

Applied Science and Technology Index. Indexes over 300 English language technology and engineering publications.

Business Index. Indexing and abstracts for 850 business, management, and trade journals, plus citations to business-related articles in more than 3,000 other publications.

Compendex Plus. Indexing and abstracts covering engineering and technology. Corresponds to print Engineering Index.

Disclosure. Detailed records for more than 16,000 public companies, and selected records for foreign companies traded on major American exchanges.

Lexis/Nexis. Offers access to full-text databases that cover business, company, financial, legal, and news information.

Predicast's F&S Index. Abstracts, excerpts, and full text of articles dealing with information on companies, industries, and markets.

Defining Research Thrusts

At some point, planning for a center needs to get down to cases. That is, develop a portfolio of research projects which maintains member interests and entices prospective members to join. A research portfolio might be structured in any of the following modes: (1) a supermarket or menu approach, (2) the use of clusters or thrusts, or (3) some combination of both.

The supermarket or menu approach includes something for everyone. It is a selection of programs and projects which appeals to all the companies (or at least a majority) supporting a center. This approach may be preferred for a center with only a few member companies, perhaps early in the life of a center, when it is still sorting out its core competencies and how the interests of companies coalesce, or operating in a very dynamic field. While this approach has its pluses, it also has some serious shortcomings. Most prominently, it can lead to a dilution and fragmentation of a center's research program.

Another approach assumes that projects can and should be clustered into a few discrete themes, each of which tends to draw the attention and interest of a sub-group of companies. In fact, a few companies may have exclusive interest in one or two projects, and zero interest in others. On the other hand, some draw the interest of virtually all member companies. In fact, research on the I/UCRC program demonstrates member firms are highly interested in and closely monitor about 40 percent of all center projects.

Figure 5-5 illustrates some I/UCRC research themes. Experience suggests that defining discrete research themes or clusters will satisfy more members, most of the time.

Figure 5-5 Sample I/UCRC research themes.

CENTER	*Process Analytical Chemistry*	*Ceramics Research*	*Software Engineering*	*Materials Handling*
Research Themes	Chemometrics In-line sensors Spectroscopy Flow chemography Process monitoring and control	Processing science Surface science Electro-ceramics Structural	Development tools Maintenance methods Distributed environment Modeling and metrics	Manufacturing systems Warehousing systems Logistics systems Flexible automation Information systems

Participants

Like most of the planning covered up to this point, defining research themes should include researchers in the host university, with specialties that pertain to or complement the general area being addressed by the center; researchers from partner institutions; IAB members or prospective IAB members; and representatives from potential state or federal government funding agencies. A professional facilitator might be appropriate when defining research themes in a large gathering.

Generating Ideas

There are several ways in which research themes can be generated. Participating university researchers raise roughly defined research questions and then cluster them into themes, or the Center Director extracts themes from the raw data of research ideas. A second approach is to have the core planning team take on the task. A third option is to have the group of participating researchers brainstorm research themes with help from a neutral facilitator.

The problem with all these approaches is that they are done in relative isolation from industry and defeat the concept of a industry/university cooperative center.

A way to involve industry in developing research themes is ask each company for two to four pages identifying research of a basic science nature that are of critical importance. It is useful for faculty members to identify research they believe should be of interest to industry. It is often enlightening to compare and contrast these different perspectives.

A final approach is to hold a more interactive strategic planning meeting which incorporates some of both of these approaches. This approach is described in some detail in "Pulling It All Together: The Strategic Planning Meeting."

It is hoped that these methods will lead the center to identify three to five research themes that can be described in a few sentences or paragraphs (see Figure 5-6). As these examples illustrate, depending upon the focus of the center, a given thrust might range in specificity from a major subdisciplinary topic (e.g., surface science), to a general methodology (e.g., simulation), to a topic of specific industrial interest (e.g., out-of-plane dynamics on web machines).

In all of these approaches a critical chore involves eliminating projects/themes from your nominated list. This can easily be handled by establishing criteria for evaluating and selecting candidates. These criteria might include: converges with faculty expertise and industry needs; complementary to other areas; doesn't represent a dilution of effort.

The latter two represent the all-important element of focus.

Goals and Objectives

Once research themes are defined I/UCRC goals and objectives are defined and redefined periodically over the life of the center.

Figure 5-6 Sample research descriptions.

Center for Ceramics Research
Surface Science: Molecular dynamic computer modeling of bulk and colloidal surface and interface phenomena; physical surface analysis using atomic force and scanning tunneling microscopy; chemical surface analysis using x-ray photoelectron, Auger electron ion scattering, and secondary ion mass spectroscopy.

Center for Analog-Digital Integrated Circuits
Simulation: Developing methodologies to evaluate, test, and characterize new and existing circuit simulators; improving speed and efficiency for analog-digital simulation through use of hardware accelerators with hierarchical simulators using parametric yield optimizers.

Center for Web Handling Research
Out-of-plane dynamics: Web flutter is a serious obstacle to high-speed operation of web machines. Flutter can lead to breaks or wrinkling in machines that handle paper and register errors in printing presses and damage on polymer sheets. Research in this area focuses on predicting the critical operating conditions in which flutter starts and predicting flutter amplitude if a machine is operated above the flutter threshold.

The difference between goal and objective is that the latter quantifies or specifies the former. Each objective should articulate a technical need or obstacle. (See Figure 5-7.)

Goals must harken back to the mission or vision statements, and related planning products. It is probably better if a center has a few meaningful goals with measurable objectives rather than dozens of goals with no implications for the participants in the

Figure 5-7 Sample statement of goals and objectives.

Goal: Basic and applied industry research to ensure high quality color images are provided to customers.

Objective: Provide information necessary to define standard protocols for transferring color data accurately among many users at different sites using different display devices.

Specific sub-objectives: More accurate color scanning methods, reproduction and color correction; improved coding and compression methods for both single and sequential color images; more accurate models for the complex color printing process by use of nonlinear systems theory; and methods to obtain more accurate color reproduction among a large variety of printing devices having different color gamuts.

program. Since new findings may modify their relevance they should be reviewed and revised much more frequently than vision and mission statements.

Most centers will find goals and objectives adequate for planning, but some centers prefer more detail (see Figure 5-8). They create a roadmap in block diagram form of the current state of science and technology, the vision of the future, and road blocks and research activities to resolve them. The power of the technical roadmap is not only its visual appeal, but also the ability to identify the order of action, such as which research activities and questions are on the critical path for another set of questions, and thereby ought to be addressed first. Unfortunately, technical roadmaps may sometimes serve as an obstacle to attempts to revise or re-invent a research area.

PULLING IT ALL TOGETHER: THE STRATEGIC PLANNING MEETING

How can centers tackle the planning activities described in this section in a systematic and coherent fashion? A one or two-day strategic planning meeting can be a useful vehicle for broadening information gathering, analyzing future needs and opportunities and for resetting a center's course. The meeting will require a great deal of time, thought, and preparation. Many centers will find it difficult to convene more frequently than every few years. As a consequence, some centers may prefer to set aside a few hours at their semi-annual review meetings and address one or two planning issues as discussed below.

It is extremely important to manage carefully the focus and agenda of such sessions. Time will be limited and it is critical that participants get a sense of tangible accomplishment.

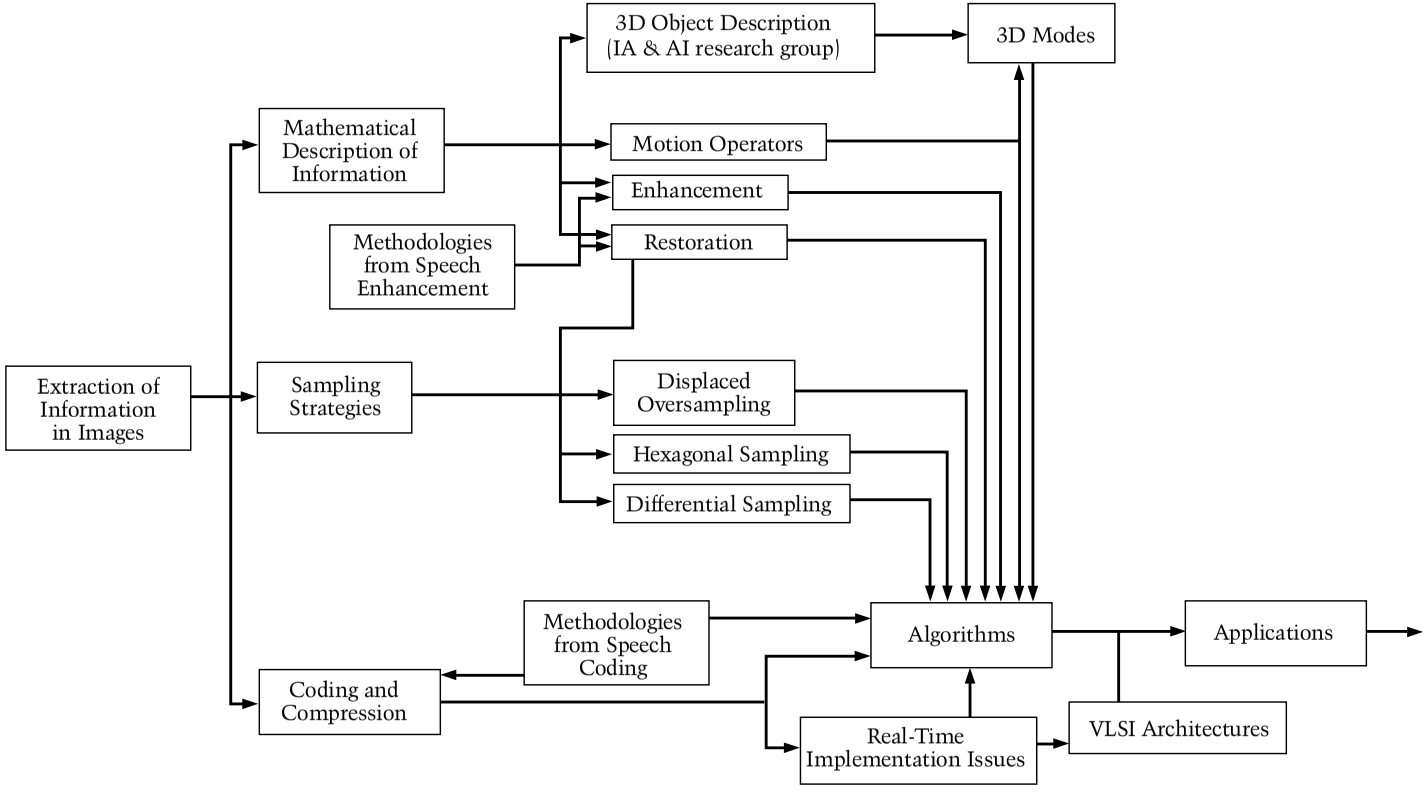
Guidelines for a Successful IUC Strategic Planning Meeting

Develop Consensus about the Need for a Meeting

Before scheduling a planning meeting be sure there is a broad-based consensus among potential participants, particularly from industry, on the need to formulate or re-evaluate the center's mission, goals, objectives, etc. Never schedule a planning meeting just for the sake of having one or because you haven't for awhile! If the costs are an obstacle consider combining your planning meeting with your semi-annual research review.

Figure 5-8 Techniques for developing research ideas, goals, and objectives into roadmaps.

(Each program plan includes a "roadmap" such as this one for the Image Processing program.)



Specify the Goals of the Meeting

The meeting planner needs to specify and describe the likely products that will come out of a planning session. It is also important not to be overly optimistic about what will be accomplished. It is better to get closure on a manageable agenda than feel that the meeting failed to accomplish an unrealistically ambitious agenda.

Make a Formal, Timely, and Structured Request for Work to be Done BEFORE the Meeting

Experience suggests that participants should be assigned homework before the meeting. For example, if the purpose of the meeting is to redefine goals or objectives, the participants should be asked to read the current statements and come up with new or improved ones. In addition, some centers have found that it is useful to ask industrial participants to poll their key staff and managers via written questions distributed several months before and again right before the meeting (See Appendix 5-1 for sample questions). While a few participants may still arrive with notes scribbled on an airplane cocktail napkin, experience has shown this strategy promotes high-quality input.

Have an Agenda

Like any meeting, an effective strategic planning session needs to be orchestrated. That means having an agenda that is organized in terms of topics and time blocks, as well as identifying those responsible for participating. This should be circulated ahead of time if possible. Chapter Appendix 5-2 provides a typical one-day planning agenda.

Spend Time on History

Unless this is the first-ever strategic planning meeting for a center, every participant will have different knowledge about prior planning efforts. It is very useful to circulate materials on various components of a center's plan before the meeting. Time should be allocated during the meeting for a brief review of them. In most organizations there will be one or two individuals who have been participants in the early years of development. Ask them to provide an oral history for the newer members.

Request Input from Every Participant

Social science research has demonstrated repeatedly that valuable input is lost via bashfulness or the dominance of a few individuals

when others have to volunteer their ideas in a group setting. Special efforts should be made to go around the room and ask each member company to share their written or verbal comments. Faculty should also be asked through a faculty representative.

Consider Using Outside Technical Experts

A nationally respected expert who is not part of the center can be asked to address the strategic planning meeting or scheduled periodically as part of your IAB meeting. Some centers have even engaged in forecasting technology in which a number of national experts are interviewed about where a field or industry is heading.

Anticipate Follow-Up and Document Action Items

Anticipate that the meeting will end with a series of action items for follow-up by appropriate individuals or committees. It is useful to draft a memo at the meeting which summarizes follow-up actions and responsibilities and have it read before the meeting adjourns.

SUMMARY AND CONCLUSIONS

Centers need to plan their research program to avoid chaos and organizational decline. However, the highly formalized and linear approach to planning practiced in many large, stable organizations is not suited to I/UCRCs' innovative, fast paced, dynamic environments. As a consequence, we advocate a soft approach to planning.

A soft approach to planning requires the planner to be more catalyst than programmer. It emphasizes the importance of developing a technical vision appropriate to the center's environment, faculty, and industry stakeholders. Reaching a vision requires creative and strategic thinking and broad-based participation by various stakeholders. Programming a strategy for this vision requires data gathering from your IAB. Like conventional planning, this process should result in traditional planning products but they may not be addressed in a conventional order and may not crystallize until after the research program has been in place for several years. Even then they typically will be stated less formally.

While a soft approach to planning may appear messy and chaotic, it should not be mistaken for seat-of the-pants management. Rather, research planning in the context of a center must emphasize organizational learning and continuous improvement.

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APPENDIX 5-1

Information Gathering for Planning

Sample Questions for IAB Interviews

1. What challenges will your organization or industry face over the next five years which are related to <center name>?
2. What are the major technical, regulatory and competitive obstacles that your organization or industry must overcome to meet these challenges.
3. Of these which is <center name> best positioned and equipped to help you with?
4. Based on your answers, which area(s) (at least two) of research and specific topics, problems and issues within those areas (at least five) do you feel <center name> should emphasize during the next five years?
5. Given current funding and membership constraints, are there any areas of research or specific topics <center name> should stay away from, at least for now?

APPENDIX 5-2

Sample Agenda for Strategic Planning Workshop

Welcome and Introductions (15 minutes; director or IAB chair)

Review of Goals (15 minutes; director or IAB chair)

Opportunity to review purpose of meeting and outcomes and deliverables expected. Try to state outcomes in terms of various planning products to be created or revised: vision, mission statement, program or research areas, goals, objectives.

Center History (30 to 45 minutes; director)

Opportunity to review where the center has been over the past x years. Review could focus on: current mission, goals, areas, previously and currently funded projects organized by research theme, major technical outcomes of the program, e.g., students trained.

Future Needs and Opportunities—National Perspective (30 minutes; director; resource person; optional)

Opportunity to present formally collected data on center environment and technical needs and opportunities. See section titled *Strategy Planning* in this chapter.

Future Needs and Opportunities—Local Perspective (15–20 minutes per presenter; 1–4 hours; IAB members and faculty)

Presentations by each IAB member; one speaker to represent faculty perspective. See Appendix 5-1. Someone should be assigned responsibility for taking notes and summarizing them for immediate distribution.

Future Needs and Opportunities—Discussion (1–2 hours; director or group facilitator)

Opportunity to review and discuss the key points made during presentations. This process would be facilitated by posting major points made by each presenter. Discussion and comment on major issues or surprises, agreement and disagreement. Goal should be to reach a consensus on key technical needs and opportunities for the future. Might include a prioritization of needs and opportunities.

Review and Revision of Appropriate Planning Products (varies depending goals of workshop; director or facilitator)

Opportunity to write or revise mission, goals, etc. based on results of previous discussion. Session needs to be structured to avoid unproductive digressions. Goal should be to reach a general consensus on the wording of various planning products without getting into "word smithing." If some issues need more detailed discussion, might involve break-out sessions.

Overview and Closure (½–1 hour; director or IAB chair)

Opportunity to review what was accomplished during the meeting. Focus should also be on action items and individuals assigned to carry them out.