Uncertainty and The Innovation Process

Research into the innovation process has shown that

- ideas can come from the unexpected or from a structured analysis of problems
- linking of existing knowledge or capability in a new way can be a starting point
- individuals often play an important part
- technical problems are often very difficult to solve and there may be a long time between idea and implementation
- there are occasions when immediate application of the ideas is possible
- market pull and technology push are equally valid starting points
- outside sources of help may be required both in technical problem-solving and in marketing
- competition can come from many directions, including suppliers and customers
- most cases require teamwork to carry the ideas through; in many cases, a product champion is necessary
- risks can be high, both in technology and markets
- some innovations have little impact, some are revolutionary; some attack existing markets, others open up completely new ones.

Given the above variety, we are faced with questions of how we might improve the efficiency and effectiveness of the innovation process. One way of managing the early part of that process more efficiently is through the use of a structured innovation search. Another way of looking at this is through the dimension of uncertainty. Two aspects of uncertainty have been found to be important in practice: the specificity or clarity of ends and the degree of knowledge about the possible means of achieving those ends. The combination of these has been described as the Uncertainty Map (Pearson, 1990) and is shown on page 30.

The type of uncertainty likely to be found in each quadrant is clearly different. For example, Quadrant 1 is largely unspecified in terms of both the knowledge of likely outputs and the means of progress for the activity. There is little scope for formal planning, and individual exploration rather than teamwork is likely to be the principal mode of operation. Sidetracks and diversions are to be expected and encouraged; “bootlegging” is often the way this kind of research takes place in an organization that is not doing basic research.

In contrast, activity in Quadrant 4 will be highly specified both in terms of means and ends; an area for good plans, strong management, and not much scope for diversions or tangential activity. There is likely to be pressure to achieve the goals against time and cost pressures, probably in the face of strong competitive forces. The “rugby team” (cross-functional) approach is clearly called for if development times are to be shortened.

Quadrant 2 includes activities where the desired end result or output is relatively well specified, but it is not at all clear how, or even if, it is achievable. A good deal of technical development activity appears here, with some successes and many failures being recorded in the past. It is inevitably a high risk area, demanding product champions and with little room for the fainthearted. Quadrant 3 is directed more toward identifying potential end uses to which previously identified means can be directed. This area is well recognizable in R&D, with particular attention needing to be paid to identifying customer needs, existing or to be developed, and to working closely with such customers to increase the likelihood as well as the speed of adoption. Creativity, listening, and open-mindedness are important skills here.
Useful titles for the quadrants might be:

1. Exploration
2. Development Engineering
3. Applications Engineering
4. Project Management

These types of activities are easily recognized and it has been found in practice that the Uncertainty Map provides a simple, but practical and useful framework for highlighting many of the issues and concerns of R&D/innovation managers in areas as diverse as sources of ideas, project evaluation, selection, planning, monitoring, and strategy. It also suggests that there is value in looking more closely at the types of people who might best be suited to managing projects in the different quadrants in order to maximize individual, group, and organizational performance and satisfaction.

In summary, every possible innovation strategy and every component of it, there are greater and lesser degrees of uncertainty. The uncertainties may include how you will achieve your strategy (means) or uncertainty concerning the goal or what you will ultimately achieve (ends). Once you have decided on a strategy and goals for your organization's innovation, an understanding of those uncertainties will help you to do a focussed risk analysis.
Exercise: Determining Levels of Uncertainty in Innovation

Take a look at possible areas of improvement or new technologies you have identified. Plot each on the Uncertainty Map. Then determine for each if the level of risk is acceptable for your organization. Use the results to think through how to proceed and who is best equipped to lead the effort.
The Innovative Organization*

Organizations that are innovative have a number of common characteristics. They are frequently fast-paced. They look both inside and outside the organization for opportunities to improve their products, services, processes, and systems. They thrive on the challenge of change. They expect chaos and manage for it. They encourage creativity. They discourage the acceptance of the status quo—the attitude that says, “If it ain't broke, don't fix it.”

Leading an organization in a way that promotes and supports creativity and innovation is a complex challenge. From the very top of the organization down to the front line, leaders must constantly examine and redirect the organization’s efforts from four distinctly different—yet related—aspects of a business.

- **Setting**: The organization’s purpose, values, and capabilities.
- **Strategy**: The long-range decisions about where to support and where to discourage innovation within a business.
- **Systems**: The day-to-day activities, institutions, and messages that support or discourage innovation, including norms, structure, processes, resources, roles, and the physical environment.
- **Skills**: The technical and behavioral tools leaders and team members use to stimulate, support, promote, and implement innovation.

By focusing on each aspect of innovation, organizations can institutionalize it. Leaders and teams can take positive steps to cause innovation to occur repeatedly.


“Once an organization loses its spirit of pioneering and rests on its early work, its progress stops.”

Thomas Watson
IBM