Templates for Innovation: A Comment on Mumford, Bedell and Hunter

John Ettlie

Follow this and additional works at: http://scholarworks.rit.edu/article

Recommended Citation

This Book Chapter is brought to you for free and open access by RIT Scholar Works. It has been accepted for inclusion in Articles by an authorized administrator of RIT Scholar Works. For more information, please contact rit_scholarworks@rit.edu.
Templates for Innovation:
A Comment on Mumford, Bedell and Hunter (2005)¹

John E. Ettlie, Ph.D.
Madelon L. and Richard N. Rosett Professor and
Director of the Technology Management Center
College of Business
Rochester Institute of Technology
107 Lomb Memorial Drive
Rochester, NY 14623

Email: jettlie@cob.rit.edu
(585) 475-7789

June 2006
Abstract:

The authors confront the nontrivial issue of whether or not creativity and innovation can be planned, and proceed to support an affirmative answer with a well-organized treatment of the applied research literature relevant to this topic. They outline and reference an incremental approach to this planning process at multiple levels of aggregation (organization, group, and individual), and present both a state-of-the-art review and a general, normative approach to this daunting challenge.

In reviewing this chapter I address what is worthwhile and important in their presentation that students of this field should find noteworthy. Next I take up the issue of what is underdeveloped or missing here that would fit nicely into their framework, or might provide food for thought to those wanting to go forward with research on the topic of planning for innovation. Finally I arrive at conclusions about this topic and the field in general that were stimulated by the chapter, including the role of information technology and knowledge management for innovation planning.

Planning for Innovation: Noteworthy Contributions

The authors (Mumford, et al, 2005) have done a credible review of the wide-ranging issues associated with this most important topic: can innovation be planned and if so,
how? Perhaps the most important contribution they make is that they develop the point that if appropriate constraints (i.e., staged project planning) are applied to the creative process, it enhances innovative outcomes. Few, if any formal treatments of the R&D management or new product development process give this insight much attention, and yet the case reports like Thomke's (2003) report on efforts to effectively constrain the design process at BMW, and other treatments (e.g., Etzioni and Stoll, 1990) illustrate how boundaries can set the creative mind free. Of course, there are limits, and what we have yet to see is the calculus of planning that will give us the optimum level of constraint by plan that maximizes outcomes. But some constraints will promote creativity and learning.

In a way, any plan is a constraint, and the optimum plan is probably one that allows for efficient learning as the innovation process unfolds. For example, one of the common problems or challenges encountered in the innovation process is that as participants learn the nature of the new technology, which by definition can only unfold gradually or it would not be an innovation, the specifications of the technology project change. This also occurs when environmental conditions change, as pointed out by the authors. This specification “creep” is maddening to those who supply new technology to customers wanting to exploit it for economic gain and have an aggressive time deadline in mind. In fact, radical technology cannot be scheduled, and this is one of the major lessons of any basic course on the subject. In our study of manufacturing software development and implementation, we found that satisfaction among key plant managers and technical personnel trying to modernize their factories was much higher when some significant part of the software development was delayed until after first launch of the
new advanced manufacturing system (Ettlie and Gentner, 1989). As plant personnel
learned what the new system could or could not do, and as the project unfolded over time,
the specifications changed. This is something all suppliers of new technology have to
plan for because they cannot learn the particulars of every customer and still make
money. Even if they did understand customer needs and specifications perfectly (and
this rarely happens), it is adopters that must ultimately understand their new system and
they must learn at their pace, which may be at variance with the planned milestones. No
surprise that many projects of this magnitude underestimate the cost and time of training
because it often has to be done more than once and in a manner not anticipated. Rarely is
classroom training alone an effective way to support a new technology introduction.

Another illustration might help capture this essential and subtle point of the
implications of gradual unfolding of innovation projects, which resist planning and thrive
on learning. Many firms practice the art of technology and design reuse (Sivaloganathan,
2001; Busby, 1999; Zangwill, 1993), primarily to reduce cost and time to market. For
example, Mercedes-Benz, in an effort to improve quality and reduce cost, has
reorganized its product development process around six, cross-functional teams (e.g.,
powertrain, design, electronics, etc.). Instead of vehicle programs developing
components separately, the goal is to share more parts across vehicle lines (Meiners,
2005). How do they intend to avoid the obvious problem that this restricts creativity in
finding the best component for the particular vehicle? The answer given is that program
managers can now concentrate on those areas that are unique to their models making
project management more efficient and accountable. There is also an intergenerational
effect: engineers must identify more components to use from outgoing models. Again,
the idea is that constraining the design process can set engineers free to be more creative in unique parts of total product characteristics. The benefits of planning include the synergistic effects which this example illustrates, and the authors develop this point well in their chapter. How to achieve integration is less clear (Rubenstein, 1989).

Given these examples, any reader would benefit by attending to the important feature of the authors' treatment of innovation planning: that they allow for learning along the way. They say early on that people will not plan unless the task is difficult, and interdependence (complexity) is high. The most successful innovators are those companies that learn faster than their competitors, which is derived from the dynamic capabilities model of the firm (Teece, et al, 1997).

One final example of this critical point (the interaction of planning or anticipation and learning and execution) is offered. If this seems belabored and redundant, it is because we have found that this issue is not obvious and often is only appreciated by people who have actually experienced the unfolding nature of the innovation process over time. In our work (Ettric and Reza, 1992), and the work of many others (e.g., Small and Yasin, 2000), it has been found that if an organization, usually a business firm, attempts to adopt a significant new operations process or information technology system and the workforce is organized in a union, there is at least one essential element of the implementation that will be necessary for success: a union-management technology agreement.

Union-management technology agreements are typically signed before the new technology arrives on the scene for installation, although some or most of the planning may have gone forward before the official start date. They typically set the new
conditions of work, since job descriptions of the workforce often change, new skills are
required and new standard operating procedures need to be followed, including
maintenance and support of the new technology.

Unions want to protect members, and of course, health, safety and job security are
important concerns for all. Management wants to continue to exercise the flexibility
needed to capture the benefits of the technology as specified and as conditions and
outcomes change, learning will occur which can improve the process. These union-
management agreements, along with a host of other organizational innovations, have
been shown to be associated with highly successful cases of innovative process and
information technology projects. However, one interesting feature about these
agreements is that the actual contract language does not predict success. That is, if one
compares successful projects of this type and less successful cases, the language of
union-management agreement will not matter. Having the agreement matters, but the
specifics don’t matter. The simple reason, of course, missed by many is that it is the
successful companies that learn the most and having the agreement allows the parties to
learn what is actually needed to be successful, including the proper specifications, and
this will obsolete the details of any prior agreement signed before the real work was
started. The limits of planning are reached quickly in these cases.

Mumford, et al, discuss the adopting of the portfolio approach to illustrate how
planning can be framed and implemented, and this points to another critical issue across
all settings: resources. To their observation that people underestimate innovation when it
is first introduced as well as how long project work takes, I would add that the official
portfolio, often overloaded with longer-term projects which cannot be sustained, doesn’t
account for “off the books” work that research and engineering professionals often
engage in to ensure that project deadlines are actually satisfied. An example is the case
of Chevrolet Corvette project team that was tasked with beating Mercedes and Toyota to
market with active suspension in 1990. This emergency project with the last minute goal
to be first with active suspension at Corvette was done, essentially, by engineering staff
officially assigned to other funded projects. A methodological warning appears in this
anecdote: in order to study planning for innovation, survey data probably will not be
sufficient. Only in-depth comparative cases will get to this type of data.

Another essential point of the innovation process that is so often forgotten, but
Mumford, et al are keen about, is the amount of time it takes to accomplish real
innovation (radical is one way of describing these breakthroughs, but disruptive,
discontinuous, and field-changing have also been used). Whenever a company changes
its platform, we look for a different process unfolding, so that is an opportunity to study
real innovation, in the context of a portfolio that must do other things as well. So placing
the right bets is the essential role of general managers. The strategic planning idea that
some possible futures are derived from a vision and some emerge is very consistent with
their observations.

The authors discuss environmental scanning, and mention by example five
examples: customer feedback, supplier feedback, market research, competitor
monitoring, and technology monitoring. Perhaps without knowing it, they give us a
blueprint, already in the literature for focusing our planning effort. Environmental
uncertainty comes from many sources but managers can only effectively attend to a few
of these. We have shown in our work (et al., 1984), along with others more recently
(e.g., Bstieler, 2005) that paying attention to competitors, customers and technology are the three key areas for planning innovation successfully. Add government when in a regulated environment. Further, since internal environments dominate the process, voice of the customer tends to be trumped by benchmarking and internal process management (Etzioni and Johnson, 1994), so the best innovators often get their competitive information from their best customers to make sure these two data points are properly weighted in the process.

Many other good points are attended to (though not explicitly cited) in the chapter, including the strength of weak connections (Granovetter, 1973); how evaluation can kill potentially good ideas, although they miss timing—too early kills ideas too soon (Hage, 1980); structuring for innovation, although they missed the literature on corporate venturing (Miles and Covin, 2002); the importance of goals, although the missed the key point of the power of goal setting, (Latham and Locke, 1991); make-buy decisions at the heart of the planning process and capability assessment and development help top managers guide important teams on innovation quests (Narayanan, et al, 2002). Other emergent issues worthy of note are alliance formation and multiple organizations involved in planning which is a real challenge; climate for innovating, although this is not clarified with respect to culture (Denison, 1996) and philosophy, such as the case studies of Honda corporation (the Honda effect); and the idea that innovation occurs in waves, and although they cite Hounshell and Smith (1998) the authors don’t discuss the waves of exploration and exploitation at Dupont, which seem to follow 7-9 year cycles.

In sum, a broad, comprehensive, if not exhaustive treatment of an important topic is a rewarding read for any serious student of the subject. For any student of planning,
project management and the innovation process generally, this chapter is highly recommended.

**Planning for Innovation: Noteworthy Omissions**

In many ways, the chapter begs to be augmented, and it is noteworthy that omissions come to mind easily when reading this treatment of the planning process for innovation—it is generally that well written. Five areas leap to mind. First, although the chapter deals reasonably well with structure, with the exception of the literature on corporate venturing, it does not deal well with the strategy for innovating. Second, leadership is an important issue, and championship is also introduced in the chapter, but what is the conceptual difference between the two? Third, the chapter deals almost exclusively with incumbent firms, and new entrants are important to any innovation system. Fourth, teamwork is mentioned, but a classical view of more is better is the summary treatment, and innovation often thrives on tension, especially between functions. Fifth, and finally the emerging role of information technology and knowledge management for innovation planning and execution as well as all the planning tools that have been successfully adopted (with the exception of stage-gate, which is often modified) are conspicuous by their absence.

**Strategy and Innovation**

Strategy precedes structure in organizations; even if some part of strategy emerges from learning (Amburgey and Dacin, 1994). Here, I allude specifically to business unit and
R&D strategy, corporate strategy for innovation, and functional strategies that support these innovative plans. This is a broad and rich area, so only a few citations will be indicated here, and that should suffice. For an introduction to the subject of the corporate strategy issues associated with innovation planning, two books are worth consideration: Melissa Shilling’s (2005) and the Burgelman, et al, (2004) text.

As far as empirical studies, many come to mind, but the work that appears on entrepreneurial orientation (Miller and Friesen, 1982) and the relationship between strategy and structure of innovating (Ettlie, et al, 1984) are two seminal works. In regards to the planning context, the notion of disruptive technology (Christensen, 1997) and recent reflections on the research agenda for this topic are reviewed effectively in the recent special issue of the Journal of Product Innovation Management (Danneels, 2006). My feeling is that in the long haul, strategy will also be more important to get right, with structure coming along, even if kicking and screaming, in the end. Just as goal setting (Latham and Locke, 1991), and the relationship between R&D and Marketing (e.g., Sherman, et al, 2005), will trump most other issues in effective innovation planning. Ultimately, that is what this chapter needs: some priorities need to be attached to all those issues reviewed so well in each section, but with no real indication of why, say, climate trumps structure. What comes first? What is second? Who’s on third (with apologies to Bud Abbott).

**Leadership and Championship**

There has been resurgence in the literature on the role of championship in the innovation process (e.g., Howell et al., 2005) but the chapter never really comes to grips
with the possible overlap between this concept and leadership, especially as it relates to innovation planning. The championship notion is becoming more expansive and some authors want to include almost any role that might influence the initiation and implementation of innovation concepts. This is especially true for radical innovation, and we need more research on reconciliation of these two important research streams.

One hopeful beginning to this end is the series of articles published by Jane Dutton and her colleagues on *issue selling* and framing (Dutton, et al, 1997; Dutton, et al, 2001; Dutton, et al, 2002). If one considers issue selling an essential part of championship behaviors and organizational change processes, then this line of research shows great promise in understanding how planning actually takes shape in organizations. What these series of studies demonstrates is that issue selling is an essential skill, including issue-selling moves of packaging, involvement and timing, in changing organizations. This may turn out to be one of the essential distinguishing features in leadership behaviors for all people engaged in innovation planning.

Another potentially important feature of the leadership skill set is orchestration of *personnel flows* in the innovation process. We have found that there is a strong correlation between initiation of radical innovation operations process adoption in manufacturing and service firms and the change of key general managers of a firm (Ettlie, 1980; 1985), and as the plan goes forward for adoption of new process technology, movement of technical personnel into middle management, including project management, is paramount to ultimate implementation success.
Incumbent versus New Entrants

Entrepreneurship has become a cottage industry in the academy, and it is wonderful to see it enjoy, at last, the attention that it deserves. However, most new firms are started by teams (Aldrich, et al, 2003), and the similarities and differences between planned and unplanned innovation startups are just beginning to emerge in the literature. Further, there is a nasty conceptual debate smoldering in this “next big thing”: researchers in the entrepreneurship area are beginning to redefine and expand their field much as quality mavens expanded their field to answer all questions. I heard the following dialogue recently at a seminar: Practitioner: “What is entrepreneurship?” Professor’s answer: “Innovation.”

Teamwork

How can anyone deny the importance of teamwork for innovation planning and execution? Not me. However, I would like to suggest that what is needed here is an emphasis on the approach to teamwork that is unique for the innovating context (e.g., Katz, 2003). We know teams are important for innovation planning and implementation, and I would guess these are two different teams for truly radical change. But what particular team at what stage of the process and their unique unfolding is important to emphasize.

For example, there is real tension between R&D and marketing in the most critical first stage of the innovation process because of the very nature of these two functions in a firm and the culture of the disciplines they represent (Ettlie, 2002). This tension needs to be managed to successfully capture the significant inputs of these important functions for, especially, early planning of innovation. We still don’t know
how these two cultures clash like titans but produce innovation success for an organization. The idea that we work happily in teams with smiles on our faces, all joyfully embracing the bliss of teamwork and value the notion of being a team-player is woefully naive.

In our own work, we have found the original gate-keeper model so effectively documented by Allen et al (1979) and others, needs updating. Firms are effectively sourcing ideas much more broadly now, in the technical ranks, including marketing, which puts real pressure on teamwork management (Ettlie and Elsenbach, 2005). This is no longer a matter of a gatekeeper managing the effective flow ideas in an R&D lab.

Munford, et al., cite Barnowe’s (1975) article which is an important contribution on leadership and innovation, but one of the essential findings in that work is that there is considerable variance in how much leaders influence innovative outcomes. Granted, a small variance (15%) might actually be practically significant in the long run but when technical teams are disadvantaged (e.g., many new junior hires) leaders exert much greater influence. Perhaps the shift in the gate-keeper model to broader sourcing of ideas internally for information processing shows how these teams have become less disadvantaged over the past two decades. It is not clear if this is a broad trend or what accounts for this shift.

We have also begun to believe that products and services have fundamental differences long ignored in the literature, which we intend to rectify. This includes how ideas are effectively sourced and the process is planned, which seem to be quite different in these two settings (Ettlie and Rosenthal, 2006).
Information Technology and Knowledge Management

The role of information technology in the innovation process has continued to increase in importance to the point now where it is probably not a stretch to say that every organization has two technical functions: the technical core of knowledge associated with the prime responsibility for new products and/or services and the information and knowledge technical core.

A number of recent studies, for example, have examined the importance of information technology in virtual engineering teams (Malhotra et al, 2001), and attendant changes required in strategy and structure needed to make these new approaches to new product development work. Clearly, the potential to improve the introduction of anything new can be enhanced by information and knowledge management, but questions remain about whether this will take place, since, using one of the chapters’ authors’ terms, there is no planning template as yet to guide this process.

This brings us to the final point which focuses on the importance of tools in the innovation planning process and how this contributes to knowledge management. To the credit of Mumford, et al, they do discuss the stage-gate process which is well known for product development. However, this staging method is also modified in many settings (Ettlie and Elsenbach, 2007), which shows how planning will be augmented by learning, discussed earlier. In addition to stage management tools, there are many other well documented methods for improving the planning and execution process including
innovation roadmapping (Radnor and Probert, 2004), QFD or quality function deployment (Ettlie and Johnson, 1994), and many, many more.
References


