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DEVELOPMENTS IN PRACTICE XXV: STRATEGIC EXPERIMENTATION WITH IT

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ABSTRACT

A focus on top line growth necessarily brings IT into the mainstream of product/service innovation, which in turn means that IT must assume a customer focus, assimilate new skills, and build collaborations with the business development arm of the organization. It also leads IT into the realm of organizational innovation and the world of strategic experimentation with IT. This paper introduces the concept of strategic experimentation with IT by embedding it within the innovation life cycle typical of most organizations. It then outlines some of the unique issues and challenges IT managers face as they tackle innovation. The paper concludes by presenting a collection of strategies for motivating, supporting, and directing strategic experimentation with IT.

Keywords: Innovation, experimentation

I. INTRODUCTION

The role of IT is changing. According to Smith and McKeen [2006], it is bifurcating into separate roles – commodity service and competitive differentiation. Seemingly schizophrenic, these dual perspectives simply reflect the fact that organizations need to balance their bottom-line focus with their top-line focus; that is, take the costs out of the business while growing revenues through IT-enhanced products and services. Although IT is experienced at reducing internal costs, a top-line focus is new and different. It requires a customer-focused orientation. Developing systems for employees is not the same as for real customers who lack allegiance, skill, and/or patience. A top-line focus also requires experimentation with new products/services which are predominantly technology-enabled. Such experimentation (e.g., testing new offerings) is well established in most organizations, but it is new terrain for IT. It means new collaborations (e.g., marketing, business development, R&D) and it entails new skills/roles for IT (e.g., forecasting, marketing timing). The upshot is to put IT “front and center.” With services Web-enabled and products downloadable, most of what customers know and think about an organization is now based on its Internet presence. As an anonymous CEO quipped to a group of IT executives, “welcome to the world of consumer behavior”.

In order to understand this phenomenon better, the authors convened a full-day focus group of senior IT managers from a variety of different companies in several industries including banking, insurance, manufacturing, media, telecommunications, government, retail, food processing and automotive. The group was sequestered for an entire day, and the discussion was moderated by one of the authors while the other author recorded the discussion. In preparation for this session, participants were instructed to focus on strategic IT experiments as opposed to “experiments with

new IT” (where promising new technologies are examined). They were also encouraged to think of specific examples within their organizations where IT had been used to drive a “new business venture” as opposed to just supporting/enhancing an existing business process. In preparation for the meeting, participants were asked to find answers within their firms to the following questions:

- Describe a recent/current “strategic experiment” at your organization. Choose an experiment where IT played a major enabling role to facilitate some sort of new business venture. Outline the business opportunity/experiment.
- Who initiated the experiment? Who was the project champion? Whose idea was it originally?
- How long did the experiment last? Was there an end-date established for reviewing the success of the experiment?
- How was the experiment structured?
- Were there measurable objectives for the experiment?
- Did you use novel IT (or was IT used in a novel way) to enable this experiment?
- What was the outcome of this experiment?
- What specific things did you learn during the experiment? Any big surprises?
- Was the experiment transformed into a regular business offering? If so, describe the transition process. Any significant problems ramping up from an experiment to a full-fledge business offering?
- Does your organization encourage and/or reward strategic experimentation? If so, what specific incentives are in place?
- How important do you think strategic experimentation is for your firm?
- How does your firm fund strategic experimentation?

This paper is based on the focus group discussion that transpired. It became clear during the day that strategic IT experimentation could not be examined in isolation. In every company represented within the focus group, strategic experimentation occurred within a larger organizational framework of innovation – an organization’s need to reinvent its products and services and occasionally itself – and, as a result, is best understood within this context. In the next section, we describe the nature of innovation and the role of strategic experimentation. Following this, we present a typical innovation life cycle and show where experimentation fits within this model. In the final section of the paper, we offer advice for managing strategic IT experiments as derived from the shared experiences of the focus-group participants.

II. INNOVATION AND STRATEGIC EXPERIMENTATION

The need to innovate is well established as necessary for long-term organizational survival [Christensen and Raynor 2003; Hamel and Välikangas 2003]. According to Christensen [1997], there are two types: sustaining and disruptive. *Sustaining* innovation improves an existing product or enhances an existing service for an existing customer. In contrast, *disruptive* innovation targets noncustomers and delivers a product or service that fundamentally differs from the current product portfolio. Sustaining innovation leaves organizations in their comfort zone of established markets, known customers, and realizable business models. Disruptive technologies enjoy none of these benefits. To be successful for the initiating organization, the disruptive innovation must meet two basic requirements: it must create value as perceived by customers and the firm must be able to enact mechanisms to capture a fair share of this new value [Henderson et al. 2003]. For other organizations and particularly dominant players, the disruptive innovation can be devastating. Christensen [1997] refers to this as the innovator’s dilemma.¹

¹ For an excellent discussion of disruptive technologies and a review of six leading theories of innovation, see Steve Denning (2005).

Innovation comes about through organizational change and, here too, we see two dominant forms – continuous change versus punctuated equilibrium. Brown and Eisenhardt [1997] describe continuous change as “frequent, relentless, and perhaps endemic to the firm” while the punctuated equilibrium model of change “assumes that long periods of small, incremental change are interrupted by brief periods of discontinuous, radical change”. In this latter case, change is primarily seen as “rare, risky, and episodic.” While it is tempting to equate sustaining innovation with continuous change and disruptive innovation with punctuated equilibrium, it is not so simple. In fact, Brown and Eisenhardt [2006] as well as others [e.g., Meyer 1997 and Nicholls-Nixon et al. 2000] cite examples where firms have successfully reinvented themselves through continuous change as opposed to abrupt, punctuated change. These authors suggest that “in firms undergoing continuous change, innovation is intimately related to broader organization change”.

Innovation frequently involves experimentation [Govindarajan and Trimble 2004]. Experimentation invokes the notion of testing something new. Learning is paramount – whether the experiment succeeds or fails is secondary to what is learned during the conduct of the experiment. Experiments also conjure up a sense of the unknown – trying something that no one has actually tried before. The juxtaposition of the word “strategic” with “experiment” introduces direction, purpose, importance, and future criticality for the organization. Strategic experiments are not happenstance. Although distinctions are sometimes fuzzy, many authors differentiate strategic experiments from process and product innovations which tend to be narrower and more focused on existing offerings. Nicholls-Nixon et al. [2000] define “strategic experimentation” as

. . . a series of trial and error changes pursued along various dimensions of strategy, over a relatively short period of time, in an effort to identify and establish a viable basis for competing (p. 496).

Govindarajan and Trimble [2005] further highlight the inherent risky nature of strategic experiments which they characterize as

. . . a multi-year bet within a poorly defined industry that has no clear formula for making a profit. Potential customers are mere possibilities. Value propositions are guesses. And activities that lead to profitable outcomes are unclear (p. 67).

As such, strategic experiments represent a rather unique management challenge. According to Govindarajan and Trimble [2005], strategic experiments constitute the “highest-risk, highest-return category of innovation and require a unique managerial approach”. Where the goal is learning, results are vastly different from those normally monitored and measured within organizations. Even expectations take on altered meaning . . . sometimes heretical . . . where failure is tolerated and perhaps even expected. There is also a strong element of “trying to manage the unmanageable”. Strategic experiments benefit from none of the controls easily imposed in a laboratory setting; for instance, control groups may not be available, results may be ambiguous, it may not be possible to shield experiments from outside influences, and experiments may not be repeatable and/or verifiable. Furthermore, attempts to manage these experiments may destroy them. Management is a delicate balance where

. . . successful multiple-product innovation blends limited structure around responsibilities and priorities with extensive communication and design freedom to create improvisation within current projects. This combination is neither so structured that change cannot occur nor so unstructured that chaos ensues [Brown and Eisenhardt 1997]

Of interest for our purposes is the fact that IT often plays a key role in innovation and change. In fact, many recent innovative products (e.g., Blackberries, iPods) and services (e.g., eBay, VoIP) are clearly enabled by information technology. One pundit suggests that innovation and transformation are becoming the new ‘I’ and ‘T’ in IT [Slofstra 2006]. The term “strategic IT experimentation” focuses on the subset of strategic experiments that are based on information technology similar to the above examples. Interestingly, very little attention has been paid to strategic IT experimentation. Henderson et al [2003] introduce the concept of “platforms” (i.e.,

technology platforms, capability platforms and business platforms) as enabling conditions offered by IT to support innovation. Sambamurthy et al. [2003] suggest a role for IT as a “digital options generator”. Both of these studies look at IT from the standpoint of its role as a facilitator and/or enabler of innovation and agility. With this paper, we examine the management issues and challenges involved with the actual conduct of strategic IT experimentation. In order to do so, we first describe the innovation life cycle as the context for strategic IT experimentation, featuring examples taken from BP and Telco (an anonymous telecommunications company).

III. STRATEGIC EXPERIMENTATION WITHIN THE INNOVATION PROCESS

Organizations typically do not assign responsibility for strategic experiments to individual departments. In fact, few organizations even use the term “strategic experiment”. Instead, organizations commit resources (space, funds, and people), build infrastructure, articulate procedures, and provide incentives all in an effort to instill a culture of innovation. We refer to this collection of activities as the innovation process. Strategic IT experiments exist within such a process and must be understood in this context. Two examples of how companies incorporate strategic experimentation into their innovation processes are BP and Telco.

BP [Smith 2004] recently challenged its lines of business to use IT as a source of innovation. Because the rate of change is so much faster with IT as compared to other forms of technology, BP realized that their traditional approaches for assessing and adopting new technology would not work. As a result, they created an abbreviated innovation process. New ideas/opportunities (arising from employees, suppliers, universities, partners, and/or venture capitalists) must pass three filters: relevance, technical readiness, and economical viability. Once passed, a line of business must then be willing to sponsor an experimental pilot. If this is successful, the idea/opportunity becomes part of an “upscale pilot” which greatly expands its range and reach. Success here leads to adoption by a line of business. The whole process, from idea to adoption, happens within a year.

In this process, strategic IT experimentation begins with business sponsorship of the experimental pilot and continues into the upscale pilot (as various features of the innovation are tested). Often the experimentation involves BP’s partners. In essence, BP “provides the business milieu within which its technology partners can hold large-sale, real life experiments” [Smith 2004].

One of our focus group organizations, Telco, had a somewhat different innovation process based on the fact that all their products and services involve technology. It consists of four stages:

1. **Idea** – Ideas are generated through both informal (e.g., brainstorm sessions or competition activity), and formal processes (e.g., market research or industry trend analysis), and the source of ideas is varied (e.g., vendors, peers, product and marketing, customers, laboratories). Ideas must meet certain requirements in order to pass to the next stage including: a) specific and targeted objectives that address “pain points” or core business offerings; b) technical measurement; and c) identification of business sponsors and champions. On an annual basis, about 40-50 ideas are approved for the next stage.
2. **Proof of Concept** – At this stage, teams are assigned to specific ideas in order to conduct the proof of concept. Testing is done within a formal or informal laboratory setting using typical controlled experimentation style. The process is very agile and adaptive, and the original idea can morph substantially. The team is highly focused and intentionally kept small. The entire proof of concept stage occurs over a 1-4 week timeframe. Of the 40-50 original ideas, only 5-10 make it successfully through this stage. Requirements for passage to the next stage include addressing issues of intellectual property protection as well as service description for the new idea.
3. **Trial or Pilot Stage** – This stage is described by the firm as “contained production exposure” as the idea is exposed to the market in a limited and measured way. A market

segment is defined and certain customers (who may be employees) are offered the chance to experiment with the product/service. Measurements are taken to reveal the marketing/branding issues, the financial “price points”, and the operational impacts. The trial/pilot occurs within a 4-12 week window but occasionally it is extended. In addition to favorable results (i.e., marketing, financial, and operational), requirements for the next stage include complete product designs and business and system requirements. Many ideas are killed at this stage.

4. **Transition Stage** – This stage is the “go to market” stage, and the idea now enters the full system development life cycle to ensure that the product/service is “industrial strength”. Many shortcuts (i.e., “duct tape” solutions) which served well enough for the pilot must now be engineered to meet production standards. It is interesting to note that IT has some unique opportunities and dangers when transitioning from an experiment to a full fledged offering. The focus group member suggested that you can sometimes go too fast from concept to the “one you actually drive”.

In both of these innovation processes, strategic experimentation begins after an idea has been vetted and deemed relevant and before it is transitioned into a full component of the business – whether product, service, new technology or new process. Thus, strategic IT experimentation begins at the proof of concept stage (corresponding with BP’s experimental pilot) and continues through the trial/pilot stage (corresponding with BP’s upscale pilot). A feedback loop may be involved at the trial or pilot stage. (See Figure 1.)

Figure 1. Strategic Experimentation Is Part of the Innovation Process

IV. STRATEGIES FOR SUCCESSFUL IT EXPERIMENTATION

During the focus group discussion, it became apparent that there are three necessary conditions for strategic IT experimentation to be successful: motivation, support, and direction. As one focus group member stated, “Without motivation, little will happen; without support, little can happen; and without direction, anything can happen”. Their recommendations to others seeking to improve strategic IT experimentation include:

1. Motivate: Establish rewards for strategic IT experimentation. Although many individuals are naturally drawn to experimentation, the demands of work often drive this interest and inclination into remission. Furthermore, experimentation is risky, and not everyone is willing to gamble with their career. As a result, experimentation and innovation do not flourish without intervention. According to focus group members, the way to create an innovation-enabled organization is twofold: provide incentives and rewards to support experimentation and risk-taking, and make it everyone's job. Good ideas are good ideas, and experience shows that they are as apt to originate at the customer interface as they are within the laboratory or the executive ranks.

Taking this a step further, one focus group company has made innovation a component of everyone's annual performance measurement. In addition, this company also offers five specific types of formal rewards for innovation ranging from patentable ideas to emerging business opportunities. The focus group suggested that not all rewards need be formal. Some chose to use a system of frequent informal rewards. Called "ovation" awards, these include books, tickets, cards, recognition days, and executive citations all to recognize innovative IT ideas and encourage/reward strategic experimentation with IT. Another company discovered that the best reward for IT personnel is simply the opportunity to work and play with new technology! In this company, enterprising IT personnel win the right to experiment with new technology without the need for champions or sponsors. According to the focus group member, this activity is funded by "skunk works" and "beg and grovel".

2. Support: Create infrastructure to support experimentation. Offering rewards for experimentation sends employees the signal that experimentation and innovation are encouraged and will be recognized. This provides the motivation for individuals to experiment, but organizations need to provide support for such experimentation if they want it to happen. Over time, the combination of recognition and support builds a culture of innovation.

In addition, focus group firms felt it is also necessary to build some infrastructure around IT innovation and experimentation. One company, for instance, created the position of "chief scientist" and provided that office with a budget and resources. According to the focus group member, it was his organization's "way to signal to everyone that the lifeblood of the organization was discovery . . . not just innovation." At this company, "innovation was a given" and expected in all parts of the business. Discovery, however, conveyed a sense of urgency as well as the notion that the company would need to continually reinvent itself in order to survive in the marketplace.

Many focus group companies had formal centers (or laboratories) to support innovation and experimentation. Depending on the firm, the role of these centers varied from "new product introduction" to "new technology introduction" to "business venturing" to "incubation centers". Where IT is considered a key business driver, these centers focus almost exclusively on strategic IT experimentation. The critical aspect of the creation of such centers is the provision of support and infrastructure to enable idea review and experimentation. Most such centers were formally entrenched within the organization with ongoing funding, permanent staffing, and well-developed procedures and processes to encourage, guide and support innovation. According to one member, the key element of his center is "to link sponsorship to innovation" reflecting the fact that "good ideas don't make it on their own".

While companies in the focus group reached consensus on the mandate for innovation centers, they disagreed in terms of governance, with the key point of differentiation being the locus of authority. Two distinct strategies surfaced:

- **Insulate** – The insulate strategy created innovation centers as places where "all lines of business can come together to address common problems". According to proponents, the key benefit of this approach is its ability to foster synergies across the business anchored in the belief that innovation is best "nurtured away from the mainstream business".

- **Incubate** – Those following the incubate strategy placed their innovation centers within specific lines of business. Forcing innovation to be housed within a single line of business was argued to lead to IT experimentation focused on “real” problems/opportunities. Furthermore, they felt that local ownership was beneficial.

The innovation infrastructure that was common to virtually all organizations in the focus group was the maintenance of an intranet for launching ideas. These sites were considered to be successful in terms of soliciting, vetting, and sharing ideas and/or opportunities. According to one member of the focus group, the key aspect is that “anyone can input and everyone gets access” to build on ideas. In firms with innovation centers, these intranets were effective “feeder” systems. In organizations lacking the formal support of an innovation center, ideas identified on the intranet required a sponsor to marshal support in order to turn them into realizable products and/or services.

A common form of financial support is the establishment of internal venture funds. At about half of the member organizations, funding mechanisms had been set up to support IT experimentation. These funds are made available on a competitive basis with an oversight committee in place to award such funding and to monitor progress and completion. The governance of such mechanisms is further discussed under the next strategy.

3. Direct: Manage innovation strategically. One member of the focus group pointed out that “experimentation never fails as long as there has been learning”. Strictly speaking, the focus group agreed BUT felt that “any such learning would have to be strategically important for the organization” for it to be considered successful. According to the group, learning for the sake of learning was “an activity enjoyed by academics!” They suggested that, providing motivation and support for individuals to experiment freely would be a recipe for disaster. Organizations must provide direction for these activities. Strategic IT experimentation does not occur by happenstance. Some of their suggestions for directing IT experimentation in order to ensure that it was strategically relevant follow.

- Link experimentation and innovation to customer value.** A simple yet effective way to accomplish this is to focus on emerging pain points. At one company, all new ideas had to articulate the specific customer pain point (CPP)² that would be addressed. This requirement, in and of itself, produced results. As the focus group member related, “the identification and surfacing of CPPs stimulated considerable and sometimes heated discussion”. Many organizational members were surprised to learn of CPPs . . . and many potential solutions emerged. It was a case of “if only I had known”. Unfortunately, failure to articulate business value to the customer is a common phenomenon.
- Link experimentation to core business processes.** The flip side to the customer pain point is to focus IT experimentation internally on core business functions. One focus group member whose organization is “currently reluctant to focus experimentation on the market” focuses all experimentation on core business activities. Their belief is that IT experimentation is “strategic only if it produces significant efficiencies for internal operations in a way that can be captured on the bottom-line”.
- Use venture funds to support strategic initiatives.** While the establishment of venture funding for IT experimentation is a form of support (see previous strategy), the governance of such funds can be instrumental in achieving strategic alignment. According to the focus group, some of the goals used by their companies in the establishment of venture funds include the following:
 - make greater use of innovation resources

² A “customer pain point” (CPP) is a documented occurrence (or situation) of an unsatisfactory customer experience. If customers need to call two separate departments to purchase a service (due to the lack of integration between these two departments), this would be considered a CPP.

- focus on new business models
- explore new/disruptive technologies
- focus on penetrating new markets
- leverage cross-organizational capabilities
- streamline decision making
- focus on opportunities that can scale

It is easy to see how these goals can be used to focus IT experimentation on strategic initiatives. The group felt that this was a successful way to use scarce resources effectively.

V. FROM EXPERIMENTATION TO INNOVATION: LESSONS LEARNED

Focus group members were asked to share examples of both successful and unsuccessful IT experimentation. Interestingly, all of the failures³ involved not the experiment itself but instead the transition from successful experiment to broader practice or to deployment in the marketplace. Since the goal of a successful experiment is to ultimately become an innovation from which the business derives value, navigating the transition from experiment to innovation is especially important. While there is a small sample upon which to draw conclusions, these failures had several elements in common. From this experience, focus group members were able to reach consensus about how to approach this critical transition point:

- **Focus on achievable targets.** Strategic IT experimentation should be manageable and targeted but, at the same time, built so that it can scale up easily. According to one focus group member, it is “far easier to ramp up a proven venture than to plan, build and deliver a winner”. At one company, the experimentation involved a “proof of concept” with new technology involving six sites. A quick decision was taken by management largely for political reasons to expand the proof of concept to 300 sites! This action literally ended the experimentation as the task immediately became one of implementation.
- **Do not rush to market.** Positive results from an experiment should be viewed as justification for further experimentation . . . not as a “license to launch”. At one company, a decision to go to market based on very favorable results from a strategic IT experiment quickly ran into difficulty. The customers involved in the experiment turned out to be unrepresentative of the overall customer base, and the uptake in the market plummeted as the rollout broadened its base.
- **Be careful with “cool” technology.** IT experimentation deals with technology. According to the group, sometimes it is easy to be misled by cool technology. The buying public may not understand what the technology does (e.g., it is an Internet pen); may have no need for the things that the technology does (e.g., tracks unvisited sites); and/or may not find the technology appealing (e.g., it is a mouse with arms and hands). On the other hand, this same technology may become the item that every teenager on the planet must have! Exercise caution.
- **Learn by design.** The goal of an experiment is to learn. Unfortunately learning does not always transpire. A frequently cited cause for such failure is that insufficient controls were designed into the experiment to enable the organization to ascertain after the fact what had happened. Was failure due to product features or due to functioning? A lack of effective marketing? The price point? According to one focus group member, the first step in a strategic IT experiment should be to identify the critical questions that need to

³ These failures included an online banking venture which, despite high initial acceptance, failed to meet anticipated customer market share post-launch; another involved a premature decision to ramp-up “what appeared to be a successful” product which subsequently flopped; while the third involved a technology to be launched by means of a partnership.

be answered at the culmination of the experiment and then design these into the experiment.

VI. CONCLUSION

A focus on top-line growth necessarily brings IT into the mainstream of product/service innovation, which in turn means that IT must assume a customer focus, assimilate new skills, and build collaborations with the business development arm of the organization. It also leads IT into the realm of strategic IT experimentation. This reflects the ubiquitous nature of information technology and represents a new and exciting role for IT. This paper outlines some of the issues and challenges IT managers will be experiencing as they begin to move into the uncharted waters of innovation. At present, in most organizations, strategic experimentation is merely a collection of activities and procedures to test out new ideas. As managers become more experienced in this area, it can be expected that many of the practices outlined above will become better understood, and IT will be able to use strategic experimentation more effectively to successfully spin good ideas into innovation gold.

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