Introduction — Managing Innovation: What Do We Know About Innovation Success Factors?

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This volume explores innovation success factors by examining new product and service development through three parts: Innovation Management, Critical Factors in New Product Development and Tools for NPD.

Innovation Management

Innovation has become the most critical factor for the survival of any organization in today's world. Innovation is defined by many as an act of creating an idea implemented in any setting to improve the affiliated organization. Innovations can be in the form of products, services or processes. Innovation can be achieved in many ways; however, it always starts with a new idea. The idea can be an invention, but turning it into a product or service is the innovation. This can be explained in the context of electricity. The electric lamp is the innovation whereas electricity was an invention. Many times, inventors are not the ones who come up with the innovations. A great example comes from the computer industry. Xerox PARC (Palo Alto Research Center) has been known to have invented technologies including personal computer, UGI (User Graphics Interface), mouse or laser printer. However, Xerox could not benefit from these technologies. Instead Apple's founder Steve Jobs who visited PARC and later implemented them into Apple's products was able to develop powerful innovative products. This is a typical path from invention to innovation. The next example is based on the first one. In the early 1990s, Microsoft introduced windows to many using personal computers based on IBM's open architecture. Up until that, tile Apple was the only computer with such a UGI. This was an innovation through imitation and a successful one.

Critical Factors in New Product Development

We focus on product innovations in this volume. While there are many other success factors impacting product innovations, we will explore the new product development process. Organizations and academicians have contributed to the development of robust processes for new product development over the past few decades. Introduction of cross-functional teams brought down the walls among different functions in an organization. Then we saw concurrent engineering surface as a model defining this cross-functionality. Then we found out that approaches should be different between hardware and software development. This introduced us to more exciting and new approaches such as using beta releases in software development.

While academicians have preached the idea for many decades, we witnessed some of today's large corporations missing the most important factors in new product development such as identification of customer requirements or the existence of market segments. A powerful example of this is the phenomenon of "Basic PC" in the mid-1990s. This was a disruptive technology as described by Harvard Professor Christensen. Before this phenomenon became a threat, Intel working with PC manufacturers including IBM, Dell or HP would always introduce a product at the highest performance level with the highest price. AMD broke this tradition by introducing inferior products at cheaper prices and found a new market segment.

Later on, we were struck by another phenomenon: services. One of the striking examples for this is the introduction of Apple ipod with itunes. As in the case of UGI, Apple did not invent the MP3 player or personal music player. Sony broke ground when Sony Walkman was introduced. However, they were not able to see the opportunity when MP3 players started to appear in late 90s. The failure of Napster, which was the first platform where songs were downloaded from, should have given Steve Jobs the idea of creating itunes and ipod. What made ipod, which is another MP3 player, successful was to marry it with a service platform: itunes.

Cultural differences not just between geographies but also between functions appeared to impact new product development success. A great example of this is the communication issues between engineering design and manufacturing teams in electronics manufacturing. An organizational function was born out of this conflict: New Product Introduction (NPI). Many electronics manufacturers today have NPI organizations which are composed of manufacturing experts but placed in an engineering design function, thus building a bridge between those two culturally different functions.

Tools for New Product Development

There is a wide variety of tools available to managers who are responsible for new product development. These range from modeling the whole process and dividing it into manageable chunks such as Phase-Gate models to those trying to extract data from customers which can then be used in development of the engineering specifications. While many of these approaches are published in books and articles, some worth mentioning are listed below.

Quality Function Deployment (QFD) has been known for more than three decades by the academicians. However, its application in the industry has been limited. It is also known as the House of Quality. It is a very powerful tool translating customer requirements into engineering specifications.

Design Structure Matrix is another powerful tool which has been introduced by MIT Professor Eppinger. Through communication and interaction among multiple functions, the tools helps to design the most effective organization. This toll would be very effective in the case of very complex products such as airplanes or microprocessors.

Technology Roadmapping is an excellent planning approach to an integrated product and technology development. It provides a platform for different function to be able to synch up. The tool was introduced to a wider audience by Cambridge Professors Phaal and Probert.

TRIZ came to daylight in the late 1990s after being kept a secret by corporations which were able to address many technical conflicts with innovative solutions. TRIZ, developed in Russia, provides exactly that. It is a tool developed through patent mining and addresses conflicts among the features of a product.

Social Network Analysis (SNA) is an emerging tool and can be powerful when combined with any intelligence data. Technology intelligence is one kind that can make or break a product. Patent analysis coupled with SNA can provide invaluable intelligence for those developing products enabled with emerging technologies.

Project Management is generally taken for granted; however, those who ignore this very basic but very important tool fail miserably. Nowadays, many companies seeking program managers to develop products seek “Project Management Professional” (PMP) certification offered by Project Management Institute (PMI).

Book Structure

Table 1 summarizes what to expect in each part and chapter. The expectations are separated for a practitioner versus a researcher or a student. The readers can review this table to identify the chapters they should focus on.

Table 1. Review of chapter contents.

Parts	Chapters	Practitioner focus	Researcher focus/Student focus
1: Innovation Management	1	How does technological or economic turbulence impact innovativeness?	Validated hypotheses highlighting innovativeness and uncertainty metrics. Case analysis from Turkey showing firms getting more innovative during a turbulent period.
	2	How can we measure innovativeness? How does innovativeness and the innovation process impact a firm's performance.	A validated model linking elements of innovativeness and the innovation process to the performance of a firm. Factors impacting innovation performance validated by tested hypotheses with data from German industry.
	3	How can we balance exploration and exploitation in new product development?	A set of propositions generated from a model built on the literature. Familiarity with leading authors and journals publishing in this topic.
	4	A review of the literature covering factors influencing innovation.	A model built on literature — ideal for a future study. Familiarity with leading authors and journals publishing in this topic.
	5	A comprehensive review of commercialization of technological innovation.	Validation hypotheses highlighting factors influential in the commercialization of technologies. Review of factors impacting technology commercialization.
2: Critical Factors in New Product Development	6	An insight into the scope and significance of complexity in new product development.	A set of learnings acquired through interviews with professionals can be used to build hypotheses to test.
	7	A survey of more than 100 companies identified relationships among NPD speed and market success.	A complete study with validated measures/hypotheses. The study identified a series of future research questions.
	8	Study on the relationship between management support and success in newproduct development.	A complete study with validated measures/hypotheses. The study can be replicated in different settings.

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3: Tools for New Product Development	9	A review of strategies to address obstacles for product innovation	A valid study with tested hypotheses. Can be expanded into larger sample in different settings for further insight.
	10	Demonstration of technology maps through review of multiple NPD cases.	Technology maps are integrated with case study approach to yield a powerful research tool.
	11	Use of modeling in support of NPD is demonstrated.	Demonstration of NPD modeling with Bayesian Networks — a powerful analysis tool.
	12	Review of 88 NPD tools identified through the literature.	A survey of the usage of NPD tools across 200 European firms. Results can lead to propositions to test in different settings.
	13	Review of project management approaches in NPS wrt information sharing.	A set of pretested propositions that can be validated through a larger sample to generalize them.