How to Build an Innovation System

by Peter Lee

The physical isolation of New Zealand from the world's largest markets means that we don't always hear the crucial day-to-day and intimate conversations of potential customers. We miss the interactions that create the cultural and intellectual fabric of their environments. It is the classic situation of not knowing what we don't know. Therefore, we often don't understand the subtleties of the business drivers in a target market, and we have a natural tendency to make assumptions. In many cases those assumptions are unwarranted and sadly "off the mark" when they're tested. So what's the most cost-effective way to short-circuit any critical mistakes in developing new ideas and products?

I would encourage any business to avoid potential pitfalls by utilising a rigorous process to bring products to market. Like any science-based organisation, there needs to be a rigorous process that begins from the moment somebody has an idea. Generating ideas is actually not difficult for most companies, and the average place of work probably generates hundreds of development ideas in the course of a year. It is important to direct this ideation by ensuring employees have a clear understanding of the business strategy so that they are able to determine whether their concept is aligned with this strategy. But to exploit ideas, there needs to be a forum to capture them, manage them, and take them through to commercialisation. It all requires resources, expertise, and discipline—not to mention a certain mindset. Most product failure is about a lack of business-oriented homework, and rarely related to the technical capacity of the product. Many organisations incorrectly assume they can invigorate their product development by simply importing processes such as buying a software program to manage the innovation process. It needs to be much more embedded in the culture of the place, and a software program certainly can't provide the human spirit that surrounds creativity.

In this article I'll describe what I believe are some of the critical elements of an innovation process. Whether you're a small business or major corporation—regardless of your

Dr. Peter Lee graduated from the University of Auckland in 1976 with a doctorate in Chemical and Materials Engineering. He worked in the forest and paper products industry in North America for 27 years, and was Vice President, Global Research and Development for International Paper, based in Connecticut. He returned to New Zealand in 2003 and was CEO of Agrigenesis until September of this year.

industry—I hope to provide you with some useful insights about innovation that can lead to business results. I believe that scientific discipline can add value to any business situation—whether you're designing new products or systems. It should not be unnecessarily bureaucratic but provide just enough procedure to serve the purpose. This is one important reason to avoid generalised solutions and to spend the time to adapt a process to the specific scope and scale of an organization. At face value, the description of a system seems remarkably simplistic. But I've learned from 25 years in product development that the discipline required to manage the entire process is incredibly demanding and worthy of the attention of any Chief Executive with a mandate for profitable growth.

Voice of Market

Many years of experience has taught me that most products fail because of inadequate early evaluation of the market opportunity. It is tempting to delay evaluating a product concept until later in the development process when the form is more precise and can be demonstrated in a more tangible way. Projects start and can get a life of their own before an external view of their viability is obtained.

Once we've established that a concept has some viability, a critical part of our product development process is to continue a highly effective information-gathering process in our target markets. It's a method for product development and innovation system that I used for many years working at International Paper, a $25 billion paper, packaging and forest products company based in Connecticut. This early look at a product's viability is based on one or more day-long meetings with experts and potential customers in the target segment. The process resembles that used by consumer products companies to test and refine their concepts early enough in the development process to incorporate the brutal facts and perceptions from critical end-users. The process is called "Voice of Market", and it's a system to take early stage products and present them to the outside world in a very facilitated, safe, and disciplined manner.

Voice of Market is similar in format to a consumer focus group, but the kinds of participants and the range of outcomes are very different. Ideally, there are eight to ten invited participants who are industry insiders and experts (including potential customers). They have the capacity to understand your idea and immediately give you valuable feedback. A typical group might include a mix of business leaders, product development executives, consultants, and academics. If your idea is compelling, then people in the room want to become part of the opportunity and become a partner in the project. They're only paid an honorarium to attend the event, so there has to be a motivator to have them join the group. If you choose the individuals wisely, they're a group of people with common interests who cannot resist the opportunity to be involved with the early stages of a new development in their chosen area. The session exposes them to ideas and people that have important insights that could influence their industry. So it's a forum to generate ideas for your company, but it also provides the

participants with value in terms of networking and idea sharing. But to get real value, you have to get the best people you can find. It's an expensive exercise to host a Voice of Market event (particularly if your target market is in foreign country), so you have to acquire a mix of participants that's effective. To achieve that you should outsource the role of finding the participants, and there are companies which specialise in that service. Once the group is confirmed, it's important to have them sign confidentiality agreements. This ensures all the ideas developed during the day belong to your organisation.

Like a consumer focus group, representatives from your company should not be part of the event—but ideally you can watch the day's proceedings through one-way glass. An independent person and organisation hosts the event, and the day begins by describing the plan to the group in formative language. It's a full day, so it has to be a high energy environment and the technique of the facilitator is critical. The idea being investigated is looked at from many perspectives, and participants are challenged to come up with business proposals and thoughts around the concept. It has to be a fun experience, and part of the day can be framed as a competition: you'll be surprised how much energy can be generated among a group of industry leaders by offering a $200 prize for the best ideas and plans.

I've found that the business plans you get from these events are simply fantastic. It's a fast process but I've found them to be remarkably accurate. Best of all, the participants are brutal in terms of their honesty and the one-way mirror requires that you have to sit and take it. It's fine for your organisation to have preconceived ideas, but you must also be willing to accept that you could come out of the day with completely different thinking and hopefully more persuasive ideas. Participants tell you in their own terms where they see the value. So if you're in the later stages of development, the discussion can become very targeted around some real opportunities.

Allow me to provide an example of the value of this process. International Paper had developed a detailed model of how paper, a lightweight fibre matrix, absorbs light over a range of wavelengths and reemits this light at a different range of wavelengths. Of course, this capability is the basis of paper appearing opaque and white. It occurred to us that this capability of porous media to absorb, transform and reemit electromagnetic energy might have broader applications. Rather than pursue some of our own ideas we presented this concept to a panel of experts chosen for their breadth of knowledge of potential markets and underlying technology. It was an eclectic mix of university professors and industry management. Over the course of a day, several novel applications for specialty porous media were conceived based upon the optical properties of paper. These included a means to reduce the radar profile of aircraft by incorporating a paper-like structure in their outer skin and resulted in our becoming a lead supplier to the military. Applications not only included stealth aircraft but also an adaptation of the product was useful in cloaking sensitive communication devices to prevent eavesdropping. We were surprised to learn that the biggest market for such

cloaking material was not military but commercial applications. So the Voice of Market process could be perceived as expensive market research, but it's not expensive when you think of the value that's created by developing a strategic plan that's formulated around an idea.

Finally, some technical advice: You can learn a lot from watching these events, but I've been amazed at how much you can learn from getting a typed transcription and video tape of the day's discussions—you often get a fresh ideas from the day by revisiting them.

Strategy and the culture of innovation

How do truly innovative companies consistently outperform their peers? Senior management are critical on many levels in terms of creating the platform. The cultural imperative is to create an atmosphere in which there is no such thing as a bad idea. An organisation has to be prepared to interact with any idea, and accept that all ideas can have merit. Over time, this creates an environment where the enterprise is greater than any one idea. In other words, it's accepted that all ideas will be driven to a decision point, but that the greater organisation is the objective—and not a single project or idea. It's human nature that we get excited about causes and ideas, so there has to be a culture where ideas have time limits, and not every idea is a winner. Honesty and trust is vital, and people should ultimately be comfortable admitting, "the idea wasn't as good as I thought".

Management also need to have the ability to communicate an understanding of the company's strategic scope. It's an on-going, daily process that requires time and commitment. Unless staff have a clear view of the evolving strategy, the innovation process can drift away from its broad framework of goals. Everybody has a style, and I prefer to think about business strategy from a market-based perspective. I focus on segmenting and market positioning. There are a number of parameters you can use, but in my mind it all comes back to segmentation and positioning.

It's highly inefficient within a company if ideas aren't presented in a common format that addresses the key businesses issues necessary for an informed decision. In other words, attention to the communication of ideas is an integral part of an inventive culture. A good proposal needs to describe the broad idea, but it should also indicate the idea's financial and strategic proposition. It should also clearly indicate the value proposition of the concept, and provide a broad understanding of its potential.

Stage Gate: the discipline of development

As I suggested previously, by the time you attempt a Voice of Market event you should have determined that there is feasibility to the concept. Voice of Market is simply a part of the larger development scheme that we use, that's commonly known in the research and product development world as Stage Gate. Once an idea has been identified, there are five "gates" and five stages in sequence: Concept, Feasibility, Development, Implementation and Commercialization (see Figure 1).

The system ensures that a number of business and technical criteria are met before moving beyond each gate. There will be

attrition at each gate and you quickly identify the risk associated with ideas. Each step of the process is more and more expensive because you're investing more and more time and resources. I believe that New Zealand, as a small country, needs to become more effective at developing a portfolio of product developments. By working collectively we could absorb the risk and guarantee a level of reward. For example, I believe that biotechnology has far too many small undertakings in this country. An amalgamation of our companies would be greater than its parts—simply because we would be able to manage risk more easily. That is, concentrate precious resources on the vital few big ideas and not disperse energy on the trivial many. The Stage Gate process provides a structure that not only aligns resources within an organization but also provides common language and procedures to align resources among organisations. Therefore, it is particularly important in a New Zealand context.

When an idea reaches the feasibility stage, segments and targets have been identified but you only have a rough plan. There still needs to be further research, the "hard yards" are yet to be done. The target markets need to be evaluated, and there are typically a lot of information gaps regarding manufacturing capabilities and the competitive situation. It's often at this stage that we talk to a few trusted customers to get some initial feedback.

Once you're through that gate, it's important to keep the energy going by providing resources and time to develop the idea, and setting time limits are important. For example, the team might be given a month to take the project to the next stage and to report to management. By now you're starting to get tangible feedback that's required to launch the development phase. Typically, only one in four ideas might get to development. Senior management are actively involved by this stage and there is a regular forum to discuss progress

FIGURE 1: Stage Gate Process
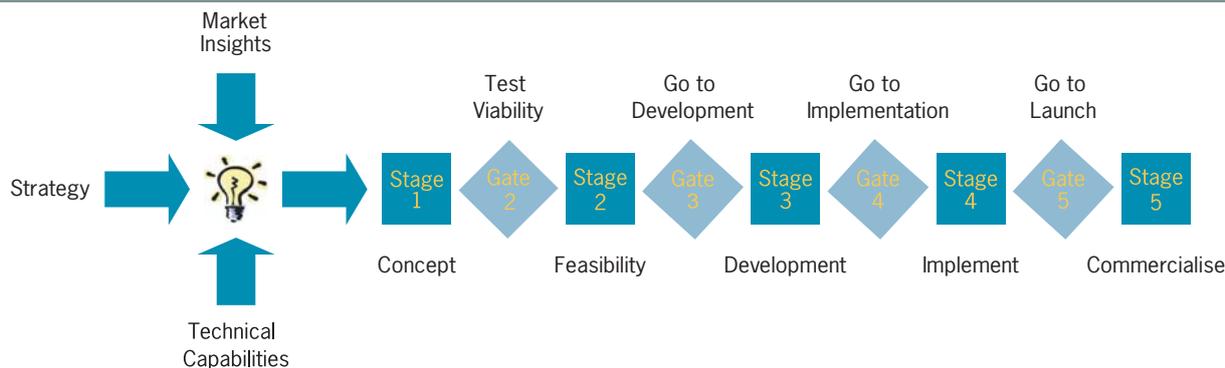
It's preferable that half your original ideas die at the feasibility stage and that half of the remaining ideas die at the development stage. This heavy early attrition will ensure that by the time you reach the resource intensive implementation and commercialisation stages, most of the remaining projects still "in the game" will be commercialised.

The concept phase is simply the point where ideas are ranked and briefly inspected. There needs to be an internal group that reviews the proposals and manages the first gate between the concept and feasibility. Senior management aren't typically involved at this stage, so the group needs the capacity to provide an initial screen. A cross-disciplinary group is a powerful way to engage all the perspectives and skills of the organisation in the early stages of the process.

I like an individual to retain "ownership" of their ideas throughout the commercialisation process. However, we need to recognise that there are creative scientists who simply want to pass on their ideas and keep doing research. The ideas people are key players in the development team. Others want to follow the project to the end. Training is often needed to allow these people to grow with their ideas. Don't underestimate the energy that comes with aligning personal motivations with corporate goals.

and ensure there is continued viability. It's important that you don't relax with early prototypes or designs. They constantly need to be refined, and you need to determine how long the revision process should or can endure. Most development projects go on to implementation, and obviously it's a complex operation to align manufacturing with sales, promotion, and your channels of distribution.

Innovation can be managed but requires disciplined processes, management's involvement and a supportive environment in order to be an effective tool for business. There has been an ongoing discussion between marketing and technology proponents regarding their respective leadership of the innovation process. I hope it is now clear that it is senior management and often the Chief Executive that need to lead this process and that both marketing and technology play vital roles in the development of new products. The relative impact of marketing and technology on successful product development will vary through the Stage Gate process. A marketing perspective is vital during the early formative stages and should be involved at some level in all stages. The Voice of Market is not only a useful tool for aligning product development with market needs but also to engage both marketing and technology collaboratively in the innovation process.