Innovation Metrics

The Innovation Process and How to Measure It

by Langdon Morris

An InnovationLabs White Paper
InnovationLabs LLC
November 2008

INNOVATIONLABS
Where Innovation Happens

Table of Contents

Introduction 3

Innovation Methodology.....4

The Innovation Funnel.....5

Stage -1: Strategic Thinking 6

Stage 0: Portfolio Management & Metrics 7

Stage 1: Research 9

Stage 2: Ideation 11

Stage 3: Insight.....12

Stage 4: Targeting.....13

Stage 5: Innovation Development 14

Stage 6: Market Development.....16

Stage 7: Selling.....17

Input, Process, and Output.....18

Conclusion 19

References 21

Introduction

Like everything that businesses do which involves the investment of capital and time, innovation has to be measured. But unlike most other forms of business measurement, measuring innovation presents problems for the process itself that is to be measured. We might call this 'innovation uncertainty principle' as many of the ways that we might want to measure innovation can significantly impede the innovation process itself. This is because innovation involves a venture into the unknown, and if we try to pin these unknowns down too fast we may make them harder to recognize and realize. We can also undermine the spirit of learning, discovery, and intelligent risk-taking that the innovation process requires if we attempt to measure the wrong things at the wrong time.

For example, we have to look at the very concept of 'return.' 'Return on Investment' (ROI) is a standard and accepted measuring tool that managers have relied on for centuries. But it's an accepted joke in the research and development community that the term 'ROI' really stands for 'restraint on innovation,' because ROI-based assessments tend to embrace short term thinking and to exclude the development of long term, breakthrough, and discontinuous ideas and projects. Premature use of ROI to measure innovation thus endangers the very thing you want to measure, and makes less likely to achieve the end goal of the process, which is better innovation.

This presents difficult problems for R&D managers. At a recent meeting at HP Labs, a manager commented that they couldn't even look at a project that didn't have the potential to be at least a $50 million business. The problem, of course, is how you can know. What do you include in your research plan, and what do you put aside? Did the researcher whose work led to the creation of HP's multi-billion dollar inkjet printing business know what he was getting into when he became curious about the burned coffee he noticed on the bottom of a coffee pot? Could he have said that his idea about superheated ink would be worth $50 dollars, much less $50 million? Unless he was inspired by a fit of hubris, probably not. So if someone had asked him for the ROI on his research work, he could either guess, lie, or say he didn't have any idea. And if he was really going to assessed on ROI at an early stage, then chances are he would have abandoned the idea altogether rather than risk his good standing in the organization.

Yet innovation has to be measured, surely, or else it cannot be managed. So what to do? Exploring some of the best options is the purpose of this White Paper.

Innovation Methodology

ROI may be a gratuitous example of innovation measurement because its flaws are so painfully evident. But it does make the point that you have to select the right tool for the job. So perhaps we should start by discussing the job: What is it that we need to measure?

The *purpose* of innovation is to create business value. That value can take many different forms, such as incremental improvements to existing products, the creation of entirely new products and services, or reducing costs, etc. The reason we want to do this is because we want our enterprise to survive, and to grow, and in a rapidly changing market the only way to do either is to innovate effectively. In the history of business, it's clear the effective innovators have a better chance of surviving, and non-innovators tend not to survive at all.

The *method* of innovation is to develop ideas, refine them into a useful form, and bring them to fruition the market where they will hopefully achieve profitable sales, or in the operation of the business where they will achieve increased efficiencies.

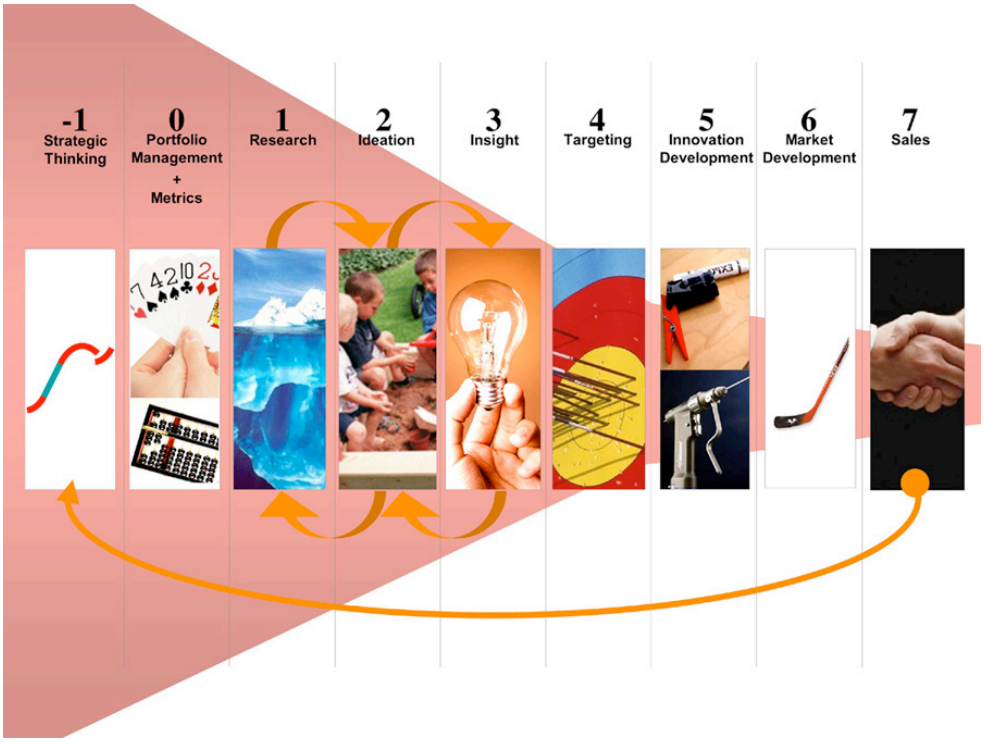
Many people have noted that we can visualize the innovation process as a funnel: Lots of ideas come in the big end on the left, and a few finished ideas come out the narrow end on the right, ready to go to market, provide exceptional value, and earn substantial revenues and profits. It's a concept that certainly works in principle, but it does require considerable attention to what happens inside the funnel.

In our work at InnovationLabs, we have found that it matters a great deal how you define and manage what happens inside the funnel. Likewise, the metrics you choose also matter a great deal. The rest of this article consists of a description of the funnel as we see it, and then suggestions for possible metrics that may be applicable at each stage.

The Innovation Funnel

Our version of the funnel consists of nine elements, or stages. In the following pages we're quickly review each stage, and discuss the metrics that apply to each.

The metrics that I propose are of two quite different types. The 'soft' metrics are qualitative, sometimes in the form of provocative questions that are intended to get people to think more deeply and effectively about the work they're doing. The 'hard' metrics are quantitative, and amenable to statistical analysis.



Stage -1: Strategic Thinking

The icon that represents Strategic Thinking is the s-curve, a commonly accepted model that helps us visualize the stages of growth of a company or an industry. The purpose of strategy, of course, is to help manage the growth process to achieve the optimal results.

Hence, the link between innovation and strategy is fundamental. It's not possible to talk about innovation without talking about strategy, and vice versa. So it only makes sense that the innovation process should begin by thinking about what we want to get out of the overall innovation effort, which is strategic advantage in the marketplace.

The output of this specific stage is a set of goals and requirements, a model if you will, which details the types of innovation we want, the growth we are targeting through them, and the markets we ought to address. Of course, just because we say what we want doesn't mean we're going to get it, but we're much more likely to get it if we we're clear about what we want, and if we manage to it and measure it along the way.

Possible Metrics for
Stage -1: Strategic Thinking

Qualitative Metrics and Provocative Questions

a. Are we targeting the right parts of our business for innovation?
b. Can we change as fast as our markets do?
c. Are we flexible enough?
d. Is our strategy clear enough that we can translate it into innovation initiatives?
e. How well do our strategies match with the way the market is evolving? (For example, if the industry is moving rapidly into technology, does your organization have the requisite technology expertise?)
f. Do we have a effective innovation dashboard?
g. Are we measuring innovation adequately?

Quantitative Metrics

a. Time senior managers invest in innovation
b. Time required from development of strategic concept to operational implementation
c. Money invested in innovation

d. Money invested in innovation of each type
e. Growth expected from the innovation process, in percent, and in dollars

Stage 0: Portfolio Management & Metrics

The icons that represent this stage are a hand of cards for portfolio management and an abacus for metrics. The cards mean to stand for a game such as bridge, where the cards constitute a portfolio that you play according to a given situation, as opposed to the winner-take-all nature of poker.

There's an important concept about the management of innovation that is expressed in the portfolio concept, which is that we can't expect to manage every individual innovation effort or project to become successful, but we can manage a portfolio of innovation projects and expect satisfying results.

The same thinking process is behind the concept of a mutual fund, diversifying risk while offering good upside potential. It's the same with venture capital funds, which are invested in portfolios of companies. A few of them are expected to do stunningly well, while more than a few will crash and burn. In both cases the portfolio manager is measured not by individual successes and failures, but by the success of the whole ensemble.

The principle of risk diversification applies to innovation investments, so the output of the portfolio management stage is the *design* of the portfolio, expressed as a mixture of projects of varying degrees of risk that, taken together, are considered most likely to enable us to achieve our strategic goals. The implementation of the portfolio is what happens in the subsequent stages of the process, which means that it will take some time before we know if the portfolio we designed actually works the way we intended. Hence, the real measurement of the results is far down stream.

But at this stage we do need to be explicit how we expect and intend to measure the results, so that all the participants in the process know going forward what the goals are, how the portfolio is being constructed, and how their work and results will be eventually assessed.

Together, stages -1 and 0 provide a platform and context for the subsequent phases, and they constitute the 'Input' stages of the funnel. They provide the structure and necessary guidance so that the actual innovation process that happens in Stages 1 - 6, have the best chance to achieve the best results.

And why call them Stage -1 and 0? It's a joke that also makes the point that you have to do the strategic work before you turn people loose spending time and money going after ideas. Because without knowing the right goals, people won't know what to bring back.

Possible Metrics for
Stage 0: Portfolios & Metrics

As I mentioned, you won't know if you're using the right metrics for this stage until the process starts producing results that you can use to compare to your initial models. So whatever you start with here are assumptions that will be managed over time.

Qualitative Metrics and Provocative Questions

a. How does our portfolio compare with what we think our competitors may be planning?
b. Do we have the right balance of incremental and breakthrough projects?
c. Are we introducing breakthroughs at a sufficient rate to keep up with or ahead of change?
d. What are our learning brands, the brands that we use to push the envelope to track the evolution of the market?
e. Are we developing new brands at an adequate rate?
f. Are our metrics evoking the innovation behaviors that we want from the people in our organization?
g. Are our metrics aligned with our rewards and reward systems?

Quantitative

Portfolios

a. Ratio of capital invested in the early stages vs. return earned in sales stage
b. Actual portfolio composition in the sales stage compared with planned/ intended portfolio composition in the planning stage

Metrics:

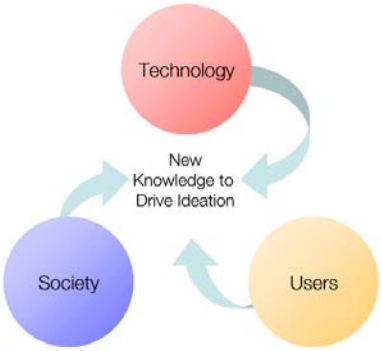
a. Expected metrics vs. actual performance achieved

Stage 1: Research

The icon that represents research is an iceberg. As you know, most of an iceberg is hidden below the surface of the water, which provides a good metaphor for the research process. Research strives both to expose unknown and unmet needs, and to develop new technologies that can meet those needs, through which we may uncover new market opportunities.

Some people may tell you the front end of the funnel is about ideas, but we believe that it's about research. Why? Because when you're running a goal-driven process, then assuming that the right ideas are just sitting out there waiting for you to find them isn't a very strategic approach.

In fact, most ideas are not like snowflakes, falling from the sky. Rather, think of them as gold nuggets or diamonds, obtained through determined pursuit. While occasionally a fortunate individual may notice one lying innocently in a stream, looking in random streams is not a genuine prospecting strategy; digging is, and research is definitely like digging.



The output of research should be solid knowledge converging from three poles of an innovation spectrum. From one pole come technical means, the new technological possibilities that are embodied in new discoveries and developments, and methods. From another comes a clear understanding of user wants, needs, motivations, beliefs, and attitudes, focusing especially on new or previously hidden insights. From the third comes an understanding of how society and the market are evolving and creating the new white spaces in which new markets will develop.

In the following stage we'll merge technology and customer knowledge together to yield insights; here the goal is 'simply' to uncover the knowledge. Simply is shown in quotes because this is by no means an easy task to accomplish.

A lot of the difficulty has to do with the nature of knowledge, and the particular knowledge we seek. Scholars of this field will tell you that, very broadly, there are two types of knowledge, explicit and tacit. Explicit is what we can say and read, our conscious ideas (the smaller portion of the iceberg that is above the water). Tacit knowledge consists of attitudes, values, beliefs, and expectations that may

not be conscious at all, and thus hidden below the waterline. But as they're critical to understanding customer needs and preferences in the marketplace, it's essential for business to discover them.

The output of research is conceptual models that express our knowledge about emerging technology, societal change, and customer values.

Possible Metrics for
Stage 1: Research

The purpose of research is to expose new perspectives, evoke new concepts, and uncover new possibilities.

Qualitative Metrics and Provocative Questions

a. How well do we understand the tacit dimensions of our customers' experiences?
b. How well do we understand the implication and applications of new technologies?
c. How well do we understand the emerging future?
d. How good have our past predictions been at anticipating change?
e. Is our research helping to target the right innovation opportunities?

Quantitative

a. Number of customer groups we have examined
b. Applications of research results in new products, services, and processes
c. Breadth of participation from throughout our organization in the research process (broader is generally better)
d. Time invested in research
e. Money invested in research

Stage 2: Ideation

The icon that represents Ideation is the sand box, the magical place where sand and teamwork create limitless possibilities for exploration and discovery, the ideal destination for wildly imaginative and irresistible creative play. A sandbox can be a rocket ship, a sailing ship, a tea party, a fortress, or perhaps a resort hotel, all within the space of minutes. It is the site of endless improvisation, imagination, role playing, and interchange.

In our ideation sandbox we explore all the knowledge and discoveries that our research has exposed, thinking about what it might mean for existing and future products, services, processes, and business models. We engage with customers and non-customers to get their feedback on specific concepts. We engage with specialists from inside and outside the organization to help us model possible business structures, supply chain models, marketing concepts, financial projections, risk assessments, etc.

This sandbox is the realm of endless 'what if…,' the place where many players congregate, discuss, and explore together. It is brainstorming. It is tinkering. It is wondering. It is arguing, sometimes (in a good way).

In addition to formal and informal ideation activities that we may sponsor and manage, we also welcome ideas submitted from insiders and outsiders. People can participate through idea capturing web sites.

And we arrive, finally, with ideas that we like.

The output of ideation is concepts that we then carry forward to further development.

Possible Metrics for
Stage 2: Ideation

Qualitative Metrics and Provocative Questions

a. Do we have a broad enough range of models of technology possibilities, tacit knowledge models, and societal trends?
b. How good are we at creating an open sandbox that can accommodate a tremendous range of possible concepts and ideas?
c. Are we encouraging people sufficiently to share their ideas?

Quantitative

a. Number of ideas developed
b. Number of ideas contributed by our staff
c. Number of ideas introduced
d. Percent of ideas from outside
e. Number of people inside the organization who are participating in the ideation process
f. Number of people from outside the organization who are participating in the ideation process
g. Number of ideas collected in the 'idea gathering' system
h. Number of collected ideas that were developed further
i. Number of collected ideas that were implemented

Stage 3: Insight

The icon representing Insight is the light bulb, the classic image of innovation. But while many people think of this image as the beginning of the innovation process, as you can see, in the managed innovation effort we anticipate that insight will come about as the result of the preceding processes and activities.

That doesn't mean that spontaneous insight is unwelcome or inconceivable, but from the perspective of innovation management, we are not going to simply sit and wait for insight to arrive. Instead, we're going to pursue it aggressively in an effectively managed innovation process.

Insight is the point of convergence where we transform ideas at the convergence of technological possibility, customer understanding, and market knowledge to create actionable insight about innovation opportunities. In pursuit of this convergence we experiment with myriad different ways to fit them together.

It might be a long way from a research concept to a business idea to a genuine insight. To get from one to the other in this stage we explore all the elements that constitute a successful business initiative to answer the question, How can we turn our concepts into something that provides value to us, or that customers will buy?

Possible Metrics for
Stage 3: Insight

Qualitative Metrics and Provocative Questions

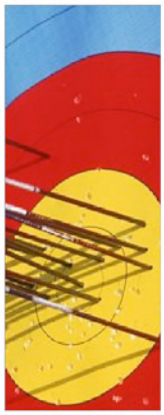
a. Are we getting enough solid insight/concepts?

b. Are the insights we're developing across a broad enough range of business ideas?

Quantitative

a. Unsuccessful technology and customer mash-ups attempted
b. Successful technology and customer mash-ups achieved

Stage 4: Targeting



The icon that represents targeting is … a target.

The purpose of innovation is to enlarge the pie, so to speak, to create healthy growth for our business. There are always many different ways to pursue that - we can make the existing pie larger, a process often called incremental innovation. We can also make a new pie, which might be a breakthrough innovation. We can sell our pies in new ways, which I call business model innovation. And we can invent new kinds of pies, which I have labeled new venture innovation.

(While different people may use different names or classifying schemes for various types of innovation, it's pretty much agreed that there are different types. The specific scheme you use is less important than the fact of having a scheme and managing to it.)

Insights have been developed to a satisfying degree of robustness, such that we see their business potential, and now we have to decide which type of innovation they are. This choice will heavily influence the specific activities and processes that we will now use to develop them further, as certainly it won't work to perfect an incremental innovation in the same way you create a breakthrough, or a new company.

The portfolio you developed in Stage 0 will come into play here, because the ensemble of ideas under development constitutes that portfolio, and over time you will see if you have the right mixture of small, medium, and big ideas.

Over time you may find that a particular idea which at first appeared to be 'just' incremental actually has breakthrough potential. So you reclassify it, and perhaps you'll need to shift the responsibility to a different team to work on.

The output of the Targeting phase is a set of ideas that under development. They are organized into four different portfolios, one for each type of innovation.

Possible Metrics for
Stage 4: Targeting

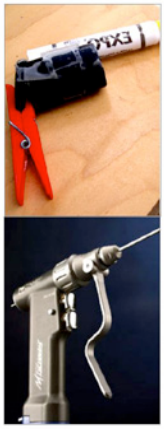
Qualitative Metrics and Provocative Questions

a. Is our innovation portfolio balanced correctly?
b. Are we using the right management processes for the different types of innovations that we are working on?

Quantitative

a. Percent of investment in non-core innovation projects.
b. Total funds invested in non-core innovation projects
c. Senior management time invested in growth innovation

Stage 5: Innovation Development



The icon representing Innovation Development is a pair of images, one showing a prototype, and the other showing a finished product design. This is the stage where rapid prototyping leads to completed innovations.

So can you make it work? Stage 5 is where you do. (Or you don't.)

In this stage you do everything that we all know is required to transform ideas into finished products. You engage in extensive engineering and lab testing, build prototypes, test assumptions, talk to customers again, this time with specific products, processes, and services in mind. You'll also interact with potential customers and non-customers to see how they respond.

As you develop your innovations, you'll build very detailed business models and write business plans. In summary, you do all the stuff that everyone knows you have to do to turn an idea into something of business value.

This is an entirely multi-disciplinary process that takes dedicated involvement from a wide range of people inside and outside the organization. Project

management skills are highly valuable here. As is the willingness to kill projects that are not going to be successful.

The output of this stage is completed innovations, ready for market.

Possible Metrics for
Stage 5: Innovation Development

Qualitative Metrics and Provocative Questions

a. Are the right people involved in the innovation process?
b. Do we have enough failures to assure that we're pushing the envelope sufficiently?

Quantitative

a. Prototyping speed
b. Number of prototypes per new product
c. Average time it takes to get from Stage 1 to Stage 5
d. Number of patents applied for
e. Number of patents granted
f. Percent of ideas that are funded for development
g. Percent of ideas that are killed

Stage 6: Market Development

The icon that represents Market Development is the hockey stick, the universal business planning symbol that shows a flat period of sales development leading to rapid sales growth.

Just because R&D got it out the door doesn't mean that your organization has the capacity to market, sell, deliver, or service it; market development is the phase where these capabilities are put in place.

Xerox provides us with a cautionary market development tale. Because at Xerox PARC, its Palo Alto Research Center, a building full of very clever people invented the first really usable personal computer, which included a mouse, great windows interface, a laser printer, and Ethernet. This was back in 1973. Unfortunately, the PARC staff was not able to communicate the significance of this monumental achievement to their senior managers across the country in Connecticut. As a result, Xerox management marketed the device as a terminal emulator for accessing the company's timeshare mainframes. It didn't work. So while we could think of Xerox as the PC pioneer, we instead think of Apple, Microsoft, and IBM. Xerox was there first; they just didn't know where they were, and were not able to capitalize on their amazing accomplishment.

So what do our customers want, really, and how do we get it to them in a way they understand? The output of market development is innovations that the market really wants, and market that knows it.

Possible Metrics for
Stage 6: Market Development

Qualitative Metrics and Provocative Questions

a. How well are we balancing our attempts to reach existing versus new customers?
b. How well do we really understand our customers?
c. Are we positioned properly for changes in the attitudes, beliefs, ideals, etc. of our customers?

Quantitative

a. Return on marketing investment
b. Number of new customers added
c. Growth rate of customer base

Stage 7: Selling

Now we earn the financial return by successfully selling the new products and services. Or in the case of process improvement innovations directed internally, we now reap the benefit of increased efficiency and productivity.

We improve our brand and our build reputation as customers appreciate and admire the value that we offer. They tell their friends. We grow. We are pleased with our successes, and then tomorrow we have to do it again because our competitors are still after our market share.

Possible Metrics for **Stage 7: Sales**

Qualitative Metrics and Provocative Questions

a. How well does our sales process match our customers' needs?

Quantitative

a. *Now* we can talk meaningfully about ROI. Did our total innovation investment, managed through portfolios, yield appropriate results in terms of sales growth, profit growth, and overall ROI?
b. Gross sales revenue
c. Gross sales margin
d. Expected results compared with actual results
e. Percent of projects are terminated at each stage
f. Successful results per type of innovation.
g. Cost savings achieved in the organization due to innovation efforts.
h. Number of new customers.
i. Percent of sales from new products / services?
j. Average age of products / services?
k. Number of new products / services launched
l. % of revenue in core categories from new products / services
m. % of revenue in new categories from new products / services
n. Percentage of profits from new products / services
o. Percentage of new customers from new products / services
p. Time to market from research through to sales
q. Customer satisfaction with new products / services

Input, Process, and Output

If we look across the nine stages of the model, from Stage -1 to Stage 7, we see that we can also divide the model into three distinct parts. Part 1 includes Strategy and Portfolio & Metrics, the Inputs that define the scope, context, and structures for innovation. Part 2 is the Innovation Process itself as we have classically thought about what it means to innovate, which includes Research, Ideas, Insight, Targeting, Innovation Development, and Market Development. Part 3 is the Output, Selling, where the innovation process earns economic value for the organizations that create and manage them. An orange arrow indicates a feedback loop from output back to input, suggesting that there is a learning loop to help improve results. This arrow is more symbolic than realistic, as of course there will be more or less constant interaction between people working in various stages as they learn things and share with others.

Conclusion

There are some important considerations to remember as we embark on the choice of metrics.

Measurement and Statistics

You have to start counting, as there is no valid measurement without valid statistics. As an aside, let me note that Dr. Deming, the man credited with introducing the Japanese to the principles of quality (and look at Toyota now!), was a statistician, and he learned to focus on what statistics told him about managing effectively. While many of the principles that Dr. Deming ultimately came to espouse may seem to have nothing to do with statistics, in fact they are all derived from his study of statistics and the linking of statistical results with both qualitative and quantitative outcomes. Properly gathered and interpreted statistics are essential.

ROI

Earlier I mentioned the problems with ROI. Now let me return to that topic. ROI discussions may be Ok when we're talking about incremental ideas that will be applied in existing, well-understood markets, but when we're discussing any idea that is not an incremental one, a huge danger of ROI is that it drives us to try to assess what the idea is worth even when we can't possibly have a realistic idea of what it's worth could be. So we guess, we make wildly optimistic predictions of revenues, and we make decisions based because like optimism. Our spreadsheets are no more than assumptions, but we treat them as real.

The other problem with ROI is that it almost always forces us to try to relate a new idea to an existing market.

> Question: "What's the value of this idea?"
> Answer: "We don't know."
> Response: "We can't fund it if we don't know what's going to be worth."
> Answer: "We won't know what it will be worth until we get some funding to develop it…"

And around and around you go. Innovation thrives in environments of 'what if,' 'how about?' and 'you know…' but it can be very difficult to achieve when there is an insistence on certainties, even when they don't exist.

This reinforces something we already know about innovation, which is that it's a process that is suffused with ambiguity. Only towards the end is the ROI discussion relevant.

Learning

Innovation is a learning process. There will be many 'failures' along the way, and this is normal. In fact, if an innovation process is *not* reporting frequent failures, then it's probably not exploring broadly enough.

This leads us to consider our underlying attitude about failure. In the innovation process, failure is about learning, and it is absolutely necessary to learn in order to succeed at innovation. The faster you learn, the faster you succeed, which also means that the faster you fail, the faster you succeed.

Measuring the innovation process and measuring its results should be looked at as both part of a learning process itself, and a process through which to improve learning (learning about learning).

Selection

If you go out and try to implement all of the metrics listed here, you'd probably die before you got even half way across the measurement desert. It's obvious that you've got to choose some metrics and start working with them, and gradually learn to fit them to your own world. Think selectively, and remember that metrics are a critical part of the learning process.

Transversal Metrics

In addition to the Stage-linked metrics already discussed, there are also some interesting transversal metrics that have to do with human resources and training activities.

Human Resources and Training Metrics Related to Innovation

a. Innovation Training provided to how many people
b. Participation in use of online innovation tools
c. Linkage between metrics, performance assessment criteria and process, and reward systems

Dashboards

As you apply metrics and fine-tune them to suit the work and culture of your organization, you can develop a set of reliable indicators that will show everyone throughout the organization how well (or how poorly) the innovation process is working out.

Such an Innovation Dashboard, even accessible via the web, can show what's happening across all the stages of the process (although some information will logically be withheld to protect corporate secrets).

Having defined suitable expectations and goals for innovation, and having put in place effective tools and methods to achieve them, and then appropriately measuring, rewarding, and disclosing the resulting performance, the pursuit of innovation is on a pathway through which the goals can be achieved or surpassed.

•••

References

1. Scott Anthony. *The Innovator's Guide to Growth*. Harvard, 2008. See Chapter 10.
2. Boston Consulting Group. Measuring Innovation 2006. www.bcg.com/publications/files/2006_Innovation_Metrics_Survey.pdf
3. Langdon Morris. "Managing Innovation Portfolios" White Paper. InnovationLabs, 2008.
4. Langdon Morris. *Permanent Innovation*. InnovationLabs, 2006. www.permanentinnovation.com
5. Langdon Morris. "Business Model Warfare" White Paper. InnovationLabs, 2003. http://www.innovationlabs.com/bus_mod_warfare1.html

•••

Your comments or suggestions about this white paper are welcomed.
Please contact Langdon Morris at LMorris@innovationlabs.com.

•••

INNOVATIONLABS
Where Innovation Happens

InnovationLabs is one of the world's leading innovation consultancies.
www.innovationlabs.com