

White Paper Series on Idea Generation

Metrics for Idea Generation

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Abstract

Metrics are one of many tools to monitor the performance of a process. For idea generation there are no general metrics which span across industries. Instead, an innovation manager must select idea generation metrics based on the strategy of their company and their current idea needs. The following white paper will discuss the selection of metrics for idea generation projects, and the management of the process given its' inputs and outputs. Further, a management chart tool is introduced to aid in managing the process.

Intro

Several questions about metrics for managing idea generation have arisen as this material has been presented to multiple audiences, and the following paper will address these questions.

As a side note, any questions about idea generation or idea management are welcomed, as this has been my primary research area during my Ph.D.

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Background

My Ph.D advisory board members at Purdue insisted that I find a common set of outputs and performance measures for idea generation that I could base an objective study on. Unfortunately, I struggled to find any such metrics, and I finally concluded that there were no general set of metrics for idea generation which were applicable across industries; hence I had to settle on subjective measures for my studies.

Interestingly as my research continued, I found that an individual company could adopt a custom set of idea generation metrics which would suit them very well. The following section will explain why there are no general metrics applicable across industries, but the subsequent section will show you how to select metrics specific to your company and its needs.

No Generally Applicable Metrics for Idea Generation

In my search for general metrics I had to consider many things, the most important being the differences amongst industries and their particular new product idea needs. The literature suggested many metrics for idea generation: patents per employee, ideas per employee, quality of ideas, time to generate ideas, quality of ideas, cost to create an idea, an ideas ability to fill the front end portfolio, revenue per idea, and so on... Interestingly, I found that none of these metrics were applicable across several industries; let me give some examples to demonstrate.

“Ideas per employee” can be thought of as a simple useful metric, but how many new product ideas does a company really need? Small startups, which are highly resource constrained, should dedicate their business to one or two products and hence they have a very small need for new ideas. Large manufacturing companies with several thousand employees (like lawn mower manufactures) could similarly have a limited budget for developing new products and effectively only need a moderate size batch of new product ideas, maybe say 400 to 500 to build on. However, companies in creative areas, like home furnishing products, need a constant stream of ideas to stoke their product lines. In this case “ideas per design employee” is a vital metric because it directly translates into the effectiveness of their design department at coming up with new ideas.

Another interesting metric is “revenue per idea created” because it accounts for the output of the idea generation and innovation process, but again this is not generally applicable. Take two companies one in technology and one in housewares. The technology company has to invest large amounts of money to develop a single idea, thus it is in their interest to seek out a large number of ideas and develop only the best; where as, for the housewares company this metric may be useful in showing how effective the design department is at creating successful new product ideas.

To complicate things further, a set of metrics may be only effective for certain types of projects. For example, if that same housewares company wants to make a radical new product line they should create a lot more ideas than normal and not hold the design employees to that “revenue per idea created” metric. However, if the idea generation activities are tasked with supporting an existing product line it may be reasonable to use a “revenue per idea created” metric.

Going through the above mentioned list of metrics one can easily pick industries in which a particular metric does not make sense or is even harmful; and conversely, one can pick metrics which are logical and helpful. So the question becomes, what metrics should a company use to help guide its' idea generation process?

So What Metrics Should Be Used?

The idea generation process is highly dependent on the strategy of the company. My research supported this so strongly that my model for the idea generation process starts with strategic alignment. Further, the balanced scorecard movement by Kaplan and its' supporting literature of the late 1990's also showed that companies with processes that were aligned with their strategy performed better than others which were lacking such an alignment.

Interestingly, the balanced scorecard movement showed the value of having metrics in aligning ones' process, but as mentioned above there is no universal set of metrics for idea generation. So how does one select or determine their metrics? Before answering this question let me provide a fictitious company as an example.

To demonstrate metric selections consider Sam Smarth the CIO at an oil refinery company that is creating a new oil refinery. Sam determined that strategically the priorities for the new refinery should be A) high efficiency, B) safe, and C) high quality distillates. The company has put aside \$5 million to generate new designs and create ideas. Because the company has clearly dictated its strategy Sam can select guiding metrics for the outputs of the idea generation process as:

- 1) Average reduction in cost per barrel produced
- 2) Average increase in quality per barrel produced
- 3) Ideas that increase safety
- 4) Ideas that increase plant reliability

The last metric of "ideas that increase plant reliability" was taken directly from the company's overarching strategy & culture which was to always reduce downtime.

Another example would be that of the VP of design, Jen Mills, at a housewares company which strategy is to launch five radically new product lines in the next 2 years, she can evaluate her idea generation process and outputs based on:

- 1) Number of new product line ideas per design employee
- 2) Radicalness of the proposed ideas
- 3) Average customer attractiveness of the proposed ideas
- 4) Expected time to market
- 5) Potential increase in brand value

The first metrics shows how much effort the design department is putting towards this project and is a great way to hold that department accountable for their efforts. The third metric of attractiveness to the customer keeps the ideas from

becoming niche posh designs which would never be purchase. Finally, the last two metrics of “expected time to market” and “potential increase in brand value” were adopted from the company’s general strategy which is to “constantly be working to increase the value of our brands” and to be “constantly refreshing the companies portfolio of products.”

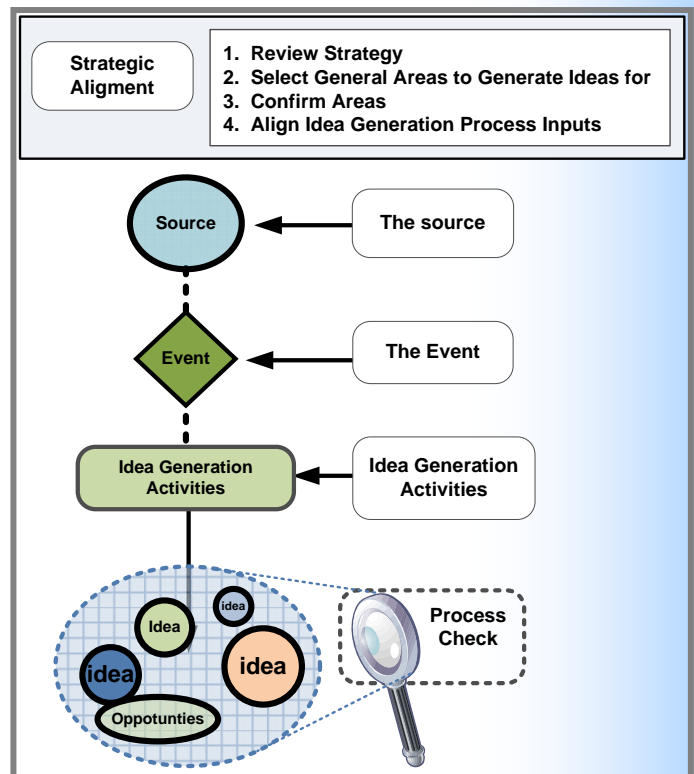
Both of these examples demonstrate how the metrics are selected based on the particular projects’ needs and the company’s overall strategy. Obviously, some skill is needed in selecting metrics but once they are determined they will help greatly in refining the idea generation process and even help in selecting ideas for further development.

Other Means of Managing the Idea Generation Process

Why do people care about metrics? Simply they give a manager feedback about the status and outputs of a process so that they can better manage it. Interestingly, for idea generation the best means of managing ideas is not by metrics but by another means, called the “process check.” Before I speak about the process check, let me review the Glassman Model© which was the result of several years of research on this subject.

This model, starts by aligning the idea generation process to the strategy of the company. Unfocused idea generation results in random ideas with random quality which may or may not be applicable to the company’s strategy or current needs. Dealing with this randomness can be taxing on management and employees alike. Some companies like ‘Google’ have build their idea generation process on randomness and serendipity, but this author is very apposed to unfocused idea generation since it is often cited as a source of “great dissatisfaction” amongst managers. Hence, using your company’s strategic goals as a focus point for the outcomes of the idea generation process is an important first step.

Next the appropriate source (being groups of people) are selected for the activities. There are many groups of individuals which can be chosen outside of the normally selected employees and core customer groups. These include: universities, national labs, research parks, hobbyist groups, groups of practice, lead users, dissatisfied customers, prospective customers, media sources, suppliers, inventors, friendly competitors, potential new entrances, and so on.. The selection of the sources depends mostly on the type of ideas which are



desired and the idea generation activities selected. I.E. the required outputs determine the options chosen for the process.

Next the event is chosen, and this is the instance which will kick off the idea generation activities. This can be as simple as a formalized project, or complicated as an idea competition. Some examples of events are: idea fairs, formal or informal request for ideas, idea retreats. Remember the more formal the event is the more people are accountable for producing ideas.

After that, the idea generation activities are conducted; this is the core of the process. Unfortunately, managers often neglect the selection of people and the selection of the event, this is why the activities are third in my model. The selection and management of idea generation activities is vital to receiving the desired ideas, because this is where the ideas are created. There are many different types of idea generation activities and each produces ideas in different categories, of different types, and of different qualities. To be clear, there is no best idea generation activity, only ones which are more or less ideal for your current needs.

Also, my research clearly shows that those who manage the idea generation activities have much better results than those that do not, and those which manage the selection of the source (people), the events, and the idea generation activities have superior results.

Finally, the ideas outputted from the process are quickly examined for feedback in a process check. This process check is one of the main ways by which managers get the input needed to manage the process. The process check looks at each batch of ideas received from an individual idea generation activity; where as, the metrics can look at each batch or the overall output of several ideas generation activities. An example is needed to clarify this point.

Sam Smarth CIO from before needs some revolutionary ideas for refinery safety system which would not be too expensive to implement, so he goes to his favorite consultants and creates a formal project to gather ideas. He dictates that they should contact lead users of safety equipment in similar industries and use Von-Hippel's 'Lead User Innovation' to create new ideas. As a second project he requires a small group of company engineers to review the literature on new safety mechanisms for factories and rigs and create a list of new ideas. As a third project, Sam assigns one engineer to get request-for-proposals from the top 20 refinery component vendors for their new safety products.

The following chart was created to summarize the main inputs and main results of each project, note that this chart provides a format which is very applicable to your own company's recording needs.

	Project 1	Project 2	Project 3
Title (Inputs below)	Lead User Innovation Safety	Safety Literature Review	Request for Proposal from Vendors
Goal	Safety Ideas for refineries	Safety Ideas for refineries	Safety Ideas for refineries
Budget	\$30K	\$0	\$0
Source (people)	1 Consulting company, 200 hours	2 Researcher Engineers	20 different refinery component vendors
Incentive	Fixed Cost	No Incentive	Purchase of products
Event	Formal Project + Deliverable Report	Formal Project	Informal Project
Event timing	January	January	January
Event Duration	3 weeks due end of Jan	20 days,	30 days
Idea Generation	Von Hippel's Lead User Innovation	Literature Review	none
Resources	Detailed Understanding of Company's Strategy	20 hours	20 hours from one engineer
Tools	Up to Consultants	Access to Databases	none
Screening method	Committed Screened	R&D Department Head	R&D Department Head
Screening attributes	Feasibility & Cost	Feasibility & Cost	Feasibility & Cost
Deliverable (Output)	25 high quality ideas, 40 low to medium quality ideas, 75 seeding ideas,	2 high quality ideas, 10 low quality ideas 40 seeding ideas,	10 high quality ideas, 25 low quality ideas 10 seeding ideas,
Idea Drivers	All Technology Driven Ideas	All Tech Driven Ideas	Mix Tech & Market
Metrics			
Reduction in Barrel Cost	5 ideas	2 ideas	7 ideas
Increase in Quality	2 Ideas (high quality)	2 ideas	8 ideas
Safety	65 ideas low to high quality	12 low to high quality	35 low to high quality
Reliability	10 ideas	7 ideas	4 ideas

Chart 1: Idea Generation Recording Chart

As one can see the inputs for the idea generation process are recorded above, this is very valuable in managing the process as one will see. However, in examining the deliverable outputs for each project one can clearly see that the consultants provided 25 high quality ideas, while the engineers provided only 2 high quality ideas, and the request for proposal turned up 10 high quality ideas.

Note that 'seeding ideas' are those which are not quite applicable but could lead to the creation of further ideas if used in additional idea generation activities. For example, a concept for integrating fire-extinguishers into the refining towers is not a directly applicable unless it is linked to some type of design or product, but yet it can be used in a design activity as a seeding idea to create a realistic design.

As an exercise, please take a second and try and deduce why the engineers in project two performed so poorly by looking at chart 1. If you guessed that the incentives were lacking and that no real time was allocated to the project you were right. During my research, I found that 80% of the companies' systemically committed an error in not providing enough incentives, time, or resources. Keep in mind that managers must fight for their employee's time especially for low priority tasks like generating ideas. You might have also guessed that the literature review was ineffective, especially compared to consultants conducting a field search for best solutions. This maybe due to the lack of literature on this subject area but again the lack of incentives and time may have impeded the activity so that conclusion should not be drawn without an detailed examination.

Next, by examining the metrics at the bottom of the chart one can see that several of the consultant's safety ideas also applied as reducing cost, increasing quality, or reliability. This can be considered an additional benefit since one idea may help several of the projects objectives at once. Again, by looking at the metrics one can see that there were 65, 12, and 35 safety ideas gathered from the respective projects giving a total of 112 low to high quality safety ideas. However, given the small number of cost reduction, quality, and reliability ideas, additional idea generation projects should be conducted to fill these needs.

So in conclusion, inputs, outputs and metrics can be used in the management of the idea generation process. To capture these one can use the provided "Idea generation recording chart" to assist their efforts. Additional details on metrics for idea management will be addressed in a separate white paper. If you are interested in learning more about metrics for idea management or related topics, contact me at Brian.Glassman@Gmail.com

Active Management and Next White Paper

With all this talk about inputs, outputs, and metrics I feel I have neglected the requirements for ongoing management during each project. My research clearly shows that one should actively manage the promotion of the event, the event itself, the use of tools, resources, and the environment during idea generation projects. And most importantly one should actively manage the idea generation activities. I feel the importance of this paragraph would deserve a white paper in itself; hence this has joined my list of pending white papers.

Any Questions on the material of this white paper can be directed to me at Brian.Glassman@gmail.com or you can check for comments or updates on this paper at my website, www.TechRD.com/blog.

Additional information for general innovation metrics can be found in:

1. Amy Chan's chapter in the PDMA Handbook on New Product Development (2nd Edition) entitled "Using an Effective Metrics Program"

<http://www.amazon.com/PDMA-Handbook-Product-Development-Second/dp/0471485241/>

2. PRTM Performance Measurement Group's list of innovation metrics

<http://www.pmgbenchmarking.com/public/Product/scorecard/PIB/metrics.aspx>

3. Innovation Metrics from an HBR article

http://cb.hbsp.harvard.edu/cb/web/product_detail.seam?R=4556BC-PDF-ENG&conversationId=27043&E=25807

The main reference for this white paper is:

Ph.D Dissertation, 2009, "Improving Idea Generation and Idea Management in Order to Better Manage the Fuzzy Front End of Innovation" Purdue University

<http://techrd.com/blog/presentations-research/dissertation-glassman-2009-idea-generation-idea-management/>