

Measuring open innovation

A toolkit for successful innovation teams

Even experienced managers still go blank when asked how to assess, control and measure the performance of open innovation (OI) activities. To address this, we will discuss a general framework for an OI performance measurement system and present a metrics-based management toolkit that provides a suite of KPIs for a specific set of OI methods.



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“The level of complexity of initiatives driven by OI far exceeds that which corporate innovation teams normally deal with in traditionally executed innovation projects.”

Thanks to loads of compelling research studies and best practice cases in OI carried out over the last decade, several companies have begun to embrace and partially apply the new principles and methods OI offers. Yet, while the development of innovation metrics, in general, is still an emerging discipline, there is absolutely no clear guidance on how companies should approach them in order to measure the success of their OI initiatives.

Upcoming challenges in measuring today’s OI practices

While, in the past, traditional problem-solving processes led to perhaps a few hundred ideas, these days, a successful ideation contest – if it is directed to an external network – can easily generate thousands of insights. Teamwork will span across companies, universities, governments, suppliers, customers and individuals. And it will involve numerous online tools, such as search engines, databases, podcasts, websites and other toolkits.¹

The incorporation of such a large

number of diverse insights can be challenging, confusing and appear uncontrollable.

It is easy to see how the level of complexity of initiatives driven by OI far exceeds that which corporate innovation teams normally deal with in traditionally executed innovation projects. Deploying OI requires not just access to financial resources and the clear allocation of responsibilities. The untapped secret lies in a company’s ability to successfully measure the huge amount of knowledge being gathered.

Does your company measure up? The need for OI metrics

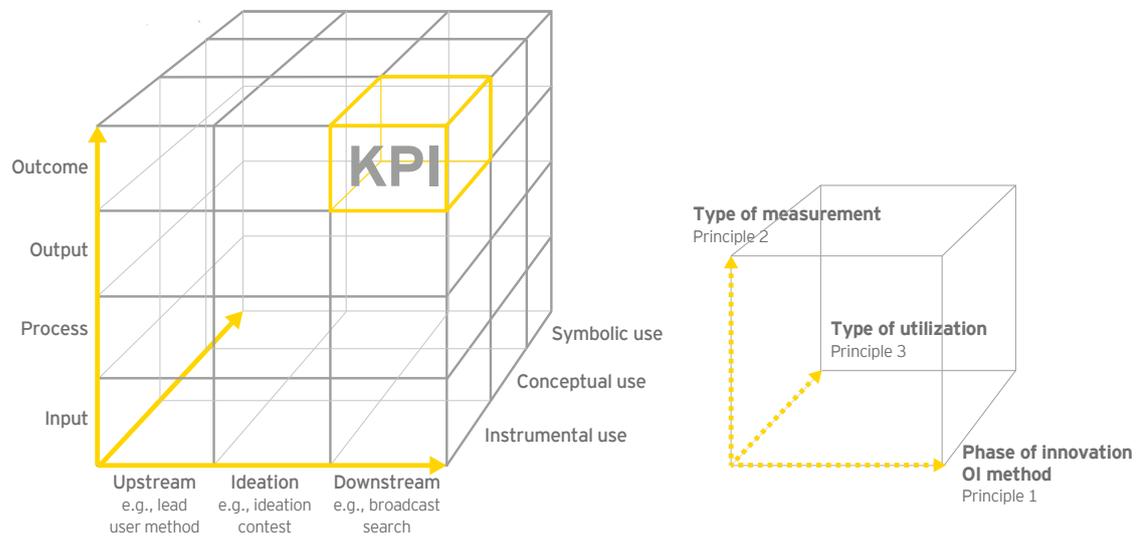
Studies have shown that around 90% of a company’s innovation efforts never result in commercialized products or services.² This has led to a suspicion that innovation still seems to rely on fairly random incidents, rather than being the result of clearly defined performance measurement procedures.³ Other research confirms this, pointing especially to the shortcomings of coordination and underestimation of the complexity that arises in the context

1. H. Habicht and K. M. Möslein, “Open Innovation Maturity: Ein Reifegradkonzept zum Controlling von Open Innovation,” *Controlling, Zeitschrift Unternehmenssteuerung*, 2011.

2. R. G. Cooper, *Top oder Flop in der Produktentwicklung*, 2002.

3. R. Reichwald and F. Piller, *Open Innovation: Kunden als Partner im Innovationsprozess*, 2005.

Figure 1
Framework for an OI performance measurement system



Source: Open Innovation KPI Study 2012, EY.

of OI processes.⁴ However, if companies approach OI in a more organized and systematic way – e.g., through the application of new innovation metrics – they could raise their return on innovation at no or small additional costs.

Among those companies that do measure innovation, we found that most still use very generic innovation metrics that are primarily based on R&D and product-development metrics solely (i.e., the number of patents filed in the past year or the number of ideas submitted by employees). Though somewhat useful, these metrics provide only minimal support for organizations on their innovation journey, since they do not map performance measures that instantly drive, impact or completely indicate a company's (open) innovation performance. Why do innovation departments still not have access to the right tools and metrics to enable them to successfully control and measure their OI projects?

In our experience, what seems to be a real challenge for companies is finding the relevant metrics for their OI activities and the discipline to make measurement a priority as part of a standardized process. Appropriate tools and metrics are needed that empower innovation teams to properly measure OI in order to be able to promote the best innovation ideas and solutions and turn new knowledge into successful commercialized products or services.

If our clients could raise their return on innovation by just 10%-20% through controlled and measured OI practices, this would give them a significant competitive advantage and the potential to be true game changers.

Framework for an OI performance measurement system

Using our experience in performance measurement and the findings of desk research, we singled out three quite distinct principles that companies must consider in order to successfully

implement a metrics-based performance measurement system for their OI projects.

Figure 1 outlines this simple framework, including our three principles on OI metrics. It gives a suite of KPIs and provides a better idea of how to properly set up a performance measurement system that will help you to assess, control and measure your OI activities.

Principle 1 Use unique metrics for each OI method

Measuring OI greatly depends on your desired innovation goals and the underlying OI method with its fundamental features, characteristics and resources that you are going to use in your OI project. In other words, method-specific metrics or KPIs are needed in order to be able to properly assess and measure the progress and success of each of these activities.

We deep dived into the three most prominent methods of OI that cover both the early, as well as the later, stages of the innovation process:

4. S. Hagenhoff, "Innovationsmanagement für Kooperationen. Eine instrumentenorientierte Betrachtung," *Niedersächsische Staats- und Universitätsbibliothek*, 2008.



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“Method-specific metrics or KPIs are needed in order to be able to properly assess and measure the progress and success of each of these activities.”

► The **lead user method** identifies innovative users who are at the leading edge of important trends and benefit greatly from obtaining a solution to their needs. Thus, they are motivated to discuss and tackle their innovation needs and ideas in workshops.

► In an **ideation contest**, a company seeking innovation-related information posts a task-specific challenge to a population of independent, competing agents (e.g., customers or suppliers) who then submit ideas within a given time frame. The company rewards the participants that generated the best solutions.

► **Broadcast search** involves contests that seek technical solutions rather than just ideas. Online broker companies, so-called intermediaries, such as InnoCentive or Nine Sigma, provide companies access to a global pool of scientists, engineers and other professionals to help them solve, primarily, R&D problems they have been unable to solve through internal methods. The problem has a stipulated time frame and cash prize for the winning solution. With the help of the intermediary, the company defines the problem and develops criteria for picking a solution.

It is quite obvious that measuring the innovation success of a lead user project requires a different set of KPIs than

those required for broadcast search. Whereas the focus of a lead user project lies primarily on evaluating the identified new needs and trends provided by innovative users, measuring the success of broadcast search requires metrics that map the potential performance of a technical solution.

**Principle 2
Consider different types of measures: input, process, output and outcome (IPOO)**

The second principle concerns the different types of measures that need to be tracked by a holistic performance measurement system. The framework should be designed to link the outputs or outcomes of an OI initiative to the inputs.

► **Input KPIs** measure the input elements within a project, such as human or financial resources.

► **Process KPIs** are used to transform inputs into outputs and to improve the efficiency of the innovation process: time variances, budget variances, error ratio, etc.

► **Output KPIs** measure the results of the development activities within an innovation process: number of ideas, number of patents, number of publications, etc.

► **Outcome KPIs** aim to determine the value of an innovation in terms of economic and market-oriented performance indicators.

Only the combination of both input and output (outcome) metrics can provide a meaningful understanding of the cause-effect relationships of a project.

Moreover, since the real value of the output (outcome) of an OI initiative is the result of more than just the resources invested (input), various measures of the processing or transformation procedures should also be integrated into the framework.

**Principle 3
Think about how to utilize your OI metrics effectively**

The mere provision of a performance measurement system through the collection of appropriate management information is itself no guarantee of successful innovations.

Pelz⁵ proposes that metrics can be utilized on three different levels: instrumental, conceptual and symbolic.

► **Instrumental use** refers to the application of information or metrics used directly for decision-making. For instance,

5. D. C. Pelz, "Some expanded perspectives on use of social science in public policy," M. Yinger and S. Cutler, *Major social issues: a multidisciplinary view*, 1978.



when the OI project is canceled because the metric “expected sales” is below a specific threshold, the metric was used instrumentally.

- ▶ A more indirect use is the **conceptual** one. The use of the information or metric does not directly lead to a concrete action, but rather provides general enlightenment and understanding. For example, when a manager recognizes that the lead time of OI projects is on average 30% lower than for conventionally run innovation projects, they are using the metric “lead time” conceptually.
- ▶ Metrics can also be used after decisions have already been made to legitimize

and justify them. This kind of use is called **symbolic**. If an OI project is canceled due to cost overruns, the official reason for its termination is “quality of ideas” – this metric is used symbolically.

The way in which metrics should be utilized greatly depends on your desired project goals. For instance, if you are following long-term goals rather than short-term success with your OI project, i.e., to facilitate a sustainable innovation culture, hard measures such as expected sales should be used conceptually for providing general enlightenment and understanding, and less for decision-making purposes.

Outlook

So far, a simple and easy-to-apply framework for OI performance measurement has been outlined. However, there is still no answer to what we should actually be measuring. What are the relevant KPIs behind that framework?

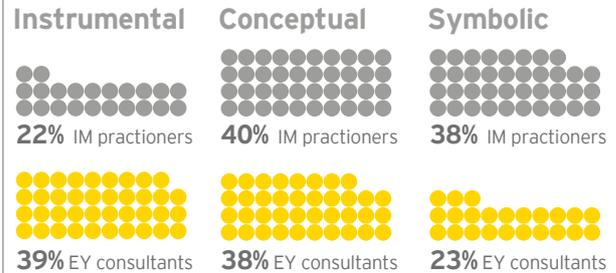
This question was the focus of our Open Innovation KPI 2012 study, in which we identified the most relevant KPIs from the perspective of innovation managers and performance measurement consultants.

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“Only the combination of both input and output (outcome) metrics can provide a meaningful understanding of the cause-effect relationships of your project.”

Figure 2

The application of OI metrics by practitioners and consultants



Source: Open Innovation KPI Study 2012, EY.
 Number of innovation management (IM) practitioners was 12.
 Number of EY consultants was 80.

Open Innovation KPI 2012 study⁶

We first had to decide which of the existing methods and tools for integrating external knowledge into the OI process should be applied to our performance measurement toolkit (principle one). As described above, the decision was made to take a closer look at the three most prominent methods of “inbound OI”: lead user method, ideation contest and broadcast search, which cover both the early and later stages of the innovation process.

The framework was enriched with a number of meaningful performance measures for each OI method. However, there was no indication that the information and metrics collected from literature would offer a wide enough range of application for practical decision-making in business corporations.

In order to close this gap, experts from corporate functions and management consulting were asked to participate in a survey to assess the relevance of an assembled set of KPIs. Our sample included large European companies from a range of different industries (e.g., chemical and pharmaceutical, automotive and mechanical engineering, consumer goods and professional services) with

6. The survey, conducted by EY in cooperation with the Technology and Innovation Management Group at RWTH Aachen University, Germany, aimed to identify the most relevant KPIs for measuring OI.

annual revenues in excess of €200m and with 1,000 employees or more. We received usable responses from 117 consultants and industry practitioners.

Making better use of metrics to drive improvement in OI projects

The study’s first question explored how metrics were being used by both practitioners and consultants to monitor the performance and predict the return of their OI projects.

The results demonstrated that consultants and practitioners share a slightly different opinion on how best to apply metrics to OI. **Figure 2** shows 39% of the EY consultants reported that decisions should be made directly on the basis of an indicator score (instrumental use), while almost the same proportion of innovation managers prefer to use metrics tactically or symbolically to delay or spur action on an OI issue.

To some extent, this difference in focus is explained by the different interests and perspectives of the two groups.

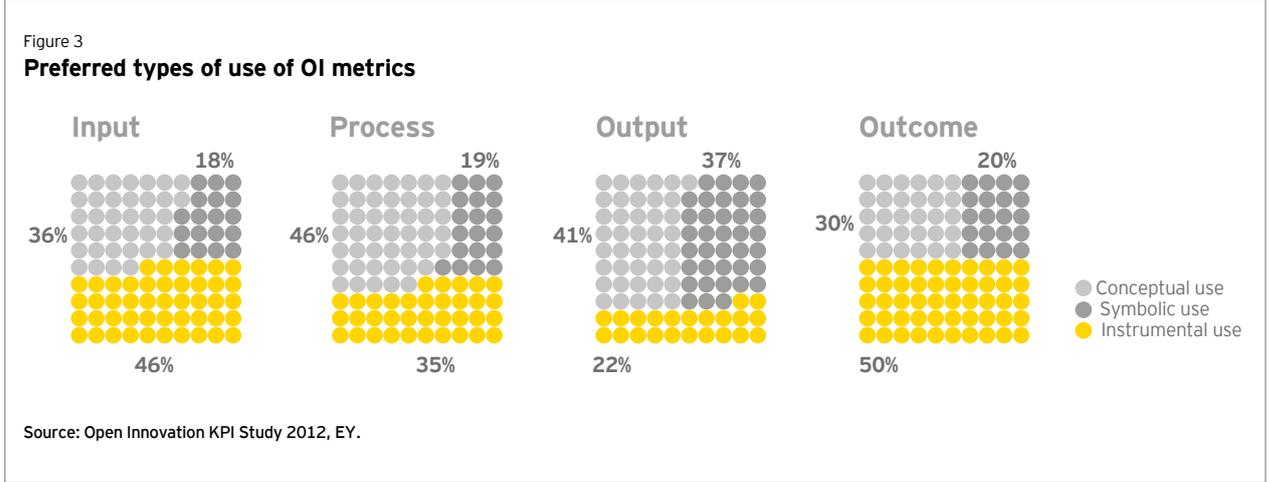
Innovation managers tend to assume that their OI projects are subject to significant uncertainty, particularly in the early stages of development, thus, for them, concrete targets and measures don’t seem to be definable or detectable.

Consultants, in turn, frequently experience innovation projects going out of control, because no or too few suitable measures have been determined in advance. That fact gives rise to a more instrumental use of metrics, where generated data is incorporated directly into the decision-making processes, thereby leading to improved results.

We also explored the primary role that metrics play when tracking different types of measures. Instrumental use seems to be more prominent at the very beginning (input) and at the end of the performance measurement process (outcome), while conceptual and symbolic use dominate output measures (see **Figure 3**).

In conclusion:

- ▶ **Depending on the innovation problem:** a dedicated focus on increasing radical innovation should involve a conceptual use of OI metrics.
- ▶ **Depending on the innovation culture:** if companies tend increasingly to lax treatments concerning deadlines and budget, then an instrumental use of measures is recommended.
- ▶ **Depending on the types of measures:** while input and outcome measures should rather follow an instrumental use, output measures should follow a more conceptual use.



Measures for OI: are there any suitable measures?

To investigate the usefulness of different metrics for measuring OI, we provided our respondents with an assembled set of KPIs for each OI method. In general, industry firms and management consultants view these indicators as important. Thus, they are somewhat confident that these measures are getting it right and helping firms to improve their OI activities.

In general, respondents seem to have a stronger tendency toward financial outcome measures, and prefer less those

indicators that, by nature, are more difficult to attract. Interestingly, measures that relate to an economic outturn seem to be more promising than measures that address empirically proven critical success factors of OI. Why isn't it common to integrate a prevailing empirically validated OI enabler as part of a performance measurement system?

One reason is that the new methods of OI are relatively young and are still maturing. The "old" systems for measuring innovation are, at best, slightly adjusted to external influences but do not capture or quantify critical success

factors of OI. Another reason could be that outcome measures are usually more meaningful than high-risk intermediate results.

Qualitative indicators, such as the radicalism and novelty of ideas, are hard to attract, since they have to be collected through painstaking qualitative assessment procedures.



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Table 1
OI scorecard for lead user integration

	I-P-O-O	Category	Measurement of	KPI	Survey results*
					Arithmetic mean
A. Initiation phase	Input	Top management commitment	Degree of freedom	Freedom given by top management to establish search fields outside of the core business	1.6
	Outcome	Market potential	Customer potential	Degree to which the lead user represents the mass market that the company is targeting for the future	1.5
B. Implementation phase	Input	Staff	Diversification	Number of lead users participating in workshop relative to internal staff members	1.0
		Quality	Heterogeneity	Degree of heterogeneity of the lead users, e.g., variation in interests and expertise of the lead user	1.3
	Process	Quantity	Adaptation effort	Number of times feedback is gathered from lead users for each developed prototype	1.1
	Output	Quality	Strategic fit	Compatibility of solutions with existing business strategy	1.2
		Knowledge generation	By-product	Additional number of interesting suggestions and ideas that emerge during the workshop	1.0
		Customer loyalty	Lead user network	Percentage of participating lead users with whom you establish contact for potential future collaborations or full-time employment	1.0
Outcome	Profitability	Profit ratio	Ratio of expected profits from the lead user innovation compared with those generated by projects run with more traditional internal innovation processes	1.2	
Overall KPIs	Input	Top management commitment		Degree of top management commitment to open innovation initiative	2.6
		R&D	Cost to market	Cost to market of development using open innovation	1.1
	Process	Time	Time to market	Time to market of the innovation	1.3
		Risk	Intellectual property	Degree of protection of intellectual property in cooperation with external partners	1.3
	Output	Sustainability	Culture	Increase in corporate-wide open innovation culture through the open innovation activity	1.2
	Outcome	Creativity	Originality	Customers benefit from the innovation provided (fit to market)	1.9
		Profitability	Revenues	Expected increase in revenue from new customers as a percentage of total sales	1.7

* Base of data collection of arithmetic mean: 3 (very important), 1 (important), 0 (neutral), -1 (unimportant) and -3 (very unimportant). n=87 (August 2012).

OI scorecards: what are the most important measures?

In order to help organizations identify and determine a coherent portfolio of the right metrics, we propose three OI scorecards. These scorecards, shown in **Tables 1, 2** and **3**, were created based on our three key principles on how to measure OI (see **Figure 1**) and represent the highest priority measures selected by our survey respondents.

The scorecards are structured around two phases: initiation and implementation. Each phase is split into the relevant stages of the performance measurement process, i.e., input, process, output, outcome. KPIs are then allocated to all of the identified processes within both the initiation and implementation phases. There is also a third part to the scorecard: overall KPIs. Again, this is split into the stages of the performance management process and KPIs are allocated accordingly. It is worth noting that, unlike in the initiation and

implementation phases, these overall KPIs are identical across the three scorecards.

On average, we observed the following:

- ▶ All the metrics taken from relevant literature play an important role in measuring success across all three scorecards.
- ▶ Both lead user and ideation contest are particularly complex methods, and broadcast search is semi-complex.
- ▶ All three methods require more than a few KPIs.

Table 2
OI scorecard for ideation contests

	I-P-O-O	Category	Measurement of	KPI	Survey results*
					Arithmetic mean
A. Initiation phase	Input	Costs	IT platform	Cost of implementing the IT platform	1.2
		Quality	IT platform	Number of available communication channels on the IT platform (e.g., chat function, forum, private message, commenting and rating abilities)	1.1
				User friendliness of the IT platform or web page (e.g., measured by the number of complaints per test person)	1.8
			Problem formulation	Scalability of the task (is the task description broad enough to engage a large number of participants?)	1.2
	Output	Scope	Heterogeneity	Heterogeneity (diversity) of external contest participants (e.g., customers, suppliers)	1.2
	Outcome	Market potential	Customer potential	Degree to which contest participants represent the mass market that the company is targeting for the future	1.3
B. Implementation phase	Process	Quality	Degree of interaction	Depth of contestant community interactions (e.g., number and intensity of messages exchanged within the community)	1.1
	Output	Quantity	Productivity	Percentage of winning ideas that become company projects	1.7
		Sustainability	Reputation and image	Increase in company reputation among participants (e.g., duration of membership or frequency of use of the platform)	1.1
	Outcome	Commercialization	Imitability	Difficulty for competitors to imitate winning ideas	1.0
Overall KPIs	Input	Top management commitment		Degree of top management commitment to open innovation initiative	2.6
		R&D	Cost to market	Cost to market of development using open innovation	1.1
	Process	Time	Time to market	Time to market of the innovation	1.3
		Risk	Intellectual property	Degree of protection of intellectual property in cooperation with external partners	1.3
	Output	Sustainability	Culture	Increase in corporate-wide open innovation culture through the open innovation activity	1.2
	Outcome	Creativity	Originality	Customers benefit from the innovation provided (fit to market)	1.9
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* Base of data collection of arithmetic mean: 3 (very important), 1 (important), 0 (neutral), -1 (unimportant) and -3 (very unimportant). n=86 (August 2012).

- Output measures appeared to be relatively less promising across all three methods.
- KPIs that are used to measure process efficiency of transforming inputs into outputs are rated lowest in importance.
- Input and outcome KPIs follow a more instrumental use.

Findings specific to each method are as follows:

- **Lead user integration:** firms seem to have the strongest tendency toward

metrics that relate on an input and outcome perspective at all stages (i.e., initiation and implementation).

- **Ideation contest:** measures that aim to determine the value of an innovation in terms of outcome KPIs are significantly important throughout all stages (i.e., initiation and implementation phase). Interestingly, only input measures that appear at the initiation phase scored significantly high.

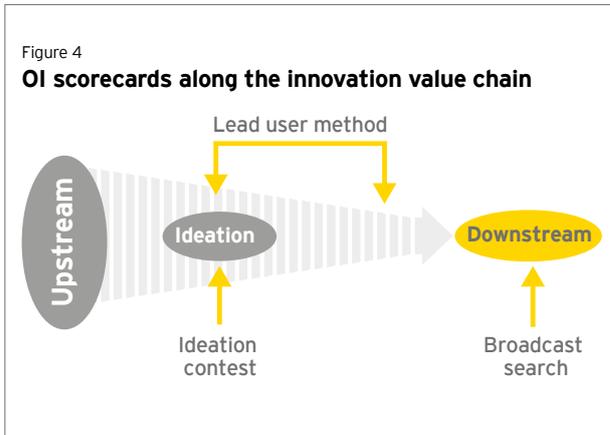
- **Broadcast search:** input and outcome measures that appear at the initiation phase are considered to be of low importance, since they do not show up in our scorecard.

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Table 3
OI scorecard for broadcast search

	I-P-O-O	Category	Measurement of	KPI	Survey results*
					Arithmetic mean
A. Initiation phase	Process	Time	Delivery date variations	Average delay in meeting deadlines (due to failed contract negotiations) in relation to projects run with more traditional internal innovation processes	1.0
	Output	Scope	Size of target group	Number of accessible problem solvers via the intermediary compared with the firm's own R&D employees	1.4
			Heterogenetic	Degree of heterogeneity of the solver community, e.g., variation in interests and expertise of the solvers	1.4
B. Implementation phase	Input	Time		The ratio between the number of days the problem is open to solvers and the average number of days for similar problems initiated by other firms seeking solutions	1.0
		Quality	Problem formulation	Specificity of the problem (is the task or issue broad enough to attract a relatively large number of solvers?)	1.0
	Process	Quality	Adaptation effort	Number of times feedback is gathered from intermediary in the development of the problem statement	1.0
	Output	Quantity	Traffic	Number of individuals or solvers opening the problem per submitted solution	1.0
	Outcome	Profitability	Cost saving	Estimated savings from using crowdsourcing initiative relative to costs of a similar in-house problem-solving process	1.4
		Market potential	Technological potential	Anticipated technological lead over competitors from utilizing external solution processes	1.6
			Feasibility	Compatibility of solution with the company's internal innovation processes (ease with which solution is integrated into subsequent phases of the development process)	1.3
Overall KPIs	Input	Top management commitment		Degree of top management commitment to open innovation initiative	2.6
		R&D	Cost to market	Cost to market of development using open innovation	1.1
	Process	Time	Time to market	Time to market of the innovation	1.3
		Risk	Intellectual property	Degree of protection of intellectual property in cooperation with external partners	1.3
	Output	Sustainability	Culture	Increase in corporate-wide open innovation culture through the open innovation activity	1.2
	Outcome	Creativity	Originality	Customers benefit from the innovation provided (fit to market)	1.9
Profitability		Revenues	Expected increase in revenue from new customers as a percentage of total sales	1.7	

* Base of data collection of arithmetic mean: 3 (very important), 1 (important), 0 (neutral), -1 (unimportant) and -3 (very unimportant). n=83 (August 2012).



“The way in which metrics should be utilized greatly depends on your desired project goals.”

When, in the process, to use the scorecards

When looking at it from a process perspective, the developed OI scorecards can be applied to the different phases of the innovation process as follows (see also **Figure 4**): in the early stages, both the lead user method and idea contests are helpful tools for identifying customer needs and first solution approaches. Broadcast search, however, is particularly useful in the later stages of the innovation process to generate suitable knowledge for technological solutions or to identify potential solution providers. Depending on the chosen method, the individual scorecards can then be used to monitor and predict the success of the OI campaign.



Conclusion

OI is not an automatic success but one that demands appropriate tools and metrics that enable you to change your strategy before mistakes become expensive or great ideas are refused. To this end, a performance measurement toolkit exists, empowering decision-makers and innovation teams – especially in technology-based industries – to properly assess, control and measure the performance of their OI activities.

Contrary to many other OI indicator studies, a toolkit has, in this case, been realized, not only in terms of secondary data sources, but also through an

empirical evaluation. This allowed us to reduce the initial amount of indicators to reach a much smaller, though statistically significant, set of relevant metrics provided by our three OI scorecards. Thus, these scorecards might help you to identify and determine a coherent portfolio of right metrics directly associated to your OI strategy, as they reflect only those measures that were rated significantly important by almost 90 innovation experts and consultants.

Once identified, the measures have to be utilized or initiated by the responsible actors within your company. As our study reveals, input and outcome measures should rather follow an instrumental

use, while output and process KPIs were dominated by a conceptual use.

However, a successful application of indicators also depends on the innovation challenge (degree of innovation), as well as on a company’s ability and sincerity to appropriately plan and manage an OI campaign (corporate culture). A dedicated focus on increasing radical innovation should involve a conceptual use of OI metrics. Nevertheless, if companies tend increasingly to lax treatments concerning deadlines and budget, then an instrumental use of measures is recommended. ■