Opinion Paper

Innovation Performance Measurement

Assessing and driving the innovation performance of companies

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1 Executive Summary

Along with the current imperative for innovation comes the need to adequately measure and steer a firm's innovation activities. However, conventional performance measurement approaches alone are rather ill-suited for this purpose: financial returns occur with a significant delay, and it is generally difficult to isolate the role of innovation from other business activities in terms of overall company performance. Traditional KPI systems tend to reward meeting budgets and avoiding risk, effectively penalizing bold and entrepreneurial behavior. However, uncertainty and novelty are at the heart of the innovation task, making it a necessity for measurement systems to acknowledge these rather unique aspects as well.

Based on the analysis of best practice approaches from academic & industry-oriented literature combined with interview-based expert insights from Silicon Valley corporate innovation practitioners, a synthesized framework for innovation performance measurement and a comprehensive set of KPIs is created that is suited for both assessing and driving the innovation performance of a company. Areas for measurement are: Inputs, Idea & Knowledge Management, Innovation Strategy, Organizational Culture & Structure, Innovation Process including Project and Portfolio and Management, and Outputs & Outcomes (Figure 1).

Sourced from latest research and project experience, indicators and measures relevant to the field of innovation are used to populate those six areas. To verify their plausibility and actual impact factor, a 'reality check' based on interviews with seasoned ICT innovation professionals coming from IBM, Huawei, Microsoft, SAP and the Plug & Play Technology Center was conducted (Figure 2).

Following this approach, the three main use cases for innovation performance measurement can be addressed: diagnosis, goal-setting and steering. While diagnosis is about conducting an ‘innovation health check’ and learning about weak spots and bottlenecks within a company’s innovation system, goal-setting makes use of the clear definitions and terminology that KPIs provide to define targets and assign those to organizational members and units across the company. Steering ultimately facilitates to achieve those goals which materialize themselves in in concrete activities, project choices and tangible outcomes.
2 Introduction

Innovation – the ideation, development, and commercialization of substantially new products, services or businesses – facilitates the development of new sources of competitive advantage. While there is general consensus that innovation depends heavily on intangibles such as creativity or risk-taking behavior, only recently have companies moved from a strategy of hope to a more tightly managed innovation approach. In the wake of this development, management control within innovation and applied R&D departments is on the rise. As a consequence, new performance measurement approaches that acknowledge the unique nature of innovation need to be developed: In these particularly uncertain and novel contexts, financial and non-financial outputs only occur with a substantial delay, and there is a general need for more granular proxy measures to assess and steer innovation performance. In addition, the overall idea of innovation performance measurement bears its very own pitfalls: A traditional measure-and-control approach employing top-down KPI assignments for organizational actors can easily cripple innovation staff’s creativity and motivation or lead to sub-optimization and an overemphasis on short-term goals.

In this paper, a holistic view is taken on what innovation performance measurement can contribute to innovation management in general. This always addresses two issues at once: The actual assessment via adequate indicators on the one hand, and the utilization of measures to boost a company’s innovation performance on the other. Which indicators lend themselves for these purposes? How should actual measurement or goal systems be designed? Is there a one-fits-all solution or should certain factors guide the measurement systems’ design? What implications arise out of this?

The paper is structured along the following aspects: first, light is shed on the underlying uses and purposes of innovation performance measurement and an overview at different levels for measurement is given. The focus is then shifted to the actual measurement challenge and an organizing framework to guide measuring the innovation performance of a company is provided. This framework consists of several measurement areas that represent crucial activities & elements of innovation management. These are subsequently populated with measures and KPIs, of which a relevant fraction was tested in terms of its plausibility and impact factor through personal interviews with seasoned innovation professionals. The interviewees hail from leading ICT players: IBM, Huawei, Microsoft, SAP and the Plug & Play Technology Center, an incubator from the Silicon Valley. Validated by this reality check, with this set of KPIs the three main use cases for innovation performance measurement can be addressed: diagnosis, goal-setting and steering. The paper is closed with concluding remarks and recommendations for corporate innovation practitioners.
3 Uses & Purposes for Innovation Performance Measurement

Generally speaking, the overarching raison d’être for each and every (innovation) performance measurement initiative is to ultimately increase efficiency and effectiveness of innovation activities. As this is still very vague, let’s have a look at some more specific sub-purposes that shed light on how measurement efforts may contribute to this ultimate goal. From a company’s perspective, performance measurement and its results can be used for:

- Personnel evaluation, promotion and incentives (promotion prospects, salary, project participation, bonuses);
- Resource allocation (project participation, forming/dissolving teams, assignment of new projects and of resources);
- Control/correction (control, correction, reorganization);
- Learning/continuous improvement (by feeding results back to employees)

Besides those rather ‘hard’ and instrumental purposes, there is also empirical evidence that the conceptual use of innovation performance information has a significant effect on leadership quality, project selection and financial innovation success. This means that the act of measuring and the resulting information may serve as a vehicle to “develop and enlarge the managerial knowledge base”. If employees are given access to measurement results and respective learning loops are established, then this act of opening up the black box of corporate innovation development can further boost overall organizational learning.

As a result, an innovation performance measurement system is an enabler and catalyst for:

- **Diagnosis**: Discovering and pinpointing specific weaknesses among a firm’s innovation capabilities through an on-going innovation performance audit
- **Orientation**: Focusing staff’s attention on the right projects, the right activities and the right behavior from an innovation performance point of view
- **Motivation**: Choosing the right goals and respective incentives to drive employee involvement, ultimately increasing innovation efficiency and effectiveness.
4 Levels for innovation performance measurement

Innovation measurement as a whole covers a wide array of subjects for assessment. Broadly speaking, these range from single innovation projects at the most granular level up to an entire economy. Many measurement initiatives targeting the company level that focus on KPIs right away often mix up these underlying levels. As a first step, the different levels that exist for measurement shall be defined. The categories proposed are drawn from existing frameworks and have been re-ordered and partly extended to cover all major levels of performance assessment.

There is the level of the single innovation project. Projects can be evaluated at different stages as they evolve from initial concept draft to prototype, eventually ending up as a final product, service or process. Beyond assessments of technical complexity or the degree of innovativeness such measurement approaches primarily aim at estimating the potential market impact of projects that are still in the pipeline. Due to the nature of innovations, sales numbers indicating the actual economic success of a project will not become available until a project has actually been taken to market. Using proxies such as the ones above and measuring at this granular level is therefore mostly relevant to portfolio managers that need to make decisions regarding resource allocation, ultimately leading to go-or-kill choices between projects.

One level higher, innovation projects may be grouped together in so-called programs that are then subject to measurement. Criteria for bundling are mostly technical and topical similarity or some other form of synergy between projects. From a management control perspective, assessing programs over projects is useful because it acknowledges the inherent risk associated with single projects. For example, an ill-performing or cancelled project that is highly innovative can be absorbed by rather incremental sure shots that stand a higher chance of delivering the desired returns. As a consequence, those employees that are in charge of a program are encouraged to balance high-risk endeavors with relatively secure projects, thus minimizing the chance that an entire program will fail.
The innovation portfolio covers all innovation projects currently in the pipeline. Measuring on this multi-project level is twofold: On the one hand, all projects and programs are aggregated to assess the overall value of projects currently in development. On the other hand, the composition of the portfolio itself is evaluated. As a consequence, it is not only the sum of projected future cash flows that matters, but also the balance of projects in terms of their timing, technical complexity, expected market impact and risk level. These evaluation criteria can be put to practice via charts and bubble diagrams that follow a similar logic as the prominent BCG growth-share matrix. Beyond that, portfolios are subject to qualitative assessments regarding their fit to the respective business strategy employed by the firm.

While there are overlaps between project, program, portfolio and the company level, the latter constitutes a distinctive fourth category with its very own subjects for performance assessment. As the name suggests, measurement on this level encompasses a holistic evaluation of all innovation efforts and outcomes. This goes beyond the mere addition of revenues generated by newly introduced products and services. Instead, the entire company, innovating business units, or selected functional units such as dedicated R&D centers where innovation is institutionalized are being assessed. This notion of a further structural divide of innovation reflects organizational ambidexterity, a concept considered essential to simultaneously address two strikingly different aspects at the same time:

- Exploration (finding and developing new ideas) and
- Exploitation (taking offerings to market and monetizing them)

Measurement areas for the company level include inputs, the innovation process, and outcomes, but may also take contextual factors such as culture or innovation strategy into account. Actual indicators can be overarching and absolute, such as the product innovation rate, or granular and specific, such as the propensity of decision makers to engage in bold yet risky behavior. A more recent trend in the field is to conceptualize and assess the innovation capabilities of a firm. This is further mirrored in alternative descriptions such as “innovation management performance” or “innovation management measurement”. Recent concepts that transgress the traditional boundaries of the firm, such as Open Innovation are also accounted for on the company level.

Beyond these levels that focus on innovation performance of and within a company, there are also measurement approaches on an even higher level. These mainly try to evaluate the innovation performance of an entire industry or geographical region, for example selected countries or local technology clusters such as the Silicon Valley. These assessments focus on fewer indicators per firm and aggregate large data sets in order to achieve representativeness. Their main purposes are to benchmark industry sectors and to inform public policy makers. The interested reader is referred to other publications.
5 Best of all worlds – A hybrid solution for innovation measurement

With the basic purposes and levels for innovation measurement sketched out, the focus can now be shifted to actual measurement. Even though there is a vast amount of measures available, they are structured along a variety of dimensions. First of all, organizing frameworks will briefly be discussed in order to find a common language for the wide array of metrics available.

One of the earliest and classic models is the so-called Inputs-Process-Outputs-Outcomes model\(^ {10} \). Within this framework, a company’s innovation activity is considered as a system around the R&D lab where inputs (funds, ideas, people, etc.) lead to outputs (patents, products, processes, etc.). These are in turn picked up by manufacturing, marketing and other business functions, eventually leading to outputs such as sales, cost savings, or product improvements. However, this model relies on sophisticated feedback loops and a systemic understanding of a firm’s innovation process that is neither always clear nor required for managing day-to-day innovation. On top of that, the R&D laboratory and respective research-focused KPIs are put to the center stage, which might be at odds with firms employing dedicated innovation centers that are less research-oriented and more focused on actual product conception and development.

Another measurement framework is the Innovation-centered Balanced Scorecard\(^ {11} \). Representing a special version of the immensely popular Balanced Scorecard concept, this framework provides four sectors or “perspectives” for measurement: financials, internal business (meaning processes), innovation and learning, and customer. One advantage of this approach is the separation of KPIs into sets of leading (foreshadowing innovation performance) and lagging (providing absolute, yet delayed information) indicators. However, the overall categories are incomplete as aspects such as strategic measures (e.g., strategic fit, goal satisfaction) or knowledge management (e.g., enlarging and exploiting a firm’s knowledge base) are missing. Both aspects have been reported to have a significant impact on innovation success\(^ {12} \).

One of the more recent and most holistic approaches is the innovation management measurement areas framework\(^ {13} \). Based on a Delphi investigation among experts, an extensive literature review and a subsequent synthesis, this model deduces seven dimensions that capture the innovation performance of a firm. In favor of general applicability, extensions such as feedback loops are left out. This is also because the underlying innovation management models differ significantly and have been generated predominantly in the context of technology. The range and sequence of innovation activities may vary across organizations and projects, but their successful management is affected by a certain number of factors - which are at the heart of this measurement framework. The model further mirrors the current shift in measurement from innovation success factors to innovation capabilities\(^ {9} \) and has already been appropriated by the mainstream management accounting discourse\(^ {14} \). However, the emphasis on the entire organization and its “capacity to make change” entails state of the art constructs from innovation research and organization theory. Compared to traditional KPIs, these can also pose considerable challenges in terms of operationalization and implementation: A multi-item scale relying on survey answers is more complex to deploy than merely counting the number of patent filings.
From the elaborations above, it becomes apparent that most current models are limited in that they do not cover all relevant aspects and/or overemphasize financial outcomes of innovation activity. To overcome these issues, a synthesized approach primarily based on the measurement areas framework can be employed. This is the holistic six-dimensional model of innovation management measurement that transcends the traditional focus on hard outcome metrics alone and instead focuses on key activities and success factors of the innovation task. (Fig. 4).

Within the visual representation of this model, core innovation aspects are represented in blue areas, contextual factors in grey areas. The entire innovation process is covered, allowing for data collection and analysis at the front-end of innovation (inputs and ideas), process management measures in the middle and outcomes at the very end. The model is thus able to differentiate between early and late stages of the innovation task, which has direct implications on actual measurement: while aspects such as innovation strategy and idea management can be measured in real-time, outputs and outcomes require time to materialize and thus represent ‘lagging’ indicators of innovation performance.

This model further mirrors the ‘company level’ of measurement discussed in section 4, making it a good fit for corporate practitioners seeking to elevate their company’s overall innovation capabilities. At the same time though, measures from the portfolio and project levels are accommodated as well. These can be found in the measurement areas ‘project and portfolio management’ and ‘outputs & outcomes’. As a result, such an integrated and rather ‘new school’ approach is best suited to tackle the current innovation management challenge in corporate settings.
6 Imperfect Measures and Omission Gaps

Measures within the context of management accounting are first and foremost meant to operationalize single drivers of performance. In this sense, measuring via metrics is about grasping real-life complexity through small, ideally quantifiable bits of information. These fractions can then in turn form the basis for a holistic measurement system as presented in the framework above. This section provides an introduction to innovation metrics and a comprehensive list and discussion of selected measures.

Historically, metrics within the field of innovation were mostly concerned with capturing financial outcomes. This should come as no surprise, as innovation in corporate contexts is mostly about generating competitive advantage and reaping economic benefits from new products and services. The results of global studies suggest that emphasizing seemingly ‘absolute’ metrics is still the modus operandi in many companies\(^{15}\). However, measuring at the very back-end of innovation also has its drawbacks: huge time lags, the challenge of isolating driving forces or a general lack of granularity required for managing innovation on a day-to-day basis. The frameworks sketched out in the previous section already point to one possible answer to this dilemma:

*Splitting up the overall innovation activity and using a balanced set of metrics can overcome the limitations commonly associated with conventional measurement approaches. Such an alternative way of performance measurement entails using proxies that have been empirically validated to drive the innovation success of a company. The resulting metrics are also on a more granular level and therefore offer more direct control and steering opportunities.*

In the following, a fraction of these measures is presented, structured along the six dimensions of the framework proposed in the previous section. While some indicators do have a noteworthy conceptual background, others just constitute plain numbers or ratios (e.g., % of sales generated by new products) that can be used for innovation measurement. This differentiation is important as there seems to be a gap between the normative (what should be measured) and descriptive (what is actually being measured) side of innovation performance measurement. What does this mean in detail?

On the one hand, there are a variety of measures put to practice that lack a proper theoretical foundation or have even been proven empirically to be invalid. In this case, companies employ metrics that by no means accurately capture drivers or outputs of successful innovation management. A good example for this is innovation spending or R&D intensity. While this measure is happily applied by innovating companies and auditing consulting firms alike\(^{16}\), studies show that there is in fact an inverted u-shape relationship between R&D intensity and NPD (new product development) performance. While there can be no denying that spending is important, it is still an ‘imperfect measure’ of innovation as there is no significant influence on the future prospects of a project\(^{17}\). Explanations for the prominence of those rather flawed KPIs vary, ranging from the ready availability of data (regardless of their relevance) to outdated knowledge of the innovation management phenomenon.
On the other side of the spectrum, there is a considerable amount of theoretical constructs from innovation management research that have not made it into performance measurement yet. This is where the so-called ‘omission gaps’ arise. They emerge because many of the state of the art concepts are notoriously difficult to operationalize, but perhaps also because academics fail to communicate them adequately. As a result, there are considerable potentials in transferring cutting-edge concepts into operational measures. As this paper seeks to elevate the current way of assessing innovation performance, some of these ‘omission gaps’ will be closed by introducing some rather new and sophisticated measures and validating them with practitioners.

**Figure 5a: KPI Reality Check: Innovation Strategy**

**Entrepreneurial Orientation**
Survey: “In general, the top managers of my firm favor... A strong emphasis on the marketing of tried-and-true products or services’ vs. ‘A strong emphasis on R&D, technological leadership, and innovations’.”

**Transformational Leadership**
Survey questions: Executive X...
- "recognizes your achievement";
- "focuses on your mistakes’; “delays responding”

**CxO attention for innovation projects**
# of projects pitched at CxO/Head of Innovation

**CxO responsibility for innovation projects**
# of projects decided (go/kill) directly by CxO/Head of Innovation

**Innovation Strategy** measures can be so-called psychometrics, where inferiors anonymously rate their managers in terms of leadership quality or attitude towards the innovation task. Measures like these were reported to be in place and their impact was considered positive. Beyond that, management commitment can be measured by the extent to which innovation projects are a top priority. However, in many organizations there is no single institution solely “in charge” of innovation, making it hard to pinpoint where exactly projects should be pitched.

**Figure 5b: KPI Reality Check: Inputs**

**Innovative Work Behavior (IWB)**
Survey: “How often does this employee...
- ...find new approaches to execute tasks?
- ...attempt to convince people to support an innovative idea?
- ...contribute to the implementation of new ideas?”

**R&D Intensity**
Ratio between expenditure or numbers employed in R&D roles and some expression of output (e.g., overall sales).
Inputs can be assessed via scales such as the Innovative Work Behaviour measure. This particular metric consists of 10 items spanning over 4 areas (idea exploration, idea generation, idea championing, and idea implementation) that are rated by supervisors on a 5-point likert scale (never-always). Practitioners reported wide-spread use and beneficial effects of such measures. R&D intensity, on the other hand, has limitations when used in the context of goal-setting. Among our respondents, it was frequently unclear how a certain budget allocation was the result of a “good job” done by an innovation center.

Measures for organizational Culture and Structure once again can be assessed through surveys. In the particular case of the measures tested for this paper, employees are requested to evaluate the overall organizational climate or the leadership style of their executives. Both measures correlate with the overall innovation success of a firm and have been approved by corporate practitioners, making them recommendable.

Key measures for Idea & Knowledge Management are the number of ideas produced and the related idea conversion rate. However, without a proper definition of what constitutes a “high quality” idea, companies risk encouraging the submission of large quantities of rather poor ideas just to meet the goal. This is also one of the most common side-effects of patent measures. While easy to count, the importance of patents depends heavily on the industry...
and the specific work group and should generally only be a supplementary goal. Customer integration, on the other hand, is a frequently applied measure for goal-setting that according to the practitioners’ comments is in fact driving performance. However, it should be taken with a grain of salt within technology-only contexts.

**Portfolio Management** measures aim at evaluating the overall portfolio by financial means. However, such measures were clearly dismissed by the innovation professionals interviewed for this paper. These measures are either considered as too impractical to deploy in large-scale organizations or are too undifferentiated in that they do not take additional factors (e.g., user adoption rate, reach in the case of platform products) into account. In contrast, the portfolio balance – the way an innovation portfolio is set-up to spread the risk – was considered beneficial and should be measured among decentralized businesses. Actual assessment can be done using bubble charts that follow the logic of other popular portfolio mapping approaches such as the growth-share a.k.a. BCG matrix.
In terms of *Project Management* measures, practitioners reported mixed feelings towards time-based measures. Both “percentage of products that were launched on schedule” and the overall “time-to-market leadership” are suited to increase innovation speed. At the same time though, these measures do not do the uncertainty and novelty involved in innovation justice. Furthermore, being the first to market does not necessarily lead to high profitability and rushing through projects can easily lead to quality problems. The number of successful project transfers or additional funds acquired for innovation projects, in contrast, were reported to be widely used and having a positive effect.

Overall sales, profitability or savings as tangible *Outputs & Outcomes* of innovation activities are widely used and deemed appropriate. From a goal-setting perspective though, this should be a goal for the entire company or selected business units, but not for a dedicated innovation center. Sales revenue from new products and services, in contrast, was not a measure that all interviewees would recommend. Even though not part of the original fraction of metrics that was put to the test, the number of users adopting an innovation in the wake of its release was repeatedly mentioned and associated with positive effects. The percentage of commercially successful projects was equally rated as beneficial – but only for non R&D-centric and rather near-market innovation centers. The number of spin-off companies, as a closing line, received mixed comments. In general, there seems to be limited applicability in technology or infrastructure-related contexts. Moreover, in some companies a spin-off is rather perceived as a “missed opportunity”.

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**Figure 5g: KPI Reality Check: Outputs & Outcomes**

<table>
<thead>
<tr>
<th>KPI Realities Check: Outputs &amp; Outcomes</th>
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</thead>
<tbody>
<tr>
<td><strong>Beneficiary</strong></td>
</tr>
<tr>
<td>Sales, profitability or savings arising from innovations</td>
</tr>
<tr>
<td>% of projects commercially successful</td>
</tr>
<tr>
<td># of startups/spin-offs generated out innovation activities</td>
</tr>
<tr>
<td><strong>Disparate views</strong></td>
</tr>
<tr>
<td>% of sales revenues from new products/services</td>
</tr>
<tr>
<td># of users/adopters</td>
</tr>
<tr>
<td><strong>Positive effect</strong></td>
</tr>
<tr>
<td>Unclear</td>
</tr>
</tbody>
</table>

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7 Putting Innovation Performance Measurement to Action

The measurement framework and KPIs provided in the past sections can be understood as generic building blocks for any innovation performance measurement initiative. However, there is still a missing link between plain measurement and actual performance improvements that ideally result out of the measurement activities.

As discussed in section 3 on uses and purposes, an innovation performance measurement system can be employed to facilitate diagnosis (by pinpointing a firm’s weaknesses within the innovation activity), serve as a beacon for orientation (by highlighting the right projects, the right activities and the right behavior), and increase motivation (through formulating clear goals and putting incentives on their completion, thus driving employee involvement). This section elaborates on the three resulting use cases, namely

- Diagnosis,
- Goal-setting, and
- Steering

as primary vehicles to utilize the KPIs. While all three of them constitute distinctive exercises, an integration of all three phases – very much like a virtuous circle – creates maximum synergies and impact.

7.1 Diagnosis

The first and foremost area for putting the measures into practice is diagnosis. Using the metrics, the entire organization can be evaluated along all measurement dimensions for a holistic account. For more focused analyses, data collection and analysis can also be limited to selected performance dimensions (as outlined in the dimensions from the framework) or a selected part of a company, e.g. a specific business unit. For example, in the case of an innovation culture audit, those measures most relevant could be drawn from the ‘Culture & Structure’ and ‘Inputs’ sections. A particularly low or declining score would indicate the need for cultural change. In a similar fashion, innovation performance understood as a dependent variable can also serve to generally evaluate whether management actions have a positive effect. Even though such cause and effect analyses are difficult to conduct due to the sheer number of influencing variables, some experts underline that this is where innovation performance measurement systems can deliver the most added value. However, this requires thoughtful modeling of the entire in-house innovation system that must be revised constantly in an iterative fashion.

In any case, analyzing such elements and determining their relationship requires longitudinal data. As a consequence, innovation performance measurement should not be a one-shot affair, but instead rely on periodic measurement to compare results. With the data available and being fed into a dashboard of innovation measures, problem definition can also be done with lower degrees of complexity.
For a more convenient approach, consider the Innovation Value Chain\(^{19}\) that is all about pinpointing a firm’s specific innovation weaknesses (Fig. 10). Through the lens of this model, the overall innovation capability boils down to three distinct capabilities: idea generation, idea conversion, and idea diffusion. By asking the right questions along all three phases, gaps and bottlenecks can be identified and resources channeled to those areas in need of most attention. While not all variables discussed previously are accounted for, the Innovation Value Chain is nonetheless an easy to understand and powerful tool to identify the ‘weak links’ within an innovating organization. This underlying logic also once again emphasizes that measurement for innovation can provide critical input to custom-tailored improvement initiatives: only if symptoms are read correctly can an effective treatment follow.

Figure 6: The Innovation Value Chain

### 7.2 Goal-setting

Next to the diagnostic approach, the measures proposed also lend themselves to define organizational and individual goals. This is the KPI approach most commonly practiced in industrial organizations: Key drivers or indicators of performance are defined ex ante and then measured after a certain time period has passed. Various ways exist to encourage organizational members to achieve those goals, of which incentives are one of the most commonly employed\(^{20}\). These can range from, for example, monetary rewards and extra holiday, to more responsibility, a higher degree of autonomy, or organization-wide exposure and recognition from top management executives. Vice versa, sanctions can be used to penalize employees should goals not be reached. This approach, however, has to be taken with caution. In the case of innovation and the significant degrees of risk and uncertainty involved, control systems based on fear can easily cripple employee engagement. This assertion is also in line with two of the recently formulated “Moon Shots for Management”\(^{21}\), a call for action that amongst other aspects advocates reducing fear and reinventing the means of control. According to management guru Gary Hamel and the avant-garde group of industry and research experts he assembled, “command-and-control systems reflect a deep mistrust of employees’ commitment and competence. They also tend to overemphasize sanctions as a way of forcing compliance. That’s why so many organizations are filled with anxious employees who are hesitant to take the initiative or trust their own judgment”. As a consequence, “…to overcome the discipline-versus-innovation trade-off, tomorrow’s control
systems will need to rely more on peer review and less on top-down supervision." Taking these arguments into account, a peer-based and asymmetric reward system that provides incentives for reached goals, but leaves out penalties for missed ones seems to be the way to go.

In order to systematically assign KPIs as goals, a matrix between innovation metrics and different organizational actors can be used (Figure 6). Goals can be set for individual employees working in innovation, their work groups, an entire innovation department or their business unit counterparts that eventually take innovative products and services to market. This exercise is crucial because not every KPI makes sense on every level. Careful matching between an entity’s area of responsibility and actual ability to have an impact on the goal should guide this exercise. Assigning the same goal (e.g., ‘# of projects successfully transferred into core business units’) to two parties at once (for example, the innovation center and a core business unit) should receive special attention. In fact, such shared goals can overcome issues and the common disconnect between innovating units and line functions (e.g., marketing & sales, operations) that are crucial in rolling out innovations. As a further guiding principle, goals should be set in a balanced fashion, some of them being individual goals, some of them being shared ones. Individual goals are deployed to ensure an employee’s personal accountability, shared goals are set if the particular innovation task is dependent on several parties. During this process, it is also far too easy to fall into measurement overkill, resulting in metric overload for the respective employees. Research on Management-by-Objectives indicates that if people are given more than six to eight objectives to accomplish, they ignore most of the objectives and concentrate on two or three they believe are important. The implications of this are straightforward: While an overarching measurement system might be more expanding, selected metrics linked to goals should not exceed quantities of seven per individual.

<table>
<thead>
<tr>
<th>what goal?</th>
<th>KPI #1</th>
<th>KPI #2</th>
<th>KPI #3</th>
<th>KPI #4</th>
<th>KPI #5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business units &amp; other functions</td>
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<td></td>
<td></td>
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<tr>
<td>Innovation center</td>
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<td>⬤</td>
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<tr>
<td>Innovation team/work group</td>
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<td>⬤</td>
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<tr>
<td>Innovation staff member</td>
<td>⬤</td>
<td>⬤</td>
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Figure 7: Assigning KPIs as goals for organizational units
7.3 Steering (or “old school” versus “new school”)

While critics might argue that even goal-setting in itself can be questioned, this paper is built on the premise that goals themselves (regardless of how individuals are being rewarded or penalized upon their successful completion or failure) are in fact beneficial. They steer motivation and attention to the innovation task, making transparent what is expected from every employee entrusted with innovation. To further illustrate how exactly measures and goals can be put to practice to ultimately boost innovation performance, consider the following (incomplete) list of sample applications:

*Top-down goal-setting and systematic review.*

Specific measures are selected and target values set. After a certain period of time has passed, the current situation is compared to what was defined ex ante. There is little room for interpretations and an emphasis on objective ‘facts’, weeding out interpersonal biases and subjective evaluations.

*Feedback talks mediated by measures.*

Indicators are used as vehicles to define goals and reflect on individual achievements. In the case of the various psychometrics (e.g., Innovative Work Behavior), employees add an element of self-assessment that is then the basis for their individual career development. In general, this is a more interactive and ‘softer’ way to steer and control. Moreover, it allows for discovery of adequate incentives and individual motivational levers.

*Internal benchmarking.*

Innovation work groups or innovating business units compete internally. Entities that score higher than their peers receive incentives. Theoretically, a twist might be added at this point by “secretly” measuring performance and then making decisions regarding promotion etc. based on the results. Due to transparency issues however, this could backfire.

*External benchmarking.*

Competing on innovation measures against industry rivals or innovation leaders from other industries might significantly boost a company’s esprit de corps and subsequently improve innovation performance. However, as relevant data does not always get publicly disclosed, such a comparison will often be limited to rather abstract and overarching innovation measures.
These approaches are not mutually exclusive and are meant to showcase the bandwidth of possible variations that exist in steering. Determining the right fit for a specific organization depends on its culture, organization design, industry and the respective measures that are put in place. Among experts, this question of picking the ‘right’ metrics to trigger behavior that eventually increases innovation performance is not without controversy. On the one hand, proponents of classic management control\textsuperscript{11,19} emphasize the final outcomes of innovation activities. Represented by absolute numbers like “patents granted”, “amount of new users” or “revenues from new products”, these indicators are – seemingly - the ultimate measures of innovation success. Other experts\textsuperscript{22}, in contrast, advocate measuring and putting incentives on behavior, suggesting a ‘soft’ way of employee encouragement and focusing on measures that employees have a direct influence on. Given the background of those publications and their authors, it becomes apparent that these conflicting views represent two different paradigms: an old-school, classic KPI-driven management control approach vs. a rather soft and new-school attempt to increase performance by establishing the right circumstances for innovation to flourish.
8 Conclusion & Take Away

In what is now a seminal quote, influential business thinker and author Peter F. Drucker once said: “What gets measured gets managed”. This notion of metrics being essential to management action also holds true for innovation, an area notoriously difficult to keep track of and steer. As the pressure to innovate continues to grow, performance measurement for innovation will therefore also stay a hot topic in days to come.

For corporate practitioners, innovation performance measurement offers compelling benefits. Regardless of whether diagnosis, goal-setting, steering or ideally an integration of the three is at the center of a measurement initiative – the six-dimensional measurement framework and the validated selection of metrics proposed in this paper offer a fruitful starting point for discussion and customization to the specifics of a firm. In terms of actual implementation, there is already a common understanding among experts that innovation performance measurement systems in general should be:

<table>
<thead>
<tr>
<th>Balanced</th>
<th>Translucent</th>
<th>Adaptable</th>
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<tbody>
<tr>
<td>(contain qualitative and quantitative, Financial and non-financial metrics)</td>
<td>(so that users fully understand the calculation and meaning of metrics)</td>
<td>(e.g., when the company’s strategy changes)</td>
</tr>
<tr>
<td>Coherent</td>
<td>Reflective</td>
<td>Supportive</td>
</tr>
<tr>
<td>(display causal and logic links between metrics)</td>
<td>of demands of both internal and external stakeholders</td>
<td>of continuous improvement</td>
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Regarding the selection of metrics, managers need to balance the tension between supplying a rich set of measures that captures all the relevant information and avoiding too many measures that may be too costly to collect, administer, and interpret or that may lead to information overload. In this context, it is also equally important what not to measure in order to reduce the stigma of failure and increase risk-taking, but not necessarily gambling behavior. Moreover, it is essential to not overemphasize immediate achievements that are easily measurable and provide instant gratification. These almost automatically get preferred over the type of ‘big picture’ goals that span into the future and require long-term investments that will not pay off right away. Beyond that, managers must also define standards to measure performance against and the measurement techniques themselves (e.g., subjective assessment of superiors; assessment by an independent third party; feedback from internal or external customers; objective score on quantitative scale).

However, there is no one-size-fits-all solution. In order to custom-tailor an innovation performance measurement system, design choices should be driven by extended “form follows function” principles that take the specific characteristics of the target organization into consideration. Among others, these are primarily the purposes and goals pursued with an innovation performance measurement system, the innovation strategy, firm size and culture, the industry context and the overall maturity level of the innovation organization. While such a measurement system alone will not turn an average company into a top innovator overnight, it will definitely have an impact in promoting and boosting innovation performance – when done right.
9 Literature


10 The Authors

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11 The Company

We make ICT strategies work

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