# *Making innovation go further in metals*

## How companies could gain by widening their innovation focus

pwc

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# About this report

This short report is a companion piece to PwC's comprehensive survey report on innovation, *Breakthrough Innovation and Growth*. That report was based on a survey of 1,757 board-level executives responsible for innovation within their company.

A small number in the sample, 34, were board-level executives from companies in the metals sector. This report focuses on this sub-sample to gain insights into innovation among metals companies and how they compare with the results in the main study.

The study uses a balanced scorecard methodology to distinguish the top 20% innovators (359 companies) and the bottom 20% innovators (395 companies) in the sample as a whole to compare and contrast their relative characteristics and experiences (see methodology note at the back of this report).

Balanced scorecard methodology distinguishing...

**359**
top innovating companies

**395**
bottom innovating companies

**34**
Board-level executives from companies in the metals sector

# Contents

# *Introduction*

It's easy to fall into the trap of associating innovation only with young or fast-moving sectors. But it's also key to competitive advantage in more mature, commodity-based industries like metals. And many companies are pretty good at it as well.

High strength. Super tough. Heat resistant. Lightweight. You only have to think of the demands on metals and their new uses to realise that innovation is happening all the time. Thousands of new patents for new metal alloys are being registered every decade. Just consider the requirements of advanced spaceflight and the super tensile materials that have to be developed. These alloys possess such strength as to be functionally unbreakable in a natural environment.

But much of the innovation effort in the sector is limited to product or process innovation with less priority given to wider innovation. This report is a companion paper to PwC's comprehensive survey report on innovation, *Breakthrough Innovation and Growth*. It looks at how metals companies are faring in their innovation strategies, puts this in the context of the sector and other sectors, before examining how companies could gain by widening their innovation focus.

***Jim Forbes***
Global Metals Leader

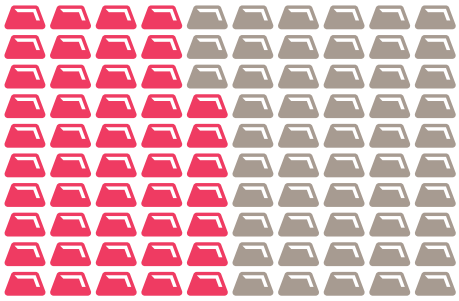
***Anil Khurana***
Partner, Strategy and Operations

# *Metals innovation and growth*

Metals innovation has a major impact on everyday life. For example, new “liquid metal” high tech alloys are set to make the next generation of phones lighter and stronger. Stronger, thinner and lighter metals are at the heart of modern car and engine design. And metals such as platinum and palladium are well known for their pollution-busting capabilities in catalytic converters.

**47%**

*Forty-seven percent see innovation as "a competitive necessity" but spend a slightly smaller percentage of revenues on innovation*



## *The importance of innovation*

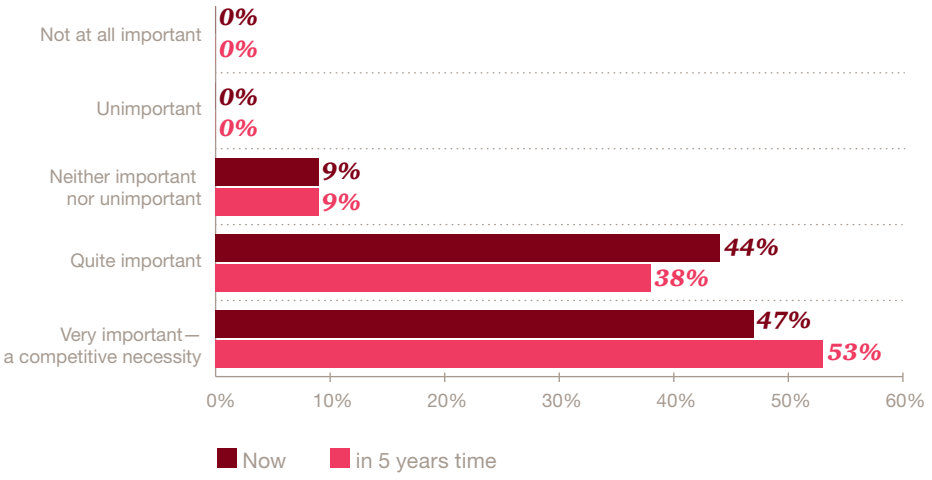
Innovation is at the heart of what many metals companies do. As part of our Breakthrough Innovation and Growth report we surveyed senior executives in companies across all sectors, including metals company executives. These metals executives reflect a cross section of innovation across the sector. None of them viewed innovation as unimportant or described their companies as laggards. Just under a fifth (18%) described their companies as 'pioneers', most (44%) said their company was 'a leader but not leading' and 38% said their company was a 'follower' in terms of innovation.

It's no surprise that many of them rate innovation as vital for their companies' prospects. Nearly half (47%) see it as "a competitive necessity" now and even more (53%) believe it will be so in five years' time. The corollary of this, though, is that around four in ten of the executives we spoke to don't see it as top priority and one in ten view it in fairly neutral terms when it comes to future success.

On average the metals companies we interviewed spend a slightly smaller percentage of their revenues on innovation than do companies across the sample as a whole (7.25% vs. 8.57%). Other research suggests that even the top spenders aren't investing as much as companies in other innovation-dependent sectors. According to Booz & Co (recently acquired by PwC), five of the top 20 R&D spenders in 2012 were automotive OEMs and seven were healthcare companies (including pharmaceuticals companies).[1] Not one was a metals company. That's not necessarily bad news. Spending more doesn't always mean innovating better but, as we discuss later in this report, it could reflect too narrow an innovation focus.

**Figure 1: Metals executives view innovation as vital to future success**

How important is innovation to the success of your company?




**Source:** PwC, *Breakthrough Innovation and Growth*

1 Booz & Co, 2013 Global innovation 1000 Study.

### *An emphasis on strategy and processes*

Successful innovation has to be built on the foundation of a clear strategy. And here the metals executives in our survey view their companies as doing rather well. 79% of them tell us they have a well-defined innovation strategy compared with only 63% in the full survey across all sectors. Indeed, this result is on par with the top innovators that we identified. Also 79% of the 'top innovators' also reported a well-defined innovation strategy compared with only 47% of the least innovative companies.

It is the same story with metals respondents' assessment of how successful their companies have been in implementing their innovation strategies. Whereas only 64% of executives across all sectors reported success, it was a much higher 82% among metals executives and, again, this was exactly in line with the result among the 'top innovators' in the wider survey.

Metals company executives are also putting a stronger emphasis on many of the essential building blocks of an effective innovation culture compared to executives in the wider survey. In particular, metals executives appear more likely to stress the importance of an equal status for innovation within the organisation, the creation of internal communities of interest, toleration of failure and having well-defined and accepted processes for innovation. It is the area of senior executive participation in innovation projects that fewer metals executives rated as important compared to executives in other sectors (Figure 3).

**Figure 2: Metals' companies put a strong emphasis on strategy**

To what extent do you agree or disagree with the following statements about your innovation strategy?

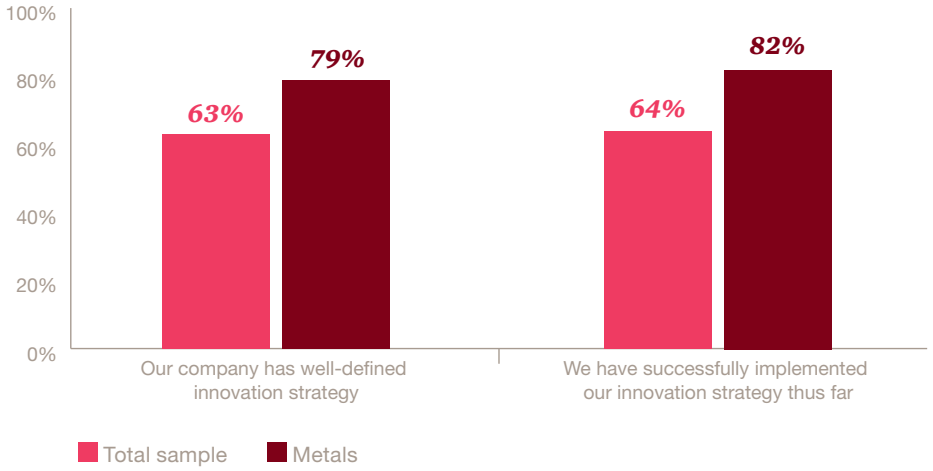
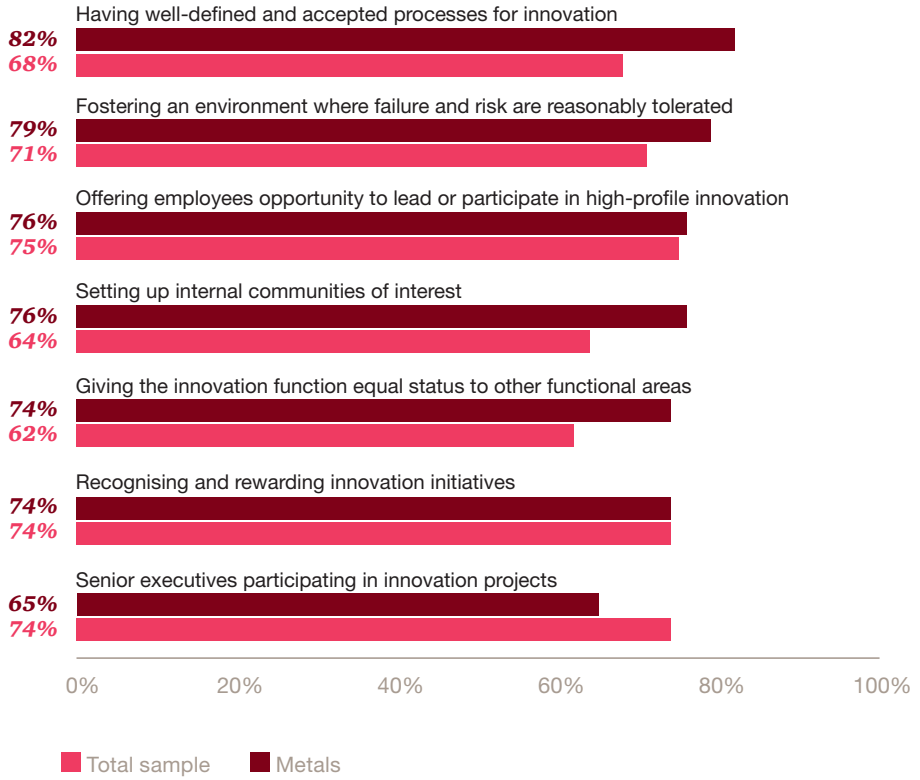



**Figure 3: Metals executives recognise the importance of many of the internal building blocks of a strong innovation culture**

Percentage giving 4/5 ratings in answer to how important are each of the following to creating and fostering an innovative culture? (scale of 1 to 5, where 1 is not at all important, and 5 is very important).



### *The challenge of growth*

So, despite the many structural challenges of overcapacity, debt and uncertain demand facing companies in much of the sector, there is general satisfaction among metals companies executives about the priority they are giving to innovation and the success of their innovation strategies. And they recognise the importance of many of the internal building blocks. But is such satisfaction well-placed or do companies need to reassess where their innovation strategies are heading?

One benchmark is to compare how metals companies in our survey are performing in comparison with companies in the wider survey. Figure 3 charts growth expectations of metals companies with those in our wider survey. The most innovative companies across all sectors are predicting growth of 62.2% over the next five years. In contrast, metals executives anticipate growth of 22.3%, only a little above the 20.7% growth projected by companies identified as 'least innovative' and well below the 35.4% average across all sectors.

*The emphasis of metals companies on innovation is in line with "top innovators" but growth expectations are down with the laggards.*

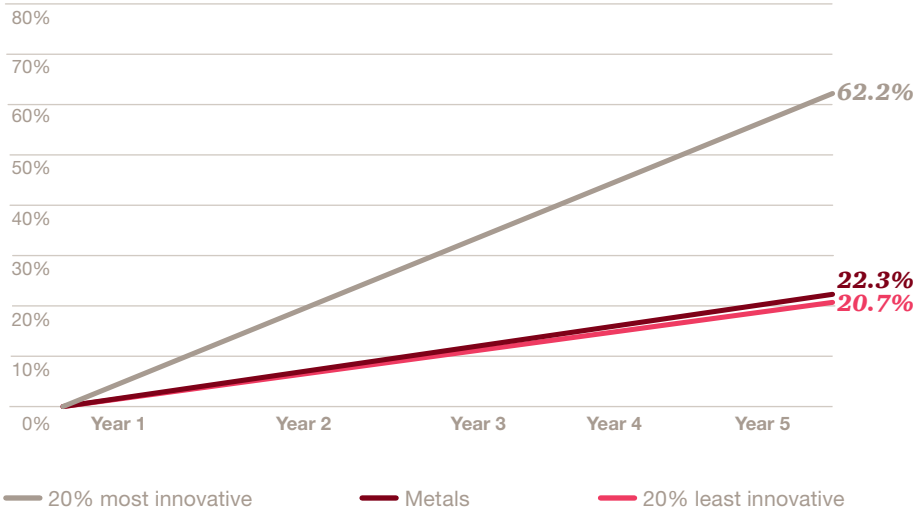
Of course, it would be wrong to attribute this contrast in growth expectations directly to shortcomings in innovation strategy. Metals is a mature industry with highly cyclical growth prospects that are heavily dependent on general economic conditions. Although advanced economies are gradually recovering growth is slowing of growth in developing economies. Also, the sector is plagued with a problem of overcapacity.

But this context makes innovation all the more important as an accelerator of growth and competitive advantage. And the fact that growth expectations also appear to lag behind those from companies in other, similarly mature sectors in the survey is a concern. For example, executives in the automotive sector anticipate 33% growth in the next five years and those in industrial manufacturing 27%.

Moreover, senior executives themselves recognise that global economic forces are not necessarily the most powerful lever for growth. Often, the growth lever that has the greatest impact is innovation. Ninety three percent of executives in our main survey tell us that organic growth through innovation will drive the greater proportion of their revenue growth.

**Figure 4: Top innovators are outperforming**

What is your company's annual revenue? What do you forecast your annual revenue will be in five years' time?




**Source:** PwC, *Breakthrough Innovation and Growth*

# *Making innovation more effective*

Innovation comes with many hurdles. First, there are the issues that companies already recognise and are seeking to grapple with. Second, there are the areas that companies are perhaps not fully aware of, but which, if explored, could help them to significantly step up the effectiveness of their innovation investment. Metals companies are not alone in having some important issues in this second category as well as the first. But this offers a significant innovation opportunity as well as a challenge. We look at both of these areas in turn.

### *Challenges identified by companies*

The biggest challenge facing companies in all sectors is the ability to take innovative ideas to market quickly and in a scalable way. It's followed closely by the task of finding and retaining the best talent to make innovation happen. Metals companies are no different from others in also having these issues at the top of their list. Three fifths (59%) of metals executives say taking innovation to market is a major challenge and 56% report talent difficulties. Other challenges - establishing an innovation culture internally, finding the right partners to collaborate with and having the right metrics to measure innovation—were close behind.

But there are solutions. Having a well-defined organisational structure around innovation helps build alignment and higher performance through the sharing of best practices, resources and mental models for growth and innovation. These drive disciplined execution and lead to repeatable and scalable innovation commercialisations.

One powerful metric for measuring the impact of innovation is tracking the percentage of revenue coming from new products and services. Focusing on what's often known as the "vitality index" can help focus efforts. But it's important to measure the impact of other types of innovation too. For example, using metrics that quantify savings on the capital and running costs saved by applying innovative technology, instead of the best alternative "off the shelf" technology available, can enable companies to track the impact of technology and process innovation.

In our view, the true measure of innovation success cannot only be seen through a financial lens. Leading companies identify measurements that go well beyond the traditional ROI. Some companies are tracking patents, publications and transfer of know-how to other business units. Other good areas to measure are increased customer satisfaction associated with new offerings, as well as process measures, such as quantity and quality of ideas in the pipeline and time to market. As innovation portfolios diversify, metrics for breakthrough and truly radical innovations need to change to reflect the new processes and types of value created.

### *Opportunities that are more hidden from company view*

Our survey points to a number of areas where companies could improve the impact of their innovation strategies. Largely these stem from perhaps taking too narrow a view of innovation. As a result, they are not so firmly in companies' line of sight. But by overlooking them, senior managers could be missing opportunities to deploy innovation in ways that could add to growth.

**Figure 5: Taking ideas to market is the biggest innovation challenge for metals executives**

How challenging do you find the following aspects of making innovation happen within your company? Respondents who said 'very' or 'somewhat' challenging.

### *Spreading ownership of innovation*

Our metals respondents are placing a high level of responsibility for innovation at the business unit level. Nearly four-fifths (79%) say they have formal innovation structures in individual business units and 85% say that individual product areas or services are responsible for their own innovations. This makes good business sense, because aligning innovation to business units ensures the innovation teams do not become isolated from the rest of the organisation.

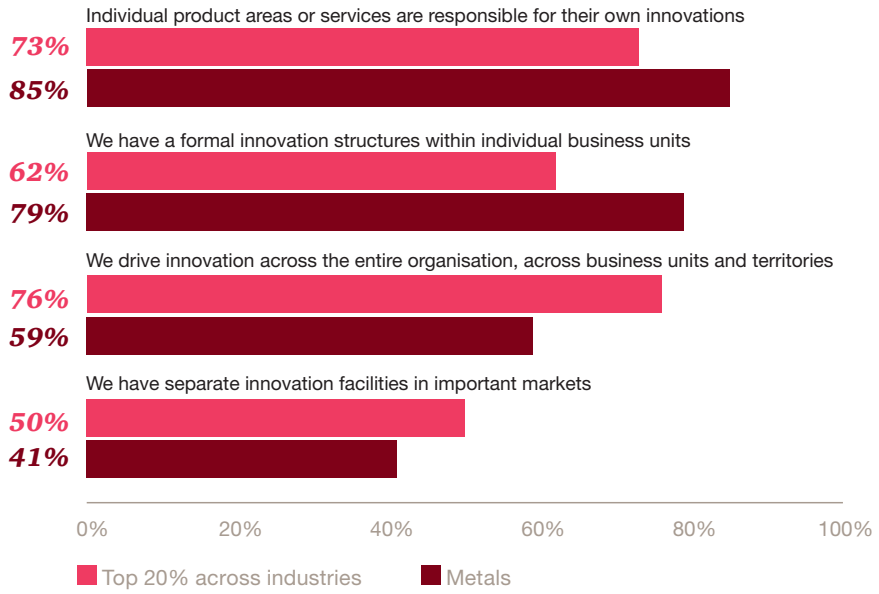
But only 59% of metals executives say they're driving innovation across the entire organisation. This leads to a twofold risk—business units in different segments or regions may be duplicating effort and there is the danger that the scope for innovation is overlooked in some parts of the company's operations. Metals companies need to look for the right balance between centralised and decentralised approaches.

### *Maximising different types of innovation*

We've found that one of the keys to driving growth whilst still maintaining the health of established products and services, is to focus on a balanced innovation portfolio. That means finding the right mix of investments in incremental, breakthrough and radical innovation across the whole range of innovation areas.

Metals respondents already have ambitious plans. In two areas—technology and systems and processes—more than 40% expect to see breakthrough or even radical innovation over the next three years (see figure 7). In both areas the sector is close to matching—or even surpassing—the expectations of the top 20% innovators across all industries. We discuss this area in more detail in the text box on page 10.

**Figure 6: Metals executives are relying on business units to drive innovation**




But the emphasis on breakthrough or radical innovation in the sector slips away beyond these two areas. In the other areas of products, business models, services, the customer experience and the supply chain, metals companies are more likely to be content with incremental innovation. And there is a gap between them and top innovators. Top innovators across industries are targeting over 40% in nearly every area.

Take service innovation for example. It's becoming a key priority for metals sector innovation. Nearly two-fifths (38%) of metals CEOs expect radical or breakthrough innovations in services. But that's less than the 47% of top innovators targeting major steps forward in service areas.

In other research we found that manufacturers with a more mature approach to service innovation—the 'service leaders' who are able to offer new and expanded services as a real value add—performed better financially, with more stable results.[2] 'Service followers' who see services as merely an extension of their product portfolio lag behind in financial performance.

Services can help generate revenues and margins during downturns, so it helps balance risk in cyclical product businesses. Strong service offerings also help improve product sales, with customers increasingly saying they are a must-have. In our research on service innovation, we found that many companies aren't yet integrated in product and service development. By taking a combined approach, they can significantly enhance performance.

2 PwC, Service innovation: Growth engine and profit machine

## Why are metals companies paying so much attention to technology and systems and processes?

Sustainability is one big reason. Metals manufacturing is highly energy intensive, and some processes can create waste and emissions too. The industry has put an enormous amount of effort into reducing its overall environmental footprint in recent years. According to world-steel, steel companies from North America, Japan and Europe have reduced their energy consumption per tonne of steel produced by 50% over a 30-year period. That's due to significant improvements in processes.

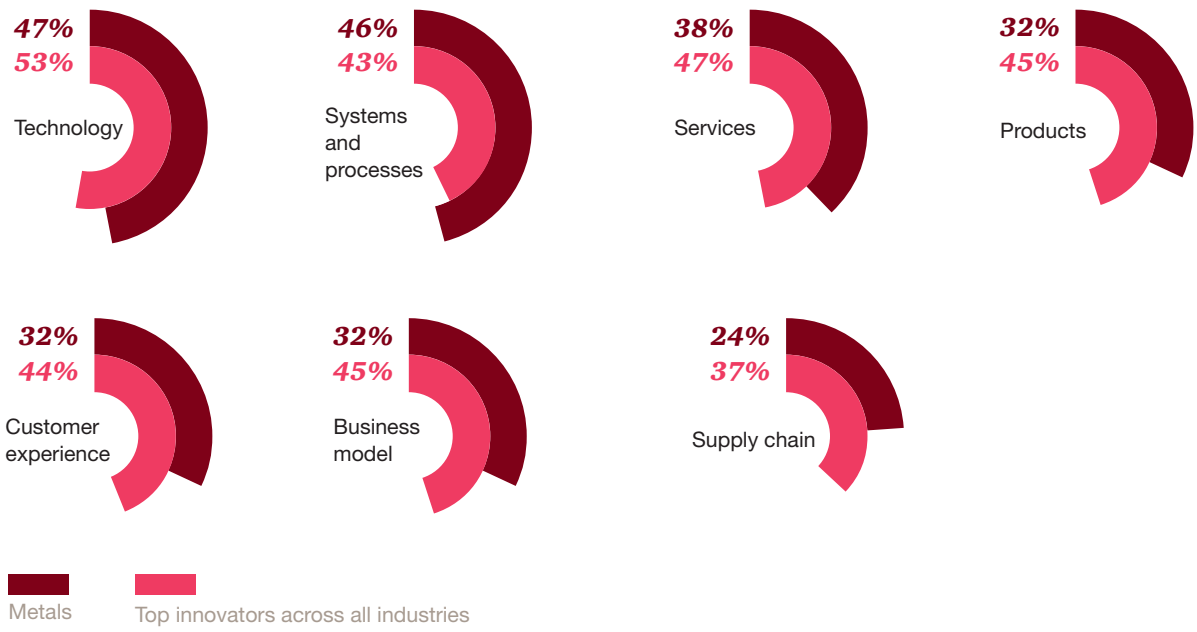
And for the metals industry, process innovation and product innovation often work hand in hand. Take steel.

In the past, parts for cars were only made using cold stamping. But hot forming special manganese-boron steels can create components that are much stronger—so parts can be made thinner and lighter and/or without additional reinforcements. That can translate into a weight reduction of up to 30%.

The technique initially could only be used to create parts with the same strength throughout. That limited its application, since some parts need to be able to absorb energy in a crash, for example. Germany's ThyssenKrupp has patented a 'tailored tempering' flexible heating process to get around the problem. The finished steel piece can have different properties within one body panel.

**Figure 7: 'Top innovators' look for innovation opportunities across a wider range of areas than metals companies**

Proportion planning significant 'radical' or 'breakthrough' innovation in each area in the following areas over the next three years?



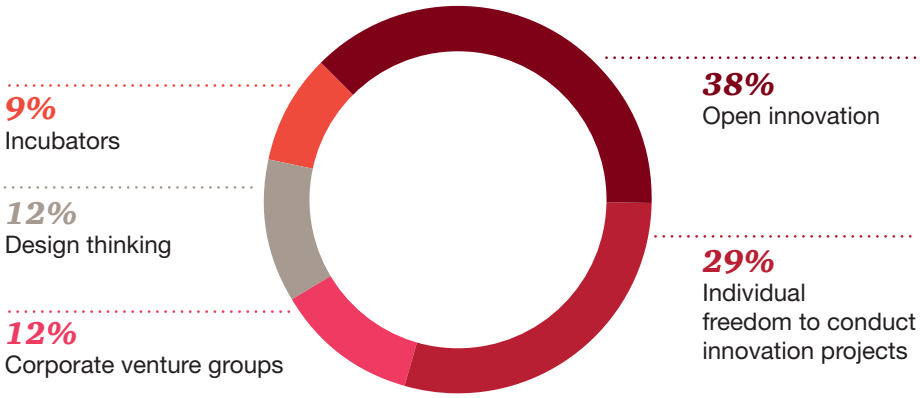
### *Widening out collaboration*

Even if your company has a strong innovative culture and is attracting top talent, you'll still need to make sure that your smart people are collaborating with the billion IQ points outside of your organisation. The top priority for metals companies is collaborating with their customers. Nearly all of the executives we surveyed say their companies have plans to work together with customers. That continues existing efforts at cooperation; for example, there are a whole host of examples of metals companies collaborating with automotive OEMs and suppliers, especially around "lightweighting" vehicles using advanced steel or aluminium.[3]

We've seen clear indications that innovation leaders are partnering far more than the laggards. Across industries, the top innovators actually collaborate three times as much as the laggards. Metals companies aren't at the bottom of the pack—but they're lagging slightly behind the overall average. Just under 19% are jointly developing products and services with external partners, compared to 22% across industries—and 34% from the top innovators. The most successful companies eventually become the "Partner of Choice" in their innovation ecosystem. That helps them attract the best ideas from strategic partners and suppliers alike, giving them access to faster, better, and cheaper innovations—a major competitive advantage.

**Figure 8: Metals executives are placing their bets on open innovation to drive growth**

Which of these approaches do you think will lead to innovations that drive the most growth for your company?




**Source:** PwC, *Breakthrough Innovation and Growth*
**Base:** Metals, 31

### *How Nanosteel is gaining from a broader innovation focus*

NanoSteel is a small start-up that's using nanotechnology to develop high-end steel. Nanosteel is commercialising research originally started at a national lab. And it's working closely with automotive partners to co-develop products. There's a strong emphasis on product innovation but innovation is focused more widely as well. "One of our most significant innovations," says David Paratore, CEO of NanoSteel "has been the change in our royalty business model."

This innovation was driven by the desire to unlock more value from the products NanoSteel is producing. "In order to maximise the value of our technology, it was deemed best to generate royalties for those companies reaping the benefit, which in our case are the tier one automotive companies," says Paratore. "We explored what worked in other companies and the model used by Dolby seemed to resonate. So we tested it with some of the auto OEMs who were receptive to the idea, before rolling out the model to the industry."

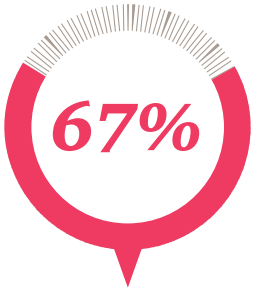
3 PwC, Pressing on the accelerator—taking metals innovation to the next level

### *Using open innovation to spur growth*

One way to collaborate with external partners is through open innovation. Across industries, open innovation stood out as the innovation process that executives felt was most likely to drive growth. It tops the list for metals companies too, and there are already many examples of companies working together, particularly around areas that represent radical breakthroughs.

Metals companies are also starting to use social media as a way to spark open innovation, and they're doing it in strategic ways. Two-thirds of our metals respondents (67%) say they will conduct campaigns around specific problems to create innovative solutions. That's more than across the total sample, and even slightly more than the top innovators.

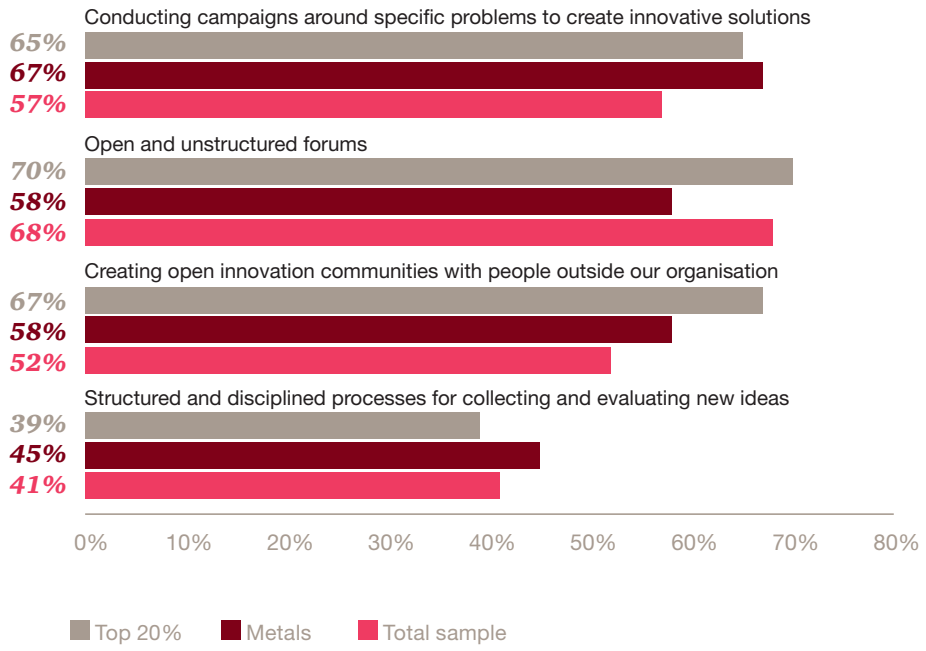
But there are indications that, unlike the top innovators, fewer are harnessing social media for innovation collaboration outside the organisation. Just under three fifths (58%) of metals executives say their companies are using social media to create 'open and unstructured forums' or 'innovation communities with people outside our organisation' compared with 70% and 67% of top innovators.




*Two-thirds of our metals respondents say they will conduct campaigns around specific problems to create innovative solutions.*

**Figure 9: Metals companies are taking a more disciplined approach to using social media**

Does your company leverage social media to support innovation efforts in any of these ways?



# *The road to growth—doing things differently*

We found a direct correlation between excellence in innovation and superior revenue growth. While there is no single roadmap for success in innovation, there are lessons that can be borrowed, tailored and made to work for any business.

*The laggards are focused on products and incremental improvements. They expect just 15-20% of their innovations to be real breakthroughs.*

The leading innovators in our Breakthrough Innovation and Growth study are each anticipating an extra 6% per annum in growth (on average), compared with their less innovative peers. Here's some advice based on what they're doing differently.

## 2/3

**Recognise the importance of innovation**
Two-thirds of the most innovative companies say innovation is a competitive necessity compared with 19% among the least innovative (vs. half among metals companies).

## 32% vs. 20%

**Innovate with purpose (with business outcomes in mind).**
The most innovative companies are more concerned about developing the right innovation strategy: 32% vs. 20% (vs 29% in metals).

## 80%

**Have a coherent strategy.**
Nearly 80% of the most innovative say they have a well-defined innovation strategy compared with 47% of the least innovative (vs. 79% in metals).

## 78% vs. 66%

**Treat innovation like any other management process.**
The most innovative are more likely to manage innovation efforts formally or in a structured way: 78% top innovators vs. 66% of the least innovative (vs only 62% in metals).

## 13% vs. 7%

**Experiment with new innovation operating models.**
The most innovative companies are more likely to use corporate venturing to drive growth: 13% top innovators vs. 7% least innovative (vs. 12% in metals).

## 2x

**Target a higher proportion of breakthrough (or even radical) innovations.**
The most innovative companies are almost twice as likely to be targeting breakthrough and radical innovations ( but it's only in technology that metals companies are targeting as much breakthrough or radical innovation).

## 79% vs. 59%

**Innovate your business model(s), not just your products and services.**
The most innovative companies are planning to enhance the business model with new value offerings over the next 3 years: 79% top innovators vs. 59% least innovative (vs 83% in metals).

## 67% vs. 39%

**Use social media to help you innovate.**
The most innovative companies use social media more often to collaborate externally: 67% top innovators vs. 39% least innovative (vs 58% in metals).

## 3x

**Collaborate more.**
When it comes to developing new products and services with external partners, the most innovative companies collaborate over three times more often.

## Glossary

In this report we refer to the terms "incremental", "breakthrough" and 'radical' innovation. We use these terms in the following sense.

**Incremental innovations** are small changes in existing products and services through minor improvements in technology or changes to the business model. Incremental innovation is essential for maintaining market share and margins of existing products and services. Examples include the release of new versions/generations of phones and software.

**Breakthrough innovations** are created by making substantial change to either the technology or business model. They can be based on entirely new technology or business model components or new ways to organise and use existing components. They are game changers that can produce significant growth. A well-known example is Toyota's Prius, which launched in 1997 in Japan, and was the first successful hybrid car.

**Radical innovations** are created from significant changes to both technology and business models. They typically introduce new value to customers, new players in the value network, and new technologies for making and delivering the product/service. An example is Amazon's use of internet technology and the combination of both a direct retail business model and a 'marketplace' business model to create a dominant retail space.

***The following terms are also used:***
**Incubators:** small start-ups inside a company that provide intrapreneurial zeal and speed.

**Corporate venture groups:** investment of corporate funds directly in external start-ups.

**Open innovation:** using external and internal resources to generate and commercialise ideas).

**Individual freedom to conduct innovation projects:** innovation squeezed into the regular workload but allowed to occupy a percentage of employee time.

**Design thinking:** observation of users as they engage with products and services and rapid prototyping of new ideas.

# Methodology

We would like to thank the 1,757 executives who took part in our study. Our quantitative and qualitative research was conducted among board-level executives responsible for innovation within their company. In this context innovation was taken to encompass products, services, business model and customer experience.

Twenty percent of interviews were from companies that generate more than $1bn+ revenue. Interviews were conducted by PwC and Meridian West. This report includes results from the 34 interviews conducted with executives in the metals sector and contains comparisons with the wider study.

For the purpose of our analysis, from the 1,757 companies interviewed we have identified the top 20% innovators (359 companies), and the bottom 20% innovators (395 companies) to compare and contrast their relative characteristics and experiences. These companies were identified based on a balanced scorecard comprising their responses to the following six areas explored in our study:

- How important the interviewee said innovation is to their company;
- Their appetite for innovation (on a scale from 'innovation laggard' to "innovation pioneer");
- The proportion of annual revenue derived from major products or services launched in the previous year;
- The proportion of annual revenue spent on innovation;
- The proportion of products and services co-developed with external partners;
- Their projected revenue growth over the next five years.

For each of the six attributes every company was given a score between 1 and 5. The most innovative 20% of companies scored a total of 23 or more out of 30, whilst the least innovative 20% of companies scored a total of between 7 and 15 out of 30.

# *Want to find out more?*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*We look forward to speaking to you.*