2022 ENGINEERING INNOVATION INSIGHT REPORT

THE ENGINEER

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INNOVATION OVERVIEW

PatSnap's 2022 Innovation Insight survey, carried out by The Engineer magazine, shines a light on the challenges and drivers of engineering innovation across some of the industry's key sectors.

Rapid technological advancements are disrupting the world and forever changing how societies live and operate. For businesses to remain competitive, innovation is critical. To be effective, and successfully translate new (or improved) knowledge into marketable solutions, there are specific steps organisations can take to bolster their approach and capture market share.

Earlier this year, PatSnap joined forces with The Engineer Magazine, the UK's longest-running technology news publication, to build a holistic picture of how engineering companies innovate in the modern world, and to gather insights on the primary challenges they face.

The survey was conducted in March 2022 with respondents coming from a diverse range of sectors including automotive, aerospace, food and drink, defence, manufacturing, electronics, and energy. In total, 323 responses were collected. Manufacturing is the most heavily represented sector, accounting for 24.4% of the respondents, followed by electronics with 7.9%, and automotive with 6.7% The various areas of the energy sector, including oil and gas, nuclear, and renewables, collectively accounted for 12% of the overall sample.

In terms of company sizes, respondents ranged from SMEs employing one to 19 engineers, to large OEMs, and Tier One companies employing upwards of 5,000 people. More than half of the respondents work for organisations with less than 100 employees.

More than 40% of respondents describe themselves as senior engineers, while 33% describe themselves as directors, CEOs, or MDs, and 21% sit at the management level. Seventy-seven percent of respondents are UK-based, followed by 7% in Europe, 5% in Africa, and 4% in North America. The survey also attracted a small number of respondents from South America, Asia, and Oceania.

In this report, we examine this diverse audience's responses to a series of questions about their approach to innovation. For instance, we asked whether their organisation has a formal approach to innovation, and what (if any) tools, technology, and processes they use to address some of the broader issues around innovation, such as building an understanding of risk and the competitive environment.

The key findings of this fact-finding mission, which are explored in detail in the pages that follow, shine a light on the key challenges faced by engineering organisations, as well as the processes and methods they use to overcome these challenges.

Why PatSnap carried out this report

Sam Wiley, Head of thought leadership and customer advocacy, PatSnap

As the global leader in Connected Innovation Intelligence (CII), PatSnap's AI-powered platform is designed to help innovation professionals conduct high-level market analysis, identify early-stage opportunities, explore industry trends and competitor portfolio shifts, improve innovation pipeline, validate ideas, and launch commercially viable solutions.

More than 10,000 companies use PatSnap, many of which are in the engineering space. In order to better serve these organizations, we knew it was of the utmost importance to understand how engineers approach innovation. Equipped with these insights, we can provide engineers with a clear understanding of the market implications, possibilities, and opportunities.

323 323 respondents

77% senior engineers and above

DO YOU HAVE AN INNOVATION PROCESS?

We began by asking respondents whether or not their organisation actually has a defined approach to innovation, a question that painted a telling picture of how attitudes to innovation vary across industry.

Whilst 36% of the sample group work for organisations with a formal innovation process, 28% say that innovation is a more informal affair. Meanwhile 26% of respondents say that their company doesn't have an innovation process and 9% simply don't know.

Whilst this spread is reflected across most of the sectors surveyed there do appear to be some notable variations.

For example, organisations in the medical and defence sectors are apparently most likely to have a formal innovation process, with 57% and 78% of respondents respectively indicating that this is the case. Meanwhile, in the manufacturing sector, which accounts for the largest slice of the response group, 36% of respondents report a formal innovation process, and 35% point to an informal innovation process. Interestingly, the automotive sector - one of engineering's fastest moving and most rapidly evolving areas - is amongst those apparently least likely to have a defined innovation strategy, with 38% of respondents from this sector telling us that their organisation doesn't have any kind of innovation process in place. Similarly, in the energy sector – a hotbed of engineering innovation – 40% of our response group tell us that there is no innovation process in place at their organisations.

When considering these sectoral snapshots, it should be noted that whilst the overall sample size is statistically robust the sample sizes for individual industrial sectors are relatively small.

Perhaps unsurprisingly, according to our survey, larger organisations are more likely to have an innovation strategy in place. Forty-four percent of respondents from companies employing between 1000 and 5000 employees report a formal innovation process, whilst just 19% of those working for much smaller firms (1 – 19 employees) report a similar process in place. Indeed, over half of respondents (56%) from organisations without an innovation process said that the size of their organisation was the key reason for this.

Amongst other reasons given for the absence of an innovation process 15% say innovation isn't important to their business, whilst others cite ineffective leadership, a lack of awareness around processes that could be used to help drive innovation and some skepticism over the need to have any kind of process in place.

36% have a formal innovation process

The PatSnap view: Why do so many SME's lack a formal innovation process?

Only 36% of respondents reported having an "innovation process" and the vast majority of those that do hail from large organizations. This begs the question: Why do most small and medium-sized businesses lack a formal innovation process?

For many organizations, the issue is data. More than two million articles are published daily, and this statistic does not include social media posts, patent applications, academic studies, and other information that impacts innovation. As a result, it can be difficult at best, and impossible at worst, to shape a meaningful narrative from an online search. Even for organizations with sophisticated research capabilities, extracting the necessary insights to inform innovation-related decisions is a challenge.

Relying on disparate, outdated data — even though this is almost always unintentional — leads to lags in innovation and, at times, intellectual property infringement.

With CII, companies can easily connect millions of data sources, segment them by industry and relevance, and extract a cohesive narrative. Built to support companies and accelerate innovation, CII empowers users to operationalize innovation data.

78% organisations in the defence sector have a formal innovation process

INNOVATION INTELLIGENCE

We then asked a series of questions aimed at building an understanding of which tools and processes - if any - organisations use to help drive innovation. We were particularly interested in understanding to what degree respondents use specific tools to help drive and underpin their innovation activities: from business intelligence software, and landscaping innovation analytics through to resources such as research paper databases.

UNDERSTANDING THE COMPETITIVE LANDSCAPE?

Survey respondents use a wide variety of processes to understand the competitive landscape before pushing ahead with important innovation investment decisions.

Unsurprisingly, a simple internet search is the most widely used approach (with 60% using this strategy). However, the use of consultancies and specialist tools and resources such as business intelligence software and research paper databases are also popular options (with around 40% of the overall response group also using these approaches). Amongst the wide variety of "other" methods identified by the survey, market research projects and various face-to-face approaches (conferences, customer interactions etc.) are also identified as useful approaches.

Whilst the pattern is broadly similar across all of the sectors surveyed, some of our larger sector response groups provide the most telling snapshot. In manufacturing, for instance, roughly a third of respondents report the use of specialist consultancies, whilst 22% say they also use specialist tools.

Unsurprisingly, there is also some variation across different sized organisations. For instance, whilst 40% of those working for organisations employing between 1000 – 5000 people report the use of specialist tools, uptake within the smallest engineering organisations (those employing up to 20 people) is much lower, with just 13% of respondents telling us that they tap into these resources.

IDENTIFYING PARTNERS AND COLLABORATORS

Collaboration with partners with different or complementary areas of expertise is frequently the key to successful innovation, and respondents use a range of different methods and approaches to identify these partners. Perhaps unsurprisingly - when compared with other innovation challenges examined by this report – there is a stronger reliance on what might be termed more traditional face-to-face methods of engagement.

Once more, a general internet search is a popular option, with just under half of respondents regularly taking to the web to find potential collaborators. This is closely followed by the use of trade bodies and institutes, with 43% of respondents finding this a useful path to finding partners. Live events are also a popular source with just under a quarter of respondents. Whilst the use of existing partners is the most popular option, just 10% of respondents use specific tools to help source partners.

Again, this general pattern is echoed across the different sector groups, with no telling variations from sector to sector.

In terms of company size, the use of specific tools is highest amongst respondents working in companies employing 5000 or more people and lowest amongst those working for organisations employing 20 or less people, with just 4.6% respondents from this group reporting the use of specialist tools.

UNDERSTANDING AND IDENTIFYING RISK

Next, we asked respondents how they identify risks in the innovation process, for instance around intellectual property or regulatory issues?

Here again, internet research (52%) and the use of existing partners and trade bodies etc. all rank very highly as useful sources of information.

However, 33% of respondents point to the use of specific tools – such as business intelligence software, innovation analytics and databases as an important resource in this regard.

Once more, these variations are mirrored across the different sectors, and the relatively small sample sizes at this granular level make it difficult to draw any meaningful conclusions over how the approach to risk varies from sector to sector. However, once more, analysis by company size pints a more telling picture, with% of respondents from organisations of 5000 plus and 15 per cent of respondents from organisations employing up to 20 people, telling us that they use specialist tools to understand risk.

40% of respondents use specialist tools to analyse the competitive landscape

ATTITUDES TO INNOVATION

We concluded by asking respondents a series of more general questions about the innovation climate. For instance: what are the key drivers of innovation in 2022? What are the most significant obstacles? And which sectors, in their view, display the highest levels of innovation?

DRIVERS OF INNOVATION

Asked to rank key drivers of innovation within their own organisations, respondents were offered three choices: market demand, competition, and the push for net zero / improved sustainability. Whilst all three of these are viewed as important drivers, market demand is identified as the key driver overall, slightly ahead of competition and with sustainability coming in third place.

Unsurprisingly there is considerable variation from sector to sector. In the manufacturing, transportation and energy sectors, for instance, sustainability is viewed as the most significant driver of innovation.

OBSTACLES TO INNOVATION

Respondents were also asked to rank the key challenges and obstacles to innovation. Here they were offered five options: budgetary constraints; the lack of a clear strategy; a risk averse culture; a shortage of key skills; and a lack of opportunity

Whilst all of these are certainly viewed as significant factors, the most highly ranked obstacle to innovation – according to our sample group is budgetary constraints, followed closely by the absence of a clear strategy. Interestingly, a shortage of skills — a much talked about problem across all sectors of industry — is one of the lowest ranked reasons given, followed by a lack of opportunity in the market.

INNOVATIVE SECTORS

Respondents were also asked to offer a view on which sectors they feel display the highest levels of innovation.

Despite the much-publicised levels of innovation in sectors considered key to meeting emissions targets (for example automotive, aerospace, and renewables) there is no overwhelming consensus amongst respondents on where the highest levels of innovation can be found.

Unsurprisingly, those sectors at the forefront of the sustainability revolution fared well here, Aerospace, automotive and renewables all attracting a sizeable chunk of the vote (10, 11 and 10 per cent respectively). But sectors such as academia (7%) and medical (6%) are also seen by some respondents as innovation trailblazers.

Amongst survey respondents, the highest levels of admiration in this regard are reserved for the electronics sector, with 14% of respondents feeling that this sector displays the strongest levels of innovation.

Market demand is the number one driver of innovation

The PatSnap view: putting the customer first

While it's intuitive that the key drivers of innovation will vary from sector to sector, it's critical that companies such as PatSnap serving these sectors take this in to consideration when developing new tools and technology.

Here we can expand with that when we innovate and build new products, we put the customer first. Human-cantered design. And design thinking.

Disruption is everywhere. Previously insurmountable scientific problems, like Moore's Law for semiconductors or effective vaccines for coronaviruses, have been vanquished through collaboration and innovation. Understanding how to innovate faster, and more efficiently, not only offers a competitive advantage but also creates organisational sustainability.

Our goal at PatSnap is to put the customer first, as such all of our updates, product offerings, and new innovations come from a human-centered design perspective. Take our Discovery platform as an example, it's built to enable users to stay up to date on the technology landscape with relevant, updated information on key players, fast-growing competitors, and new entrants in your area of interest. With the data collated in this manner, users can access necessary insights without needing to conduct manual internet searches.