

Humanity & Optimism:

The future of science is here



Introduction

“Science knows no country, because knowledge belongs to humanity.” — Louis Pasteur

Scientists’ role is to move us toward a better future. But what does that future look like? What does the next generation lab look like, who is standing in it and what problems will they be solving?

Thermo Fisher Scientific partnered with Savanta, a leading market research company, to understand what professionals in life sciences expect the world to look like in 2030. We conducted 20 hour-long in-depth interviews and surveyed more than 600 life sciences professionals from the United States and Europe. What they had to say about the future was deeply reassuring, richly satisfying and occasionally surprising.

We asked respondents to examine the life sciences industry with an informed vision of where it could be in the near future, from how their professional lives might change and what technologies would advance, to what responsibilities an organization has with respect to issues like diversity and sustainability. What emerged was a reflection of science as a force for curing, caring, or confronting a raft of enormous challenges today and tomorrow.

Although life sciences today is a field focused on data-driven analysis, defined formulas, and clear-cut experimentation, it turns out scientists see the future being centered more on optimism and enhancing the human experience.

Highlights

Faced with these challenges, scientists are not afraid to tackle them, and are confident they are going to succeed:



91% of scientists agree that life sciences companies should prioritize people and humanity over the products and services they provide.



76% of scientists believe they will live to see a complete cure to most types of cancers during their lifetime.



92% of scientists say implementation of environmentally responsible R&D can be achieved by 2050. Driving sustainability is an important emphasis for scientists who believe they can make incredible things happen.



18% of scientists currently give their field an excellent grade for diversity.

39% of scientists say their field will have an excellent grade in diversity in 2030. Much work is needed here but scientists are confident that steps are being taken already to bring us far closer in the future.



88% of scientists believe that artificial intelligence (AI) computing will have completely transformed the operation of labs by 2030.

The value of science and the relationship between today's optimism and tomorrow's innovation

The past few years have been an interesting time to be working in science. As the world began to enter lockdown, all eyes fixed upon science, as companies in this sector were tasked with guiding the public through fear and uncertainty.

Life science leaders were asked about their current views and future outlooks on how society values scientists. Despite living in a new age of public opinion regarding science, the findings showed scientists feeling well-valued by society.

Nearly all (90%) of scientists feel that they are "valued" by society and two-thirds (67%) say scientists are "highly valued."

It's clear that today's scientists feel appreciated by the public. The small

share of scientists (10%) who don't view themselves as working in a valued profession today largely believe that in a decade's time things will be different, with 66% predicting that societal attitudes will pivot and scientists will be valued.

Despite global challenges, scientists believe it is a good time to be in life sciences.

But when thinking about the industry as a whole, there are some challenges, one being the ability to keep and recruit new talent. The "great resignation" may not be just a 2020 problem, as some scientists foresee hiring being an issue in the next decade. Looking toward 2030, 32% think attracting the best and brightest young people to science will be a difficult task to accomplish.

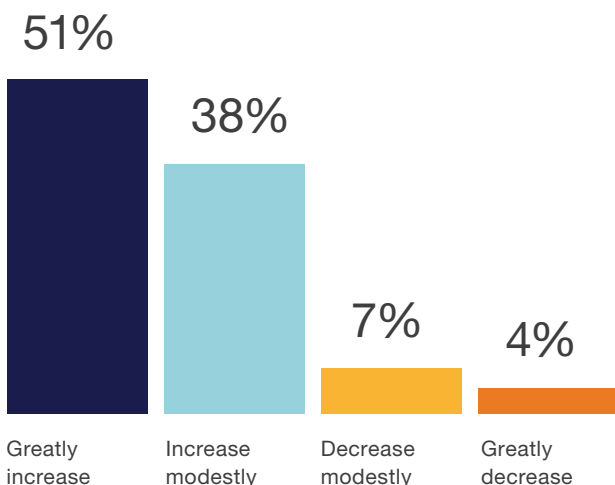
But how does the current value of science impact innovation tomorrow?

Our study found that scientists are an optimistic and idealistic group. One area where this is apparent is scientists' faith in new ideas that are integral to progress: in other words, innovation.

Over the next decade, nearly 90% of respondents believe innovation is on pace to "increase" between now and 2030.

One of the largest perpetual challenges in life sciences is the development of life-extending treatments and curative breakthroughs for cancer. In the face of this enormous challenge, 76% of scientists believe that science will develop a complete cure for most types of cancer in their lifetimes.

Perceived pace of life science innovation between now and 2030



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Innovation is synonymous with hope. To me it's hope for a better future, for a better cancer treatment.”

— Alyssa, Director, Clinical Research

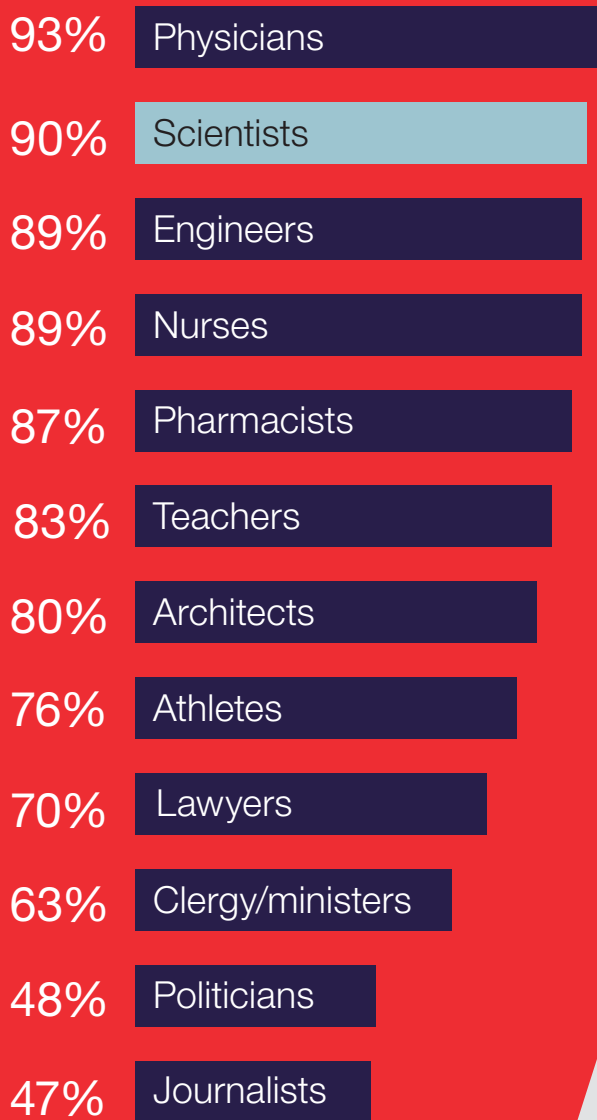
Many of these thought leaders have spent their careers in science, developing treatments for diseases; being optimistic about defeating one of the most frightening illnesses facing humanity is in line with their positive outlook toward science.

According to our respondents, there is no limit to innovation in life sciences. Scientists expect to see breakthroughs that can

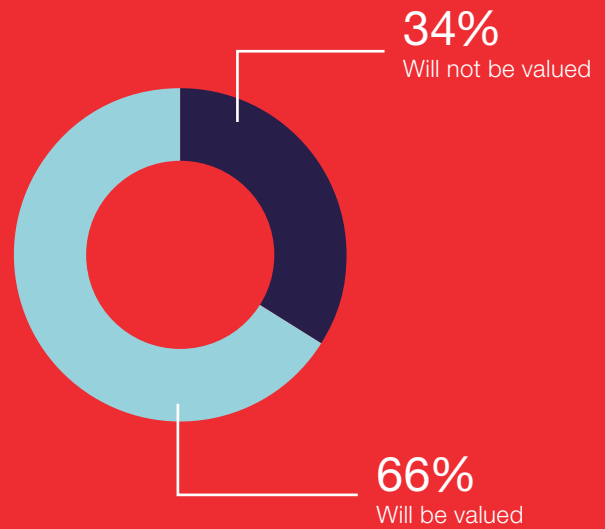
have profound effects on humanity. But before science can complete the structure to house these breakthroughs, work needs to be done on the ground floor. Typically it would start in a laboratory, but the modern lab as we know it is changing. How will labs look in the future, and what kind of technologies will be needed to reach peak innovation?



Today's most valued professions in the eyes of scientists



Of the few scientists that do not feel the profession is valued now, to what extent will it be valued in 2030?



It is an exciting time to be a scientist. And it's getting better. I feel like I'm just exploring my hobby or a passion, and I get paid for it."

— Masi, Director, Biotechnology

Hybrid workplaces and the shift to the (hybrid) lab of the future

The past two years have brought many challenges with lasting effects across all industries — one of these being the shift to remote or hybrid work environments. This move has been painless for some, but for others, new ways of working have proven to be disorienting. How dramatic is this shift, what types of change are seen as beneficial by science professionals, and what types are more difficult to incorporate?

While the hybrid model has taken root and continues to expand, with 51% working under this arrangement, scientists are uncertain whether the continuation of this hybrid model will help or hinder innovation in life sciences. When asked how much of their time would be spent working remotely by 2030, respondents gave an average two days per week.

Factors that are leading scientists to hybrid work in the future

Remote setting



86% of scientists agree that eliminating physical commutes is the best thing about working remotely.



77% of scientists agree remote work greatly decreases their job stress and anxiety levels.



68% of scientists think that remote working will enhance innovation and creativity in the future.

Traditional setting



80% of scientists agree that collaborating with their co-workers in the same place is very important to them.



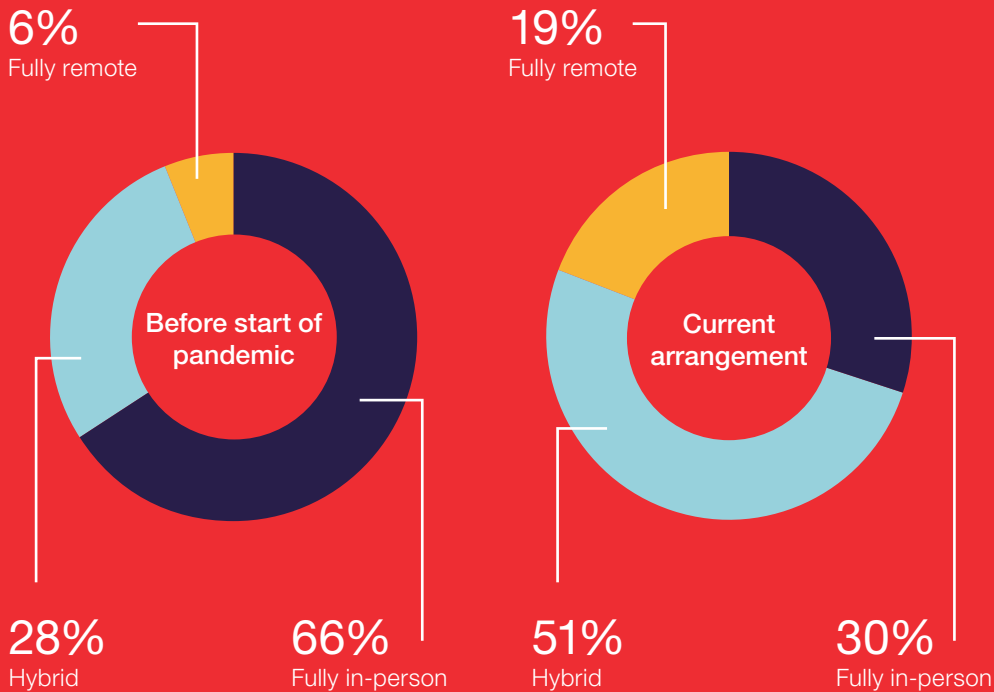
66% of scientists agree that their home office/ workspace lacks certain elements they need to do their jobs most efficiently.



52% of scientists who work remotely in any capacity say it has a negative effect on their personal productivity levels.

Since hybrid labs are here to stay, new technologies will be needed to fully execute this permanent transition. One new technology in the forefront is AI. Scientists view AI as a tool that will be crucial for the future of life sciences within and beyond the lab.

Work arrangements of scientists: before and after the pandemic



On average, scientists say
2 of 5
days of their work week will be remote in 2030

“

There is also having that flexibility of doing work in a home setting versus being actually there and having a hybrid model will allow you to have interaction in-person when needed. Though there are challenges, how we work in life sciences has evolved and new methods are likely here to stay.”

— Ila, Director, Pharmaceuticals

The role of artificial intelligence today and in 2030

It's rare to find an industry that hasn't been intrigued by the possibility of transformative change that AI and machine learning (ML) promise. And although AI and ML have faced challenges across industries and applications, observers continue to say that they will have incredible impacts on our lives in the future.

When asked to describe their feelings about AI in regard to their own work, unsurprisingly, optimism leads the charge, followed by enthusiasm and curiosity.

But AI brings its own set of challenges. Will new jobs that emerge from applications of AI in the life sciences offset any jobs lost from AI's effects? Scientists have mixed views on this topic as 43% say that by 2030, AI will have the net effect of increasing jobs, while 39% say that AI will do the opposite and reduce employment in life sciences.

The COVID-19 pandemic has also accelerated trends toward digital ways of working, including better connectivity, more streamlined connection between lab managers and staff, and the relentless march of digitized lab processes.

AI has generated excitement regarding life sciences capabilities in upcoming years. But AI is just one of many exciting developments in science. What other technological advancements should we expect to see come 2030?

By 2030, scientists believe the following:

88%

believe that AI computing will have completely transformed the operation of labs.

74%

say that fewer human workers will be needed in labs because of productivity gains tied to robotics.

74%

agree that by 2030, virtual labs will rival traditional ones in terms of numbers and output.

64%

say the labs of 2030 will be unrecognizable compared to right before the pandemic.

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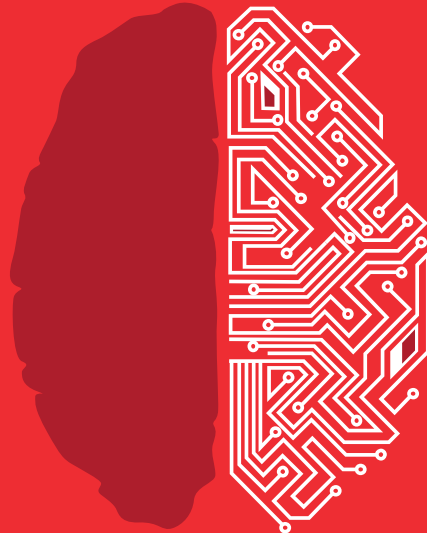
With AI the hope is that we can use that to help predict outcomes of health. We could use that for things like health economics outcomes research, payer-related savings from some of the data through AI, predictive analytics of how a person might progress, and what interventions can be made early on to result in health savings.”

— Anna, Associate Vice President,
Clinical Trials

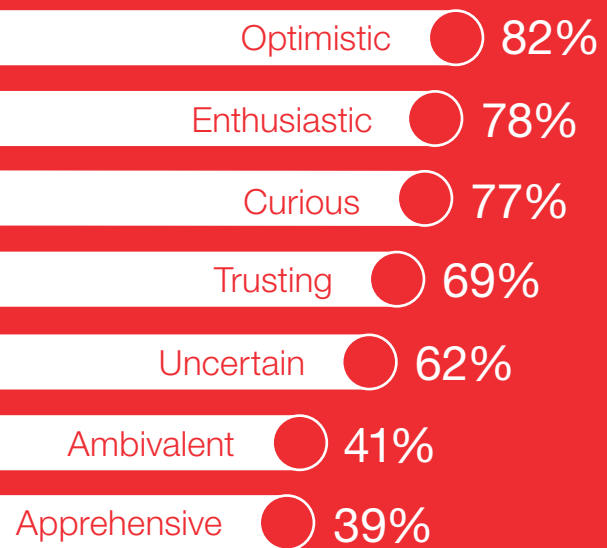
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I think labs are going to be virtual. Especially with the widespread use of non-invasive diagnosis tools now, we're very much going into near virtual laboratory.”

— Essam, Clinical Genomics



Feelings regarding artificial intelligence among scientists



Scientists say innovation is inevitable, but what is the balance of risks and rewards?



I'm hooked on wearables, because I just find them extremely interesting. I would say revolutionary."

— **Lisa**, Associate Director, Contract Research Organization



I think the use of robotics in surgery is certainly going to take off. There's a lot of untapped potential in the surgical space."

— **Jim**, Director, Biotechnologies



Science needs to spend more time considering the moral and ethical questions and effects that many innovations raise."

— **Andrew**, Director, Diagnostic Solutions

Life sciences developments: exciting and rising

Almost every industry sees a large amount of change, but in the life sciences words like "breakthrough," "revolutionary" and "life-changing" aren't trite — they often describe the relentless pace of new developments and discoveries.

The survey asked scientists to evaluate a set of scientific happenings that are close at hand at present on a number of attributes, such as the timing of arrival, levels of excitement and concern and other related categories.

- Personalized, individualized medical breakthroughs are among the developments seen as most exciting **at present**.
- Digital biomarkers and wearable/portable medical devices for health monitoring are seen as the most exciting developments to come **by 2030**.

Life sciences developments: hesitation and hype

Several developments, such as Internet of Things (IoT), virtual reality (VR), augmented reality (AR) and aspects of AI have "wait-a-minute" elements that can make scientists pause to reflect on cost-benefit ratios and ethical and moral calculations.

And while the overall levels are rather low, aspects of laboratory transformation may be oversold at this point in time, along with other "connective" issues.

The future of life sciences is bright. Scientists are optimistic in their capabilities as well as advancement of technology being where it needs to be to bring better innovations and treatments to the people they serve.

Does this optimism in science extend beyond the laboratory, how do scientists feel about humanity and are they confident about creating a better world? Let's see how science stands on these important issues.



Top five most exciting developments in 2030

- 1 Increasing use of digital biomarkers to influence health-related outcomes
- 2 Wearable/portable/implantable devices/remote and self-health monitoring
- 3 Personalized healthcare medicine
- 4 Utilizing advances in genomics and phenomics to combat disease
- 5 Greater understanding of the microbiome and resultant applications

Top five innovations that scientists predict will bring both risks and rewards in 2030

Use of IoT to facilitate self-management of disease, diagnostic testing and remote care

1

Autonomous vehicle/mobile robotic/drone technologies

2

Use of VR and AR in labs and manufacturing environments

3

Use of AI/ML to diagnose and treat patients

4

Self-driving, autonomous laboratories

5

Beyond the lab: sustainability, diversity and leadership in the future

Looking onto the next decade, climate change and sustainability may be the biggest challenge humans need to confront and conquer. When talking about issues surrounding the future of our planet with respondents, perhaps it is reassuring that 95% of scientists think sustainability is an important focus for life sciences companies over the next 10 years.

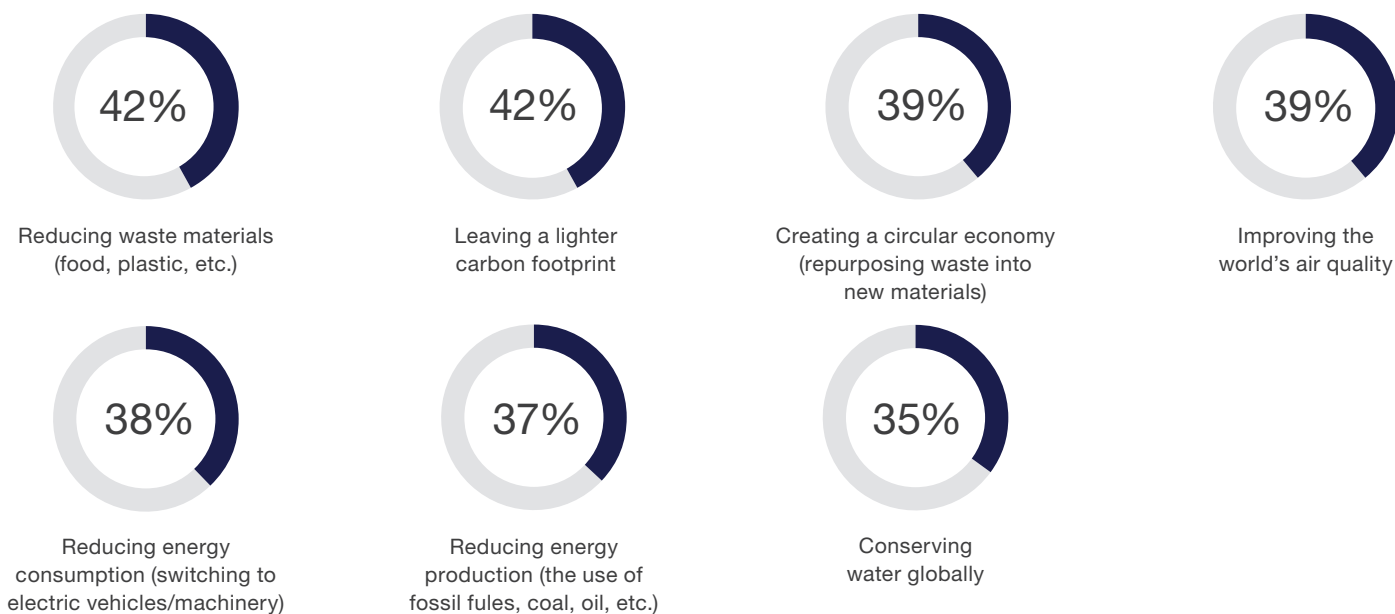
When respondents were asked to pick

the three most important sustainability issues companies should invest in to create a better future, what resulted was an even distribution of chosen topics. This suggests that scientists do not envision one true solution to the sustainability crisis, rather a combination of scientific resolutions that need to be obtained. When it comes to whether scientists believe they can solve these issues, the high awareness of all these items illustrates there is optimism that

necessary change can happen. But to do so, scientists need the support of their organizations to make climate change mitigation and adaptation a reality.

Scientists have concerns that organizations will do only the bare minimum to follow the “rules,” exclusively doing what’s convenient or superficial to bolster their brand image. Scientists see through these tactics, and they know exactly what they need to see.

Sustainability issues scientists say are most important to invest in now to create a better future



I think companies play it too safe and talk out of both sides of their mouth and pay a lot of lip service. They're not doing enough about it. They're not loud enough about it. As time goes on, sustainability will be key to attracting customers and high-quality talent."

— Dave, Director, Lab Equipment

Level of diversity scientists see in their field, today and tomorrow

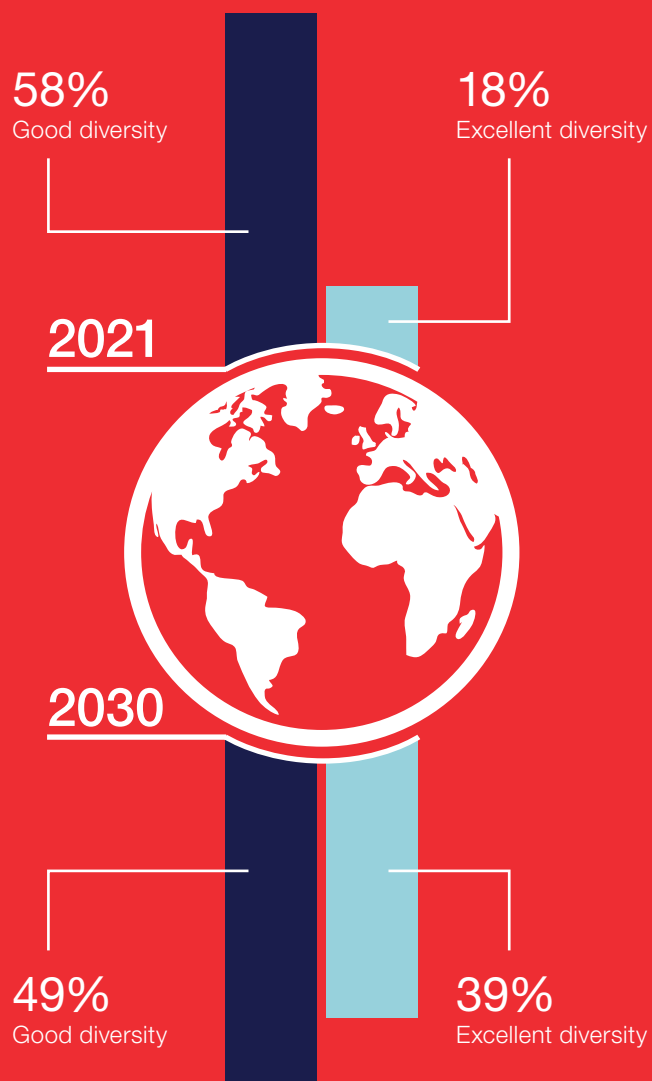
Despite formidable challenges for addressing the climate crisis, scientists were optimistic about achieving sustainability goals by 2030, and are very optimistic about their achievements by 2050. For example, they believe implementing environmentally responsible R&D activities (92% by 2050) and reducing energy consumption or switching to renewable energy sources (91% by 2050) will be within reach. The need to perform well on environmental, social and corporate governance (ESG) measures is also projected to increase in importance by 2030, according to 80% of scientists.

For scientists, the planet is a critical area of focus. But even more so are people. What do scientists have to say about the importance of promoting diversity in the future?

When it comes to a diverse environment in science, “good” isn’t good enough, and excellence is both desirable and attainable. When asked to evaluate the life sciences industry’s current efforts to promote and achieve diversity in the workplace, the majority of respondents felt it is “good” (58%). Only 18% said current diversity efforts in the industry deserved an “excellent” rating. However, they were more optimistic about the future of diversity in the life sciences. In 2030, expectations of excellence doubles to 39%.

For the industry to thrive in the future, it will be necessary to consider and promote diversity beyond only gender, to dismantle barriers for a broader range of scientific voices.

Scientists value working for diverse organizations, in part because they enrich conversations and worldviews, and can often facilitate unexpected breakthroughs.



Having people who have those different perspectives is so critical, especially in science and biotechnology. You need that. You need your ideas to be challenged, and you need those different dialogues and different perspectives in order to make a change.”

— Alyssa, Director, Clinical Research

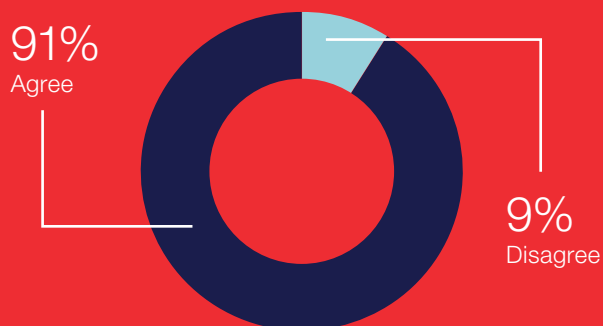
In order to accomplish goals in science, sustainability and diversity, great leadership is needed from the top level to implement winning policies. What are the characteristics scientists view as most important in their leaders?

We asked thought leaders in the life sciences industry to choose the three most important characteristics for companies to obtain global leadership.

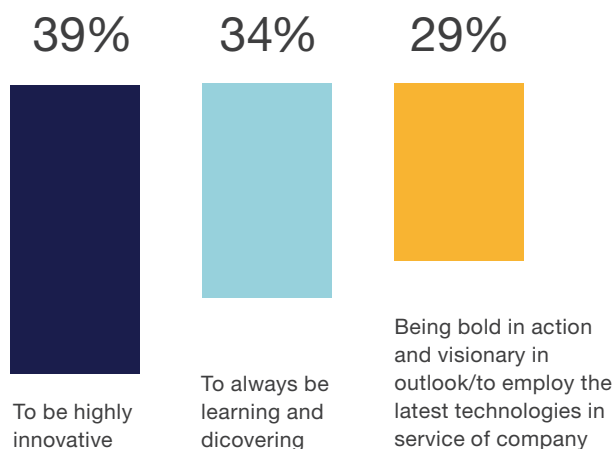
Among a heavy list of characteristics, being innovative, continuation of learning and discovering, and having a visionary outlook to employ the latest technologies were the three most important qualities for being a leading life sciences company.

Finally, when we asked respondents if life science companies should prioritize “people and humanity” or “products and services” they sell, it was no contest at all. People and humanity were far more important, with agreement by 91%.

“Life sciences companies should prioritize people and humanity over the products and services they provide”



According to scientists, the three most important characteristics of a leading life sciences company



Additional characteristics life sciences companies should possess



The world is changing every day. It’s essential for a company that wants to be a leader in the global market to be always one step forward to the changes that are developing in the world in order to be prepared to offer what the people and society need to have a better life.”

— **Javier**, Marketing Lead, Life Sciences

Conclusion

David S. Landes once wrote:

“In this world, the optimists have it, not because they are always right, but because they are positive. Even when wrong, they are positive, and that is the way of achievement, correction, improvement, and success. Educated, eyes-open optimism pays; pessimism can only offer the empty consolation of being right.”

This research among scientists reflects such a belief. The optimism and emphasis on humanity in this report are neither naïve nor misplaced: rather, they are borne from a belief that scientific discovery can lead to great accomplishments for humanity. These scientists think the future is at our door, and the outlook is bright. What people may think of as futuristic concepts are already in use for many scientists, and this is only going to accelerate. In this time of wondrous innovations, technological breakthroughs and rapid change on all fronts, individuals, nations, even our entire planet can be helped and healed by science.



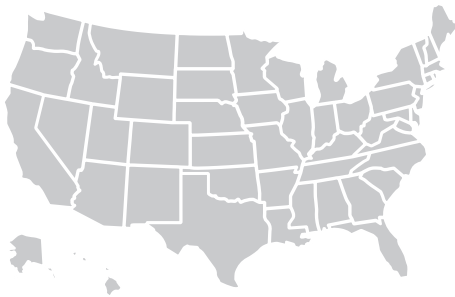
Methodology

Respondent demographics

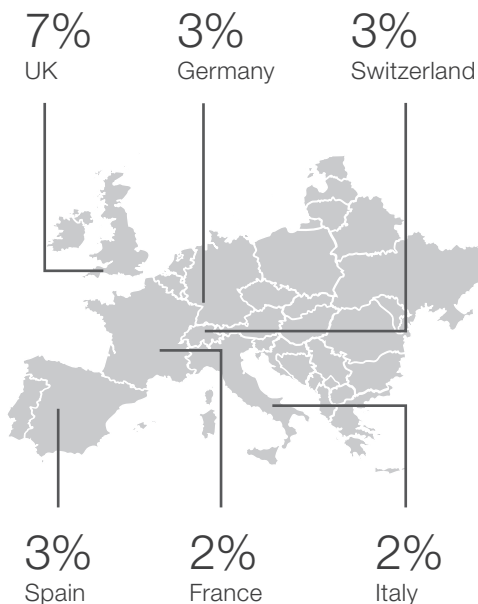
Savanta and Thermo Fisher Scientific conducted an online survey with 606 scientists along with 21 in-depth interviews with leading life sciences professionals from across the globe. Participants included a close male-to-female ratio, age representation in the 24 to 64 range, and a mix of professional titles across the entire span of the life sciences category.

Countries

US — 80%



Europe — 20%



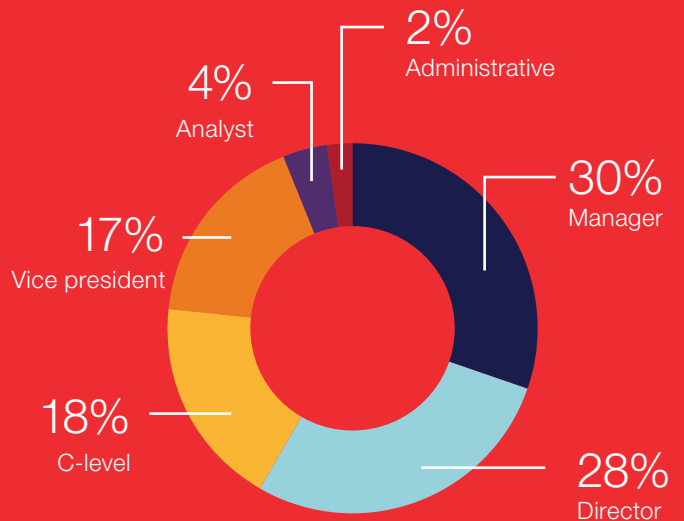
Gender



Age



Job title



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