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Technology Vision 2021 for Life Sciences

Leaders Wanted

Experts of change at a moment of truth

accenture >

The when, where and how of care is changing. Rising costs of New Science[1] and patient care, and the increase in demand for more holistic care models and experiences, have the industry challenging itself to do the impossible: Produce and deliver more effective, affordable, personalized treatments and solutions—all while adapting to new ways of working at an accelerated pace.

Our 2021 technology vision survey revealed that leaders don't wait for the "new normal," they build it themselves. Big changes today require bold, innovative leadership that prioritizes tech. And it's not just about fixing the business but upending convention and creating a new vision for the future.

96%

of biopharma executives believe capturing tomorrow's market will require their organization to define it; this was the highest percentage of all industries surveyed.

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Embracing a new mindset to shape a better future

The disruptions and demands caused by the COVID-19 crisis set a high bar for life sciences companies—with many meeting or exceeding expectations. Companies had to reevaluate how to keep their operations and workforce inspired while staying committed to delivering products and solutions to patients and companies around the world. Even with extreme levels of instability, the past year shattered industry norms and showed the art of the possible, when technology is driven by a renewed sense of purpose, focus and commitment to patients, customers and the general population.

My organization is operating with a renewed sense of purpose this year.

	58%		
39%			
		2%	1%
Strongly agree	Agree	Neither agree or disagree	Disagree
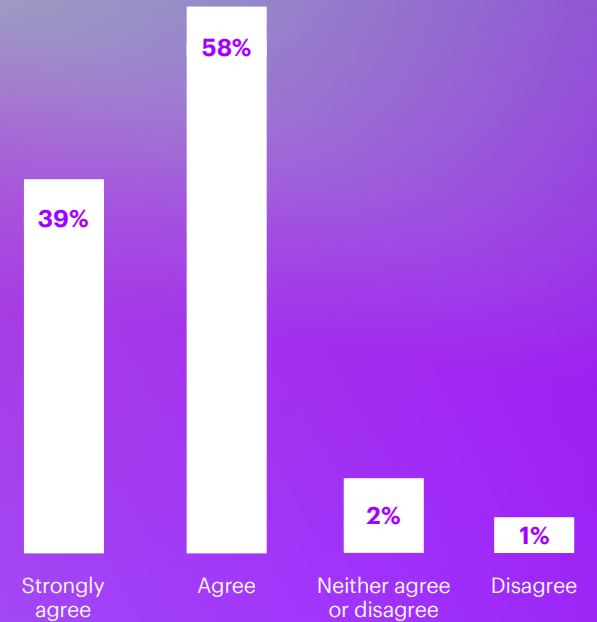
97%
of biopharma executives said their organization is operating with a renewed sense of purpose this year.

With New Science driving post-pandemic market leadership in biopharma, and MedTech companies thinking more strategically about connected technology platforms, these shifts will require new talent, processes and technical capabilities to improve treatments and outcomes.

Success will demand more than integrated business and technology strategies—it will require sustainable operations from the top-down that account for the needs of patients at every step of their treatment journey.

To deliver on the promise of better patient and customer outcomes, a digital-first approach must be nurtured by the entire C-suite and manifested across R&D, supply chain, patient services and industry support functions at a pace never seen before.

94% of biopharma executives report that their organization is innovating with an urgency and call to action this year.

Our five technology trends for 2021

Technology has sustained us through the pandemic and now continues to redefine how we work, live and interact. These are the key tech trends life sciences leaders must embrace to forge a better future.

1 Stack Strategically

Architecting a better future

With the ever-accelerating pace of change in the life sciences industry, companies will compete on architecture based on an integrated business, technology and digital strategy.

2 Mirrored World

The therapeutic potential of massive, intelligent, digital twins

Growing investments in data, AI and digital twin technologies allow companies the freedom to transform their innovation process in a risk-free, digital environment.

3 I, Technologist

The democratization of technology

Creating digital natives is about making individuals comfortable with technology. In making technology more accessible, leaders must now activate creativity by accentuating and amplifying human ingenuity through technology.

4 Anywhere, Everywhere

Bring your own environment

It's time for life sciences companies to maximize virtual technology benefits by understanding the appropriate application of the new hybrid (remote and in-person) operating models throughout their value chains.

5 From Me to We

A multiparty system's path through chaos

Arguably more than any other industry, life sciences experienced a COVID-19-driven scramble to reimagine partnerships—with multiparty systems gaining newfound attention.

Trend 1
Stack Strategically

Architecting a better future

New business models, New Science and new technologies like the Internet of Things (IoT), applied analytics, augmented reality and cloud can unlock the power of ecosystems and data to create a competitive edge. The internal reinvention of the technology stack strategically aligned to the business will not only drive efficiencies in internal operations, but also the ability to create boundaryless ecosystems that facilitate the new business models required for success.

A new era of competition has arrived in life sciences—one where companies compete on their architecture. This means companies need to reinvent their internal technology landscape to compete and win in external ones.

94%

of biopharma executives agree that their organization's business and technology strategies are becoming inseparable—even indistinguishable; this was the highest percentage of all industries surveyed.

Takeaways

2020 revealed the opportunity to use cloud and microservices to unlock the potential of legacy technologies. Life sciences companies now need to bank their achievements and scale them up towards an adaptive technology foundation that is not weighed down by legacy.

Unlocking legacy internal systems will only get you so far—a trusted partner ecosystem is critical to industry success, particularly in a M&A-intensive landscape. All life sciences companies will need to build technology stacks that are fluid across the ecosystem.

A global consumer healthcare company focused on switching its technology organization from a project- to a product-centric operating model.[2] Within the global health team, it aligned to ensure the business and technology teams act as one, united around shared strategy and goals and managed by a single backlog of priorities. The outcomes? In 2020, product release times were reduced from every three months to every two weeks for the Global Health Partner site, unique visitors increased by 300% to 2.5million, and registrations doubled, with 69% new reach. Much of the industry is seeing constraints with legacy technology, data and organizational silos. Although these served their short-term needs, they aren't easily adapted to today's new business realities, and fail at being future-ready. A microservices revolution will enable organizations to design applications as reusable components, giving enterprises the flexibility they so desperately need.

A global biopharma company adopted a multi-tenant concept with AWS Glue, rendering an on-demand, pay-as-you-go capability with an enterprise data lake microservices approach.[3] This allowed for faster data access and better insights in the drug development process. For the scientists, speed and ease of use for rapid adoption were core tenets of success.

Industry leaders have already created "as-a-service" foundations across the enterprise and are leveraging microservices and easily portable cloud-based applications. This approach allows for seamless integration with the extended ecosystem as companies strive to push the necessary boundaries to better serve their patients.

96%
of biopharma executives believe that their organization's ability to generate business value will increasingly be based on the limitations and opportunities of their technology architecture.

Trend 2
Mirrored World

The therapeutic potential of massive, intelligent, digital twins

Digital twins were initially adopted for their ability to monitor, simulate and streamline data from discrete devices. Increased adoption, combined with the addition of AI and analytics, encouraged life sciences leaders to scale their individual digital twin projects into networks of intelligent twins—living models of entire factories, product lifecycles and end-to-end supply chains. These models create continuous threads of data that will soon be essential to every enterprise's digital strategy, allowing companies to innovate, reduce costs and contain risks at deployment.

Digital twins have been around for a while, but in life sciences, COVID-19 provided the moment of truth. The process of developing and distributing the vaccines designed to combat the pandemic has effectively been years in the making, as digital twin technology provided the platform for productivity to explode when it counted the most. On the medical device side, digital twins can help researchers and product development teams to model complex scenarios, such as surgical simulations and clinical device interactions.

Takeaways

Mirrored-world simulations give life sciences companies the freedom to transform their innovation process by exploring new ideas and asking limitless "what-if" questions in a risk-free, digital environment.

Digital twins have already proven crucial to building effective supply chains in a complex and evolving life sciences market.

Digital twins offer faster and greater research and development insight at relatively low risk, but accessing that insight requires an ecosystem mentality—going beyond the enterprise's four walls to share data and collaborate.

Technology Vision 2021 for Life Sciences

Digital twins have great application in the operational and supply chain aspects of life sciences. They can be used to test the efficiencies of different plant configurations, or to test production efficiency to drive greater insight, predictability and consistency. Companies can emulate the distribution of different products and services, based on target population, logistical infrastructure, needs, etc.

Siemens Healthineers has created a digital twin to simulate the use of cardiac resynchronisation therapy—a treatment option for patients suffering from chronic congestive heart failure. It involves an advanced pacemaker that resynchronises the beating heart using two electrodes, one implanted on the right ventricle, the other on the left.[4]

In creating the Pfizer-BioNTech vaccine,[5] scientists were able to bring data and intelligence together at an unprecedented scale and ask and answer questions using digital twins before committing to unnecessary costs. During vaccine development and production, companies shared recipes, production line setups and process data to create greater speed and predictability. A digital twin control tower enables life sciences executives to recreate an overview of the broader ecosystem to more accurately predict outcomes and optimize every facet of the product lifecycle in advance. As a result, life sciences companies can reimagine how they operate, collaborate and innovate.

We expect to see similar 'Mirrored World' concepts that transformed enterprises from individual 'machines' to end-to-end systems applied for humans with the focus on individual organs and genetic codes shifting to the full human experience, including patient behaviors. This could not only identify the right treatment for an individual, but allow digital twins an opportunity to impact adherence, quality of life and long-term outcomes.

What is a digital twin?

A digital twin is a virtual representation of an object or system. It precisely emulates that object or system's behavior and characteristics by using real-time data combined with simulation to enable scenario planning and improve decision making.

97%

of biopharma executives agree: Digital twins are becoming essential to their organization's ability to collaborate in strategic ecosystem partnerships.

Trend 3
I, Technologist
The democratization of technology

If there is one thing that has been underlined by COVID-19, it's the realization that it takes more than science to conquer care in the future. Making technology accessible to all, be it through low code platforms, natural language processing or robotics process automation, puts powerful capabilities in the hands of people across functions. Now the focus shifts toward building digital natives across the enterprise, connecting the disciplines across the organization, enabling data exchange across the ecosystem and activating creativity by accentuating and amplifying human ingenuity through technology.

Takeaways

Scientists are already accustomed to breakthrough technologies in life sciences—now it's time to drive their use through the rest of the organization. This will require upskilling and training the entire enterprise to build digital fluency.

Democratization of technology doesn't mean anarchy: Boundaries are vital while driving adoption and being mindful of the special need for responsible data governance.

Leaders must create the space for people at a grassroots level to experience a culture change and feel the freedom to participate, experiment and become technologists.

I, Technologist is about bringing humans closer to technology—not just technology closer to humans. In fact, 98% of biopharma executives believe technology democratization is becoming critical in their ability to ignite innovation across their organization,[6] the highest of all industries surveyed. Scientists' core discipline has already been transformed by technology in the research and development space. Now, it's about connecting more diverse research teams via technology; allowing increasingly accessible technology (like low code/no code) to penetrate other areas of operation; aggressively facilitating the flow and exchange of data for clinical trials and approvals through centralization; all while continuing to ensure data is accurate and secure.

One of the world's leading biotechnology companies is investing in a strategic program to encourage its employees to become digital natives in a flexible and intuitive manner, one that would balance out the need for transformation without creating additional burdens. The solution involves more than technology: It includes a culture change built on cooperation, agility and connection. The teams are creating engaging virtual experiences by leveraging the latest collaboration tools (e.g. Miro, Pigeonhole, Menti, Whitespace). The program is focused on deploying NextGen learning methods such as bite-sized and experiential learning to feel less bulky and heavy for trainees.

Democratization of technology not only allows, but forces people to create grassroots movements and experiment with creative processes and technology applications. This provides the opportunity to make humans more aware of, and comfortable with, the technology that's out there. The challenge is to activate that creativity (tempered by appropriate controls) on an ongoing basis, and to upskill individuals so that they see themselves, and act as, technologists.

90% of biopharma executives agree their organization must train their people to think like technologists—the highest of all industries surveyed.

Trend 4
Anywhere, Everywhere

Bring your own environment

With shifts in technology, data and innovation, there is a need for life sciences companies to rapidly adjust to new ways of working. While laboratory and plant work may require a controlled environment, there's a range of other work that can be done remotely. Hybrid ways of working present obvious benefits for life sciences enterprise functions (HR, finance etc.), but require new levels of professional trust. Patient needs and experiences should also be at the core of these responses to market innovation and disruption.

The "bring your own environment" (BYOE) model will drive the industry's technology agenda in terms of connectivity, collaboration and the tools and platforms that enable them. Specific activities like team-building brand exercises or town hall events must be catered for, but the future-ready workspace might look more like a studio than an office space with cubicles.

Takeaways

During the pandemic, life sciences focused on the technical necessities of making BYOE work possible. Now, good governance and business model optimization require them to make it seamless and secure. Enterprises must address pain points to ensure sustainability.

Real-time, online collaboration to leverage a potentially national, or even international, talent pool offers great benefits. But new behaviors require a trust-based social contract driven by leaders and teams, and among peers within teams, to specify when and how remote collaboration occurs and on what terms.

Technology Vision 2021 for Life Sciences >

The remote worker has been a corporate hypothetical for decades. Although life sciences companies experimented with this on a small scale to decrease costs, COVID-19 drove the industry to put it into practice. Now it's time to push the envelope, with guardrails and a continued emphasis on productivity and preserving the human connection that is still vital to employee engagement.

Opportunities across the value chain in functions like HR, finance, marketing, analytics and insights, can easily be sent off site but scientists still prefer to be close to where samples are

being captured. It's time to go back to first principles and look at function-based, rather than role-based, allocations of tasks to discern which ones could be performed remotely.

At the same time, life sciences companies have to balance cost and efficiency considerations with individualized work preferences while ensuring appropriate governance and compliance. A heavy-handed focus on the bottom line could create unattractive working models that make companies uncompetitive in the employment market, and a cookie-cutter approach might not have enough flexibility to

attract workers from different generations who need tailored blends of employment practices.

The balance between employee fulfilment and company goals is a fine one and requires a new social contract that creates and maintains an easy trust between leaders and teams, and the workforce as a whole. Effective governance models must provide seamless, secure means of collaboration and communication in a new hybrid world. Function- rather than role-based ways of working will determine who does what, where and when human-plus-machine options are appropriate.

92%

of biopharma executives believe the remote workforce opens up the market for difficult-to-find talent and expands the competition for talent among organizations.

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Trend 5
From Me to We

A multiparty system's path through chaos

Three ways companies typically innovate are to build, buy or partner. In life sciences, the emphasis has moved from building and buying to partnerships. Partnerships enable a faster time-to-insight and -technology. Make no mistake, M&A activity and building the right skills internally are as important as ever. However, the greater partnership emphasis represents a strategic acceleration to gain access to skills and technology—to enable experimentation and business model innovation faster than ever before.

Whether as a result of the pandemic, or simply in response to more demanding consumers in an increasingly digital business environment, life sciences companies and their CEOs are under greater pressure than ever before. They are expected to meet end user expectations and seize first mover advantage given seemingly impossible timeframes.

Takeaways

Life sciences companies need to enable their ecosystems to collaborate freely using sensitive data and algorithms without compromising data security and privacy.

Large enterprises' relationships with startups are changing—the need to innovate rapidly is driving adoption of multiparty systems. Customers require nimble responses built on company-wide innovation mindsets that balance speed of adoption with appropriate governance, led by corporate venture/business development groups.

Technology Vision 2021 for Life Sciences

One major potential obstacle to consider is trust, because most contemporary innovation is data driven. Companies and consumers expect their data to be both secure and used in their best interests. How can data be shared to allow for innovation without compromising on data integrity and jeopardizing trust? The answer might, again, lie with technology itself. TripleBlind,[7] for example, is a startup that opines that "privacy-enforced data and algorithm interactions will unlock the tremendous value, currently trapped in private data stores and proprietary algorithms."

Data sharing also enables effective democratization, giving both consumers and companies access to the information they need to make informed decisions about innovation and care. Without democratization, even large companies won't be successful. Data sharing further enables life sciences companies to benchmark themselves against each other and other industry segments.

To build greater resilience, life sciences companies must be consumer driven. Patients are increasingly engaged with their care and expect rich experiences that depend on digital ecosystem partnerships and innovative technologies like cloud. The process starts with appropriate technology investment and thinking beyond traditional industry boundaries.

Increased consumer demands with respect to a rich experience during their own care are predicated in large part on building effective digital ecosystem partnerships. While building and buying new capabilities are still important business practices, the life sciences mindset has shifted to far greater proportion of partnering, where trust, security and healthy equity remain key principles. It's time to challenge orthodoxy and use multiparty systems to create order from the chaos.

98%

of biopharma executives state that multiparty systems will enable their ecosystems to forge a more resilient and adaptable foundation to create new value with their organization's partners—the highest of all industries surveyed.

Taking the lead

A new era of competition is dawning—one where architecture matters. The leaders who excel will be decided not just on the success of their business plans, but on the ingenuity of their technology choices. With only 75% of biopharma executives saying that

their organization is facing technological changes at an unprecedented speed and scale (the lowest of all industries surveyed), there is room to improve and adopt accordingly. To help turn these trends into action, we suggest the following:

Stack Strategically

Invest in a focused path to build a digital decoupled, future-ready architecture with cloud and microservices, aligned with business capabilities.

Mirrored World

Assess where you can drive the best value from digital twin capabilities. Move beyond experimentation to expand and embed into your core operations.

I, Technologist

Embark on a journey to foster digital natives across the enterprise, empowering and upskilling your workforce so that they see themselves, and act as, technologists.

Anywhere, Everywhere

Promote and adopt trust-based social contracts, reflective of your organization's culture and driven by leaders, teams and peers within teams, to specify when and how 'work' occurs and on what terms.

From Me to We

Build your ecosystems so they can plug and play, experiment and find new, innovative business models and solutions more quickly with the right value to patients.
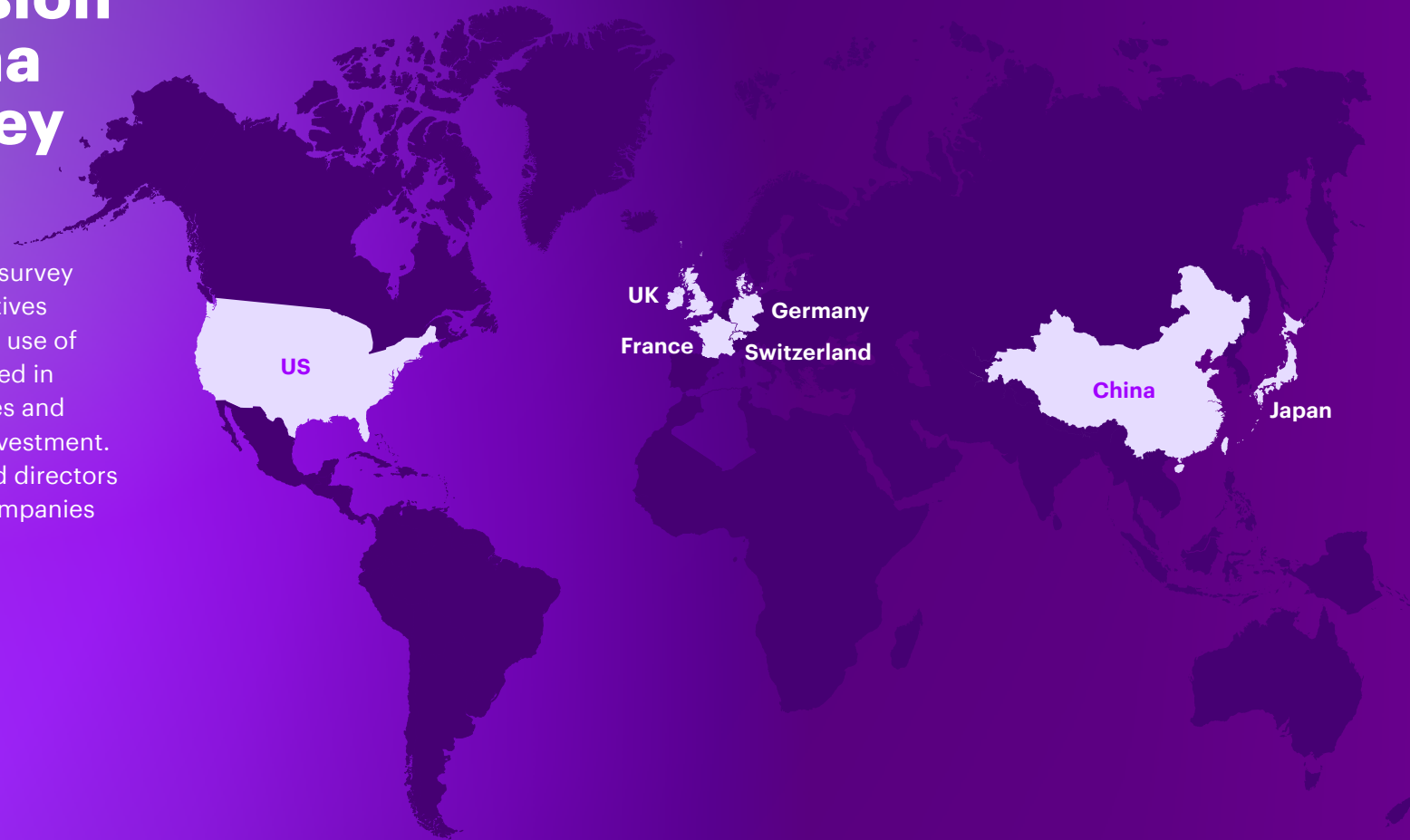
In closing

A new future is on the horizon—one that's different from what the world expected. As this future takes shape, there will be no room for life sciences enterprises that cling to the past. Life sciences companies must, sustainably and appropriately, maintain connected ways of working, digital fluency and ecosystem collaboration. People are ready for something new and it's time for biopharma and medical technology companies to join them.

Technology Vision 2021 biopharma executive survey

Accenture Research conducted a global survey of 100 biopharma business and IT executives to capture insights into the adoption and use of emerging technologies. The survey, fielded in March 2021, helped identify the key issues and priorities for technology adoption and investment. Respondents were C-level executives and directors at pharmaceutical and biotechnology companies across seven countries.

UK

France

Germany

Switzerland

US

China

Japan

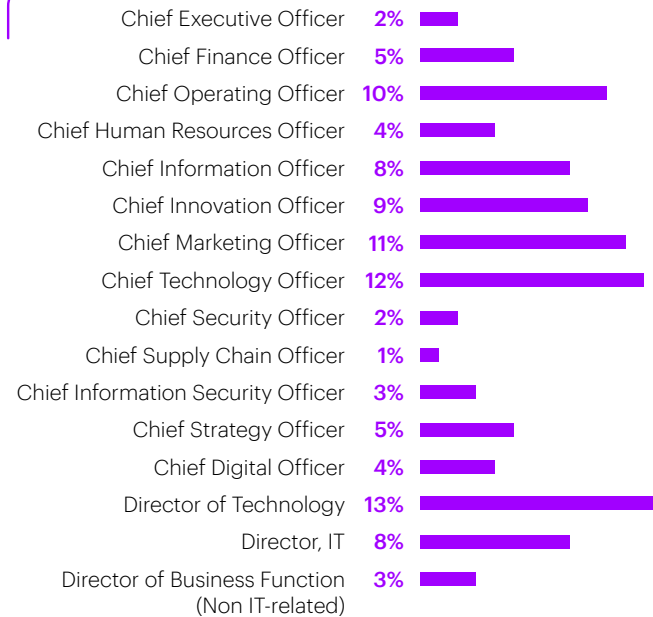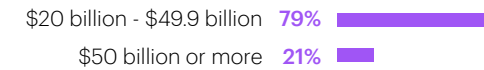# Survey demographics

Country

US	**30%**	
Switzerland	**15%**	
China	**15%**	
UK	**10%**	
Japan	**10%**	
Germany	**10%**	
France	**10%**	

Role

Chief Executive Officer	**2%**	
Chief Finance Officer	**5%**	
Chief Operating Officer	**10%**	
Chief Human Resources Officer	**4%**	
Chief Information Officer	**8%**	
Chief Innovation Officer	**9%**	
Chief Marketing Officer	**11%**	
Chief Technology Officer	**12%**	
Chief Security Officer	**2%**	
Chief Supply Chain Officer	**1%**	
Chief Information Security Officer	**3%**	
Chief Strategy Officer	**5%**	
Chief Digital Officer	**4%**	
Director of Technology	**13%**	
Director, IT	**8%**	
Director of Business Function (Non IT-related)	**3%**	

Revenue

$20 billion - $49.9 billion	**79%**	
$50 billion or more	**21%**	

Sector

Pharmaceuticals	**76%**	
Biotechnology	**24%**	

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Resources

[1] New Science: A new economic reality for innovation and growth

[2] Transforming from a project to product-centric organization

[3] Biopharma on AWS: Bring advanced and differentiated therapeutics to market faster with AWS

[4] Could digital twins revolutionise healthcare?

[5] How Pfizer Makes Its Covid-19 Vaccine

[6] Technology Vision 2021 Business and IT Biopharma Executive Survey.

[7] TripleBlind: Unlock Private Data Sharing

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We have decades of experiences working with the worlds most successful Biopharma, Biotech, MedTech, Distributor, Digital Health, Contract Research and Manufacturing companies to innovate and improve their performance and across the entire Life Sciences value chain to better serve patients and stakeholders. Accenture's Life Sciences group connects more than 20,000 skilled professionals in over 50 countries who are personally committed to helping our clients achieve their business objectives and deliver better health and economic outcomes.

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