Life Sciences

FUTURE FAST FORWARD

Transform the value chain to address future cost, innovation and service challenges with a powerful business platform

DASSAULT SYSTEMES

THE FUTURE DEMANDS TRANSFORMATION

MEET THE EXPERTS

STEVE LEVINE
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Levine is the founder of the Living Heart Project, the groundbreaking project that brought together cardiovascular experts in science, engineering and clinical practice to develop the first commercially available electro-mechanical human heart simulation.

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Director
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D'Souza is currently focused on developing and commercializing novel digital health solutions for the Life Sciences industry. He has had over 20 years' experience in computational modeling and simulation.

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Business Consultant Director
Life Sciences Industry

Kerboul is responsible for creating and developing strategy and associated solutions for pharmaceutical, medical devices and patient care industry segments.

INTRODUCTION

The Future Demands Transformation

Consumers used to the value and immediacy of digital technologies, are no longer satisfied with one-size-fits-all products and services.

Thanks to the Internet, people are more informed than ever before. Some are even managing and tracking their health with devices. They want active participation in their treatments.

Consumers are using health and fitness technologies to:

Refill a prescription **56%**

Measure fitness and health improvement goals **32%**

Pay a medical bill **24%**

Monitor health issues **24%**

Check on the cost of care using an online cost tracker **18%**

Receive alerts or reminders to take medication **17%**

Measure, record, or transmit data about medication **15%**

Life Sciences and Health Care Predictions 2022 [Deloitte, 2017]

According to a Deloitte report, in 2016, 75 percent of consumers in the United States sought a partnership with their providers to determine the most effective treatment decisions.[1]

This change is causing a shift in the Life Sciences industry, says Guillaume Kerboul.

"The first important shift is the shift from treatment to prevention. That means, other than curing disease, there is now more attention on preventing disease."

To offer preventive solutions, pharmaceutical and medical device companies need to continuously get insights from patients in order to innovate better treatments.

"[In this new environment], pharmaceutical and medical device companies must not only reach the patient at the physician's office or the hospital, but to also find a way to reach them at home," says Kerboul.

The other shift is a shift of expectations to outcome-based models, where companies are paid for positive outcomes.

"The consequence is in the way you will develop your product, but also in the way you will measure the efficiency and efficacy of your treatment," he adds.

TRANSFORMING THE VALUE CHAIN

Currently, there isn't an easy way for companies to get reliable information directly from their customers — the patient — making it tough for companies to have a continuous relationship with them.

The existing pharmaceutical and medical devices value chain is disjointed, Steve Levine explains.

> "There's not very good communication along the value chain. The people doing the innovation are very separate from the experience of their users."
>
> — Steve LEVINE

The value chain's disconnected nature also makes it a challenge for experts of various disciplines to collaborate and innovate together, which means drugs or medical devices will take a longer time to get to market.

In the end, the current system is not well-suited for the challenges facing the industry today nor will it deliver the personalized experiences the market demands.

EMBRACING THE FUTURE

"Digital technologies favor a patient-centric world," says Levine.

"If you're not becoming patient-centric, then you will become less competitive because in a digital economy, patients will have more control and more choice. And they'll respond to those companies that deliver a better patient experience," says Levine.

Companies that do not adapt to these demands in time will be left behind, unable to keep up with the pace of innovation, becoming irrelevant to consumers.

But there is a better way: Successful first movers and technology adopters will gain massive competitive advantage.

FAST FORWARD TO THE FUTURE

Imagine a time where data insights help predict drug reactions, enabling a pharmaceutical company to create more efficient drugs.

Experts around the world work in real time to create a digital replica of the human heart.

A medical device's efficacy is tested on a virtual human body before a prototype is made.

Scenarios like these seem like something out of a science-fiction novel.

However, these situations are close to becoming a reality — or even already exists.

The following are three key digital technologies that can set up pharmaceutical and medical device companies for success in the future:

3D MODELING AND SIMULATION

Real-world data has enabled the creation of in silico models of the human body using digital simulation technology.

The key to an accurate virtual model of a human being lies in the details, says Levine.

"We have learned that developing a model from data that is not intended for building or testing a good model is rarely of the quality that you can rely upon. So, to get the benefits, the industry has to commit to collecting data for the primary purpose of developing accurate models," he says.

While it's still early in the day for this new frontier of medicine, the potential for virtual human models is vast.

If one can simulate a medical solution virtually, organizations can create better-targeted solutions and experiences to avoid expensive mistakes.

3D modeling and simulation can also be used as a universal language.

"Virtual reality and interactive settings allow people who are not really experts in all areas to derive maximum knowledge from what you're trying to do," says D'Souza.

DATA SCIENCE

Data is the new currency of Life Sciences.[2] By aggregating personal health data, there will be better health interventions, early prevention, greater personalization of care and more effective measuring of outcomes.

Life Sciences companies stand to gain from improvements in:[3]

- Research and development efficiencies
- Clinical trials through better insights, greater efficiencies and lower costs
- Customer experiences

But there's a huge amount of data to be harvested and no easy way to access it. Data is currently siloed and incomplete across the value chain.

There are three reasons why this is so, says D'Souza:

- Many health providers consider medical records and insights as intellectual property
- Providers are limiting access to data due to privacy concerns
- Health providers are unaware of the existence of additional health data

What is needed is a unified platform that allows us to integrate and analyze data from multiple, sometimes disparate sources.

CLOUD TECHNOLOGY

Many Life Sciences companies are acknowledging that cloud technology will transform the way they do business.

KPMG found that 64 percent of Life Sciences companies have already adopted cloud technology or plan to do so. They consider it one of the top priorities to enhance internal efficiency.[4]

According to the same KPMG report, when Life Sciences companies adopt cloud-based solutions:

- Capital investment and operational costs are lowered with user-based pricing models
- Data will support activities across the value chain
- Processes will be optimized and the cost of doing business will be reduced
- Data from Internet of Things can be processed and analyzed more easily

Cloud technology is a cost-effective solution to eliminate data siloes and create digital continuity in disjointed legacy systems.

It will also accelerated collaborative innovation and ultimately create better-personalized customer experiences.

CASE STUDY: THE LIVING HEART PROJECT

What happens when data, 3D modeling and simulation come together on a cloud-based business platform

According to the World Health Organization, cardiovascular disease (CVD) is the number one cause of death globally. An estimated 17.9 million people died from CVD in 2016, with 85 percent due to heart attack and stroke.[5]

To solve this global problem, Dassault Systèmes launched the Living Heart Project (LHP) in 2014.

Leading cardiovascular researchers, educators, medical device developers, regulatory agencies and practicing cardiologists worldwide worked to create a 3D model of the heart.

This model is now being used worldwide to create new ways to design new devices and drug treatments. For example, global manufacturer Admedes Schuessler GmbH tested their devices by implanting them virtually into the 3D heart model.[6]

"Although we are still in the early phases of maturity, we have demonstrated that on the **3D**EXPERIENCE® platform, pharmaceutical and medical device companies can evaluate the function and risks of new drugs or devices; optimize design, delivery and manufacture; and help identify exactly which patients would be the best candidates in the clinic for a given treatment," says Levine.

Regulators are also seeing the potential in the LHP.

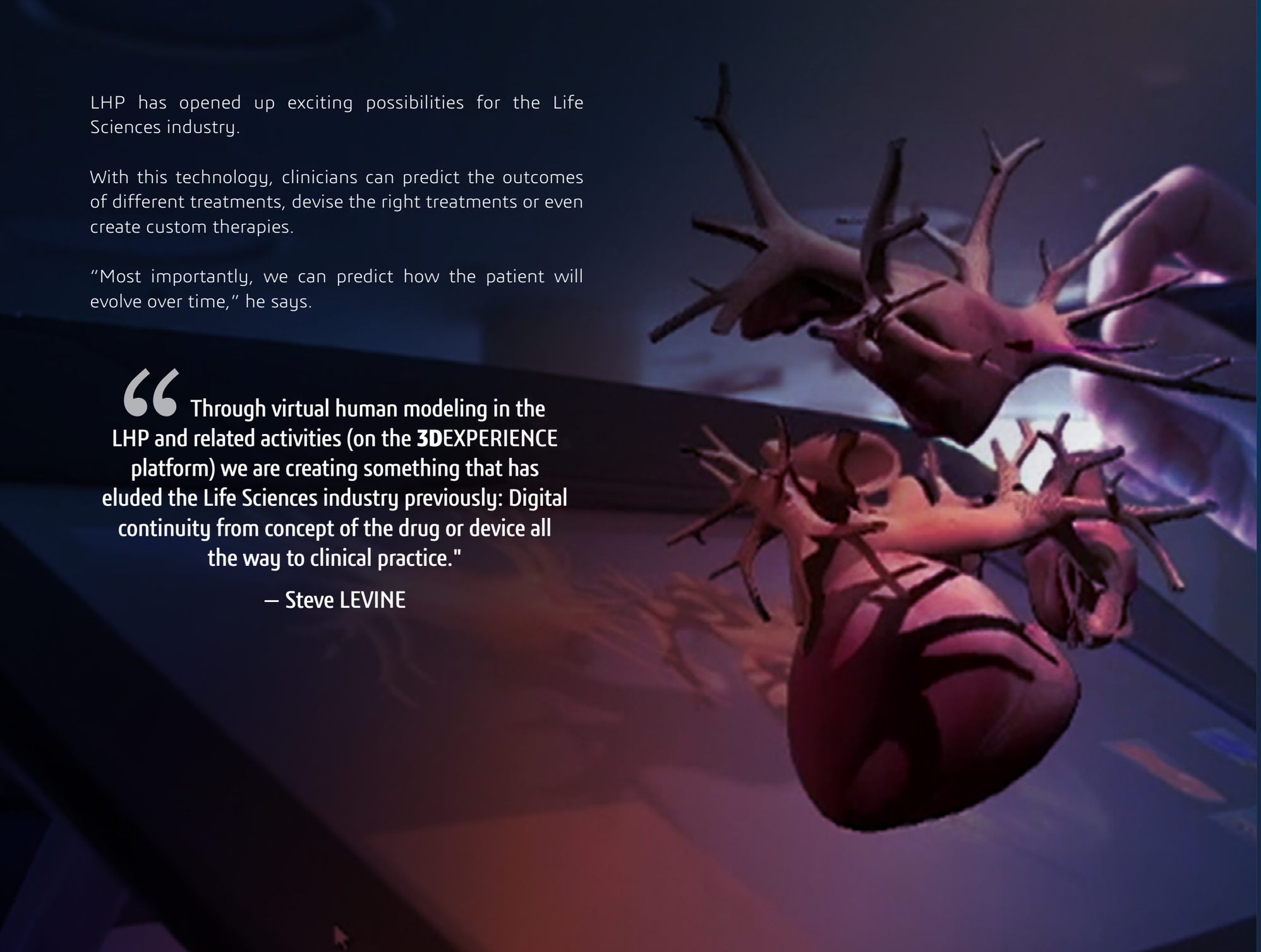
The US Food and Drug Administration (FDA) had been collaborating with Dassault Systèmes on the LHP since 2014. In July 2019, the partnership was extended for another five years to improve the cardiovascular device review process and accelerate access to new treatments.[7]

LHP has opened up exciting possibilities for the Life Sciences industry.

With this technology, clinicians can predict the outcomes of different treatments, devise the right treatments or even create custom therapies.

"Most importantly, we can predict how the patient will evolve over time," he says.

> **"Through virtual human modeling in the LHP and related activities (on the 3DEXPERIENCE platform) we are creating something that has eluded the Life Sciences industry previously: Digital continuity from concept of the drug or device all the way to clinical practice."**
>
> **— Steve LEVINE**



FUTURE-PROOF THE VALUE CHAIN

For pharmaceutical and medical device companies to bridge the gap between today and tomorrow, they need to excel in cost, innovation and/or service.

Addressing all three areas is quite a challenge, but tackling just one or two of these areas can bring about great results.

Here are three strategies to fast-forward your company to leapfrog competitors:

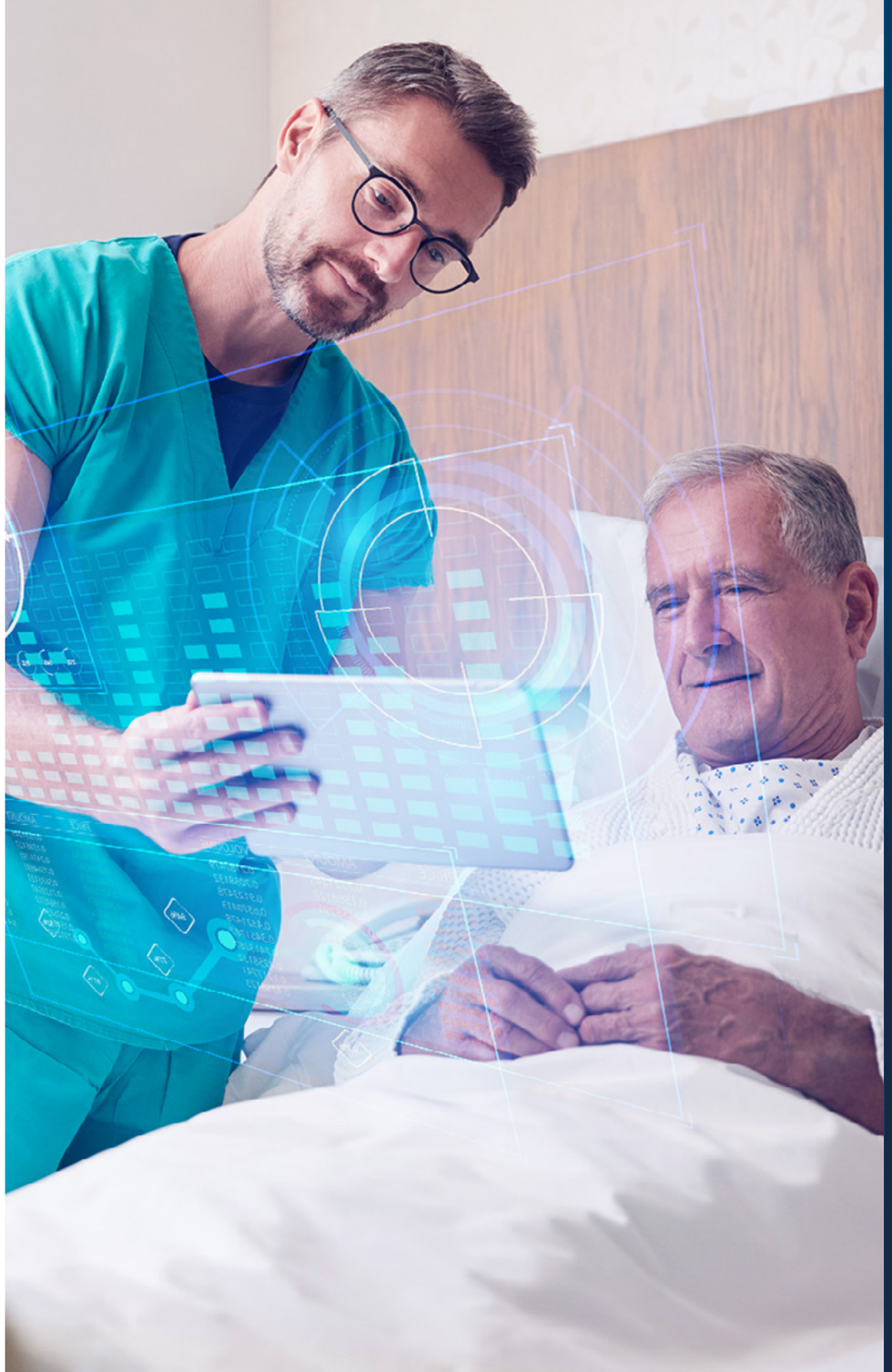
Strategy 1: Focus on patient empowerment for cost-effective experiences

With patients now more engaged in making healthcare decisions, they want more value from the money they are spending on their treatments.

Therefore, companies that can empower patients to take charge of their health and become a fellow partner in their healthcare will truly gain an edge in the new market.

In a value-based world where outcomes are rewarded, organizations have to ensure that their products will succeed in the market.

By embracing digital technologies such as 3D modeling and simulation that allows for rapid and accurate testing of various designs, they can increase the success of their product, lower patient risks and reduce research and development costs at the same time.



While it is challenging to make the necessary changes to deploy these new systems, it will pay off, says D'Souza.

In the long run, a patient-centric approach will enable companies to create solutions that are safer, of higher quality and more sustainable.

"At the end of the day, if you don't know what's happening with your patient, you're going to run more tests, which is going to keep costs mounting.

"You will also have an increased chance of medical device recalls and failures because while you're trying to get devices faster to the market to beat the competition, you don't have a very good understanding of how your device actually works on a patient."

Ultimately, insights gained from patients will result in better drugs and devices that are more effective and safe.[8]

This will in turn improve patient outcomes, shorten hospital stays and reduce incidences of product recalls.

"In the long term, this will reduce your costs and make you more profitable than you are today. Certainly, that's why business leaders are paying attention to personalized healthcare," he adds.

Strategy 2: Extend and maximize the value chain ecosystem to fast track innovation

To stay ahead of competitors, companies are optimizing speed, efficiency, accuracy and cost-effectiveness to fast-track innovation.

Many pharmaceutical and medical device companies are merging, acquiring, outsourcing and partnering with other organizations to add capabilities and build scale.

"Rather than set up a lab, perform clinical trials or other activities, the best medical device and pharmaceutical companies are now contracting specialists who commit on value. They don't buy the offices, labs or the (employees)," says Kerboul.

This allows organizations to extend and maximize the value chain to keep costs under control and speed up innovation.

The challenge is to ensure that these partners are well integrated into the value chain.

Many external collaborations fail due to fundamental issues such as:

- Manual data processing methods and poor data quality, which leads to difficulties in sharing data and the loss of time and efficiency
- Poor intellectual property management and ignoring security concerns without ensuring that partners only have access to information that they need
- The inability to leverage and analyze data that is being generated
- Poor communication between collaborators, who must work together even though they are often in different countries and time zones

The work environment is key, adds Kerboul.

"You need to set up an environment where stakeholders, companies and partners work on the same set of data and speak a common language around the data they share," he says.

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>
> — Guillaume KERBOUL

Strategy 3: Embrace open and innovative collaboration to improve service through personalized experiences and marketplace advancement

For companies to stay competitive in the era of consumerized healthcare, they need to leverage an ecosystem of experts to quickly and efficiently innovate solutions and improve the experiences they offer ahead of competitors.

> "Some of the key elements into making (projects like the LHP) a reality is a diverse ecosystem of experts, all of them being able to contribute their knowledge and skills."
>
> — Karl D'SOUZA

A Deloitte report highlighted that collaborations amongst experts have been key in many medical advances in the last few years.[9] Stakeholders who are searching for solutions and ways to enhance patient experiences are often challenged by operational and logistical difficulties, conflicting priorities, and scarce resources. When experts and stakeholders come together to achieve a mutual goal, these obstacles can be overcome and breakthroughs in the marketplace can happen.

However, for this ecosystem to truly innovate effectively, they must work via a platform that allows them to "generate a collective intelligence," says Guillaume.

For example, a cloud-based platform — with its ability to work across disjointed legacy systems — will enable the ecosystem to effectively leverage content and expertise to innovate at an accelerated pace.

When Life Sciences companies can accelerate the delivery of groundbreaking personalized experiences, this will create market advancement that will ultimately improve patient outcomes.

THE PLATFORM FOR VALUE CHAIN TRANSFORMATION

As the consumerization of healthcare continues, pharmaceutical and medical device companies are facing tremendous pressures to stay competitive by accelerating innovation despite rising costs, strict regulatory requirements and a disjointed value chain.

To overcome these challenges, they need to leverage virtual experience technology to excel in innovation, cost or service.

This is how the **3D**EXPERIENCE platform will enable you to fast forward to the future:

Fast track innovation by connecting the dots between people, ideas and data across the entire ecosystem

Innovation is key to staying competitive and flexible in a world where knowledge and sophisticated technologies are growing exponentially.

With the **3D**EXPERIENCE platform, you can connect the dots in your partner ecosystem and use contractors and academics to greatest effect by sharing data and knowledge in real time.

By adopting a flexible business model that outsources and simultaneously connects specific areas of the business such as research and discovery, clinical trials or manufacturing, you can achieve lower, more predictable costs and leverage external expertise while achieving regulatory compliance.

This ability to seamlessly integrate partners across the value chain will allow you to create successful outsourcing partnerships that will maximize the value chain for faster, more efficient collaborative innovation.

Improve service by empowering companies to embrace the consumerization of healthcare

As patients become partners in their treatments, companies must focus on improving patient experiences to stand out.

Insights into the patient's behavior, lifestyle and needs is crucial. That's why companies that can collect, integrate and analyze patient data throughout the value chain will win in the era of consumerized healthcare.

For example, French-American startup Biomodex uses the **3D**EXPERIENCE platform to create functional 3D replicas of specific patient organs that physicians can use to practice complex surgeries before the actual procedures.

This ability to have a trial run in a safe, virtual environment improves the quality of the treatment and reduces patient risk and accelerates the development of more effective solutions.

By enhancing the right patient experience with supplemental value-added service, companies will advance healthcare and produce better patient outcomes.

Judge cost according to outcomes by consistently providing personalized, value-based patient-centric solutions

In a value-based healthcare environment, Life Sciences companies have the double challenge to prove the efficacy of their solutions and ensure that they eliminate costly overheads.

The **3D**EXPERIENCE platform's capabilities will allow stakeholders in the value chain to gain better insights faster, create more value-driven solutions and improve patient outcomes. Here's how:

- Modeling and simulation allows for the virtual testing of products
- Social collaboration creates the exchange of knowledge and know-how
- Data-driven analytics involves large amounts of scientific data that can be converted into intelligent data

ARE YOU READY TO WIN THE FUTURE?

Operate with excellence with the **3D**EXPERIENCE platform - from idea to modeling and simulation to market delivery and usage.

Accelerate innovation, offer cost-effective solutions and provide valuable experiences for tomorrow's customers and patients — today.

Fast forward your company with the **3D**EXPERIENCE platform.

Speak with us to experience the transformation.

Our 3DEXPERIENCE® platform powers our brand applications, serving 11 industries, and provides a rich portfolio of industry solution experiences.

Dassault Systèmes, the **3D**EXPERIENCE® Company, provides business and people with virtual universes to imagine sustainable innovations. Its world-leading solutions transform the way products are designed, produced, and supported. Dassault Systèmes' collaborative solutions foster social innovation, expanding possibilities for the virtual world to improve the real world. The group brings value to over 250,000 customers of all sizes in all industries in more than 140 countries. For more information, visit **www.3ds.com**.

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