DASSAULT SYSTEMES

IN ASSOCIATION WITH THE FT FINANCIAL TIMES

LEADERS IN BUSINESS SUSTAINABILITY

A Dassault Systèmes e-book

Imagine being able to respond to changes in customer-demand almost instantaneously and being able to design and engineer intelligent products sustainably in half the time of today and at half the cost.

Imagine being able to minimise the amount of energy required to manufacture and distribute your products, significantly reduce waste in both the engineering and manufacturing process, maximise productivity and keep your employees safe and up-skilled.

All these possibilities are not only within your grasp, they are already being implemented by companies and industry sectors, spearheading and accelerating the use of digital technologies to design and engineer products and platforms faster, more cost effectively and more sustainably.

Today, sustainability must be embedded into the way we design, engineer, and manufacture our intelligent products of tomorrow. An important part of how to do this is through virtual twin technology.

Virtual twin technology supports sustainability efforts because it enables you to simulate both consumer behaviour, plus the design, engineering, production and supply-chain environments in real-time. This becomes your digital thread and it is this digitally connected thread that will transform industries.

According to our **joint Accenture / 3DS study** on how virtual twins can accelerate sustainability, this technology can create $1.3 trillion of economic value and significantly reduce emissions over this decade.

During the next five years, the digital twin market is projected to grow at 36% CAGR but there are challenges in its widespread adoption.

This e-book will look at some of those challenges and hear from leaders in business sustainability, who spoke recently during our latest virtual event on how they're evolving their businesses through digital transformation to create a better world for us all.

Introducing our three pillars of business sustainability

1. PRODUCTS & SERVICES

Develop innovative products and services, quickly and reliably.

2. NEW BUSINESS MODELS

Adopt new business models to sustainably address rapidly changing market demands.

3. PEOPLE

Workforce evolution to address the skills gaps and working practices for people in business.

Our business focus is on:

- Helping businesses who find it hard to develop innovative products and services, quickly and reliably.
- Evolving business models to keep pace with new supply chains and new ways of managing connections to consumers.
- Enabling more flexible working patterns and ensuring knowledge and know how is aligned across the workforce.

QUESTION

How can we use these three pillars to become truly resilient and sustainable?

ANSWER

Digital Transformation

WHAT IS DIGITAL TRANSFORMATION?

Adopting a data-centric approach, with a single source of truth and using collaborative environments to connect people, functions and organisations. To have continuity throughout the lifecycle of the product or service so that information, data and decisions are fully traceable.

How does Dassault Systèmes **3D**EXPERIENCE Platform address each of our three pillars?

PRODUCTS & SERVICES

The **3D**EXPERIENCE platform brings together a wide range of technologies for design, development, simulation, manufacturing, planning and project management.

It enables the development of virtual twin experiences to provide, not only a static digital representation of the product, but also simulations of how that product may behave in the real world, how it is assembled, delivered and how a customer can interact with it.

NEW BUSINESS MODELS

The **3D**EXPERIENCE platform empowers collaboration between suppliers, customers and internal stakeholders. In addition, it allows businesses to simulate how operating models will work before they're implemented through the creation of virtual twin experiences.

PEOPLE

The **3D**EXPERIENCE platform helps people to collaborate and contribute through communities, dashboards and interactive group applications such as 3DLean.

People can capture their ideas, share knowledge and then use it to maximise business benefits. This knowledge and know-how is then stored and available to others for their continuous learning.

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of companies stated their corporate agility has improved as a result of Covid-19, whilst

49%

said the pandemic has helped with the accelerated adoption of new technology.

BUSINESS SUSTAINABILITY AND TRANSFORMATION STRATEGIES 2021

To fuel our knowledge, we commissioned independent research from the analyst firm Tech-Clarity, led by Jim Brown, who surveyed global business leaders to understand their priorities in building sustainable, resilient businesses.

It resulted in our Executive Strategies for Long Term Business Success study, which showed that sustained business viability was already at risk from disruption.

We're now in our third year of this Tech-Clarity research, with year-on-year insights from 250 companies on how business priorities have evolved.

During 2020 for example, the economic and market impacts of Covid-19, forced many companies into survival mode - with 46% of businesses increasing their focus on accelerating digital transformation due to the pandemic, but not placing as much priority or attention on workforce development, environmental and social sustainability.

This year however, Corporate Social Responsibility (CSR) has taken a huge leap in focus from 15% in 2020 to 41% in 2021. Environmental issues have also jumped up the agenda to 25% (from 12% in 2020).

The number of companies that report an increase of focus on accelerating environmental sustainability efforts tripled from 12% to 36%. Even better, companies who are increasing attention on workforce development grew by 255%.

This ambition is being enabled by the digital transformation that has taken place over the last 18 months, which can be leveraged for workforce development as much as it can for team collaboration and innovation.

In fact, 54% of companies stated their corporate agility has improved as a result of Covid-19, while 49% said the pandemic has helped with the accelerated adoption of new technology.

So in many ways, those companies that invested in digital transformation are better prepared for the future disruption and are more agile going forward. Now, companies will be looking to address environmental concerns and CSR policy as part of rapidly evolving business models.

WHAT CHANGES ARE TODAY'S BUSINESS CHAMPIONS HAVING TO MAKE TO ENSURE SURVIVAL FOR TOMORROW ?

IAN HOWELLS
Senior Vice-President, Honda Motor Europe

"Connectivity is the biggest driver of change. The automotive industry has broadly had the same business model for more than 100 years. As our products and services grow more connected, the dynamics are starting to change. People now expect a direct-to-consumer purchasing option. Sustainability underpins everything, both in terms of social responsibilities and environmental impact."

STEVE RAYNES
Head of R&T Business Development and Partnerships, Airbus

"We signed up to challenging aviation CO_2 targets in 2008 and plan to reduce the levels that existed in 2005 by 50% in the lead-up to 2050. We're changing the curve in two ways - through sustainable aviation fuels and by introducing ZEROe, the world's first zero-emission, hydrogen-fuelled commercial aircraft by 2035."

DR STEPHEN LAMBERT
Head of Electrification, McLaren Applied

"The biggest impact we can make is to support the electric vehicle market with new technologies. We're focused on how to make electric vehicles more efficient. Using energy in the best way possible will be key to the future of aviation and automotive. We are entering the third wave of electrification. It's no longer a cottage industry, we've seen new entrants scrambling to bring electric vehicles to the market and now, in the next five years, the market will have a critical mass with consumer choice and will need to compete on efficiency."

KAREN BENS
Business Controller Sustainability, Atlas Copco

"We've done our maths and we know that our biggest carbon footprint comes from the use of our machines and the applications we put out into the world. We've been working on our own energy efficiency for years now and we've achieved 100% electrification so our biggest challenge is to take responsibility and be a part of the wider solution for energy transformation. Climate inaction has become a major financial risk so we feel this acutely from shareholders. We need to find the right talent who can help develop more sustainable solutions."

FRANK LUDWIG
Chief Transformation Officer, Jaguar Land Rover

"The heart of our Re-imagine strategy is the electrification of both our Jaguar and Land Rover brands. Modern luxury to us puts sustainability at the centre of everything we do and we are moving to become an electric-first luxury business - for Jaguar by 2025 and with six electric variants for Land Rover over the next five years. Our aim is also to achieve zero emissions across our supply chain, operations and manufacturing by 2039."

ERIK KRUSE
Partner Manager to IoT Ecosystems, Ericsson

"I'm focused on being part of the solution within agriculture and water to reduce waste and leaks, optimise consumption and look after the soil. We're moving to a world of AI, big data and machine learning at the edge which will see new players enter old industrial systems with innovative ideas and solutions. We need to understand technology's potential to drive change."

MICHELLE TILLEY
PMO & Digital Director, EDF

"Half of the CO_2 added to the atmosphere is from the last three decades, if we do not change now climate change will become irreversible. Nuclear energy forms a key part of the UK's energy strategy going forward. It is the only form of clean energy, which can underpin the renewables mix - which is variable dependent upon the weather. As you will be aware, the UK does not have a consistent or reliable weather pattern. So nuclear is the only plausible long-term reliable and consistent, low carbon source of energy for those times when renewable cannot provide stability of supply."

OLIVIER RIBET
Executive Vice-President EMEA, Dassault Systèmes

"Sustainable innovation is driving change in all of the sectors we're involved with. It's no longer enough to build things, we need to build in a way that's sustainable for the future. We need to rethink the way we transport ourselves, feed ourselves and how we define the home. For us it's confirmation that we need to double-down and go even faster to help companies with their digital transformation."

DIGITAL TRANSFORMATION is not just about reducing friction and increasing collaboration - it's a major enabler of sustainability. So what are the barriers to change and how can we overcome them?

NIGEL STACEY
Global Lead of Accenture Industry X

"The sustainability initiative isn't going to be easy. It's going to require transformative change. That's why digital twin technology coupled with AI, machine learning, Edge, 5G and the cloud are so important in the drive for sustainability. Digital twin technology supports sustainability efforts because it enables you to simulate consumer behavior, their use of product features, the design, engineering, and production environment in real-time when extended with the suppliers of the raw ingredients required to produce all the way through to distribution and the aftermarket. This becomes your digital thread and it is this digital connected thread that will transform industries."

FIVE BARRIERS TO DIGITAL CHANGE

1. Product complexity.
2. Lack of leadership support for virtual twin.
3. More evidence of savings needed.
4. Difficulties integrating supply chain to participate.
5. How to integrate legacy systems and technology.

COLIN CLEMSON
Vice-President, Dassault Systèmes

"If you want to be a pioneer, you need to be considering the virtual twin approach. The companies adopting this approach will be the companies that change our real-world by perfecting their approaches in their virtual worlds first. Human minds cannot manage and manipulate the vast amounts of data that we have available to us at the touch of a button. We need the power of virtual twins to explore this data and make the right decisions."

ALICE STEENLAND
Chief Sustainability Officer, Dassault Systèmes

"We need the technology to help us transform. The technology agenda and the sustainability agenda is the same agenda."

FIVE SOLUTIONS TO OVERCOME BARRIERS

1. Digital transformation provides the opportunity to simplify through granular analysis. Simplify, extract waste and costs and digitise what's left.
2. Show leadership evidence of digital transformation supporting KPIs and improving efficiencies.
3. The link between monetary and ethics values are now one-and-the-same. Savings need to be measured in environmental and CSR terms.
4. You need people, environment and digital solutions. Everybody has to come on the journey together.
5. Present it as an opportunity to tidy-up and prune inefficient legacy systems for future savings.

UMESH DOWLATH
Consultant, InnoSolve Consulting

"We have to remove the inertia that sits within leadership to move from the current to embrace more digital ways of doing things. With added clarity on how virtual twinning can support KPIs and a clear idea of the pain-points that digital transformation can remove, you can build a more convincing case to take to the senior board."

SOLUTIONS TO SUSTAINABLE BUSINESS TRANSFORMATION

What is the circular economy?

The circular economy is a simple idea that increases in complexity when implemented by different industry sectors. Today's economy involves taking resources, making things with them and then essentially, throwing them away afterwards. We live in a take, make, waste economy. The idea of the circular economy is to bend our habits into a circle so that we take, make and re-use in order to keep resources within the economy for as long as possible.

AMY SENTER
VP and Chief Sustainability Officer, Kellogg Company

"Kellogg has had Environmental Social Governance (ESG) at its core since it was founded over 100 years ago. Kellogg culture has maintained that mindset with circular regenerative systems ranging from the cardboard in our packaging to nature-based food systems."

ALICE STEENLAND
Chief Sustainability Officer, Dassault Systèmes

"The idea of reusing, recycling, and regenerating resources lies at the heart of a circle that more and more companies are moving towards."

OLIVIER RIBET
Executive Vice-President Executive Vice-President EMEA, Dassault Systèmes

"Barriers of age and generation collapse when people unite around a common project and purpose, by working collaboratively."

Five ways to overcome resistance to virtual twin technology

1. CONNECT TECHNOLOGY AND SUSTAINABILITY AGENDAS

Measure and track value, connect to your growth strategies and factor sustainable values into key investment decision making.

2 IMPROVE UNDERSTANDING OF VIRTUAL TWIN TECHNOLOGY

Identify potential use-cases across the organisation, including infrastructure and data requirements and make this a strategic initiative across all departments/functions with a C-Suite leader to ensure silos and competition for digital investment dollars are removed.

3 FOCUS ON DISRUPTIVE, SYSTEMS-CHANGING USE CASES

Pay attention to scaling solutions with fast transformational sustainability impact. Look past efficiency improvements and small change and focus on end-to-end value chain change.

4. DEPLOY VIRTUAL TWINS RESPONSIBLY

Embrace virtual twins based on responsible and inclusive principles. This ensures that transparency, inclusion, and accessibility are imbedded from the beginning.

5. RALLY ECOSYSTEM SUPPORT

Build your ecosystem of partners to accelerate your transformation journey; you cannot do this alone.

The speed to market and reduction in risk is why virtual twins have been so successful in supporting the development of 85% of the world's electric vehicles, more than 75% of global wind power, the world's first solar airplane and new bio-materials.

All the world's top EV manufacturers and 90% of the top drug and healthcare laboratories utilise virtual twin technology but the power of these technologies is applicable to all industries, such as construction where commercial and residential buildings use 40% of our global energy demand and account for 25% of our global water usage.

Energy consumption in buildings could be reduced by 30 to 80% using digital twin technologies. They can also provide $288 billion of savings in building operating costs by reducing energy consumption, maintenance, planning and commissioning costs.

PEOPLE POWER

ANNE WATSON
CEO, Enginuity Group

"Some 65% of the workforce for 2030 has already left the education system so if we consider the pace of technological change, employers will now have to up-skill their workforce every 18 months but don't have the foresight to know which skills will be relevant for the future. Manufacturing generally has an ageing workforce so the loss of knowledge is also critical. The pandemic has compounded the problem and by July last year, 11,000 jobs were lost in aerospace. It's vital employers retain knowledge to pass on to the next generation.

MONIKA FRANKE
Global Head of HR at Polestar (Volvo)

"Competencies, passions, engagement and drive are so much more important than processes, especially in a start-up environment. We have to rely on our super-powered employees to guide management, explore solutions and feel the ownership to drive this business forward."

RAMON VULLINGS
Cross-industry Innovation Expert, Author, and Idea DJ

"Step away from ego and see the world as Lego. Break down the blocks that hold people back and allow them to construct this new world."

A FOCUS ON LIFE SCIENCES AND SMARTER MANUFACTURING

The life sciences industry has really shone through the pandemic – from the NHS response, to the development and ramp-up in production of medical devices and diagnostics (PPE, respirators, PCR and antigen tests) and to the discovery and development of new therapeutics and vaccines in record times, the industry has changed the course of the pandemic in a manner never seen before.

CLAIRE BIOT
Vice President, Life Sciences & Healthcare Industry, Dassault Systèmes

"We help companies digitally transform their approach to scientific innovation by using the **3D**EXPERIENCE platform to catalyse the next generation of therapeutics in a more affordable and sustainable way. Sustainability covers society, environment and business. We need to reduce carbon emissions across the entire value chain whilst sustaining business in a transparent and cost effective way."

We are seeing similar progress in other areas too – the development of new cancer diagnostics and treatments has accelerated incredibly in recent years, with several companies now producing cell therapy products for cancer patients that are customised entirely to the individual patient.

These new drugs have been 'designed' to interact in a precise way with the biology of disease and to be efficacious and safe, but they have not been designed for efficient or sustainable manufacture.

Manufacturing processes are complex and inefficient and change always comes with the risk that it may impact on quality.

New drugs are also expensive to administer to patients – they must be injected and so have to be manufactured, stored and administered using sterile methods which adds significant costs (sterile facilities, air filtration, water purification, advanced packaging etc).

Plus, when a new treatment is developed, the priority is always on gaining (and retaining) regulatory approval and ensuring supply can meet growth in demand.

Sustainability therefore is is often a secondary consideration, especially in the early years after a launch.

SO WHAT'S THE ANSWER?

SMARTER MANUFACTURING

Being smarter means to understand complex manufacturing processes more completely by gathering, analysing and visualising more data and surfacing more insights across the lifecycle through digital transformation.

You can then:

- Use these data-driven insights to bring new products to market quickly with an already optimised manufacturing process, rather than launching with a suboptimal process and "fixing the airplane in flight".
- Continue to identify opportunities to boost yield/ productivity, while simultaneously reassuring regulators that there is no risk to the quality of the process.
- Standardise on manufacturing platform technologies to increase agility and efficiency, plus drive greater collaboration between R&D and manufacturing to improve "design for manufacturing" and hand-over processes.
- Eliminate errors in manufacturing by automating where possible and augmenting the worker to increase right-first-time rates.

JUDITH RICHARDSON
Global Supply Chain Director, Jaguar Land Rover

"Our re-imagine strategy looks at modern luxury for discerning customers. In order to deliver on this strategy, we need to change the manufacturing supply chain and evolve the ways we've been working over a number of decades. Our digital focus is on the integrated end-to-end supply chain, looking at everything from materials used, how they're produced and shipped around the world, plus customer after-care as well. We use technology to achieve granular visualisation of the supply chain and to really understand the whole process so that we have total traceability."

DANIEL MATLIS
Founder and President, Axendia

"Life sciences facilities are lagging in technological advances as they were built for regulatory approval and then never touched. The pandemic however is an inflection point for the modernisation of the industry. Digital transformation has a key role to play, driving forward cloud-based solutions, modelling and simulation. To be successful, we need to transform culture, streamline processes and build the factories of the future today."

HOW CAN DIGITAL TRANSFORMATION HELP OTHER MANUFACTURING BUSINESSES TO CONTINUE THEIR POSITIVE IMPACT MORE SUSTAINABLY?

1. Digital visualisation for better visibility of systems, resulting in greater line efficiencies and improved quality control.
2. Enhanced automation through Artificial Intelligence and evolved machine learning.
3. Predictive analytics for better data to improve the overall manufacturing process.
4. Knowledge sharing for more collaborative working processes across multiple sites.
5. More connected factories providing end-to-end processes, enhanced efficiencies and overall visibility.

"IN MY MIND, BUILDING A MORE SUSTAINABLE WORLD THROUGH DIGITAL TRANSFORMATION AND TECHNOLOGIES SUCH AS VIRTUAL TWINS IS THE CHALLENGE OF THE LEADERSHIP GENERATION."

Call it a movement, call it a seismic change, call it a societal reset, there's no doubt that momentum is building around the topics of sustainability, an up-skilling revolution and digital transformation.

Sustainability is now mainstream and rapidly becoming the largest driver of commercial success going forward.

In the coming decade, sustainably-minded businesses will operate more efficiently and more profitably. Sustainably-minded businesses will attract a greater share of public attention, earning the right to exist.

Your business needs to become more sustainably-minded and you have the opportunity to lead this evolutionary change.

You can be the pioneer your business needs to understand the necessity of being on that journey.

You can be the visionary your business needs to see the opportunities sustainability presents. And you can be the leader to drive it forward.

In addition to the ideas and approaches contained within this e-book, at Dassault Systèmes, we can provide further business case studies across multiple sectors that outline how companies are embracing sustainable approaches to driving agility and increased resilience.

We're also here to help you mobilise your organisation into action, up-skill your workforce and help you to build virtual universes to re-imagine your sustainable futures with a free virtual twin readiness assessment.

So do contact us and together we can accelerate this journey into a more sustainable, digital-first world.

This is the progress humankind will be most proud of looking back. Let's act fast and execute well in order to get the job done.

We're here to support you. Just tell us where you want us to go.

JOHN KITCHINGMAN,
Managing Director, Northern Europe,
Dassault Systèmes

Dassault Systèmes, the **3D**EXPERIENCE Company, is a catalyst for human progress. We provide business and people with collaborative virtual environments to imagine sustainable innovations. By creating 'virtual experience twins' of the real world with our **3D**EXPERIENCE platform and applications, our customers push the boundaries of innovation, learning and production.

Dassault Systèmes' 20,000 employees are bringing value to more than 270,000 customers of all sizes, in all industries, in more than 140 countries.

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