

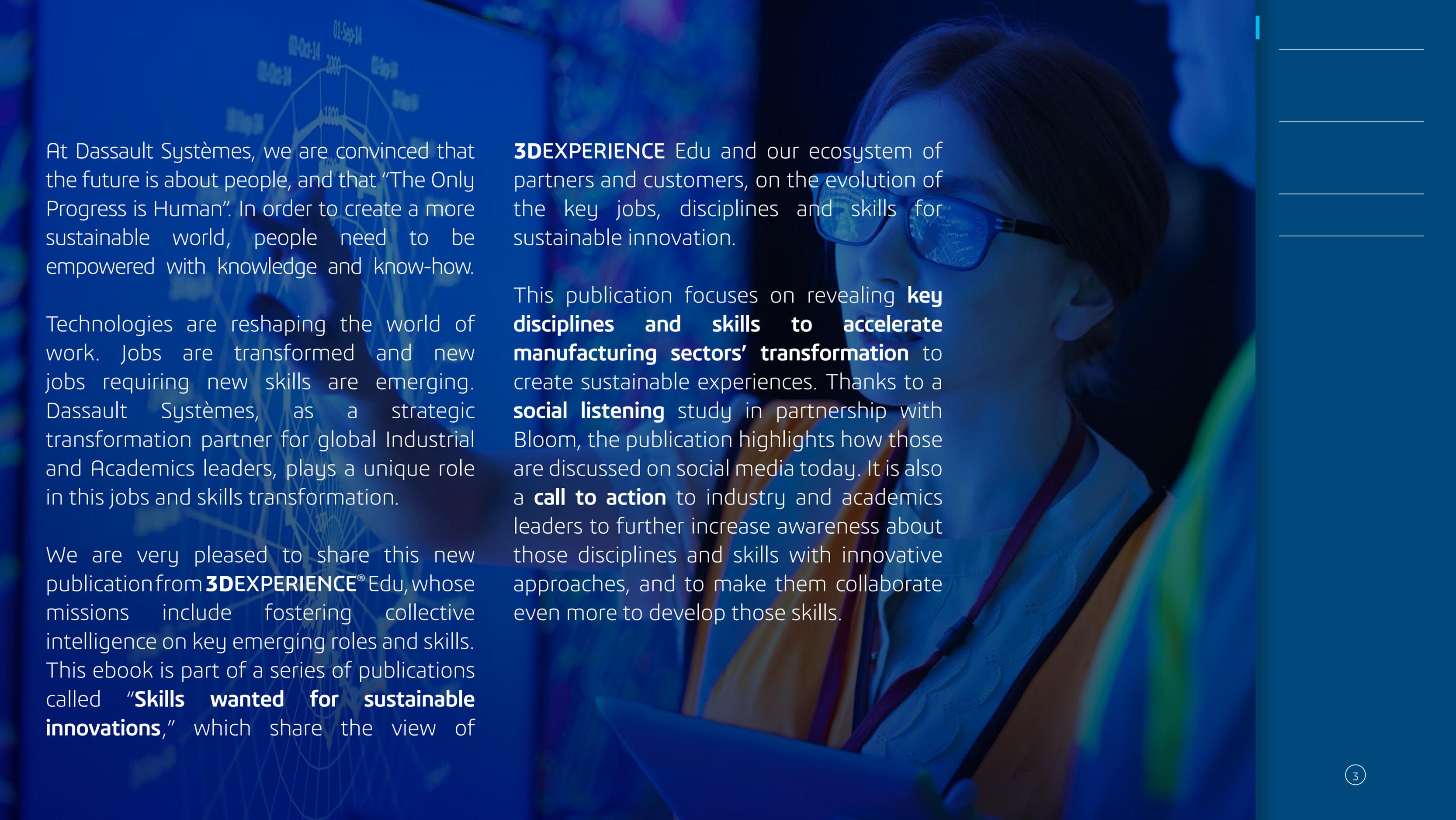
YOUR SKILLS, OUR FUTURE

KEY SKILLS TO ACCELERATE MANUFACTURING SECTOR TRANSFORMATION



We're experiencing a global Industry Renaissance today, bringing new ways – real and virtual – of seeing the world, inventing, learning, producing and trading. Tomorrow's game-changers will not be those with the most automated production systems, but those who build a culture of knowledge and know-how to reveal and train the Workforce of the Future, able to solve the challenges of a planet lacking sustainable solutions.

BERNARD CHARLÈS
Vice Chairman of the Board
and Chief Executive Officer



At Dassault Systèmes, we are convinced that the future is about people, and that “The Only Progress is Human”. In order to create a more sustainable world, people need to be empowered with knowledge and know-how.

Technologies are reshaping the world of work. Jobs are transformed and new jobs requiring new skills are emerging. Dassault Systèmes, as a strategic transformation partner for global Industrial and Academics leaders, plays a unique role in this jobs and skills transformation.

We are very pleased to share this new publication from **3DEXPERIENCE®** Edu, whose missions include fostering collective intelligence on key emerging roles and skills. This ebook is part of a series of publications called “**Skills wanted for sustainable innovations,**” which share the view of

3DEXPERIENCE Edu and our ecosystem of partners and customers, on the evolution of the key jobs, disciplines and skills for sustainable innovation.

This publication focuses on revealing **key disciplines and skills to accelerate manufacturing sectors’ transformation** to create sustainable experiences. Thanks to a **social listening** study in partnership with Bloom, the publication highlights how those are discussed on social media today. It is also a **call to action** to industry and academics leaders to further increase awareness about those disciplines and skills with innovative approaches, and to make them collaborate even more to develop those skills.



PIVOTAL SKILLS TO ACCELERATE MANUFACTURING TRANSFORMATION





Sustainable manufacturing is simply not an option. Nor is it only about improving energy efficiency or developing a zero-waste strategy. It's about innovation for social responsibility, to minimize our impact on the environment and overall create a more sustainable system.

With the manufacturing sector accounting for 41% of global GDP, manufacturing transformation is not only a necessity, it's also a huge opportunity for sustainable innovation and sustainable business at large.

To build up more sustainable systems, **new skills and massive upskilling** are needed in all industries, to move from products to sustainable experiences.

Dassault Systèmes **3DEXPERIENCE**[®] platform empowers the next generation innovators to enhance the real world with the virtual world. It underpins essential disciplines for collaboration, modeling, simulation and data management. Fostering **multidisciplinary** across those disciplines is necessary to create the new experiences needed in tomorrow's sustainable economy from idea, to market delivery and usage. From conversations with our industry customers,

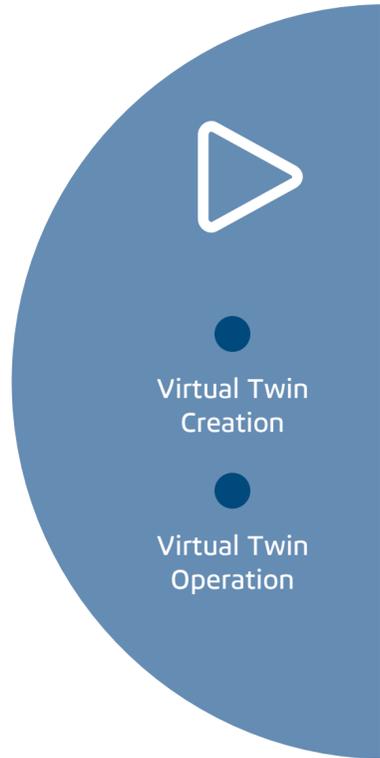
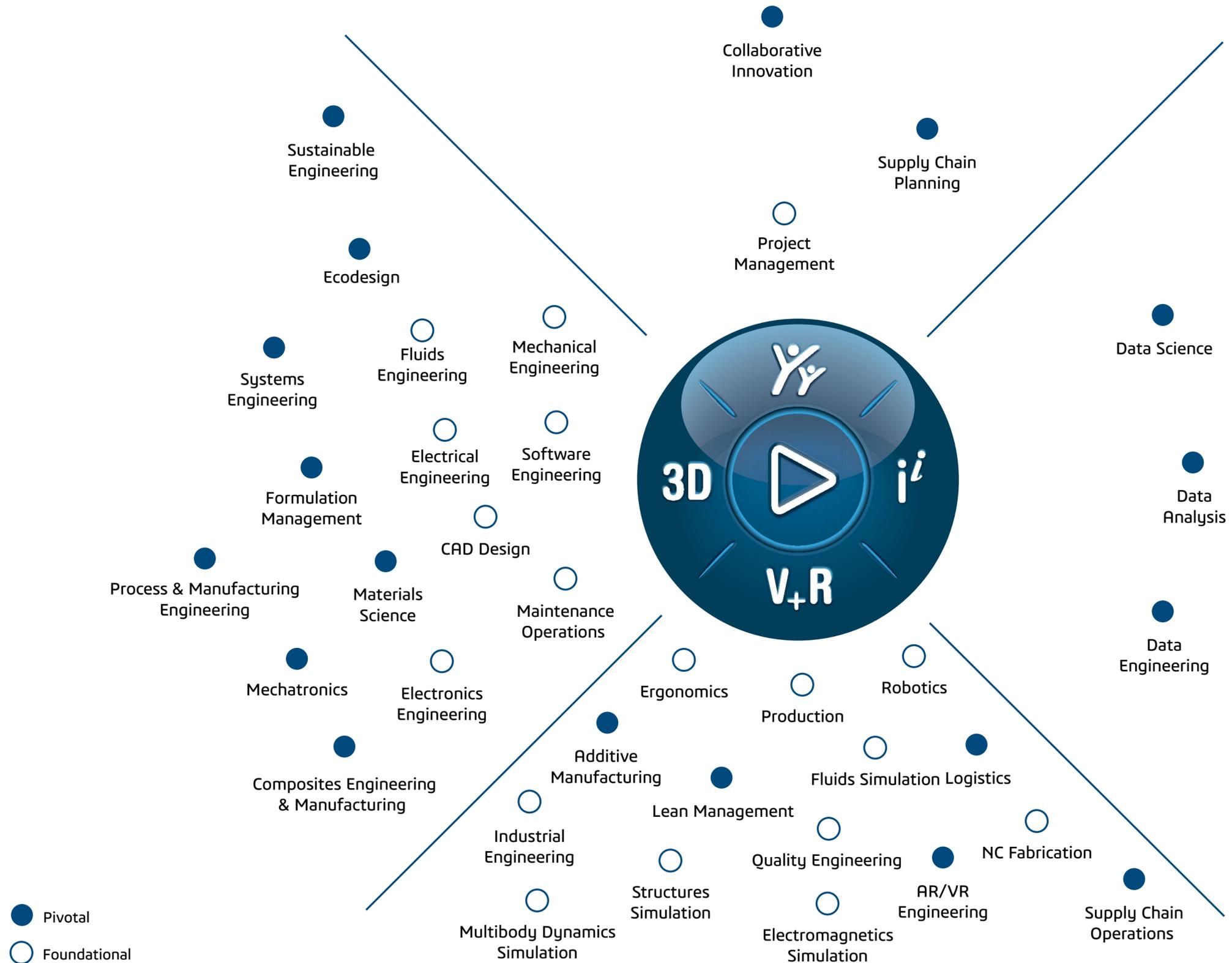


a new concept emerge in their approach to jobs and skills: the concept of **pivotal skills**. Those skills are considered as critical to accelerate their transformation to deliver sustainable experiences. While foundational skills are still massively needed, pivotal skills are ones which development needs to be accelerated as their shortfall will strongly inhibit the ability to deliver a new and sustainable value by the industry.

3DEXPERIENCE[®] platform and their identification as foundational or pivotal. Those disciplines are composed of skills set which are not detailed in this publication. They are and will be detailed in dedicated Skills publications: System Engineer, Additive Manufacturing Designer, Mechatronics Engineer, Industrial Engineer, at: <https://3ds.com/edu/skills>

In the graph on the next page are the disciplines which are powered by the

PIVOTAL SKILLS TO ACCELERATE MANUFACTURING TRANSFORMATION



For example, systems engineering is a pivotal discipline to develop and design new products and experiences as complex systems, taking into consideration not only the systems functionalities but also, its usage and its impact on the environment. According to INCOSE, systems engineering's skills are shown to the right:

To find out how those pivotal disciplines and skills are discussed and understood today by people, we decided to run a social listening study.

THE BREADTH OF SYSTEMS ENGINEERING COMPETENCIES



Source: INCOSE, A World in Motion, Systems Engineering Vision 2025



SOCIAL LISTENING TO REVEAL CONVERSATIONS ABOUT MANUFACTURING SKILLS



Embarking on a social listening campaign is one way we can better understand which disciplines and skills are being actively talked about year after year, and by who. Is it manufacturing companies? Academic institutions? Individual practitioners and experts? Students?

As we all need to get more engaged to further develop those skills, we can also track the trends year after year to see not just what topics are raised, but which gather the strongest levels of engagement, and try to find new ways to increase the level of engagement and understanding.

We worked with our partner Bloom, an artificial intelligence (AI) platform dedicated to qualitative, predictive and strategic analysis of social networks, to perform an analysis on mentions of the identified skills on social networks.

Social networks contain an enormous amount of information that can be mined for powerful insights. Bloom's unique approach uses semantic and social inference techniques to achieve unparalleled depth and accuracy in the analysis of digital communities. It exploits the unique characteristics of networks to study the propagation of information, to identify the opinions of actors and to measure their influence ("social inference"). Learn more at <https://bloomsocialanalytics.com/en/>

Through the Bloom analytics platform, we analyzed five social media networks (Facebook, Twitter, Instagram, YouTube & TikTok), in three languages (English, German and French) over a one-year period (April 2021-2022) to discover what disciplines and skills are discussed and by whom. The content includes a mix of text, pictures and video content.

The data set included more than 30 skills, disciplines and jobs that we identified through our research. Over this 12-month period, we collected nearly 480,000 documents (posts + comments) that garnered 54 million engagements (likes, shares and comments) from over more than 36 million unique actors.

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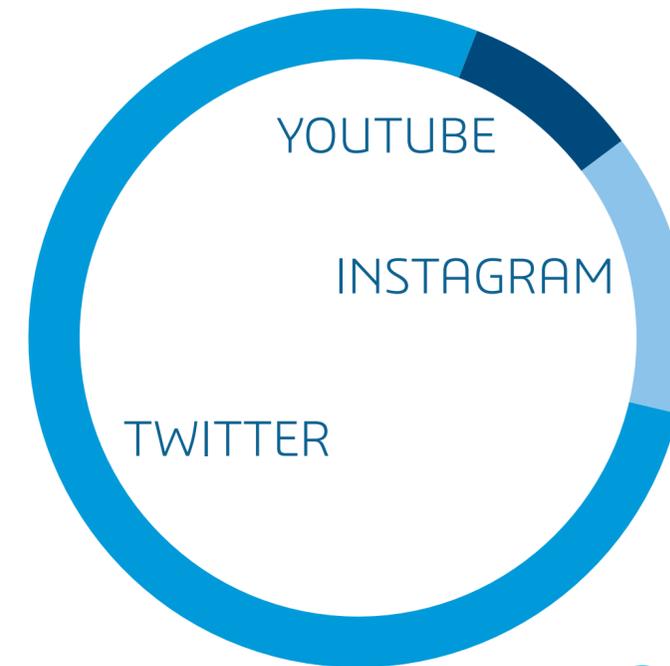
LESSONS LEARNED FROM SOCIAL LISTENING

So, what did we learn? First, the number of conversations by platform:

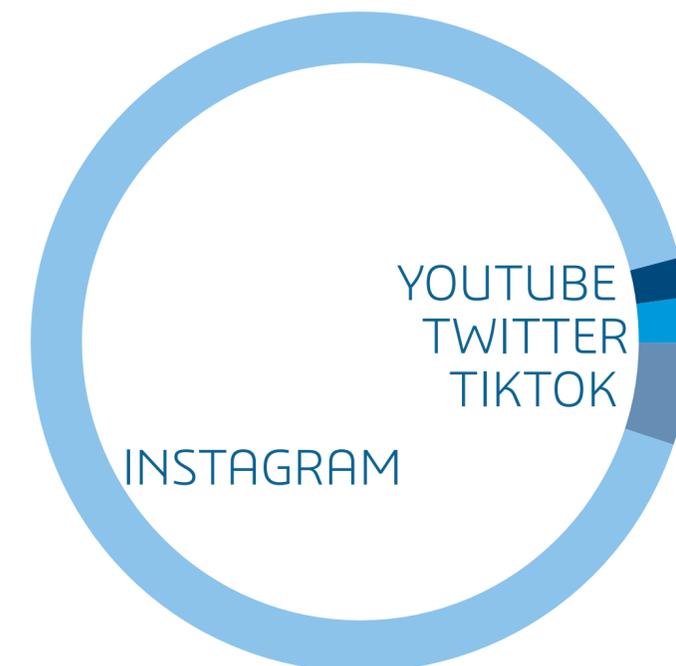
- **Twitter** by far hosted the most conversations on skills/ disciplines/job topics, accounting for 79% of the posts and comments.
- **YouTube** gathered about 9% of all documents, primarily featuring tutorials and videos published by individuals to explain specific jobs or specific skills they applied to real-life projects.
- **Instagram** accounted for 12% of all documents, a high percentage of which took place on corporate accounts showcasing new technologies used within their projects.

In terms of activities by platform (sum of documents and engagements), Instagram collected 90% of all activities, whereas Twitter and Youtube collected only 2% respectively and TikTok is now gaining traction (5%) through emerging communities of like-minded users who are interested in topics like 3D printing, virtual reality or even virtual twins and want to show off their hands-on projects.

DOCUMENTS BY PLATFORM



ACTIVITY BY PLATFORM



SOME KEY TAKEAWAYS

We can observe from the social media analysis that even core technical skills are being discussed and trigger strong engagement. But we can also see that there is a massive opportunity for the emerging pivotal disciplines and skills to be profiled as well, helping to explain and define what they are and what jobs require them.

Social media also allows these conversations to happen in a wide range of ways. New, engaging formats can generate awareness about skills and reach different audiences. Our social listening confirms that individuals whether experts or students are now the primary path for passing on

information within targeted communities. Some engineering influencers collect a million engagements when they broadcast videos showing an experience they created, revealing their own technical skills by explaining the tool and process they used. As an example: several influencer accounts on TikTok have collected more than 10 million views including one 3D Designer's post with a tutorial on how to design and 3D-print a one-can cooler. Using #3DPrinting and #Additive Manufacturing as tagged skills, he earned more than 14 million views with more than one million likes.

While there are some very positive examples, the research also shows tremendous opportunity for all types of actors to share more content about manufacturing disciplines and skills. Let's look at five examples:

- **Sustainability** is a popular topic in manufacturing sector, becoming part of the everyday conversation. In Germany, there are a lot of conversations around Lifecycle assessment topics (LCA for sustainability topics) and it triggers many engagements, much more than in other countries where we ran the analysis.
- **Additive Manufacturing** accounted for 55,100 discussions with more than 278,000 engagements within the English-speaking world. Companies and universities dominate the talk about

additive manufacturing. Academic publications, new innovative usage methods, on-going projects and promotional corporate material, the subject is widely discussed. The content that got the highest engagement explains the strong potential of additive manufacturing, including recent developments and applications in the field. Both Instagram and YouTube frequently include lots of videos and visual content on this topic.

- **Data science** is primarily discussed at a high level, focusing on industry certifications or open positions offered for data scientists. Few universities and companies talk about this skill on social media, when it is so critical for their future business!

- **Mechatronics** collected 52 million engagements alone from more than 86,000 publications posted over the past year. This illustrates a key lesson from the analysis: very technical topics can be highlighted on social networks, primarily through videos or other engaging formats to attract the younger public and generate awareness on disciplines that require more workers and skills. For example, a quite fun video about Mechatronics earned 13.5 million views, and 2.5 million of likes, using many engineering-related hashtags:

#engineering

#mechatronics

#mechanicalengineer

#engineeringdesign

#engineeringstudent

- On the contrary both **MBSE** (Model based System Engineering) and **System Engineering** have not found success as a popular topic on those social media, with very few actors or communities are engaging on this topic. Even then, the content collects limited engagements. It is such a critical discipline for the future of so many industries, more needs to be done to increase conversations and awareness about it!

CONCLUSION



As the skills gap continue to widen, finding new ways to communicate about skills and disciplines and to measure how they are understood and generate engagement among different actors is critical. Social listening offers a powerful means to understand the state of the conversations around this essential topic for the manufacturing transformation. We will keep measuring the engagement specifically on the pivotal disciplines and skills, and continue to work hard with all our partners, either from business or academia, to help develop those.

We will also keep facilitate these conversations and drive innovative ideas and approaches to generate engagement. Visit <https://3ds.com/edu/skills> for more information. Looking forward to your own social media campaigns on skills and let's communicate on key pivotal disciplines.

#skills #pivotaldisciplines #sustainableexperiences
#sustainableengineering #ecodesign #systemsengineering
#formulationmanagement #materialscience #mechatronics
#compositesengineering #compositesmanufacturing
#additivemanufacturing #digitallogistics #leanmanagement
#dataengineering #dataanalysis #datascience #ARengineering
#VRengineering #digitalsupplychain #collaborative innovation
#simulation #industrialengineering #virtualtwincreation
#virtualtwinoperation

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

Dassault Systèmes, the **3DEXPERIENCE** 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 **3DEXPERIENCE** platform and applications, our customers push the boundaries of innovation, learning and production.

Dassault Systèmes' 20,000 employees are bringing value to more than 300,000 customers of all sizes, in all industries, in more than 140 countries. For more information, visit www.3ds.com.

