The Future of Making

Sean Manzanares

Senior Manager, Business Strategy & Marketing

AUTODESK.

MORE | BETTER | LESS

Discussion Topics

1. *. . .how manufacturing digitalization is transforming the landscape of global manufacturing* ***competition***

Powered by
Ford
EcoBoost
Castrol
EDGE
66
66
GTE Pro
side:1

9 Mega Technology Trends

And How They Are Re-Shaping Our World

Forbes

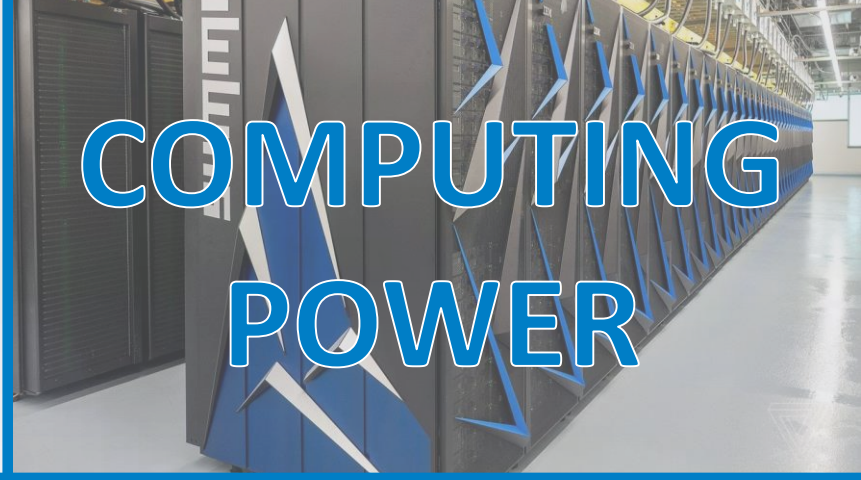
Bernard Marr

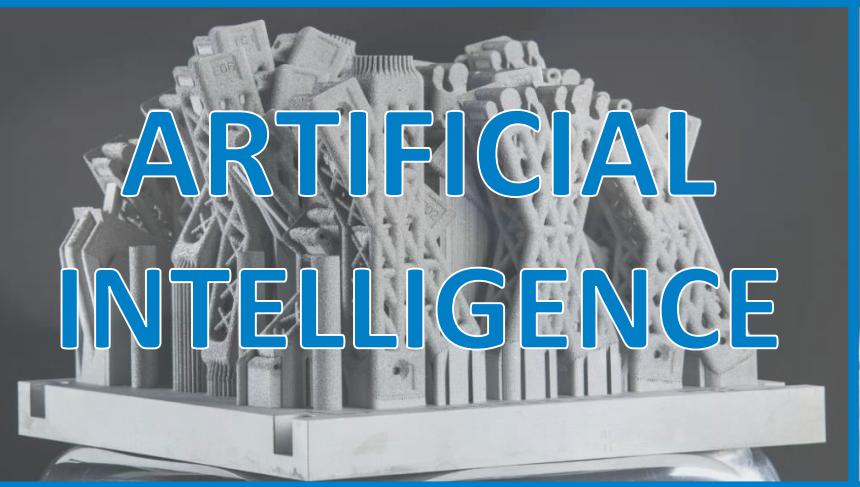
Strategic Business & Technology Advisor

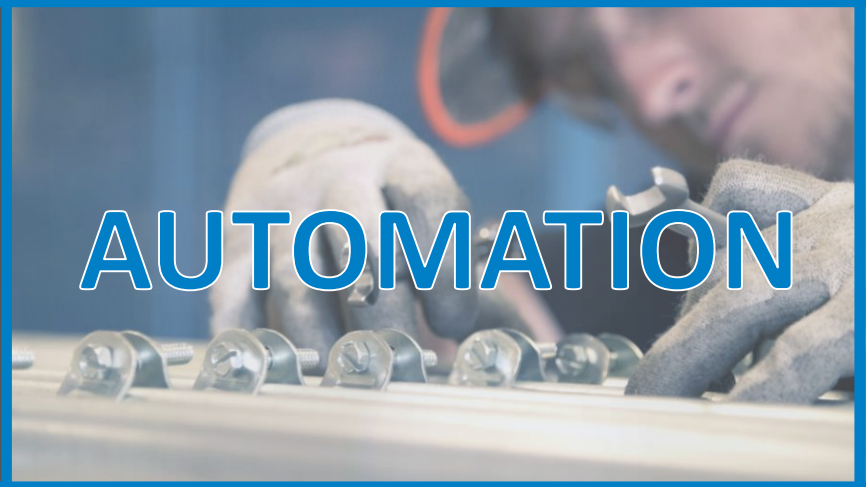
December 2017

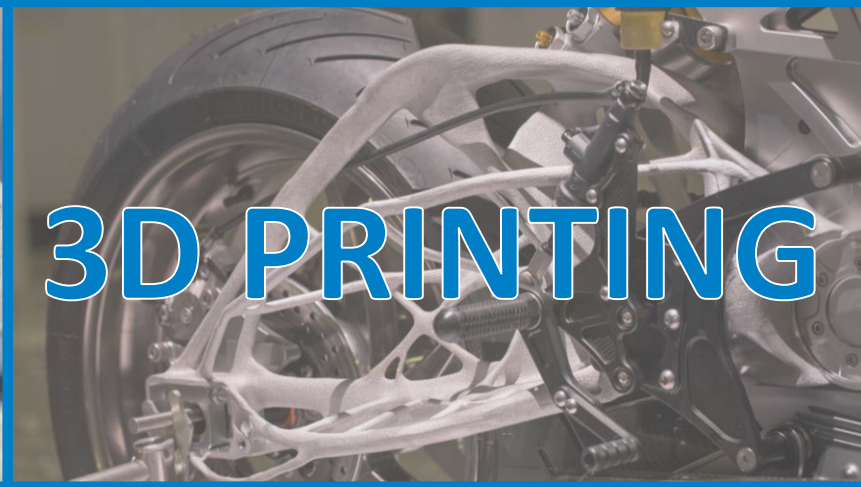
DATA

IoT

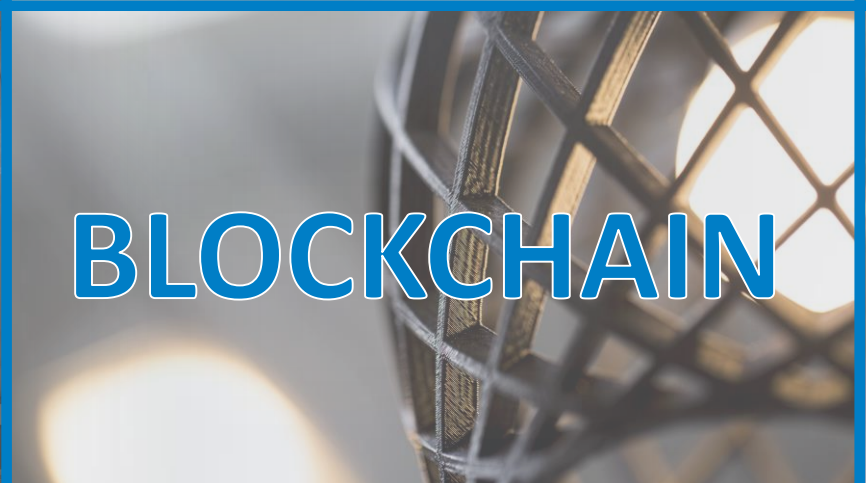

COMPUTING
POWER


ARTIFICIAL
INTELLIGENCE

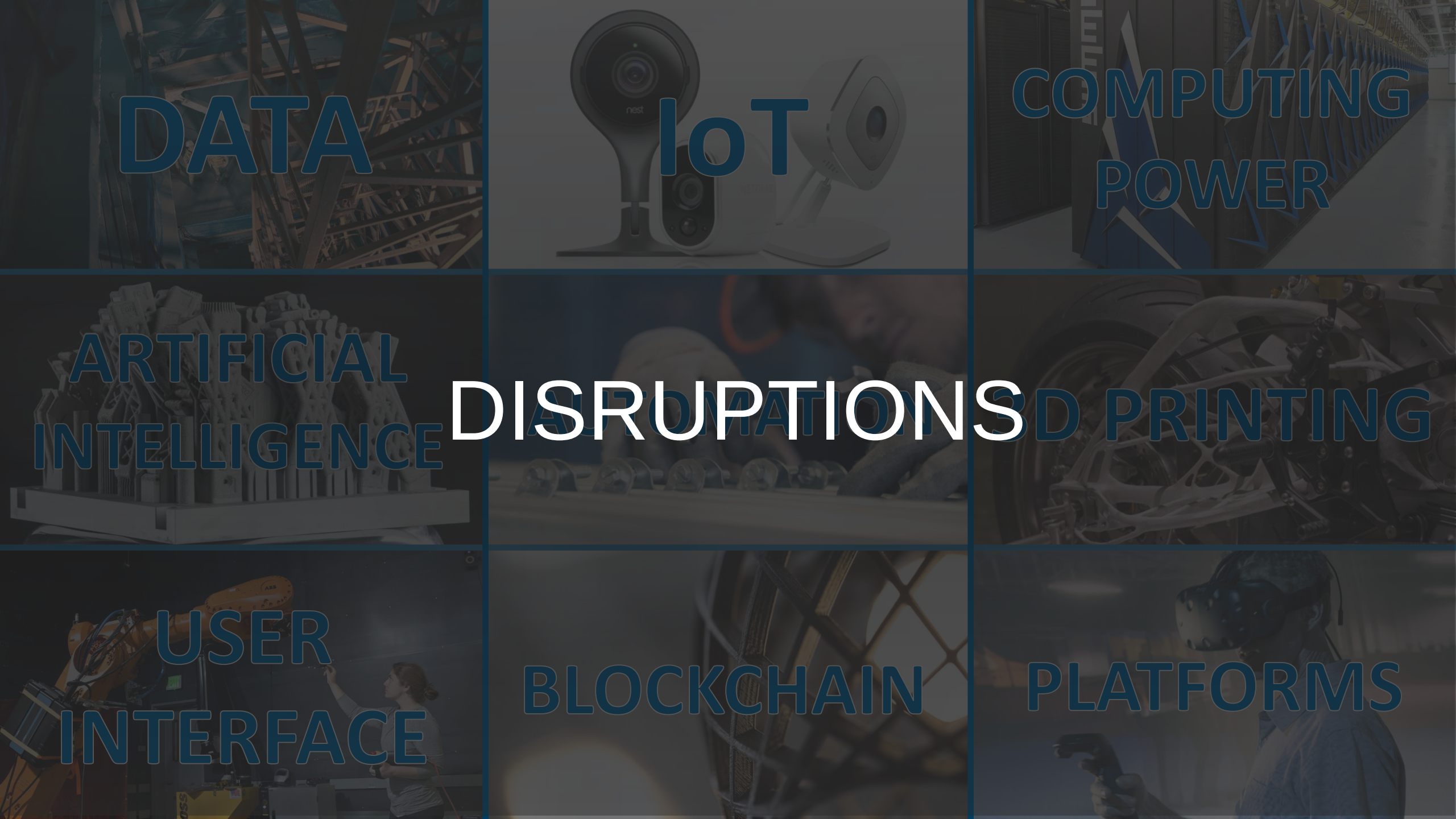

AUTOMATION


3D PRINTING

USER
INTERFACE


BLOCKCHAIN

PLATFORMS



DISRUPTIONS

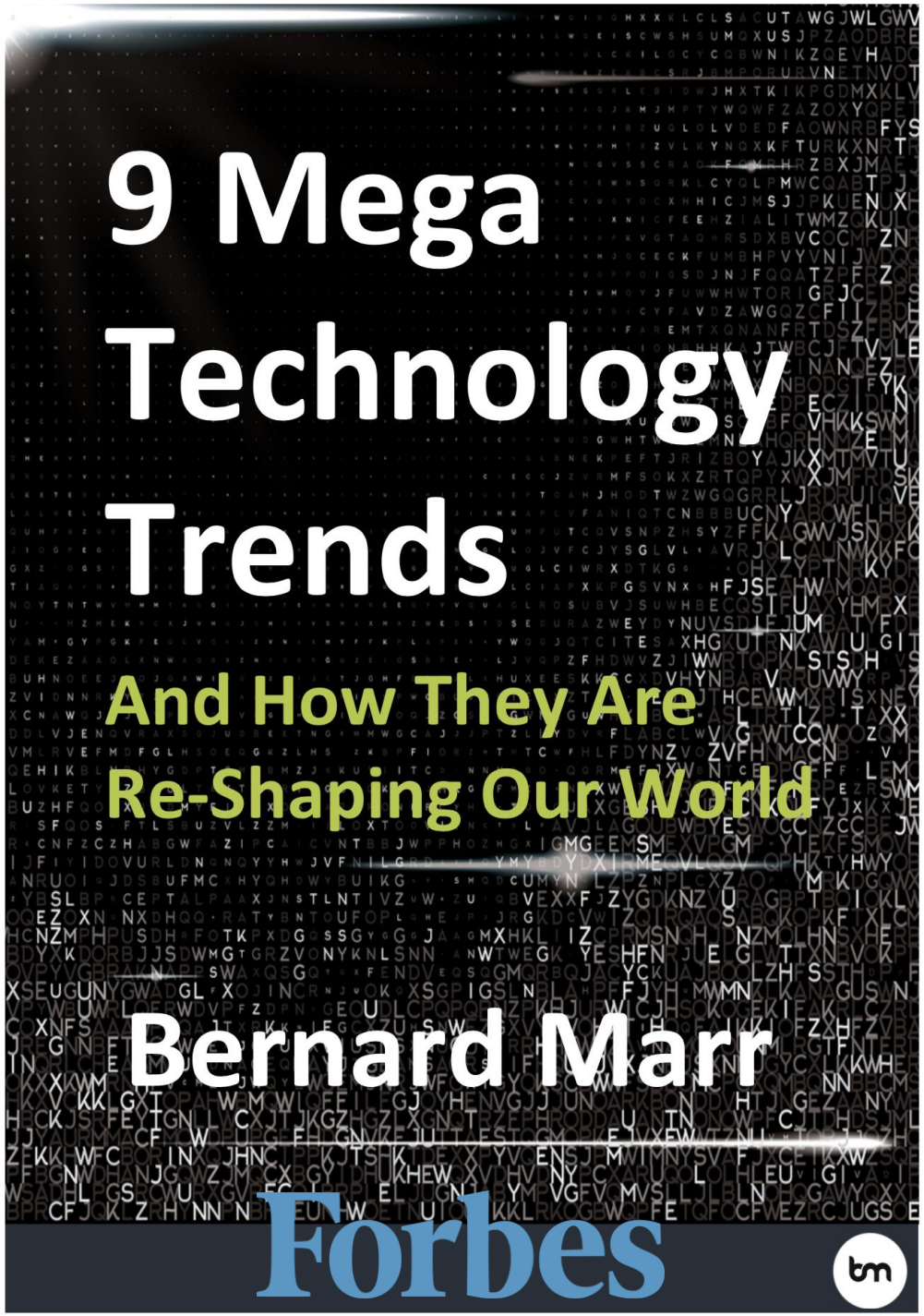
DISRUPTIONS

1. Means of production
2. Hyper-connectivity
3. Changing nature of work

Discussion Topics

1. *. . .how manufacturing digitalization is transforming the landscape of global manufacturing competition*

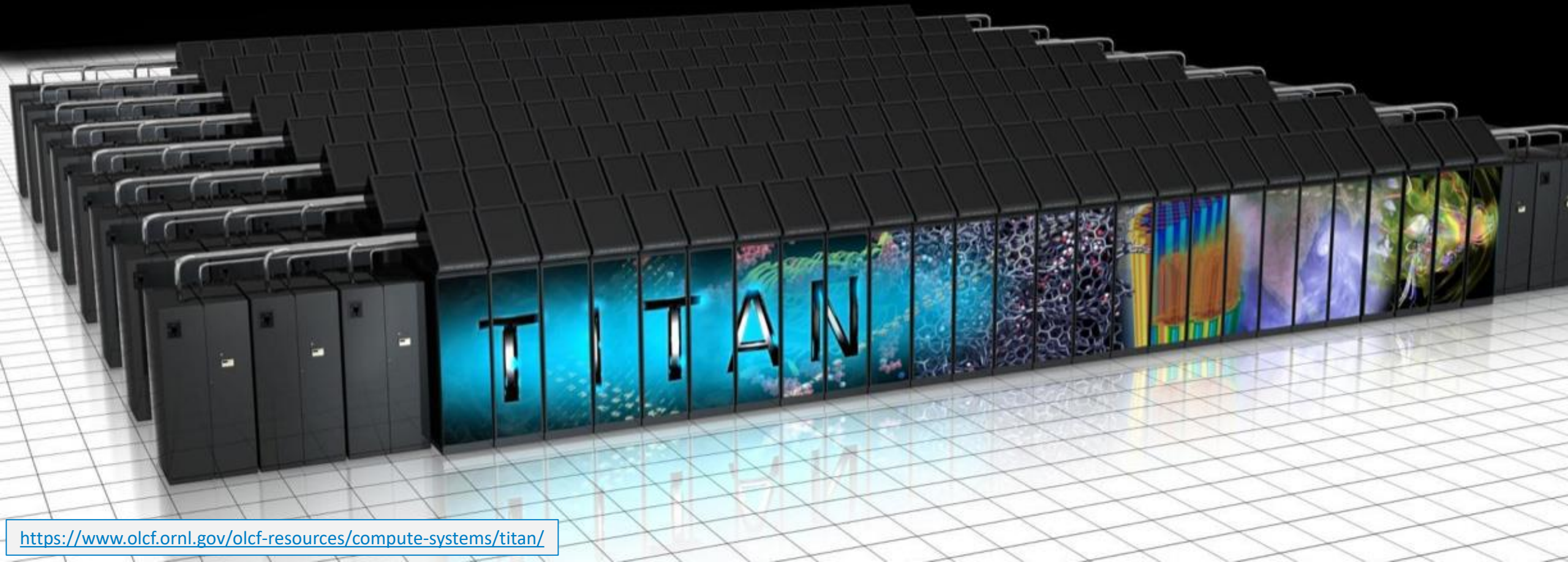
2. *. . . how these **technologies** are enabling new forms of value creation and **cost-efficient** production*



1. Increase in Data
2. IoT / Smart Devices
3. Computing Power
4. Artificial Intelligence
5. Automation
6. 3D Printing
7. Interacting with Technology
8. Blockchain
9. Platforms

World's #1 Open Science Supercomputer

Flagship accelerated computing system | 200-cabinet Cray XK7 supercomputer | 18,688 nodes (AMD 16-core Opteron + NVIDIA Tesla K20 GPU) | CPUs/GPUs working together – GPU accelerates | 20+ Petaflops



https://www.olcf.ornl.gov/olcf-resources/compute-systems/titan/

High Performance Computing (HPC) allows scientists and engineers to solve complex, compute-intensive problems.

HPC applications often require high network performance, fast storage, large amounts of memory, very high compute capabilities, or all of these.

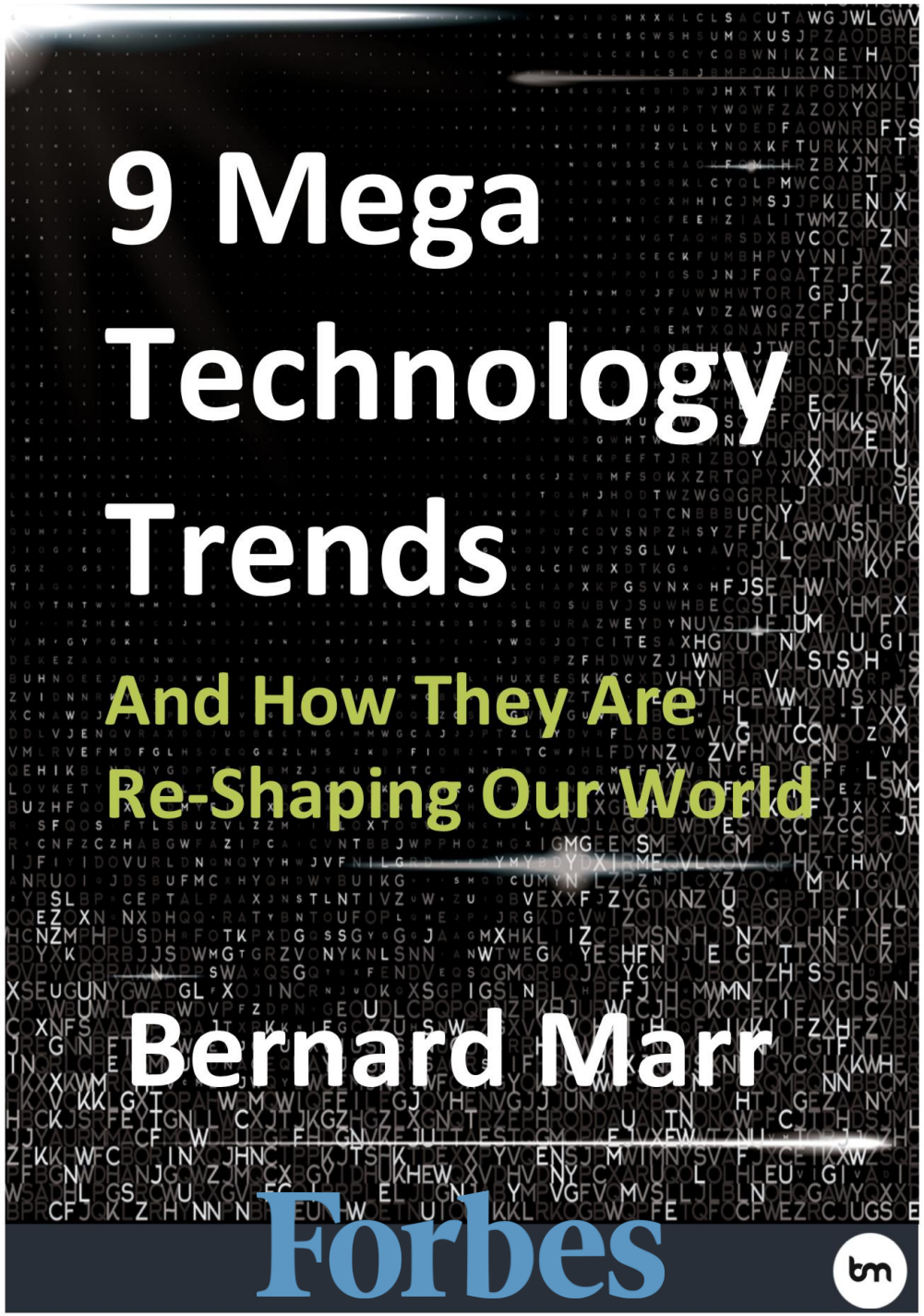
HPC **enables you to increase the speed of research** and reduce time-to-results by **running HPC in the cloud** and scaling to larger numbers of parallel tasks than would be practical in most on-premises environments.

WIRED

AMAZON'S HPC CLOUD: SUPERCOMPUTING FOR THE 99 PERCENT

By Jon Brodkin, Ars Technica

The Amazon Elastic Compute Cloud is becoming increasingly popular for high-performance computing. It's now capable of running many of the applications that previously required building out a large HPC cluster or renting time from a supercomputing center.



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THE OLD WAY

Designer/engineer uses computer as passive machine.

one human

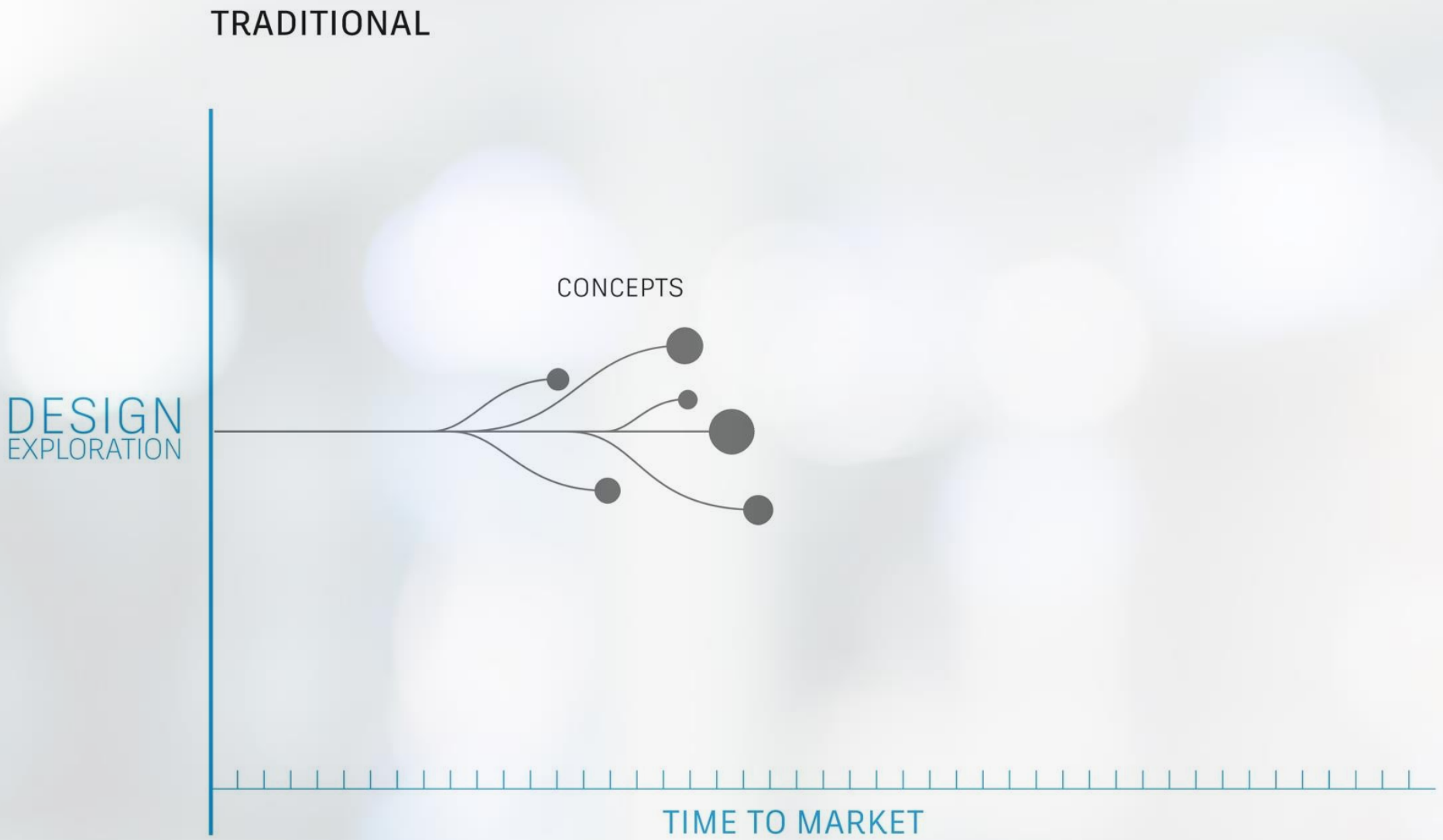
+

one computer

=

limited design options

PRODUCT DEVELOPMENT PROCESSES HAVE REMAINED LARGELY UNCHANGED SINCE THE INDUSTRIAL REVOLUTION



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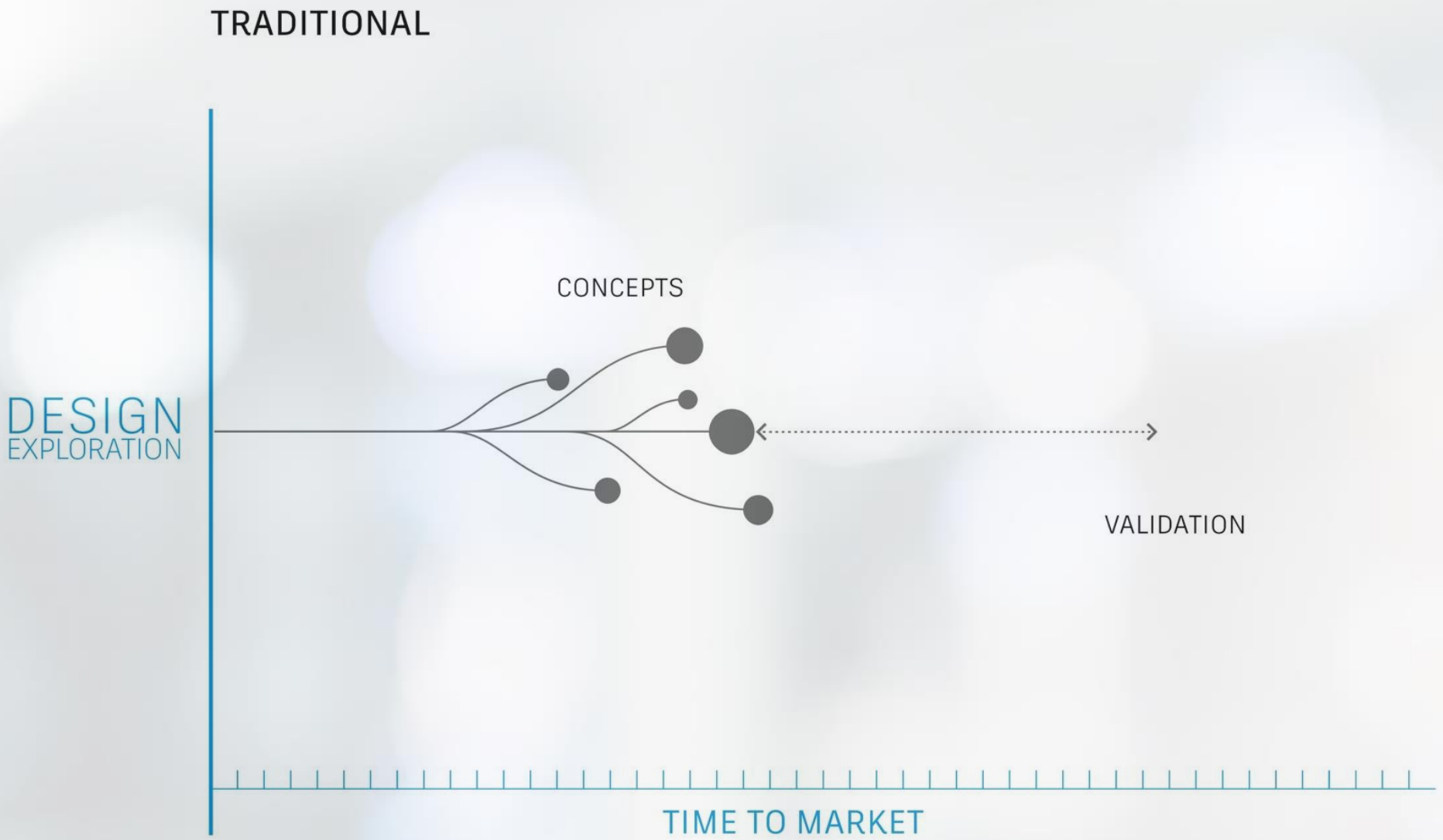

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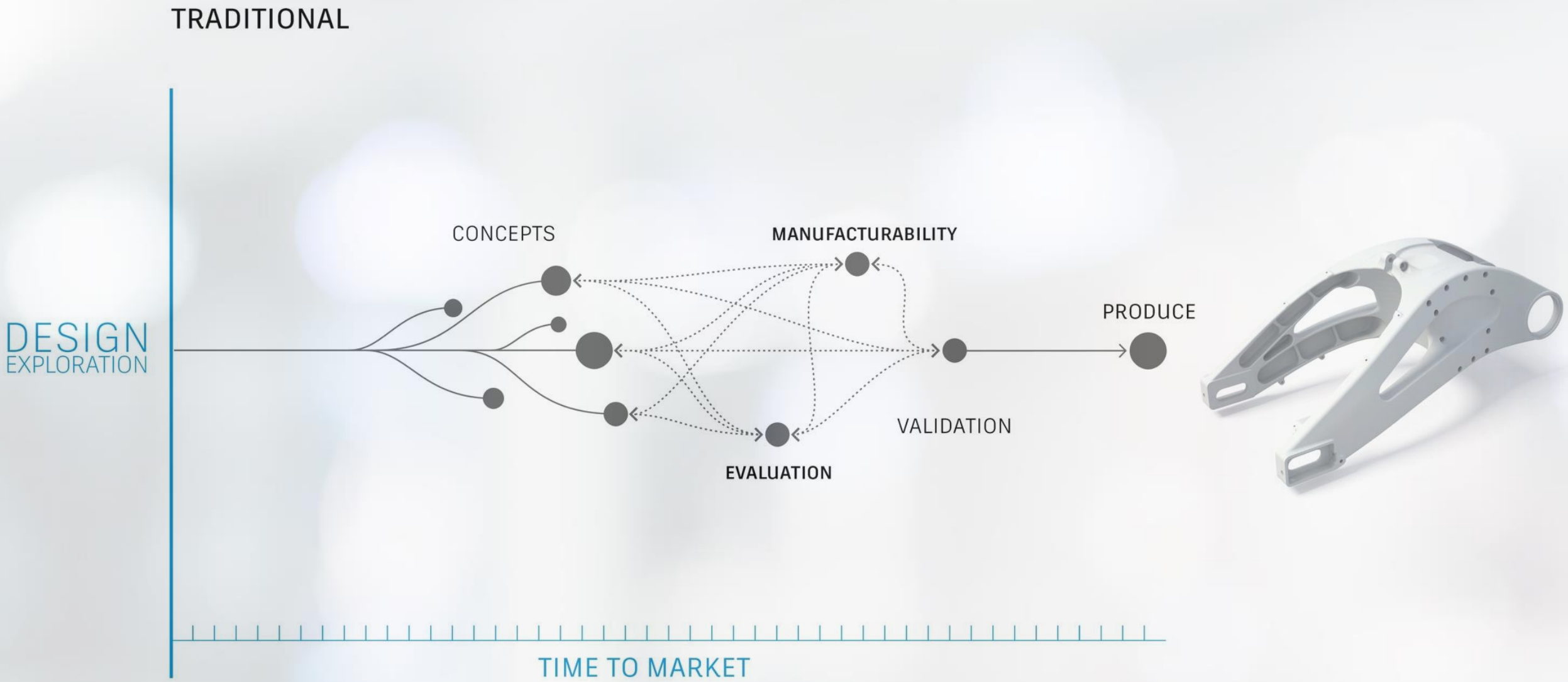
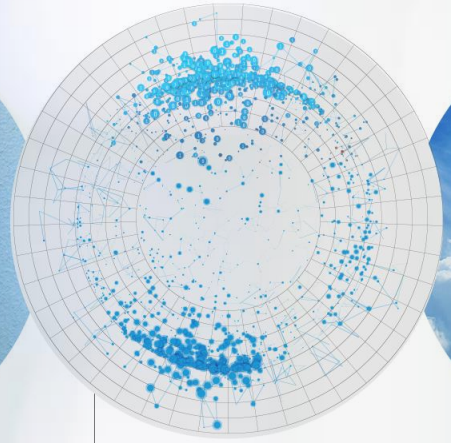


THE NEW WAY

Computer and designer/engineer unite as co-creators

one human

+

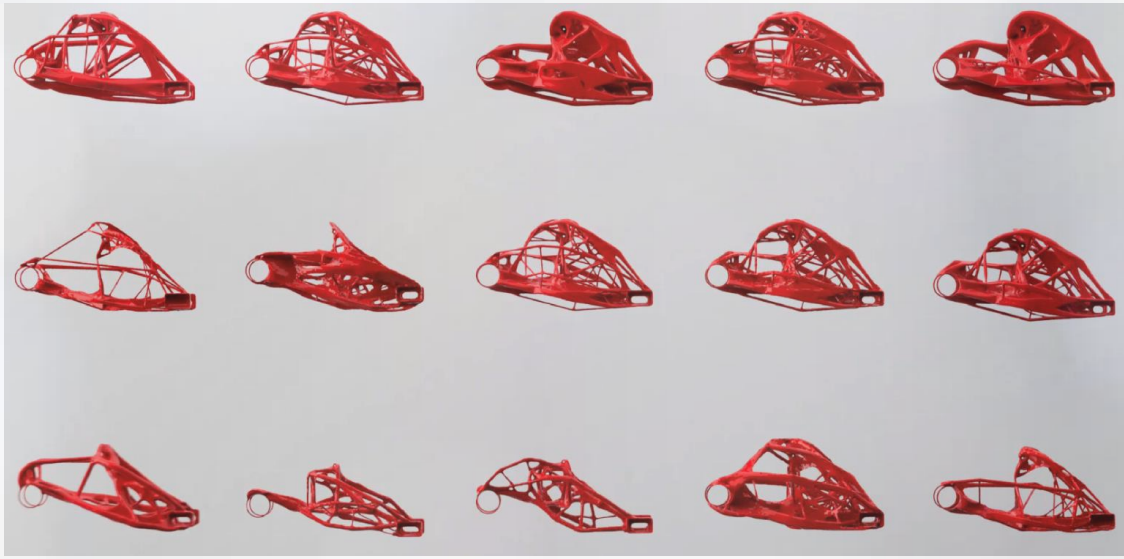


machine learning algorithims

+

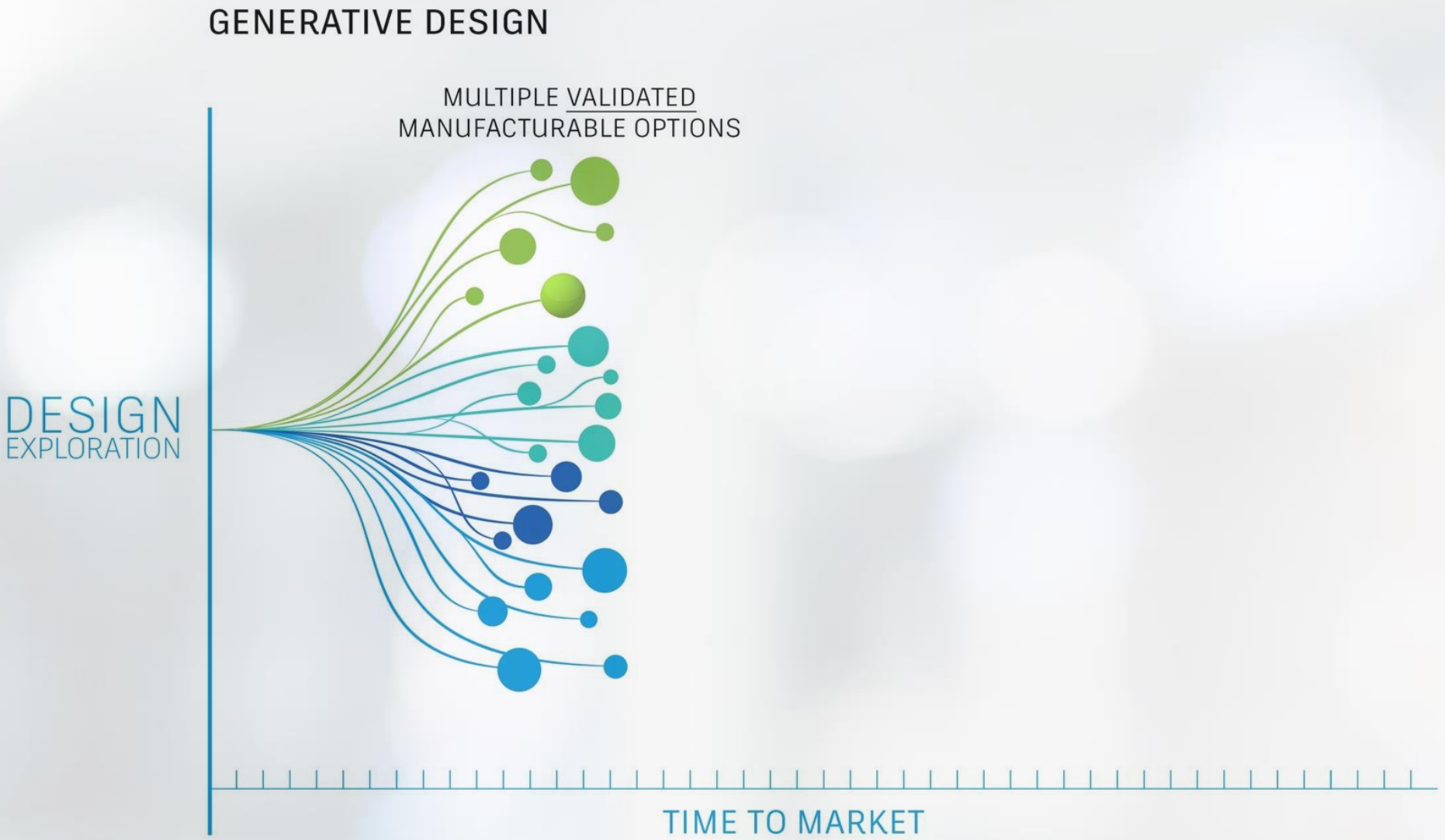
unlimited cloud-computing power

=



100s to 1000s of design options

GENERATIVE DESIGN ENABLES DESIGNERS TO EVALUATE HUNDREDS OF VIABLE OPTIONS



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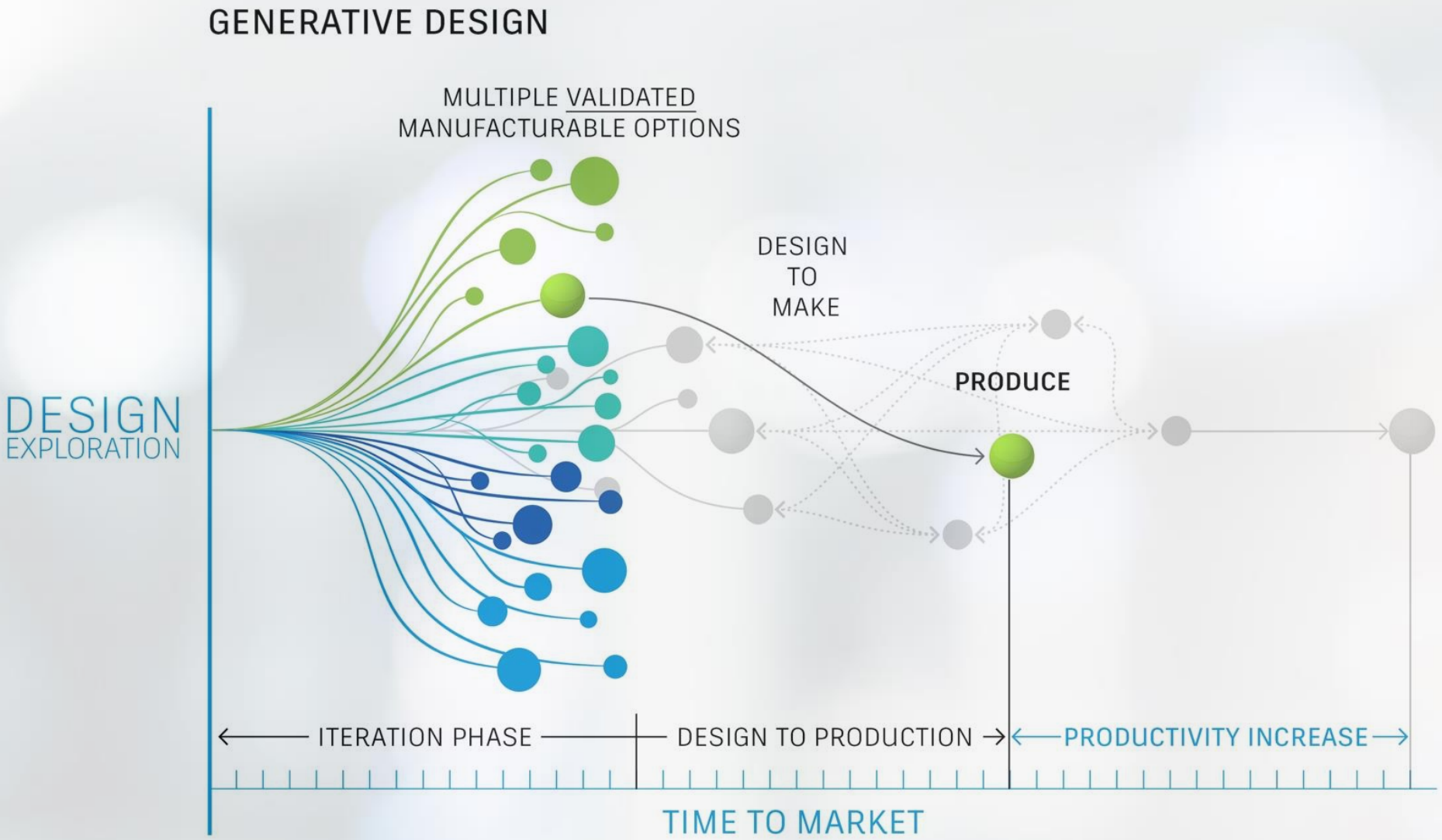

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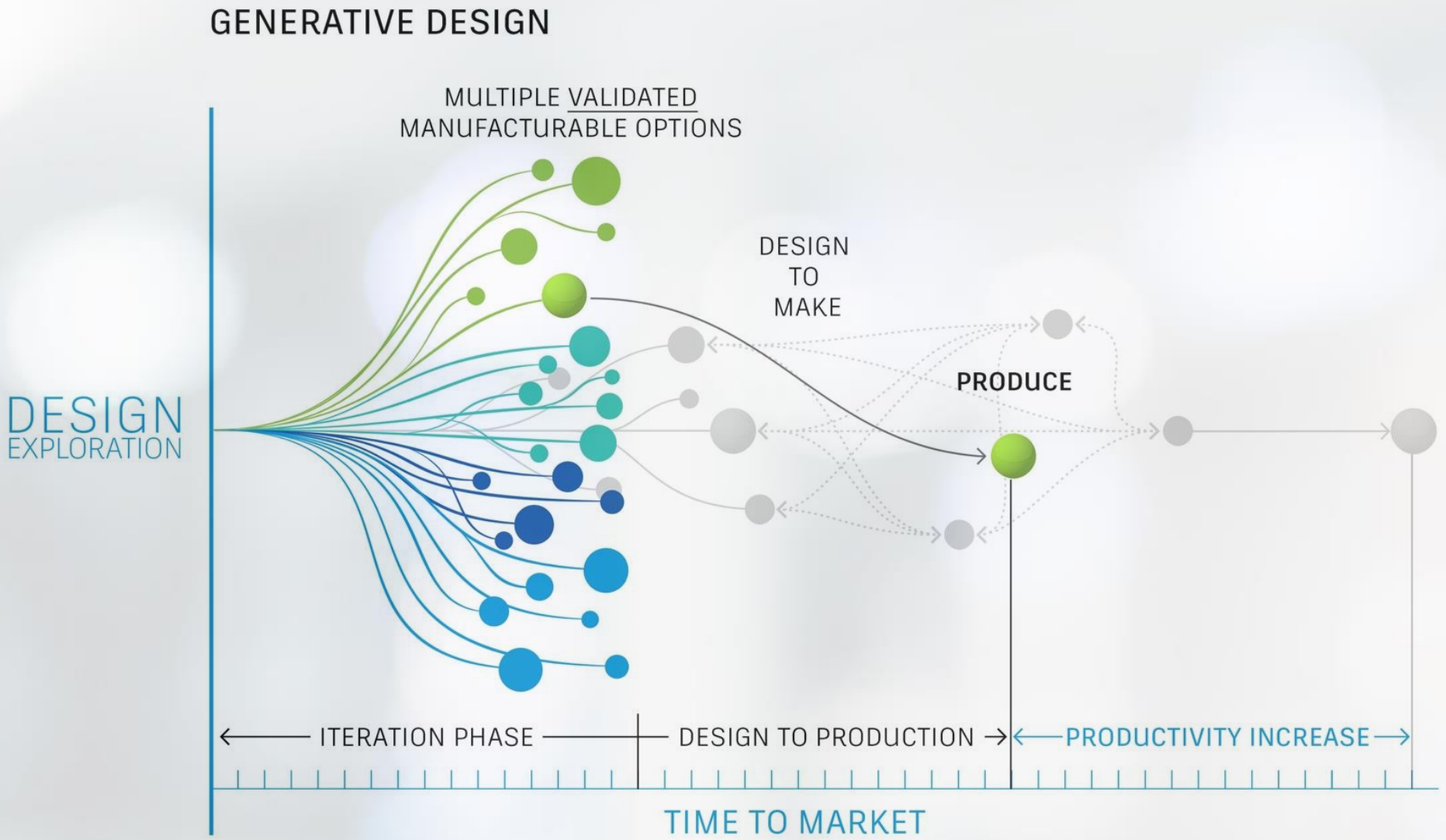
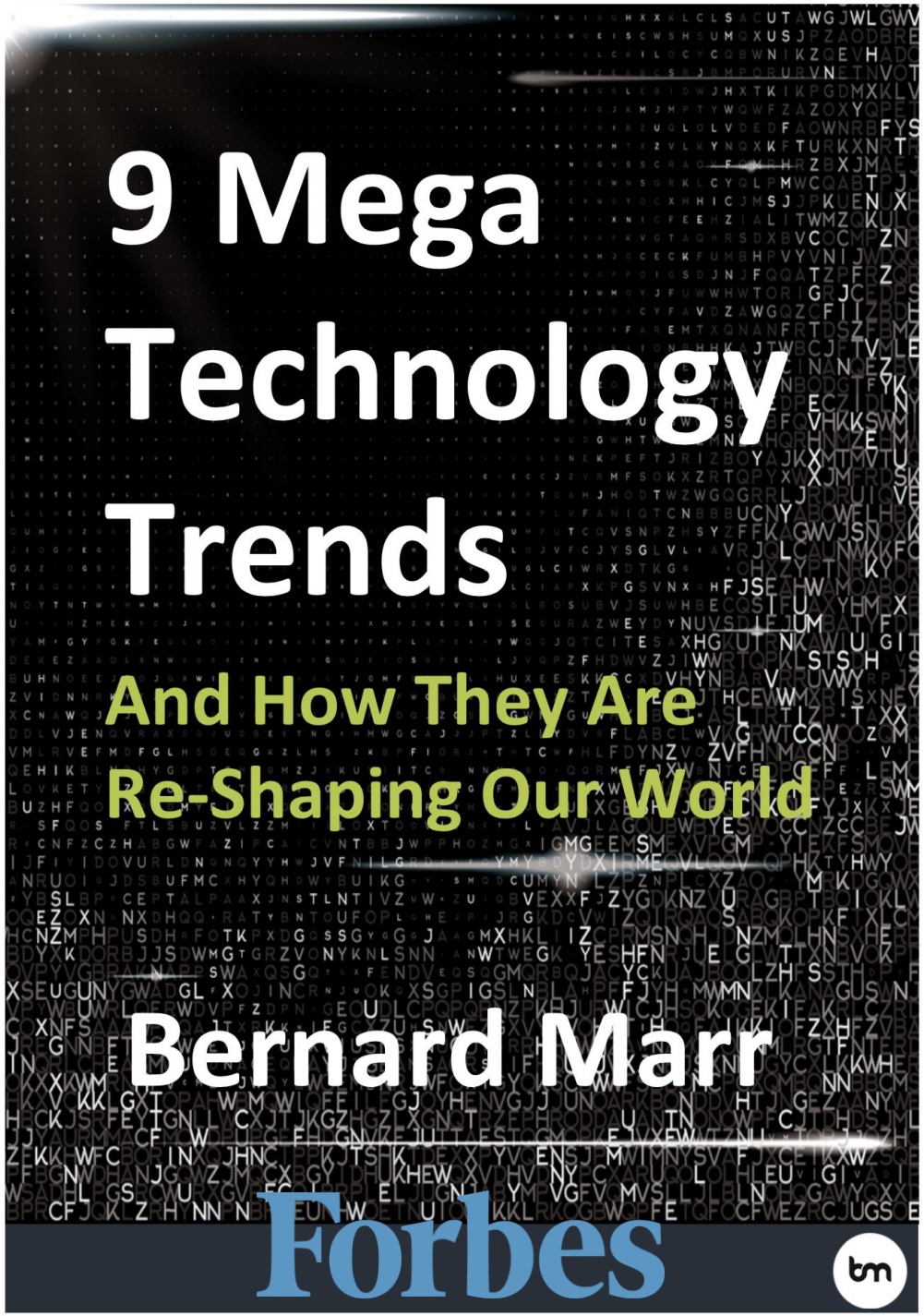


Discussion Topics

1. *. . .how manufacturing digitalization is transforming the landscape of global manufacturing competition*

2. *. . . how these technologies are enabling new forms of value creation and cost-efficient production*

3. *. . .how firms need to and can **adopt** manufacturing digitalization **techniques***
   - *foster unique **innovations**, and*
   - *stay **competitive** in the markets (home and abroad)*



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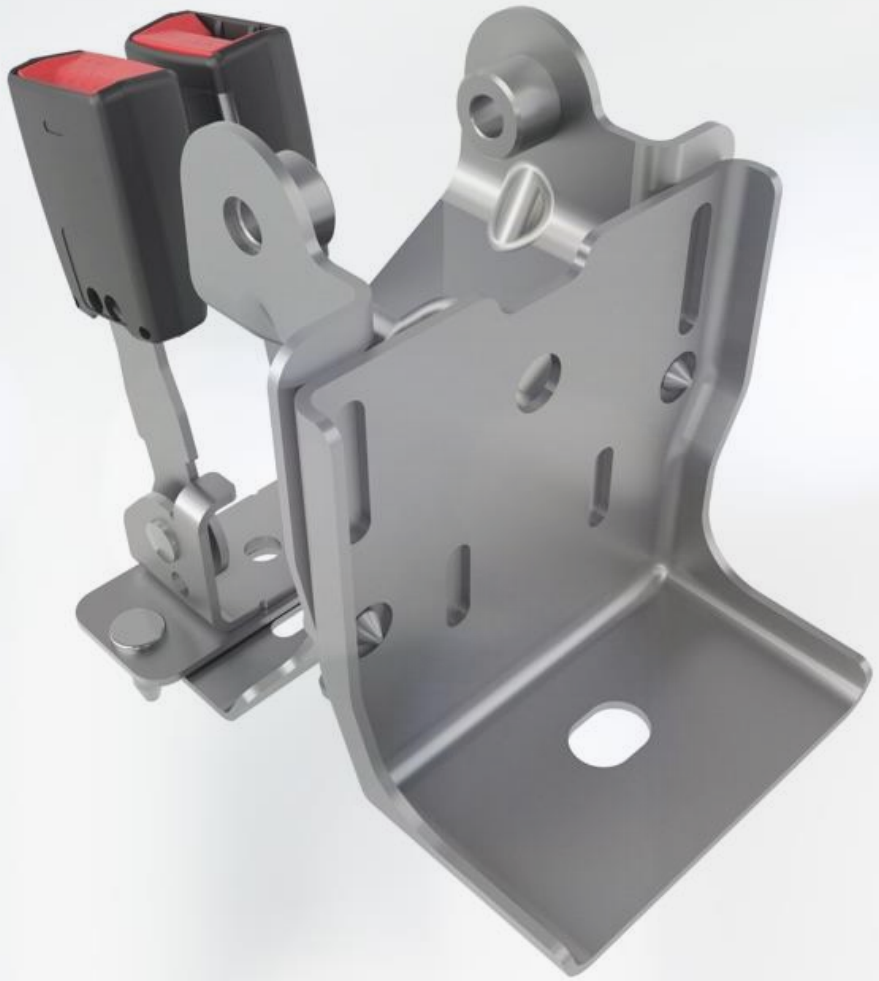
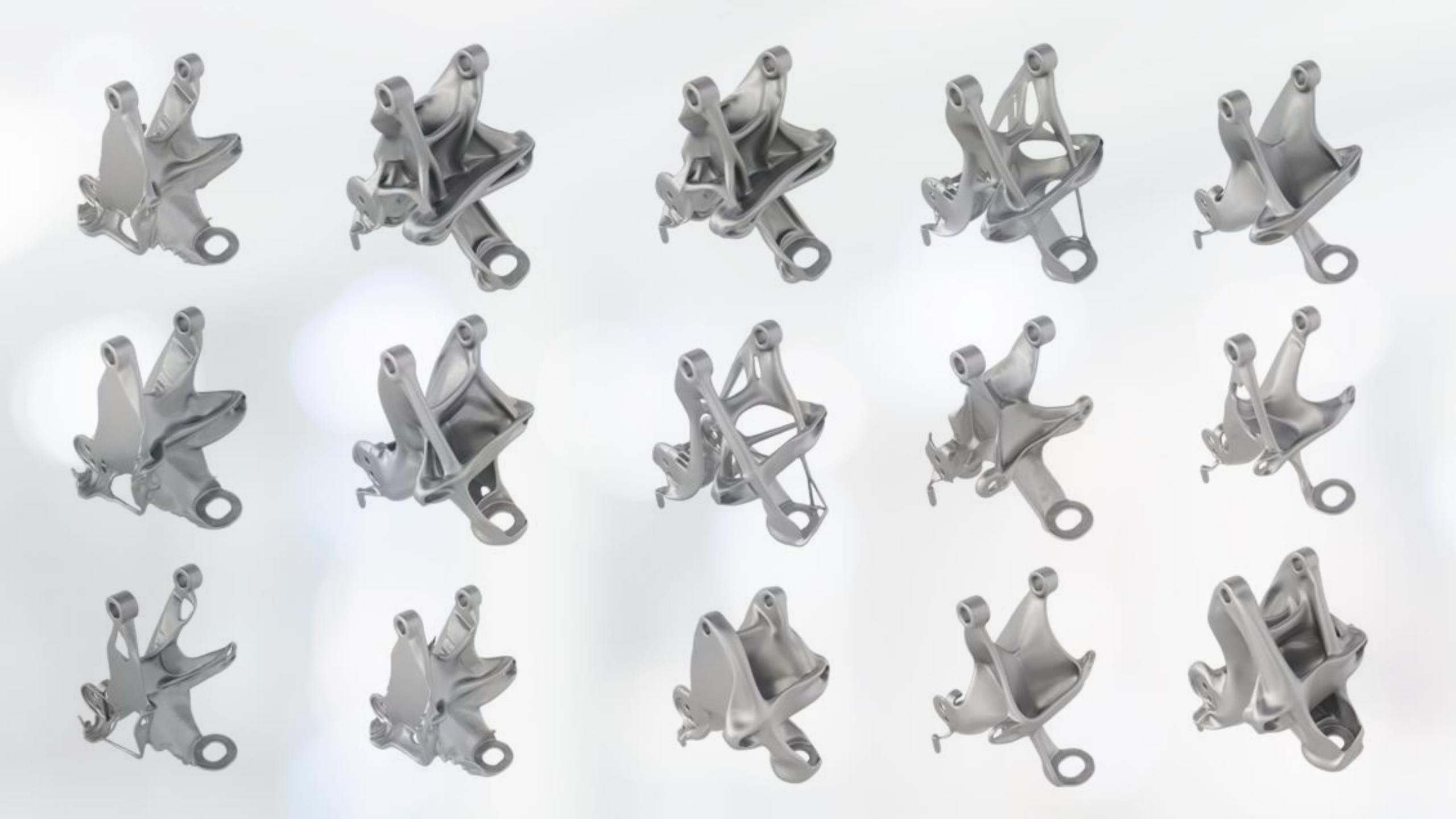
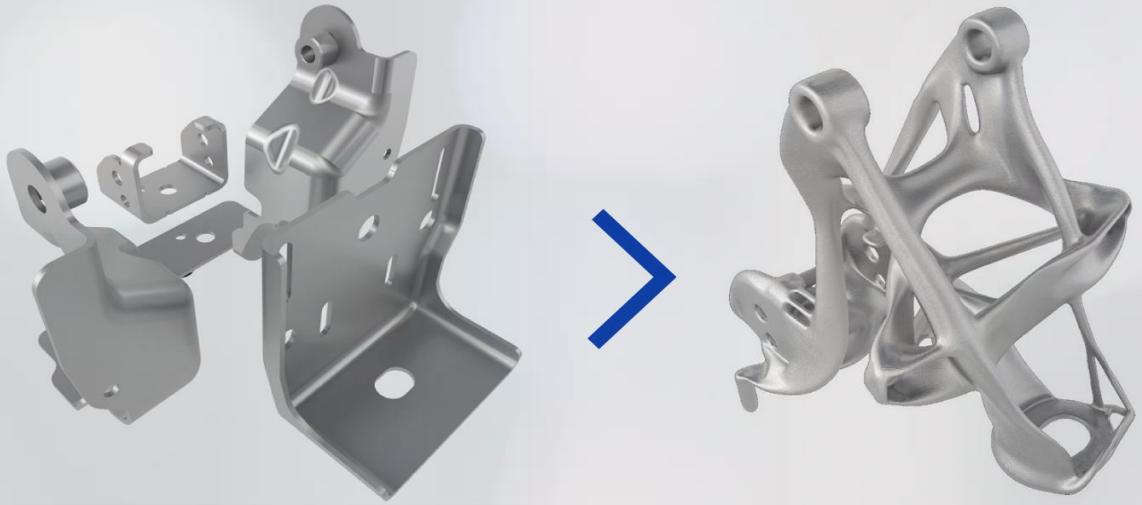
“General Motors plans to launch 20 new all-electric vehicles by 2023. GM believes in an all electric future.”
Mary Barra
CEO
October 2017
GM





GENERAL MOTORS NEXT GENERATION VEHICLE LIGHTWEIGHTING

MAKING GM VEHICLES LIGHTER



3D PRINTED SEAT BRACKET

Proof-of-concept shown

GENERATIVE DESIGN

150+ DESIGNS,

1 PART

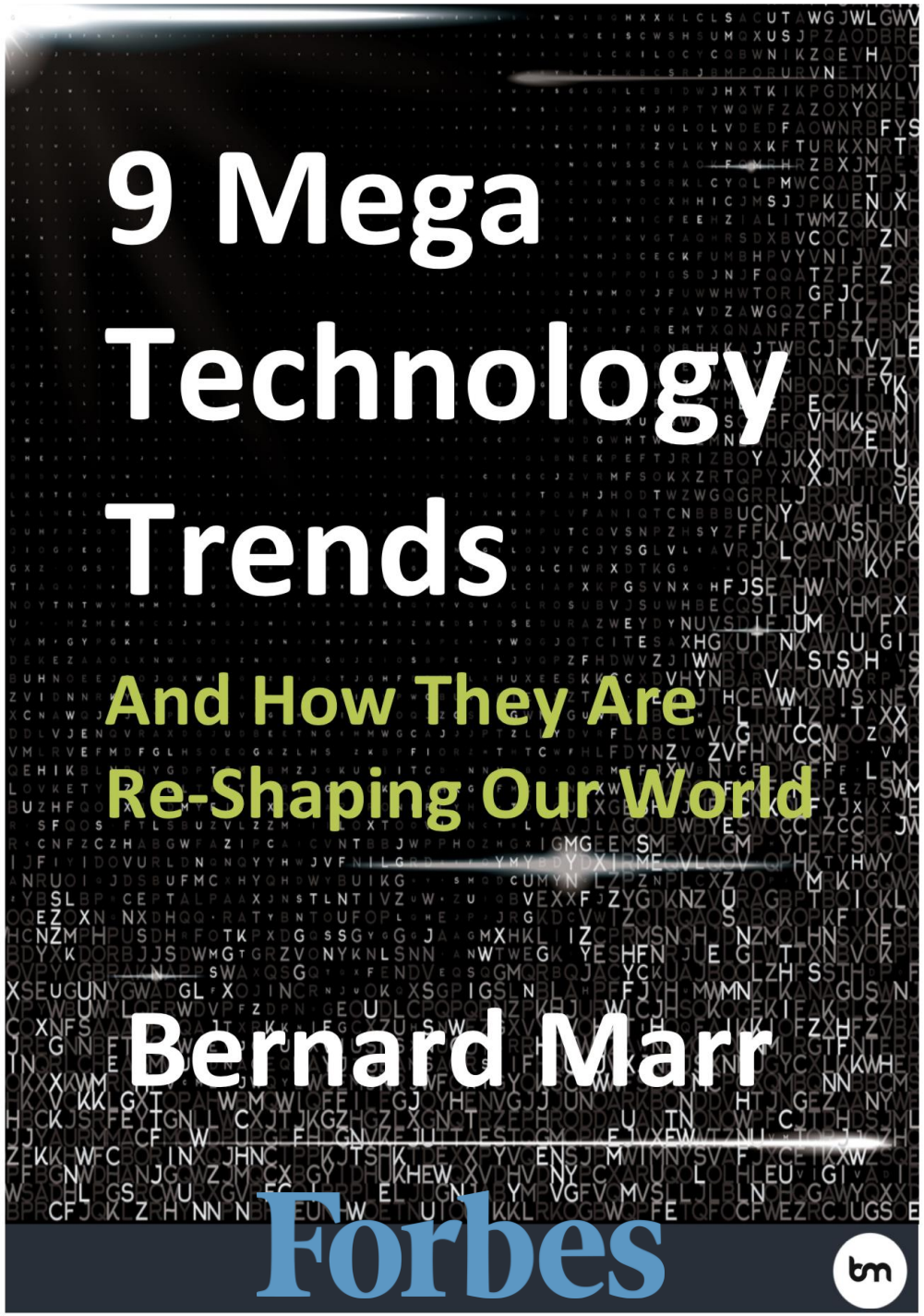
CONSOLIDATING

8 COMPONENTS
INTO 1 PART

40%
LIGHTER

20%
STRONGER

AUTODESK



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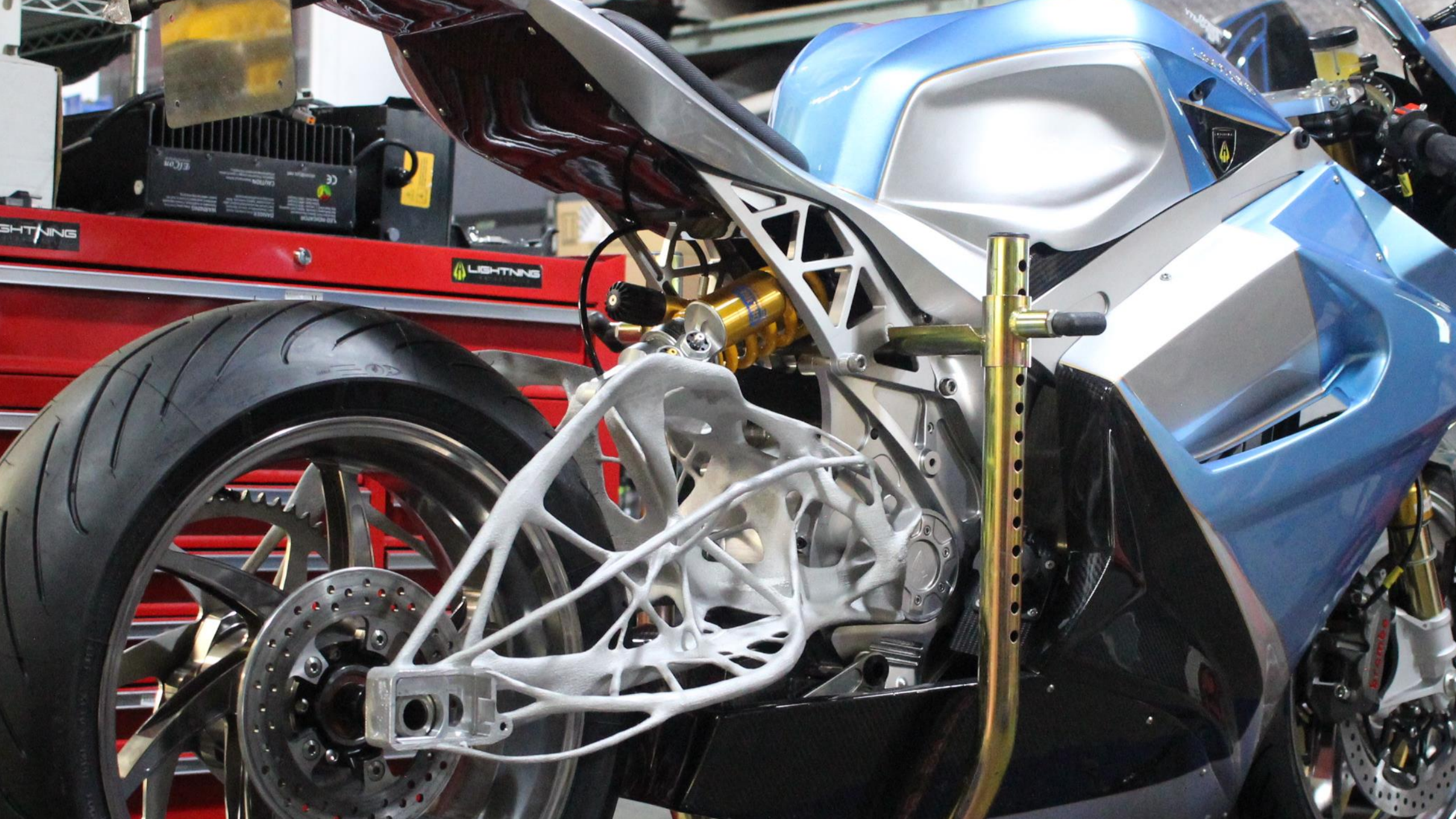
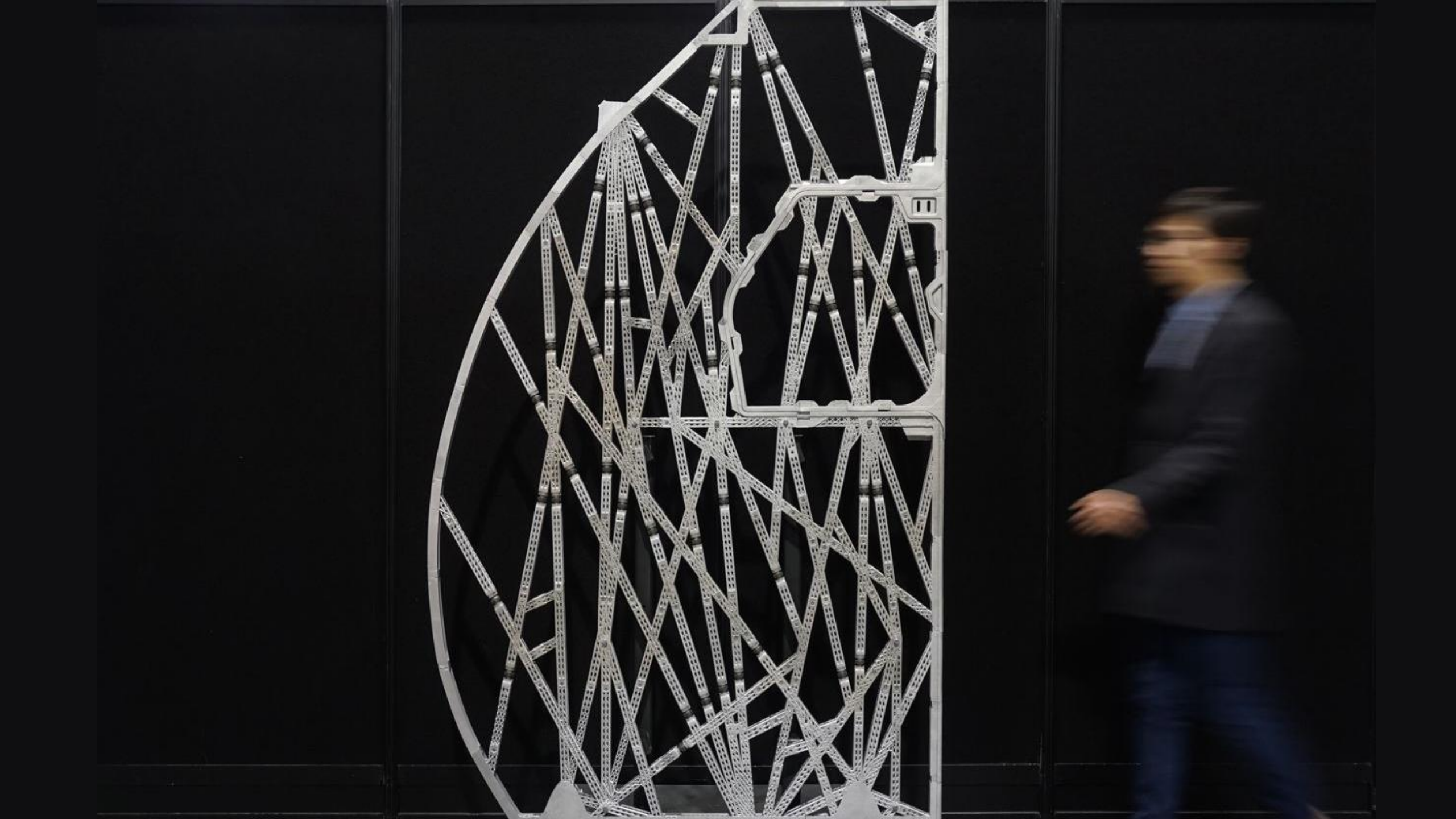
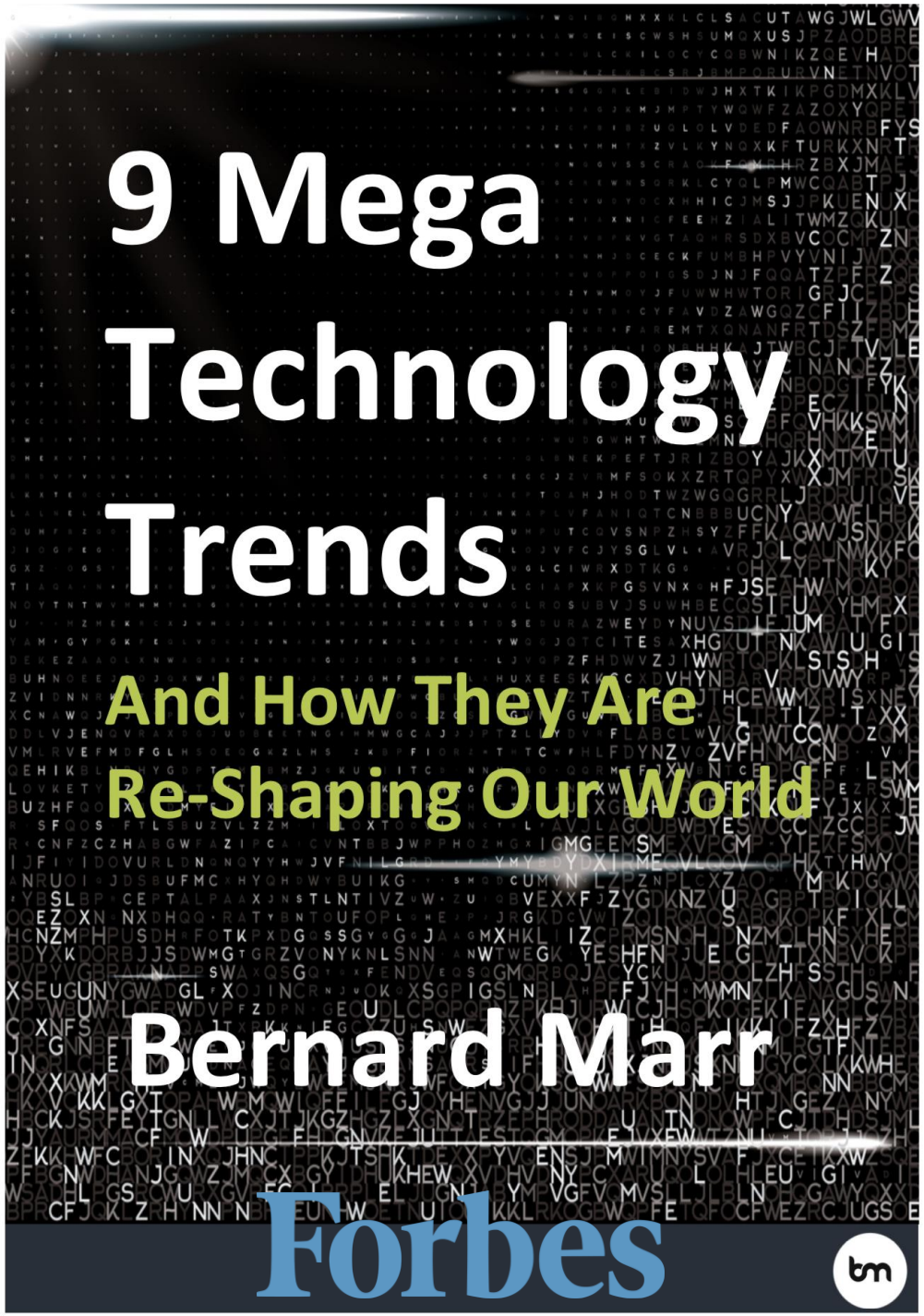

LIGHTNING



CONNECT

AUTOMATE
CONVERGENCE OF DESIGN & MANUFACTURING

CONVERGENCE OF DESIGN & MANUFACTURING
PRODUCE



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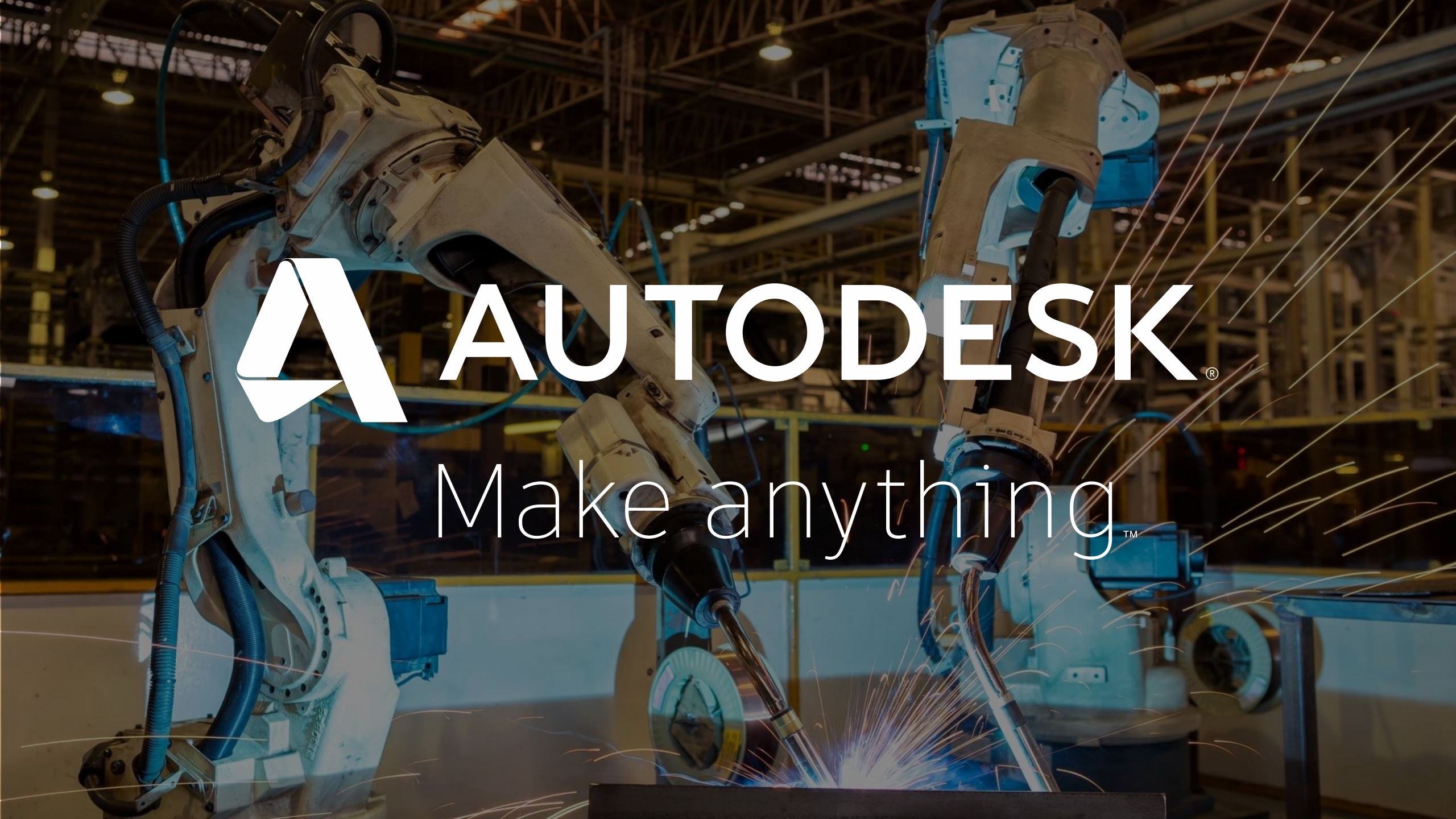
AUTODESK®
Make anything™

Thank You

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@seanmanzanares

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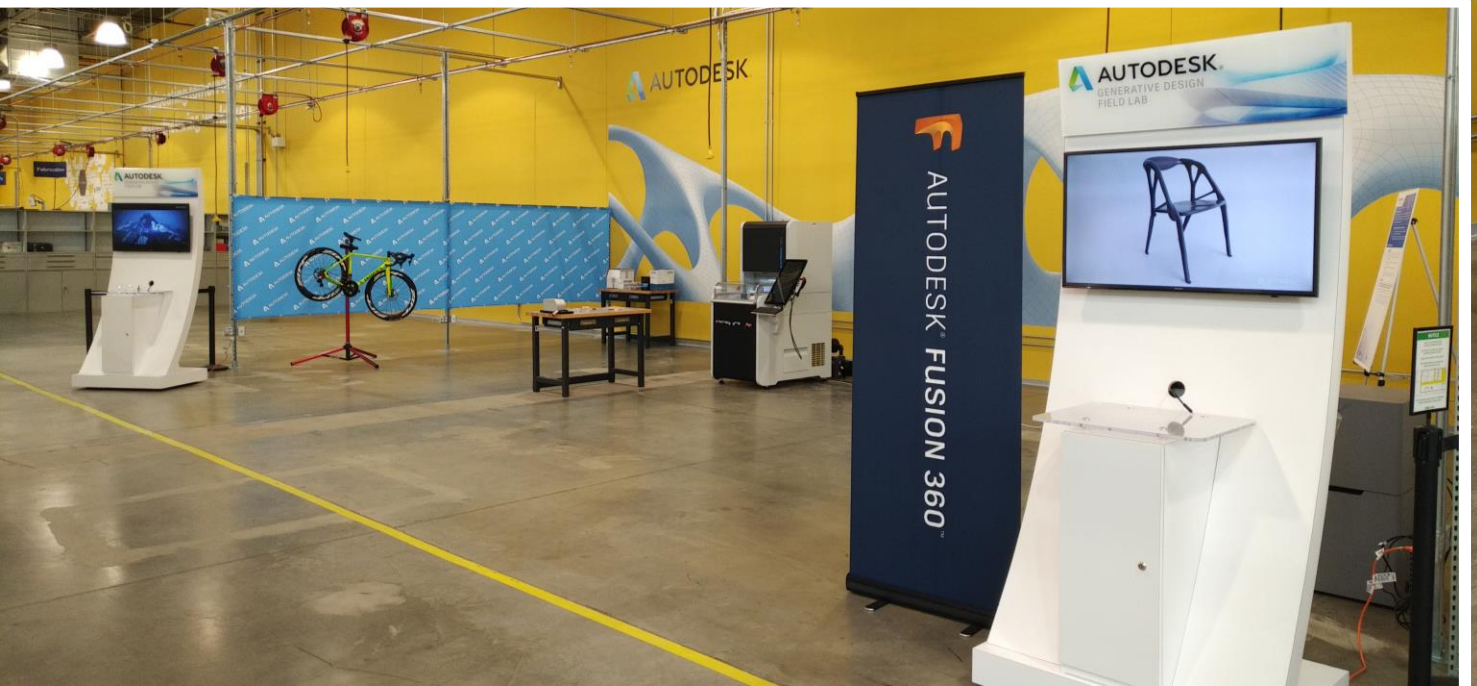
DMDII