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How to optimize industrial performance in pharmaceutical industry

CPDIS, January 16th, 2025



Guillaume Atoui

Head of Asset performance program
Sanofi Manufacturing & Supply



Layla Bral, Associate Scientist, Belgium

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We chase
the *miracles* of science
to *improve* people's
lives

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Our Four Global Business Units



Anthony Van Poucke,
Associate Scientist,
Belgium

Specialty Care

- Immunology
- Rare Diseases/
Rare Blood Disorders
- Neurology/
Multiple Sclerosis
- Oncology

General Medicines

- Autoimmune Type 1
Diabetes
- Type 2 Diabetes
- Cardiovascular
- Established Products
- Transplant

Vaccines

- Influenza
- Polio Pertussis and Hib
- Boosters
- Meningitis
- Travel & Endemic
- RSV

Consumer Healthcare

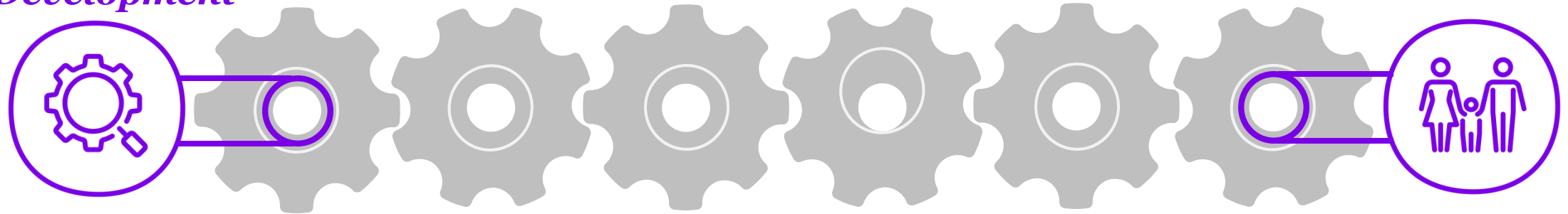
- Allergy
- Cough, Cold & Flu
- Pain Care
- Digestive Wellness
- Physical & Mental Wellness

Manufacturing and Supply, the *essential link* between R&D and patients...

Research & Development

Manufacturing and Supply

Patients



Industrial Development

Active Ingredients Manufacturing

Drug Product Manufacturing

Packaging & Device Assembly

Product Final Release

Logistics & Distribution

Manufacturing Science and Analytical Technology

Biologic drug substance
(mAbs, insulins, enzymes, vaccines)

Chemistry
(small molecules)

Manufacturing:
Solids (tablets and capsules), oral (liquids and topical), injectables (pre-filled syringes, vials, cartridges).

Devices & Packaging:
Solids (blisters and bottles), liquids (bottles and stick packs), devices (pens, auto-injectors), kit assembly. Also includes serialization when required.

Worldwide network

Sanofi Manufacturing & Supply (M&S) - *Our Mission*



Giovanna, Asthma Patient

To build a *modern, industry-leading manufacturing network*

Bringing together *talented people* and *cutting-edge technologies, data & digital*

To reliably launch and supply *high-quality, affordable and sustainable medicines and vaccines*

Around
30,000
employees

4.3bn

units of medicines & vaccines manufactured & distributed

€1bn

invested
every year to transform and modernize our industrial network with a strong focus on digital

Embracing *all technologies* and supporting *all global business units*



Bioproduction & injectables serving *Specialty care*



7

Specialty care manufacturing sites



Global Leader in *Vaccines*



10

Vaccines Manufacturing sites



Wide range of established & innovative *General medicines* products

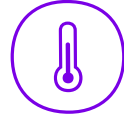


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General medicines manufacturing sites

Minimizing our *impacts*

Our 5 environmental *commitments*



Fight climate change: build the road to carbon neutrality by 2030 and net zero emissions by 2045

By engaging Sanofi towards the 1,5°C global warming trajectory



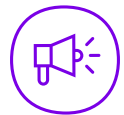
Limit our environmental footprint and aim for circular solutions

By optimizing the use/reuse of resources and reducing impact of emissions



Improve environmental profile of products

By delivering eco-innovative products and by fostering a sustainable use of medicines



Mobilize our people for environmental sustainability

By promoting an environmentally-conscious culture in the workplace



Engage our suppliers in our environmental ambitions

By sourcing responsibly and leading by example

Planet Care CSR flagships

Acting for *Environmental Sustainability*



Carbon neutrality

On all scopes by 2030 including 100% renewable electricity and eco-fleet



100% blister free

End the use of plastic in blister packs for all our vaccine syringes by 2027



100% eco-design

For all our new products by 2025

Our External Engagement



Our commitment to restoring a healthier planet does not stop at our manufacturing sites, but also extends to reducing our GHG emissions linked to our value chain.

Julie Van Ongevalle
EVP, Consumer Healthcare

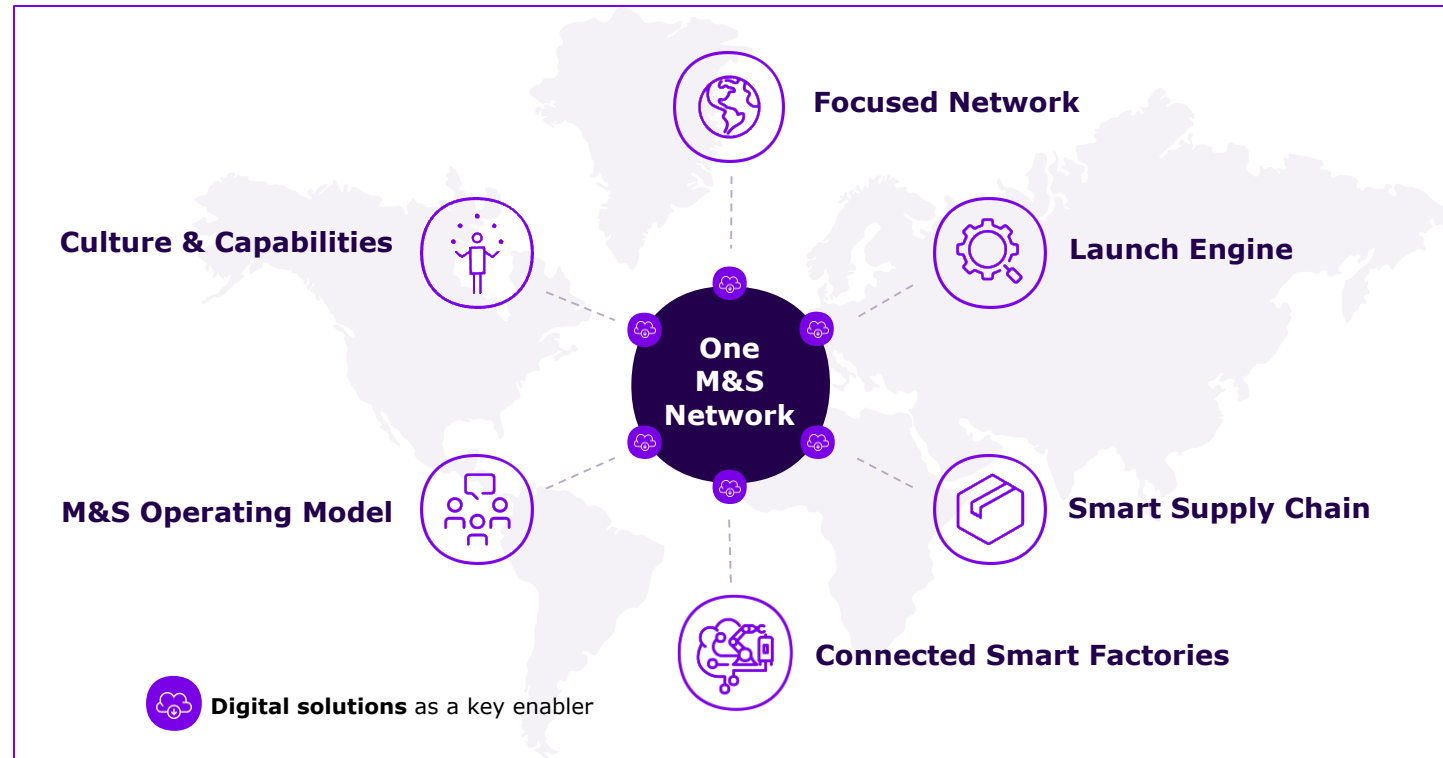


We're proud to be part of CDP's leadership band for our commitment, actions and transparency on climate change, water as well as Supplier Engagement. When it comes to protecting our Planet, we're all powerful agents of change.

Brendan O'Callaghan
EVP, Manufacturing & Supply



M&S modernization to support the company's growth & ambition



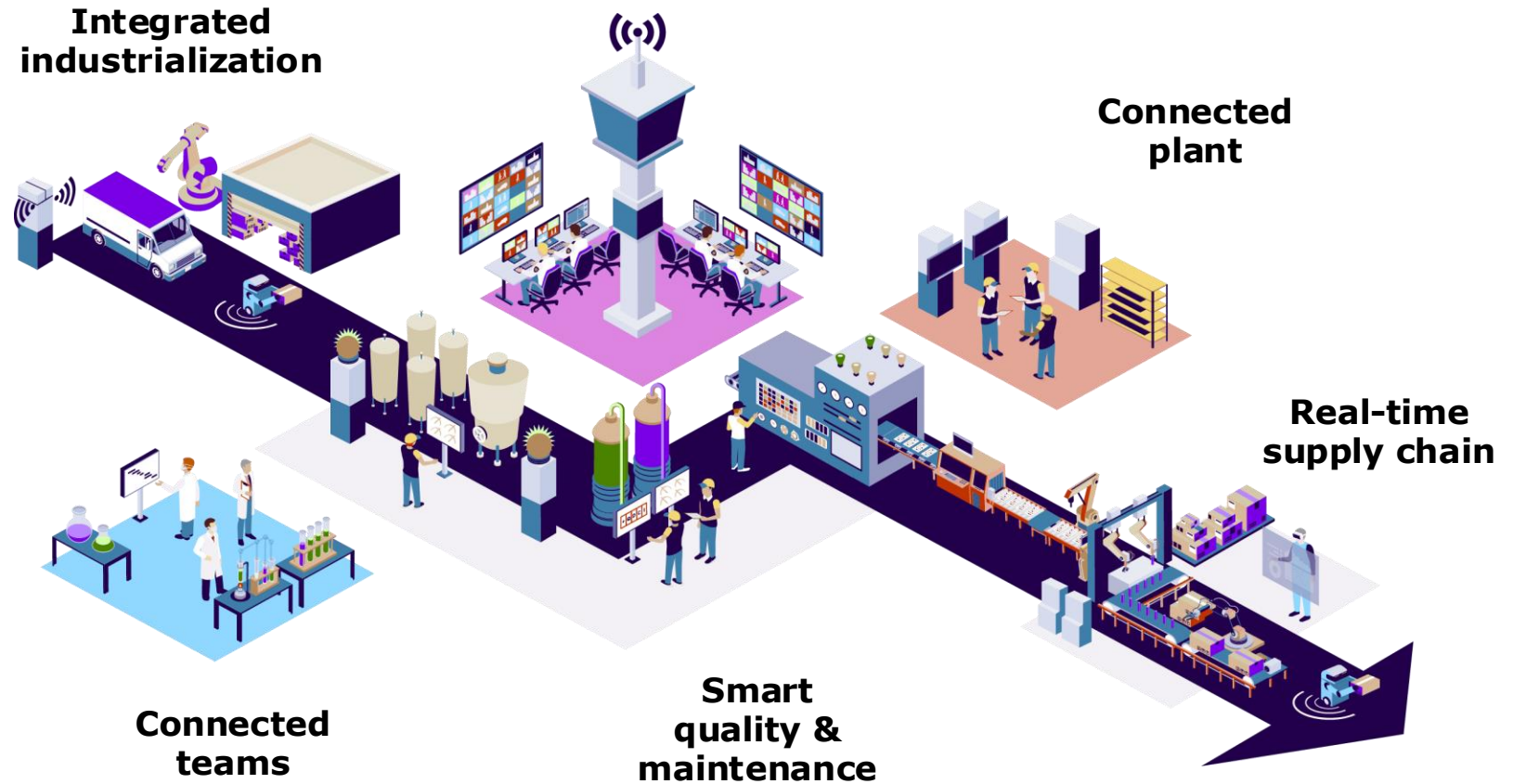
We have a *clear transformation roadmap* built around *3 guiding principles* (Simplify, Standardize and Digitize) and *6 major initiatives*

Play to Win in Manufacturing and Supply



Roll out massive *digitalization* plan

Making our *Connected Smart Factories* a reality



We use real-time data and AI for *predictive & prescriptive* decisions and *dynamic optimization*

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Plai

A mobile & web app delivering real-time data dashboards, to provide a 360° view across key activities. Through the power of **AI**, plai delivers snackable, actionable insights to help making informed decisions.

plai for Manufacturing & Supply

An app developed in 3 modules to digitize, standardize, simplify



plai.m&s
plai.qa
plai.supply

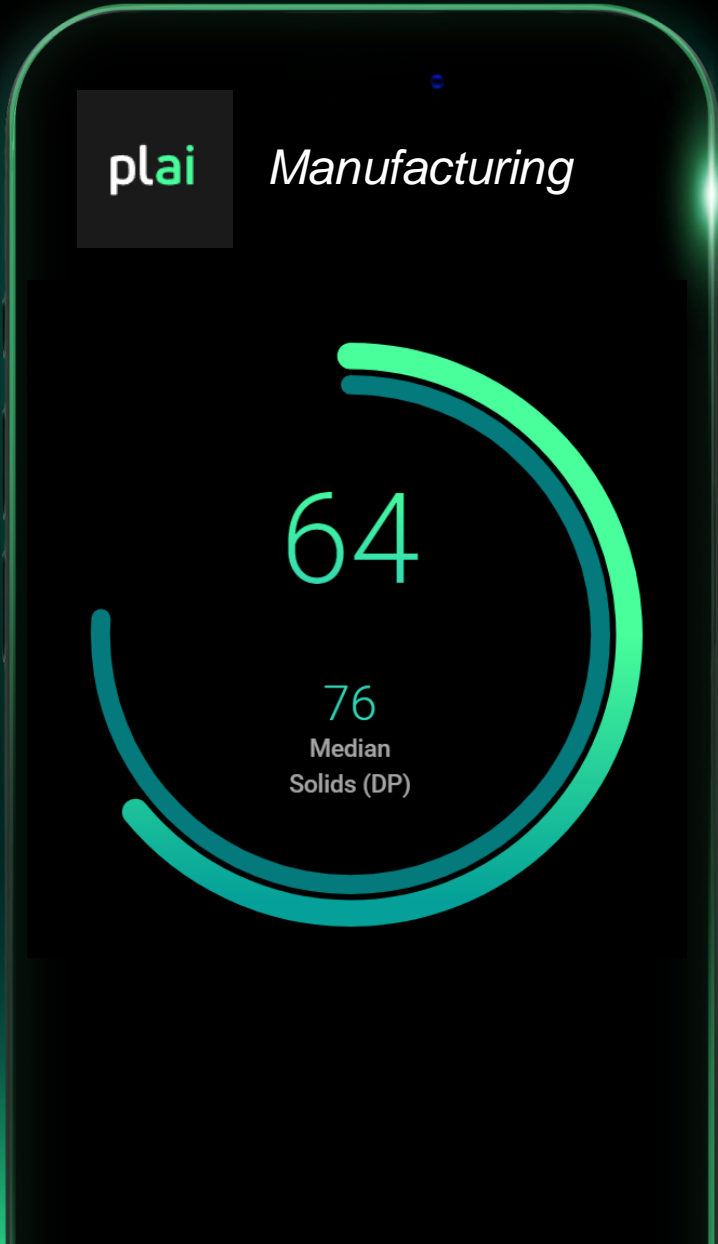
Data democratization

Simple access for everybody to key performance, quality and supply data

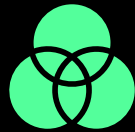
AI

Leverage Artificial Intelligence for insights and to support & accelerate our processes

Plai Site Pulse: A.I. to simplify site performance tracking



A.I. checks all data every day & summarizes it in one score



Integrates internal and external benchmark



Provides recommendations to improve

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How to improve industrial asset performance?

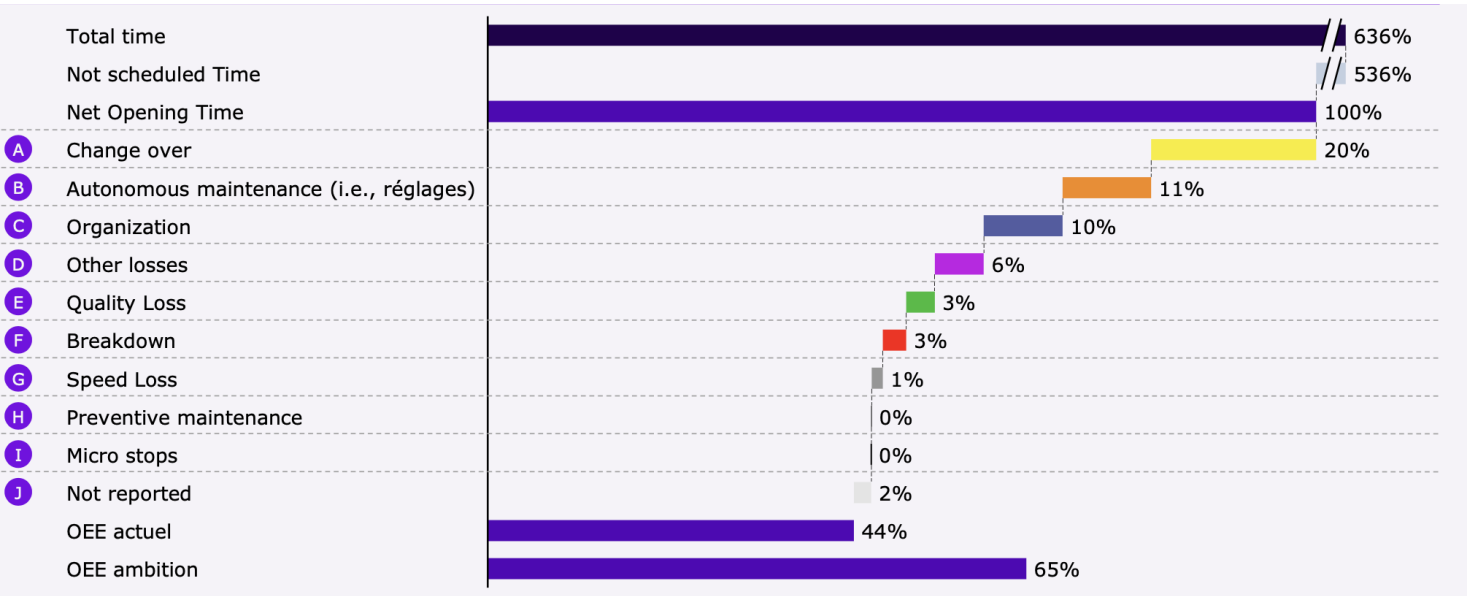
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Fundamental elements of industrial performance



- **Safety:** No incident / accident
- **Quality:** Right First Time
- **Flow:** no delay, no waiting
- **Productivity:** optimized and ergonomic workstations
- **Yield:** no product loss
- **Asset performance:** reduce equipment stoppages
- **System management:** real time monitoring, escalation & cascade, preventive and corrective actions to eliminate root cause of problems

Example of production line performance analysis



Observations guideline

Change over

- Identify the reasons explaining the deviation from the standard with line operators
- Perform C/O A&B observations x3 + consolidation of sequences for each line (most C/O impacting the most OEE)
- Perform observations C/O E x3 + consolidation of sequences (repeatability of the current sequence) for each line

Autonomous Maintenance

- Verify existence of Autonomous Maintenance documents for operators + Process confirmation
- Check presence of Quick Reference guide to support diagnostic and maintenance level 1
- Observe several adjustments made on each of the lines and blocking points / points for improvement
- Identify the products & equipment generating the most adjustments and the potential corrective actions

Organization

- Observe the rituals and identify how it impact the OEE, observe visual management tools supporting performance review
- Observe the hand over on lines by operation
- Observe the recovery of breaks (i.e., is recovery effective with the new organization?)
- Observe starts and end of production steps

Other losses

- Observe packaging material reloadings x3 for each line, what reasons explain OEE losses (i.e., size, operator gesture, etc)
- Observe Resorting / recycling operations conditions (which sampling being used / equipment being used)

Quality loss

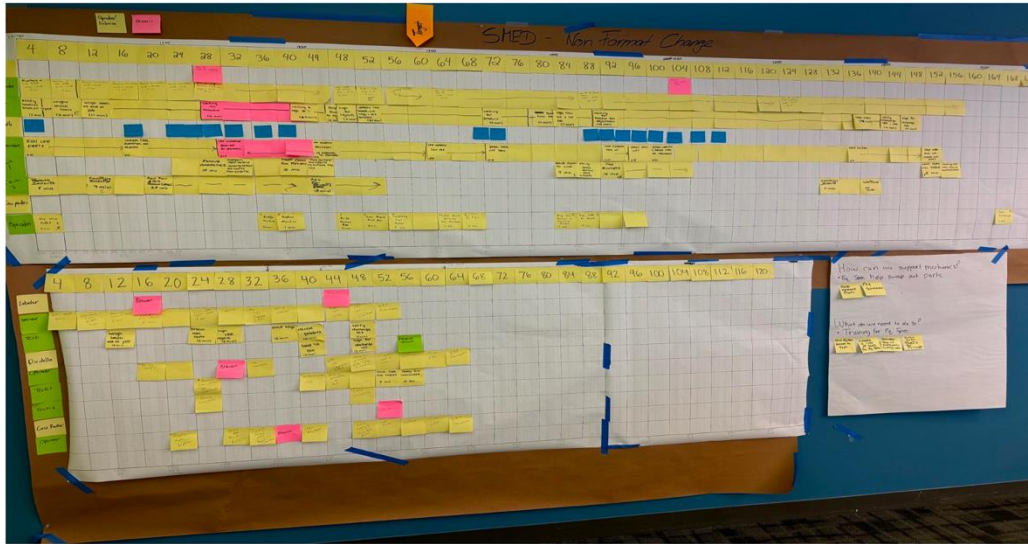
- Observe sorting / reconditioning, AC, PSF => understand why we have losses (i.e., problem of gesture, problem of material, problem of equipment)
- Evaluate AC problems encountered on lines in order to identify the GPS3 to initiate

Speed loss

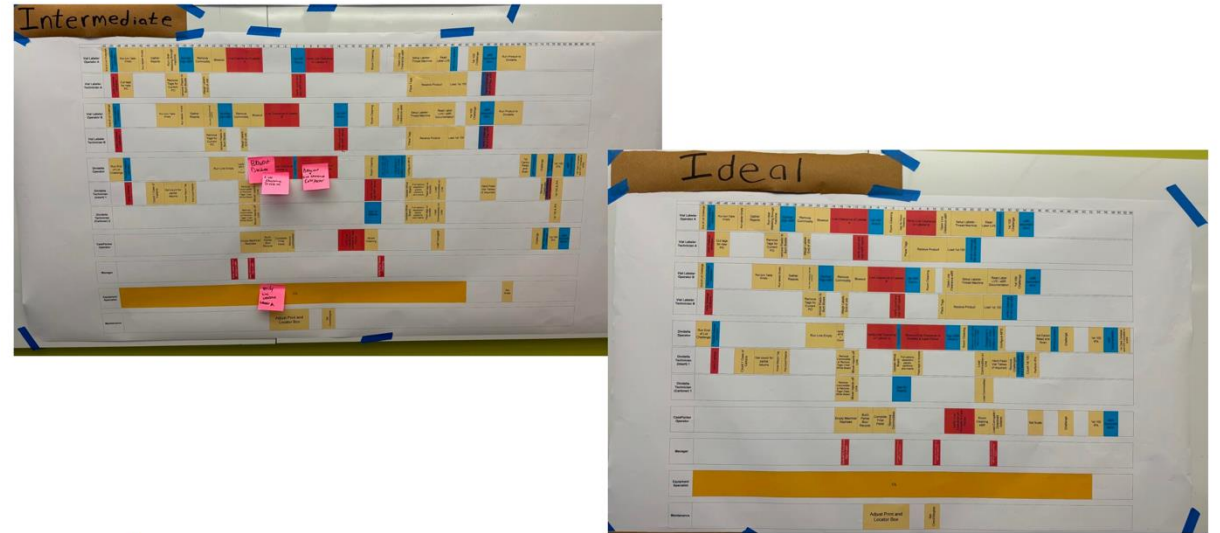
- Observe respect of speed rate (i.e., why we slow down the lines, what is the rationale, AC not adapted, training of operators, etc.)
- Verify Line output setups (i.e.: Thermoforming line speed set up) and eOEE output datas
- Observe % of rejects by IPC during different production stages

Optimizing changeovers: saving time and securing process

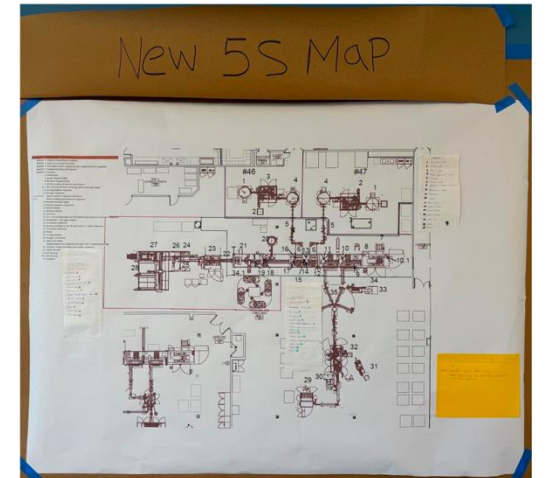
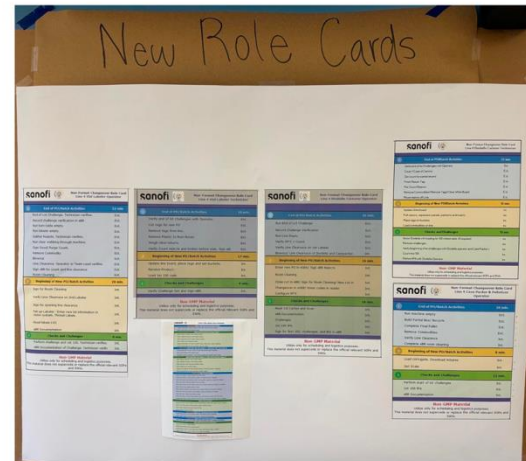
Observation and Current Process Map



Intermediate and Ideal State Process Maps



Revised Role Cards and 5S Plan



Our *partnership* with McLaren

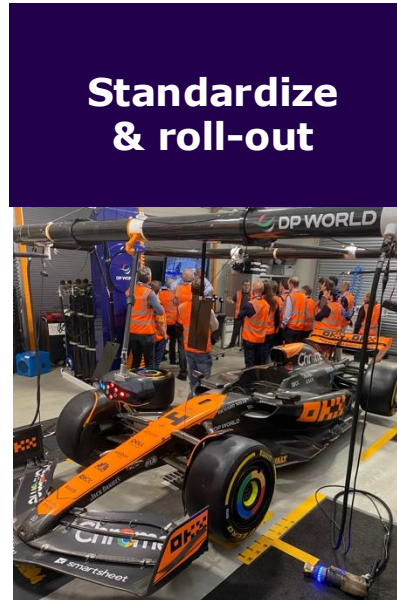
8% improvement on equipment efficiency over 2 years (top 10 sites)



Data transparency, real time



Collaborate



Standardize & roll-out



Sustain high performance culture



Emulate & Celebrate

- *25 sites (all GBUs), 300 lines* connected to Digital standard solution, included in site perf. routines

- *Race simulation app* to better use data in our sites

- *best practice sharing* sessions inspired by top performing sites

- *Supply Chain race* boosting end-to-end collaboration to improve on time delivery to patients

- *dedicated playbooks* co designed Sanofi / McLaren

- *3 Smart Factory* cases: F1 technology applied to pharma production lines to boost efficiency

- *Asset race* focused on reaching top perf. leveraging network capabilities

- *Monthly McLaren talks* inspiring Sanofians on cultural and technical topics

- *Reward* winning teams

- *Engagement* with McLaren drivers

Illustration of cross site collaboration: quality and performance by design

Top speed...



*Increase
line
validated
speed*

Pit stop...



*Reduce
time
between
batches*

Upgrades...



*Optimize
yearly
preventive
maintenance*

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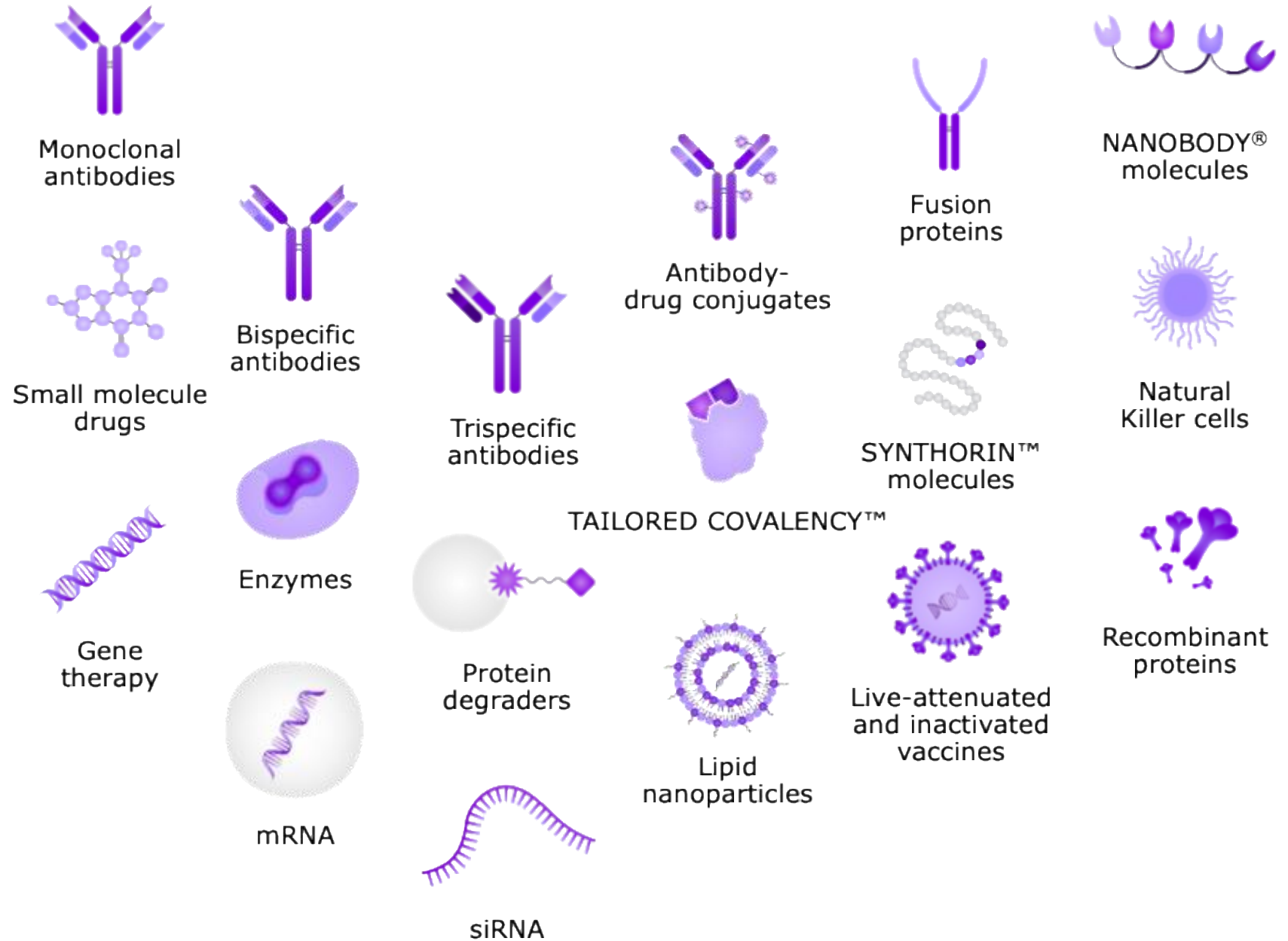
*Modulus presentation
Nov. 2024*



Pioneering Technology Platforms

Industry-leading technology platforms give our R&D teams the tools they need to design pioneering vaccines and therapeutics. We're combining epidemiological research with these new technologies to potentially target underlying causes of disease.

Discover more [Pioneering Technology Platforms](#)



Neuville



One Factory, Infinite Possibilities: A New Era in Biotech Begins!

Singapore



Sanofi's **Modulus** is a *first-of-its-kind, next generation* and *most advanced biotech production facility* across the entire biopharma industry



Manufacture *up to four vaccines and biomedicines* simultaneously

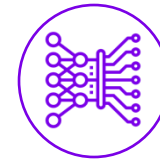


Agile and flexible design allows system to seamlessly switch production lines in a matter of days or weeks

Industry standard is several months, and even years



Scalable production capabilities, housing the equivalent of 34 standardised mini factories



Fully AI-enabled and continuously learning, so it rapidly adapt to meet public health demands

Modulus supports Sanofi's ambition to *bring life-saving medicines* to patients more quickly

In 2024, Sanofi launched **Modulus** facilities in *two sites*:
Neuville-sur-Saône, France & Tuas, Singapore



The result of an *investment* of
nearly €500M in France and
€558M in Singapore

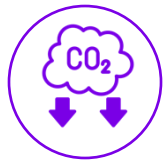


Fully operational by
mid 2026



Enable the *creation of 200 new
high value-added jobs* at each
site

Modulus supports Sanofi's *environmental sustainability commitment* to build a
healthier future and 2045 target towards net-zero emissions



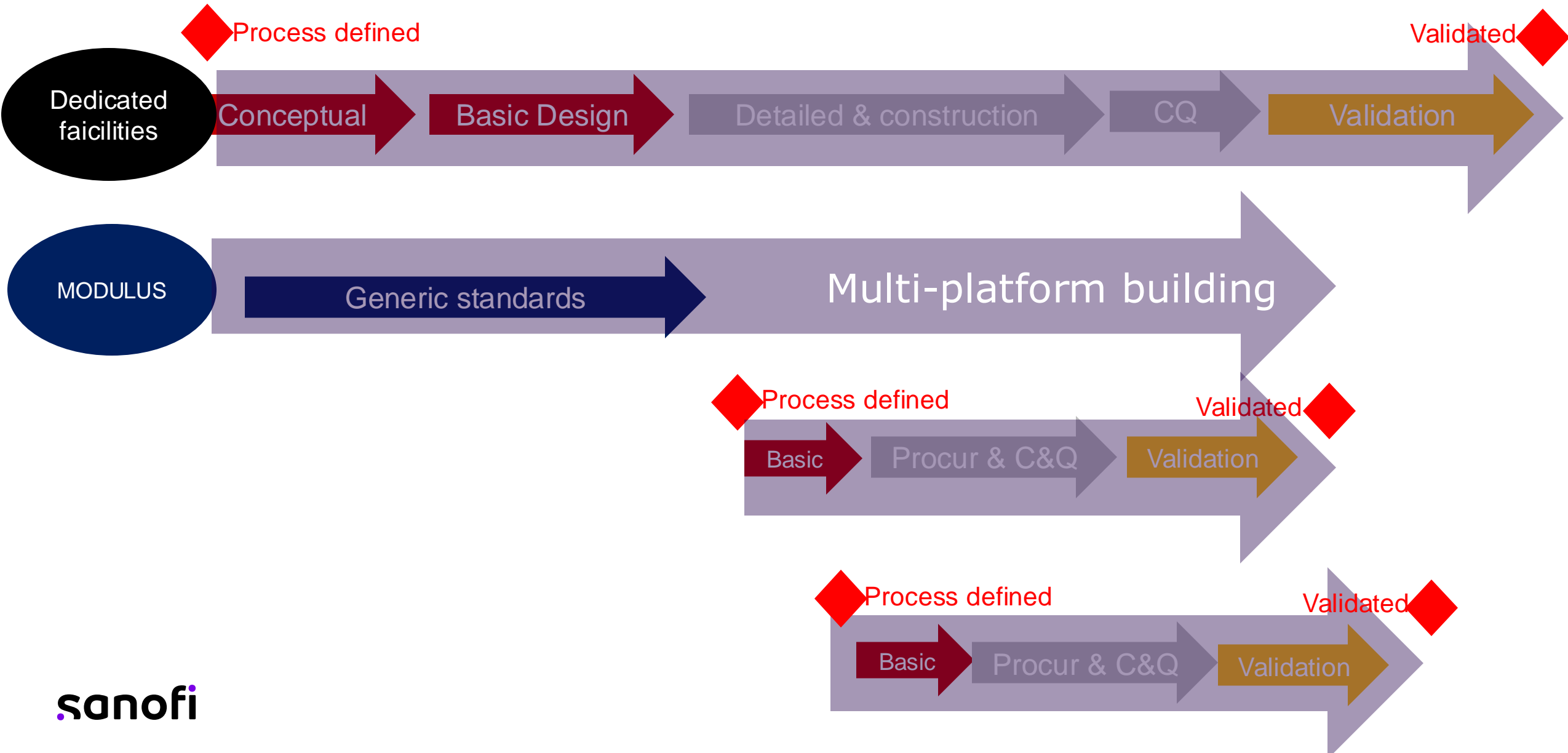
Designed with the *lowest possible
carbon footprint*



Aiming for *100% renewable energy*,
including from the sites' own solar panels

MODULUS: a building for multiple technology platforms

A product agnostic building for faster launches



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