



Enterprise Excellence Network

World Class Manufacturing: Moving from Lean to Digitisation

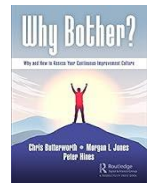
Professor Peter Hines, Visiting Professor SETU

Agenda

- ◆ Introduction
- ◆ What is Digitisation and Industry 4.0?
- ◆ What is happening at the leading edge?
- ◆ What about other firms?
- ◆ What are the barriers and enablers?
- ◆ What support is needed?
- ◆ Questions

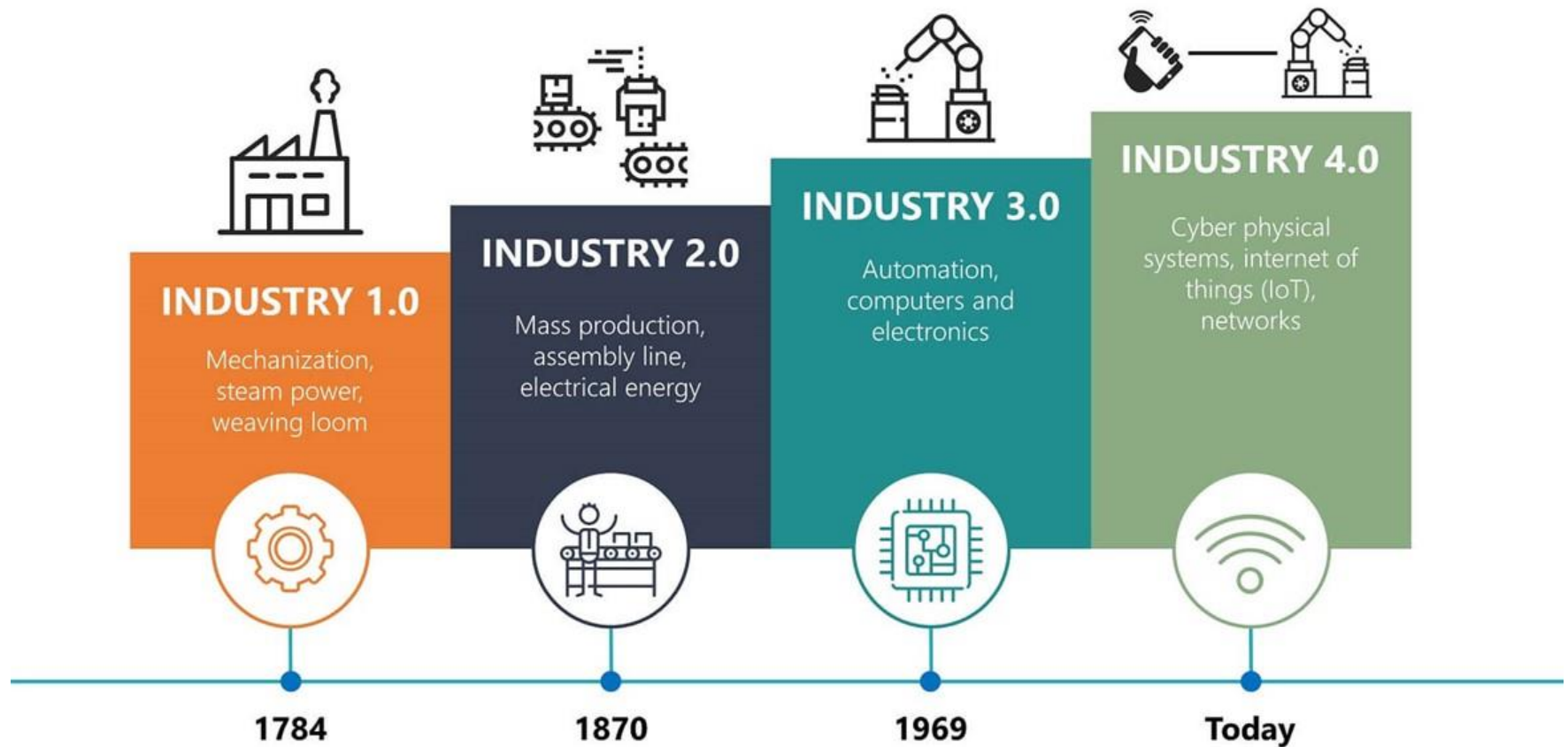
Professor Peter Hines

- *Professor Peter Hines is Co-Founder of the Lean Enterprise Research Centre at Cardiff University & Visiting Professor at South East Technological University. His academic work is globally ranked top 3 for citations in Lean.*
- *Peter is a recognised leader in Enterprise Excellence, a member of the Shingo Academy where he acts as a Faculty Fellow.*
- *He is a multiple Shingo Research/Publication Award recipient for his co-authored books; ‘Why Bother?’ in 2022, ‘The Essence of Excellence’ in 2019, ‘Creating a Lean and Green Business System’ in 2014 and ‘Staying Lean’ in 2009.*
- *Peter is a pioneer of a systematic approach to improvement involving a sustainable and enterprise-wide approach across all industry sectors.*
- *He now manages the Enterprise Excellence Network as well as the Lean Business System groups on LinkedIn with c. 100,000.*

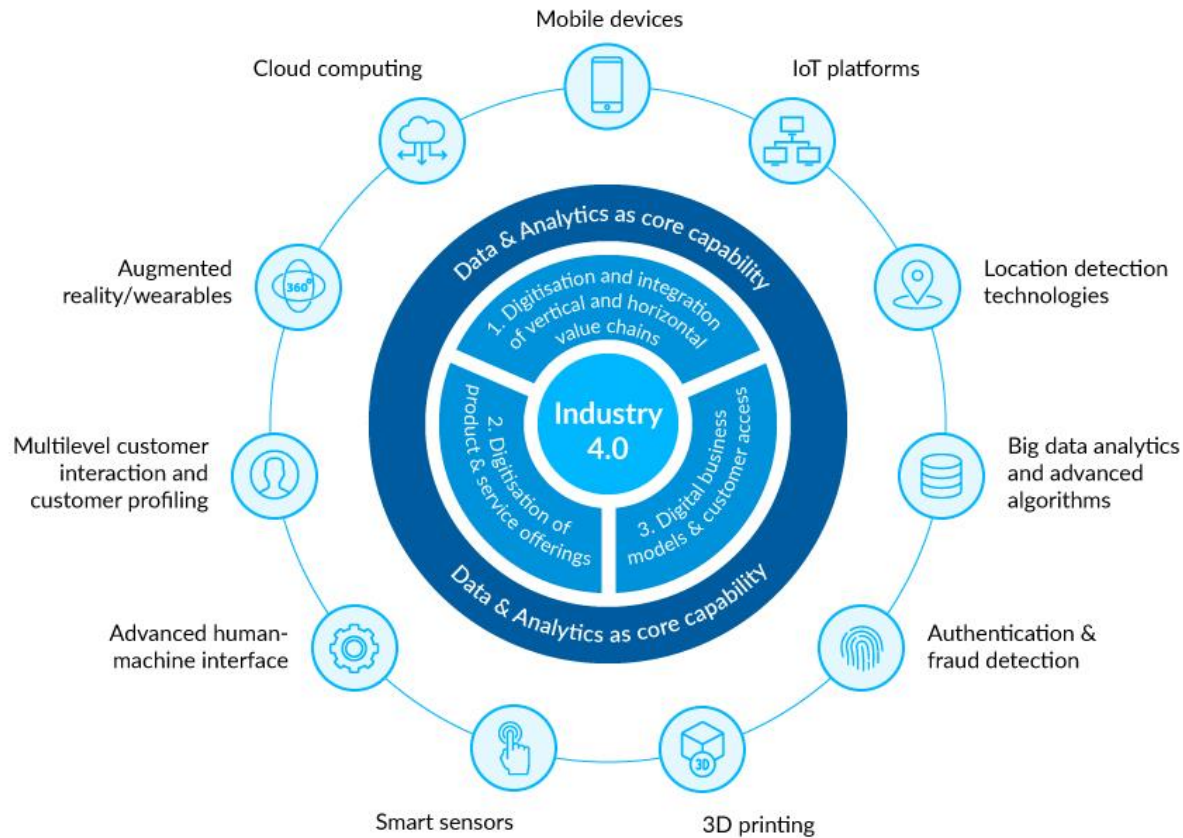




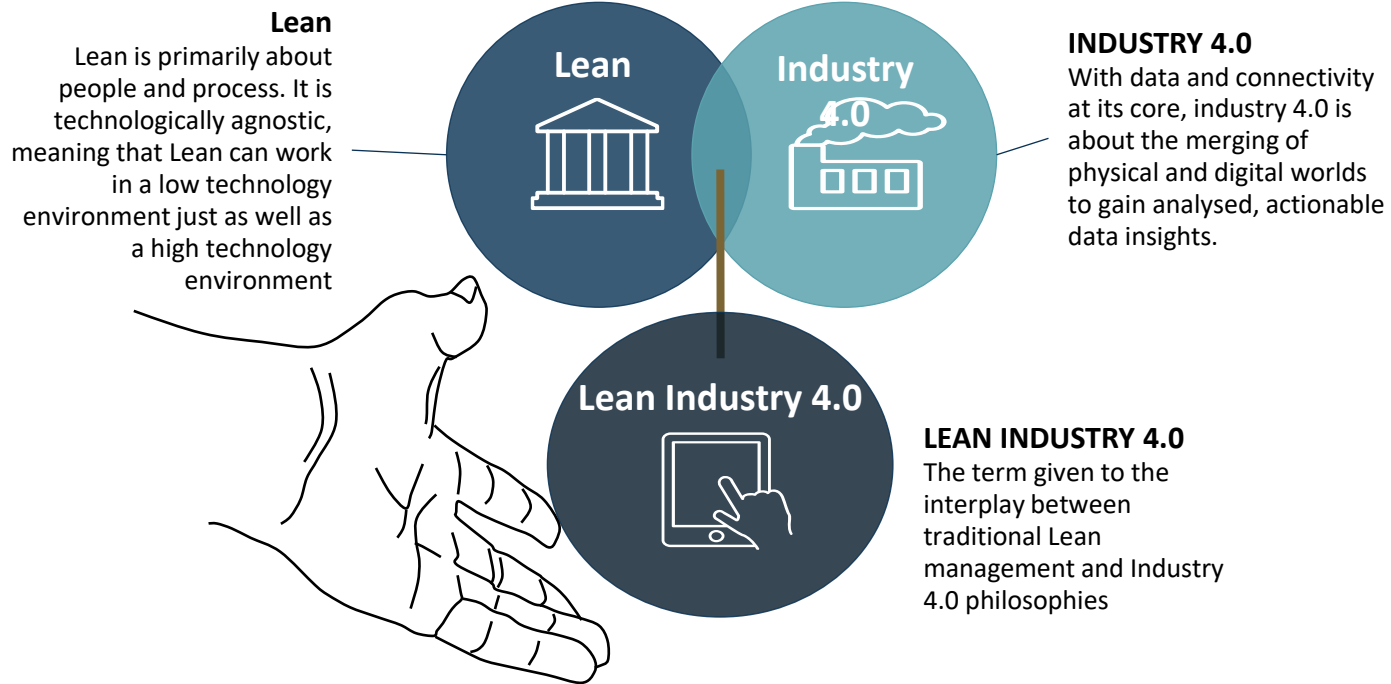
Industry 4.0



The Technologies Within Industry 4.0



Lean Industry 4.0





Faurecia Excellence System (Lean)



Source: Peter Hines, Florian Magnani & Josefa Mula,

Faurecia Industry 4.0 Stages

Digital transformation started in 2017

1

Smart Automation

- 860 smart robots deployed
- 1100 AGVs deployed
- ~70% of the digital savings by smart automation

Digital Production System

- > Development of standard tools: DMC, NEO, MIP etc.

Data Platform and AI

- > Creation of DSF

40-50 M€ savings per year

Strong digital acceleration in 2021...

2

Smart Automation

- 250+ smart robots deployed
- 380+ AGVs deployed

Digital Production System

- 30+ new model plants
- REO for labour management

Data Platform and AI

- 14 use cases identified
- Up to 9 M€ in 2021

55-60 savings M€ per year

...to lead towards 2025

3

Smart Automation

Digital Production System

- 150 model plants in 2025
- Improvement of the system for real time plant control tower

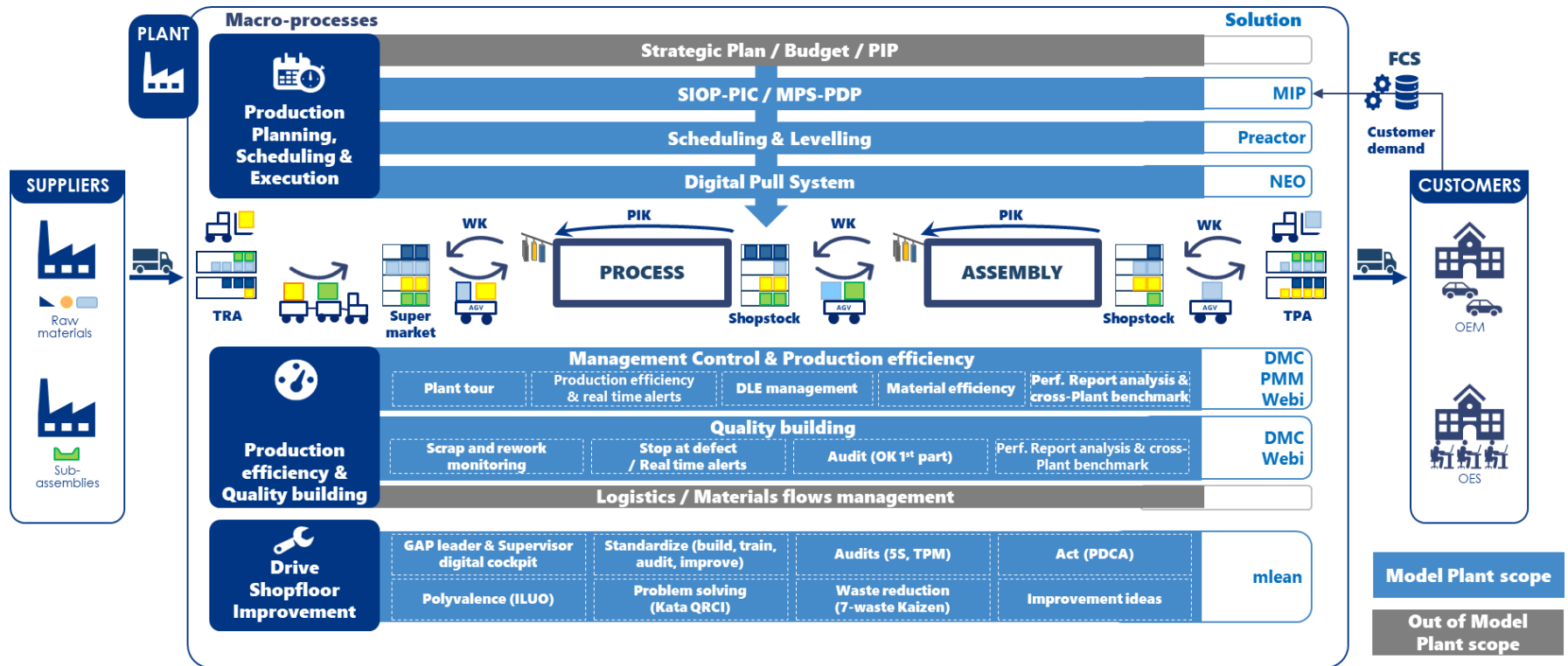
Data Platform and AI

- > Leverage of data generated by the digital production system

65-75 savings M€ per year

Source: Peter Hines, Florian Magnani & Josefa Mula,

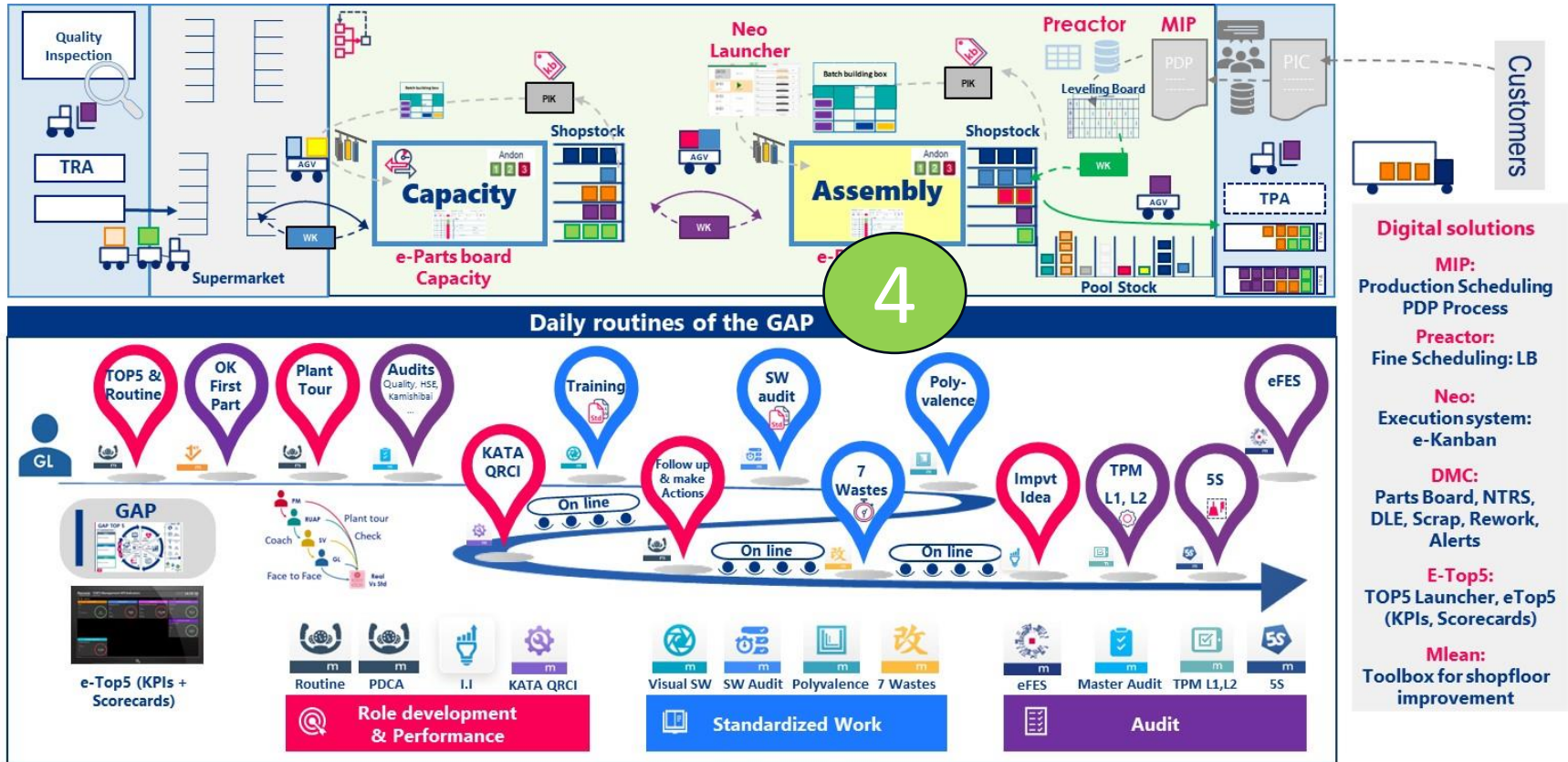
Faurecia Model Plant



Source: Peter Hines, Florian Magnani & Josefa Mula,

An Advanced Lean Industry 4.0 implementation: Viewed Through Lean, Technological and People Lenses, forthcoming publication

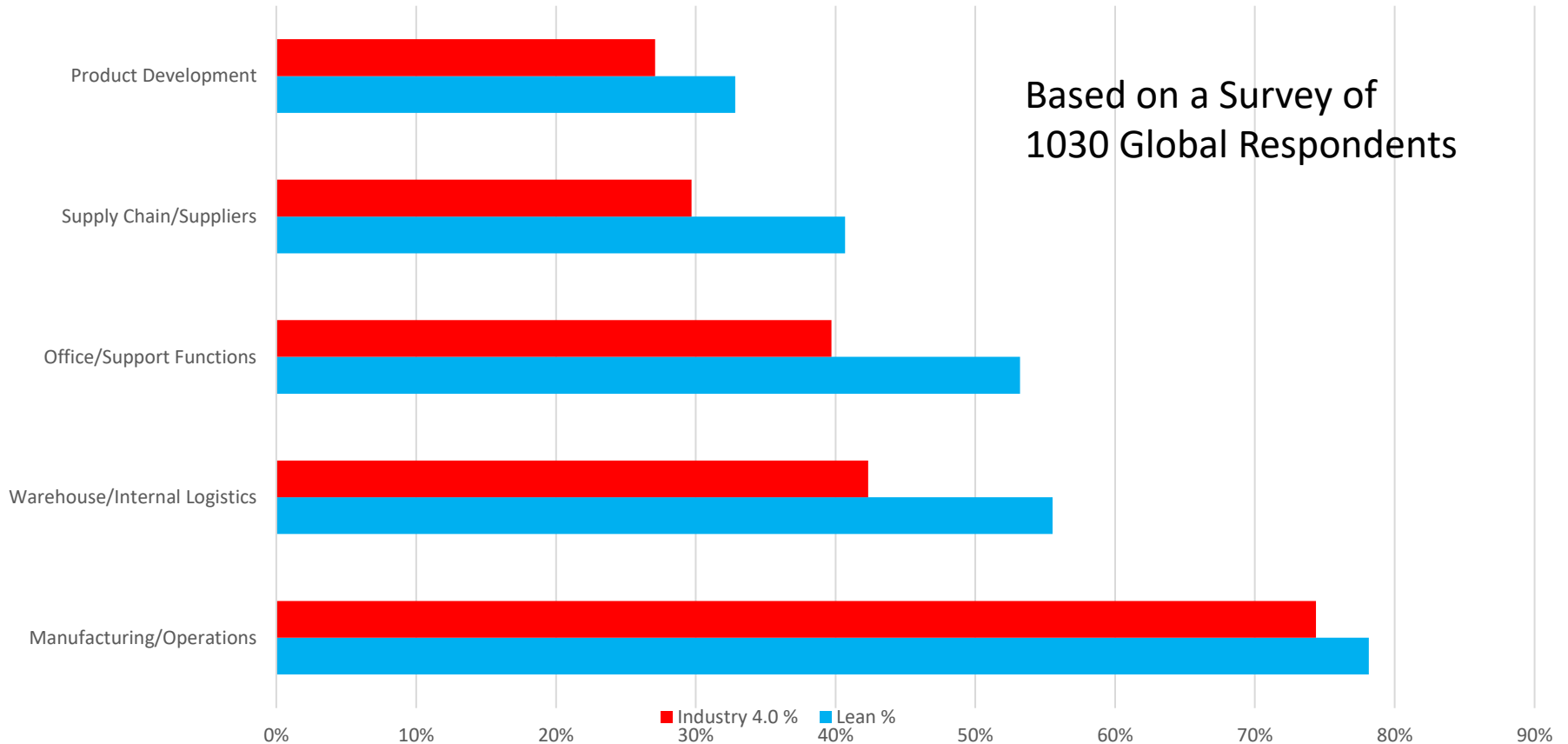
Digitising the Role of the Team Leader



Source: Peter Hines, Florian Magnani & Josefa Mula,



Where are Other Firms?

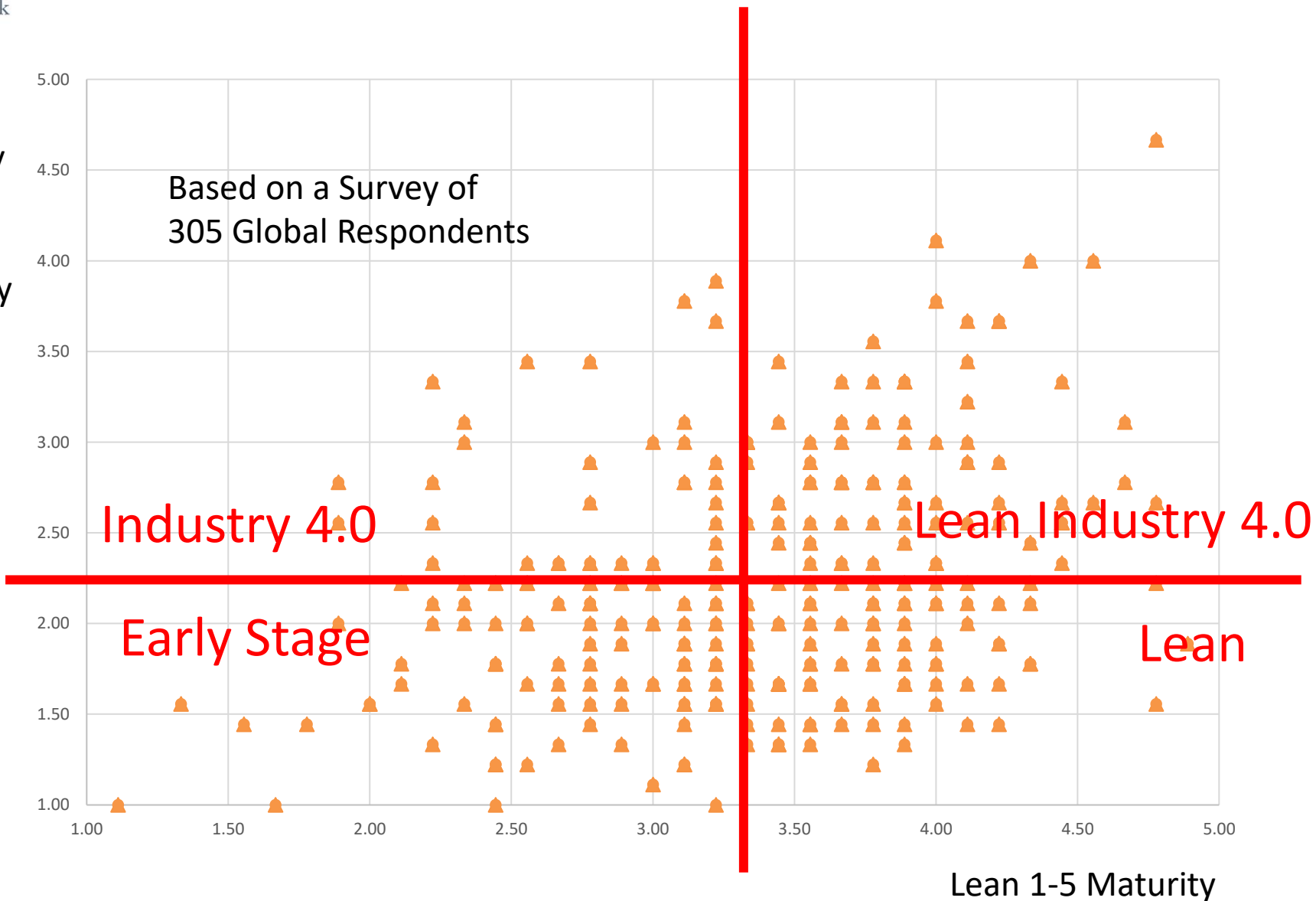


Source: Peter Hines, Guilherme Tortorella, Jiju Antony, David Romero, Aidan Walsh, Darrin Taylor et al.

A Global Industrial Perspective on Lean Industry 4.0: A Qualitative Wide-Angle Lens Approach, forthcoming publication

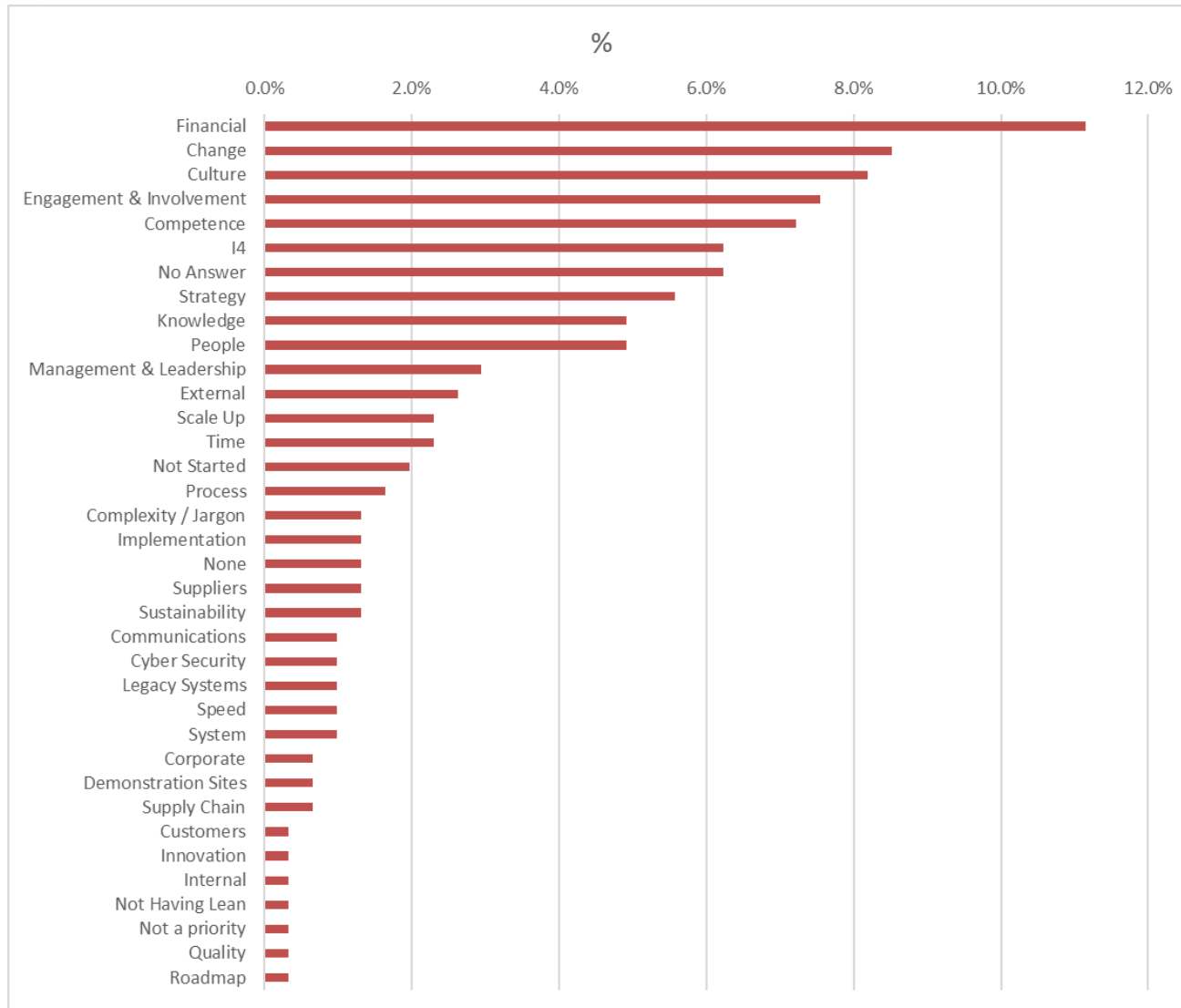
Maturity of Lean & Industry 4.0

Industry
4.0
1-5
Maturity





What are the Barriers?



.....but it
depends
where
you start

Source: Peter Hines & Guilherme Tortorella

Top Barriers by Starting Position

Rank	Lean Industry 4.0	Lean	Industry 4.0	Early Stage
1	Financial	Change	Engagement & Involvement**	Financial
2	Change	Industry 4.0	Financial	Change
3	People**	No Answer	Culture	Culture
4	Culture	Competence	Strategy	Competence
5	Engagement & Involvement	Engagement & Alignment	Knowledge*	Industry 4.0
6	Competence	Culture	Management & Leadership***	Strategy
7	Process***	Financial	Competence	Knowledge
8	No Answer	Strategy	Industry 4.0	No Answer
9	Industry 4.0	External**	No Answer	Scale Up**
10	Time	Not Started	People	Time*

Bold = Positive Significance for Higher Position

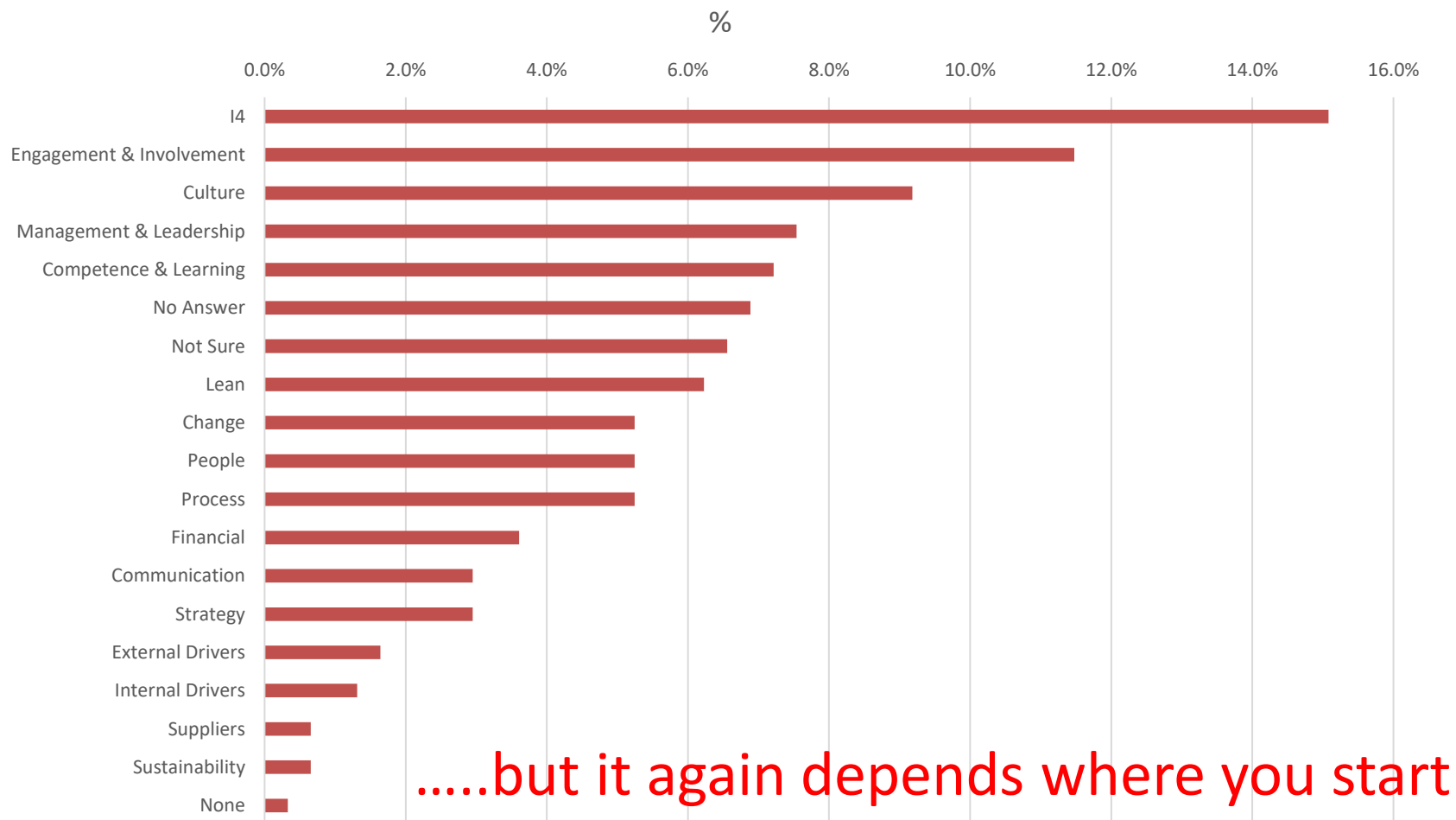
Italics = Negative Significance for Higher Position

* Significant at 10%, ** Significant at 5%, *** Significant at 1%

Source: Peter Hines & Guilherme Tortorella

Barriers and Enablers of Lean Industry 4.0, European Lean Educators Conference, Avans University, October 2023

What are the Enablers?



Source: Peter Hines & Guilherme Tortorella

Barriers and Enablers of Lean Industry 4.0, European Lean Educators Conference, Avans University, October 2023

Top Enablers by Starting Position

Rank	Lean Industry 4.0	Lean	Industry 4.0	Early Stage
1	Industry 4.0**	No Answer**	Engagement & Involvement	Industry 4.0
2	Engagement & Involvement	Industry 4.0	Lean*	Engagement & Involvement
3	Culture	Engagement & Involvement	People**	Culture
4	Competence & Learning	Culture	Management & Leadership	Not Sure*
5	Management & Leadership	Competence & Learning	No Answer	Management & Leadership
6	Process	Change	<i>Industry 4.0</i>	Competence & Learning
7	Lean	Not Sure	Culture	Financial**
8	No Answer	Lean	Not Sure	People
9	Strategy	People	Process	Change
10	Change	<i>Management & Leadership*</i>	Strategy	Process

Bold = Positive Significance for Higher Position

Italics = Negative Significance for Higher Position

* Significant at 10%, ** Significant at 5%, *** Significant at 1%

Source: Peter Hines & Guilherme Tortorella

Barriers and Enablers of Lean Industry 4.0, European Lean Educators Conference, Avans University, October 2023

Support Needs for Companies

Most Important Outside Help Needed	Outside Help Needs (%)	Provider				
		Government Body	Consultants	University / Academia	Technology Providers	Industry / Professional Bodies
Training and Education from Short Course to Degrees	17%	5%	5%	5%	1%	1%
Awareness Raising and Knowledge	10%	2%	1%	2%	1%	1%
Experience Sharing between Companies	10%	1%	1%	1%	1%	2%
Implementation Support	8%	2%	3%	1%	1%	1%
Case Studies, Use Cases and Other Research with Success/Failure Stories	7%	1%	2%	2%	1%	1%
Grants for Pilots and Implementation	6%	4%	0%	0%	0%	0%
Other General Support	5%	3%	0%	0%	1%	0%
Benchmarking Exemplar Sites	4%	0%	1%	0%	0%	0%
Advice on Trends, Providers	4%	2%	1%	1%	0%	1%
Explain Benefits, Business Case & Return on Investment	3%	0%	1%	0%	0%	0%

Outside help needs vary with level of maturity

An important role for Universities like SETU and bodies like DEC

Source: Peter Hines, Guilherme Tortorella, Jiju Antony, David Romero, Aidan Walsh, Darrin Taylor et al.



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