Le sfide finanziarie e organizzative per la servitization

Workshop IFS – 14 novembre 2022

Prof. Carlo Alberto Carnevale-Maffè
SDA Bocconi School of Management – Milan, Italy

La servitization dopo il CO-CO-CO

- Covid, CO2 e connettività hanno cambiato lo scenario economico e organizzativo della servitization industriale e commerciale

The ESG tsunami is coming

Stop selling. Start «servitizing».

«Selling products is an act of environmental irresponsibility»

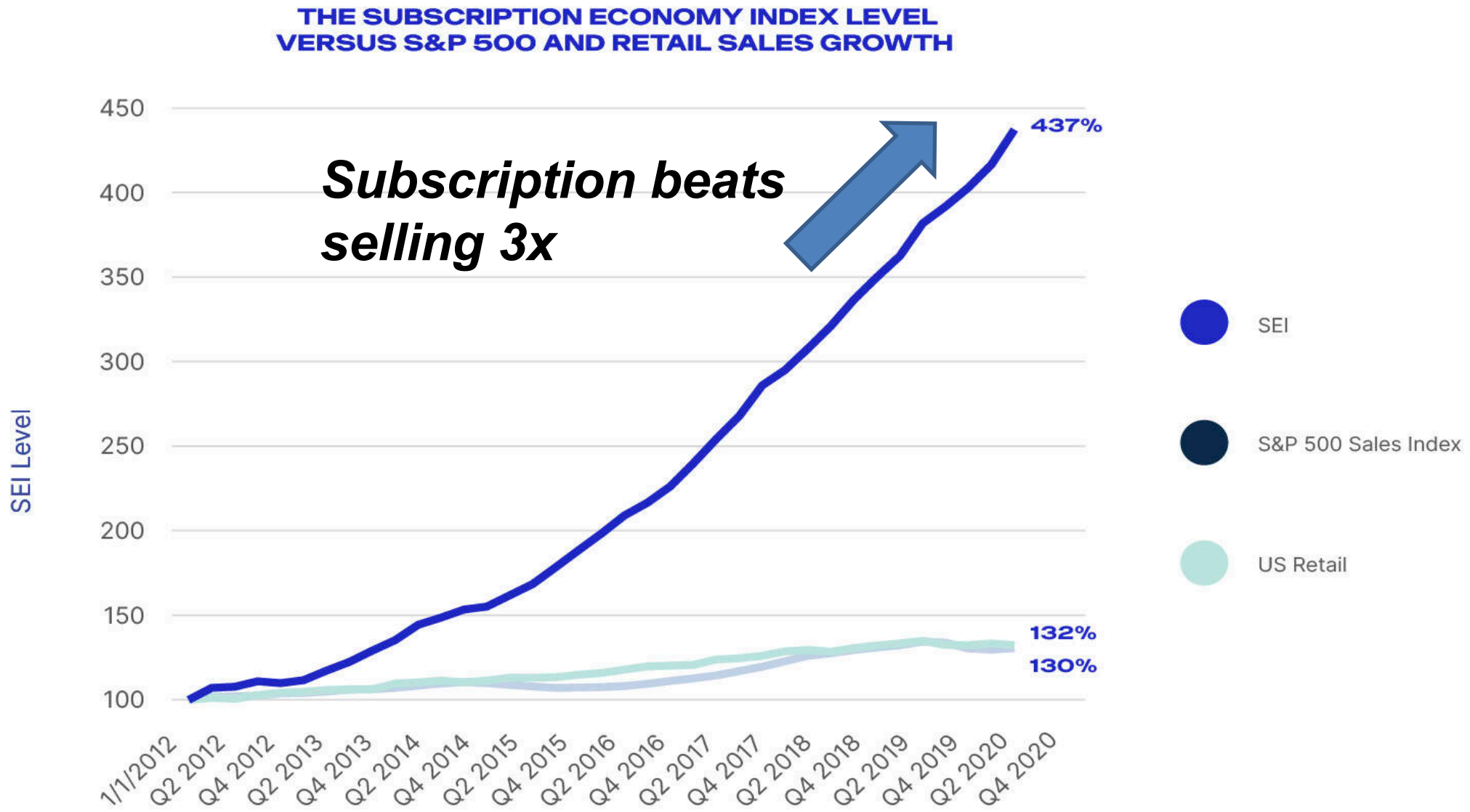
Anonymous Green Activist

1. Design to Serve: servitization and ESG& Design to Share (Environment, Social, Governance)

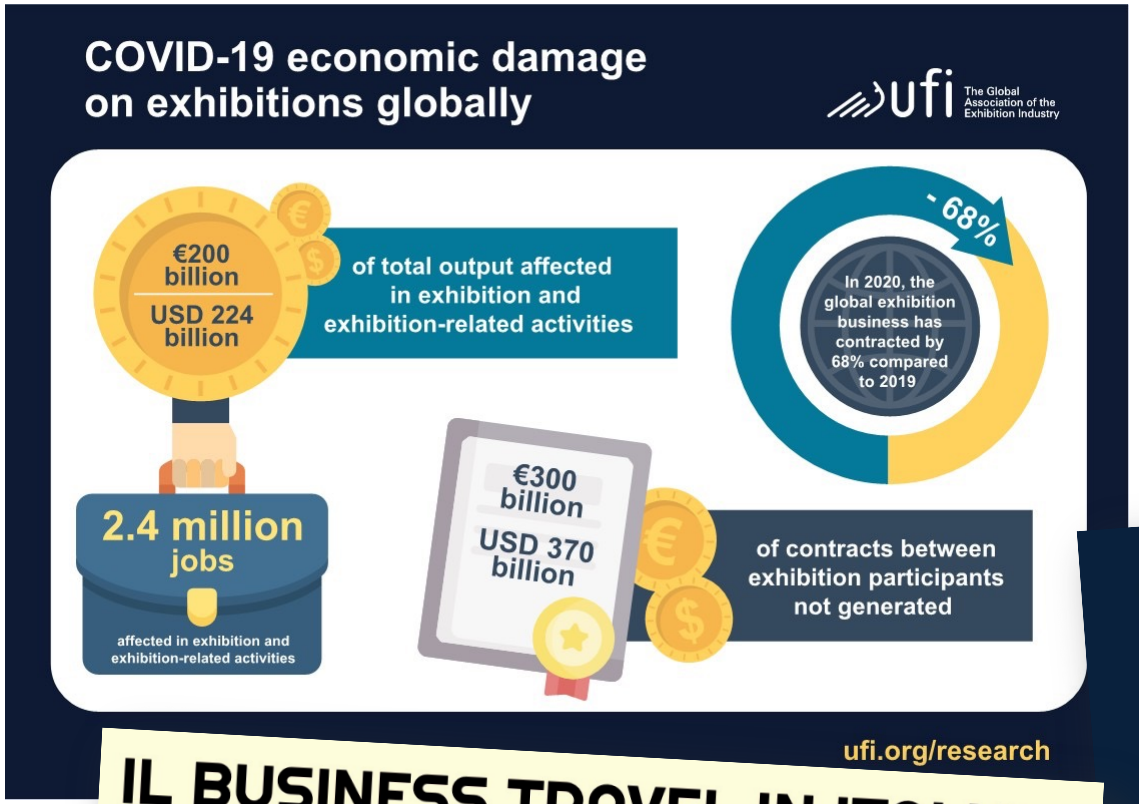
2. Connected customers & users: the organizational challenges of servitization & sharing

3. Is «sustainable industrial technology» still profitable? Service governance & financial impact

The end of ownership? Everything-as-a-Service.



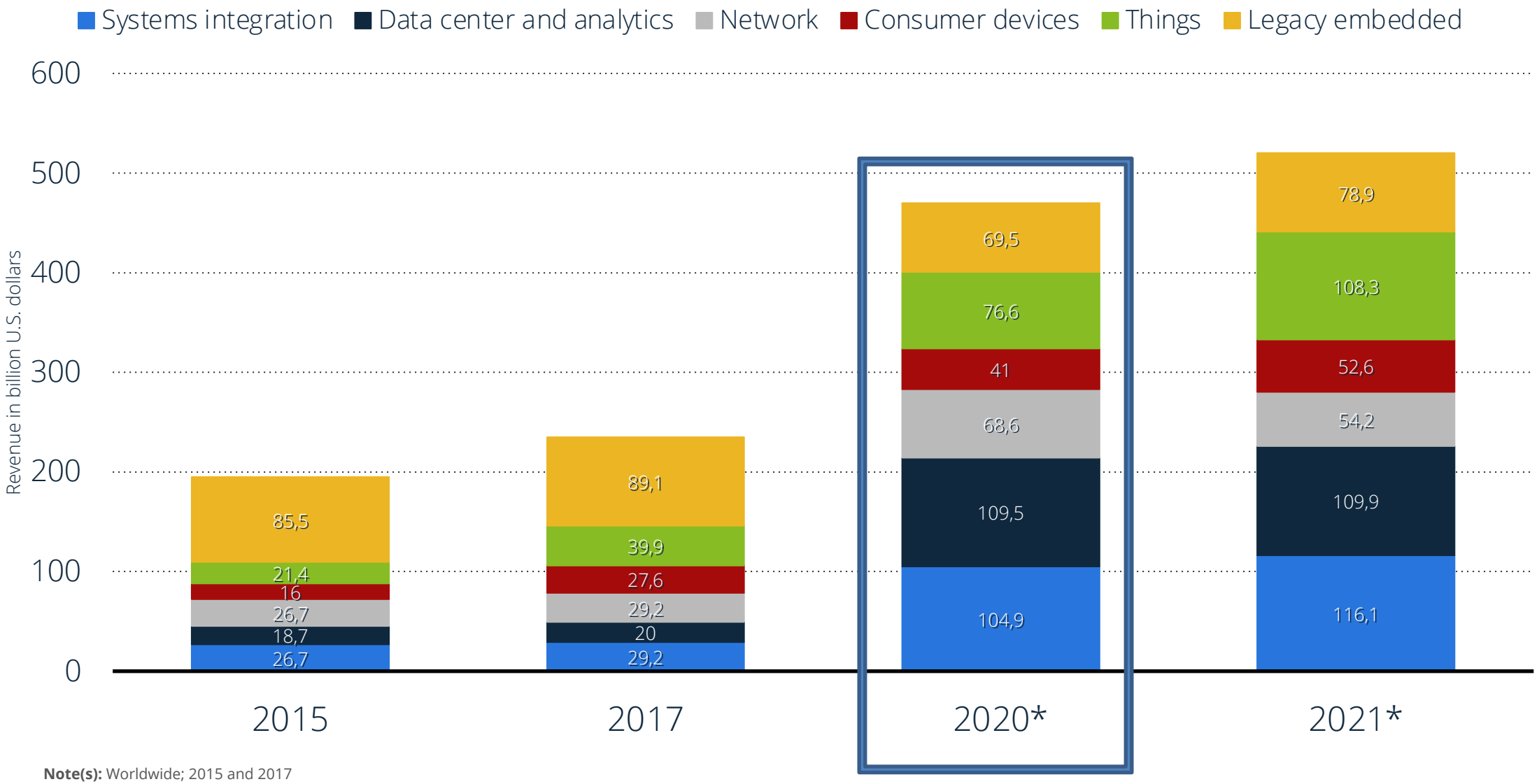
L’industria manifatturiera ha imparato in un solo anno a produrre e vendere beni senza spostare le persone



IL BUSINESS TRAVEL IN ITALIA NEL 2020 A 7,6 MILIARDI (DA 20)

La pandemia e l’esplosione del mercato dei dati industriali

IoT and analytics - global revenue 2015-2021, by segment



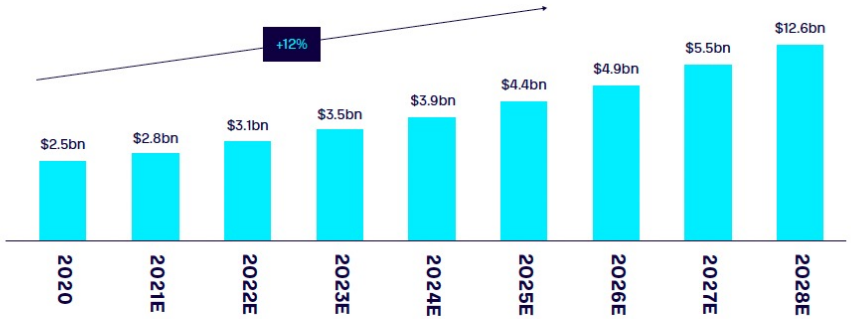
Note(s): Worldwide; 2015 and 2017
Source(s): Bain & Company; Gartner; IDC; Harbor Research; Cisco Systems; Ericsson; Machina Research; Ovum; Statista estimates; ID 913299


INDUSTRIAL
METAVERSE

La crescita del mercato per gli abilitatori del Metaverso Industriale

AR/VR headset market size

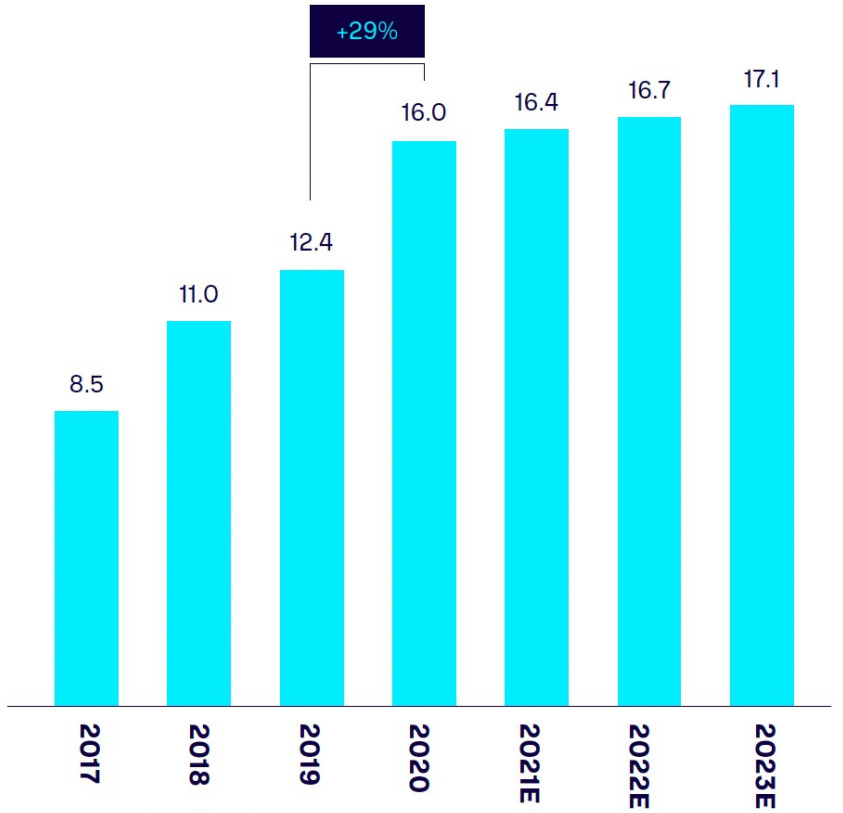
Haptic technology[1] market size



Source: Arthur D. Little, Credit Suisse, IDC, Researchandmarkets.com

The growth of collaboration software has accelerated rapidly during COVID-19 pandemic[1]

Global collaboration software market size ($bn)



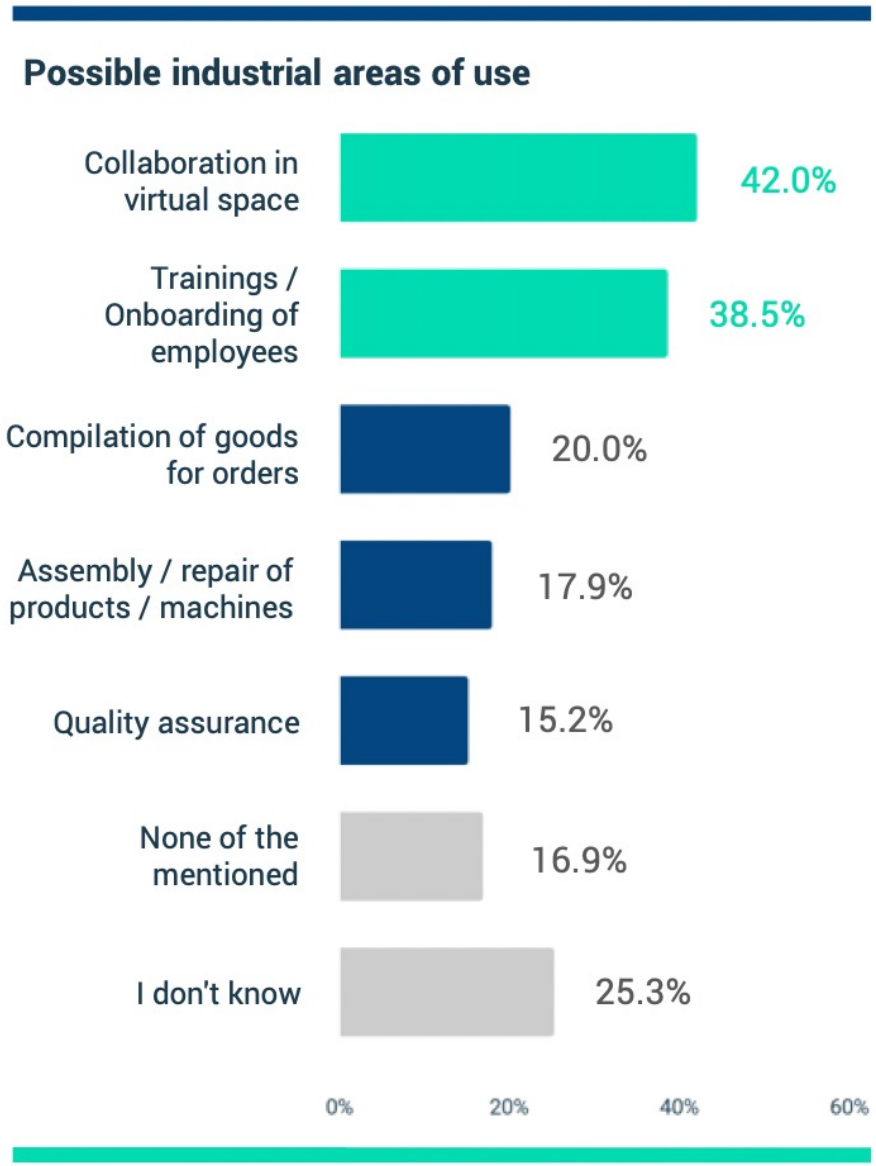
Source: Arthur D. Little, Statista

Note: (1) Collaboration software enables the sharing, processing, and management of files, documents, and other data types among several users or systems. Popular examples include Slack and Microsoft Teams

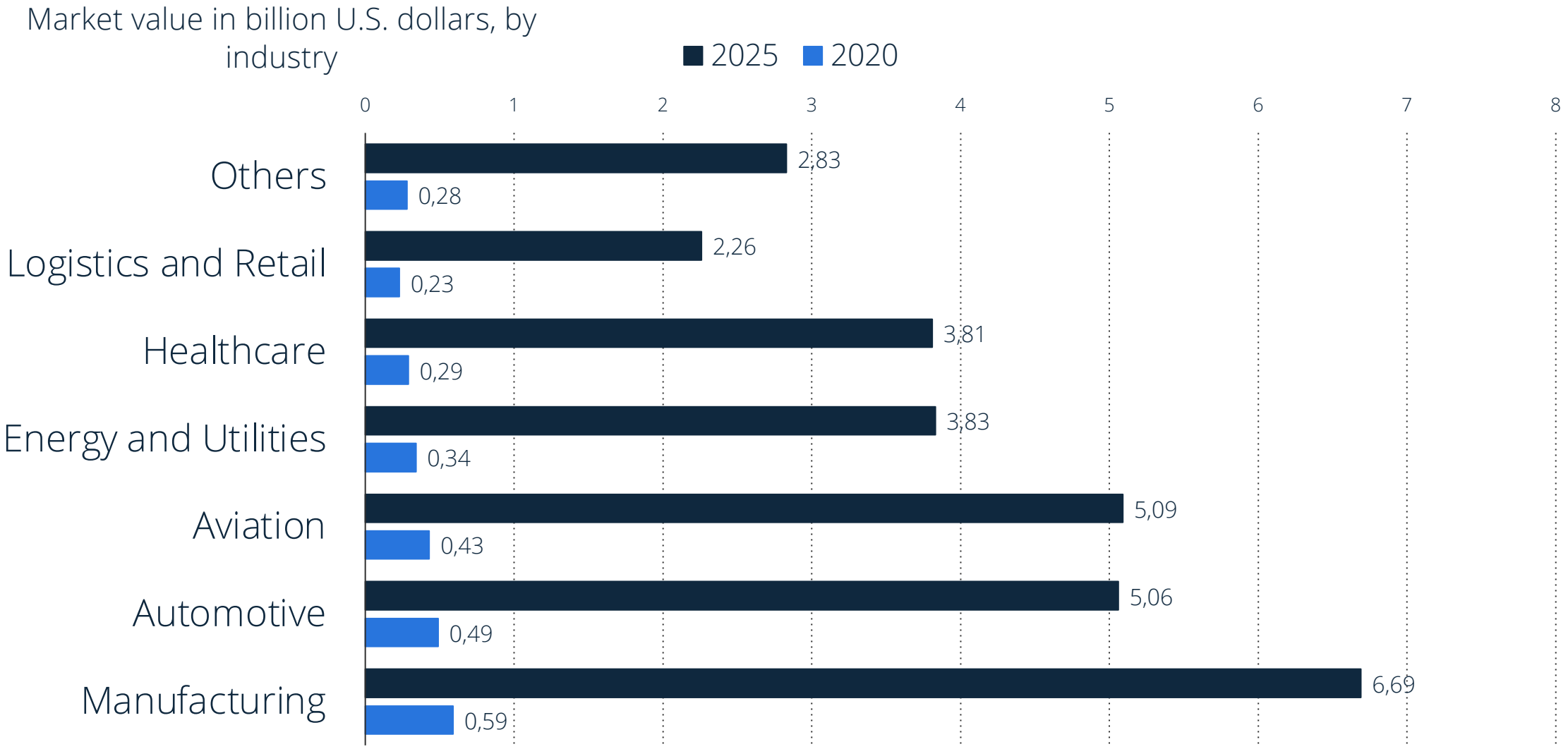
Virtual collaboration and training conceivable

In the survey of possible areas of application in industrial settings, collaboration in the virtual space (42%) and use for training and onboarding (39%) are the most common answers. One in five can also imagine the compilation of goods for orders. In order to see more use for quality control (15%) or assembly / repair (18%), concrete practical examples are obviously needed. Already today, however, the majority of blue-collar workers and executives (over 56% each) see potential for the industry in virtual collaboration.

With 42% of mentions expressing no choice or indecision, the lack of imagination and knowledge about the Industrial Metaverse is revealed.

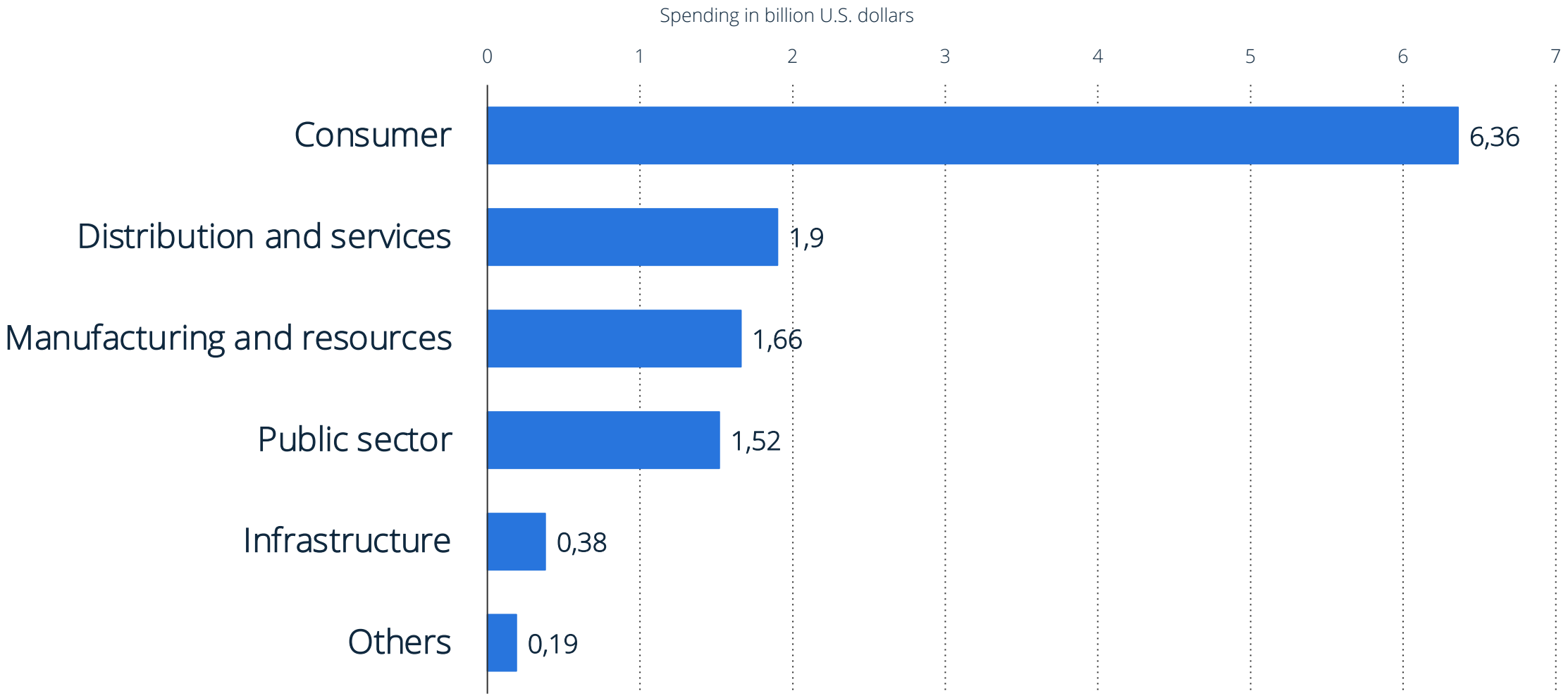


Digital twin market size worldwide: 8x from 2020 to 2025



Note(s): Worldwide; Expert interviews and BIS Research analysis
Source(s): BIS Research; ID 1296187

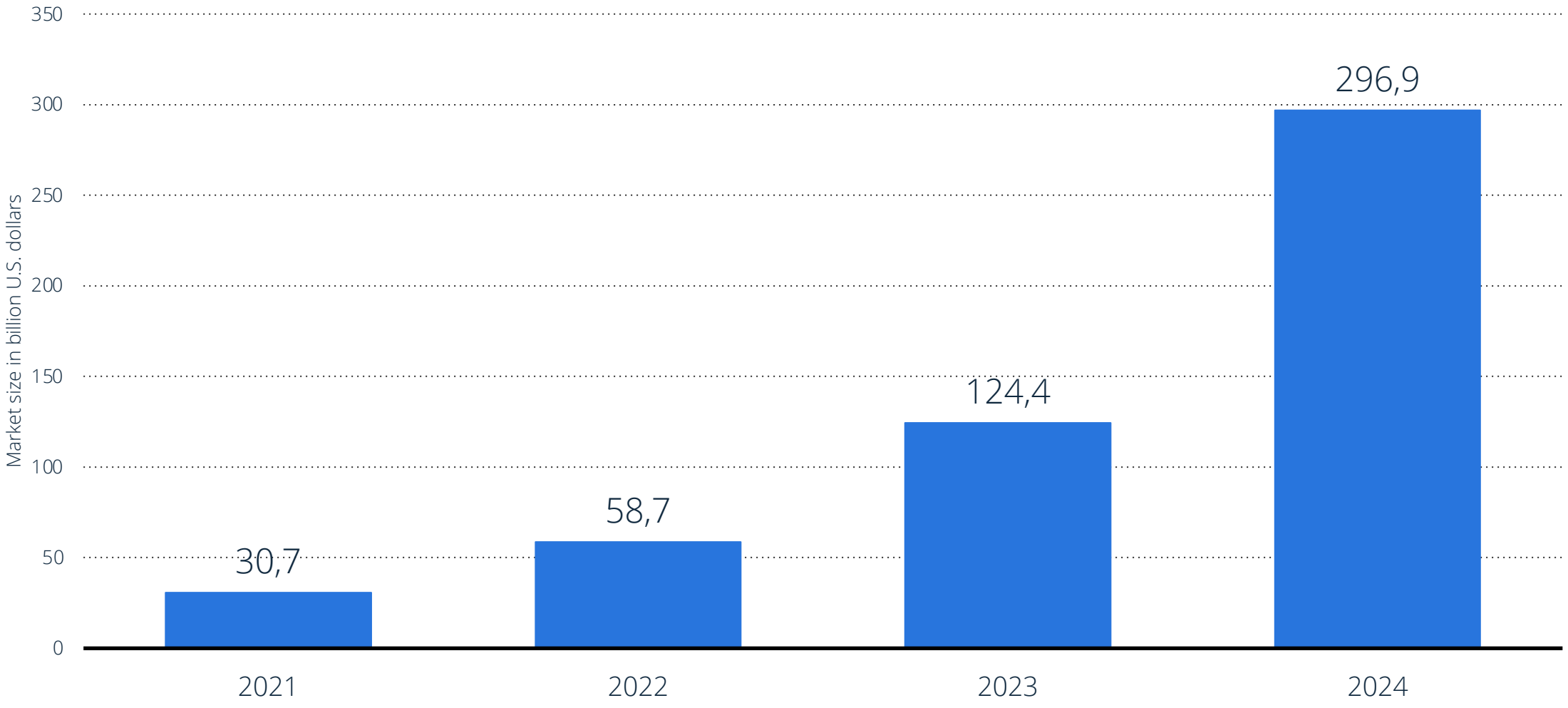
Global AR/VR forecast spending by segment 2020



Note(s): Worldwide; 2020
Source(s): IDC; Statista; ID 737615

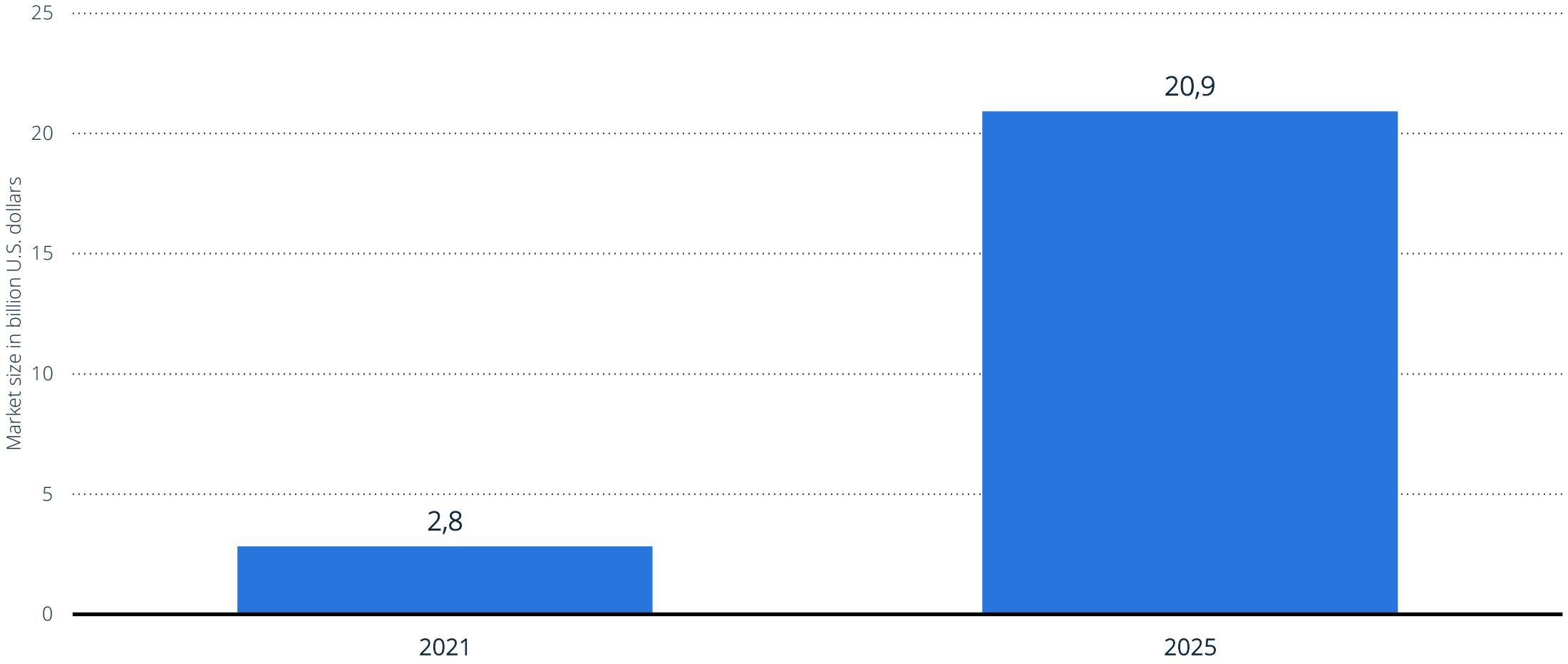
Overview: Worldwide

Augmented (AR), virtual reality (VR), and mixed reality (MR) market size 2021-2024



Note(s): Worldwide; 2021
Source(s): BCG; Mordor Intelligence; ID 591181

Size of the augmented & virtual reality (AR/VR) market in Europe 2021-2025

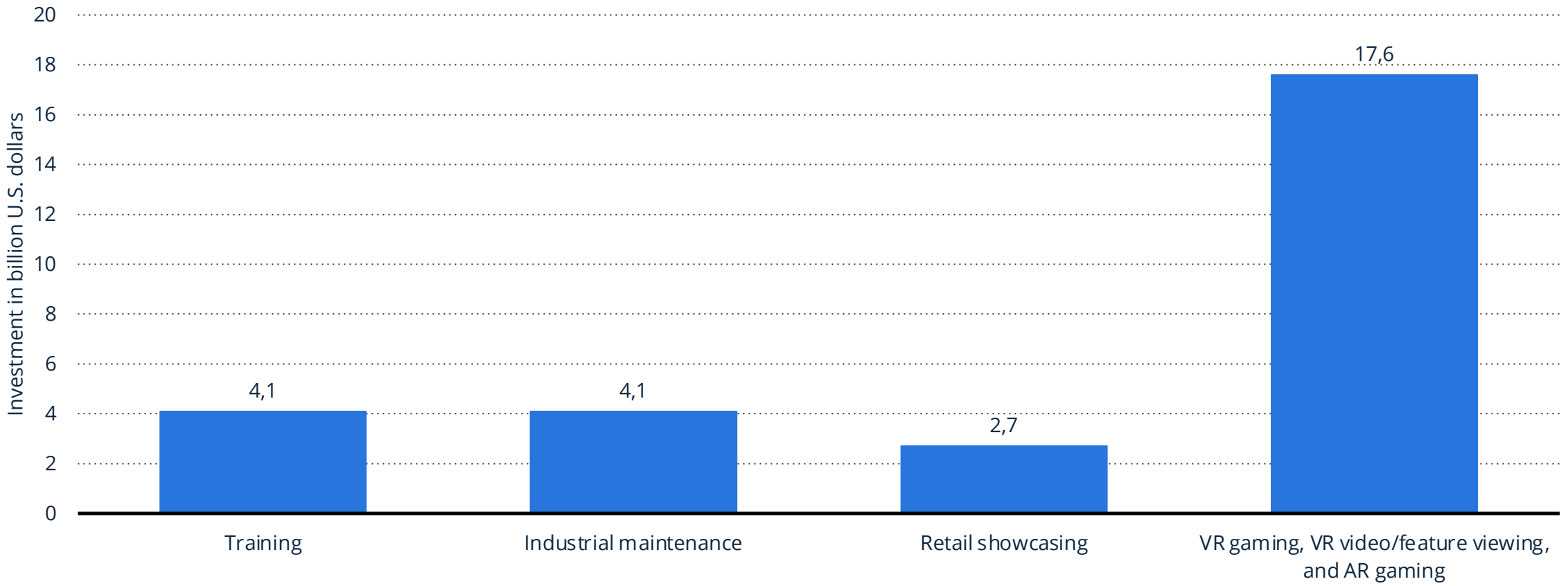


Note(s): Europe; 2021
Source(s): IDC; ID 1121370

Overview: Europe

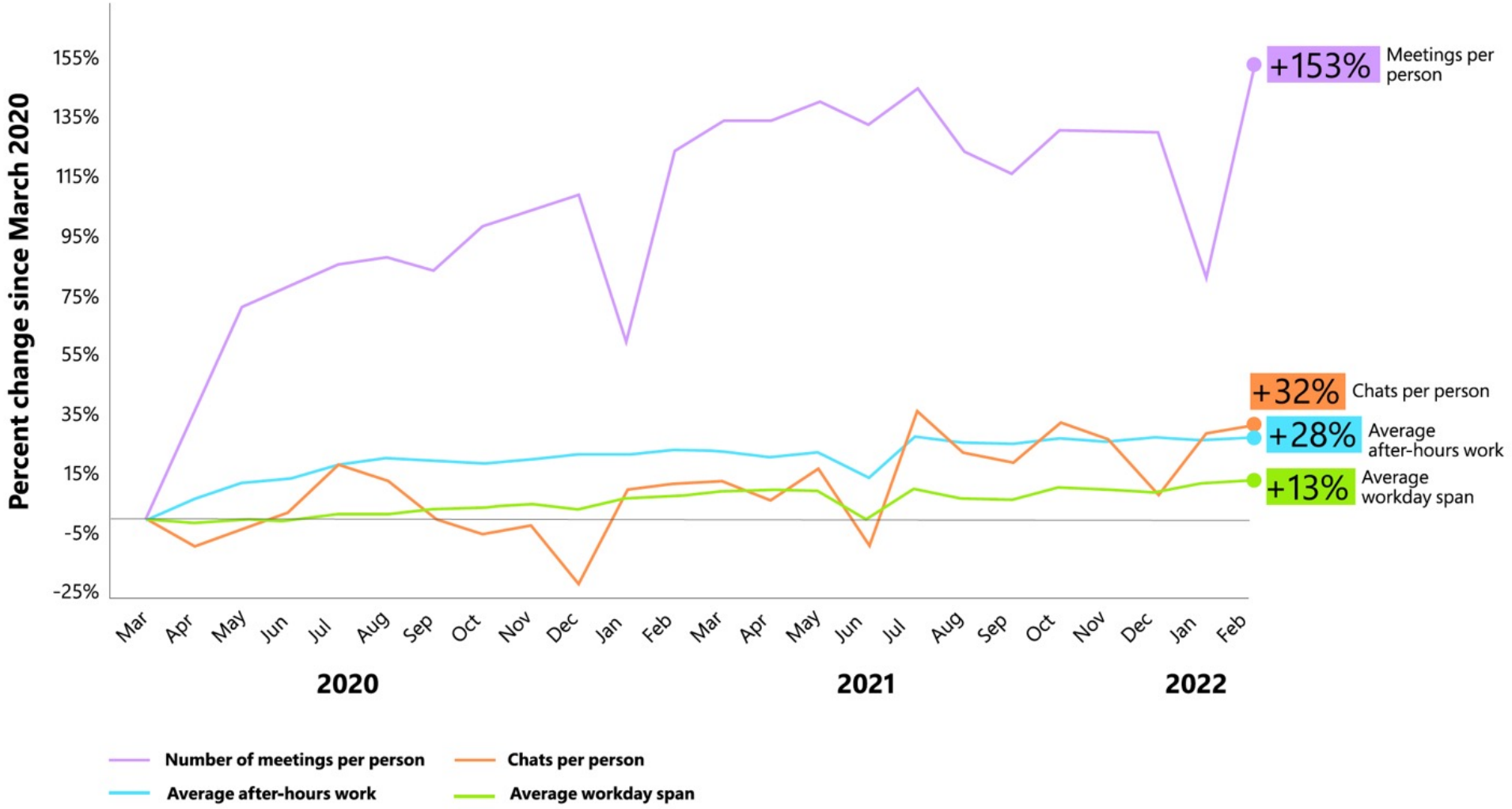
Investment in augmented and virtual reality (AR/VR) technology worldwide in 2024, by use case (in billion U.S. dollars)

Investment in AR/VR technology worldwide in 2024, by use case



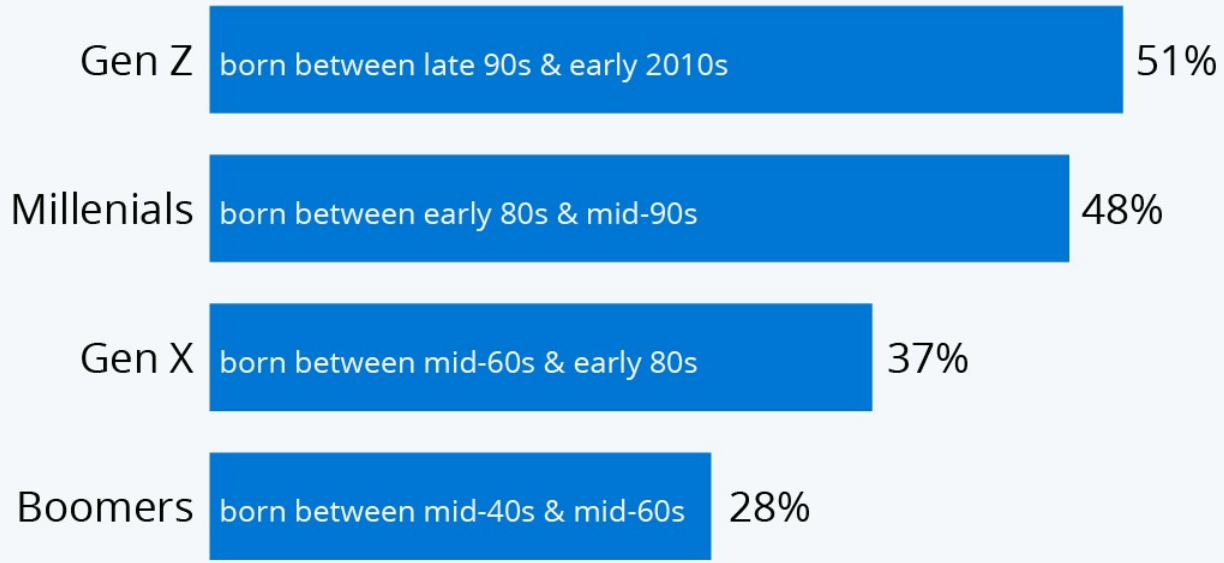
Description: The commercial use cases for augmented and virtual reality (AR/VR) that are expected to receive the largest investment in 2024 are training and industrial maintenance with 4.1 billion U.S. dollars forecast to be invested in both fields. VR gaming, VR video/feature viewing, and AR gaming make up the three largest consumer use cases for augmented and virtual reality (AR/VR), with 17.6 billion U.S. dollars expected to be spent in 2024. Read more
Note(s): Worldwide; 2020
Source(s): IDC

Come è cambiato il lavoro dopo la pandemia



Will the Metaverse Lead to Metawork?

Share of respondents envisioning partly working in the metaverse in the near future by generation



Overall respondents not expecting metaverse work at all **16%**

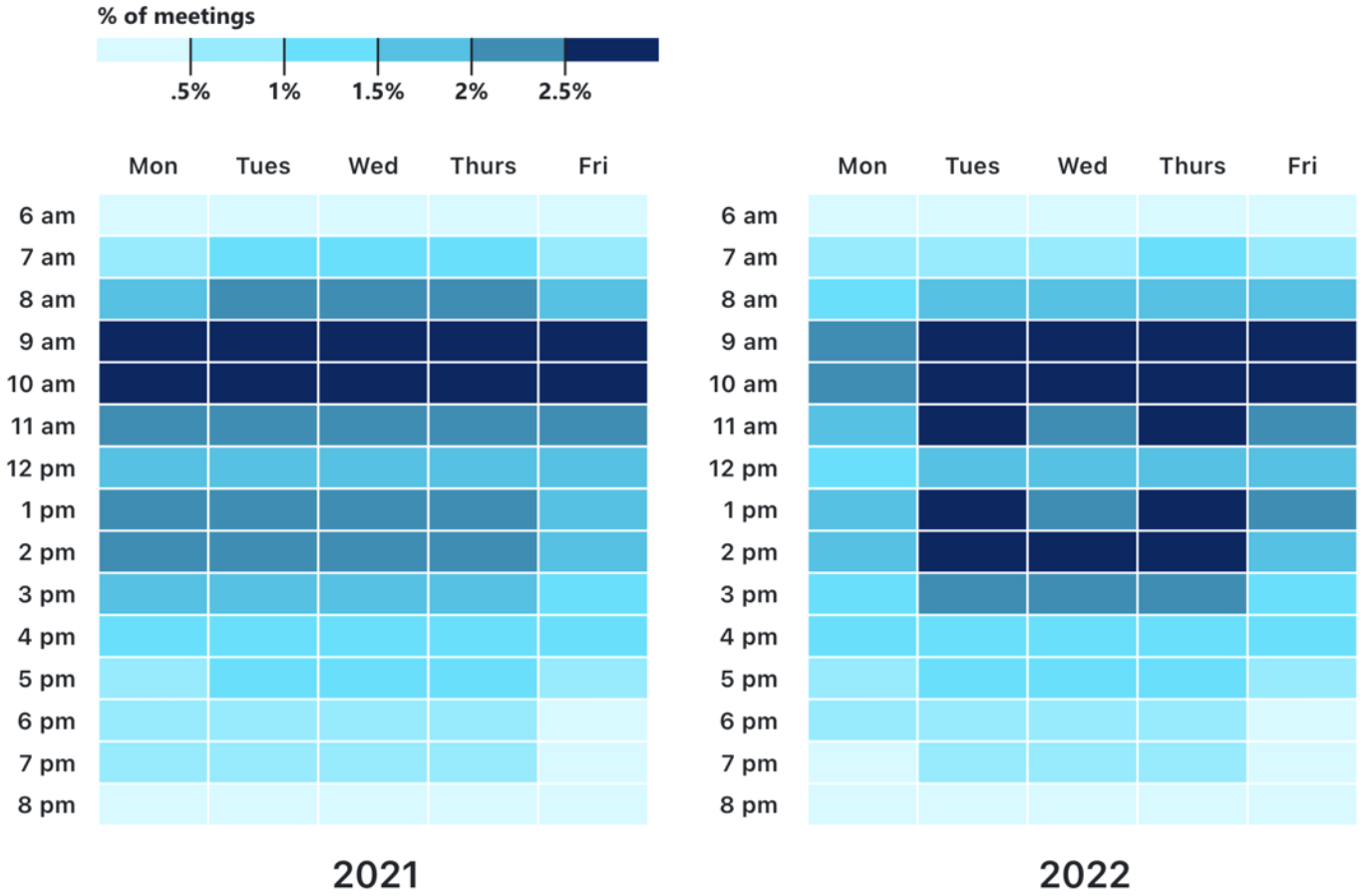
Based on surveys of 31,102 full-time employed or self-employed workers in 31 countries; Jan-Feb 2022

Source: Microsoft 2022 Work Trend Index

Come è cambiato il lavoro dopo la pandemia

Meeting habits are changing

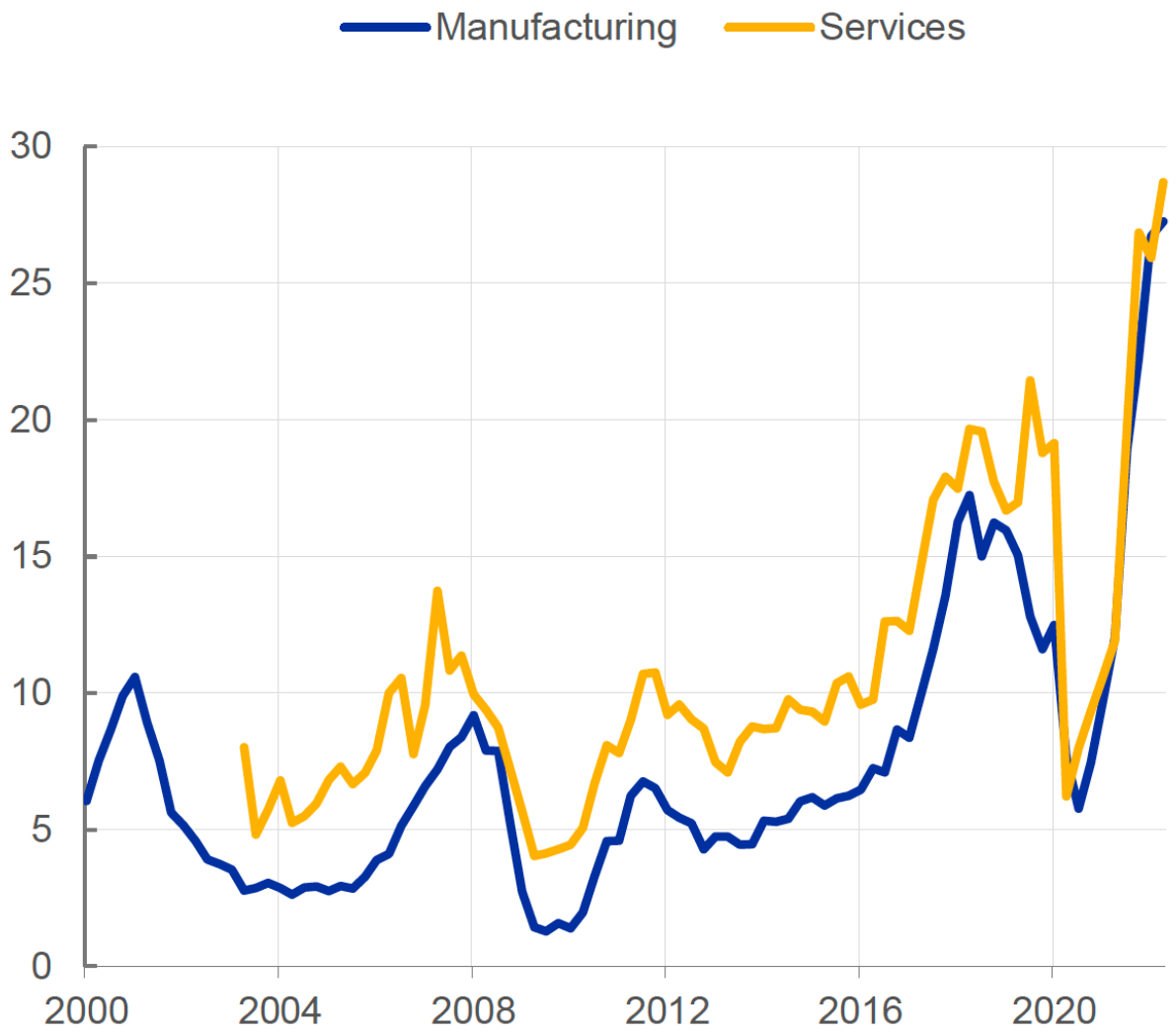
Meetings now start later on Mondays and finish earlier on Fridays, and there are fewer meetings at lunchtime. While 9-11 a.m. is the most used meeting time, 2-3 p.m. is rising in popularity.



Analysis of collaboration activity across Microsoft 365 tools the past two years. This visualization is based on aggregated data, without personal or organization-identifying information.

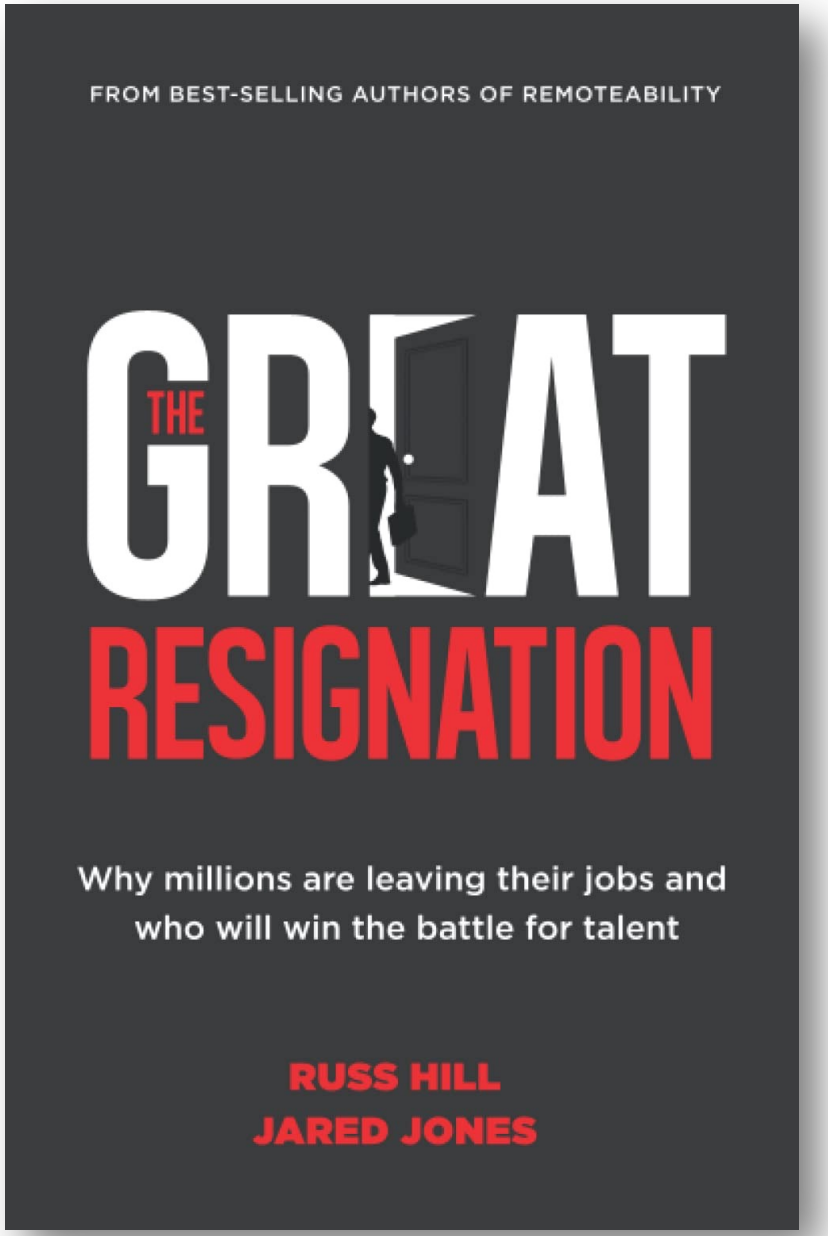
Limits to production – shortage of labour

(percentage balances)

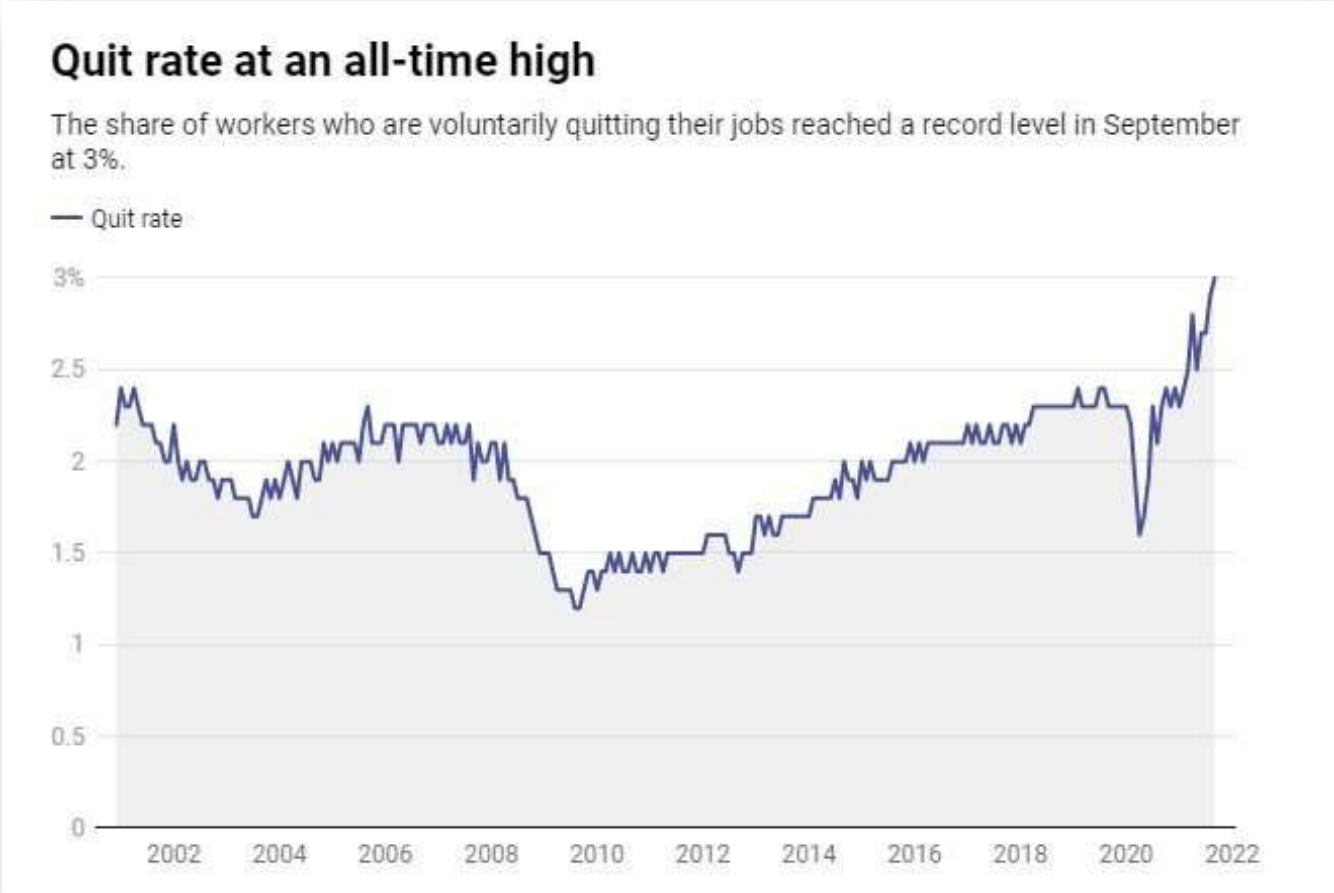


Source: European Commission.
Last observation: 2022Q2.

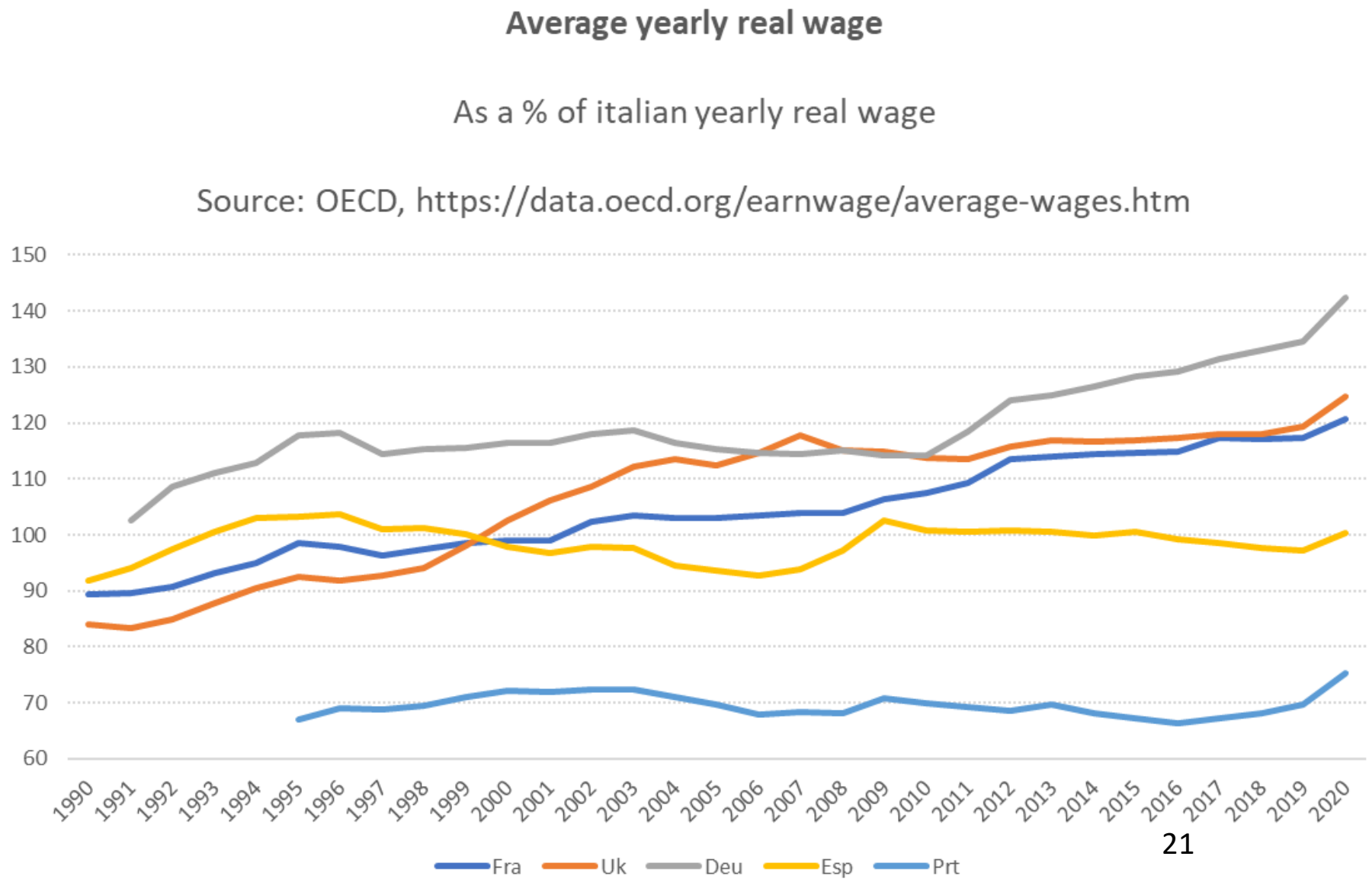
Manca la roba, ma manca anche la gente…



Non basta più offrire un “posto di lavoro” e un “salario”



I salari reali italiani sono più bassi (e decrescenti) rispetto ai peers europei



IMPRESE CHE ASSUMONO

GIUGNO

13%

GIOVANI

GIUGNO

31%

DIFF. REPERIMENTO

GIUGNO

39%

OPPORTUNITÀ DI LAVORO NEL MESE DI GIUGNO

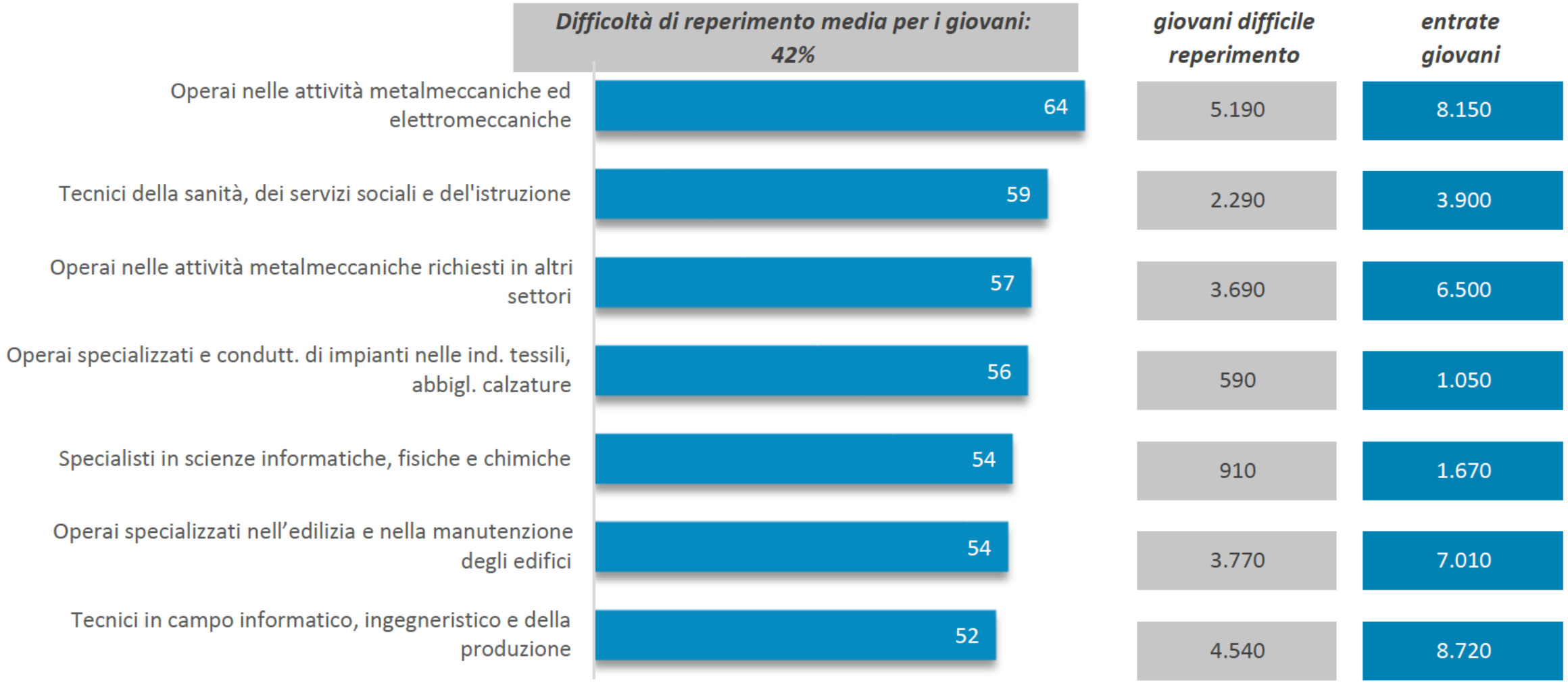
La difficoltà media di reperimento dei profili professionali è arrivata al 39% a Giugno 2022.

Particolarmente critica la situazione nel turismo, nei servizi e nel settore commerciale

Le difficoltà di reperimento per i giovani arrivano al 42%

Le professioni con maggior difficoltà di reperimento per i giovani

(entrate previste di giovani - quota % e v.a.)

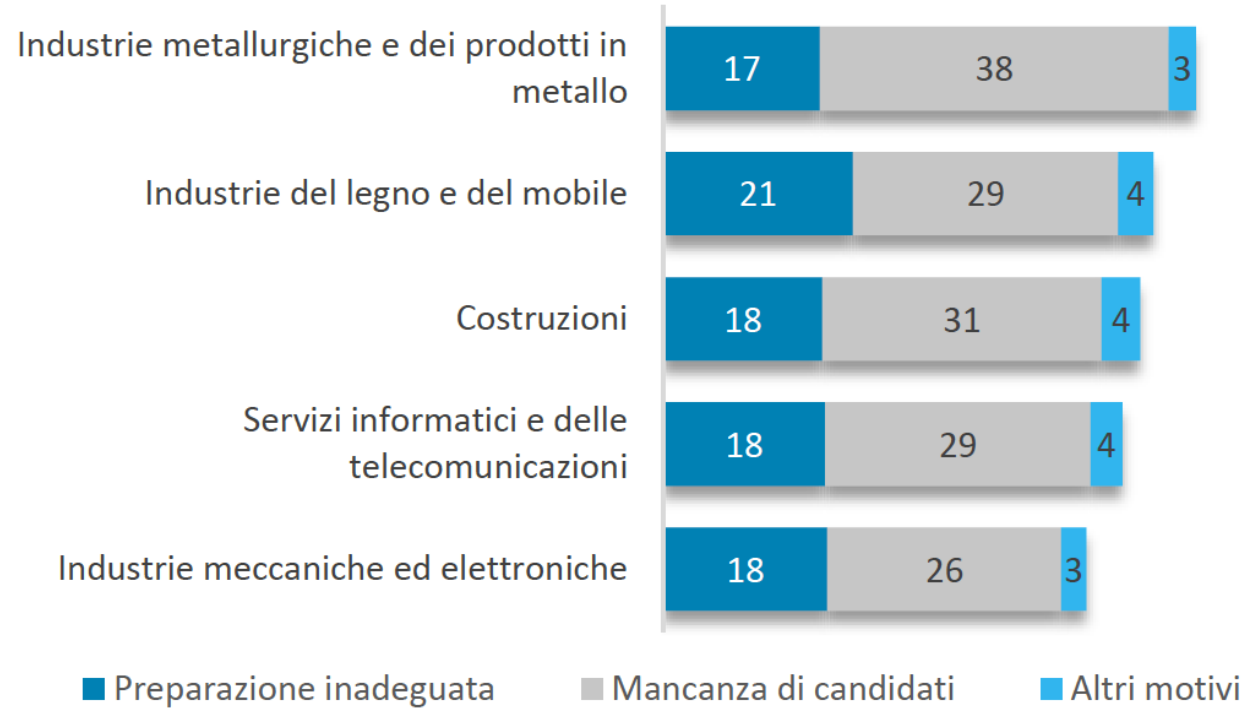


I profili professionali più critici arrivano al 75% di difficoltà di riferimento

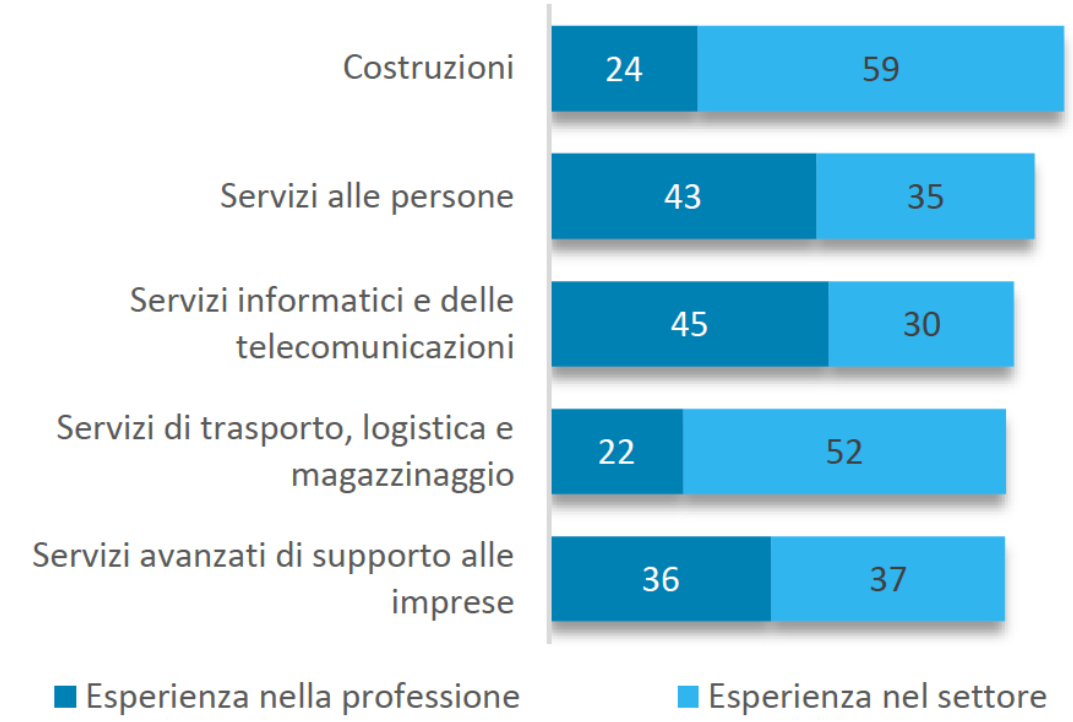
Il mondo industriale è tra quelli più in difficoltà ad attrarre capitale umano

I principali settori...

...con maggiori **DIFFICOLTA' DI REPERIMENTO** e i motivi (%)



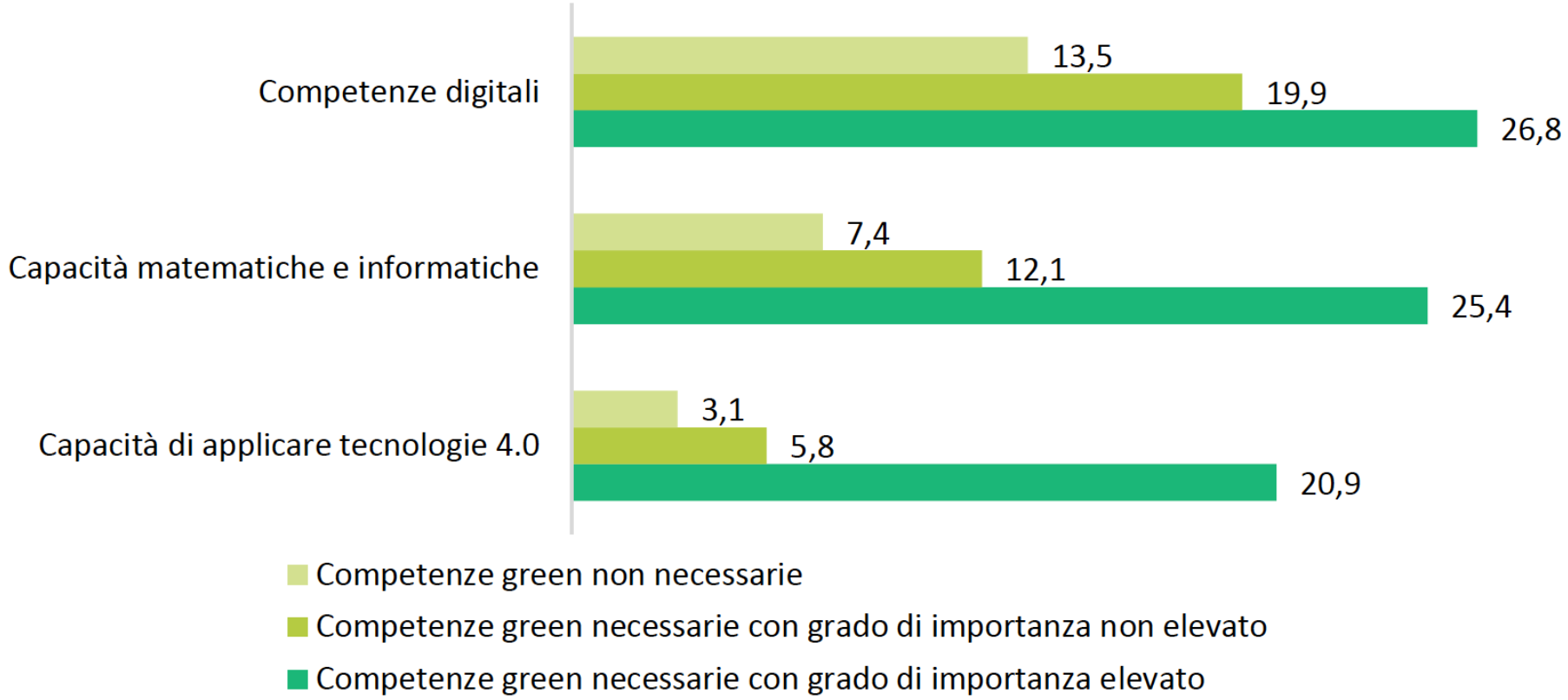
...che più richiedono **ESPERIENZA** lavorativa specifica (%)



Quota % delle entrate difficili da reperire sulle entrate totali di ogni settore.

Cercate talenti «green & digital». Buona fortuna...

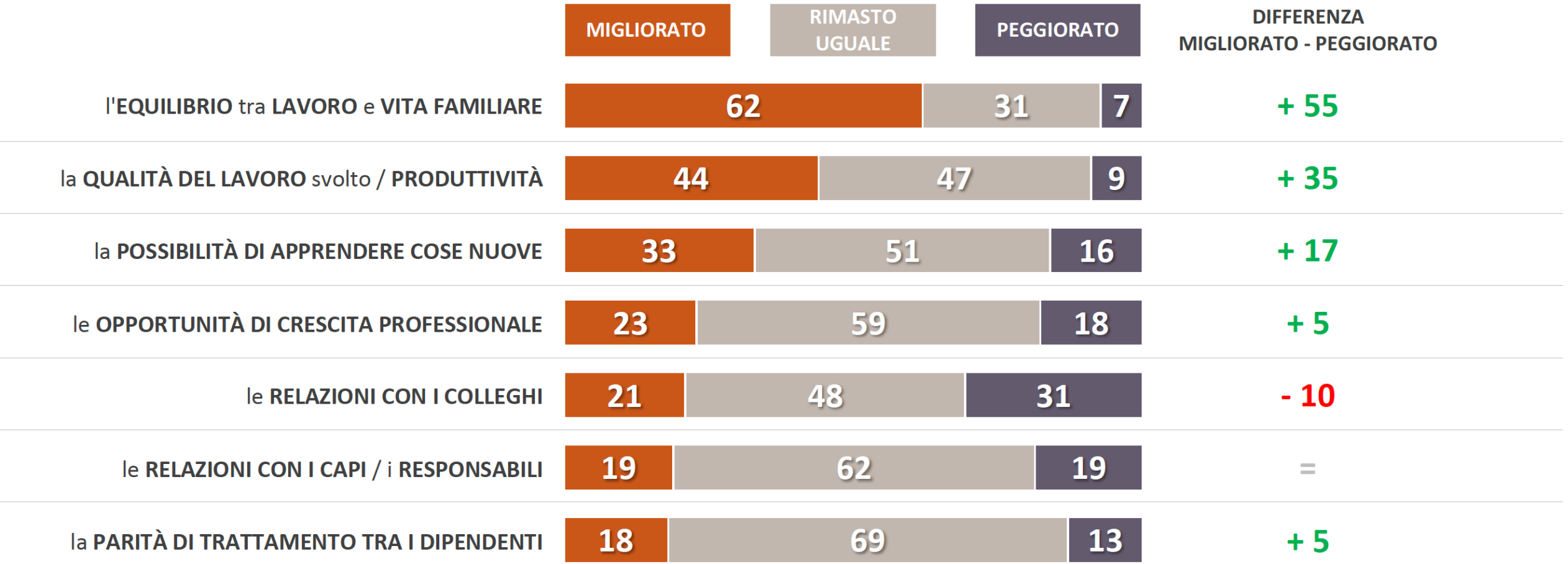
FIGURA 13 – DOMANDA DI E-SKILL CON UN GRADO ELEVATO DI IMPORTANZA PER GRADO DI IMPORTANZA DELLE COMPETENZE GREEN NEL 2021 (% SUL TOTALE DELLE ENTRATE PER IMPORTANZA DI COMPETENZE GREEN RICHIESTE)



Fonte: Unioncamere-ANPAL, Sistema Informativo Excelsior, 2021

Smart working toccasana per equilibrio vita-lavoro e produttività: ne risentono però soprattutto le relazioni con i colleghi

Direbbe che lo smart working abbia migliorato o peggiorato ciascuno dei seguenti aspetti della sua vita lavorativa?
(RISPONDE CHI HA FRUITO DELLO SMART WORKING NEL 2022)

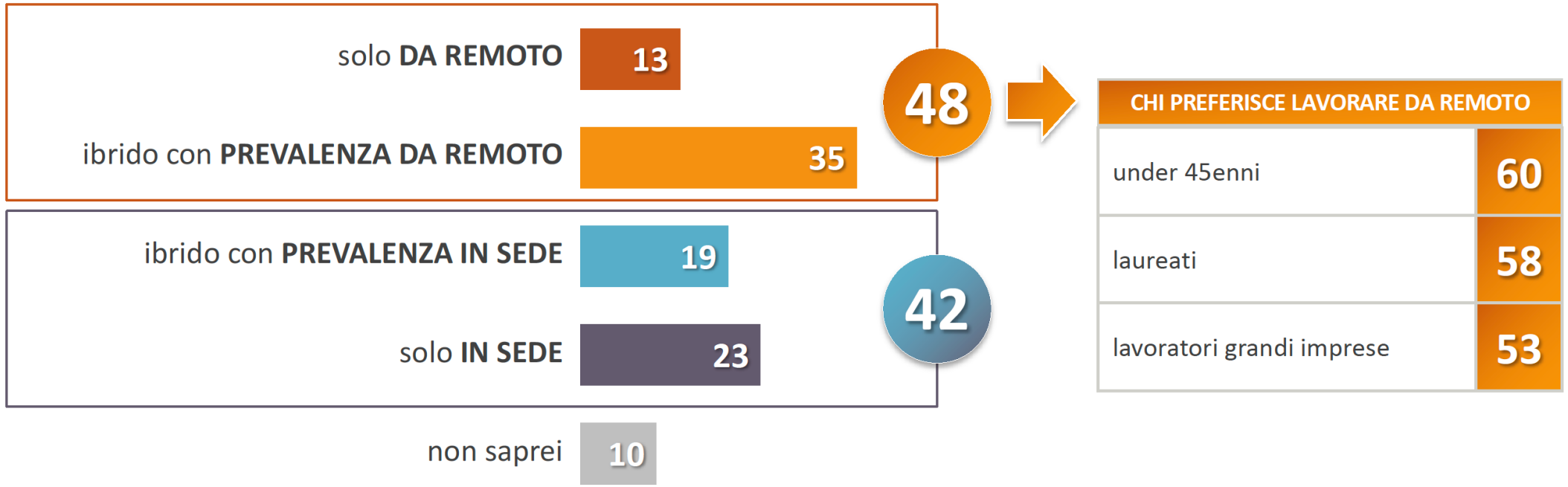


SWG

NOTA INFORMATIVA: valori espressi in %. Date di esecuzione: 7-9 settembre 2022. Metodo di rilevazione: sondaggio CATI-CAMI-CAWI su un campione rappresentativo nazionale di 800 soggetti maggiorenni.

La metà dei lavoratori dipendenti vorrebbe lavorare prevalentemente da remoto: il 13% full remote. In particolare under 45 istruiti che operano nelle grandi imprese

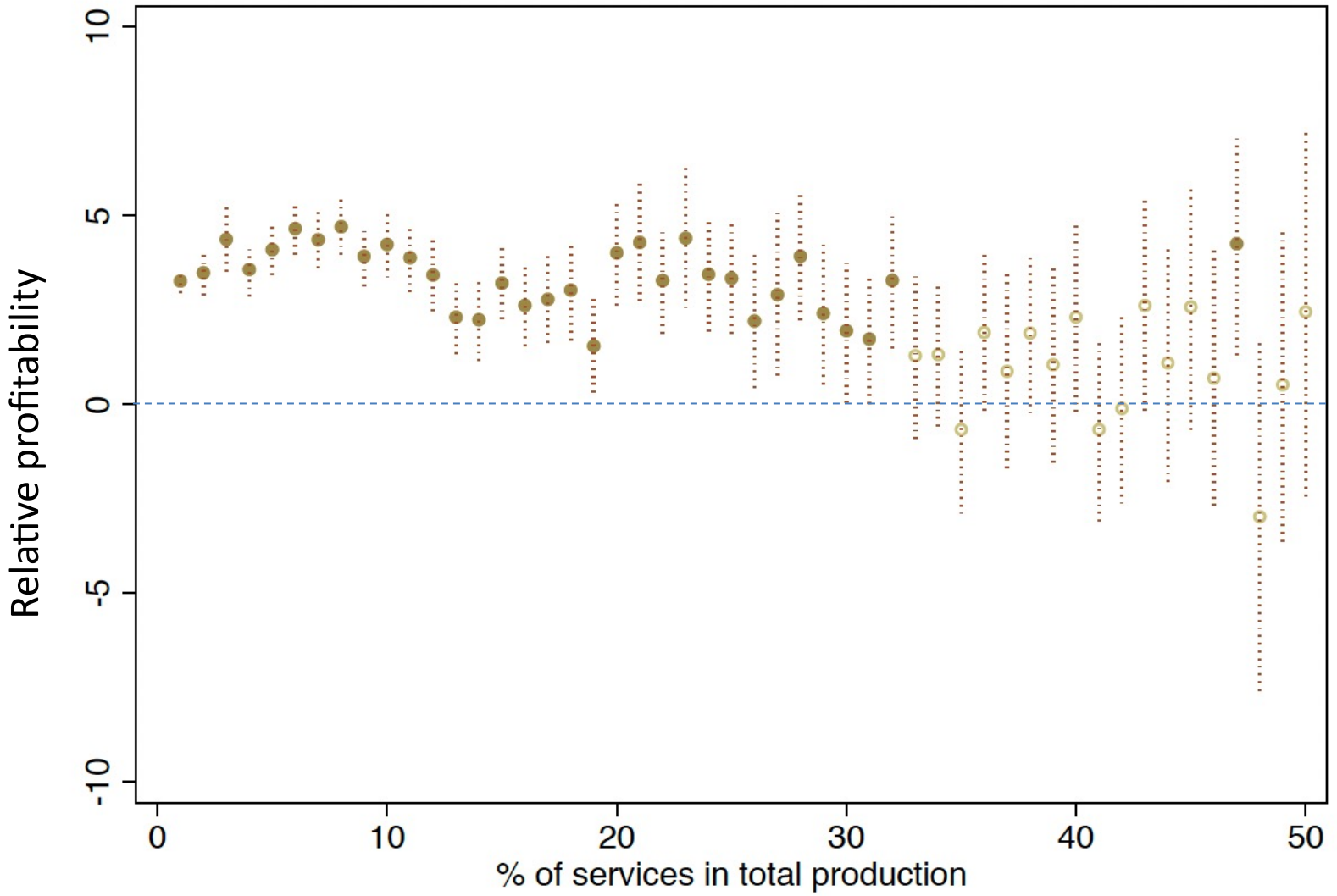
Quale sarebbe per lei la condizione di lavoro ideale, rispetto alla possibilità di lavorare in sede o da remoto?



CHI PREFERISCE LAVORARE DA REMOTO	
under 45enni	60
laureati	58
lavoratori grandi imprese	53

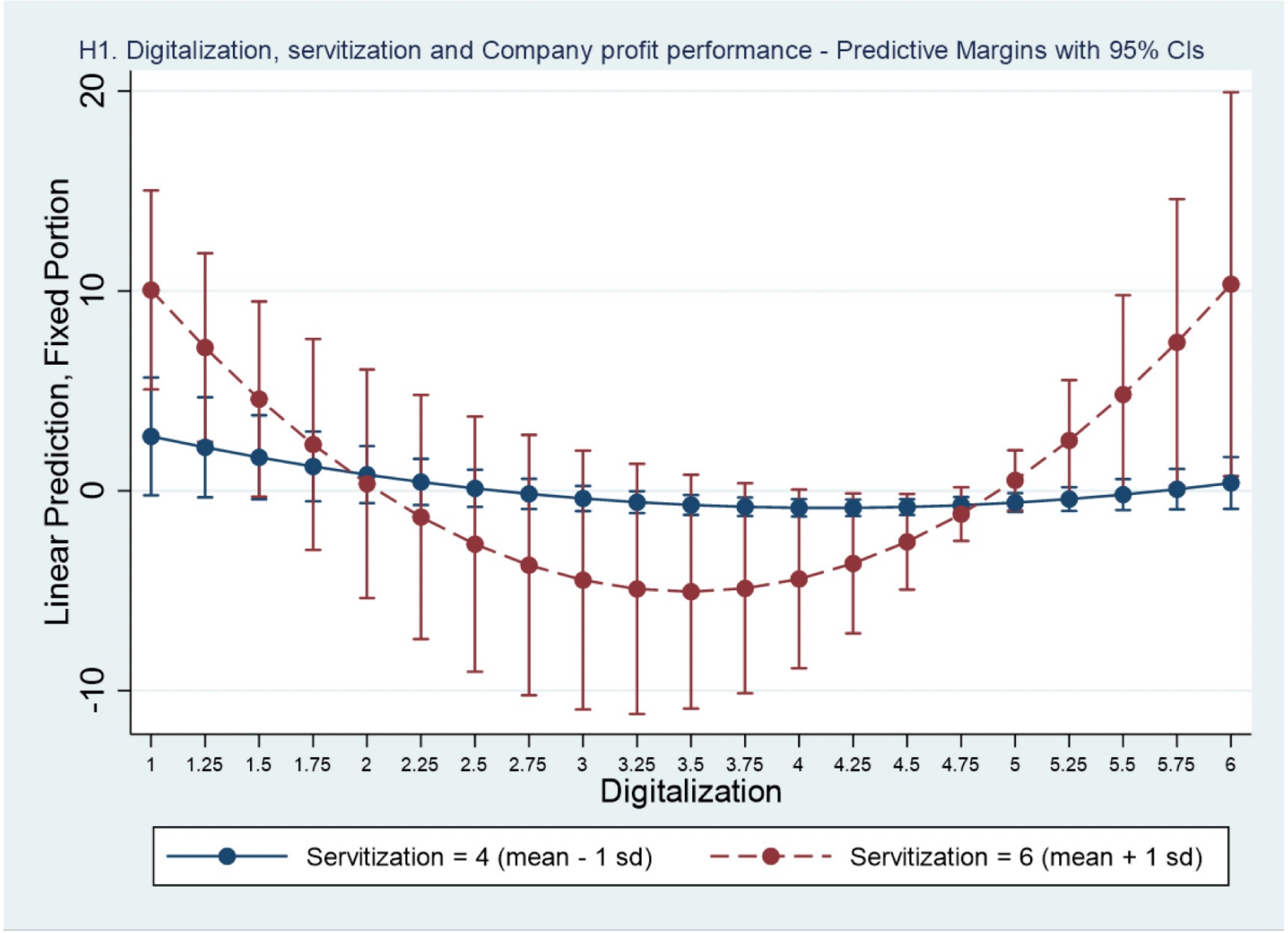
NOTA INFORMATIVA: valori espressi in %. Date di esecuzione: 7-9 settembre 2022. Metodo di rilevazione: sondaggio CATI-CAMI-CAWI su un campione rappresentativo nazionale di 800 soggetti maggiorenni.

Relative Profitability of Servitized Manufacturing Firms



Source:
Matthieu Crozet & Emmanuel Milet
Should everybody be in services?
The effect of servitization
on manufacturing firm performance
No 2015-19 – October - CEPII Working Paper

The moderating effect of servitization on the nonlinear relationship between digitalization and company financial performance.



Source: Kohtamäki, M., Parida, V., Patel, P.C., & Gebauerd, H., (2020). The relationship between digitalization and servitization : the role of servitization in capturing the financial potential of digitalization. *Technological forecasting and social change* 151(February). https://doi.org/10.1016/j.techfore.2019.119804

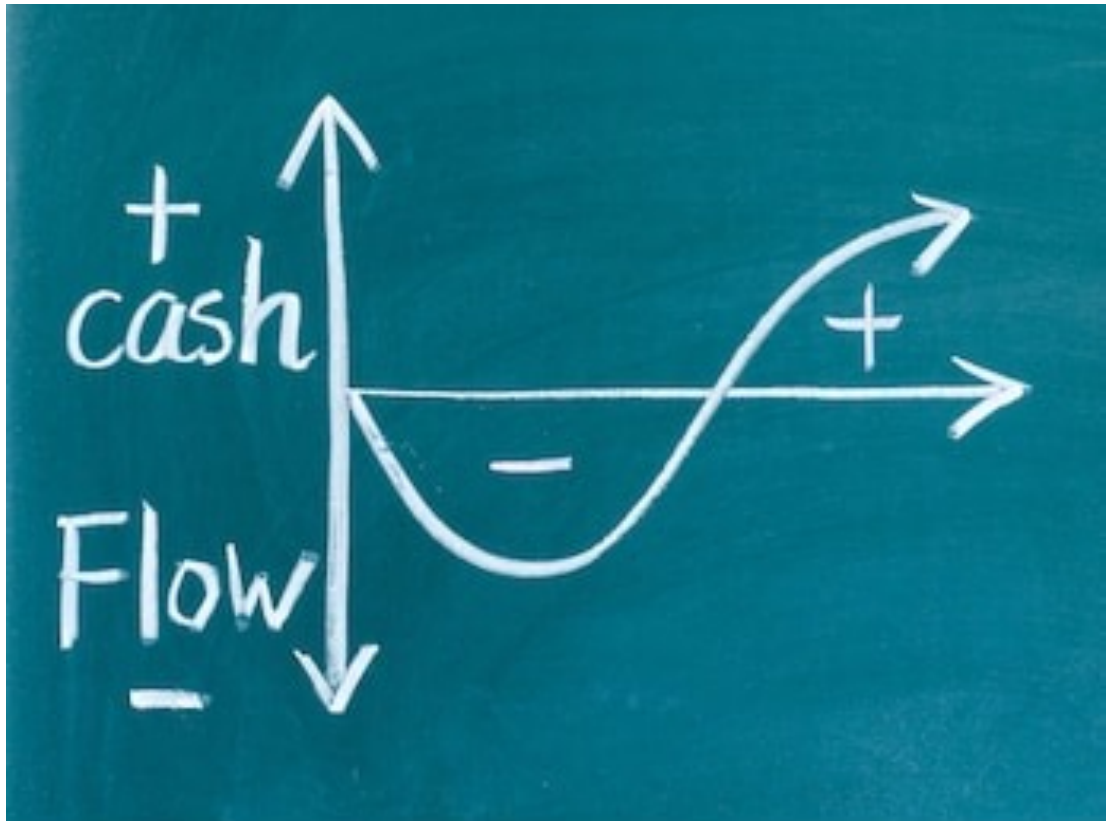
Empirical Research on Financial Outcomes of Servitization

Cluster	Authors (Year)	Country & Data	Financial Performance Measurement		
			Revenue	Profit	Firm Value, method
Revenue	Antioco et al (2008)	Belgium, the Netherlands, and Denmark, 137 manufacturing firms	+		
Revenue & Profit	Eggert et al (2014)	German, 513 mechanical engineering companies	+	short term: − long term: +	
	Kastalli and Looy (2013)	Worldwide, 44 Atlas Copco's subsidiaris	short term: − long term: +	short term: − long term: +	
	Neely (2008)	25 Countries, 10,028 publicly traded manufacturing firms	+	−	
Profit	Ambroise (2018)	France, 184 manufacturing firms		+	
Profit & Firm Value	Visnjic et al (2016)	Developed countries, 133 publicly traded manufacturing firms		short term: − long term: +	short term: − long term: + Tobin's q
Firm Value	Fang et al (2008)	US, 477 publicly traded manufacturing firms			short term: − long term: + Tobin's q
	He and Lai (2012)	China, 229 publicly traded manufacturing firms			+, SERVQUAL model[a]

+: Increase, −: Decrease

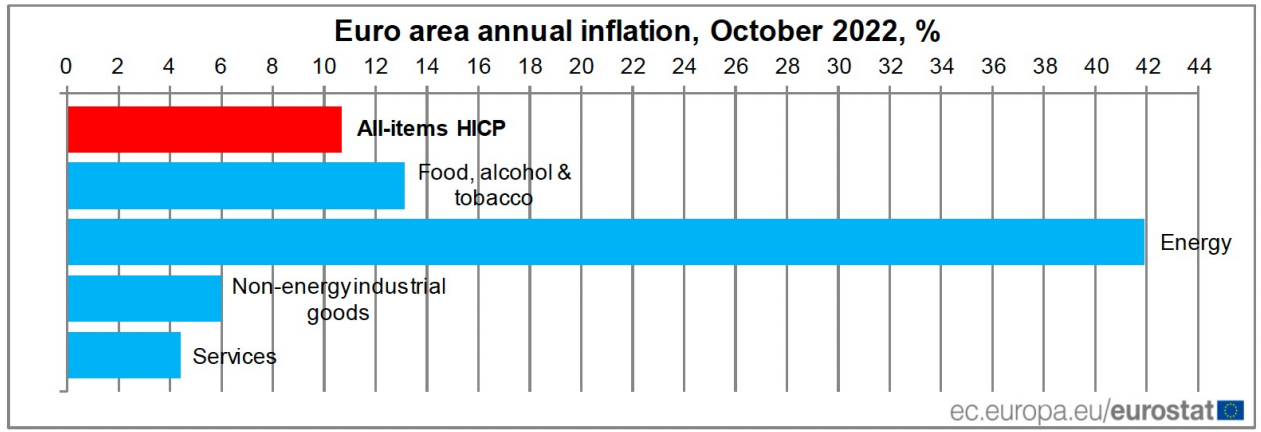
[a] SERVQUAL model is developed by Parasuraman et al (1985, 1988). It contains 22 items for assessing customer perceptions and expectations regarding the quality of service.

La servitization è una scelta di stato patrimoniale e di cash flow prima che di conto economico



- Dalla vendita all'**affido tecnologico**: estendere il perimetro di governance all'ecosistema degli **attori downstream**
- Presidiare i fattori di proprietà intellettuale sulla «**data value chain**» (che comincia sul lato della domanda...)
- Allineare il sistema di incentivi organizzativi al **modello patrimoniale degli intangibles**
- Invertire i **prezzi relativi** di macchine e servizi, in logica value-based

Eurozona, inflazione a Ottobre: 10,7%
Prezzi dell'energia: +41,9% in un anno (ma: servizi: +4,4%)



Italia: 12,8%
Francia: 7,1%

Euro area annual inflation and its components, %

	Weights (‰)	Annual rate							Monthly rate
	2022	Oct 21	May 22	Jun 22	Jul 22	Aug 22	Sep 22	Oct 22	Oct 22
All-items HICP	1000.0	4.1	8.1	8.6	8.9	9.1	9.9	**10.7e**	1.5e
All-items excluding: > energy	890.7	2.0	4.6	4.9	5.4	5.8	6.4	**6.9e**	0.8e
> energy, unprocessed food	841.2	2.1	4.4	4.6	5.1	5.5	6.0	**6.4e**	0.7e
> energy, food, alcohol & tobacco	681.8	2.0	3.8	3.7	4.0	4.3	4.8	**5.0e**	0.6e
Food, alcohol & tobacco	208.9	1.9	7.5	8.9	9.8	10.6	11.8	**13.1e**	1.5e
> processed food, alcohol & tobacco	159.4	2.1	7.0	8.2	9.4	10.5	11.5	**12.4e**	1.1e
> unprocessed food	49.5	1.4	9.0	11.2	11.1	11.0	12.7	**15.4e**	2.7e
Energy	109.3	23.7	39.1	42.0	39.6	38.6	40.7	**41.9e**	6.5e
Non-energy industrial goods	265.2	2.0	4.2	4.3	4.5	5.1	5.5	**6.0e**	1.2e
Services	416.7	2.1	3.5	3.4	3.7	3.8	4.3	**4.4e**	0.1e

e estimate

Inflation rates (%) measured by the HICP

	Annual rate							Monthly rate
	Oct 21	May 22	Jun 22	Jul 22	Aug 22	Sep 22	Oct 22	Oct 22
Belgium	5.4	9.9	10.5	10.4	10.5	12.1	**13.1e**	2.7e
Germany	4.6	8.7	8.2	8.5	8.8	10.9	**11.6e**	1.1e
Estonia	6.8	20.1	22.0	23.2	25.2	24.1	**22.4e**	-1.6e
Ireland	5.1	8.3	9.6	9.6	9.0	8.6	**9.6e**	1.7e
Greece	2.8	10.5	11.6	11.3	11.2	12.1	**9.8e**	-1.0e
Spain	5.4	8.5	10.0	10.7	10.5	9.0	**7.3e**	0.1e
France	3.2	5.8	6.5	6.8	6.6	6.2	**7.1e**	1.3e
Italy	3.2	7.3	8.5	8.4	9.1	9.4	**12.8e**	4.0e
Cyprus	4.4	8.8	9.0	10.6	9.6	9.0	**8.6e**	0.5e
Latvia	6.0	16.8	19.2	21.3	21.4	22.0	**21.8e**	0.9e
Lithuania	8.2	18.5	20.5	20.9	21.1	22.5	**22.0e**	1.3e
Luxembourg	5.3	9.1	10.3	9.3	8.6	8.8	**8.8e**	1.2e
Malta	1.4	5.8	6.1	6.8	7.0	7.4	**7.5e**	-0.6e
Netherlands	3.7	10.2	9.9	11.6	13.7	17.1	**16.8e**	1.3e
Austria	3.8	7.7	8.7	9.4	9.3	10.9	**11.5e**	1.3e
Portugal	1.8	8.1	9.0	9.4	9.3	9.8	**10.6e**	1.1e
Slovenia	3.5	8.7	10.8	11.7	11.5	10.6	**10.3e**	0.8e
Slovakia	4.4	11.8	12.6	12.8	13.4	13.6	**14.5e**	1.3e
Finland	2.8	7.1	8.1	8.0	7.9	8.4	**8.3e**	0.7e

e estimate Source dataset: prc_hicp_manr

Inflazione in Italia: grande divergenza tra totale e «core»

FIGURA 3. INDICI DEI PREZZI AL CONSUMO NIC PER TIPOLOGIA DI PRODOTTO

Gennaio 2017 - ottobre 2022, variazioni percentuali tendenziali (base 2015=100)

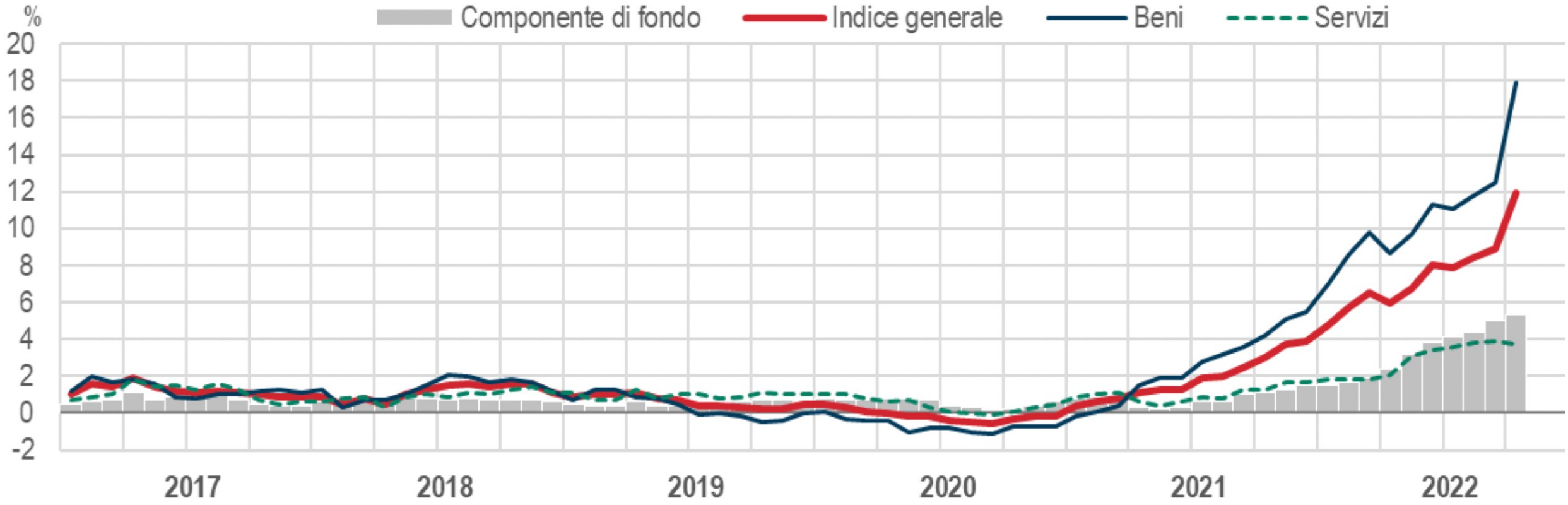
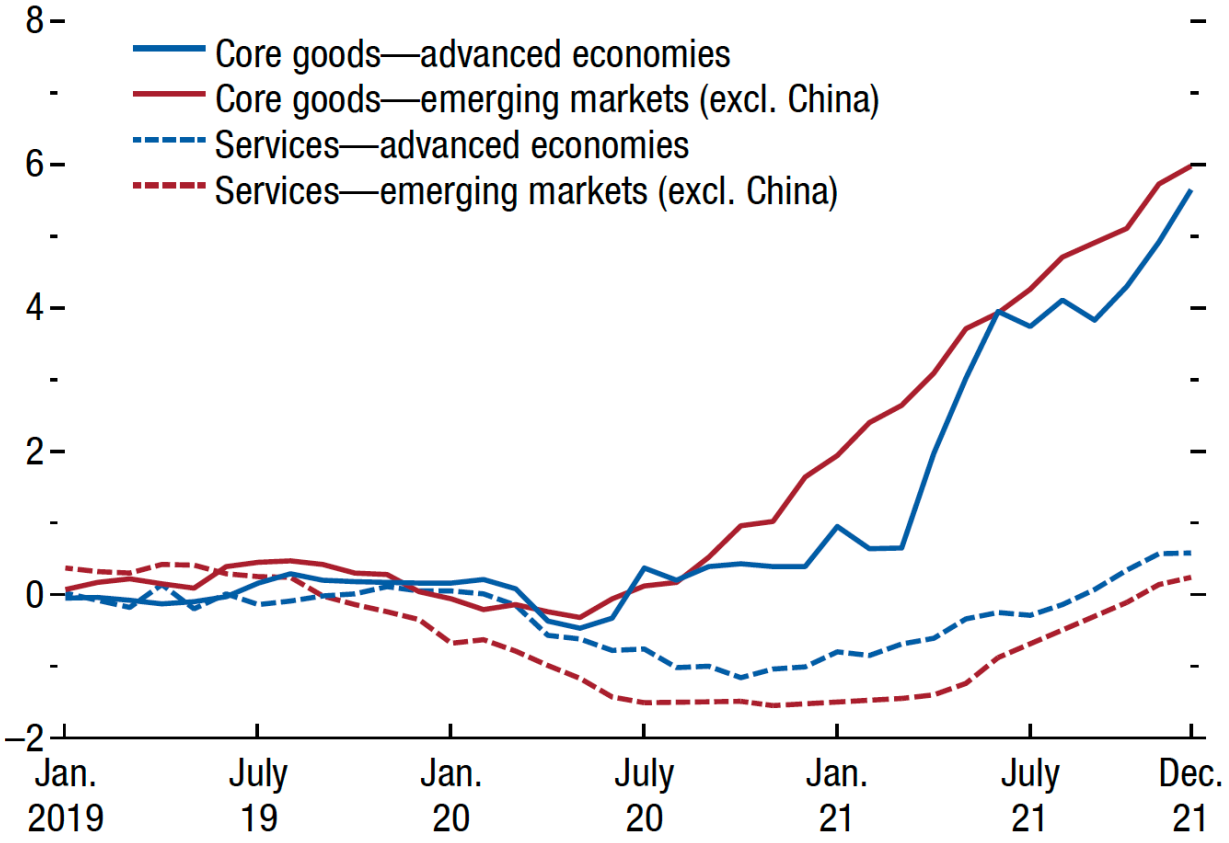


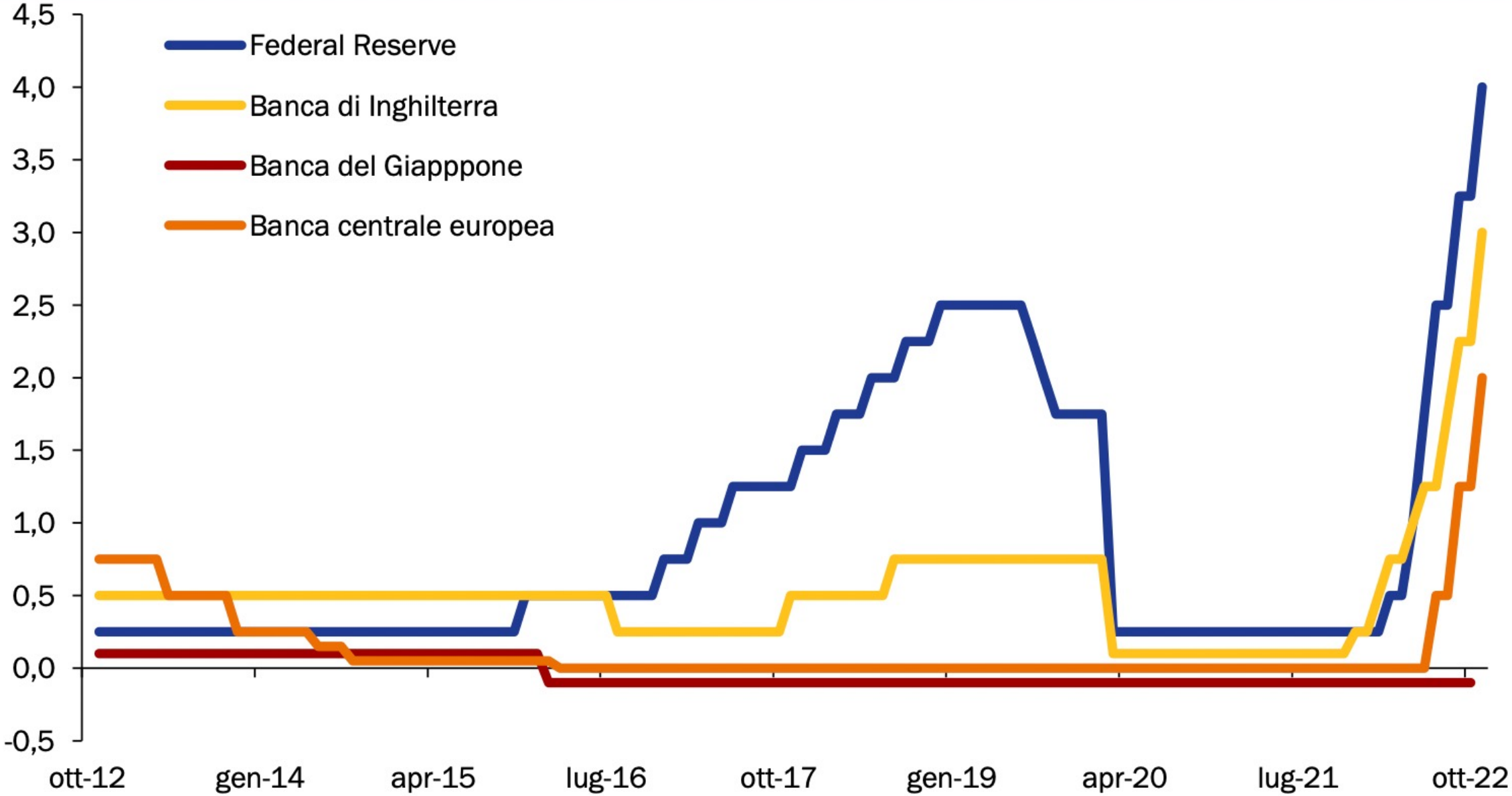
Figure 1.13. Goods and Services Inflation
(Deviation from pre–COVID-19 averages, percent)



Sources: Haver Analytics; and IMF staff calculations.
Note: Lines show the difference between the year-over-year percentage change in price indices each month and the average observed during 2018 and 2019 for each sector. Core goods exclude energy and food. Countries are aggregated using purchasing-power-parity weights. Advanced economies include United States, Euro Area, Japan, Korea, Canada, and Australia. Emerging markets include Indonesia, Malaysia, Brazil, Mexico, Colombia, Chile, Russia, and South Africa.

Inflazione: la differenza tra beni e servizi

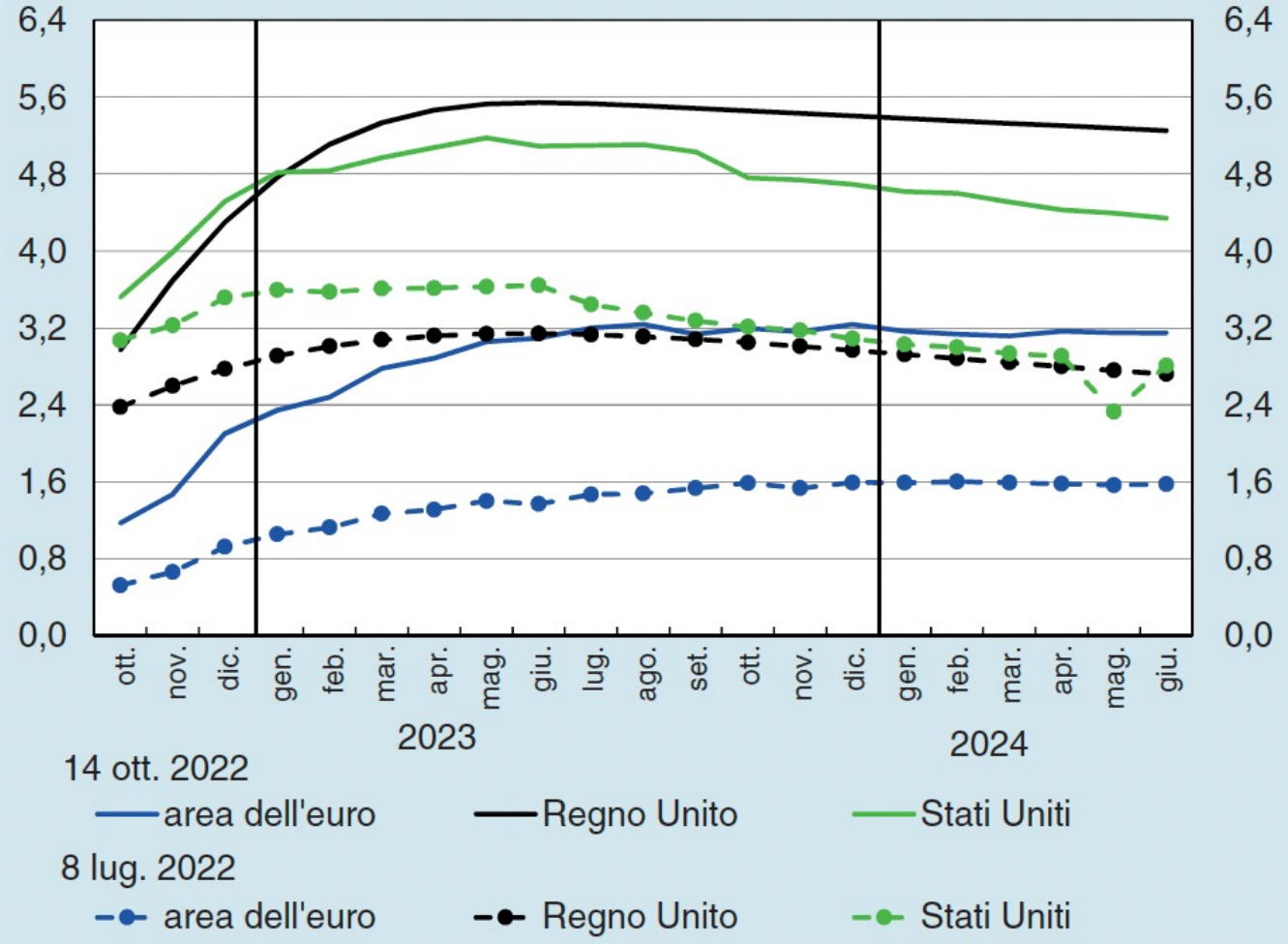
FIGURA I.4: TASSI DI POLICY DELLE PRINCIPALI BANCHE CENTRALI (%)



Fonte: Refinitiv.

Tassi di interesse overnight impliciti negli strumenti derivati (1)

(scadenze mensili; punti percentuali)



Fonte: elaborazioni su dati Refinitiv.

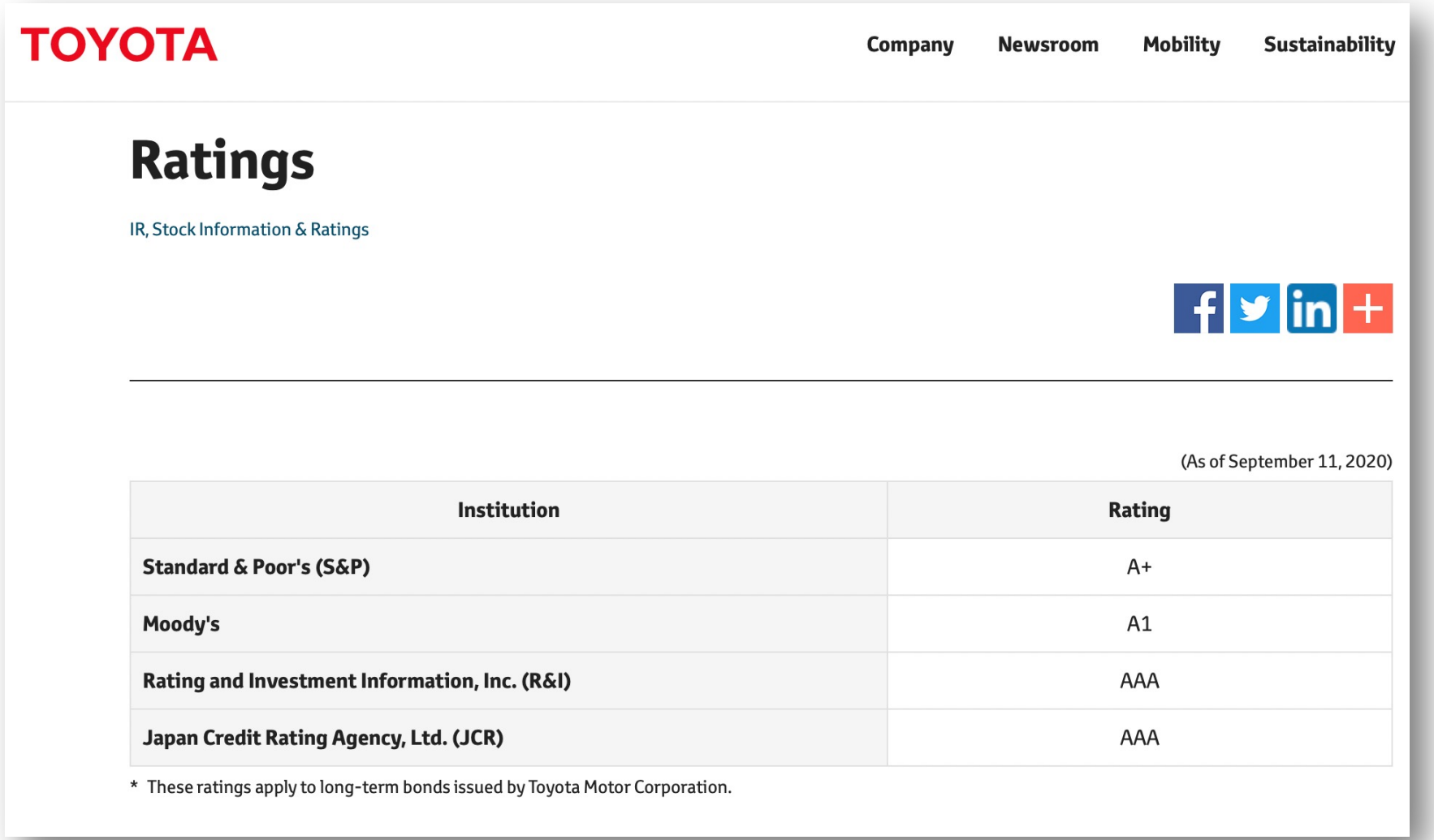
(1) Tasso di interesse atteso implicito nelle quotazioni degli *overnight indexed swaps* (OIS).

Il mercato si attende per l'Eurozona tassi di interesse uguali o superiori al 3% a partire dal 2023

“Everything-as-a-service”

Strategia, organizzazione e processi per la servitization industriale

Articolo Quinto: chi ha il miglior rating ha vinto



TOYOTA

Company Newsroom Mobility Sustainability

Ratings

IR, Stock Information & Ratings

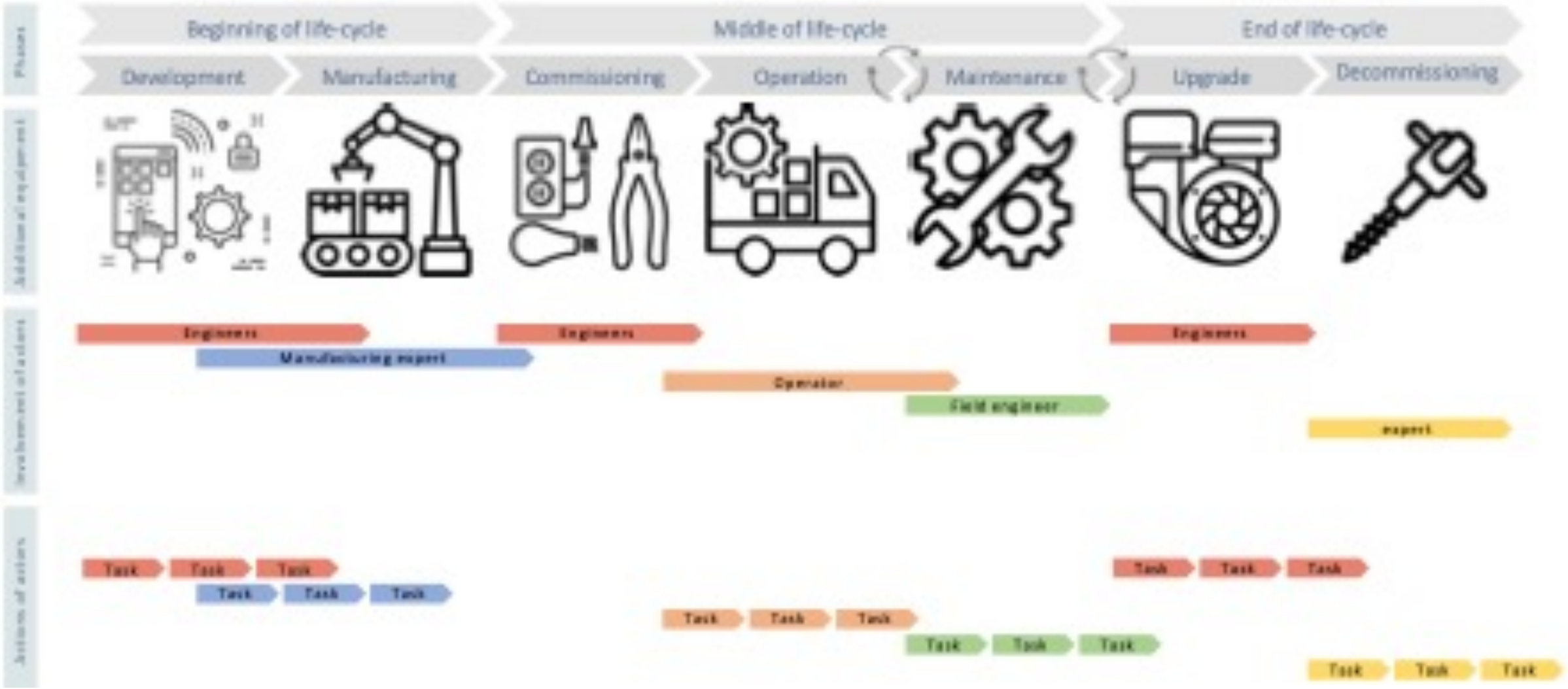
(As of September 11, 2020)

Institution	Rating
Standard & Poor's (S&P)	A+
Moody's	A1
Rating and Investment Information, Inc. (R&I)	AAA
Japan Credit Rating Agency, Ltd. (JCR)	AAA

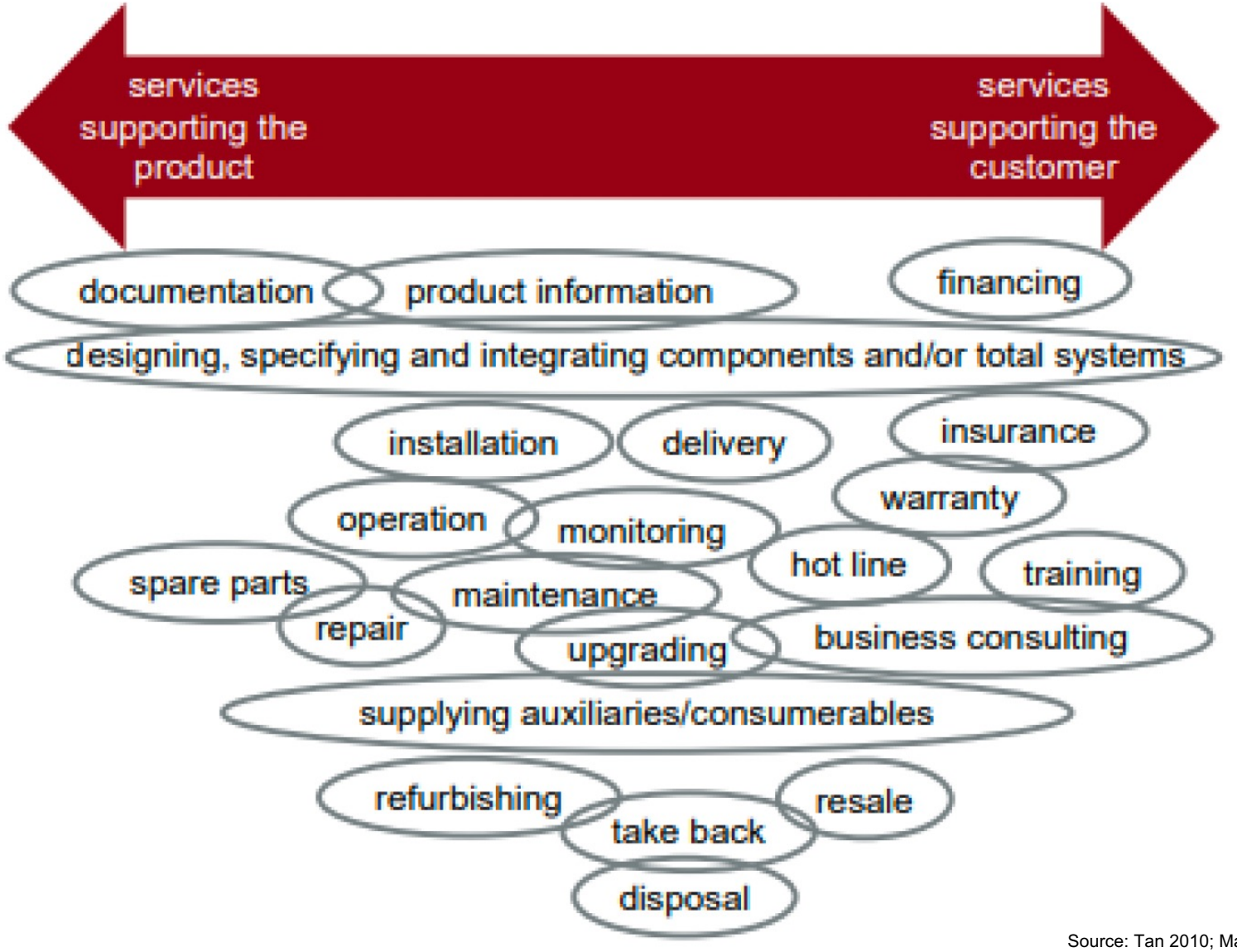
* These ratings apply to long-term bonds issued by Toyota Motor Corporation.

Externalities & Complementarities of Servitization

Servitization across the asset life-cycle

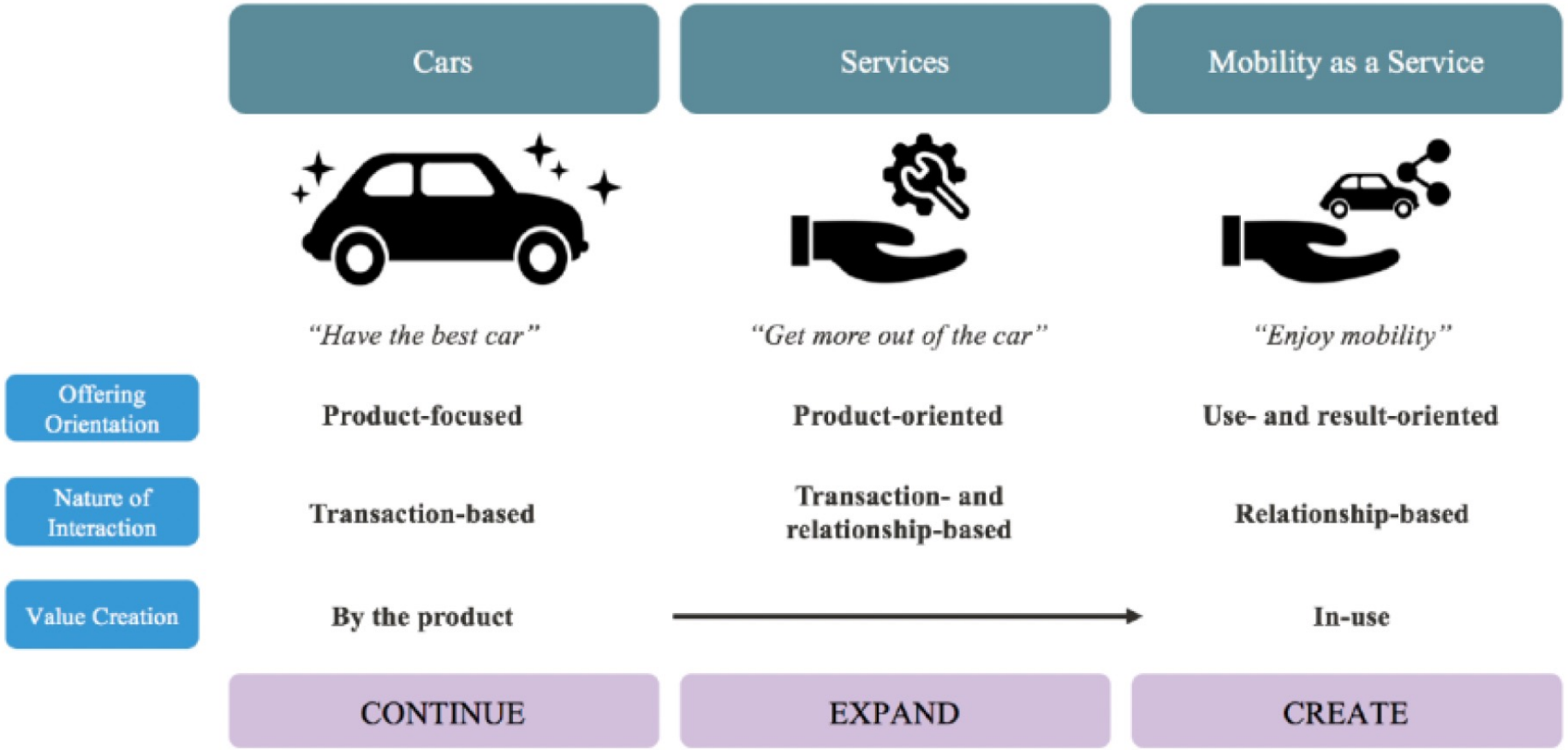


Services supporting the Product vs the Customer

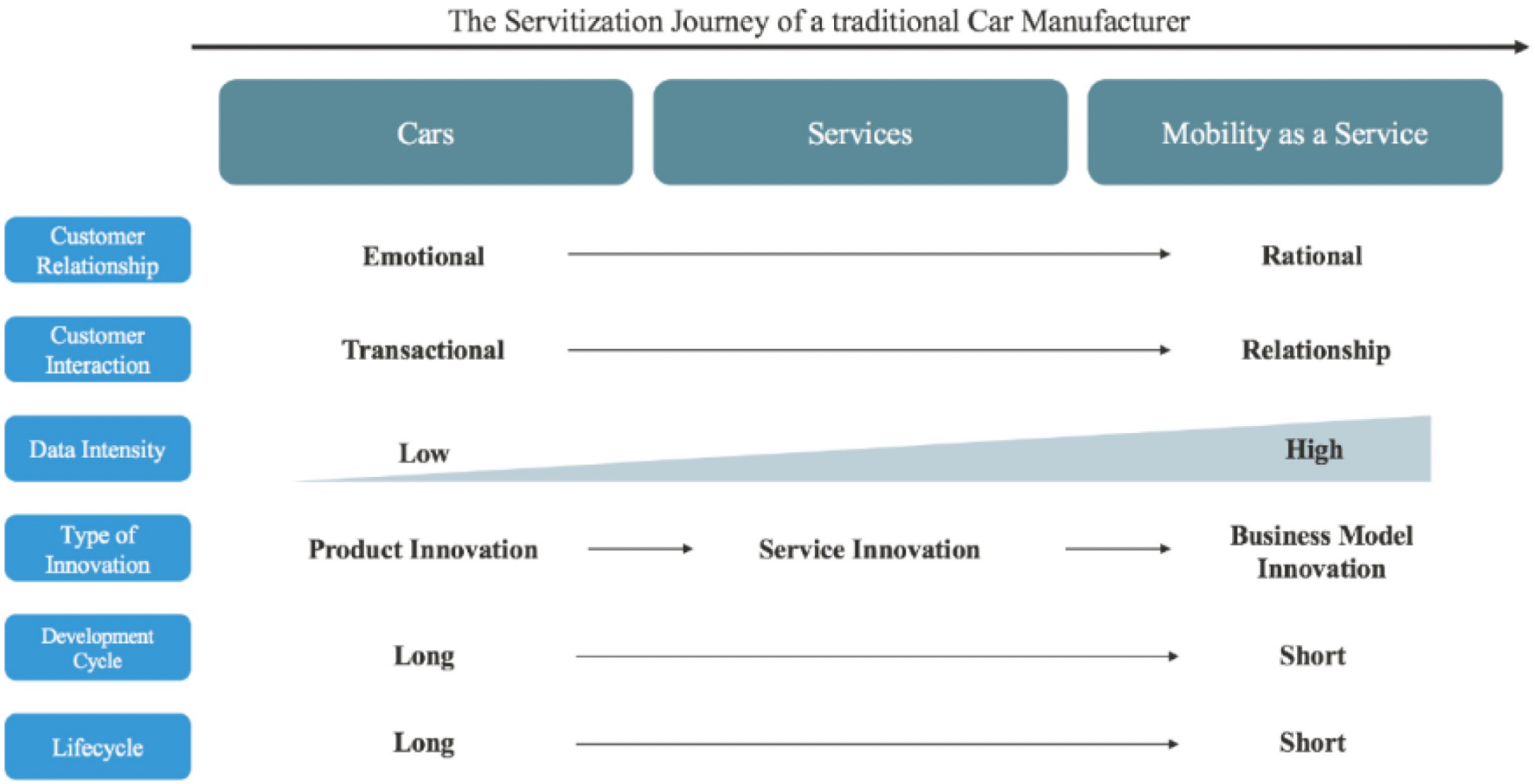


Source: Tan 2010; Mathieu 2001; Oliva & Kallenberg 2003

The servitization journey of car manufacturers



Car Servitization: Organizational Factors



Insegnare a vivere una vita «ibrida»

Toyota WeHybrid: più guidi green, più risparmi

Toyota, Luca': "Oltre metà percorso in elettrico per le nostre ibride al Giro d'Italia"

31 maggio - Milano

Con il progetto Beyond Zero la casa giappones declina la propria visione per un futuro nel seg della mobilità sostenibile e del minor impatto ambientale. Luigi Luca', amministratore delega Toyota Italia: "Ecco i pilastri della nostra strat tra vetture a idrogeno, plug-in hybrid, full hyb 100% elettriche"

Toyota WeHybrid, come trasformare i chilometri ad emissioni zero in un piccolo tesoro

di Nicola Desiderio

ROMA -Un modo nuovo di vivere l'auto sfruttando al massimo la sua tecnologia, a favore non solo dell'ambiente, ma anche delle tasche dei consumatori. È l'obiettivo di WeHybrid, il pacchetto di soluzioni che debutta con la nuova Toyota Yaris e mette a frutto tutti i benefici del sistema ibrido trasformandoli in molteplici vantaggi per il cliente.

alVolante.it

NOVITÀ | PRIMI CONTATTI | PROVE | VIDEO | ATTUALITÀ | SPORT | GREEN | FOCUS | PROB

me » News

EWS

Toyota WeHybrid: più la guida è green, maggiore è il risparmio

assicurazioni toyota yaris wehybrid

di Paolo Alberto Fina

Pubblicato 29 luglio 2020

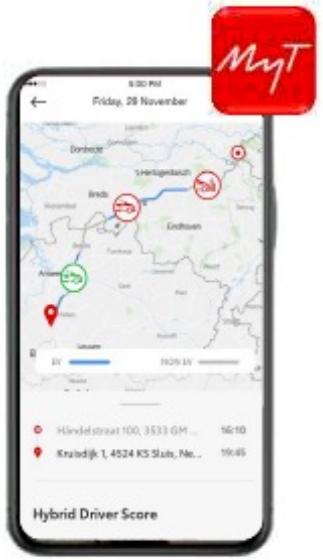
Debutta con la nuova Toyota Yaris Hybrid una nuova forma di assicurazione: chi sfrutta a lungo il motore elettrico ha diritto a sconti.

Con la tecnologia e il customer engagement, prodotto diventa un servizio competitivo

CONNECTIVITY

FLEET 100% Connected-ready

CUSTOMERS 70% Activation



PAY PER DRIVE **CONNECTED**

ADEGUI IL TUO PIANO AI KM CHE PERCORRI.

- Car Financing f_{ct} (mileage)

WEHYBRID INSURANCE

WEHYBRID SERVICE

- Insurance Premium & maintenance costs f_{ct} (%EV)

e.Care

CUSTOMER ← → RETAILER

- Real-time / Remote vehicle diagnostic and customer assistance

FULL HYBRID ELECTRIC

DIGITAL NATIVE

MyT App

%EV

SPACE 48%

TIME 61%

- WeHybrid
- Fleet sales (TCO)
- Lobbying with PA

Allineare gli incentivi dei clienti e di tutto l'ecosistema di attori di servizio

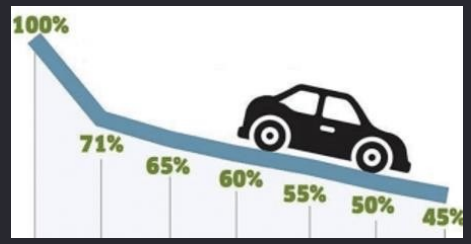
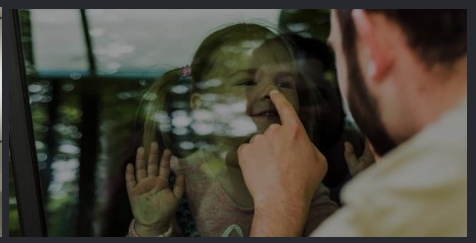
CLIENTI SARANNO GLI ATTORI DI QUESTA NUOVA RIVOLUZIONE

WEHYBRID

+EV - COST				+EV +MOBILITY
CONSUMI	ACCESSIBILITA'	SERVICE	INSURANCE	KINTO GO
				
○ 50% EV → 25km / l	○ Valore futuro garantito più alto → Rata più bassa	○ Fino a 20% di sconto sui tagliandi	○ RCA completa ○ Costo km ○ Gratis in EV ○ 0,04€ / km (motore acceso)	○ Mobility credit per pagare il parcheggio, metro, taxi …

#WEHYBRID EV 55% @ 4,4/100 (105 G/CO2 -12.000 KM/ANNO)

BENEFICI DIRETTI SUL COSTO DI POSSESSO

SVALUTAZIONE	CONSUMI	WEHYBRID INSURANCE	WEHYBRID CREDIT	WEHYBRID SERVICE
				
€ 308	€ 218	€ 316	€ 66	€ 50
Yaris Cross ha un maggior valore nel tempo vs competitors segmento +4,5% (circa 1.232 euro in 4 anni)	Consumi competitors segmento B SUV 5,5 l/100 km e costo litro benzina euro 1,65 (120 x 5,5 x 1,65 = 1.089 – 871= 218)	12.000 km x 45% termico x 0,04 euro = 216 euro /anno – 532 Rc Auto media Italia	12.000 km x 55% x 0,01 euro= 66 euro	% sconto medio su manutenzione annua su 4 anni di manutenzione ordinaria

RISPARMIO ANNUO MEDIO € 958 + € 150 GREEN CREDIT = € 1.108

KINTO GO

Un prodotto industriale non si vende. Si «affida». Perché è un digital asset, non una macchina.

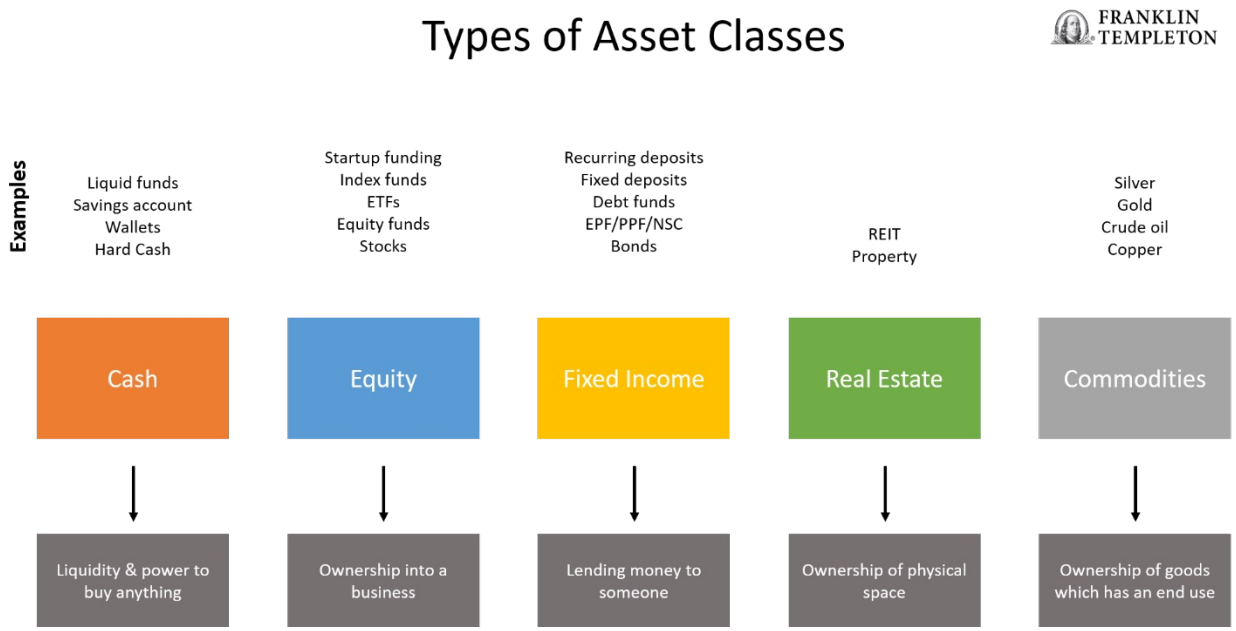
Vendere prodotti è effetto puntuale e transazionale, stipulare patti di servizio è un atto continuo di processo. Il nuovo concetto di commerciale/vendita è passaggio **da atto transazionale a atto processivo.**

Cambia il sistema di incentivi: la metrica della performance basata sul fatturato è distorsiva.

E se smettessimo davvero di vendere prodotti?

E' ora di creare e gestire una nuova asset class

Vendere prodotti è effetto puntuale e transazionale, stipulare patti di servizio è un atto continuo di processo. Il nuovo concetto di di relazione con il mercato è passaggio **da atto transazionale a atto processivo basato su dati, servizi tecnici, veicoli finanziari e risk management.**



Come funziona nel settore aerospaziale?

Si vendono ore di volo e viaggi, non veicoli


DESIGNLINES | MILITARY & AEROSPACE DESIGNLINE

Aerospace Manufacturers Lead the Shift to Servitization

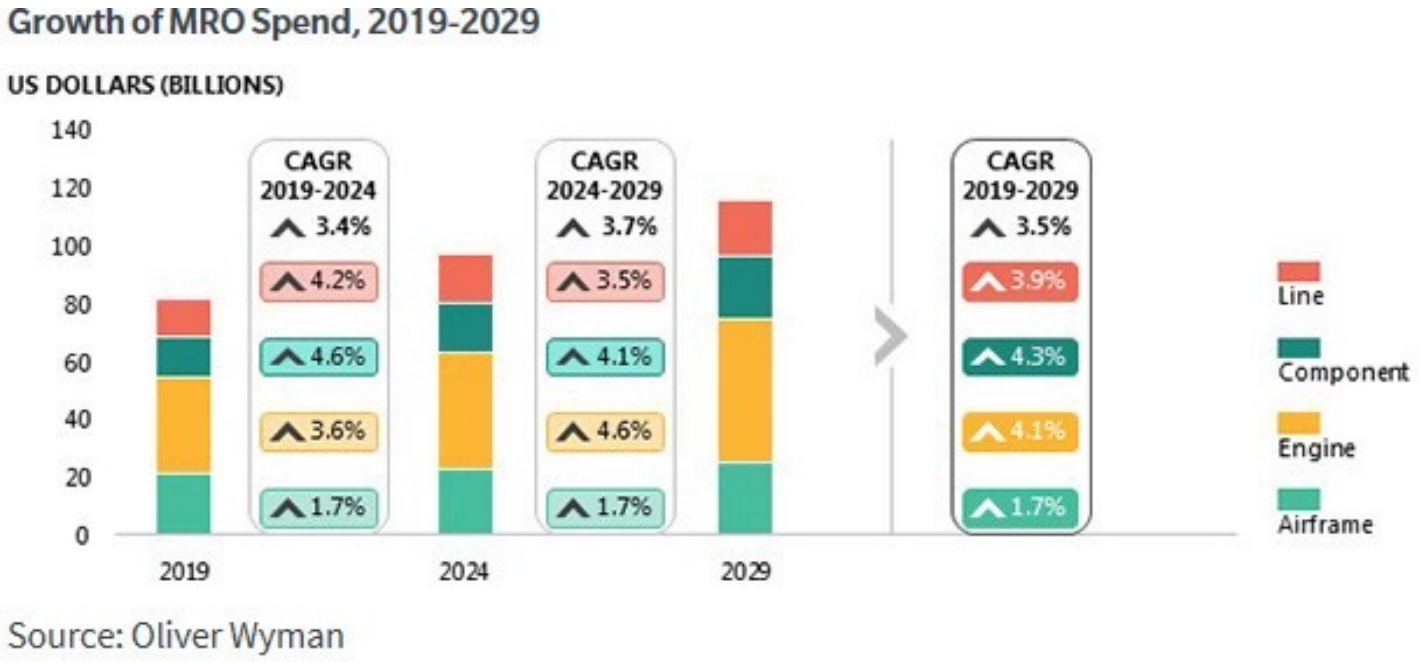
The research highlights the gap between customers' increasing demand for maximized product uptime and manufacturers' ability to deliver it, plus strategies for manufacturers to start meeting these new expectations today. Some key findings include:

- 98% of end users want to see more manufacturers provide service agreements that offer maximized product uptime
- However, only 33% of manufacturers currently offer service based on maximized product uptime today
- 51% of manufacturers indicated they have the infrastructure in place to support service models based on maximized product uptime, but still have more work to do to support this model, while only 25% of manufacturers indicated they can fully support service based on maximized product uptime today
- 58% of manufacturers believe customers would be willing to pay more for service agreements that guarantee maximized product uptime, while 57% of end users indicated an uptime guarantee would be worth the extra cost.

MRO spend in aviation industry is set to raise 41% in 10 years

“Product, it actually means more than just hardware, for what we sell, and have done for many years, that is our product expertise, our process technology in production, and our understanding of how the product works on engine level. /../ But I think 90% think of the hardware. And that is a problem in itself”.

The definition of product as hardware only, limits the value creation. It has its history from the traditional business models of selling engines rather than “power by the hour” and the increased value of availability that is recently happening in the aerospace industry.



MRO spend which is calculated to be $81.8bn in 2019 is expected to raise ~41% in next 10 years and forecasted to reach $116bn in 2029. (Source: Oliverwyman GLOBAL FLEET & MRO MARKET FORECAST COMMENTARY 2019-2029)

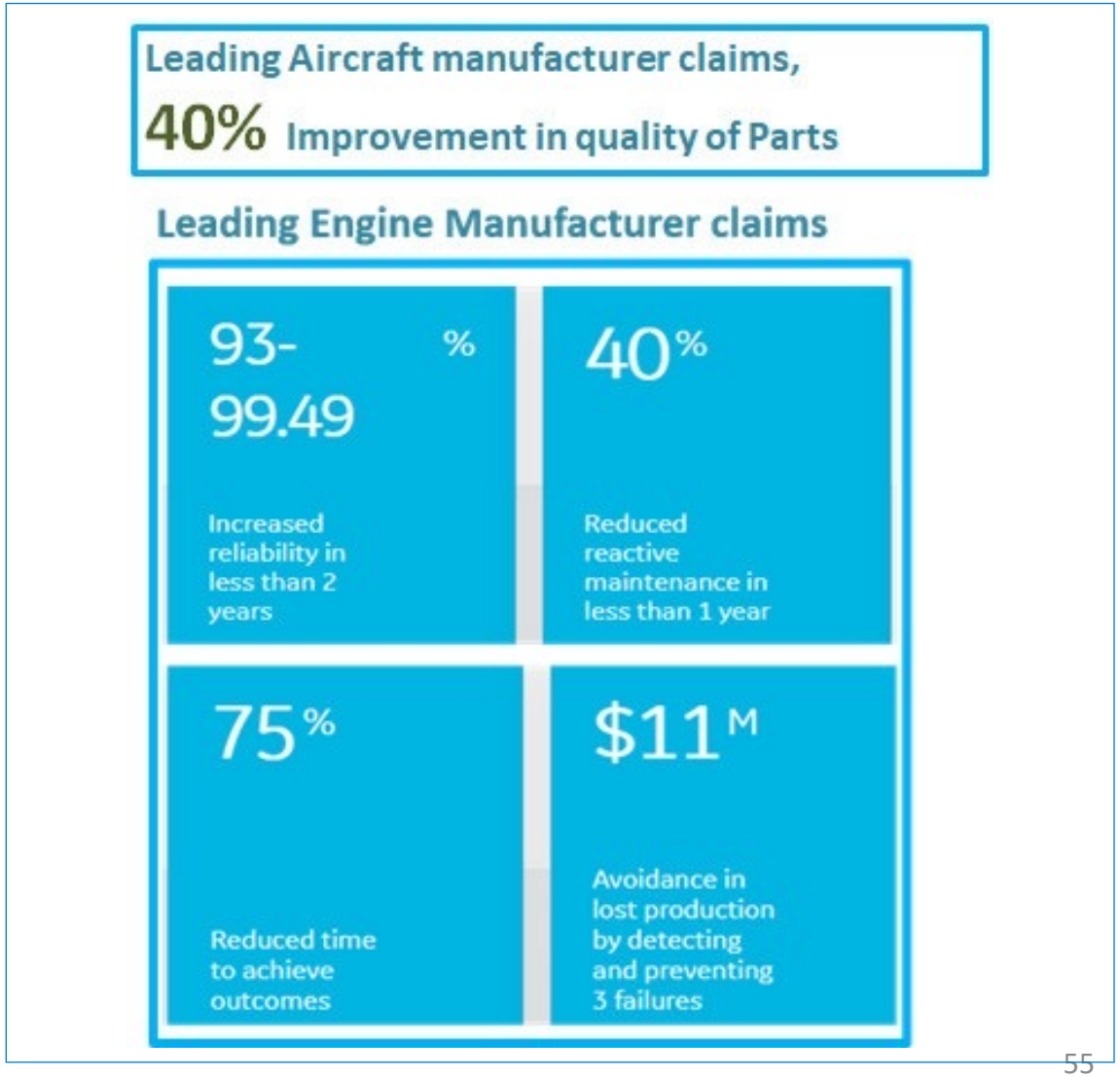
75% of OEMs use or plan to use Digital Twins of their assets

A survey by Gartner reveals that 75 percentage of organizations that use IoT, use Digital Twins or plan to do it in near future. Digital Twins is a digital replica of the physical assets. The digital assets along with the real time performance data collected from the sensors placed in the aircraft and its components can be used to simulate, predict and optimize the outcome or productivity of the physical asset or a process undergoing any kind of scenario.

GE collects and uses the data from its aircraft engines to create a unique model of specific asset, system, or process.

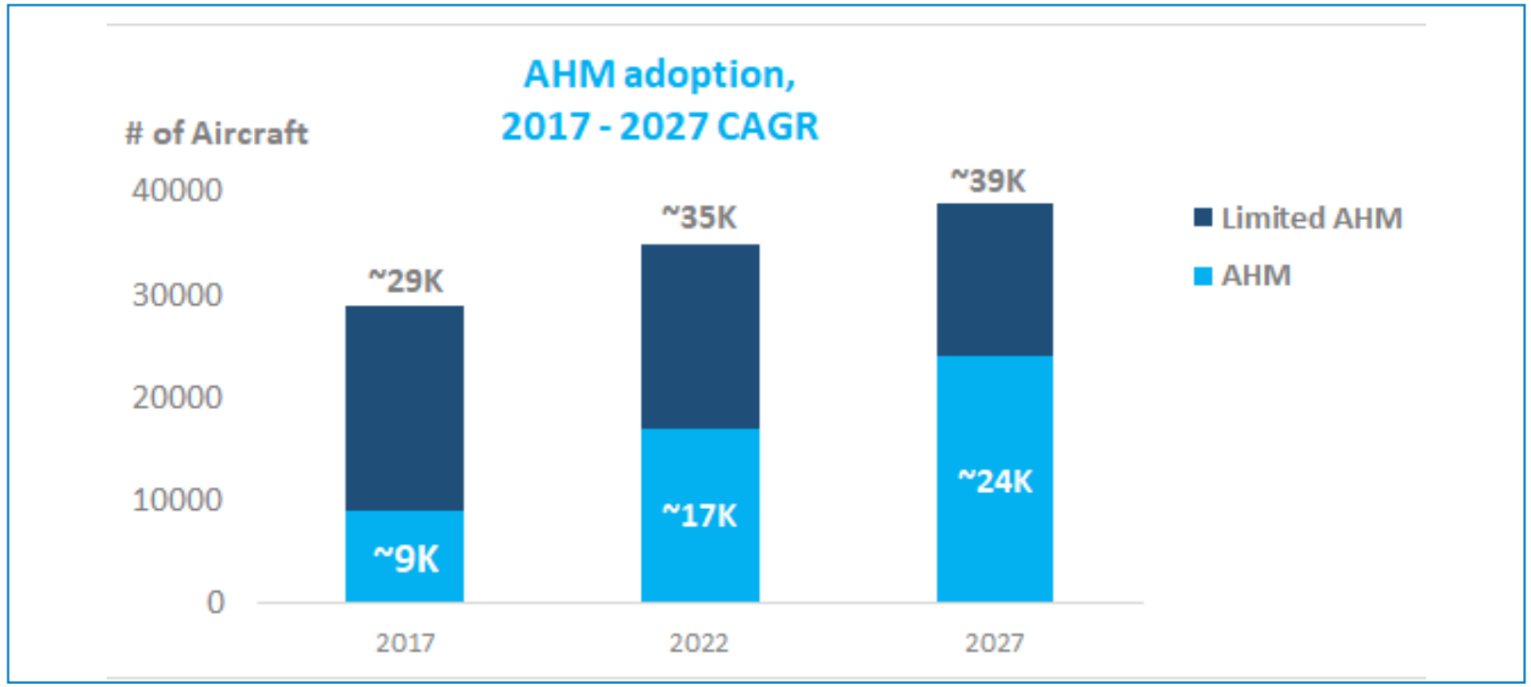
Analytics are then applied to these models to detect anomalies in the system. The twin determines a set of actions that can maximize the performance of the asset. These modeling and analytics are embedded in GE's Predix platform that allows to rapidly create or modify business services for customers. Boeing, Airbus and few more aviation manufacturers have implemented the Digital twin technology.

Benefits of using Digital twin technology



Source: *GE Digital, Boeing*

Boeing’s AHM servitization platform



Source: *“ICF - Big data; the race is on, but what is the end goal?” Presented by Joost Groenenboom – IATA 14th Maintenance Cost Conference*

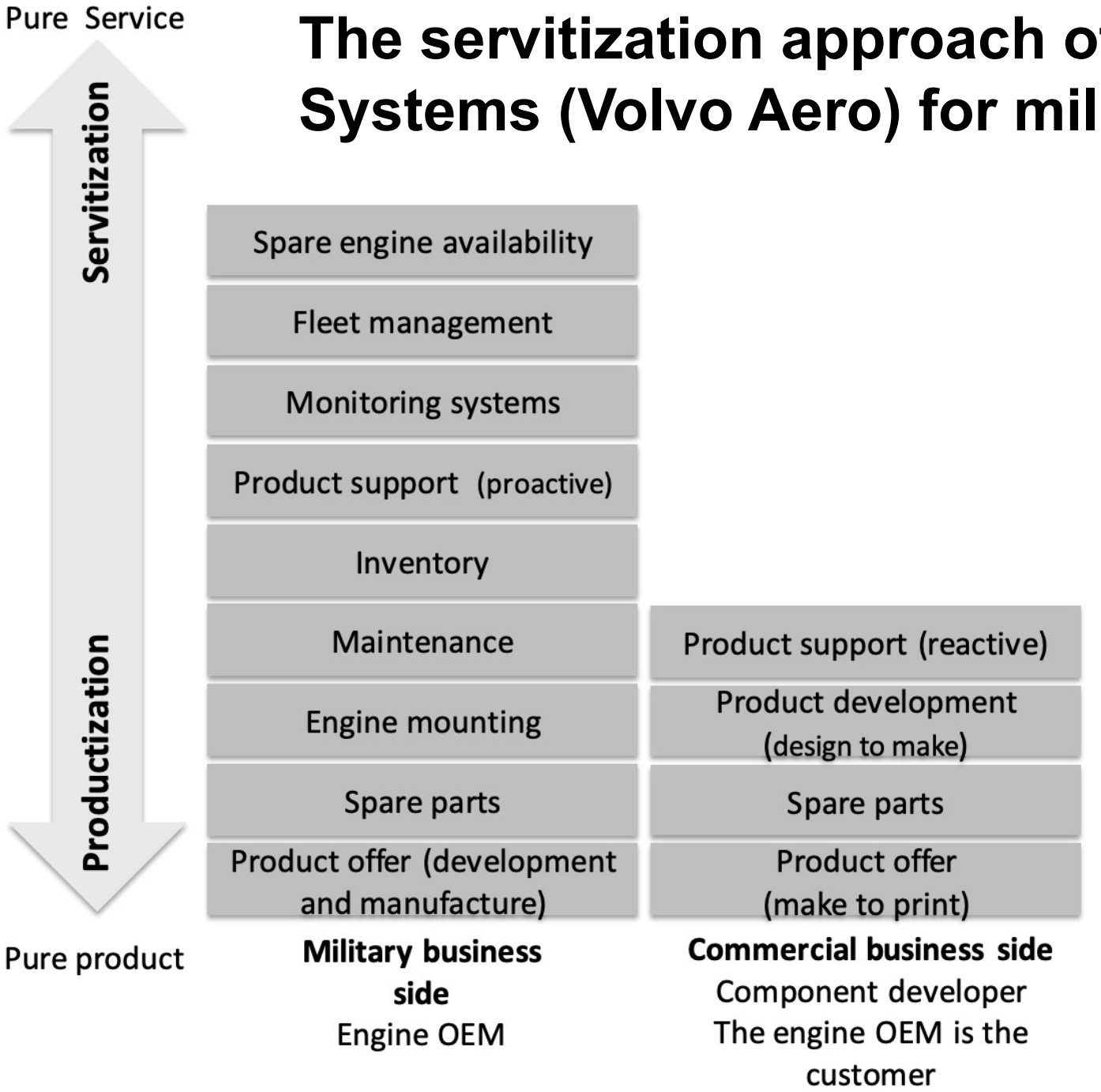
ICF forecasts that, by 2027 approximately 24,000 aircraft would be equipped with health monitoring solutions.

The Aircraft Health Monitoring (AHM) system is used to receive data from the aircraft to get real time alerts on the faults, warnings and cautions recorded on the aircraft during the flight. This system connects with ACMS/ECAM in the aircraft and with ACARS to receive operational and performance data. By monitoring these events, the airlines can pre plan their maintenance activities and perform suitable trouble shooting procedure to confirm or ignore any recorded failures. This helps to reduce the unplanned maintenance downtime and avoid AOG scenarios.

Boeing’s AHM solution provides this capability to its customers. The AHM solution collects the airplane data that can be analyzed to determine the serviceability and performance of the aircraft. It also notifies the anomalies recorded during the flight, for which the maintenance can be planned in advance to avoid the additional ground time of the aircraft. The outcome from this analysis can be used to make decisions on the maintenance requirements, designs and operational strategies to improve the overall fleet performance.

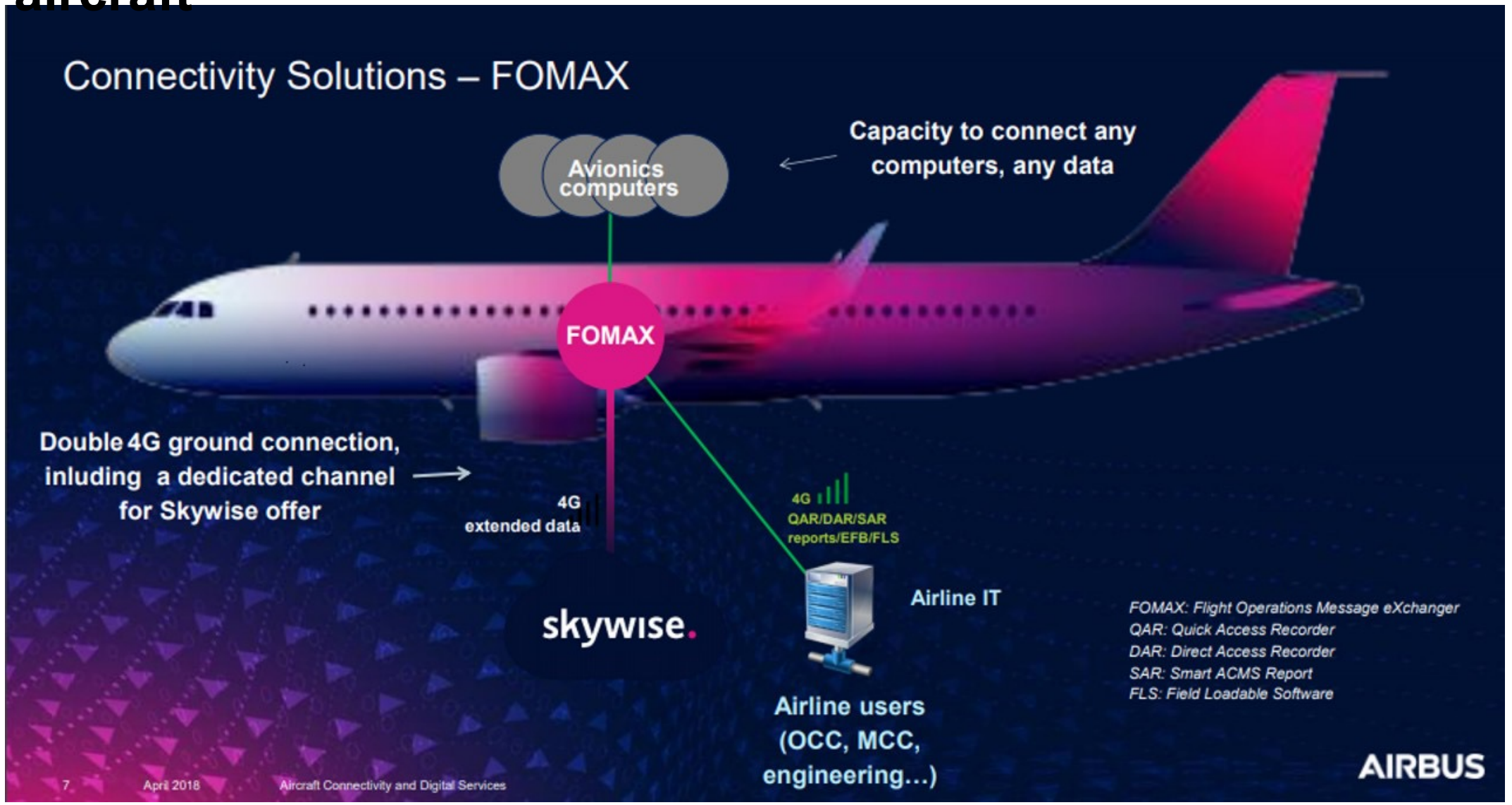
Boeing has also integrated this with their technical documentation solution to quickly access the troubleshooting and maintenance repair procedures. Other Manufacturer’s like GE, Rolls Royce and Bombardier also provide customer services using their own health monitoring systems.

The servitization approach of GKN Aerospace Engine Systems (Volvo Aero) for military and commercial markets



The case company GKN Aerospace Engine Systems (previously known as Volvo Aero). The company has three main businesses; First, the largest, the commercial market, where the company develops components to aircraft engines in partnership with the engine Original Equipment Manufacturer (OEM). The second market is the military, where the company develops the engines to the military aircrafts, such as the Swedish Gripen fighter. Thirdly, the company develops components and subsystems to European space rockets. In addition to product developments, the company provides services such as maintenance and product support

Airbus's FOMAX is capable to record and transmit up to 24000 parameters (30GB information per flight) from A320 aircraft



Airbus's SKYWISE open data platform provides access to sensors, manufacturing, operational and maintenance data

Data platform that provides the airlines access to a data lake containing different scopes of data related to the aircraft coupled with advanced analytics will enable them to monitor their fleet's performance, trends, alerts and build their own health monitoring KPI's to perform predictive maintenance activities.

The Maintenance Operations Control (MOC) center monitors the data continuously to predict the maintenance requirements thus eliminating the unplanned downtime and achieving maximum serviceable life of the component.

Airbus has introduced their open data platform "Skywise". Skywise provides its subscribers access to the sensor data, manufacturing data, operational and maintenance data of the aircraft. Using its analytical and report generation tools, the airlines can monitor and predict the maintenance requirements before any unplanned failure occurs.

Servitization on the land: Caterpillar & John Deere

SERVITIZATION

CASE STUDY

ALSTOM TRANSPORT

ALSTOM'S SERVICES OFFERINGS

MAINTENANCE

Maintenance services utilise Alstom's expertise in supply chain and industrial organization and its system engineering competency to provide train availability. Services range from accident repair, technical support and spare parts agreements to fully-outsourced maintenance whereby Alstom takes all responsibility for technical risk, allowing the operator to concentrate on their own core business

SUPPORT

The competencies that Alstom has developed in order to deliver outsourced maintenance are also available as support services to operators. These services include training, e-documentation, obsolescence management, asset management, dept design, recycling and integrated fleet support

MODERNISATION

These services address some of the customer's key concerns about future proofing, competitiveness and business sustainability. They support the customer with life time extension, energy consumption and comfort. Services are designed around: energy saving, diesel upgrades, hybrid trains, signaling, passenger experience and accessibility

PARTS AND REPAIRS

Alstom provides day-to-day support and technical assistance for operators who carry out their own maintenance. Services help customers with: spare parts, repairs, availability, overhaul and test benches

ALSTOM'S ADVANCED SERVITIZATION CONTRACT WITH VIRGIN TRAINS WEST COAST

One of Alstom's most well-known customers is the rail operator Virgin Rail Group, with whom it has an advanced services contract. In 1999, Virgin won the franchise to operate a service on one of the major rail routes in the UK, the West Coast Mainline from London to Glasgow, on condition of it replacing all of the existing rolling stock. Virgin agreed a contract with Alstom for a brand new type of tilting train, the Pendolino, along with a full maintenance offering to support this brand new (and therefore arguably risky) technology. The relationship between Alstom and Virgin continues today, The key features of the contract are all designed to focus on results that are directly relevant to Virgin's core business of moving people on trains.

In order to deliver a contract like this, Alstom has invested heavily in facilities and technologies. Its TrainTracer technology provides real-time condition monitoring and identifies problems before they occur. Alstom runs a number of trackside maintenance facilities in order that technicians can be as close as possible to a train with a problem and can rectify it as soon as possible, using the knowledge gathered from the condition monitoring. This 'pit stop' approach helps to decrease immobilisation time- for which Alstom would be penalised because the customer would suffer.

Alstom built in-house a drive-through scanner for trains that monitors key consumables such as wheels and brake pads, automating the preventive maintenance task of examining the train. Trains would previously go into a depot every 30 days for inspection by up to 15 people. Now they are inspected every 3 days using the scanner. It also commissioned what it called the 'largest and most sophisticated' rolling stock refurbishment facility in the UK, a 13 000 m2 plant in Widnes, used initially to undertake the significant task of repainting all of the Pendolino trainsets operated by Virgin Trains West Coast,

CONTRACT FEATURES

KPIs

Alstom is contracted to present 51 viable trains to Virgin every morning and ensure these are available for 18 hours per day. Trains have to be clean and have all customer-facing features (such as toilets and catering) in working order

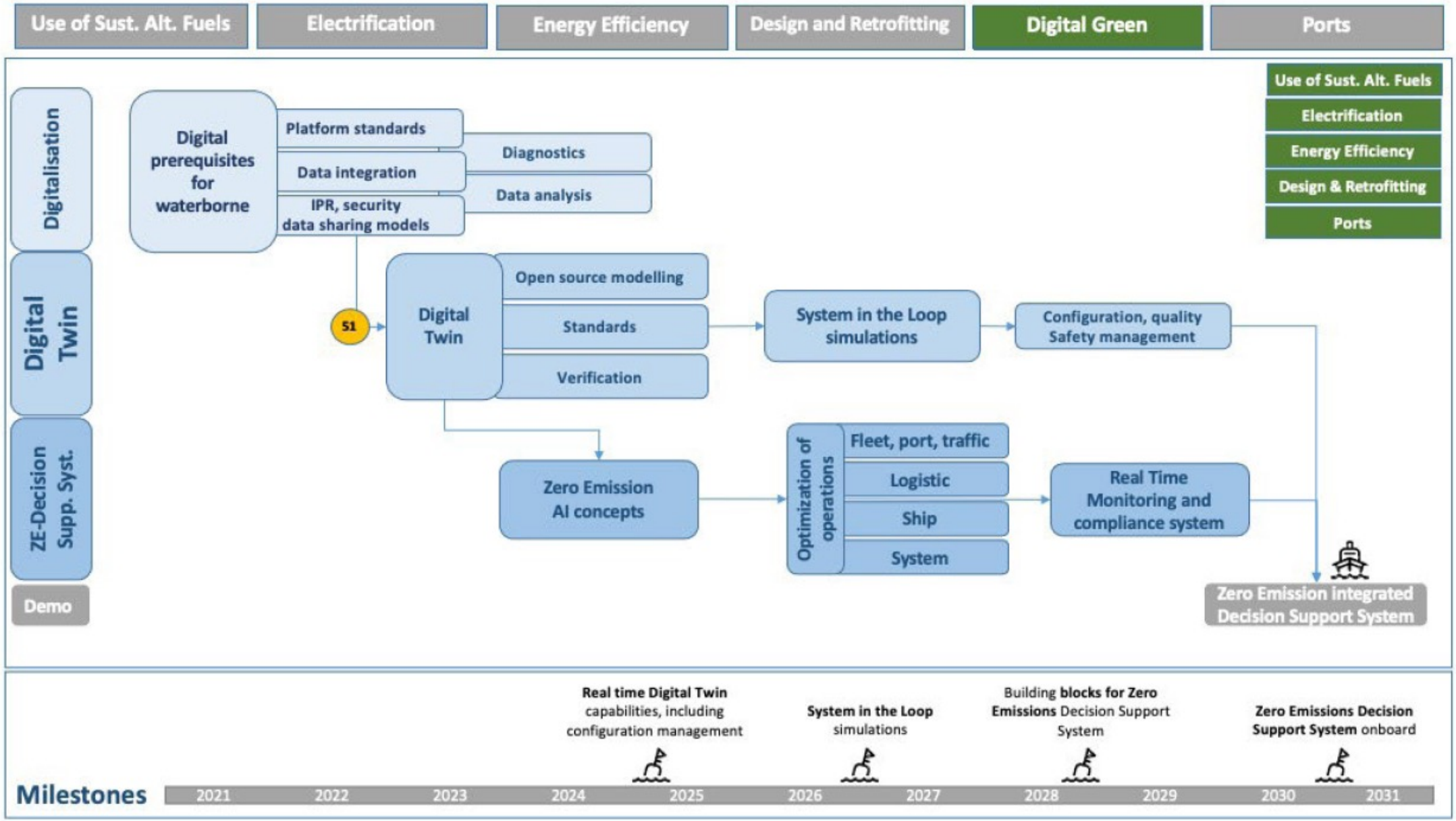
PAYMENT

Alstom is paid on the basis of pence per mile traveled by the trains

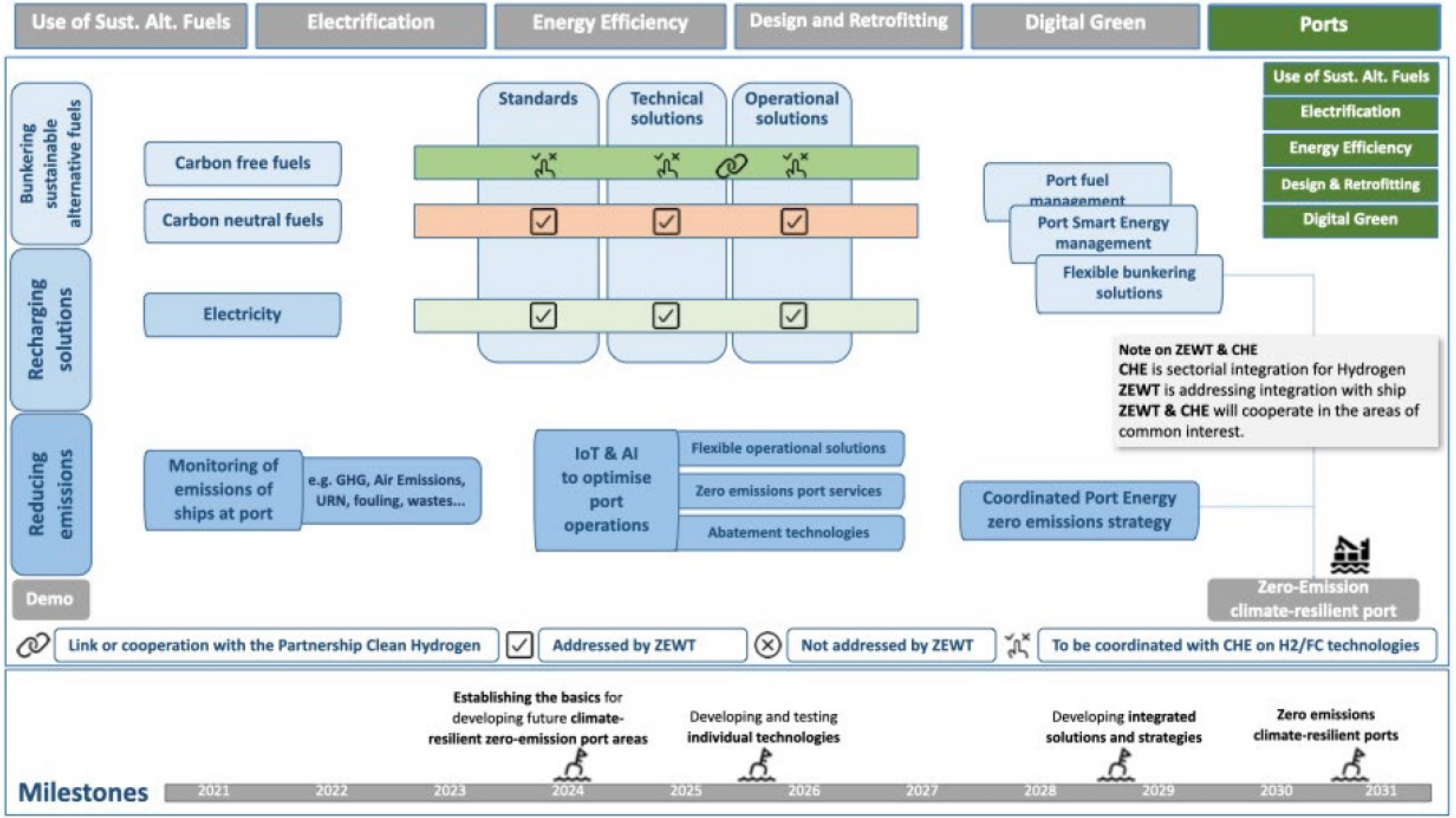
PENALTIES

Since Alstom takes on the risk of technical failures, it receives penalties if trains are delayed or canceled due to technical or maintenance problems

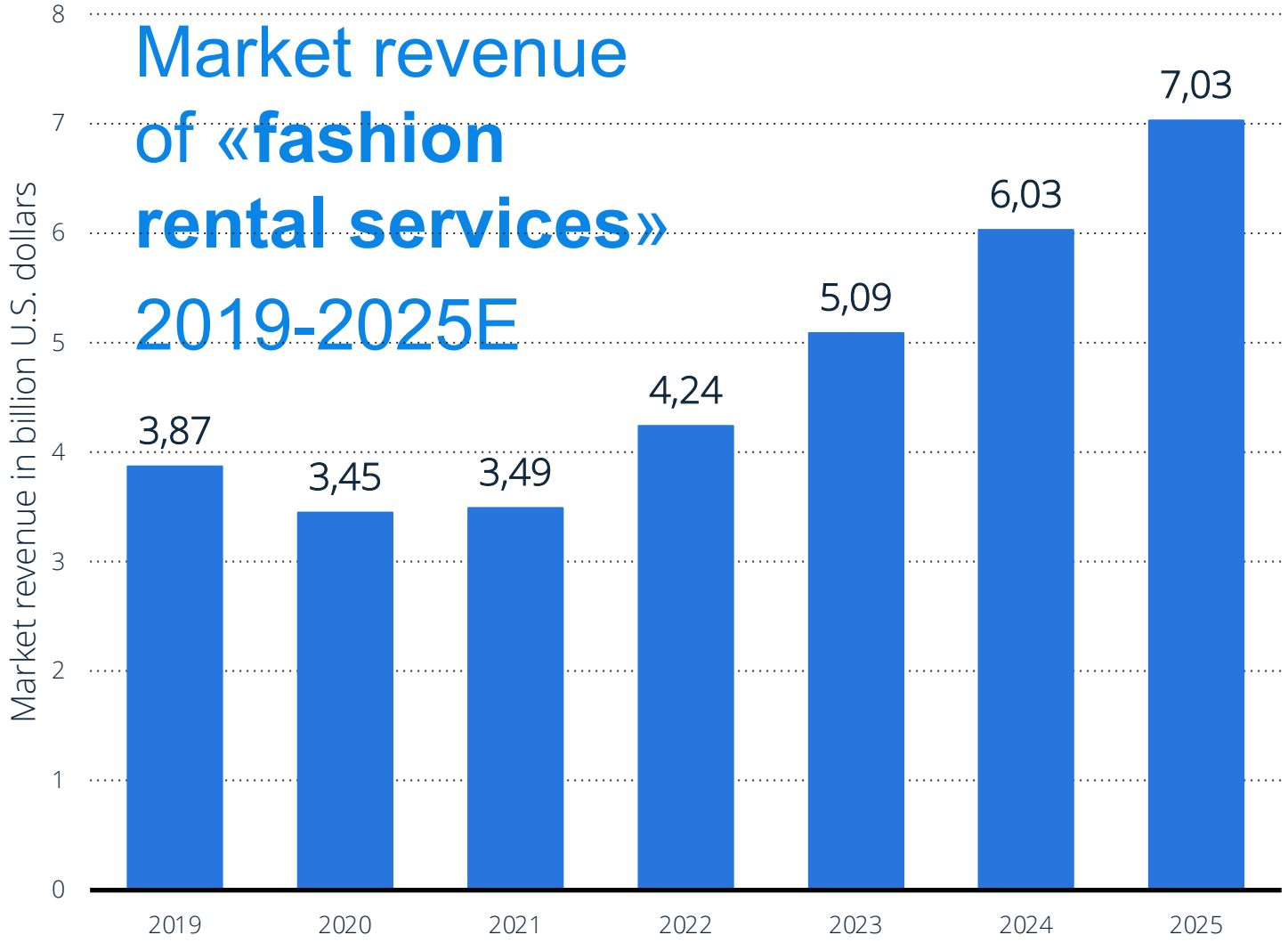
Digital Green & Digital Twin

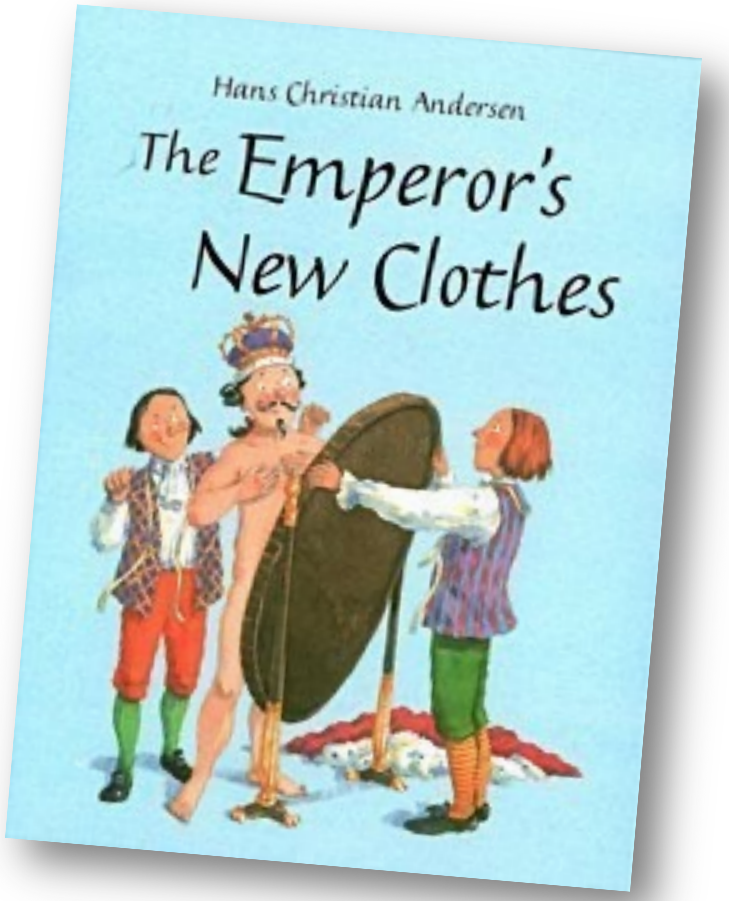


Ports & Infrastructures



The Emperor’s New Clothes are no longer new

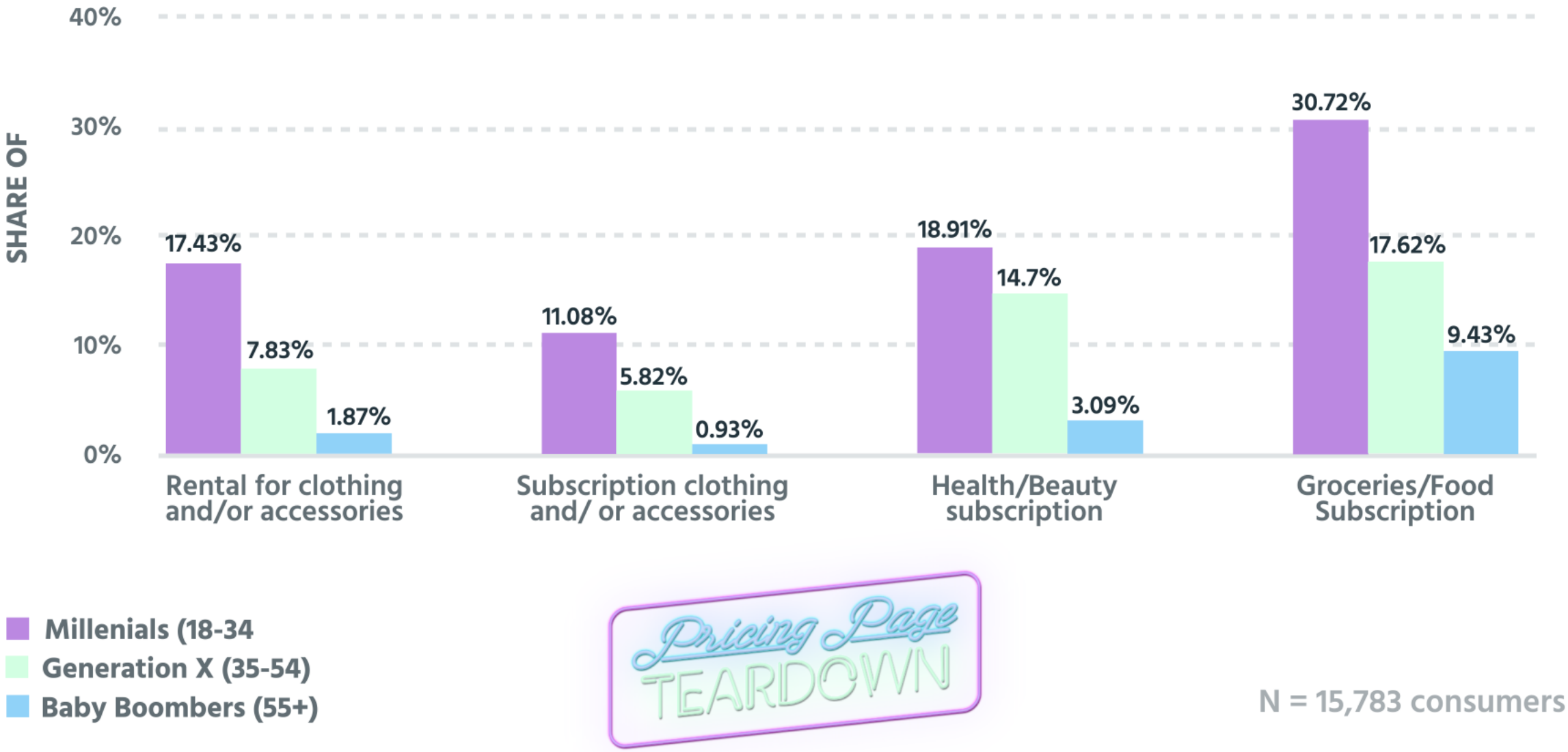




Note(s): Worldwide; as of 2020.
Source(s): Statista; ID 1195613

statista

Sorry, Boomers: Millennials and Generation X are “subscribers”, not “consumers”



An Unlimited Wardrobe on the Cloud

Rent-The-Runway is the largest laundry service in the world…

Business

Rent the Runway wants to replace your everyday wardrobe with its $89 monthly plan

Rent the Runway now has five stores, including locations in Washington, New York and Chicag
borrowed clothes. (Rent the Runway)

Sound. Inform

VOGUE

RUNWAY

Would You Quit Shopping If You Had an "Unlimited" Wardrobe of Borrowed Clothes?

THE NEW YORKER

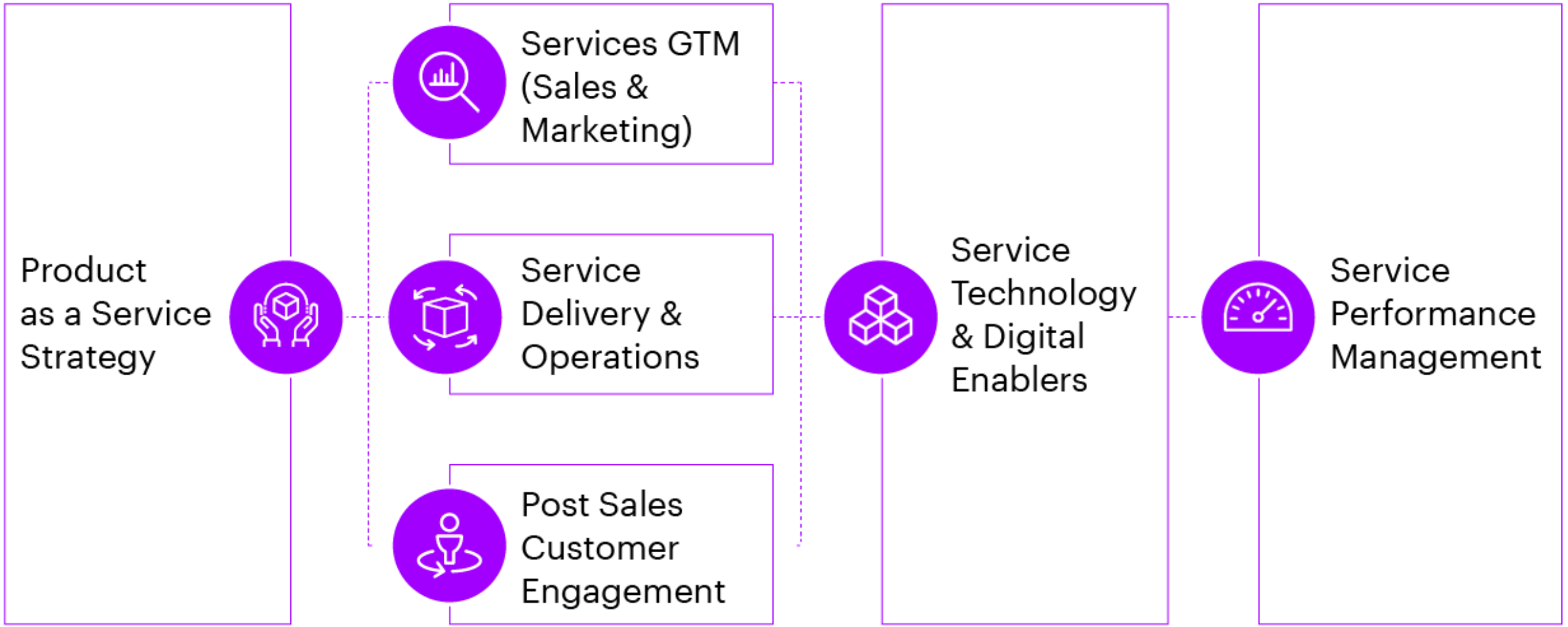
RENT THE RUNWAY WANTS TO LEND YOU YOUR LOOK

With its subscription service, the company has created an unusual hybrid of fast fashion and luxury. Will it stop you from buying new clothes?

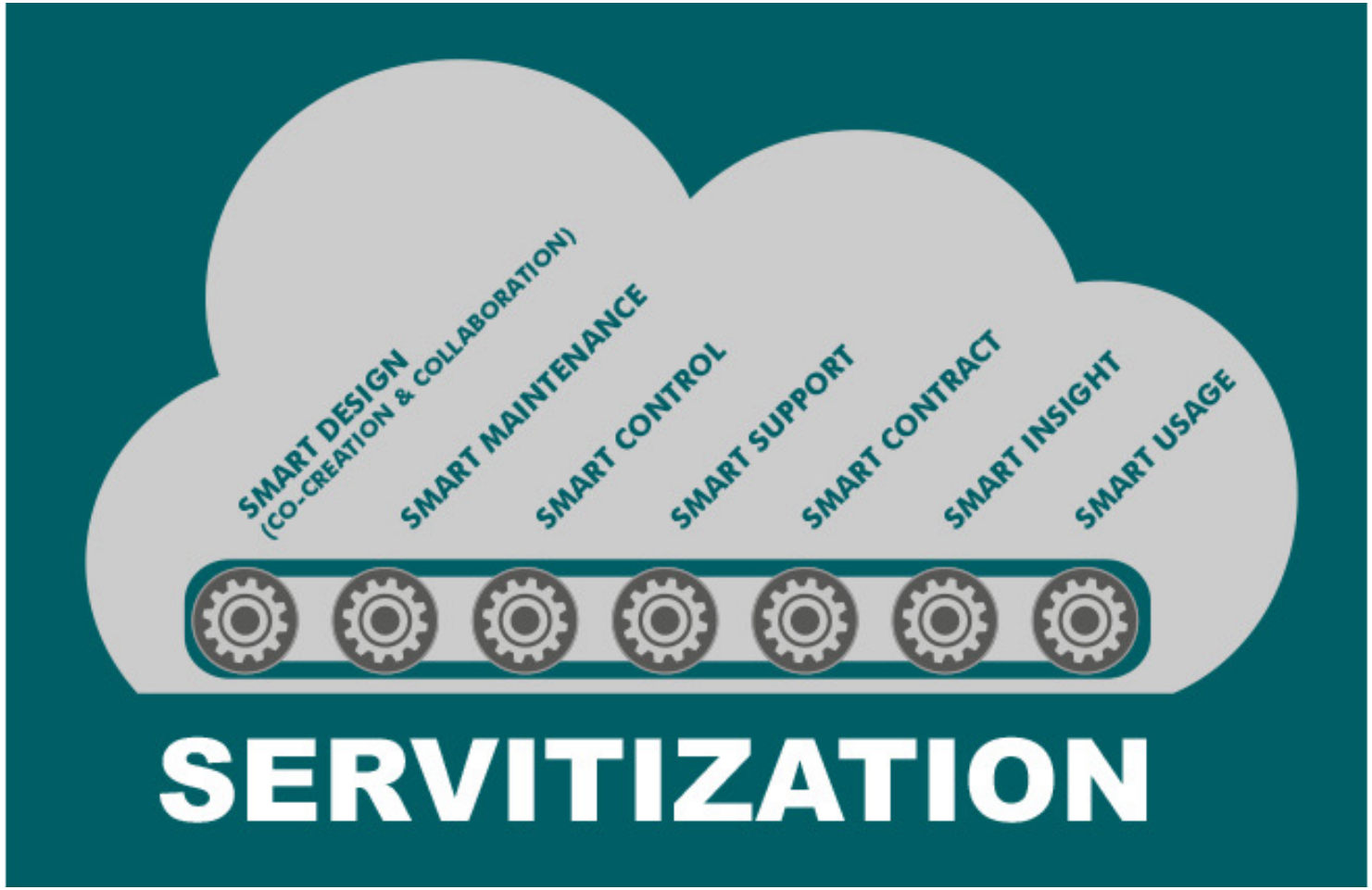
By Alexandra Schwartz
October 15, 2018

Many subscribers say that they have effectively stopped buying clothes. Illustration by Janne Iivonen

The building blocks of industrial servitization



Stop selling. Start «servitizing».



Il servizio è sineddoche dell'organizzazione

La servitization richiede di fondare una nuova fabbrica. Una fabbrica di servizi.

E i servizi sono una scienza applicata, non un accessorio dei prodotti.

Servitization industriale: key messages strategici

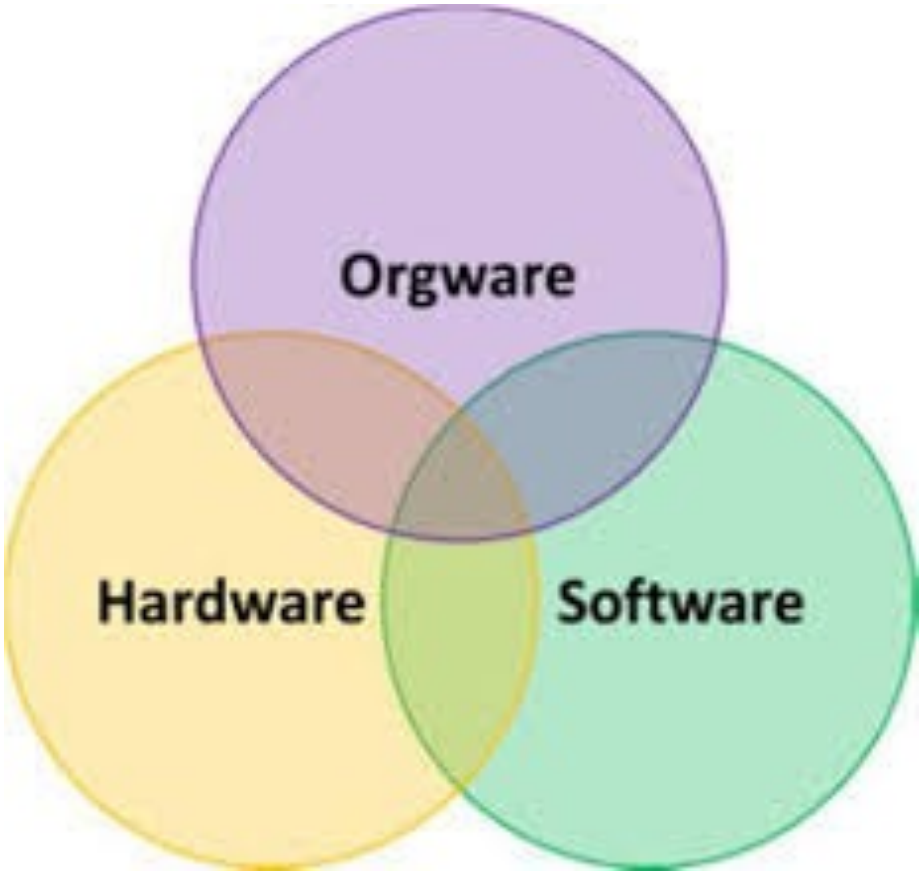
1. Servitization in manufacturing can help mitigating the risks in a changing pattern of globalization and macroeconomic policies.

2. Digital Manufacturing is a strategic answer to environmental and sustainability challenges, making industrial processes more accountable.

3. Industrial digitalization triggers business model evolution by reshaping your organizational borders to connect with new value chains

Benvenuti nell'Era dell'ORGWARE

- **Hardware**: taylorismo e fordismo
- **Software**: formalizzazione dell'informazione tecnica
- **Orgware**: interoperabilità dei processi industriali



Thanks!

Arrivederci…

Prof. CarloAlberto Carnevale-Maffè
Bocconi University School of Management
Email: carloalberto.carnevale@sdabocconi.it

Twitter: @carloalberto

Temi

- La Servitization deve diventare una nuova asset class finanziaria, ibrido di bond con tranching di rischio: la tranche junior va fatta sottoscrivere al cliente.
- Differenziale di costo del capitale tra OEM e utilizzatore: servitization come arbitraggio sul costo del capitale e sul valore residuo dell'asset, nonché sui costi dei beni intermedi (materiali, consumables, energia e utilities, ecc.)
- Agency problem nell'utilizzo dell'asset, da indirizzare con allineamento degli incentivi (caso WeHybrid)
- Fattori di risk management sul valore dell'asset (Asset Lifetime Value), sul suo riutilizzo/recupero a fine vita utile
- Ruolo dei dati (proprietà, diritti di accesso e uso, sicurezza)
- Disponibilità dei complementary asset necessari ad assicurare l'OEE al cliente: personale, competenze, indivisibilities (stock di know how, macchinari, etc.)
- Tema della certificazione dell'impatto ambientale del macchinario
- User personas per gli utilizzatori di macchinari e impianti
- Servitization è una teoria dell'organizzazione estesa, e quindi ricade in tutte le tematiche caratteristiche delle organizzazioni, essendo ibridazione di una relazione di mercato con un rapporto organizzativo.