Merck KGaA, Darmstadt, Germany

Q1 21 Roadshow

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Agenda

Business overview

01

Group

Three high-tech businesses competing in attractive markets

Healthcare

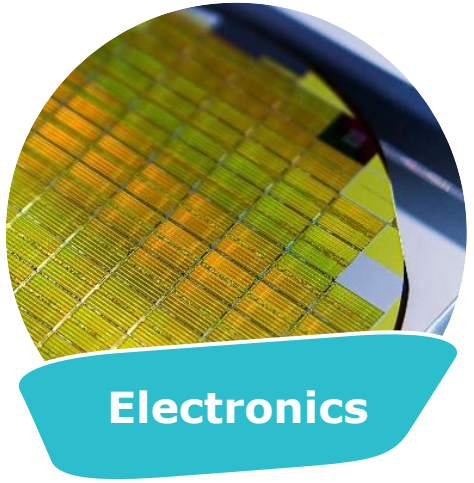
Leading in specialty pharma markets

- Biologics and small-molecule **prescription medicines** against cancer, multiple sclerosis, infertility
- **Research** focus: Oncology, Immunology & Immuno-Oncology
- **Successful portfolio management:** e.g. divestment of Consumer Health and Allergopharma

Life Science

Leading life science company

- Tools and services for **biotech research & production**
- **Tools and laboratory supply** for academic research and industrial testing



Electronics

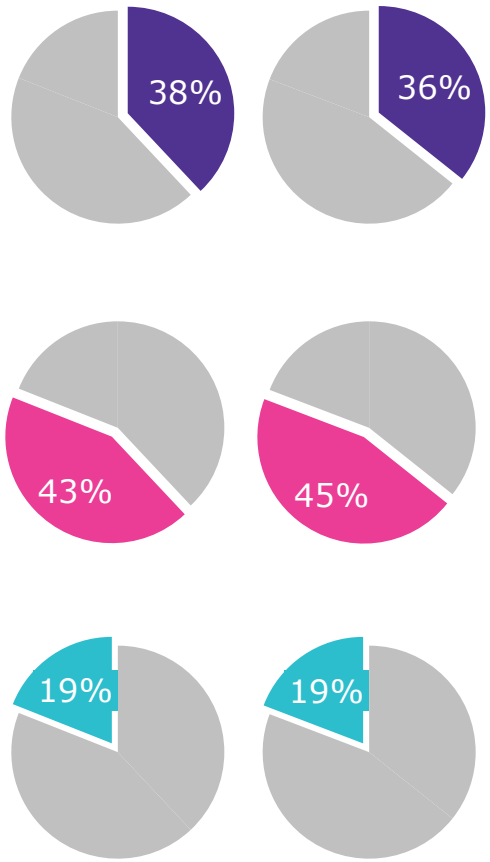
Leading company in high-tech solutions

- High-tech solutions and materials for **electronics**
- BroaMattd portfolio of **decorative and functional solutions**

Group today – three strong pillars as basis for profitable growth

FY 2020 contribution to[1]

	Sales	EBITDA pre
1. Healthcare	38%	36%
2. Life Science	43%	45%
3. Electronics	19%	19%



1. Healthcare

Global specialty innovator poised for above-industry growth

- **Resilient core business** backed by excellent life cycle management
- **Strong growth** from new products, late-stage pipeline assets with blockbuster potential
- **Rigorous cost discipline** and value-maximizing pipeline prioritization

2. Life Science

Diversified industry leader poised for above-market growth

- **Portfolio advantage** and outperformance drive above-market growth
- **Strengthen core**: products (PS), chemistry (RS), lab water (AS)
- **Establish new pillars**: PS services, gene editing and novel modalities

3. Electronics

Leading electronics player poised for accelerating growth

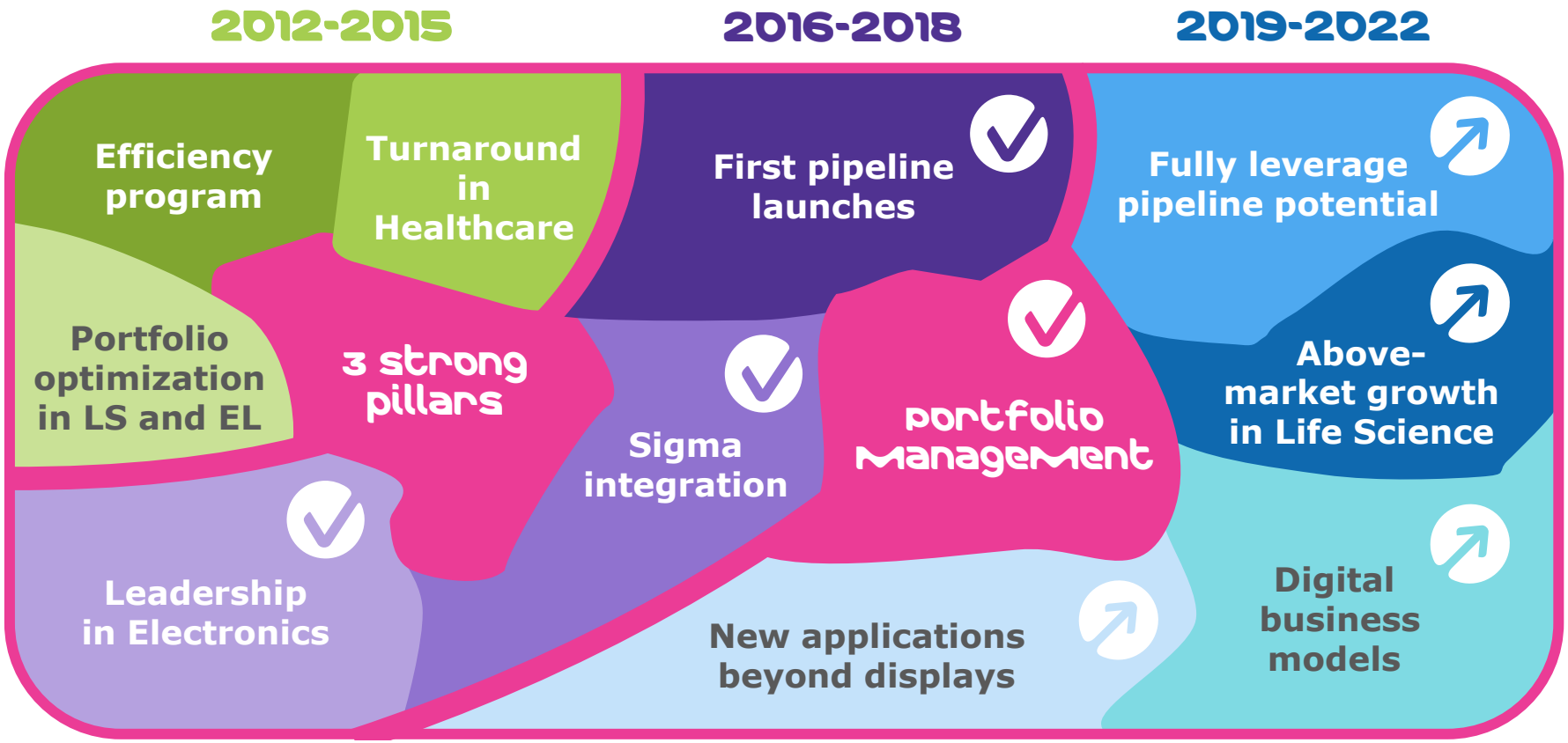
- **Growing semiconductor share** as key driver for acceleration
- **More resilient growth** through rising diversification
- **Strict cost discipline** in maturing parts of the portfolio

[1]EBITDA pre share excluding Corporate & Others; 2020 EBITDA pre restated for €365 m patent litigation provision release

Acronyms: PS = Process Solutions, RS = Research Solutions, AS = Applied Solutions

Group

The 2016 vision – a strategic agenda until 2022

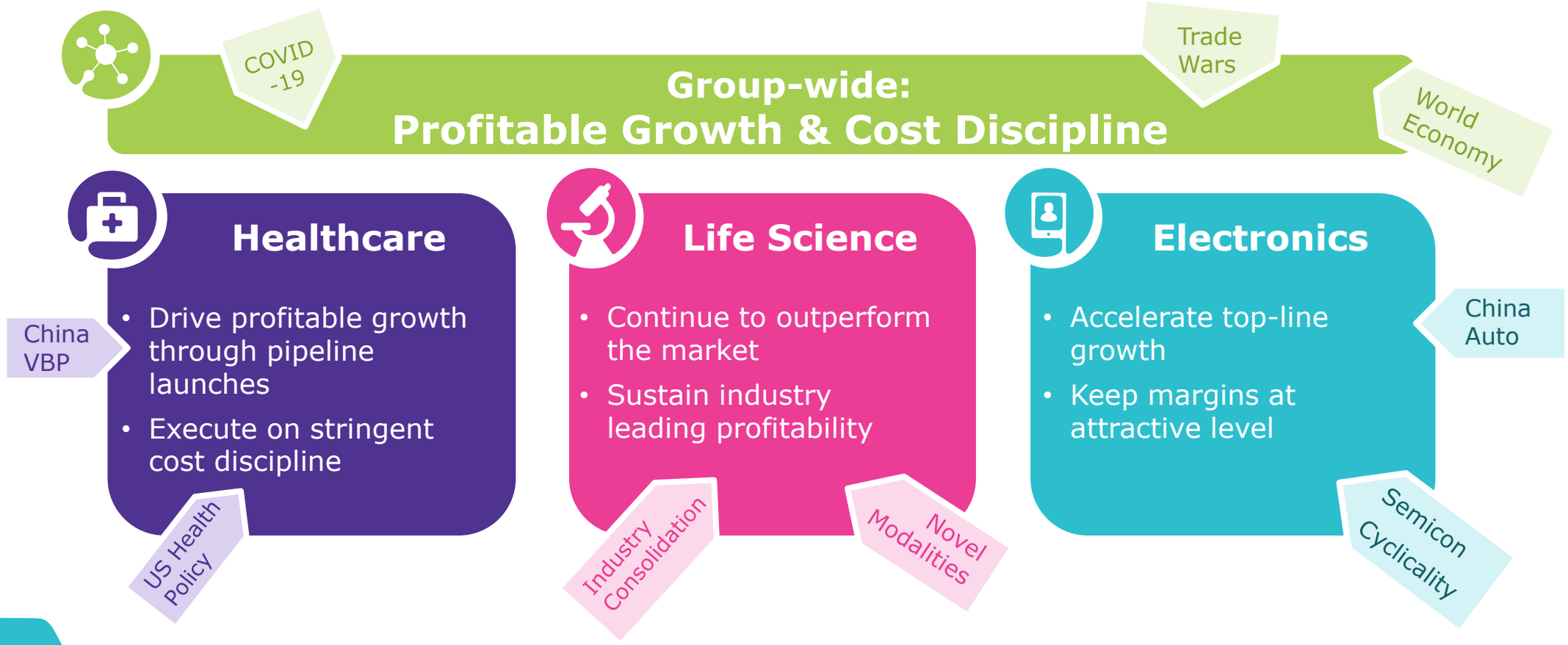


Executing on the growth and expansion phase of the 2016-22 strategic agenda

✓ = delivered; ↗ = well on track

Group

2021 and beyond – poised for growth in a challenging environment



Staying on course in a potentially volatile environment

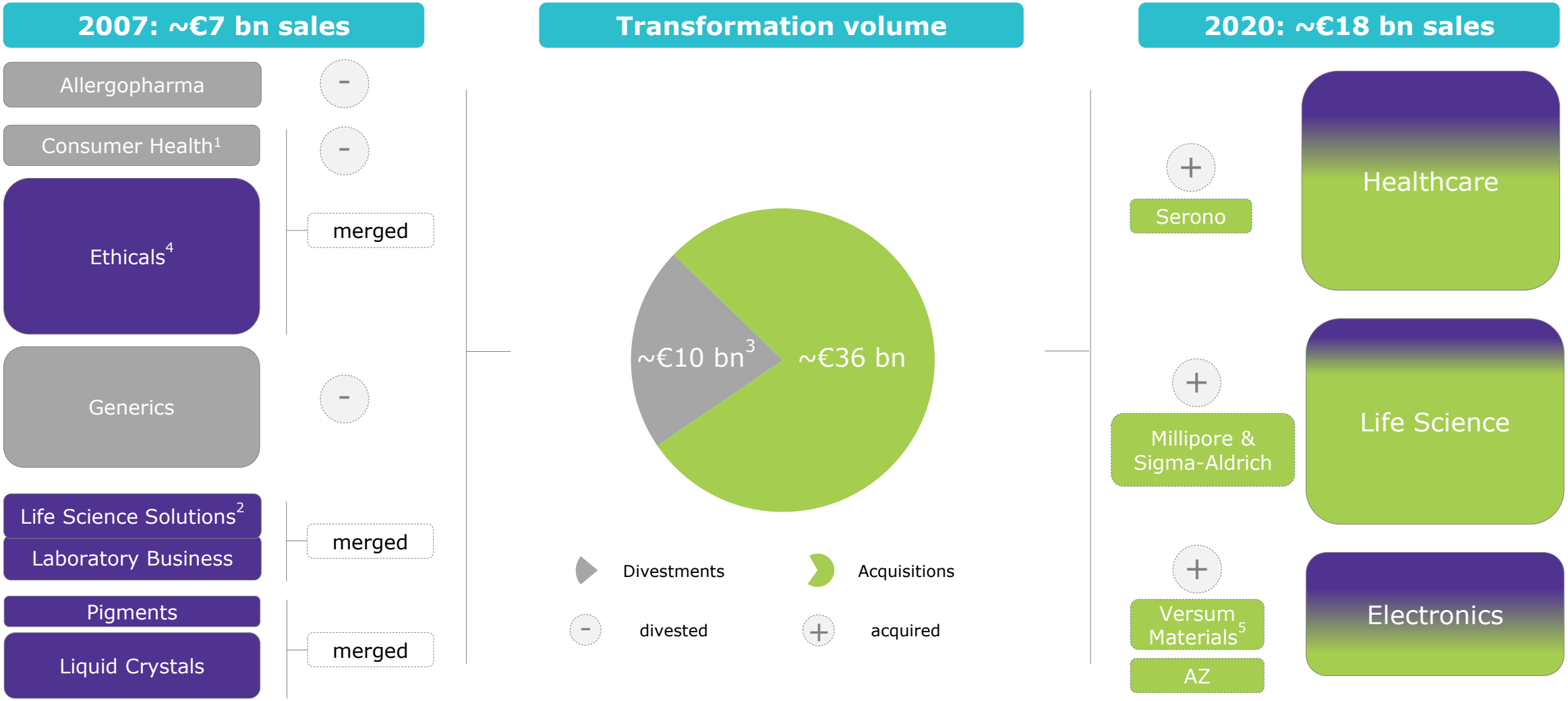
Acronym: VBP = volume based procurement

02

transforming the company

Group

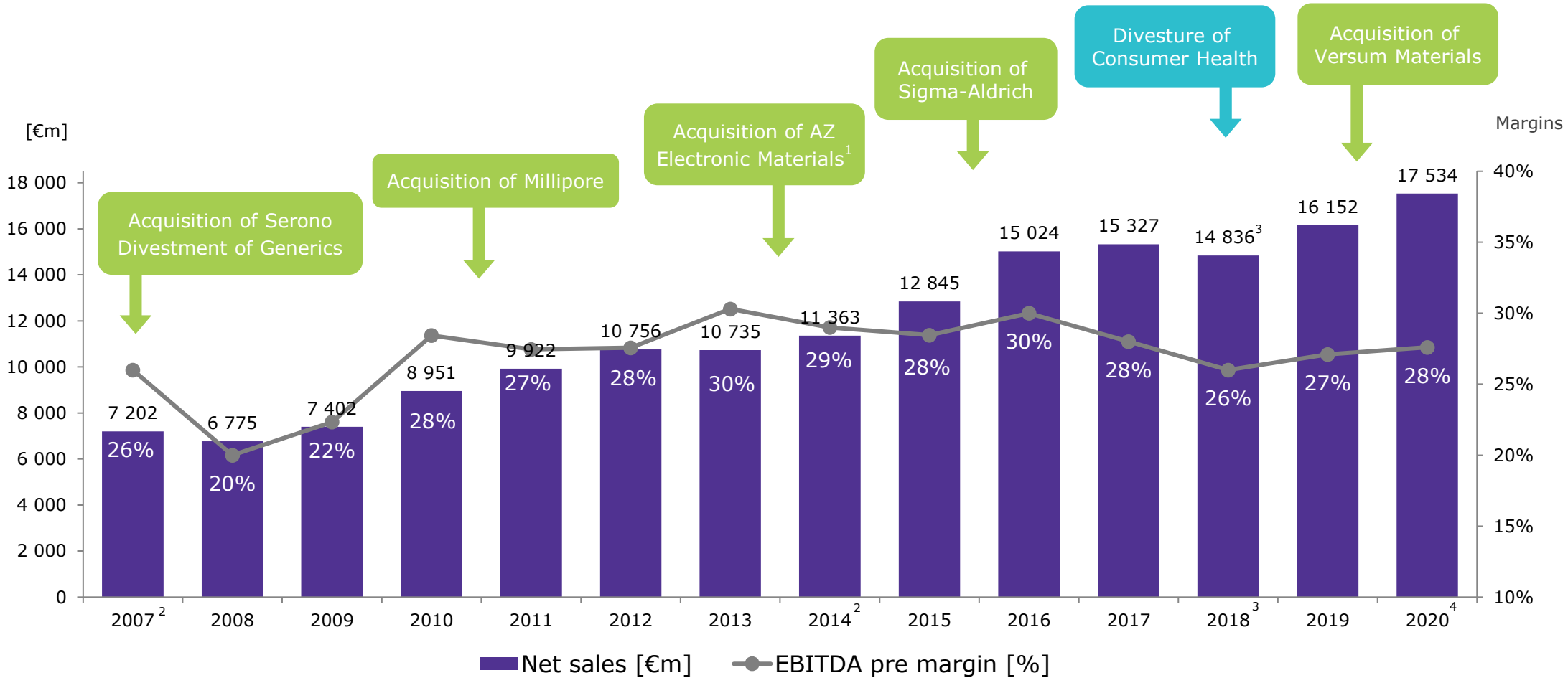
We have added scale and strengthened the attractiveness of our portfolio



[1]Closing of sale of Consumer Health at a cash purchase price of €3.4 bn completed as of December 1, 2018; [2]Excluding "Crop Bioscience", which was divested; [3]Profroma divestment volume includes cash proceeds for Consumer Health; [4]Excluding "Theramex", which was divested; [5]Closing of acquisition of Versum Materials at a purchase price of €5.8 bn completed as of October 7, 2019

Group

Continue to transform to a science and technology focused company



[1]Included since 2 May 2014; [2]2007 and 2014 EBITDA pre margin adjusted for comparability; [3]2018 net sales reflect Consumer Health divesture (reduction of ~€1 bn net sales p.a.)
[4]2020 margin restated for €365 m patent litigation provision release

Group

All three business sectors delivering on their strategic priorities

Healthcare

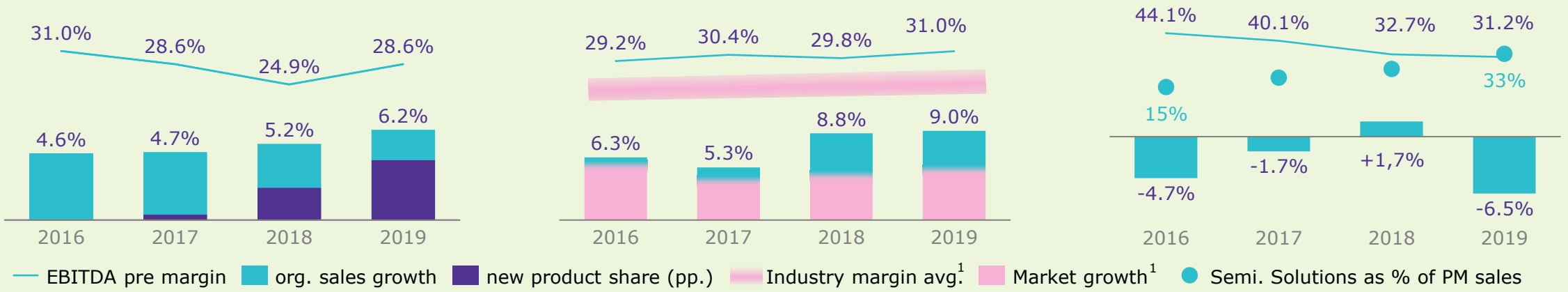
- **Accelerating organic growth** with rising contribution from launches (Mavenclad®, Bavencio®)
- **Margin trough behind, pipeline progressing** well

Life Science

- **Above-market organic growth** paired with **industry-leading margin**
- Significant **growth investments** (organic, inorganic & partnerships)

Electronics

- Significant portfolio change **towards higher growth business** (Semi, OLED)
- **Margin stabilizing** at ~30% amid sound execution of Bright Future

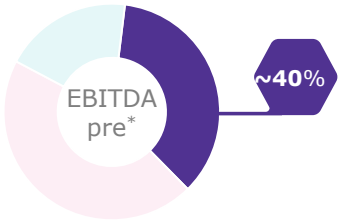


[1] Company estimate based on industry data and reporting by peers

Group

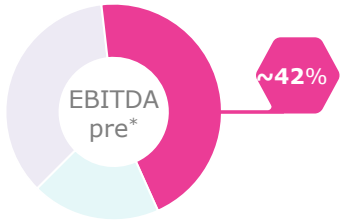
Clear set of priority goals

Healthcare



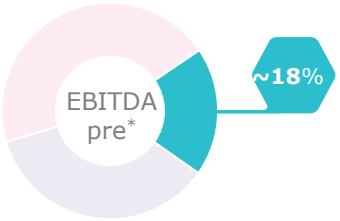
- Deliver on ambition to keep core business at least stable until 2022
- Transition from investment to earnings phase by 2019
- Foster successful Bavencio® and Mavenclad® ramp up
- Stringent pipeline execution

Life science



- Strengthen position as differentiated player in a highly attractive market
- Maintain consistent above-market growth trajectory and superior profitability

Electronics



- Deliver ambition of 3-4% CAGR
- Implement 5-year transformation program and focus on seamless integration of Versum and Intermolecular; to deliver financial ambition of around 30% margin
- Maintain strong cash generation and cash conversion

*based on FY 2020

Group

Three-pillar structure – positioned to win in high-growth markets

Global economy[1]

Global GDP

~3% to 4%

End markets[1]

Global pharma industry
~4% to 5%

Global life science industry
~5% to 6%

Global electronics industry
~4%

Σ ~4% to 5%

Focus market areas[1]

Oncology: ~10%
Immunology: ~5% to 9%

Biologics: ~10% to 12%
Services: ~7% to 8%

Semi materials: ~4% to 6%

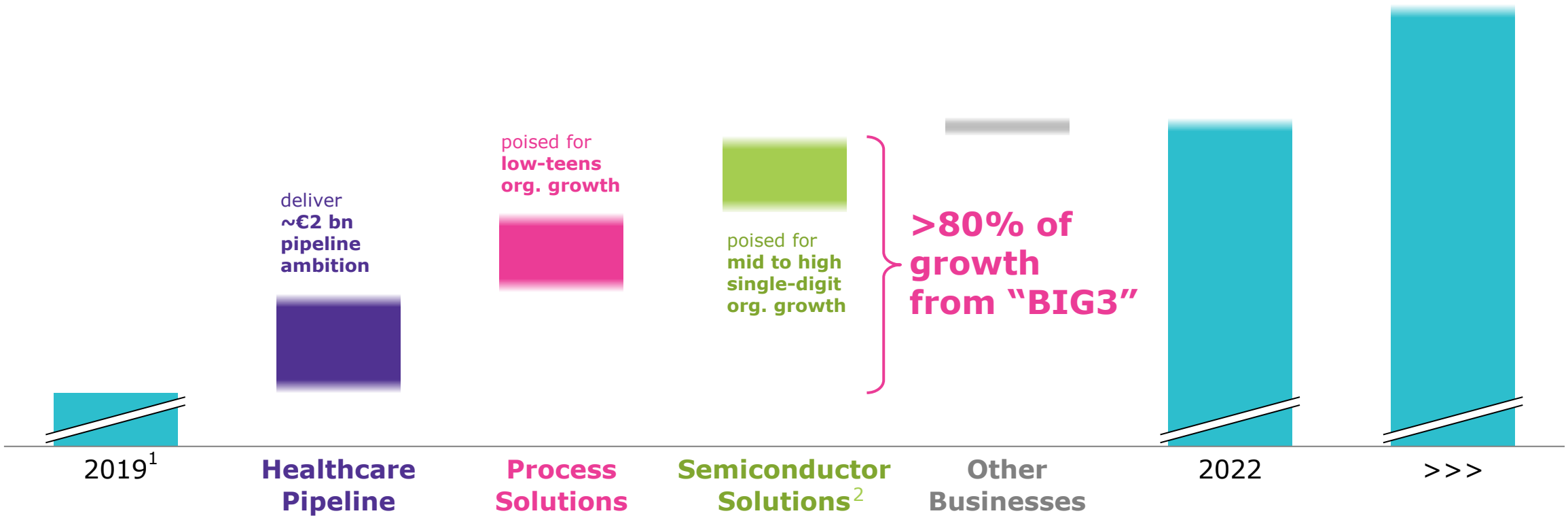
Σ 6%-plus

Purposefully positioned in attractive markets with secular growth above global GDP
…further focusing investments on attractive sub-segments

[1] Company estimates of mid-term growth outlook based on industry forecasts and reports from public research institutes (e.g. IMF, IQVIA, EvaluatePharma, Prismark, etc.)

Group

Three main drivers of growth to 2022 and beyond



Beyond 2022: further significant growth potential from "BIG3" and increasing contributions from other businesses

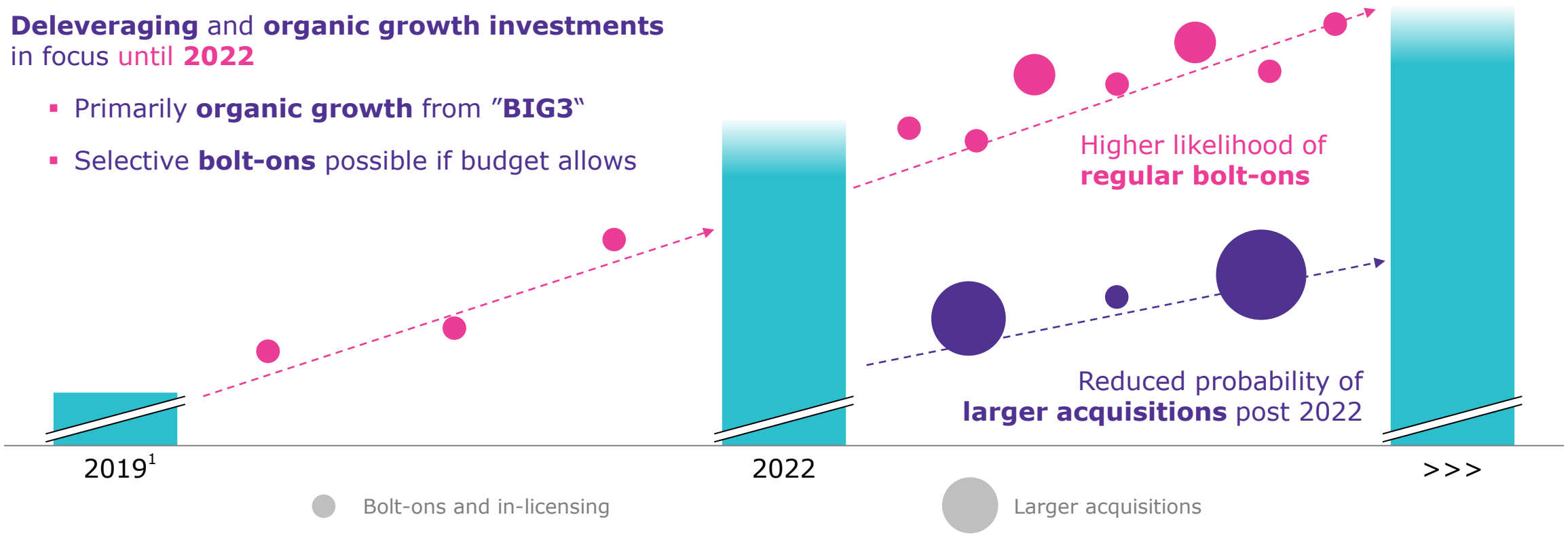
[1] 2019 Group sales of €16.2 bn; [2] Including Versum portfolio effect

Group

Portfolio strategy – from transformation to evolution

Deleveraging and **organic growth investments** in focus until **2022**

- Primarily **organic growth** from "**BIG3**"
- Selective **bolt-ons** possible if budget allows



Strong portfolio: significant organic growth potential to 2022 and beyond
…and higher likelihood of regular bolt-ons post 2022

[1] 2019 Group sales of €16.2 bn

Healthcare

Executing on the earnings phase

03

Healthcare

Creating optionality through focused pipeline approach

Pipeline and launch progress supported by strong base

Pipeline quality

- Early stage pipeline fueled by **in-house innovation**
- Potentially **transformative late-stage pipeline** assets (Evobrutinib, Bintrafusp alfa)
- **Optimized risk profile** through strategic partnerships (Pfizer and GSK), in-licensing (pivotal-stage Xevinapant) & focused externalization

Launch activity

- **Mavenclad®** approved in >80 countries including the U.S.
- **Bavencio®** launched in MCC[1], RCC[2], and UC 1L/2L[3]
- **Tepotinib** first-in-class approval of an oral MET inhibitor[4]

Strong core business due to **excellent life cycle management**

Mid-term outlook
Healthcare

~€2 bn pipeline sales & stable base business **until 2022** + significant **growth potential** beyond

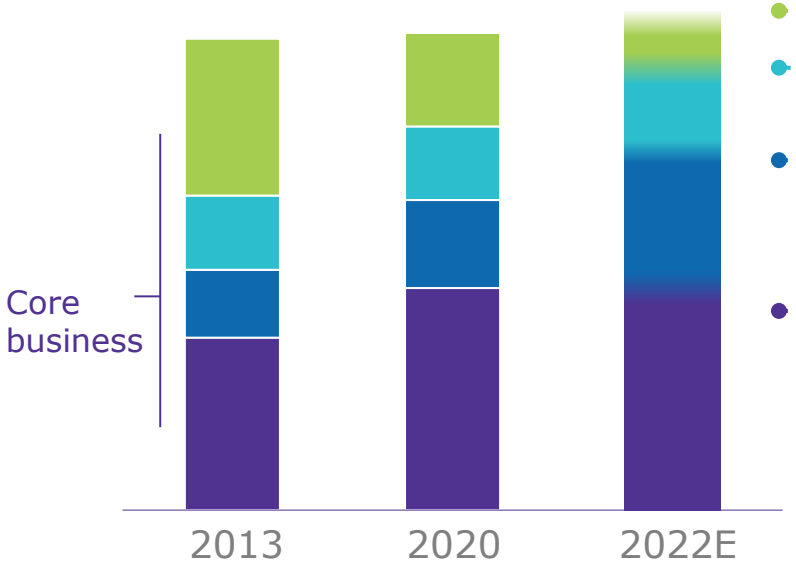
Confirming financial ambition of a **stable base business and ~€2 bn pipeline sales until 2022** with further significant **growth potential beyond**

[1] MCC = Merkel Cell Carcinoma, launched in all major jurisdictions; [2] RCC = Renal Cell Carcinoma, launched in all major jurisdictions; [3] UC = Urothelial Carcinoma, 1L = first line, 2L = second line, launched in all major jurisdictions; [4] approved in Japan and U.S.

Healthcare: Base Business

Confirming ambition to keep base business at least stable to 2022

Healthcare base business net sales until 2022



Rebif®
Decline in line with interferon market

- Maintain solid track record of patient retention
- Integrate into joint franchise with Mavenclad®

Erbitux®
Stable to slightly growing

- Drive EM[1] growth and mitigate competitive / price pressure in EU by clear branding
- Continued China NRDL inclusion secured through successful renegotiation in late 2020

Fertility
Recovery as of mid 2020, mid single-digit growth beyond 2021

- Drug demand driven by emerging markets growth and demographics
- Leverage competitive strengths (e.g. broad and innovative portfolio, security of supply)
- Drive recovery after COVID-19

CM&E[2]
Stable in 2021, mid to high single-digit growth beyond

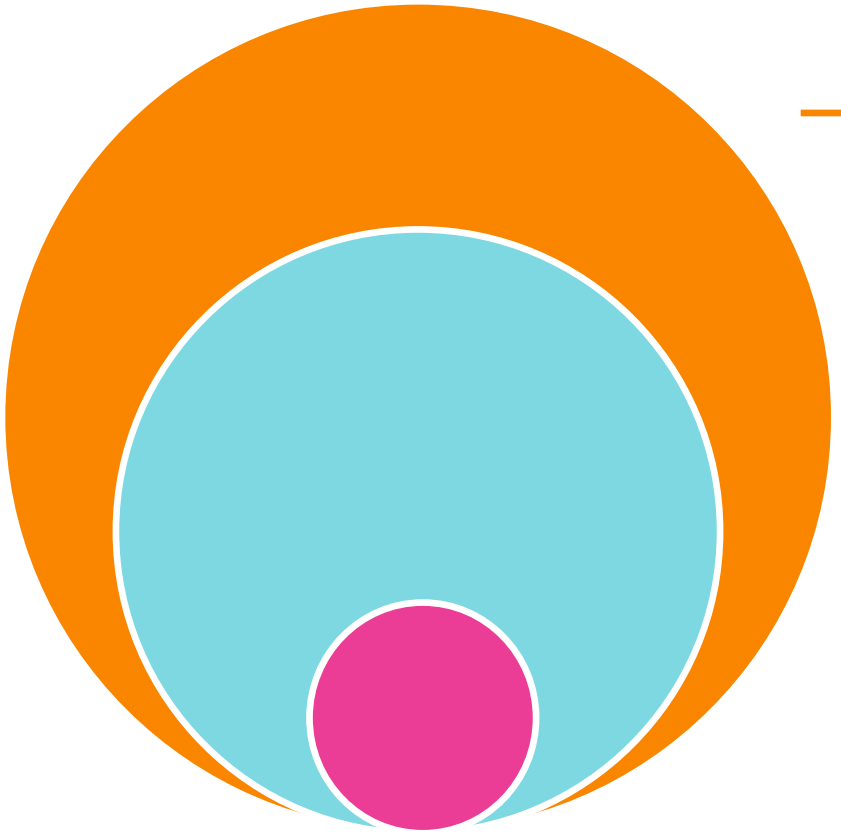
- Increasing prevalence of diabetes and cardiovascular diseases
- Mitigate VBP pressure in China through EM growth, effective life cycle management, and portfolio expansion

Core business with **36 consecutive quarters of growth** (Q2 2011 – Q1 2020)
Growth to **pick up after COVID-19 impact**, further **growth potential after 2022**

[1] EM: emerging markets; [2] Cardiovascular, Metabolism and Endocrinology (new Franchise name as of Q1 2021)

Healthcare: Sales from Pipeline

Mavenclad and Bavencio launches on track for ~€2 bn pipeline ambition in 2022



MAVENCLAD® (cladribine) tablets 10 mg

- Global peak sales: €1.0–1.4 bn
- Approved in >80 countries, including USA, EU, Canada and Australia
- Dynamic market volume still lags pre pandemic levels by ~20% but increased vaccination likely to drive market recovery and Q2 growth

BAVENCIO® avelumab Injection 20 mg/mL

- Approved for aRCC (USA, EU, Japan), mMCC (50 countries incl. USA and EU), and UC 2L (USA, Canada, Israel)
- Approved for UC 1L in US on June 30, 2020, in EU on January 25, 2021 and in Japan on February 24, 2021
- Phase III read-out remaining: NSCLC 1L (est. primary completion date: October 2021)

TEPMETKO® tepotinib

Tepotinib

- Approved in Japan on March 25, 2020 (Sakigake and ODD granted in 2018 & 2019)
- Approved in US on February 3, 2021 (granted priority review under RTOR)

Bintrafusp alfa

- Multiple potentially registrational studies across various tumor types ongoing

ILLUSTRATIVE - Not to scale;
Acronyms: BTD = Breakthrough Designation; ODD = Orphan Drug Designation; IA = Interim Analysis; RTOR = Real-Time Oncology Review; sBLA = Supplemental Biologics License Application

Independent real-world data (RWD) differentiates Mavenclad®

- A high-efficacy DMT that demonstrates **full antibody response to COVID-19 vaccination**
- **Differentiated vs. other high-efficacy therapies** in light of COVID-19 vaccinations for MS patients

Patient population		Total N=125	Protective humoral immunity[a]
DMT treated patients	**Mavenclad®**	**23**	**100% ($p = 0.99$)[b]**
	Ocrelizumab	44	22.7% ($p < 0.0001$)[b]
	Fingolimod	26	3.8% ($p < 0.0001$)[b]
Untreated MS patients		32	100%
Healthy subjects		47	97.9%

In the first-ever real-world data study of its type **all patients on Mavenclad® who received a mRNA COVID-19 vaccine were able to mount a full antibody response**, similar to healthy subjects and untreated people with MS, irrespective of lymphocyte counts[1]

DMT = disease-modifying therapy

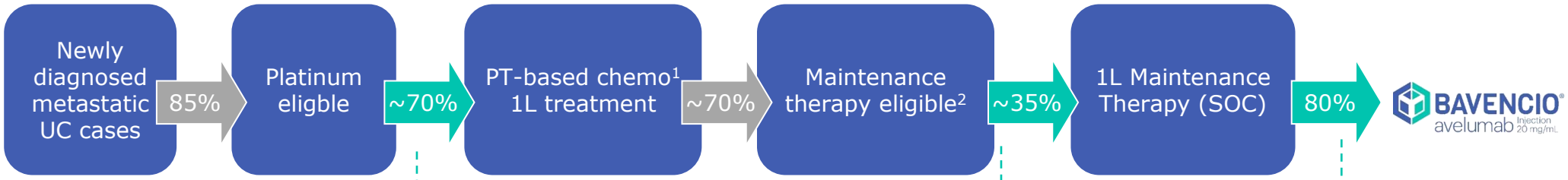
1.Achiron et al. Ther Adv Neurol Disord https://doi.org/10.1177/17562864211012835

[a]Protective humoral immunity defined as a index value higher than 1.1 using EUROIMMUN semiquantitiative ELISA for IgG specific for the recombinant S1 subunit of SARS-CoV-2 spike protein

[b]Fisher's exact test to detect differences in categorical variables between DMT-treated patients with MS and untreated patients with MS

Bavencio® UC 1L launch update: Significant opportunity to drive further growth by increasing the adoption of 1L maintenance therapy

U.S. - ~10 months into launch, on track to changing the SOC:



Growing share of PT-based chemo: increased from ~50% at launch and rising

Increasing adoption by academic centers with further growth opportunity among community oncologists

Dominant market share within indicated segment

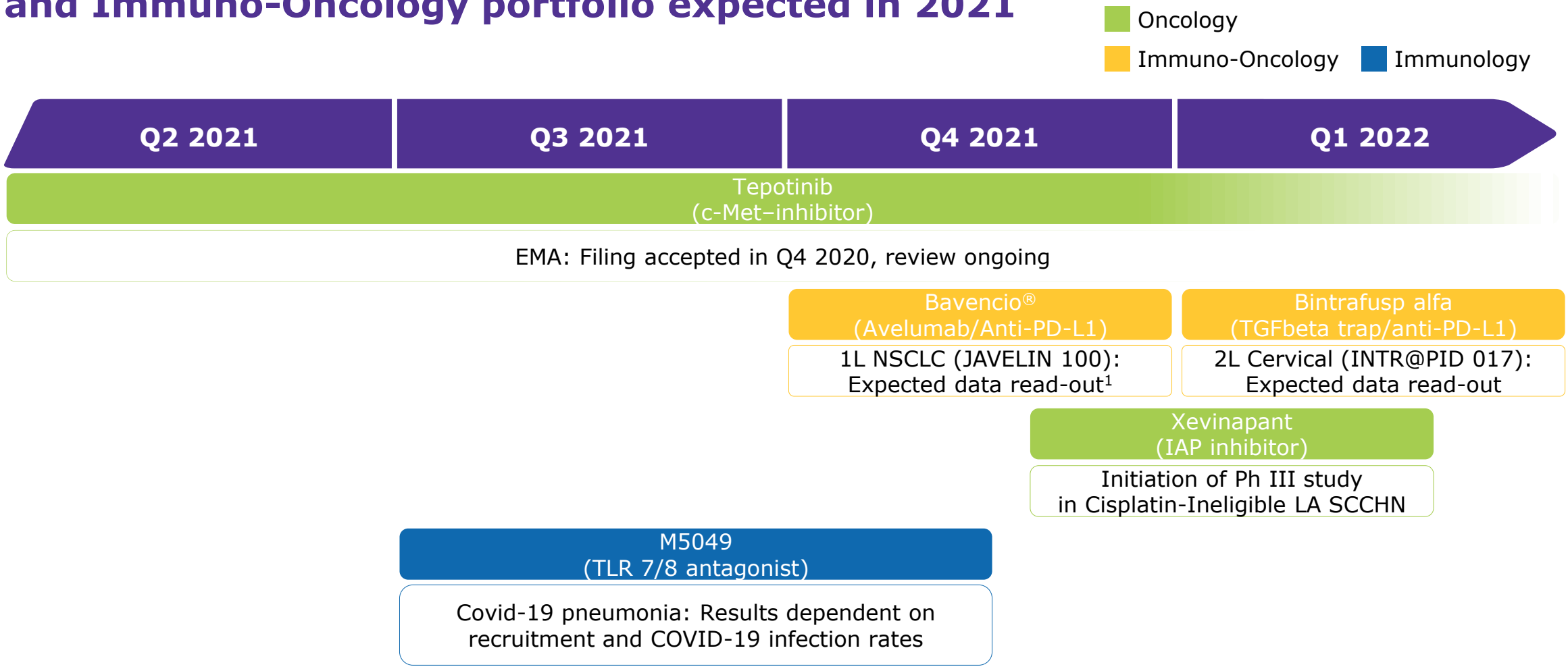
- Bavencio® maintenance treatment recently upgraded to category 1 level of evidence in NCCN guidelines as the only IO in 1L UC

Europe & Japan – Recently approved, promising early signals:

- Market access on track
- Strong initial uptake in key launch markets
- Recently recommended by EAU (European Association of Urology) guidelines (March 25) as the preferred treatment in 1L UC

1: Carboplatin or Cisplatin, 2: Complete / partial response or stable disease based on clinical trial data; Acronyms: PT = Platinum, SOC = Standard of care

Healthcare catalysts – Significant developmental progress across Oncology and Immuno-Oncology portfolio expected in 2021



Acronyms: EMA = European Medicines Agency, LA = locally advanced, SCLC = Small cell lung cancer, SCCHN = Squamous cell carcinoma of the head and neck, NSCLC = Non-small cell lung cancer, , TLR = Toll-like receptor, 1: Clinical timelines are event-driven and may be subject to change

Life science

Focusing on profitable growth

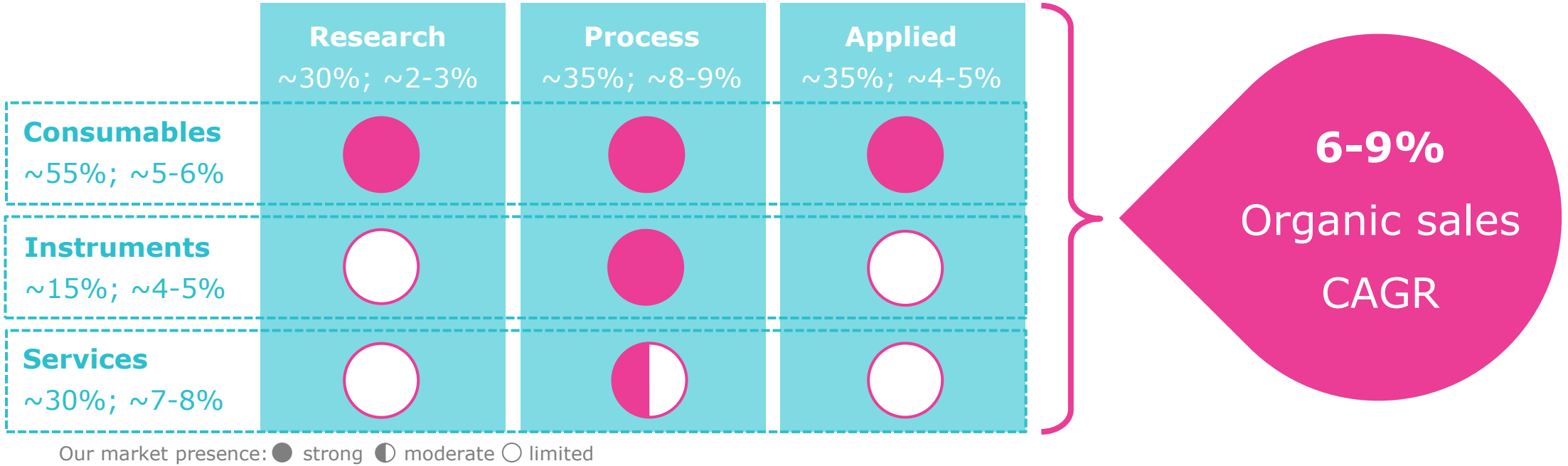
04

Life Science

Building growth momentum with focus on attractive market segments

Total Life Science Market[1]

~€170-180 bn; ~5-6% CAGR



Mid-term outlook

Life Science Business Sector

6-9%

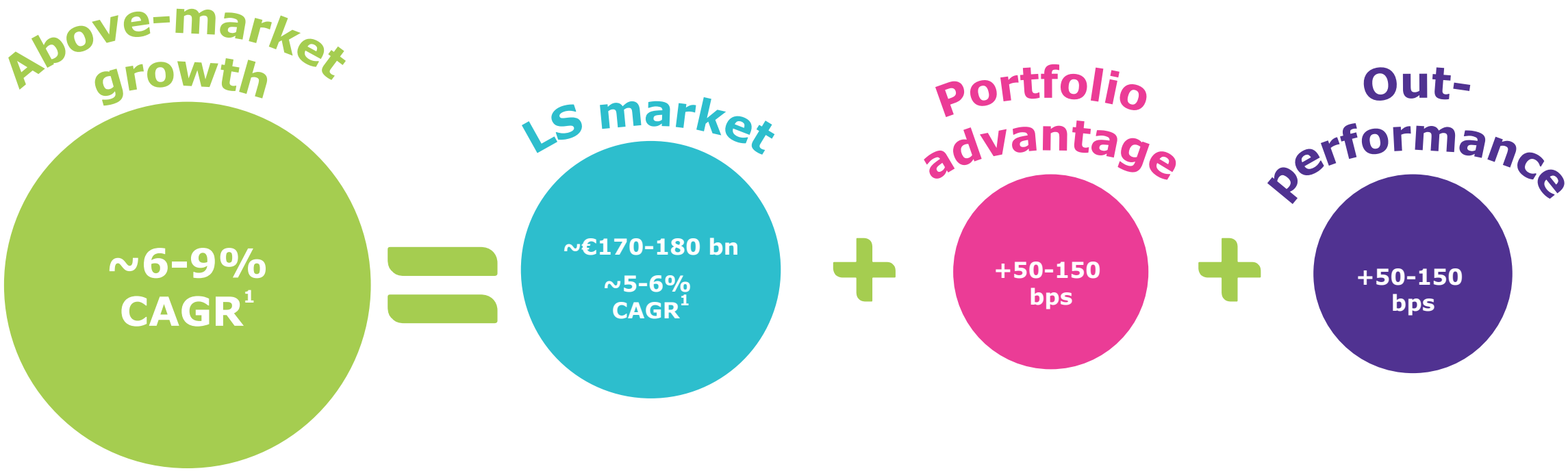
Organic sales CAGR

Upgrading mid-term financial ambition **to 6-9% organic sales CAGR**

[1] Company estimate of the market segments, based on industry forecast over 5-year horizon; all growth rates in 3x3 Matrix indicate external market growth

Life Science

Improved mid-term outlook driven by market and portfolio focus

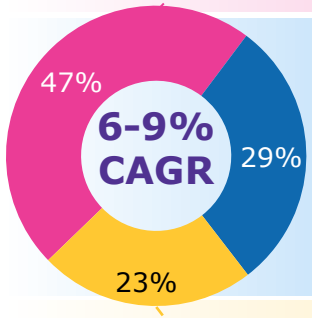


- **Market outlook improving** further, mainly due to **Process** segment
- **Above-market growth set to continue** due to **portfolio advantage** and **outperformance**

[1] Company estimate based on industry forecast over 5-year horizon

All business units contributing to above-market growth

Sales split[1]



Mid-term outlook[2]

Process Solutions

Low-teens growth

vs. market of 8-9%

Research Solutions

Low single-digit growth

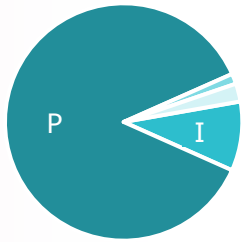
vs. market of 2-3%

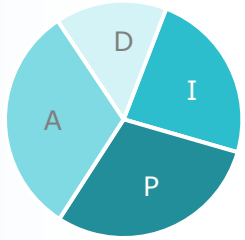
Applied Solutions

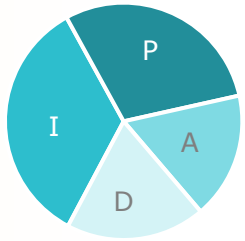
Mid single-digit growth

vs. market of 4-5%

Customer Split[3]







Fundamental growth drivers

- **Biologics:** global mAbs[4] production growing by ~11-15% p.a. for 2020-2024[5] driven by new molecules and biosimilars
- **Diversification:** contribution by top 10 molecules will decline to ~30% until 2024 from ~50% in 2020[6]
- **Novel modalities:** cell & gene therapy market with >30% CAGR 2020-2024[5], complex delivery drives demand for services and viral vectors

- **Research activity:** >9,000 pre-clinical projects in research pipelines[7]; rising number of experiments backs healthy growth in biotechs/CROs[8]
- **Public and private funding:** availability, access and predictability drive demand from academia and emerging biotechs
- **Emerging technologies:** high growth technologies for drug discovery and development, e.g. advanced cell culture and AI drug discovery

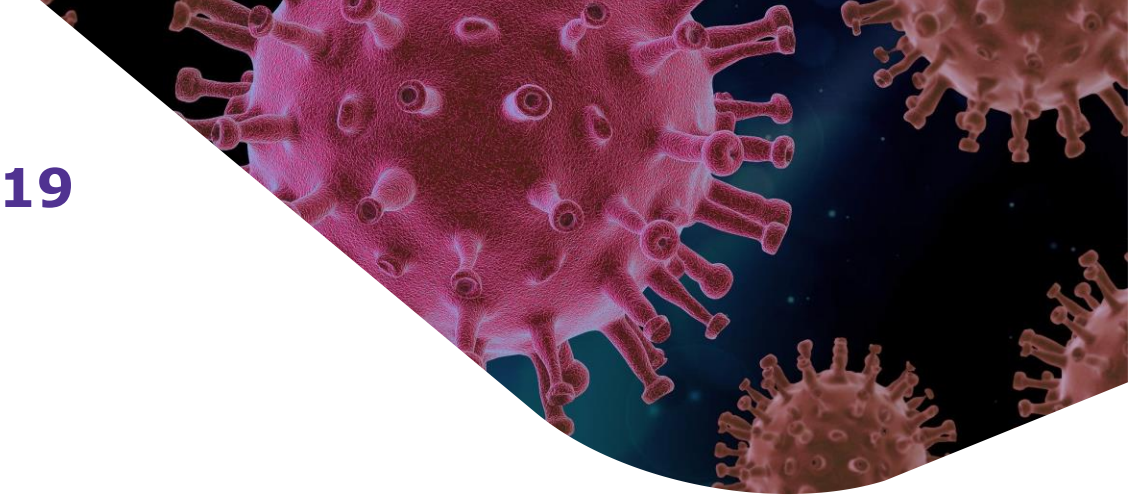
- **Regulation:** rise in quality standards and increasing demand for testing across customer segments
- **Population and economic growth:** demand for access to more sophisticated products and services rises, e.g. in emerging markets
- **Speed:** need for fast testing results raises requirements for Applied customers, esp. in clinical testing and food & beverage testing

Customer Segments: P Pharma and Biotech I Industrial and Testing A Academia D Diagnostics

[1] Based on H1 2020, CAGR is organic mid-term ambition; [2] growth rates are organic CAGRs; [3] indicative only; [4] mAbs = monoclonal antibodies; [5] Source: company estimate based on industry forecasts; [6] Source: EvaluatePharma; [7] Source: statista; [8] CRO = Contract Research Organization

Life Science

Critical offering in the fight against COVID-19



PRODUCTS feed into...

www.sigmaaldrich.com/covid-19

VIRUS DETECTION

- **Leading critical component provider for Molecular and Serological diagnostic kits**
- **PCR reagents, kits and tools for all stages of assay development**

VIRUS CHARACTERIZATION

- **Offering is among largest biologic reagents and hardware portfolios**
- **Effective vaccines and therapies start with reliable virus characterization**
- **Highest quality reagents needed for understanding of viral attachment, genomics, or proteomics**

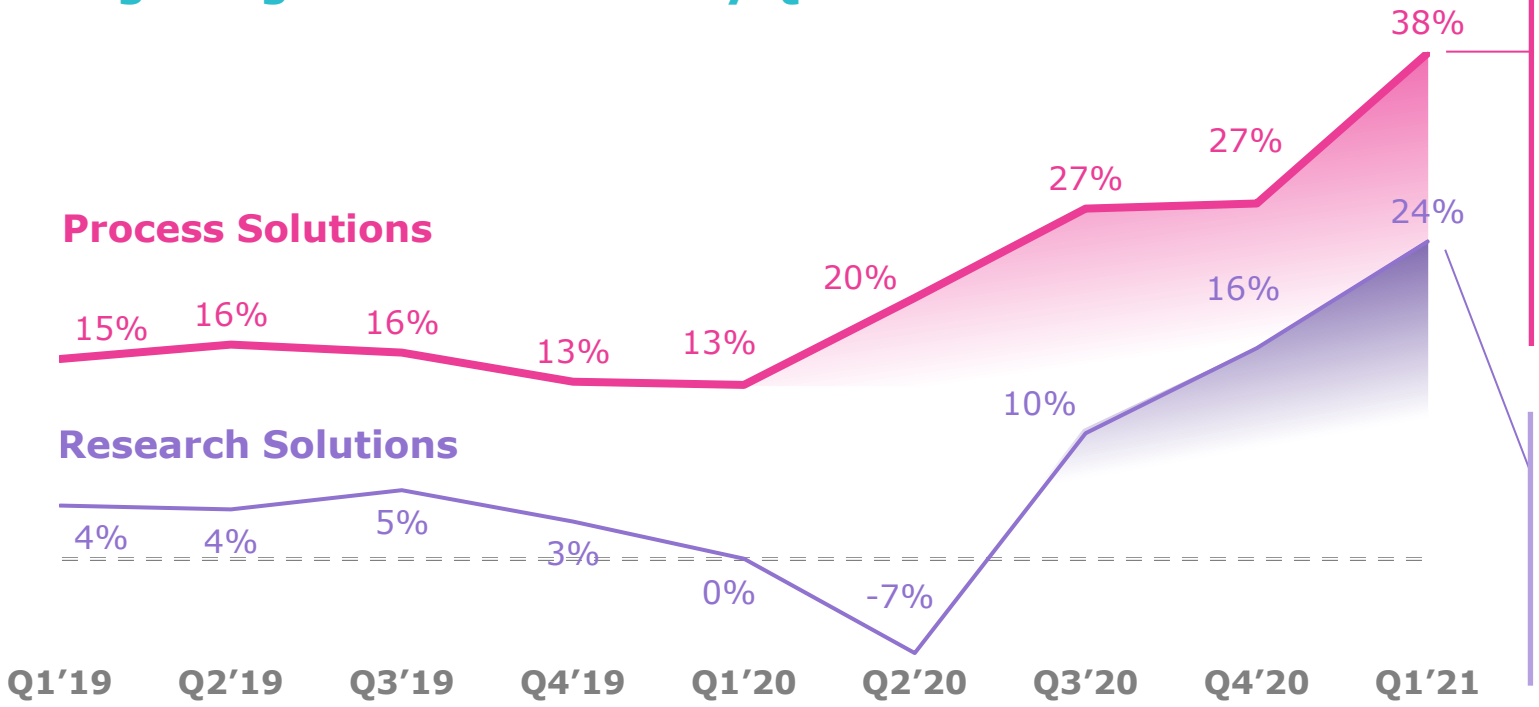
VACCINE & THERAPY PRODUCTION

- **Supporting global COVID-19 vaccine and therapy response effort:**
  - **Upstream and downstream research and scaling**
  - **End-to-End solutions**
  - **Biosafety Testing Services**

From: Q3 2020 earnings call – 2021.03.04

Life Science: Upside potential for Process Solutions materializing amid increasing capacity; Research Solutions gaining momentum as well

Organic growth versus LY by Quarter



- Successful capacity ramp-up accelerated further
- Roughly **half of additional growth** since Q2 2020 has been **COVID-19 related**
- Strong underlying demand
- Order intake > +60%

- Strong core business
- Parts of growth attributable to ongoing recovery post lock-downs
- **Less than half** of growth since Q2 2020 has been **COVID-19 related**

Key factors for 2021 guidance remain:

- Further progress of capacity expansions & optimizations
- Sustainable demand growth; both Covid-19 and underlying

Shaded areas represent COVID-19 growth contributions

Electronics

Leveraging the portfolio shift

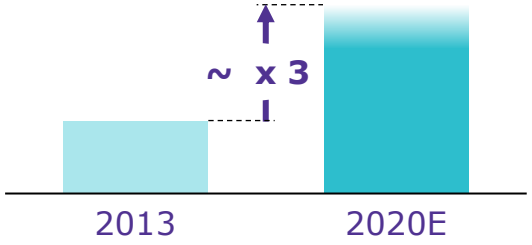
05

Electronics

Portfolio shift leads to greater resilience and accelerated growth

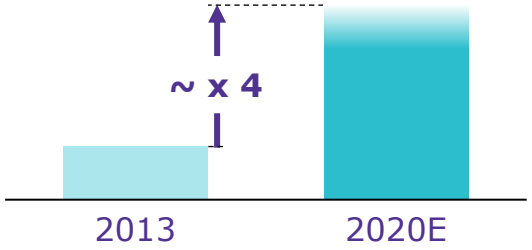
of customers

[that make up 80% of Sales]



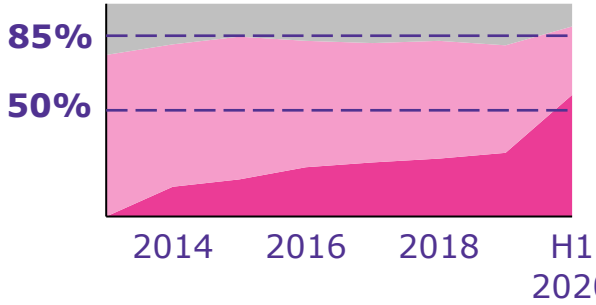
of product groups

[that make up 80% of Sales]



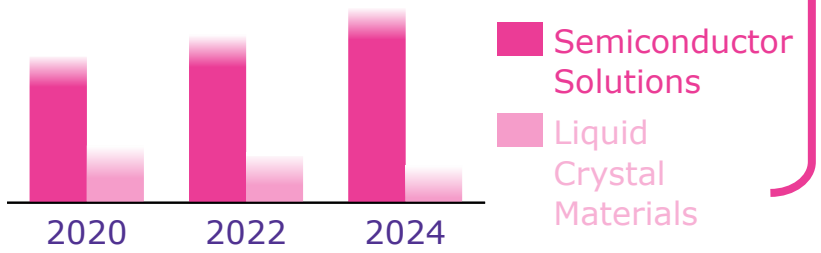
Electronics sales split

[% of total]



Semi vs. Liquid Crystals

[illustrative anticipated sales development]



Mid-term outlook

Electronics

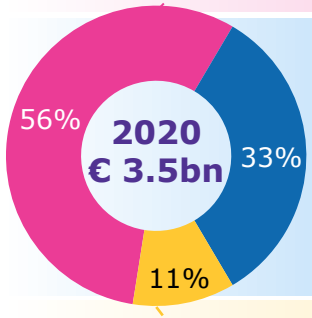
3-4%
organic sales
CAGR

Updating mid-term financial ambition **to 3-4% organic sales CAGR**

Electronics

Portfolio refocus drives mid-term guidance upgrade to 3 to 4% CAGR

Sales split[1]



Mid-term outlook[2]

Semiconductor Solutions

Mid- to high single-digit growth

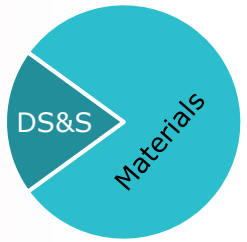
Display Solutions

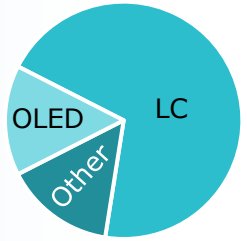
Low single-digit decline

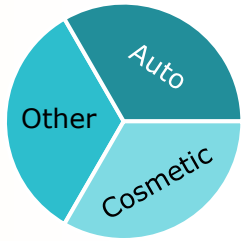
Surface Solutions

Low single-digit growth

Business Split[3]







Fundamental growth drivers

- Continued market growth due to technological advances (Artificial intelligence, 5G, Big Data and cloud, Internet of Things) serving customers in **Logic, Memory, Packaging and others**
- 4 to 6% market growth[4]
- 200 to 300bps above-market growth from share gains & better portfolio (incl. 100 to 150bps additional growth from integration top-line synergies)

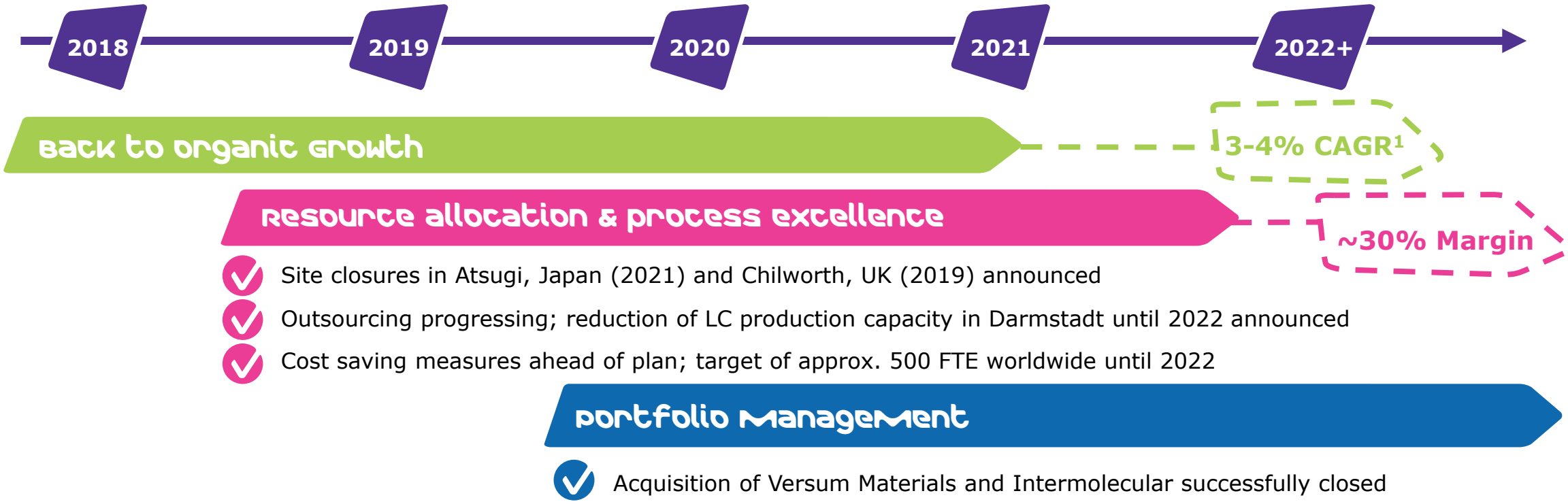
- Driven by trend to **bigger TV size, higher resolutions, more mobile devices**
- 3 to 4% growth of total LCD m² area[5], while price pressure continues
- 18 to 22% growth of total OLED m² area[5] with slight to moderate market share gains
- OLED material market to exceed LC material market by 2021[6]

- Well balanced exposure to **automotive** and **cosmetics** end market
- Drivers: rising living standards, higher disposable income in growing markets & higher demand for high value products at reasonable prices
- Light vehicle production and relevant cosmetics end markets returning to growth in 2021 and reaching 2019 levels by 2022 and beyond[7]

[1] Based on FY 2020, CAGR is organic mid-term ambition; [2]growth rates are organic CAGRs; [3]indicative only
[4]Source: Jan 2020 IC Insights 2018-2024 CAGR for wafer starts in million units; [5]Source: Omdia Display Market Outlook, Q1 2020; [6]Internal Business Intelligence; [7]Sources: LMC Automotive Light Vehicles Forecast, Aug 2020 & Euromonitor BPC (Beauty & Personal Care) Aug 2020

Electronics

5-year transformation program Bright Future is well on track



[1]New mid-term CAGR guidance starting 2020

Electronics

Strategic roadmap materializing

Measures for a bright future

Darmstadt

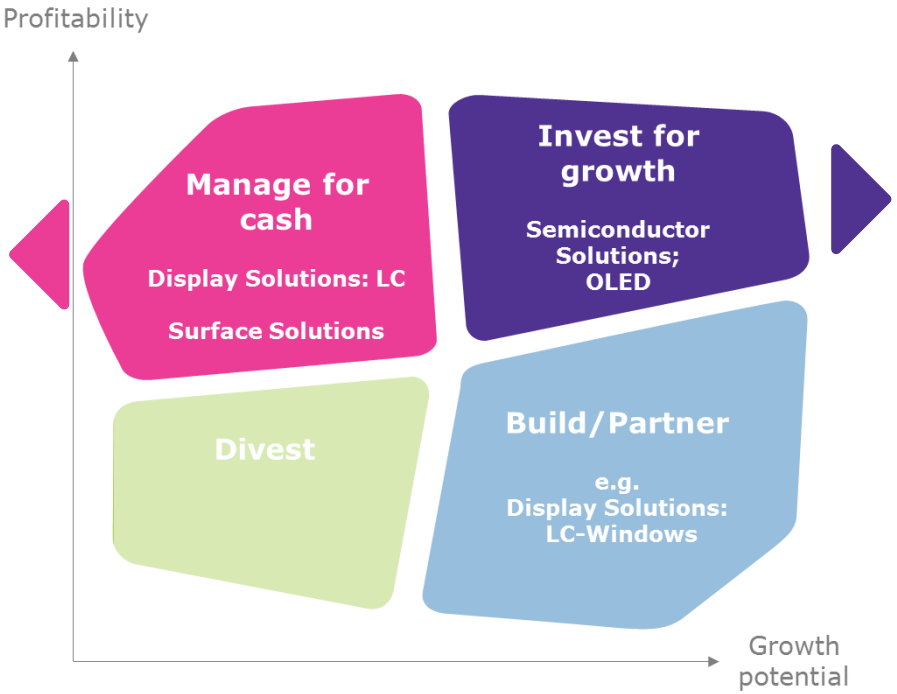
- In Darmstadt focus on R&D and production
- Immediate bottom line contribution from 2019 onwards
- Reduce the number of FTEs by ~15% = ~400 FTEs

Chilworth

- Chilworth site during September 2019 successfully closed

Atsugi

- Shut down of Electronics activities at Atsugi site started (to be completed during 2021)
- R&D and production activities in Atsugi transferred and consolidated in other PM locations in Asia
- Consolidation of site structure in Japan



VERSUM MATERIALS

- Leading supplier of high-purity process chemicals, gases and equipment serving semiconductor manufacturers
- Track record of accelerated growth and industry leading profitability

➢ Creating a **leading electronic materials player** with **attractive long-term prospect**

INTERMOLECULAR®

- Leading in advanced materials innovation
- Acquisition to strengthen semiconductor technology offering

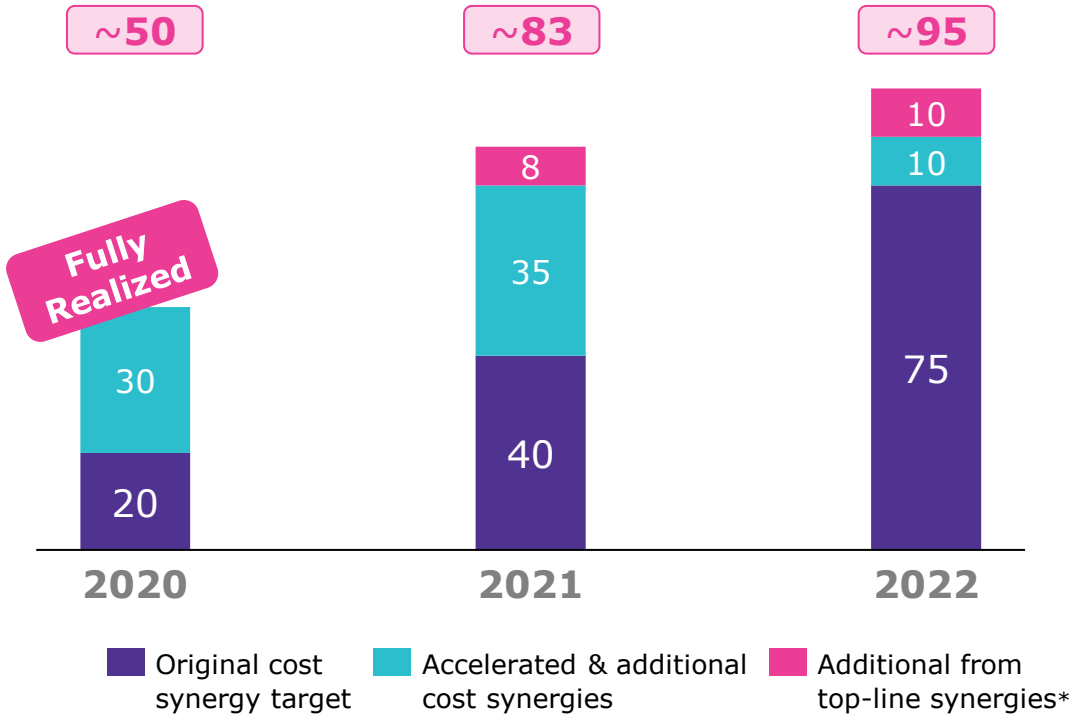
➢ Application specific **materials expertise with** that **perfectly complement** Group's business and technology portfolio

Bottom-line management to support margin ambition of 30% in the long-term

Both transactions successfully closed

Successful integration drives substantial synergy upgrade and acceleration

EBITDA pre impact of synergy ramp-up [€ m]



Original target for 2022 is now being addressed for 2021

Sources of synergies

Business optimization

- Transform country setup
- Streamline duplicate structures

Procurement and supply chain

- Optimize production and supply chain network
- Achieve savings through joint procurement

Corporate and Administrative functions

- Integrate corporate & administrative functions
- Cost savings due to U.S. company delistings

*Top-line synergies from cross-selling, new products introductions and overarching initiatives

sustainability

06

Sustainability strategy enhanced, leveraging strengths with clear commitment to new targets

Who we are

Innovation Power

- We are a leading science and technology company with curious minds dedicated to human progress
- Long track-record in offering innovative products in attractive markets and serving important megatrends

Pioneering Products

- Well-equipped for developing new product classes: Portfolio of life-improving products in all businesses
- Enabling customers incl. scientists and developers to design next-gen products

Responsible Governance

- Resilient operations; sustainable leadership and risk-mitigation approach
- Responsibility is in our DNA: reflected by legal form, corporate governance and long history of more than 350 years

Targets

Goal #1: **Dedicated to human progress**

In 2030, we will advance human progress for more than 1 bn people through sustainable science & technology.

- Sustainable innovations and technology for our customers
- Impact of our technologies and products on health and well-being

Goal #2: **Creating sustainable value chains**

By 2030, we will integrate sustainability into all our value chains.

- Sustainability culture & values
- Sustainable and transparent supply chain
- Securing our social license to operate in all regions

Goal #3: **Reducing our ecological footprint**

By 2040, we will achieve climate neutrality and reduce our resource consumption.

- Climate change & emissions
- Water & resource intensity

Integration

Integrated

- Part of the overall strategy
- Linked to steering and operations
- Currently built into part of Executive Board compensation system

Steered & Reviewed

- Executive Board
- Supervisory Board
- Corporate Sustainability Committee

Communicated

- Development and reporting of meaningful KPIs
- Annual Report, Sustainability Report
- Investor events

ESG: Environmental, Social, Governance

Potential to increase sustainable value for business and society

High-impact SDGs		Where we can contribute	Goal	and benefit
	Good Health and Well-being	➢ We are able to contribute with dedicated products, know-how, partnerships and initiatives in pharma, science and technology.	1 3	**Business opportunities** ▪ Develop a new range of sustainable products & services, benefiting from ourinnovation power ▪ Open up additional customer groups and expand regional reach **Risk management** ▪ Reduce risks through higher awareness and longer-term view ▪ Secure supply chain resilience **Partnerships** ▪ Contribute as supplier of choice to customers' ESG strategy ▪ Improve ESG impact of our suppliers ▪ Increase depth, meaning, and strategic focus of partnerships **Operations** ▪ Increase attractiveness as employer ▪ Reduce costs of capital ▪ Benefit from grants and reliefs (politics, insurance, etc.) ▪ Incentivize through integrated compensation schemes
	Decent Work and Economic Growth	➢ Our ambition of future growth considers health and safety of employees also in the supply chain.	1 2	
	Industry, Innovation and Infrastructure	➢ Our innovation power will lead to more sustainable products and processes in various industries.	1 2	
	Responsible Consumption and Production	➢ Being a responsible supplier, we will also challenge suppliers to support in reaching company targets.	2 3	
	Partnerships for the Goals	➢ To unleash even more power, we foster collaborations with capable partners to sum up know-how for more sustainable impact.	1 3	

SDGs: Sustainable Development Goals of the United Nations ESG: Environmental, Social, Governance

From: Q3 2020 earnings call – 2020.11.12

Reduce our environmental footprint: Environmental targets 2020 have been achieved, new targets set

Achievements 2020

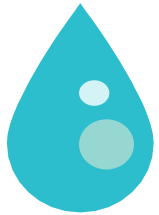
Reduce scope 1+2 emissions

2020 target[1]: -20%	2020 result[1]: -25%

Emissions target 2020 achieved!

- ✓ 25% overall reduction for Scope 1 and 2 emissions in 2020 relative to 2006 (planned: 20%)

Reduce water in stressed areas



2020 target[2]: -10%	2020 result[2]: -27%

Water target 2020 achieved!

- ✓ Water use in stressed areas reduced by 27% in 2020 vs. 2014 (planned: 10%)
- ✓ By 2020, all production sites[4] successfully implemented sustainable water management system

Reduce Group Waste Score

2025 target[3]: -5%	2020 result[3]: -4.6%

Waste target ongoing & on track!

- ✓ Based on Group Waste Score, reduced environmental impact by 4.6% vs. 2016 (planned: 5% by 2025)

[1]versus 2006 baseline, excluding Versum Materials
[2]versus 2014 baseline
[3]versus 2016 baseline
[4]Sites > 70.000 m³/a

New targets from 2021

- Aiming for **climate neutrality** (scope 1 to 3 emissions) **by 2040**
- **Lower scope 1 and 2 GHG[5] emissions by 50%** and to source 80% of purchased electricity from renewable sources until 2030 vs. 2020 baseline
- **Absolute reduction of 1,500 kt[6] scope 3** CO_2 equivalents by 2030

- Enhancing water efficiency and **improve the new Group water intensity score by 10% by 2025** vs. 2019 baseline
- Minimize negative environmental impacts, **harmful emission residues should be lowered** below a scientifically defined threshold by 2030

[5]GHG = Greenhouse Gas
[6]corresponds to ~30% of 2019 scope 3 emissions (current estimation incl. Versum Materials)

Next steps towards achieving ESG targets

AGENDA 2020-2022

- Analysis of requirements: Strategy, business, regulation, stakeholders
- Develop SBV tool[2] to measure product sustainability value
- Link ESG[1] to board compensation
- Build effective data platform for internal steering
- Develop ESG KPIs for reporting
- Further incorporate ESG in R&D, controlling, M&A and supply chain
- Decide on dedicated investments and initiatives to achieve targets

2030 targets

- goal 01 — Dedicated to human progress
- goal 02 — Creating sustainable value chains
- goal 03 — Reducing our ecological footprint

[1]ESG: Environmental, Social, Governance

[2]Sustainable Business Value: Dive in deeper and read the research article on the SBV method

From: Q4 2020 earnings call – 2021.03.04

07

Guidance and Executive Summary

Latest COVID-19 assumptions for 2021

Overarching assumptions

- **Increasing vaccination penetration** across large populations **in all major regions** as of summer
- **Global gradual easing of lockdowns to continue; vaccination efforts expected to keep up** with virus mutations
- **Overall improvement** in the course of 2021 to continue**; however, higher degree of forecast uncertainty**

Healthcare assumptions

- **Confirm ~ stable organic base business & pipeline sales target,** despite higher uncertainty
- Pandemic **impact on ramp-ups** (particularly still depressed MS dynamic & high efficacy market in Q1 2021) **remains a watch out; recent vaccination data expected to accelerate market position of Mavenclad®**
- **Fertility** to **continue recovery**

Life Science assumptions

- **Continued strong additional demand & capacity expansions to support strong growth in Process Solutions**
- **Research and Applied** more volatile and differentiated across customer and product segments; **tailwinds for Research, about neutral effect in Applied**

Electronics assumptions

- **Neutral to positive impact on Semiconductor Solutions** end markets
- **Display and Surface Solutions** to **return to underlying trajectories**

Full-year 2021 guidance

Net sales:
Organic: +10% to +12% YoY
FX: -2% to -4% YoY
~€18.5 – 19.5 bn

EBITDA pre:
Organic: +16% to +20% YoY *(excl Biogen[1])*
FX: -2% to -4% YoY
~€5.4 – 5.8 bn

EPS pre:
~€7.50 – 8.20

[1] Q3 20 reversal of the provisions for the patent litigation proceedings for Rebif in the amount of ~€365 m; Guidance including Biogen – organic: +9% to +12%

Executive Summary

steady earnings growth with high margins and a low risk profile

Group

Successfully driving **transformation into a leading science and technology company**

setup

Three-pillar structure strengthened further as a resilient basis; COVID-19 crisis as another proof point

Growth Engines

Healthcare pipeline, Process Solutions and Semiconductor Solutions will be key drivers of growth to 2022 and beyond

Execution

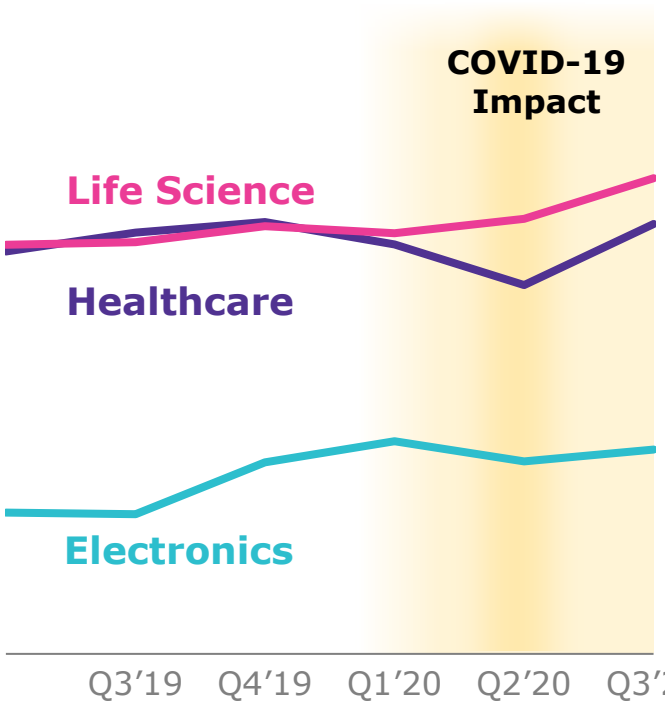
Delivery on strategic priorities ensures profitable growth; regaining financial flexibility with higher likelihood of regular bolt-ons post 2022

appendix

Group

Successful crisis management increasingly mitigates pandemic impact

Quarterly Net Sales in €m*



Underlying developments

- **Life Science well positioned** for new COVID-19 driven demand trends
- **Process business** rapidly addressing new market needs, **fueling net upside**
- Research and Applied **driving recovery in Q3**

- **Fertility: well managed return** to pre COVID-19 levels - not yet all regions
- **Strong Mavenclad® recovery** being driven since June
- **Bavencio® UC launch** progressing very well on a largely virtual launch
- **General Medicine** on track with good volume development

- Managing visible **recovery in Q3,** but not yet growing organically
- **Semiconductors Solutions' strength** within strong market
- Net downside from COVID-19 **in Display and Surface**

* At fixed 2019 FX rates

Guidance upgrade proof point of **excellent crisis management** and **strong business performance**

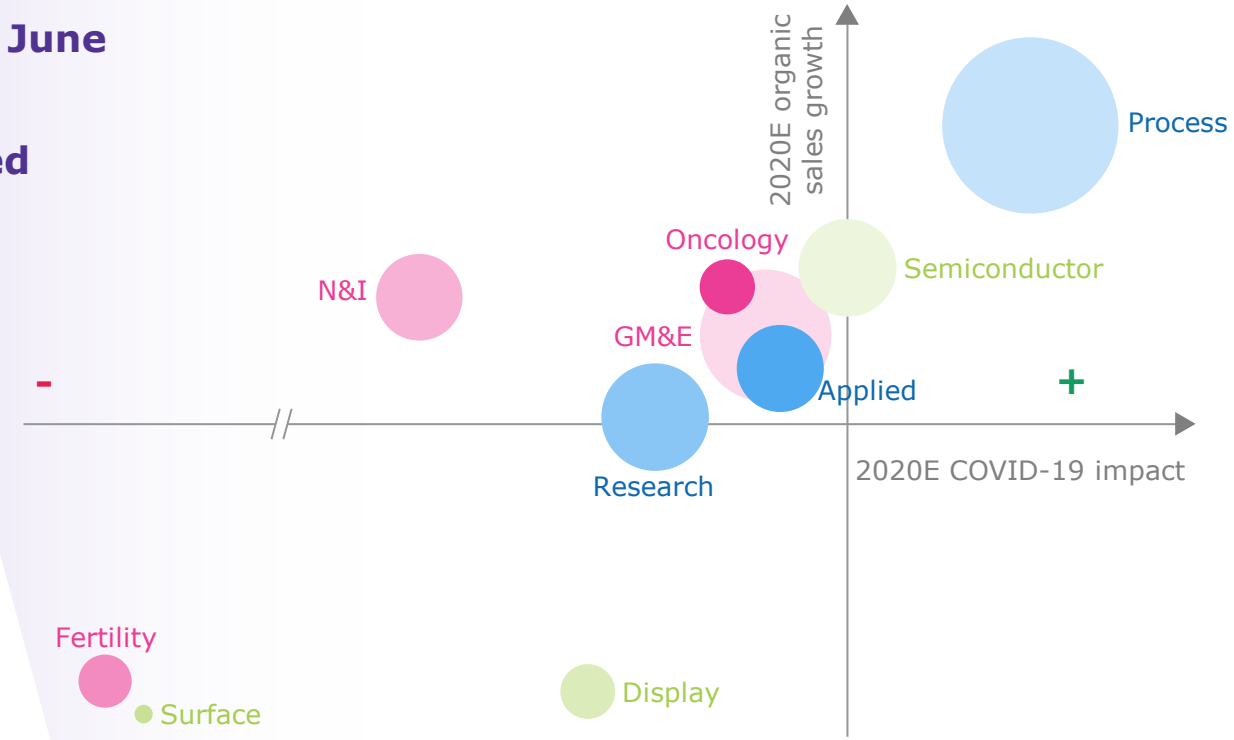
From: Q3 2020 earnings call – 2020.11.12

Group

2020 – strong resilience in times of global crisis

- **2020 guidance confirmed; recovery started in June**
- **Most businesses growing** despite COVID-19
- **Largest business** growing and **positively affected**
- Smallest businesses with biggest impact

Growth and COVID-19 impact by business[1]



Delivery on priorities during crisis

- ✓ **Health & safety of employees**
- ✓ **Business continuity**
- ✓ **Contributions to public health and society**
- ✓ **Sustainability aspects further enforced**

CMD 2019

Merck KGaA, Darmstadt, Germany - steady earnings growth with high margins and a low risk profile

[1] Indicative only and based on guidance from August 6: slight to moderate organic sales and EBITDA pre growth, COVID-19 with up to a mid single-digit impact on sales of which 50-60% hitting EBITDA pre

2021 business sector guidance[1]

Healthcare

Net sales

- Organic: +7% to +10%
- Mainly driven by Mavenclad®, Bavencio® and recovery of Fertility
- Base business organically around stable

EBITDA pre

- Organic:+12% to +15% YoY *(excl Biogen[2])*
- FX: -5% to -7% YoY
- ~€2,000 – 2,100 m

Life Science

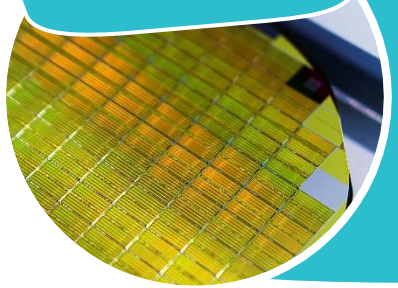
Net sales

- Organic: +15% to +18%
- Process Solutions as main growth driver

EBITDA pre

- Organic:+22% to +26% YoY
- FX: -1% to -3% YoY
- ~€2,850 – 3,000 m

Electronics



Net sales

- Organic: +5% to +7%
- Strong Semiconductor Solutions contribution, subject to quarterly DS&S project phasing
- OLED with high growth

EBITDA pre

- Organic:+9% to +12% YoY
- FX: -3% to -5% YoY
- ~€1,050 – 1,130 m

[1]Buiness Sector guidances are only support to the group guidance and do not have to add up; [2] Q3 20 reversal of the provisions for the patent litigation proceedings for Rebif in the amount of ~€365 m; Guidance including Biogen – organic: -4% to -6%

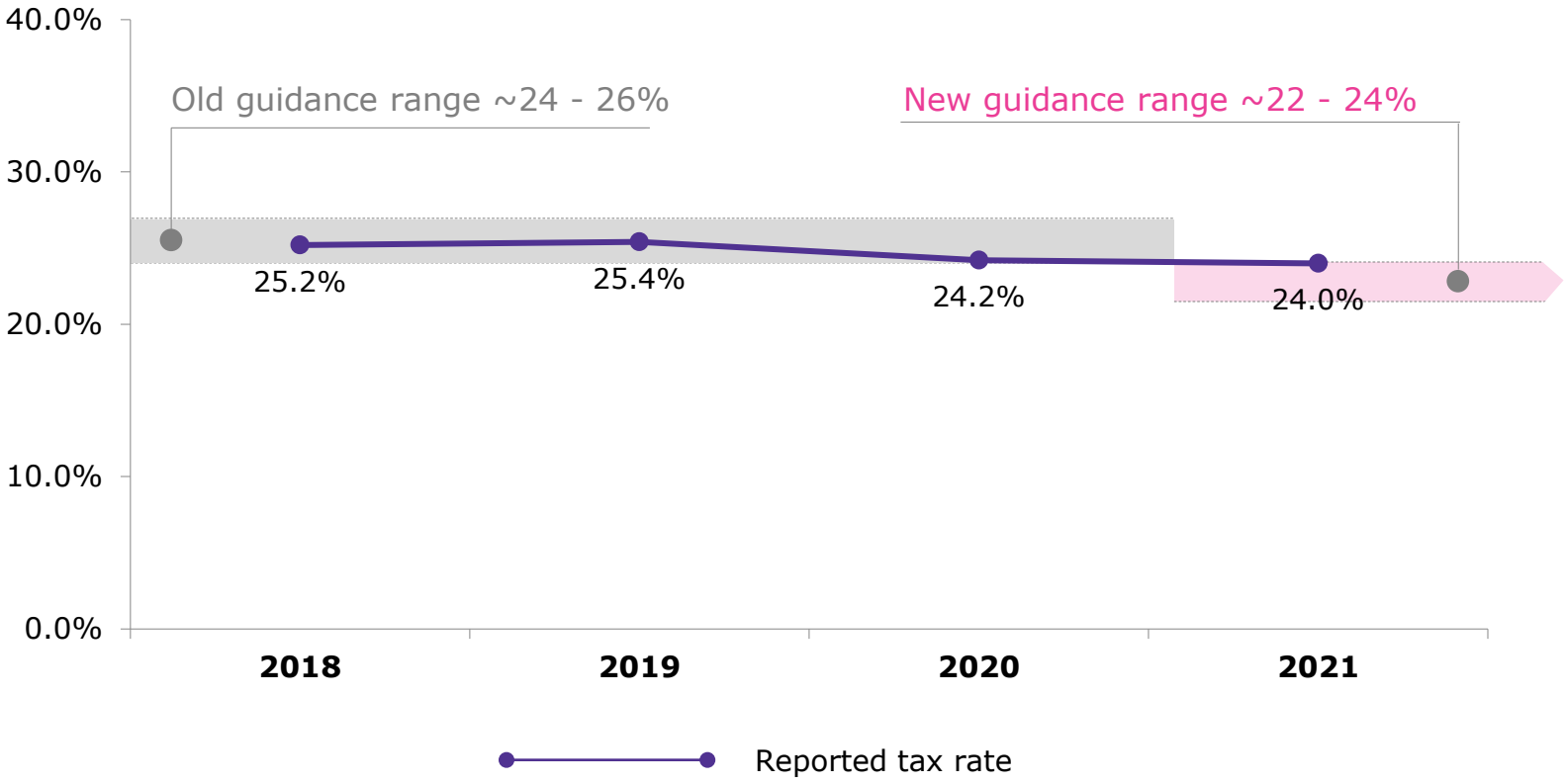
Additional financial guidance 2021

Further financial details

Corporate & Other EBITDA pre	**~ €-440 to -490 m**
Interest result	**~ €-220 to -245 m**
Effective tax rate	**~22% to 24%**
Capex on PPE	**~€1.4 to 1.5 bn**
Hedging/USD assumption	**FY 2021 hedge ratio ~70% at EUR/USD ~1.17**
2021 Ø EUR/USD assumption	**~1.19 to 1.23**

Underlying tax rate guidance lowered to new range of 22% to 24%

Tax rate development 2018-2020 and from 2021 onwards



Rationale for update

Strong profit growth in Life Science results in different profit contributions worldwide, leading to a lower overall tax rate

Focus on organic growth and deleveraging to 2022

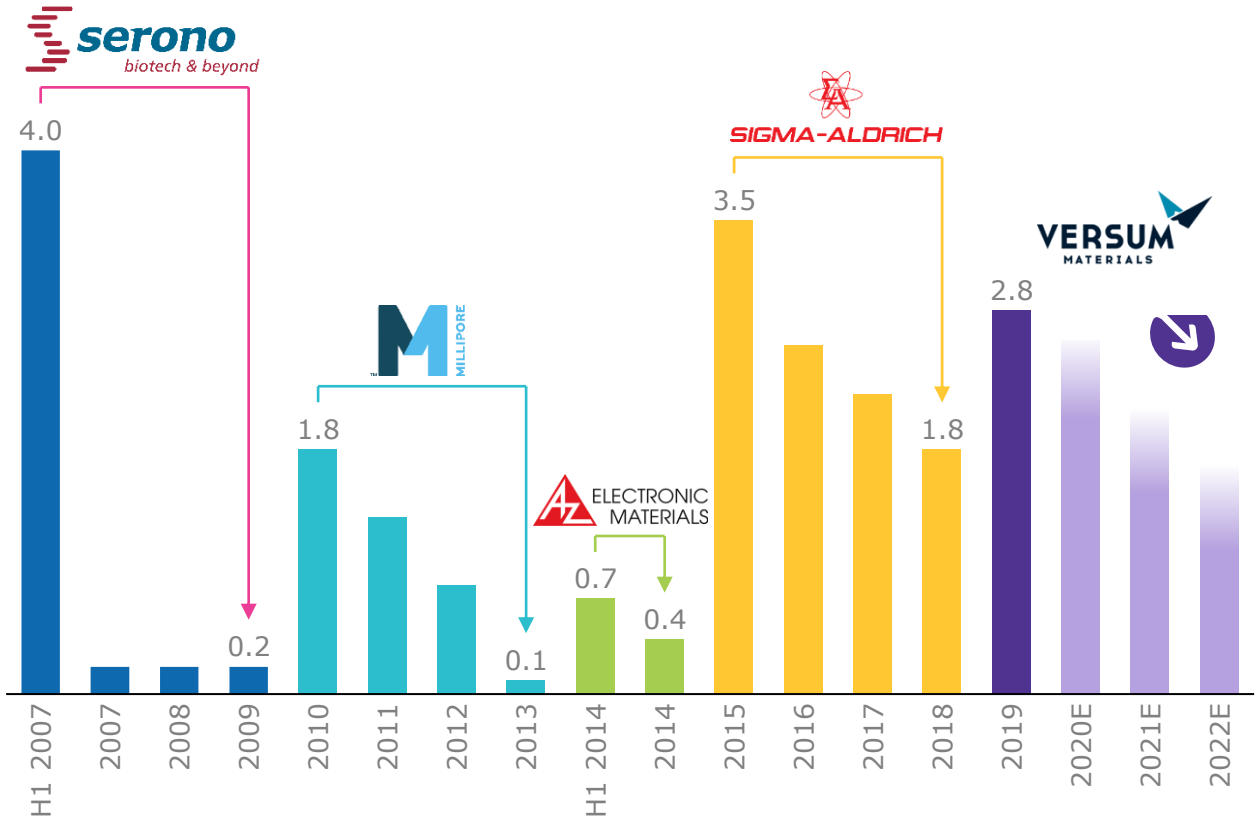
Proven swift deleveraging
after major acquisitions

UPDATE

- **Deleverage to <2x** net debt/EBITDA pre in 2022
- **M&A on hold until 2022**; only smaller deals to be realized if budget available
- New mid-term capex ceiling of ~€1.3 bn reflects **increased focus on organic investment** and Versum consolidation

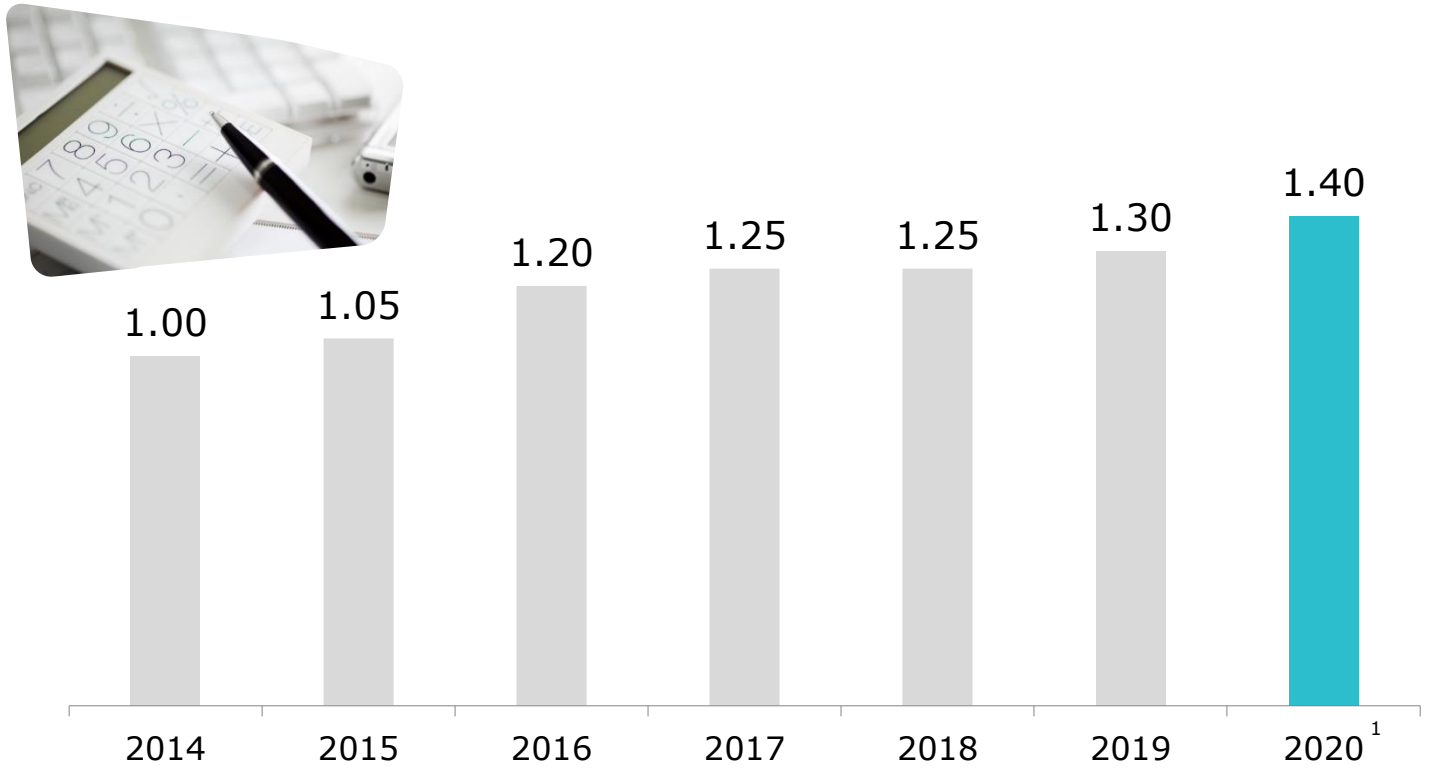
- Dividend policy mirrors **sustainable earnings trend**

Net debt / EBITDA pre track record & outlook



Sustainable dividend growth

Dividend[1] development 2014 -2020



2020 dividend

- Dividend of €1.40 (+8% YoY) per share proposed[1] for 2020
- Payout ratio of 23.1% of EPS pre[2] in 2020; aiming for 20-25% of EPS pre
- Dividend yield[3] of 1.0%

[1]Final decision is subject to Annual General Meeting approval

[2]Excluding Biogen provision release, including the provision release the ratio is 20.9%

[3]Calculated with 2020 year-end share price of € 140.35 per share.

Governance

Merck‘s KGaA, Darmstadt, Germany ownership structure

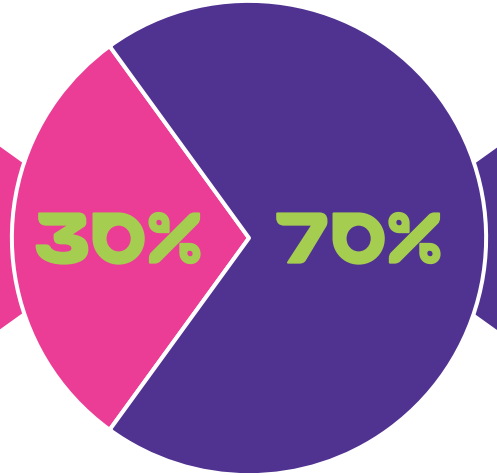
Shareholders of Merck KGaA, Darmstadt, Germany

- Shareholders hold ~30% of Group’s total capital
- Share capital is divided into 129,242,252 bearer shares and one name share without nominal value
- Listed at German Stock Exchange’s Prime Standard, member of the DAX 30
- Only bearer shares entitled to vote at Group’s Annual General Meeting: **one share, one vote**

Supervisory Board

Its Chairman leads AGM, representing interests of Group’s shareholders:

- Approving financial statements of the Group
- Working together with Executive Board, receiving reporting on progress regarding business and financial development at the Group, Containing 16 members: **8 employee representatives, 8 independent representatives** (2 family representatives and 6 elected shareholder representatives)
- 2 committees: **Nomination and Audit Committee**



E. Merck KG, Darmstadt, Germany: Partners‘ Meeting & Family Board

- E. Merck KG, Darmstadt, Germany (99.9% Family) holds ~70% of Group’s total capital
- These 70% of the total capital are **not entitled to vote** at Group’s AGM
- A Family Board represents the entrepreneurial interests of the Family (elected by partners’ meeting)

Board of Partners

Elected by Family Board, and takes over some duties of a usual Supervisory Board:

- Appointment, dismissal and supervision of Executive Board members of the Group
- Approves extraordinary business transactions and annual financial statements of E. Merck KG, Darmstadt, Germany
- Contains **5 members of the Family Board and 4 external members** of the business community
- 3 committees: **Finance, Personnel and R&D Committee**

Nomination Committee	Audit Committee	Finance Committee	Personnel Committee	R&D Committee
Defines criteria and makes proposals for new candidates	Control systems, external auditing, financial statements	financial statements, external auditing	Executive board members, contracts, compensation	research activities of all sectors: HC, LS, EL

Family Board: Familienrat; Board of Partners: Gesellschafterrat; Supervisory Board: Aufsichtsrat; Nomination Committe: Nominierungsausschuss; Audit Committee: Prüfungsausschuss: Finance Committee: Finanzausschuss; Personell Committee: Personalausschuss; R&D Committee: Forschungs- und Entwicklungsausschuss

From: SRI presentation – 2021.03

Executive board compensation

Pay for performance reflecting the company's long-term strategy

Variable

Long-Term Incentive Plan — 40-50%

- Reflecting the long-term strategy for Group's **growth and (from 2022) sustainability ambition**
- **4 years performance cycle**: 3 years target achievement + 1 year holding period
- Based on virtual Group Share Units (Grant € divided through start share price, multiplied with the end share price)
- **Financial targets**: 50% Company Share Price vs. DAX + 25% EBITDA pre margin + 25% Organic sales growth
- **From 2022** multiplied with **sustainability factor** (0.8-1.2) reflecting KPIs from each of the sustainability goals
- Corridors for each target and achieved targets **published transparently** ex-post in the compensation report
- **Maximum cap**: Maximum pay out 250%, maximum € cap for LTIP for each board member published
- **Claw-back** allows to retain amounts allocated from the Long-Term Incentive Plan

\+ Performance of Group share price vs. the DAX **50%**
\+ EBITDA pre margin in relation to target value **25%**
\+ Organic sales growth in relation to target value **25%**
× **0.8-1.2** Sustainability factor
= **0-180%** of allocated units

Profit Sharing — 25-35%

- **Three-years average profit after tax** of the E. Merck Group KGaA, Darmstadt, Germany, multiplied with individual permille rate
- **From 2021 reduced individual performance factor of 0.8-1.2** can increase (bonus) or decrease (malus) the amount based on a set of criteria, incl. the 3 sustainability goals, disclosure of catalogue and reasons for if performance factor ≠1.0
- **Individual permille rate** for each board member and maximum € cap for each board member published
- **Staggered incentivization** and **minimum threshold value** and maximum limit for profit after tax (0.75/2.0 bn €)
- Mandatory **personal investment in Company Shares** amounting to one third of the net payment of the profit sharing (4 year holding period)

Basic

6-9% **Pension Entitlements** Defined contribution

0-3% **Additional Benefits** Mainly contributions to insurance policies, personal security expenses, company car…

Basic Compensation — 15-20%

- **Fixed and non-performance related compensation**
- Paid in 12 equal monthly installments
- 1.4 million € for the chairman / up to 1.1 million € for the members of the executive board

Maximum total compensation: reduced to €11.5 m Chairman, €9.5 m other executive board members

pink = new from 2021

External stakeholders assess our engagement

As of 2020, Merck KGaA, Darmstadt, Germany received an **MSCI ESG* Rating of AAA.**

*Environment, Social, Governance

2021, we received an **ESG Risk Rating** of 19.5 and **Sustainalytics: low risk** of experiencing material financial impacts from ESG factors.

Since 2008, Company is part of **FTSE4Good Index**, measuring the performance of companies with strong ESG practices (top 15).

In 2020, Merck KGaA, Darmstadt, Germany has once more achieved **prime status** by **ISS Oekom**.

In 2019, the Group share was again **included in STOXX Global ESG Leaders Index**, a sustainability index based on key environmental, social and governance criteria.

Company has been **reconfirmed** as a constituent of the **Ethibel Sustainability Index** (ESI) **Excellence Europe** since May 2020, based on VigeoEiris.

Company for the second time received platinum status in 2021, among the **top 1% of companies**. **EcoVadis** annually examines ~75,000 suppliers from 160 countries.

In the 2021 **Access to Medicine Index** Group ranked **eighth place**. We were recognized for our performance in R&D, where we ranked fifth.

CDP Climate: In 2020, we scored **"B"** (2019: C). **CDP Water**: In 2020, we received a **"B"** (2019: B).

Group
Regular portfolio review remains key to success

strong track record

- Acquisitions and divestments are part of Group's history
- Licensing and partnerships remain on our agenda
- All prior transactions earned their cost of capital

defining portfolio guard rails

- Three strong pillars with no business marginalized
- Leading market position in attractive markets
- Focus on innovation and sustainability through science and technology

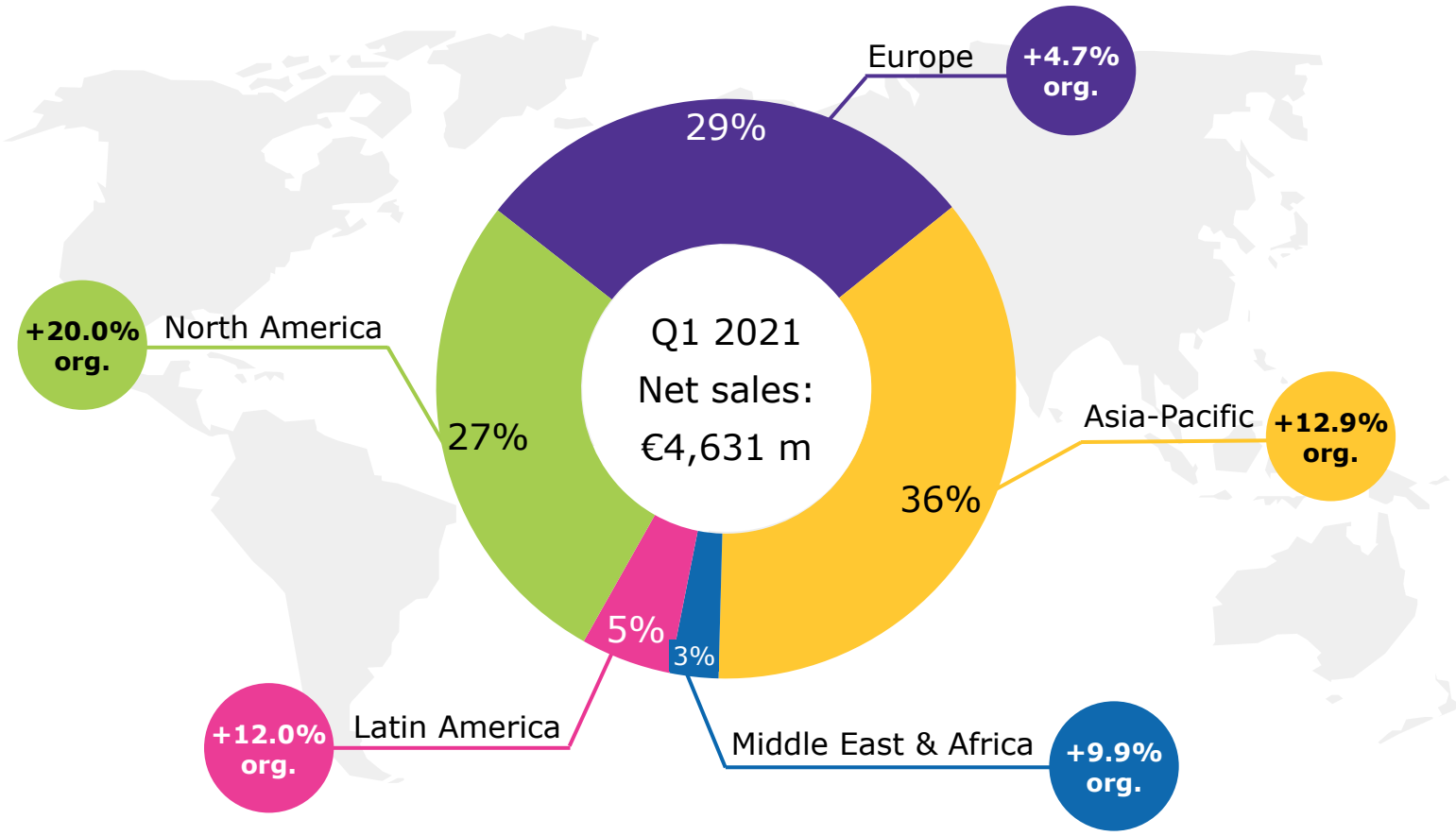
clear financial M&A criteria

- Supporting profitable growth strategy
- IRR > WACC
- EPS pre accretive
- Maintain investment grade rating

- **Current set-up is strong and organic investment opportunities are attractive**
- **Expect to regain financial flexibility by 2022 to pursue external growth opportunities**
- **Targeted and more regular bolt-on approach more likely than large transformative deals**

Life Science demand drives particularly strong growth in North America and Asia-Pacific

Q1 2020 Regional breakdown of net sales [€m]



Regional organic development

- APAC: strong Life Science and Healthcare growth while Electronics ~ stable with Semi offsetting Display
- Europe: Growth in Process & Research Solutions more than compensates Healthcare decline largely in CM&E
- North America: growth across all three sectors, particularly strong Life Science and Bavencio® performance
- LATAM growth driven foremost by Fertility and Bavencio®
- CM&E is the largest growth driver in ME&A

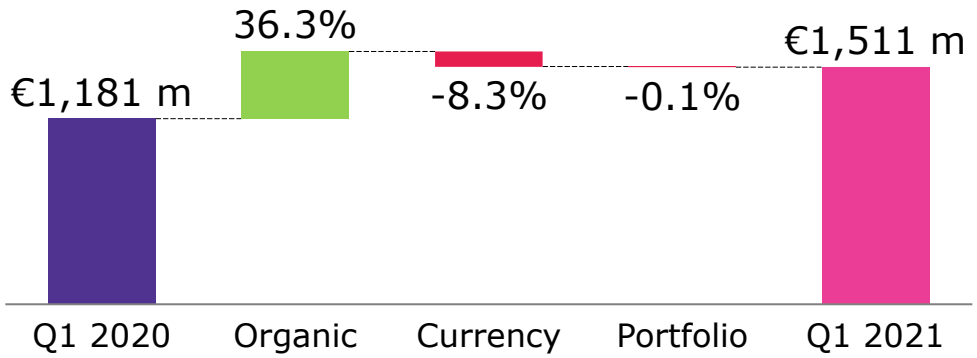
Totals may not add up due to rounding

27% organic growth in Life Science, moderate Healthcare growth & stable Electronics drive very strong organic Group sales and EBITDA pre growth

Q1 YoY Net Sales	Organic	Currency	Portfolio	Total
Healthcare	3.5%	-5.9%	-1.2%	-3.6%
Life Science	26.7%	-6.2%	0.0%	20.4%
Electronics	0.2%	-4.5%	0.0%	-4.3%
Group	**12.2%**	**-5.8%**	**-0.4%**	**6.0%**

- 22% org. growth in Fertility and 20% org. growth in Oncology more than compensate for N&I decline (-4% org.) amid depressed dynamic market and VBP impact in CM&E[1] (-4% org.)
- Record Life Science organic growth driven by all business units with Process Solutions up +38%; Research elevated to +24%; Applied Solutions delivers 8% organic growth
- Electronics about stable as Semiconductor Solutions growth (+4% org.) and recovering Surface Solutions (+5% org.) are offsetting decline in Display (-7% org.)

Q1 YoY EBITDA pre



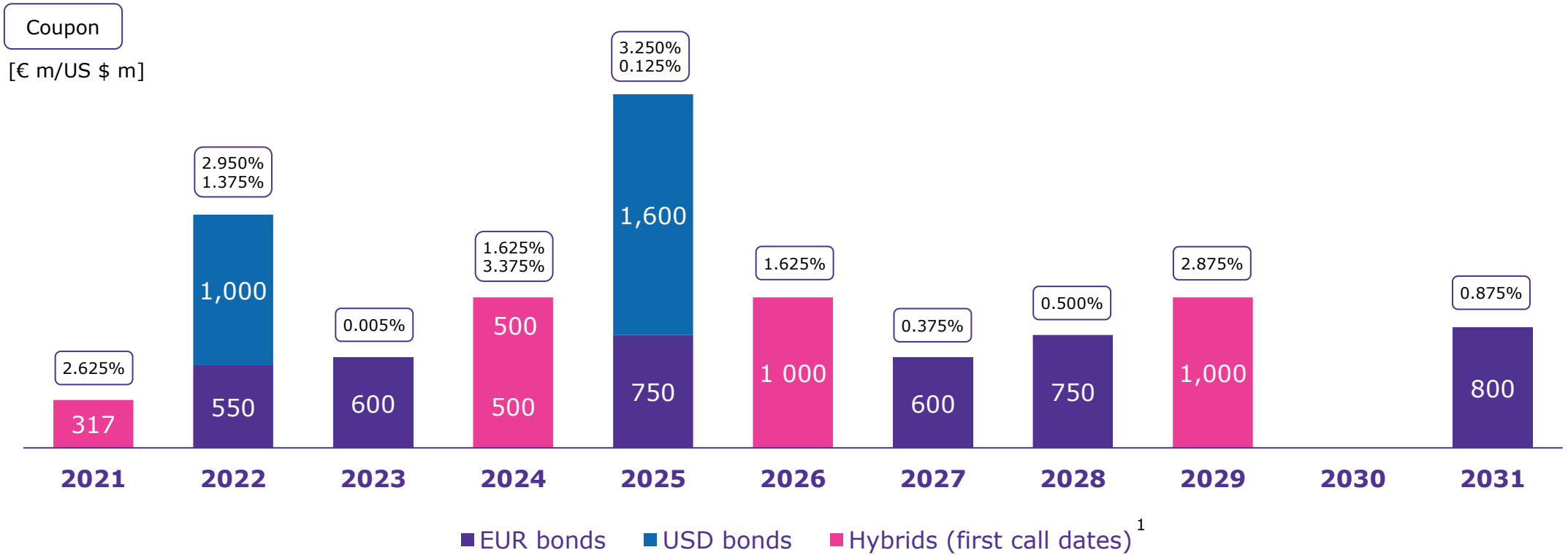
- Organic EBITDA pre growth three times faster than sales growth
- Strong Life Science gross profit further boosted by Bavencio® milestones and continued cost discipline in all sectors
- FX burden of -8% across various currencies with largest negative impact from USD, BRL and JPY; partly mitigated by hedging

[1] Cardiovascular, Metabolism and Endocrinology (new Franchise name as of Q1 2021)

Totals may not add up due to rounding

Balanced maturity profile: Lower refinancing risks & higher flexibility

Maturity profile as of March 31, 2021



[1]No decision on call rights taken yet

Q1 2021: Overview

Key figures

[€m]	Q1 2020	Q1 2021	Δ
Net sales	4,370	**4,631**	6.0%
EBITDA pre	1,181	**1,511**	27.9%
Margin (in % of net sales)	*27.0%*	32.6%	
EPS pre	1.50	**2.18**	45.3%
Operating cash flow	516	**1,216**	135.4%

[€m]	Dec. 31, 2020	March 31, 2021	Δ
Net financial debt	10,758	**10,081**	-6.3%
Working capital	3,938	**4,231**	7.4%
Employees	58,096	**57,933**	0.0%

Comments

- Net sales growth of 6% driven by 12% organic growth and FX burden of -6%
- EBITDA pre increase, driven particularly by operating leverage in Life Science further boosted by Bavencio® milestones
- EPS pre driven by EBIT pre growth, supported by better financial result & lower effective tax rate
- Operating cash flow more than doubles, largely driven by strong EBITDA pre growth and favorable net working capital
- Significant reduction of net financial debt

Totals may not add up due to rounding

Q1 2021: Reported figures

Reported results

[€m]	Q1 2020	Q1 2021	Δ
EBIT	716	**1,043**	45.7%
Financial result	-98	**-59**	-40.0%
Profit before tax	617	**984**	59.4%
Income tax	-159	**-236**	48.1%
Effective tax rate	25.8%	**24.0%**	
Net income	456	**747**	63.7%
EPS (€)	1.05	**1.72**	63.8%

Comments

- Strong performance across all sectors particularly in Life Science drives 46% EBIT growth
- Reduced interest expense and lower LTIP provisions drive improved financial result
- Effective tax rate at the higher end of the new guidance range
- EBIT growth, improved financial result and lower tax rate drive higher net income & EPS

Totals may not add up due to rounding

Cash flow statement

Q1 2021 – cash flow statement

[€m]	Q1 2020	Q1 2021	Δ
Profit after tax	458	**748**	290
D&A	431	**424**	-7
Changes in provisions	16	**-34**	-50
Changes in other assets/liabilities	-23	**160**	183
Other operating activities	-10	**6**	16
Changes in working capital	-356	**-88**	267
Operating cash flow	516	**1,216**	700
Investing cash flow	-288	**-346**	-58
thereof Capex on PPE	-337	**-309**	29
Financing cash flow	542	**6**	-536

Cash flow drivers

- Strong increase in profit after tax driven particularly by Life Science, further boosted by Bavencio® milestones
- Provisions largely reflect various favorable developments in litigation positions
- Contribution from other assets/liabilities largely explained by tax positions
- Working capital upside mainly driven by higher payables (Q4 2020 phasing effect)
- Delta in investing cash flow primarily explained by divestment of Allergopharma in Q1 2020
- Capex driven foremost by Life Science capacity expansions

Totals may not add up due to rounding

Adjustments in Q1 2021

EBIT Adjustments

[€m]	Q1 2020		Q1 2021	
	Adjustments	thereof D&A	Adjustments	thereof D&A
Healthcare	-27	2	**10**	0
Life Science	11	0	**14**	0
Electronics	35	0	**17**	3
Corporate & Other	17	0	**6**	0
Total	36	2	**47**	3

Financial calendar

Date	Event
May 12, 2021	Q1 2021 Earnings release
August 5, 2021	Q2 2021 Earnings release
September 9, 2021	Virtual Capital Markets Day
November 11, 2021	Q3 2021 Earnings release
April 22, 2022	Annual General Meeting

Healthcare

China's VBP: Round 4 bidding recently completed, sustained confidence in keeping base business approx. stable through 2021 and 2022

Round 1	Round 2	Round 3	Round 4
2019	2020		2021
March: First round initiated, no Merck's KGaA, Darmstadt, Germany products impacted	**December:** Round 2 announced (incl. bisoprolol)	**April:** Round 2 winners granted exclusive access to 60% of total hospital market[1], non-winners (incl. Concor®) retain access to remaining 40% of hospital market at a gradient price cut[2] + can freely compete in non-hospital/ retail market	**July:** Round 3 announced (incl. Metformin IR and XR)[1]

UPDATE

Jan: Round 4 announced (incl. calcium dobesilate[3] and canagliflozin[3]), bidding completed on Feb 3, Invokana® & Doxium ® not among winners, Implementation starts from late April/May subsequentially

August: Bidding completed, 8 winners (all Chinese manufacturers), Glucophage® not among winners

- **Access retained to non-hospital/retail market (~30% of total market)**, and **~20% of the hospital market** (at gradient price cut)
- Continued **growth of Chinese metformin market >10% p.a.** over the next 5 years

China Glucophage sales represent **only ~8% of the total base business** (2020 net sales)

Sustained confidence in **approx. stable base business (org.) through 2021 and 2022**

1: hospital market for bisoprolol and metformin makes up ~70% of total market, this includes urban hospitals, rural hospitals, and community health centers; 2: Concor® price cut in the high single digit %; 3: alliance products;
Acronyms: VBP = Volume-Based Procurement

From: Q4 2020 earnings call – 2021.03.04

Healthcare pipeline

May 12, 2021

Phase I

M1231
Bispec. MUC1xEGFR ADC
Solid tumors

M1774
ATR inhibitor
Solid tumors

peposertib
DNA-PK inhibitor
Solid tumors[1]

bintrafusp alfa
TGFbeta trap/anti-PD-L1
Cervical cancer 1L

M6223
anti-TIGIT mAb
Solid tumors[2]

M5049
TLR7/8 antagonist
Systemic lupus erythematosus / Cutaneous lupus erythematosus

M5717
PeEF2 inhibitor
Malaria

Simplified overview excluding programs for which Merck KGaA, Darmstadt, Germany explores externalization opportunities and/or for which Company pursues only limited internal development activities

Phase II

berzosertib
ATR inhibitor
Small-Cell Lung Cancer[3]

tepotinib
MET kinase inhibitor
Metastatic Colorectal Cancer
RAS/BRAF wt, *MET* amplified[4]

tepotinib
MET kinase inhibitor
Non-small cell lung cancer,
EGFR mutant, *MET* amplified[5]

bintrafusp alfa
TGFbeta trap/anti-PD-L1
Non-small cell lung cancer 1L/2L

bintrafusp alfa
TGFbeta trap/anti-PD-L1
Locally advanced non-small cell lung cancer

bintrafusp alfa
TGFbeta trap/anti-PD-L1
Biliary tract cancer 1L

bintrafusp alfa
TGFbeta trap/anti-PD-L1
Cervical cancer 2L

bintrafusp alfa
TGFbeta trap/anti-PD-L1
Triple negative breast cancer (HMGA2 positive)

M5049
TLR7/8 antagonist
COVID-19 pneumonia

Phase III

xevinapant
IAP inhibitor
Locally advanced squamous cell carcinoma of the head and neck[6]

avelumab
anti-PD-L1 mAb
Non-small cell lung cancer 1L

evobrutinib
BTK inhibitor
Relapsing multiple sclerosis

Registration

tepotinib
MET kinase inhibitor
Non-small cell lung cancer,
*MET*ex14 skipping[7,8]

avelumab
anti-PD-L1 mAb
Urothelial cancer 1L-M[9,10]

ADC: Antibody Drug Conjugate; Bispec.: bispecific; 1L: first-line treatment; 1L-M: first-line maintenance treatment; 2L: second-line treatment;

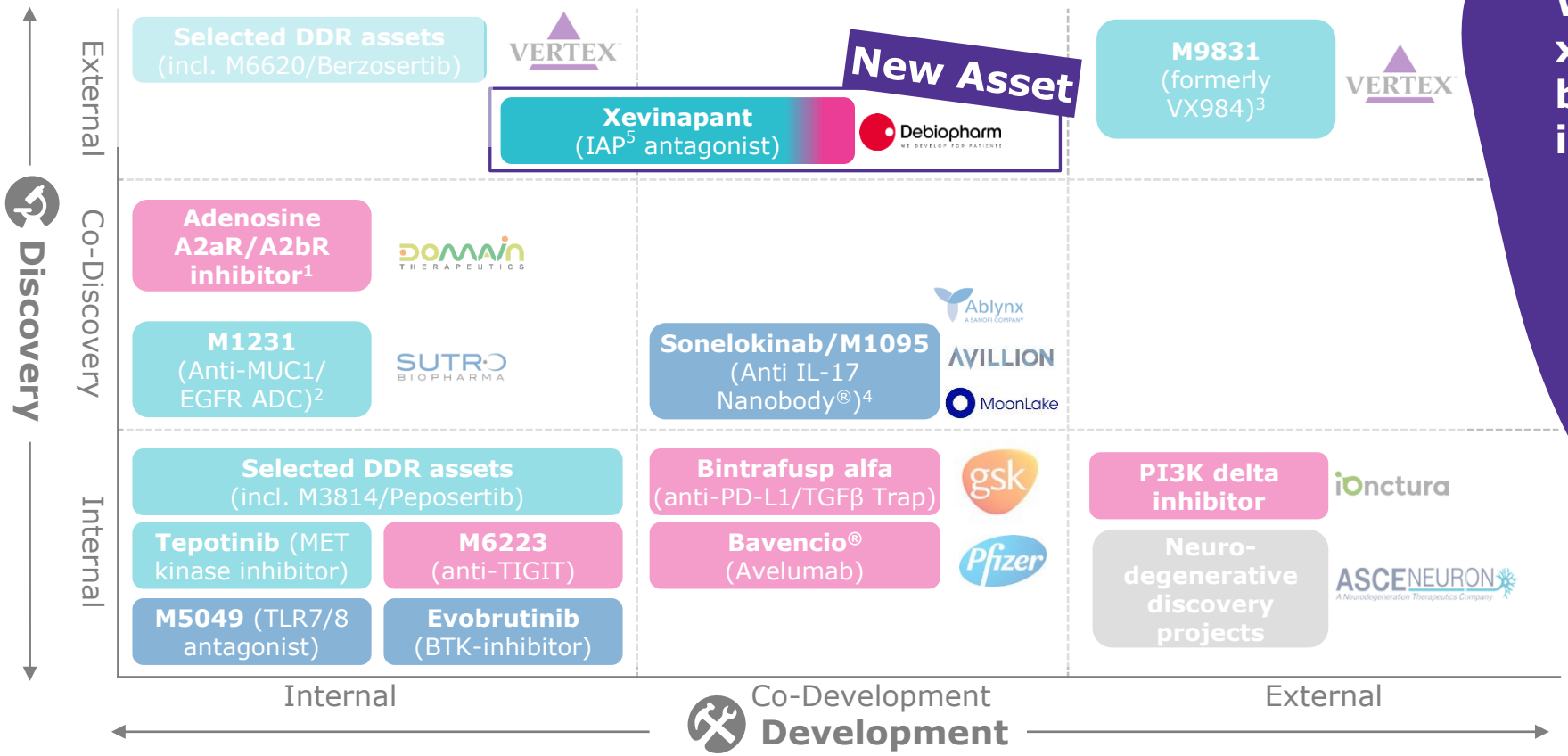
[1] Study in combination with avelumab. [2] Includes study in combination with bintrafusp alfa. [3] Includes studies (phase I/II) in collaboration with/ sponsored by external partners, e.g. NCI. [4] In combination with cetuximab. [5] In combination with osimertinib. [6] On March 01, Merck KGaA, Darmstadt, Germany announced a worldwide in-licensing agreement with Debiopharm, Switzerland, for the development and commercialization of xevinapant (Debio 1143). [7] As announced on February 03, 2021, the US Food and Drug Administration (FDA) has approved tepotinib for the treatment of adult patients with metastatic non-small cell lung cancer (NSCLC) harboring mesenchymal-epithelial transition (MET) exon 14 skipping alterations. This indication is approved under accelerated approval based on overall response rate and duration of response. Continued approval for this indication may be contingent upon verification and description of clinical benefit in confirmatory trials. [8] As announced on November 26, 2020, the European Medicines Agency (EMA) has validated for review the application for tepotinib for the treatment of adult patients with advanced non-small cell lung cancer. [9] As announced on January 25, 2021, the European Commission (EC) has approved avelumab as monotherapy for the first-line maintenance treatment of adult patients with locally advanced or metastatic urothelial carcinoma. [10] As announced on February 24, 2021, Japan's Ministry of Health, Labor and Welfare (MHLW) has approved a new indication for avelumab as a first-line maintenance treatment for advanced bladder cancer.
Additional information: Several combination studies (phase II) of avelumab with talazoparib, axitinib, ALK inhibitors or chemotherapy ongoing under sponsorship of Pfizer.

- Oncology
- Immuno-Oncology
- Immunology
- Neurology
- Global Health

Unless noted otherwise, clinical programs conducted in collaboration with external partners are not shown unless Merck KGaA, Darmstadt, Germany has co-ownership of data. In such case the indication is shown in *Italics*.
Pipeline products are under clinical investigation and have not been proven to be safe and effective. There is no guarantee any product will be approved in the sought-after indication.

Xevinapant
Potential to become standard of care in core area for the Group

Chart originally presented in 2020 R&D update call; selected, non-exhaustive examples



Worldwide xevinapant in-licensing builds on leadership in head and neck

1. Strategic fit
2. Exploitability
3. Clinical & commercial competencies

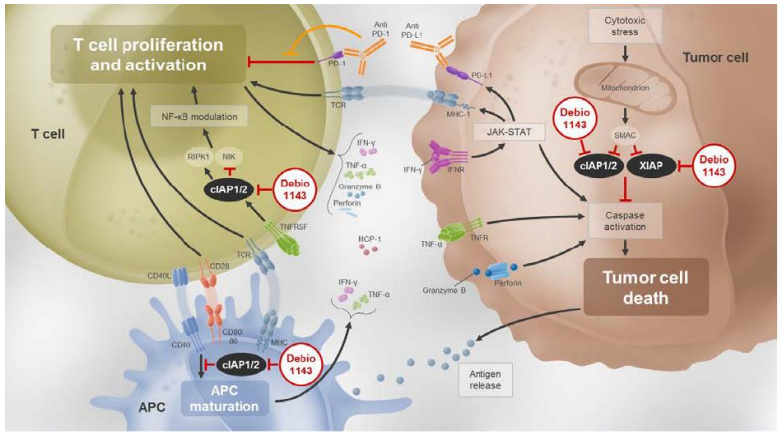
Oncology
Immuno-Oncology
Immunology

1: In 2017, Domain Therapeutics and Merck KGaA, Darmstadt, Germany entered into a collaboration and licensing agreement for the development of adenosine receptor antagonist drugs specifically designed for oncology and immuno-oncology; 2: In 2014, Sutro and Merck KGaA, Darmstadt, Germany initiated a collaboration to discover and develop ADCs utilizing Sutro's cell-free protein synthesis platform, Xpress CF+™. Merck KGaA, Darmstadt, Germany is responsible for drug product, clinical development and commercialization of any resulting products; 3: In 2019, an exclusive license was granted to Vertex for the use of M9831 in gene-editing applications; 4: Avillion conducted Ph II of M1095 in Psoriasis, Merck KGaA, Darmstadt, Germany decided to out license sonelokinab to a new partner to initiate Phase III development in 2021 5: Inhibitor of Apoptosis Proteins

From: Q4 2020 earnings call – 2021.03.04

Xevinapant (Debio 1143)
Potentially first in class oral IAP antagonist with FDA BTD

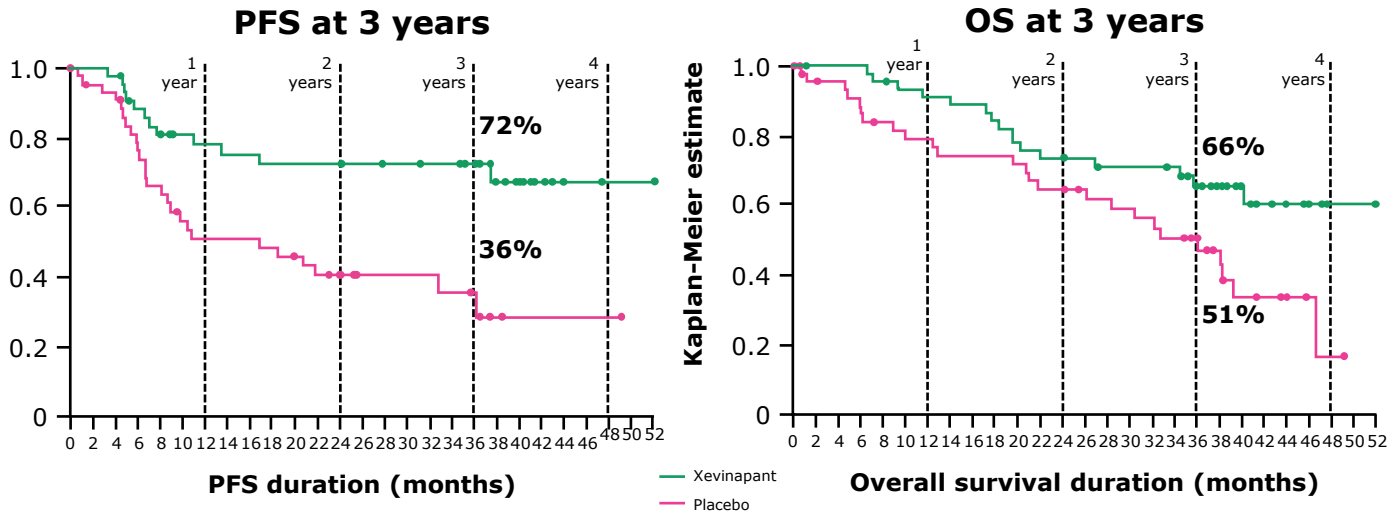
Mode of Action[1]



- Oral Inhibitor of Apoptosis Proteins (IAP) antagonist: chemo-/radio-sensitizer & enhancer of anti-tumor immunity
- IAP antagonists tackling two cancer hallmarks:
  - Enhancing anti-tumor immunity
  - Lowering threshold for tumor cell death

Compelling Phase 2 data[2] published in *The Lancet Oncology*, and presented at ESMO 2020

- **Improvement in OS statistically significant** and clinically meaningful: **HR 0.49** (0.26–0.92); p=0.0261
- **Clinically compelling PFS improvement: HR 0.34** (0.17–0.68); p=0.0023
- Predictable and manageable safety profile without substantial additional toxicity to standard CRT



Acronyms: BTD = Breakthrough Therapy Designation; IAP = Inhibitor of Apoptosis Proteins; 1: Debiopharm; 2: ESMO 2020 - Late Breaking Abstract 39 - 3-years follow-up of double-blind randomized phase II comparing concurrent high-dose cisplatin chemo-radiation plus xevinapant or placebo in high-risk patients with locally advanced squamous cell carcinoma of the head and neck

Xevinapant

Total deal-volume of up to ~ €900 m and industry-typical sales royalties

Payment type	Amount (in €)	Accounting treatment[2]
Upfront payment	~ €190 m	Largest part to be capitalized as an intangible asset
Approval milestones	Up to ~ €380 m[1]	To be paid and capitalized as an intangible asset upon approval and to be amortized once asset is ready for use
Commercial milestones	Up to ~ €330 m	To be paid and capitalized as an intangible asset, based on sales thresholds and to be amortized over remaining useful life
Sales	n/a	Group to recognize sales globally (incl. US)
R&D Costs	n/a	For ongoing TrilynX study ▪ Cash view: 50/50 cost sharing ▪ P&L view: fully shown in Group P&L 2nd study for cisplatin-ineligible patients: Company incurs 100% of cost
Royalties	n/a	Group to pay industry-typical sales royalty to Debiopharm

[1] thereof up to ~€300 m for focus H&N indications)

[2] final accounting treatment is still subject to alignment with auditors

Xevinapant (Potentially first in class oral IAP antagonist)

Two Phase III studies are designed to target the majority of unresectable LA SCCHN patients receiving systemic therapy + RT

Blockbuster potential provided success of both studies

20,000+ unresectable LA SCCHN patients in US and EU-5 each

Tepotinib (MET kinase inhibitor)

First-in-class launch in MET Exon14 sets foundation for EGFRm/ METamp opportunity and exploration in other tumor types

TEPMETKO® tepotinib

Lay the foundation in NSCLC – MET Exon14
(VISION study, NCT02864992
3-5% of total NSCLC population)

- **Highly competitive data** set presented at ASCO 2020 and published in New England Journal of Medicine in May 2020 (99 patients with a follow up ≥9 mths)
- **First-in-class launch**[1] in Japan[2] in March 2020, Sakigake designation[3] granted in 2018
- **Approval by US FDA**[1] received on February 3, 2021

Tap into a growing opportunity in NSCLC – EGFRmut/ METamp
(INSIGHT 2 study, NCT03940703
2-5% of total NSCLC population)

- **Increased EGFRm detection** with testing and treatment moving into earlier lines of therapy (ADAURA trial demonstrates a 79% reduction in the risk of death with Osimertinib in the adjuvant setting (ASCO 2020), suggesting an even greater uptake of Osimertinib)
- **METamp as the primary driver of resistance -** Some publications suggest that METamp resistance post-Osimertinib could be ~25%[4]

Explore EGFR resistance in CRC – Tepotinib + Erbitux® combo
(NCT04515394)

- Opportunity for **Tepotinib to address an unmet need in metastatic colorectal cancer (mCRC) together with Erbitux®** ERBITUX CETUXIMAB

1: approved for both treatment naïve and previously treated METex14 positive NSCLC patients; 2: second largest Oncology market globally; 3: SAKIGAKE designation promotes research and development in Japan, aiming at early practical application for innovative pharmaceutical products; 4: Piotrowska et al., "Landscape of Acquired Resistance to Osimertinib in EGFR -Mutant NSCLC and Clinical Validation of Combined EGFR and RET Inhibition with Osimertinib and BLU-667 for Acquired RET Fusion", AACR Cancer Discovery 2018; Acronyms: CRC = Colorectal cancer; EGFR = Epidermal Growth Factor Receptor; NSCLC = Non-small cell lung cancer

Tepotinib (MET kinase inhibitor)
Tapping into the rapidly evolving EGFRmut/METamp market – Encouraging INSIGHT 1 data

TEPMETKO® tepotinib

INSIGHT 2 – Tepotinib + Osimertinib in Osimertinib Relapsed METamp NSCLC

Recruiting

- **Study design recently amended to reflect evolved and future standard of care:**
  - **Target population** – Inclusion criteria adjusted to focus solely on 1L Osimertinib failures
  - **Testing -** Streamline patient enrollment based on current gold standard method (TBx FISH)
  - **Increasing METamp prevalence** - Some publications suggest that METamp resistance post-Osimertinib could be ~25%[1]
- Estimated primary completion date: **November 2022**

Tepotinib + Erbitux® (Cetuximab) - Adressing a significant medical need in 2L metastatic colorectal cancer (mCRC)

Recruiting

- Opportunity for **Tepotinib to address an unmet need in CRC** together with Erbitux®
- Estimated primary completion date: **March 2023**

A solid foundation - Encouraging INSIGHT 1 data (18-months follow-up presented at WCLC 2019)[2]

Endpoint	Tepotinib + gefitinib	Chemotherapy
Primary - PFS (HR 0.13 [90% CI 0.04, 0.43])	16.6 m	4.2 m
Secondary - ORR (OR 2.67 [90% CI 0.37, 19.56])	66.7%	42.9%
Secondary - OS (HR 0.09 [CI 0.01, 0.54])	37.3 m	13.1 m

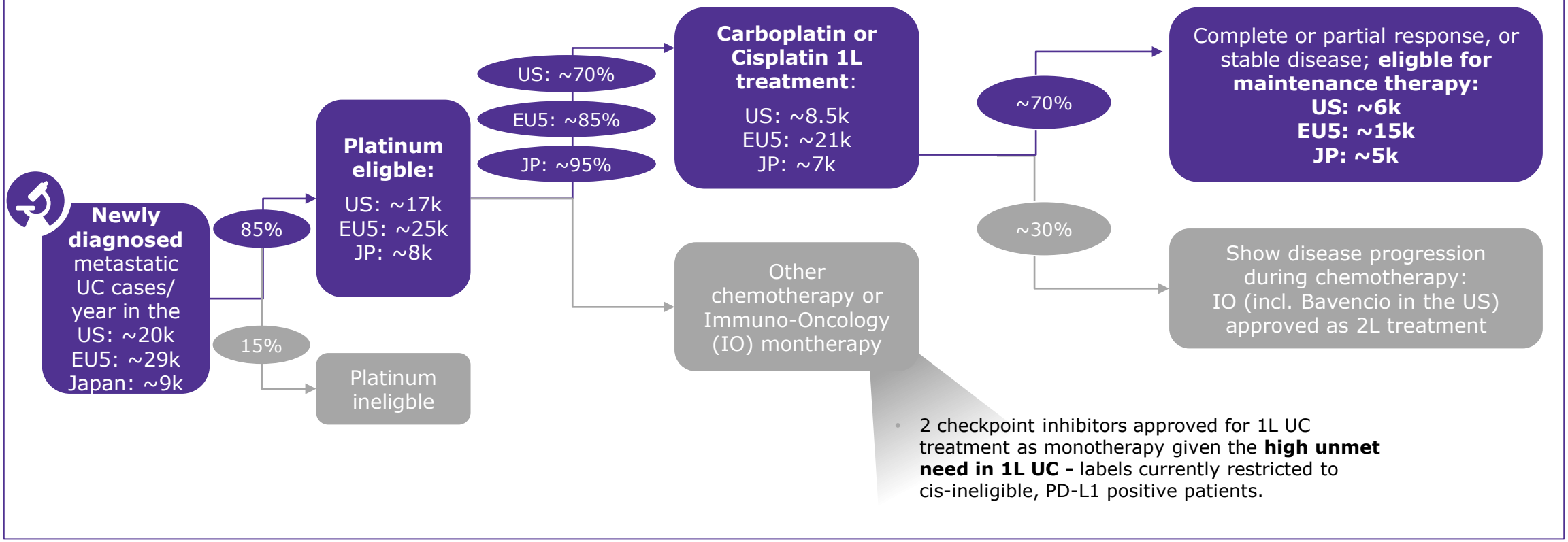
- **Proof of Concept: MET amplification can be considered a suitable biomarker** for treatment with Tepotinib
- **Safety:** generally **well-tolerated,** most adverse events mild to moderate

1: Piotrowska et al., "Landscape of Acquired Resistance to Osimertinib in EGFR -Mutant NSCLC and Clinical Validation of Combined EGFR and RET Inhibition with Osimertinib and BLU-667 for Acquired RET Fusion", AACR Cancer Discovery 2018; 2: Wu et al., „Long term outcomes to tepotinib plus gefitinib in patients with EGFR mutant NSCLC and MET dysregulation: 18 month follow up", presented at WCLC 2019; Acronyms: FISH = Fluorescence in situ hybridization; TBx = Tissue Biopsy

Bavencio® (Avelumab) – Urothelial Carcinoma (UC 1L)

UC 1L maintenance treatment achieving transformative OS benefit (31% reduction in risk of death, 7 months increase in median overall survival)

Durable responses to standard of care (1L chemotherapy) are rare with most patients experiencing progression within 9 months of treatment[1]



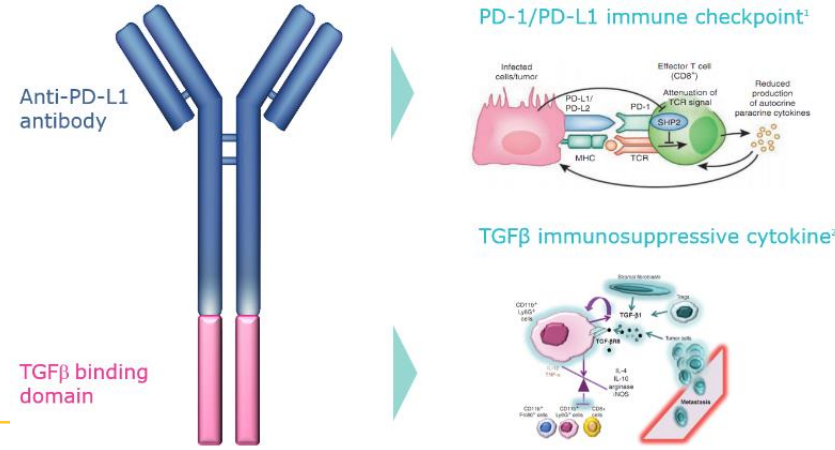
1: Kantar Health Patient Metrics & Kantar Health Treatment Architecture for epidemiological data; IMS Claims, Kantar and IPSOS for triangulation of market shares

Bintrafusp alfa[1]

An innovative first-in-class bifunctional fusion protein discovered in-house leading the TGF-β immuno-oncology field

Mode of action

- Innovative **first-in-class bifunctional fusion protein** designed to simultaneously target two immune suppressive pathways (blocking PD-L1 and reducing TGF-β signaling)
- Demonstrated **superior anti-tumor activity in pre-clinical study** compared to anti-PD-L1 alone, and anti-PD-L1 and TGF-β given in combination as separate agents
- **Great excitement in IO community** about M7824 uniquely addressing TGF-ß biology widely accepted as key resistance factor for anti-PDx therapies



clinical development achievements

- Tested in **14 Phase Ib expansion cohorts** across >700 patients in more than 10 tumor types
- Shown clinical anti-tumor activity across multiple hard-to-treat cancers including **advanced NSCLC, biliary tract cancer, HPV-associated cancers, and gastric cancer**
- PhII study **M7824 monotherapy versus pembrolizumab 1L**, advanced NSCLC high PD-L1-tumor expressers started in October 2018

clinical development plans

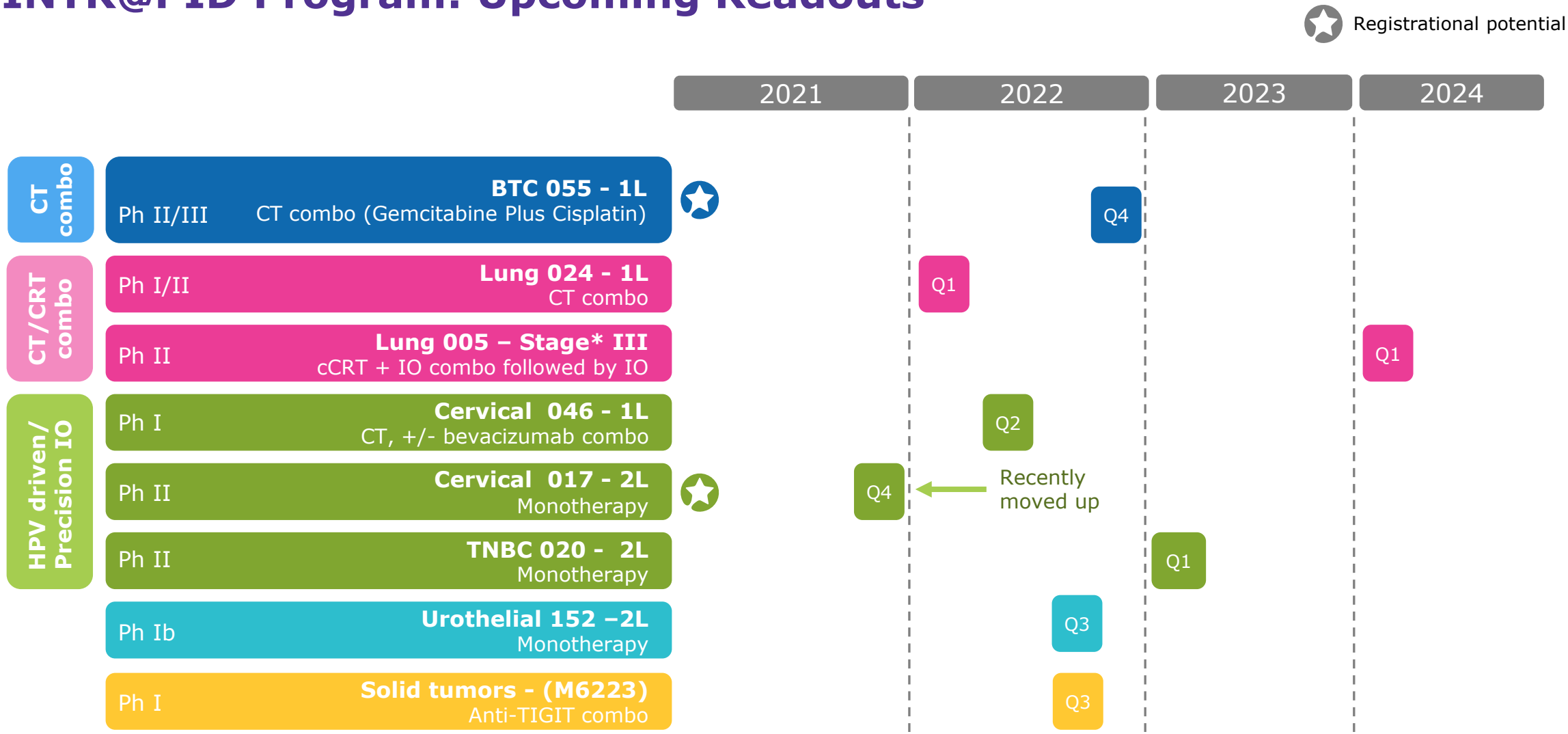
- **Multiple high priority immuno-oncology clinical development studies** ongoing or expected to commence shortly, including **studies in non-small cell lung and biliary tract cancers with registrational intent** and most recently **advanced, unresectable cervical cancer**

[1]proposed International Nonproprietary Name (INN)

Acronyms: NSCLC = Non-small Cell Lung Cancer, IO = Immuno-Oncology

Bintrafusp alfa

INTR@PID Program: Upcoming Readouts



Acronyms: BTC = Biliary Tract Cancer; CT = Chemotherapy; EMT = Epithelial-mesenchymal transition; HPV = Human papillomavirus; NSCLC = Non-small Cell Lung Cancer; RT = Radiation therapy; TNBC = Triple-Negative Breast Cancer; * unresectable; **All clinical timelines are event-driven and may be subject to change**

From: Q4 2020 earnings call – 2021.03.04

Bintrafusp alfa: Developmental Progress
NSCLC Stage III cCRT Combo trial

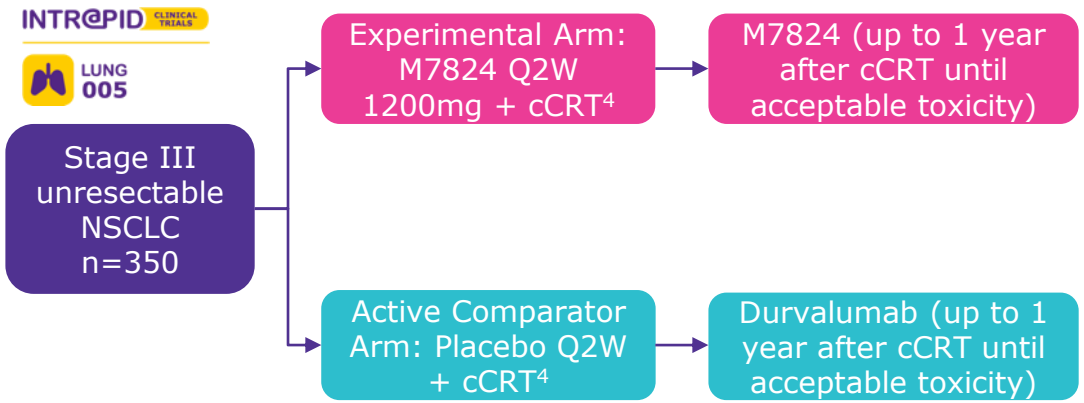
NSCLC 2L data presented at ESMO 2018

- **Need:** NSCLC accounts for 80-85% of all cases of lung cancer[1]
- **Results: Encouraging efficacy comparing favorably** to established PDx-inhibitor monotherapy (IRC)[2,3]:
  - **ORR (all-comers):** 25.0%
  - **ORR (PD-L1-positive):** 37.0%
  - **ORR (PD-L1-high):** 85.7%
- **Progression free survival by IRC** (PD-L1 ≥ 1%):
  - M7824: **mPFS = 9.5 months**, competitor: 4.0 months[2,3]
- **Overall Survival by IRC** (PD-L1 ≥ 1%):
  - M7824: **mOS not reached**, competitor: 12.7 months[2,3]

Pre-clinical data on M7824 + RT combo[5]

- M7824 and RT combination therapy **enhances antitumor activity relative to mono-therapies** in mouse models
- EMT, VEGF, and RT-induced fibrosis gene signatures are decreased with M7824 and combination therapy, and **M7824 reduces RT-induced fibrosis**
- Results **support evaluation of M7824 + RT in the clinic**

INTR@PID LUNG 005



Endpoints

Primary endpoint: PFS

Main secondary endpoints: OS, Safety, Pulmonary function, Association of PD-L1 expression at base line and efficacy

[1]Jemal A et al., Cancer statistics, 2007, CA Cancer J Clin 2007;57:43-66; [2]Paz-Ares et al., Poster presented at the 43rd European Society for Medical Oncology Annual Meeting, Munich, October 19–23, 2018, data shown for 1200mg Q2W dose; [3]Herbst et al.; Pembrolizumab versus docetaxel for previously treated, PD-L1-positive, advanced non-small-cell lung cancer (KEYNOTE-010): a randomised controlled trial (www.thelancet.com Published online December 19, 2015 http://dx.doi.org/10.1016/S0140-6736(15)01281-7); [4]Cisplatin/Etoposide or Carboplatin/Paclitaxel or Cisplatin/Pemetrexed concomitant with Intensity Modulated Radiation Therapy (IMRT); [5]Lan et al., Combination of M7824 and radiation therapy enhances antitumor activity, increases immune response, and modulates radiation-induced fibrosis in cancer models, 2018

Bintrafusp alfa: Developmental Progress
Data shown at AACR 2019 highlights opportunity in HPV-related cancers

Efficacy variable	HPV-associated cancer (n=43)	HPV+* (n=36)
Confirmed BOR, n (%)		
CR	2 (4.7%)	2 (5.6%)
PR	10 (23.3%)	9 (25%)
SD	6 (14.0%)	5 (13.9%)
PD	20 (46.5%)	17 (47.2%)
Not evaluable	5 (11.6%)	3 (8.3%)
Delayed PR†	3 (7.0%)	3 (8.3%)
ORR per RECIST v1.1, n (%) [95% CI]	12 **(27.9%)** [15.3–43.7]	11 **(30.6%)** [16.3–48.1]
Total clinical response rate†, n (%)	15 **(34.9%)**	14 **(38.9%)**
DCR, n (%)	18 (41.9%)	44.4%

Prevalence: >630,000 new cases of HPV-related cancer are reported worldwide annually[1]

Response Rates:

- Bintrasfusp alfa response rates **compared favorably to those with anti–PD-1 inhibitors** (ORRs of 13%–24%)[1-7]
- **ORR was 27.9% and 30.6% in HPV-associated and HPV+ cancers, respectively**
- Including three additional patients with delayed PRs after initial PD: **Total response rate was 34.9% and 38.9% in HPV-associated and HPV+ cancers, respectively**

Long-term Benefit:

- **Most responses durable** with 4 responses having DoR >18 months and 11/15 responses ongoing at the data cutoff
- Responses to bintrafusp alfa occurred **irrespective of tumor type** or PD-L1 expression
- **Safety profile was similar to anti–PD-(L)1 therapy[1,5]** except for SCC/KAs and low grade mucosal bleeding which are anticipated AEs with TGF-β inhibition[8,9]

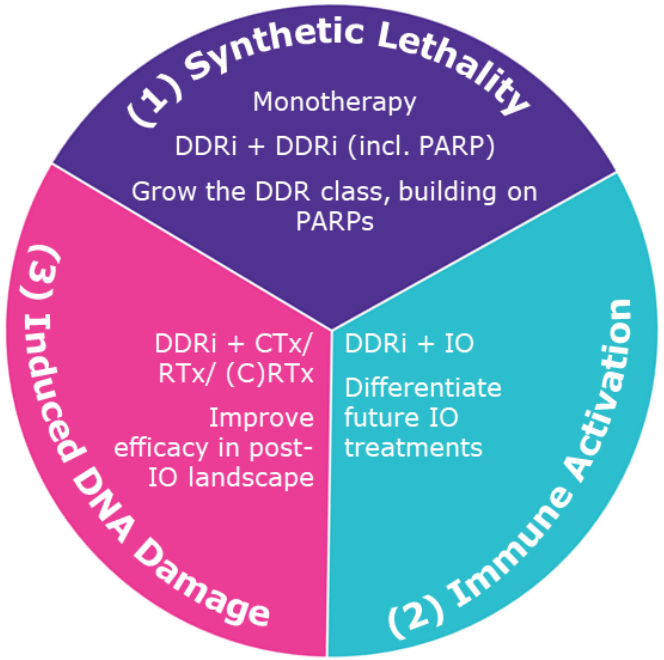
Cervical Cancer 2L study recently posted on ct.gov

†Due to confirmed PD before onset of response, these patients did not meet response criteria by RECIST v1.1; *HPV status was determined from prior documentation, or by using cobas® 4800 HPV Test (Roche) in the dose escalation phase or RNA sequencing (RNASeq) in the expansion phase.

[1]Bauml J, et al. J Clin Oncol. 2017;35:1542–49; [2]Ott PA, et al. Ann Oncol. 2017;28:1036–41; [3]Hollebecque A, et al. J Clin Oncol. 2017;35(Suppl):Abstract 5504; [4]Chung HC, et al. J Clin Oncol. 2018;36(Suppl):Abstract 5522; [5]Ferris RL, et al. N Engl J Med. 2016;375:1856–67; [6]Mehra R, et al. Br J Cancer. 2018;119:153–59; [7]Morris VK, et al. Lancet Oncol. 2017;18:446–53; [8]Lacouture ME, et al. Cancer Immunol Immunother. 2015;64:437–46; [9]Trachtman H, et al. Kidney Int. 2011;79:1236–43

DNA Damage Response (DDR)
Leading DDR portfolio with a broad clinical program

Strategy presented at R&D Update Call 2019



ATRi

Berzosertib/M6620 (formerly VX-970)
- Only ATR-inhibitor with a POC from an RCT (Ovarian cancer, Berzosertib +/- Gem)
- Multiple NCI studies in various tumor types
- Promising Phase II data (Small cell lung cancer) recently published in "Cancer Cell"
- Phase II SCLC trial recently initiated

M4344 (formerly VX-803)
- Development recently terminated due to prioritization of M1774

M1774 (formerly VX-400)
- Phase I FiH monotherapy study ongoing. Expansions to investigate combinations under discussion.

DNA-PKi

Peposertib/ M3814
- Ph Ib/II in Rectal cancer (CRT combo) recently discontinued
- Combo with Avelumab: Study with and w/o RT ongoing (PhI, solid tumors)
- Multiple NCI studies in various tumor types

M9831 (formerly VX984)
- Exclusive license[1] granted to Vertex in 2019 for use in gene-editing applications

ATMi

M4076
- Clinical candidate/ready for Phase I trials, chemical structure first disclosed at AACR 2019

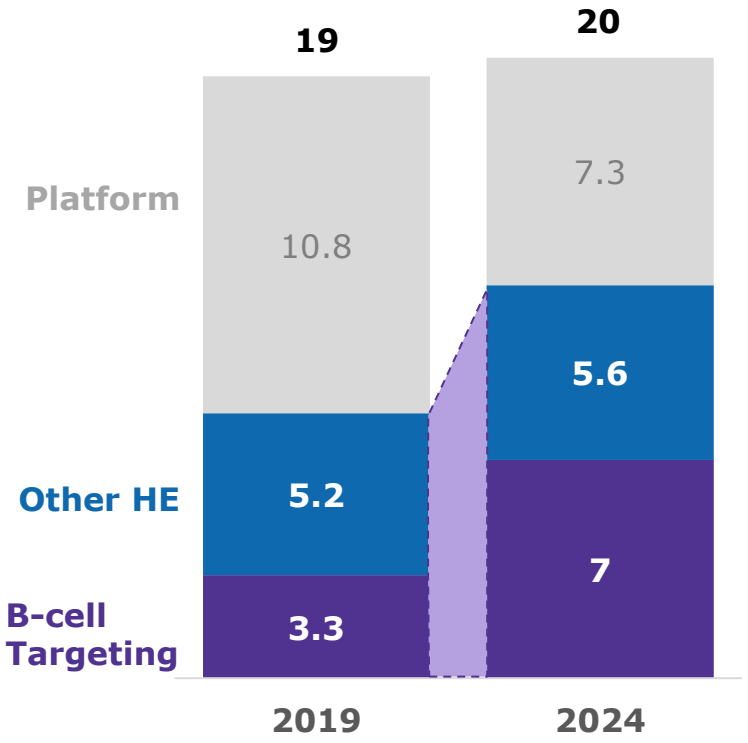
1: incl. upfront payment + milestone/royalties on future sales; Acronyms: ATMi = Ataxia telangiectasia-mutated; ATRi = Ataxia telangiectasia and Rad3-related inhibitors; CRT = Chemoradiotherapy; DDR = DNA Damage Response; DNA-PKi = DNA-dependent Protein Kinase Inhibitor; PARP = poly(ADP-ribose) polymerase inhibitor; POC = Proof of concept; RCT = Randomized Controlled Trial; RT = Radiation Therapy

We pioneered BTKi development for MS with Evobrutinib
Potential to have 3 complementary MS branded products by 2025

Unmet need in Multiple Sclerosis (MS) – Need for new mechanisms to control disease

- **~50% of patients with Relapsing MS (RMS) continue to have ongoing disease activity** over 2 years even when treated with the most effective agents
- No therapy with impact on **progression** mediated by **CNS myeloid cells**
- **Systemic side effects** of therapies limit patient acceptance and compliance
- All approved higher efficacy therapies **associated with elevated risk of infection**

Worldwide MS Market [€ bn][1]



B-Cell Targeting + High-Efficacy (HE) Orals represent >60% of MS sales

- **BTKi is a novel class** of non-depleting therapies selectively targeting both B-cells and innate immune cells including disease progression-relevant microglia
- Merck KGaA, Darmstadt, Germany was the **first to conduct a full Phase II dose-ranging study in MS with Evobrutinib**, a highly selective covalent BTKi[2]
- **Merck KGaA, Darmstadt, Germany** is a **growing MS player** and could have 3 complementary branded products by 2025 – Mavenclad®, Rebif®, Evobrutinib

Platform agents – interferons, copaxone, DMFs and Teriflunomide; Other HE (high-efficacy) - cladribine, S1Ps, alemtuzumab; B-cell Targeting – ocrelizumab, ofatumumab, ublituximab. Includes branded products, generics and biosimilars; 1: Merck KGaA, Darmstadt, Germany internal estimates; 2: Montalban et al. NEJM 2019; 380:2406-2417; Acronyms: BTKi = Bruton's tyrosine kinase inhibitor

Evobrutinib stands out amongst BTK inhibitors under development
Uniquely positioned both in terms of clinical evidence and mode of action

		Fenebrutinib##	Tolebrutinib**	Evobrutinib
Clinical Evidence	Long-term* **efficacy on relapses**	✗	✗	✓ (1)
	Long-term* **safety**	✗	✗	✓ (1)
	Convenience (oral)	✓ BID	✓ QD	✓ BID
	Exposure in CSF	✗	✓ (2, ##) **in HV**	✓ (3) **in MS**
	Biomarker of inflammation and progression in MS patients (sNfL)	✗	✗	✓ (3)
Preclinical data	**BTK occupancy in the CNS**	✗	✓ (4)	✓ (5)
	Efficacy in progressive EAE model and reduction of leptomeningeal inflammation#	✗	✗	✓ (6-8)

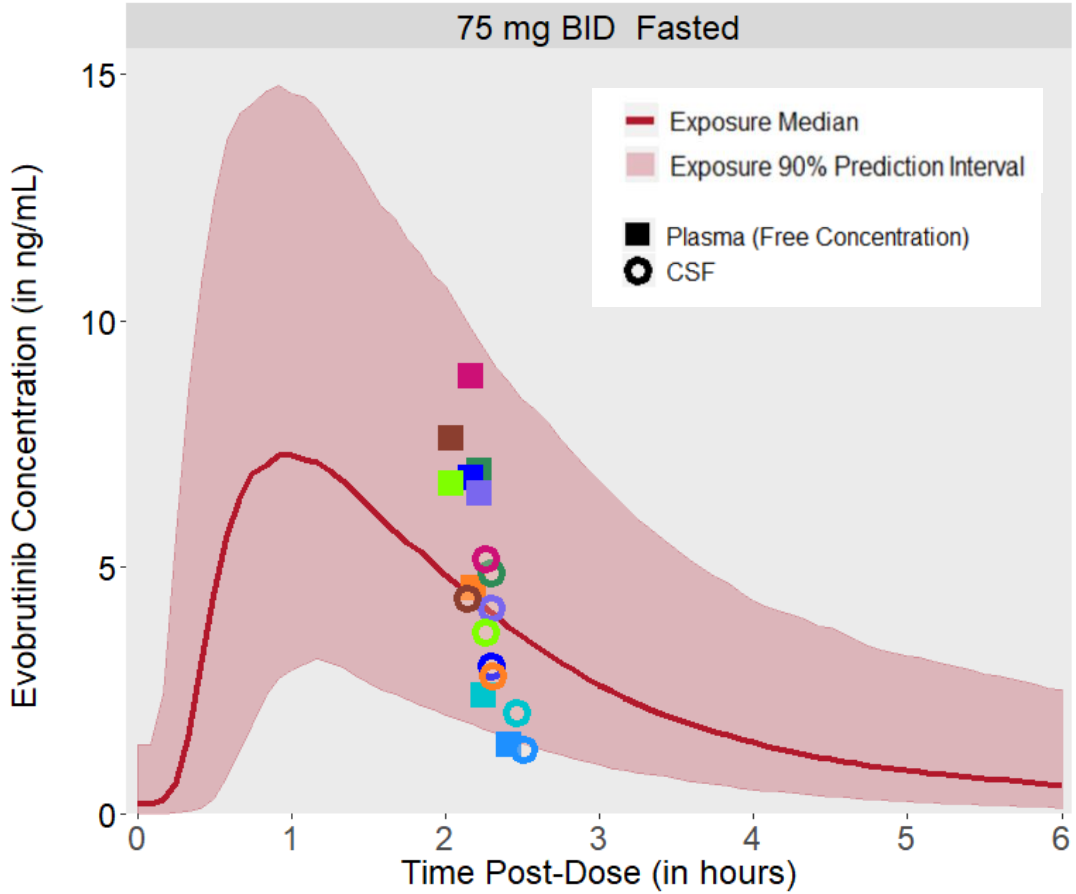
evolutionRMS

Phase III studies: Recruitment on track → Target data in-house in Q4 2023 and potential filing shortly after

✗: not reported

*Long term is defined as the continuous treatment of MS patients for at least 96 weeks; **Extension to Phase II clinical trial in MS ongoing; #Defined as having an evidence on all the following: Inhibition of leptomeningeal and cortical inflammation and progression in preclinical models; ## No reported data in MS patients; 1: Montalban et al., triMS.online conference 2020; 2: Smith et al., ACTRIMS 2019; 3: data on file; 4: Francesco et al., ECTRIMS 2017; 5: Boschert U et al., ECTRIMS-ACTRIMS 2017; 6: Kim et al., ECTRIMS 2020, 7: Alankus YB et al., ECTRIMS 2018; 8: Rijvers et al., ECTRIMS 2020; Acronyms: sNfL serum Neurofilament Light Chain; BID twice a day; QD once a day; HV healthy volunteers; MS multiple sclerosis

Evobrutinib has the potential to tackle Multiple Sclerosis directly in the brain



- Evobrutinib was quantifiable **in CSF of 9 of 9 clinically stable RMS patients** administered the efficacious 75 mg BID dose in the RMS Phase 2 OLE study*
  - Plasma PK were at steady-state and consistent with other RMS Phase2 patients
- **CSF concentrations are consistent with free plasma concentrations**
- The **measured CSF concentrations are biologically relevant**
  - Median BTK trough occupancy >95% observed at similar plasma concentrations

CSF cerebrospinal fluid; BID twice a day; RMS relapsing multiple sclerosis; OLE open label extension; PK pharmacokinetic; BTK Bruton Tyrosine Kinase; *Data on file

Evobrutinib targets inflammation and progression
Dual mechanism of action offers an innovative oral approach to MS therapy

MOA on B-cells and macrophage/microglia cells is an **innovative oral approach to MS therapy** with potential to impact compartmentalized inflammation and progression

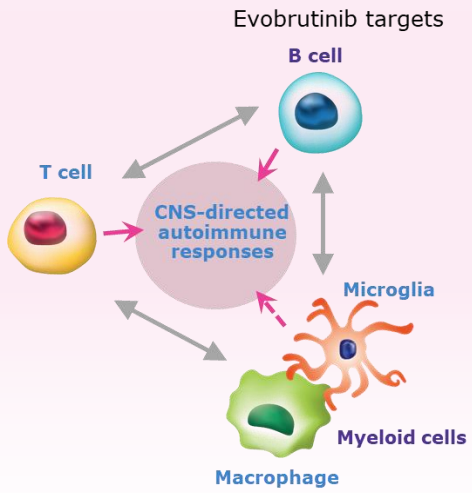
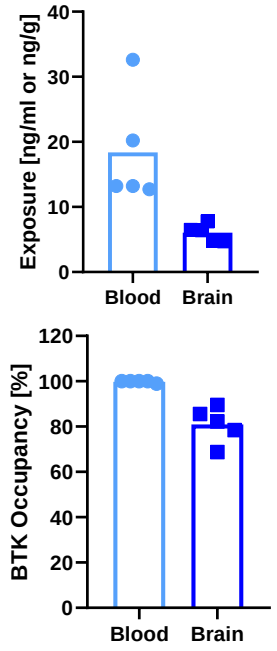


Figure modified from:
Li R, et al. 2018.

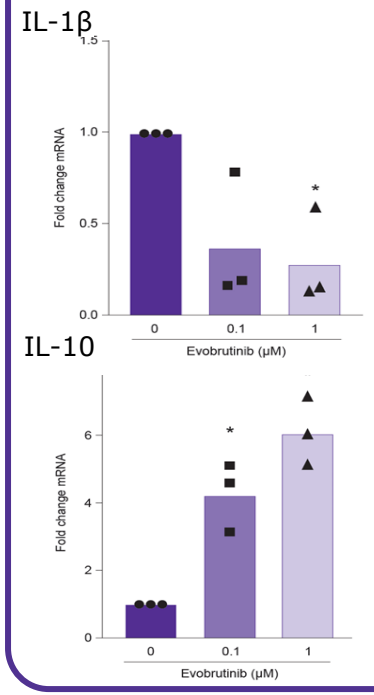
Evobrutinib is a CNS penetrant BTKi[2]

CNS exposure in EAE mice



Evobrutinib shifts macrophage phenotypes from M1 pro- to M2 anti-inflammatory [3]

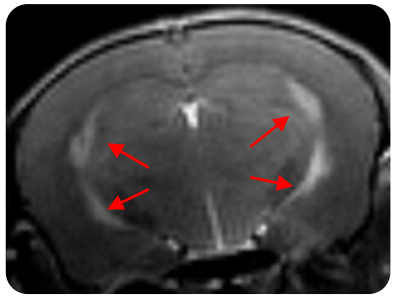
Macrophages after GM-CSF activation



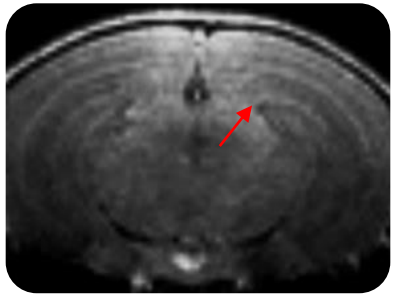
Evobrutinib reduces CNS B cells and leptomeningeal inflammation[4]

Leptomeningeal structures

Vehicle:



Evobrutinib:



EAE in SJL/J mice

- Important role of macrophage/ microglia cells in addition to B and T cells in both **periphery and CNS**[1]
- Evobrutinib **reaches brain** to potentially impact compartmentalized inflammation[2]
- Effects may be mediated through effects on **CNS-resident and CNS-migrating cells**[3,4]

1. Li et al. Nat Immunol 2018; 2. Adapted from Boschert U et al. ECTRIMS-ACTRIMS 2017; 3. Alankus YB et al. ECTRIMS 2018; 4. Sol Kim ECTRIMS 2020

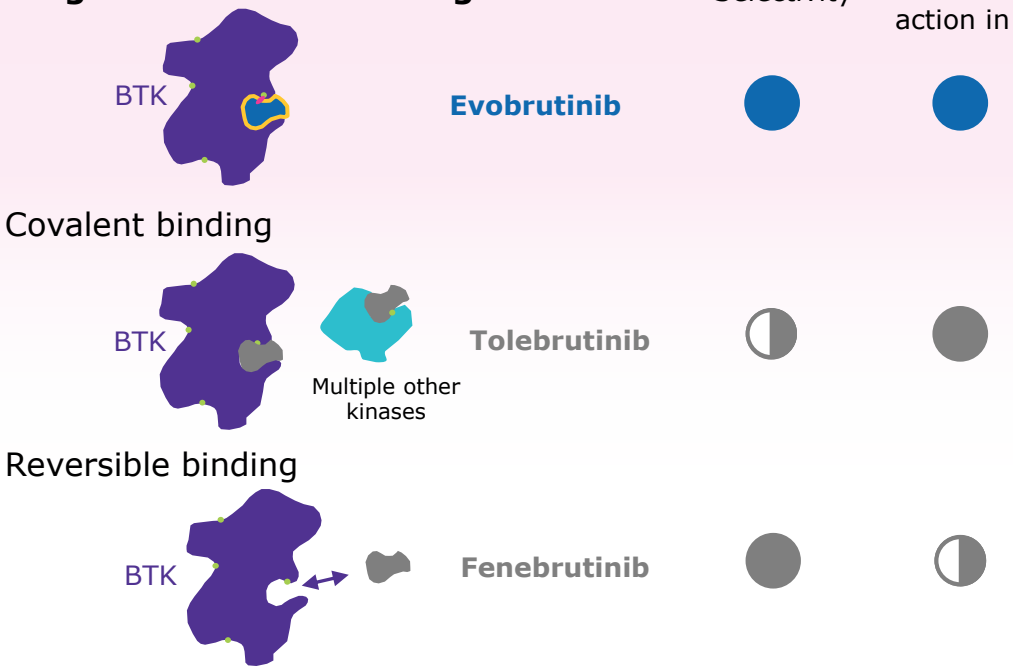
Evobrutinib is optimally dosed to offer best-in-class BTK inhibition

Optimized dose selection & targeted covalent binding results in sustained BTK inhibition that is necessary for robust efficacy

Sustained BTK inhibition in CNS-resident and CNS-migrating cells resulting from covalent binding MOA and BID dosing can be critical to achieve best-in-disease efficacy[1]

Targeted covalent binding leads to highly specific continuous target engagement[2-6]

Targeted covalent binding



BID dosing enables critical >95% BTK inhibition throughout the day in the majority of patients[7]

BTK Occupancy (SS Trough) Threshold	25 mg QD	75 mg QD	75 mg BID
	% of Population (RMS Ph2)		
95%	23	48	98

Efficacy at 48 weeks[8]	
75 mg QD Evobrutinib Fasted: **ARR = 0.25**	75 mg BID Evobrutinib Fasted: **ARR = 0.11**

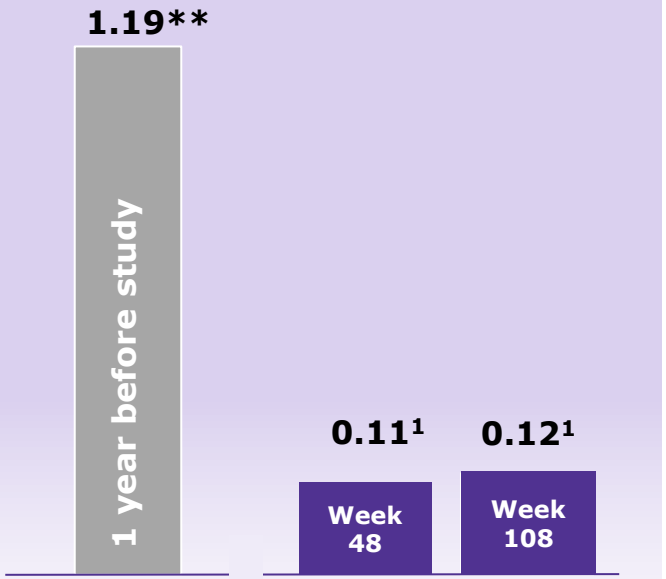
1. Boschert et al., ECTRIMS 2017; 2. Bianco et al., Trends in Pharmacological Sciences 2020; 3. Bauer R.A., Drug Discovery Today 2012; 4. Swinney D.C., Curr. Top. Med. Chem. 2006; 5. Barf, T. & Kaptein, A., J. Med. Chem. 2012; 6. Caldwell et al., J. Med. Chem. 2019; 7. Montalban et al., EAN 2020., 8. Montalban et al NEJM 2018
*at disease relevant concentrations; ARR: annualized relapse rate; *75 mg BID fasted equals 45 mg BID fed that is a dose used in Phase III EVOLUTION studies

Evobrutinib holds unmatched Long-Term Data among BTKi class in MS

Evobrutinib (BTK-inhibitor)

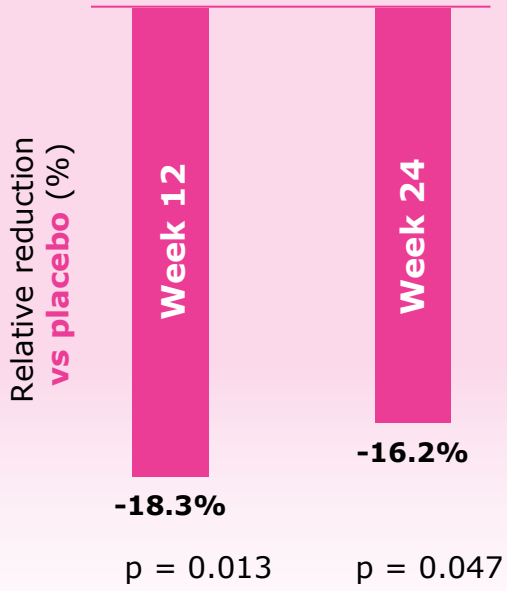
Best-in-disease efficacy & favorable safety over 2 years in largest Phase II study in MS

Very high, sustained efficacy



Annualized Relapse Rate

Early and substantial impact on sNfL*



Relative reduction of Serum Neurofilament Light vs Placebo (%)[3]

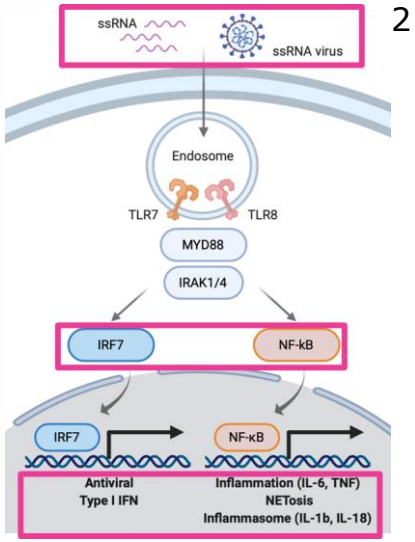
- Evobrutinib is the **only BTKi to have demonstrated very high, sustained efficacy and favorable safety** in the largest Phase II study in MS (n=267), with an ARR of confirmed relapses of 0.12 up to 108 weeks[1]
- Evobrutinib **impacts sNfL levels**, a biomarker of neuronal damage, reflecting **disease activity and drug response in patients with MS[3], starting at 12 weeks** and maintained through 24 weeks[2]
- Evobrutinib is **highly selective resulting in targeted kinase inhibition**, and its safety data in >1200 patients over 2+ years supports the potential for an **optimal long-term safety profile[2]**

1. Montalban et al 2020 EAN; 2. Data on file; 3. Kuhle et al. Neurol. 2019; *Significant covariates of evobrutinib effect on NfL (age, EDSS, T2 lesion volume and time since MS onset) are markers associated with advanced and progressing MS;** Average ARR during the 1 year before the study are historically collected data and relapses were not confirmed by an independent, blinded rater. No formal statistical comparison was conducted between pre-study and on-study ARR.

M5049 (TLR7/8 antagonist)
TLR7/8 are drivers of SLE pathology and possibly of COVID-19

Mechanism of Action[1]

- M5049 (**discovered in-house**) is a **potentially first-in class small molecule** that blocks activation of Toll-like receptors TLR7 and TLR8, two innate immune sensors that detect single-stranded (ss) RNA from viruses such as SARS-COV-2, the virus responsible for COVID-19, and inflammatory self-RNAs in the context of autoimmunity
- Activation of TLR7/8 leads to immune cell activation and inflammation, which when not properly controlled can cause severe immunopathology



2

Results from Phase I study in healthy volunteers (NCT03676322)[1]

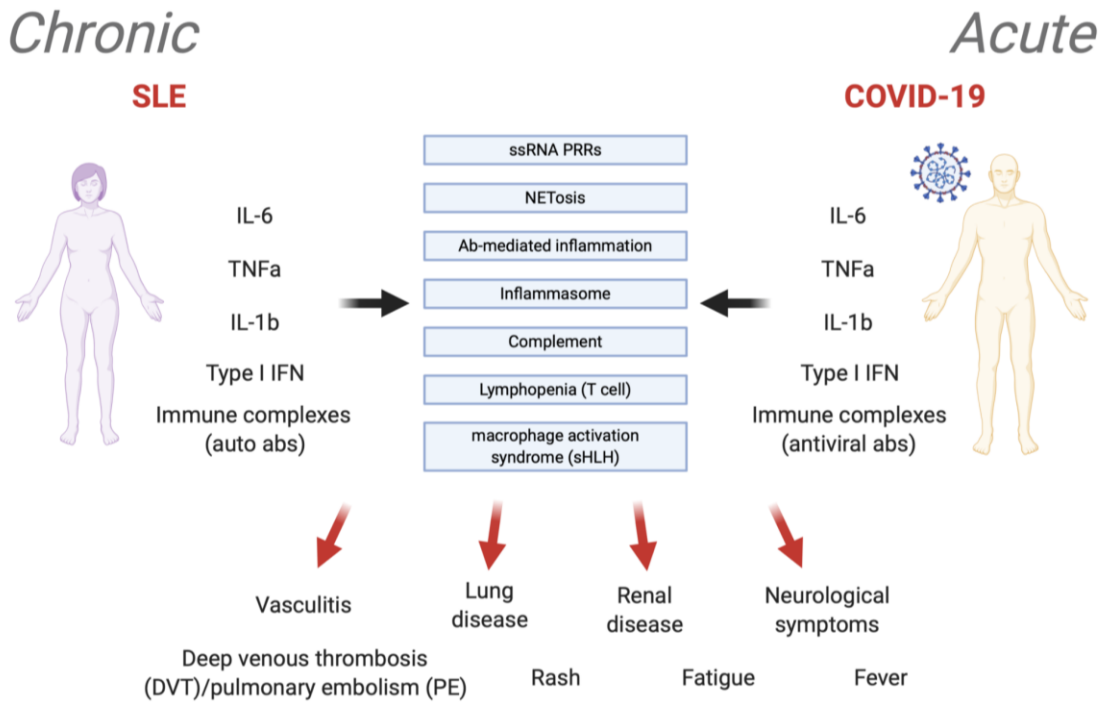
- **Well-tolerated** over the dosing interval, no significant or dose-limiting adverse event
- Pharmacokinetic parameters linear and dose-proportional from 1 to 200 mg
- Exposure-dependent inhibition of ex vivo-stimulated IL-6 secretion observed, with maximum inhibition achieved at 200 mg

Preliminary Phase I data warrant further investigation as a potential treatment for autoimmune diseases including SLE

1: Port et al., A PHASE I, FIRST-IN-HUMAN STUDY TO ASSESS THE SAFETY, PHARMACOKINETICS AND PHARMACODYNAMICS OF SINGLE AND MULTIPLE ASCENDING DOSES OF M5049, A DUAL ANTAGONIST OF TLR7/8, IN HEALTHY SUBJECTS, Lupus Science & Medicine 2020;7(Suppl 1):A1–A131, conference cancelled due to COVID-19; 2 Adapted from ImmunoHorizons July 1, 2018 Dowling, D;
Acronyms: SLE = Systemic lupus erythematosus; TLR = Toll-like receptors

M5049 (TLR7/8 antagonist)
Similarities between SLE and COVID-19

Similarities between SLE and COVID-19[1]



Phase II study started in July 2020

Rational:

- Investigate if M5049 intervention at critical point in course of COVID-19 disease may prevent or ameliorate hyper-inflammatory response in patients with COVID-19 pneumonia and **prevent progression to 'cytokine storm'**
- Successful intervention with investigational drug may reduce life-threatening complications of COVID-19, including severe respiratory symptoms often necessitating further interventions such as mechanical ventilation

Design:

- Phase II randomized, controlled clinical study
- Commenced in July 2020

Results:

Dependent on recruitment and COVID-19 infection rates
First results expected in Q3/Q4 2021

1: Illustration created in-house; Acronyms: SLE = Systemic lupus erythematosus

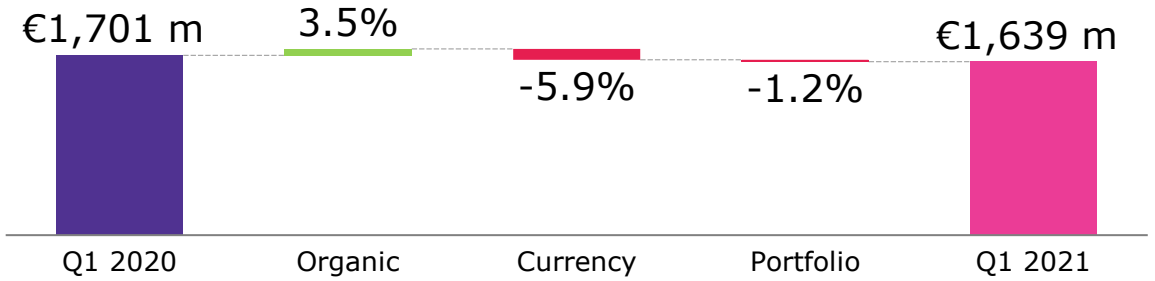
All timelines are event-driven and may be subject to change

Healthcare: strong Fertility & Oncology performance, while Mavenclad® remains impacted by depressed dynamic market

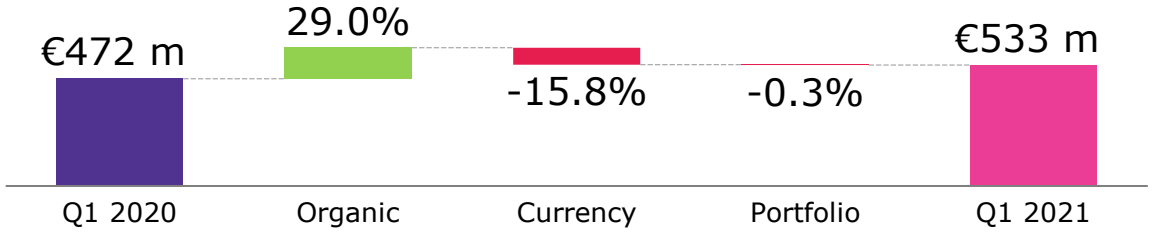
Healthcare P&L

[€m]	IFRS		Pre	
	Q1 2020	Q1 2021	Q1 2020	**Q1 2021**
Net sales	1,701	1,639	1,701	**1,639**
M&S*	-423	-370	-423	**-365**
Admin	-79	-73	-78	**-69**
R&D	-417	-416	-417	**-415**
EBIT	422	445	395	**455**
EBITDA	501	523	-	-
EBITDA pre	472	533	472	**533**
(in % of net sales)	27.8%	32.5%	27.8%	**32.5%**

Net sales bridge



EBITDA pre bridge



Comments

- Mavenclad® growing +26 % organically to €147 m, amid still depressed dynamic market; Rebif® decline -17% in Q1 due to tough comps related to tender win in Q1 2020
- Oncology up +20%, Bavencio® sales doubled post UC 1L launch in U.S. and initial contribution from EU & JP[1]; Erbitux® up +10% largely driven by China growth
- Base business about stable, strong Fertility growth (+22% org.) compensating for Rebif® and CM&E decline (-4% org.)
- Strong savings in M&S from continuous rigorous cost discipline, supported by reduced face-to-face activities amid pandemic
- R&D flat as a result of continued prioritization; no significant COVID-19 related project delays
- EBITDA pre and margin significantly supported by Bavencio® milestones (~ €50 m)

* Marketing and selling expenses

Totals may not add up due to rounding

[1] U.S., Europe and Japan approvals received on 30/06/2020, 25/01/2021 and 24/02/2021 respectively

Life science

Life Science

Capitalizing on three key life science trends

1 COMPLEX BIOLOGICS

Single Use / End to End

Opened Wuxi site in 2018, and expanded Danvers facility

Viral Vectors

Expanded Carlsbad viral vector manufacturing site in 2016; further doubling of capacity planned for 2021

Antibody Drug Conjugates (ADC)

Launched ADC Express™ for the rapid production of ADCs

2 DIGITAL UNIVERSE

#1 eCommerce site in Life Science[1]

- **>90%** of Millipore products on eCommerce platform
- **x2** net sales growth of eCommerce vs. non-eCommerce[2]

3 ASIA

Manufacturing/Distribution

Nantong, Wuxi Single use

Commercial expansion

Tier 2 cities

eCommerce partnership

Alibaba Group 阿里巴巴集团

[1]measured by traffic, rated by external service SimilarWeb; [2]by business segment within Life Science

Life Science

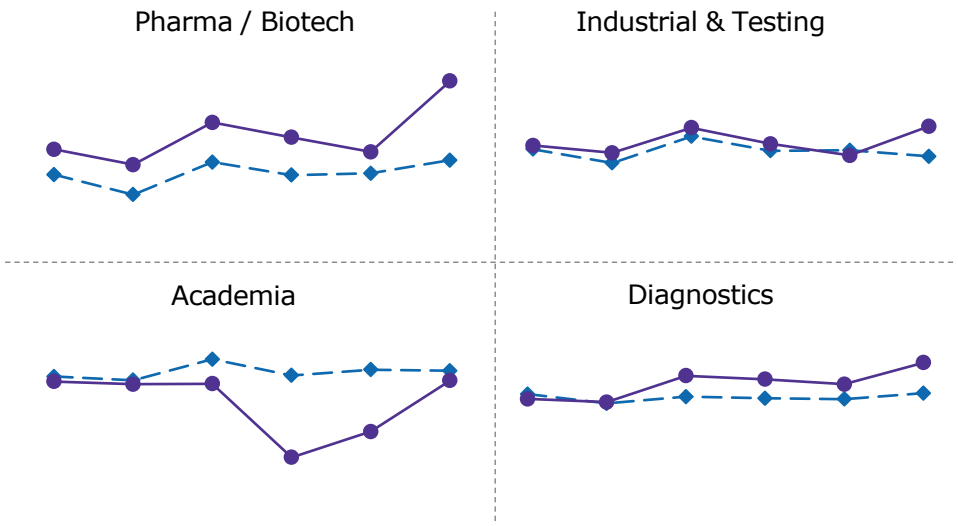
Highly resilient and well positioned to participate in COVID-19 upside

2020 heatmap of COVID-19 impact by customer segment

	Pharma/ Biotech	Industrial & Testing	Academia	Diagnostics
Process Solutions	+++ -	COVID-19 insensitive	COVID-19 insensitive	COVID-19 insensitive
Research Solutions	+	COVID-19 insensitive	- - -	++ -
Applied Solutions	+ -	+ -	- -	+

+ upsides from COVID-19 - downsides from COVID-19

H1 2020 monthly sales* by customer segment



* Illustrative;
to scale only within each customer segment

- Mid-term: **downsides to fade**, some **upsides to stay**, recovery started in June
- Order book for Process Solutions **up by >40%,** capacity expansion underway

From: Q3 2020 earnings call – 2020.11.12

Process Solutions: Therapies are evolving from treatments to cures

Advancing traditional is critical as novel modalities develop

TRADITIONAL

- Uses small molecules, peptides, proteins
- Chronic, manages or treats
- Templated manufacturing

MODALITIES

HP-API

Plasma

mAbs

Vaccines

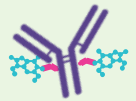
→ FORMULATED **FOR THE MASSES**

NOVEL

- Uses DNA, RNA, Cells
- Potentially curative
- Non-templated manufacturing

MODALITIES

Gene & Viral



ADCs

Cell therapies

mRNA

→ FORMULATED **FOR an individual**

Acronyms: HP-API = highly potent active pharmaceutical ingredient; mAbs = monoclonal antibodies; DNA = deoxyribonucleic acid; (m)RNA = (messenger) ribonucleic acid; ADC = antibody drug conjugate

COVID demands align with our strengths but increase supply chain pressure

unit operations		PALL	ThermoFisher SCIENTIFIC	SARTORIUS
Cell culture media	●	●	●	●
Biopharm materials	●	●	●	●
Chromatography	●	●	●	●
Hardware	●	●	●	●
Single use	●	●	●	●
Sterile	●	●	●	●
Virus	●	●	●	●
Clarification	●	●	●	●
Tangential flow filtration	●	●	●	●

● = A leading player ● = Significant presence ● = No offering

Sources: press releases, company reports, and internal assessments

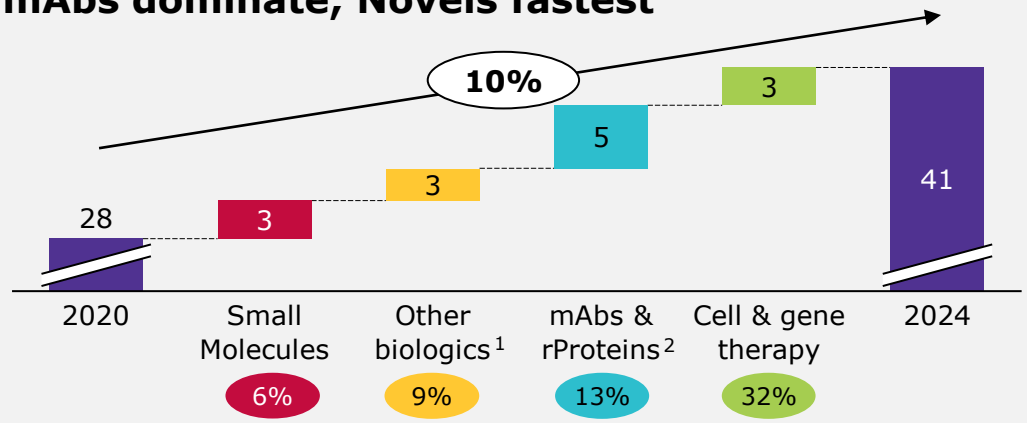
COVID-19 Outlook

Type	Implications
mAb **65** programs **Bind and block** virus from entering cells	• Universal templates • A leading position for 8 out of 9 unit ops
Vaccine **199** programs Protective **immune response**	• Multiple templates • Leveraging Single Use
Nucleic Acid **43** programs Leveraging **human factory**	• Emerging manufacturing processes • Lipids are critical

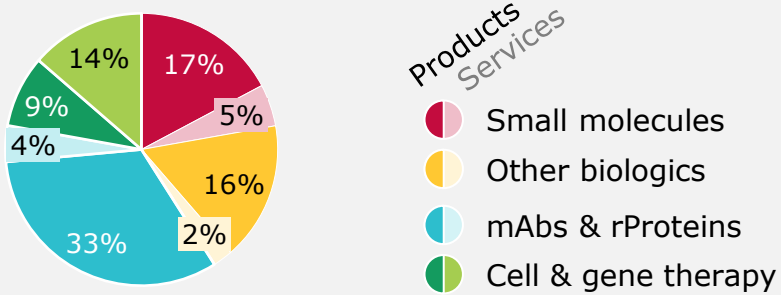
Opportunities in services to accelerate double-digit growth

Accessible Market (€ bn)

mAbs dominate; Novels fastest

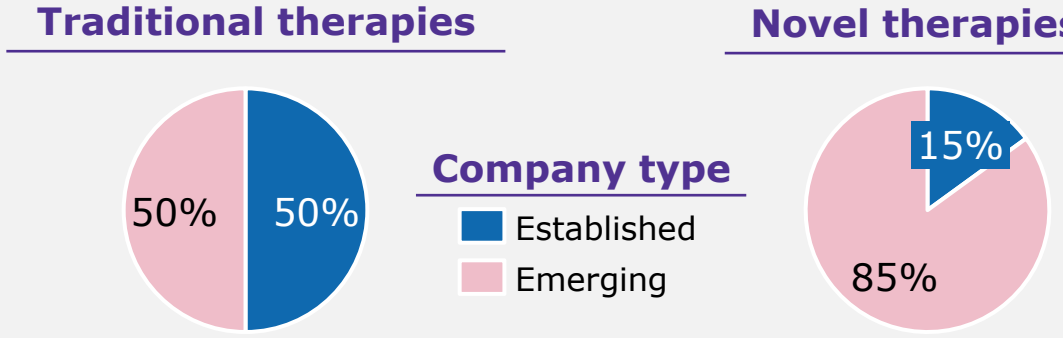


Service importance varies by modality

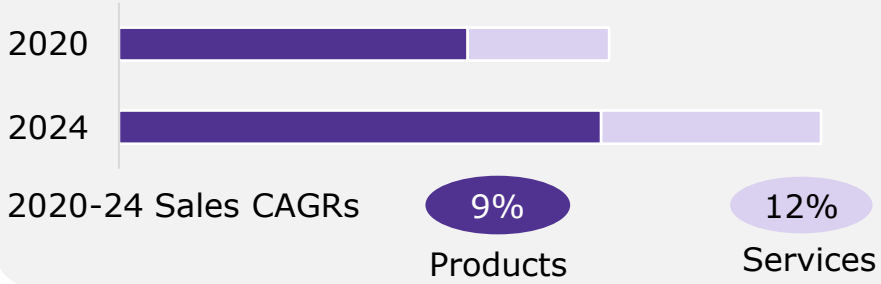


Origins of biologics pipeline

Emerging biotechs drive novels



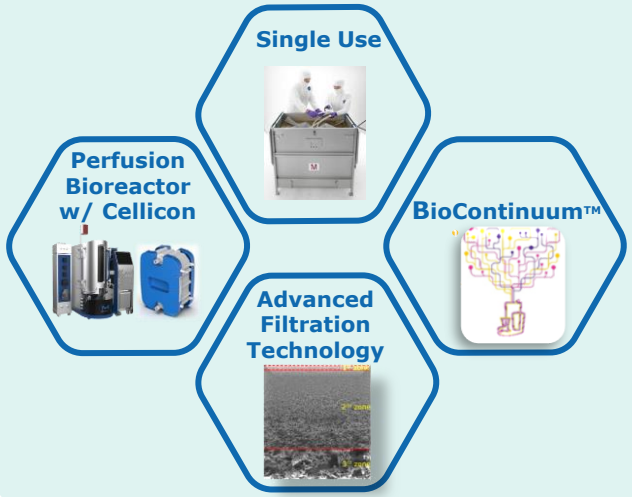
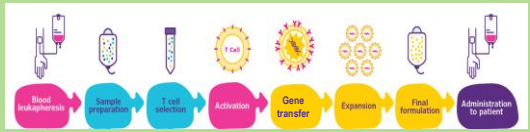
Services see faster growth in coming years



Sources: Evaluate Pharma, internal market models, CSR sales data; [1] Other biologics include plasma, vaccines, insulin, microbial and non-mAb biosimilars; [2] mAbs include ADCs here;
Additional acronym: rProteins = recombinant proteins

Process Solutions: Strategic direction

Innovate and invest today to continue above market growth in the future

	TRADITIONAL	ALL	NOVEL
Modality			
Revenue driver	Near term	Mid term	Long term
Offering	Products	Services	Products
Portfolio		 ✓ Contract development & manufacturing organization ✓ Contract testing organization ✓ Product characterization	**Manufacturing novel therapies**  ✓ Templated viral manufacturing consumables and reagents ✓ Autologous manufacturing system

Process Solutions

Next-generation bioprocessing on the cards

Today's process & portfolio

CHOZN
Cell Line

Ex-Cell® Advanced™
media

Mobius®
bioreactor

Clarisolve®
Depth Filters

Eshmuno®
Chrom. resin

Viresolve®
Pro Solution

ProSep®
Ultra Plus
Resin

Opticap®
Filters

Launched 2018

Pellicon®
Ultrafiltration
Cassettes

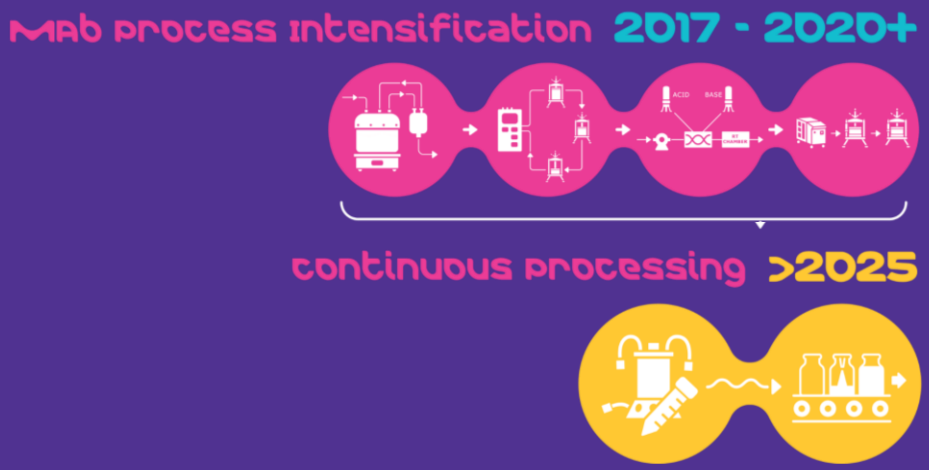
Durapore®
Filtration

Launched 2018

Millipak®
Final Fill
Filter

BioReliance ® | **cGMP SOLUTIONS & SERVICES** | **EMPROVE®**

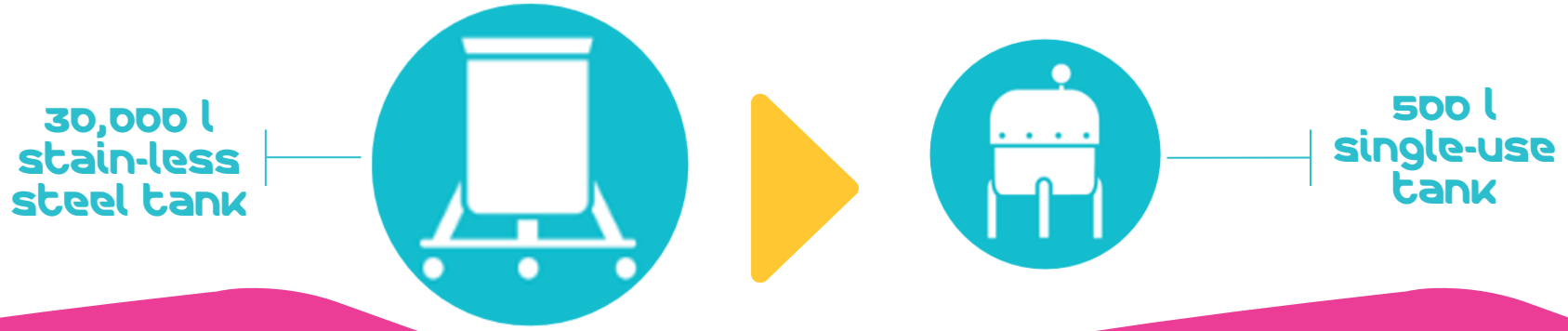
Tomorrow's process



Continuous bioprocessing will …

- be an evolution in mAb bioprocessing
- take time to establish
- leverage the present
- lead to hybrid solutions

Our single-use technologies drive flexibility in modern bioprocessing



Traditional Multi-use facility	
CAPEX* required	**~$500 m to $1 bn**
Time to construct	**5 to 10 years**
Change over time	**4 weeks**
Footprint	**~>70,000 m²**

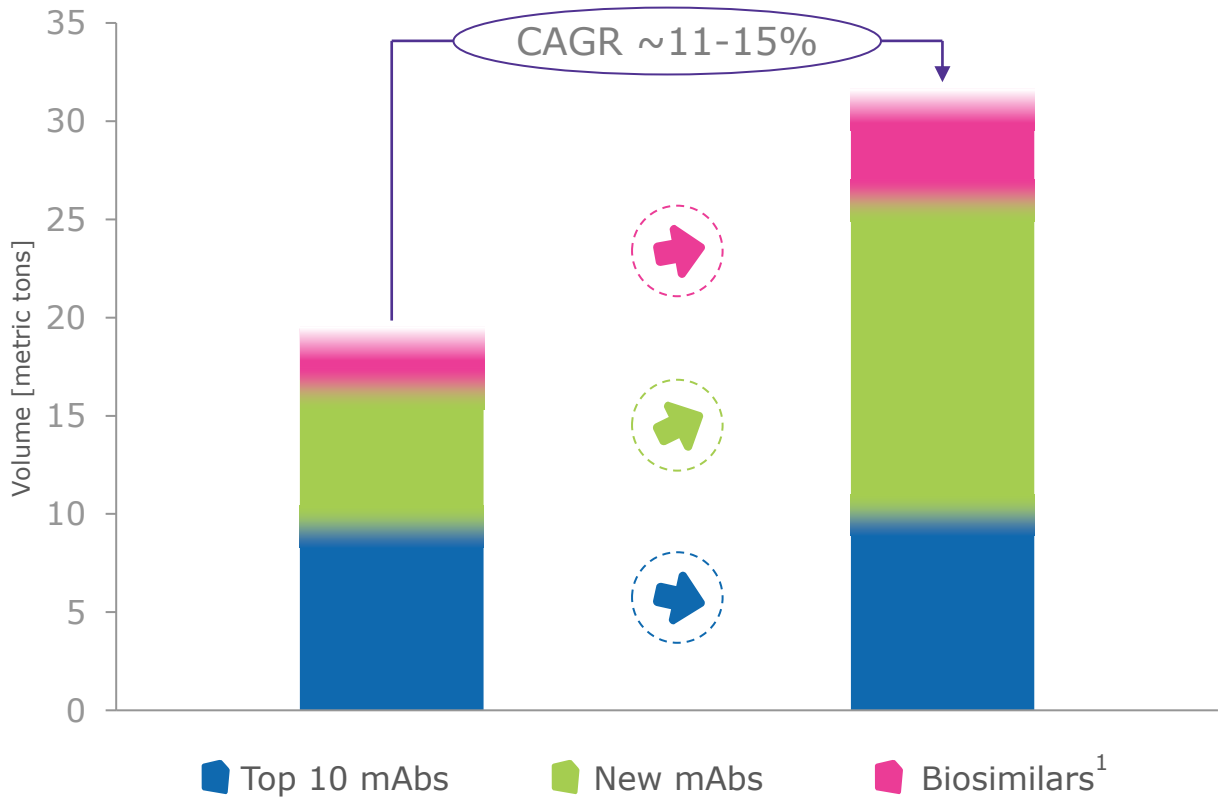
Innovative single-use facility	
CAPEX required	**$20 m to $100 m**
Time to construct	**1.5 years**
Change over time	**0.5 days**
Footprint	**~11,000 m²**

Strong demand for single-use technologies and Process Solutions' broad offering was and will remain a key source of growth for Life Science

*CAPEX = Capital Expenditure

mAbs market democratization will drive diversification, change & variability

mAb volume projections 2020 to 2024



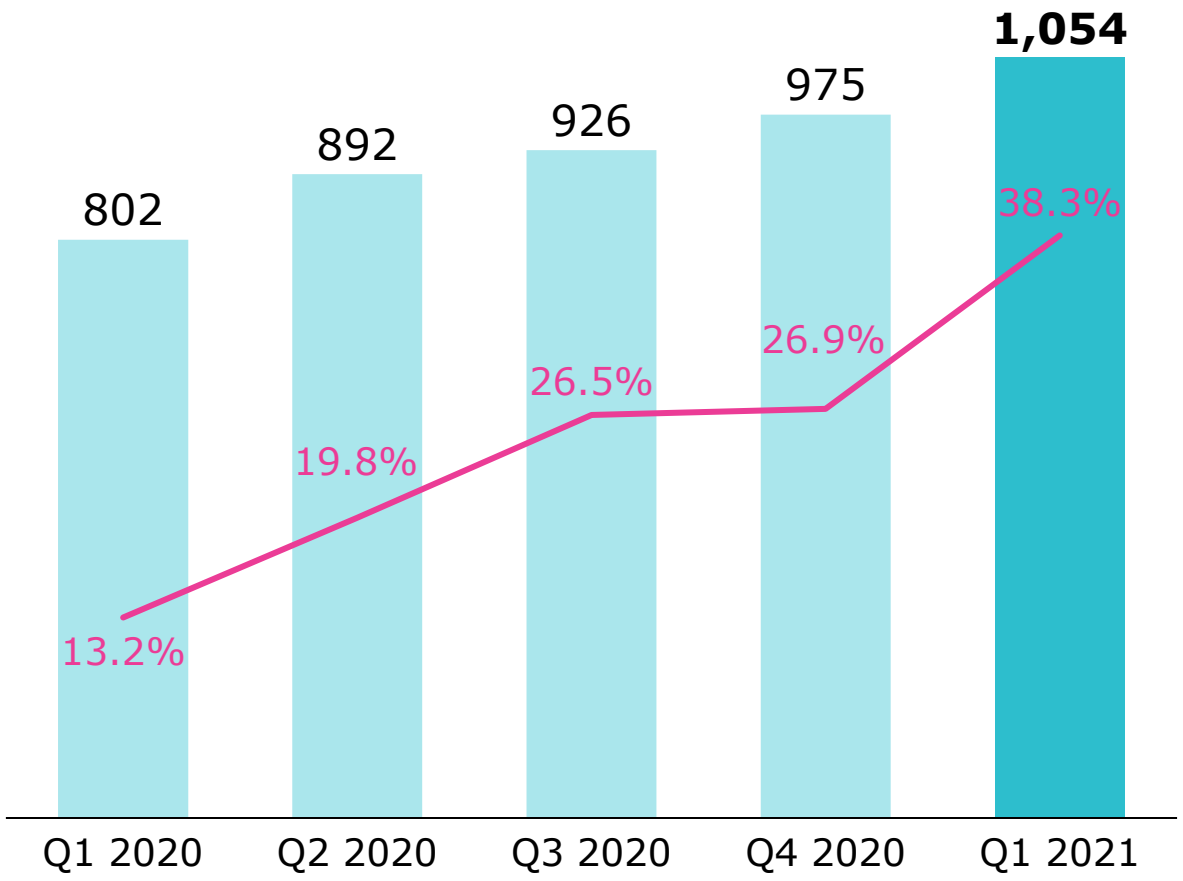
[1]Biosimilars scaling factor = 2.8 based off internal estimates and McKinsey analysis;
Source: company estimate based on industry forecasts, EvaluatePharma; mAbs = Monoclonal antibodies

Market development

- Overall mAbs market will grow ~11-15% CAGR
- Top 10 originator mAbs represent ~ 50% of market volume today and will decline to ~30% in 2024
- Biosimilars will gain share

BIG 3 - Process Solutions: upside potential continues to materialize

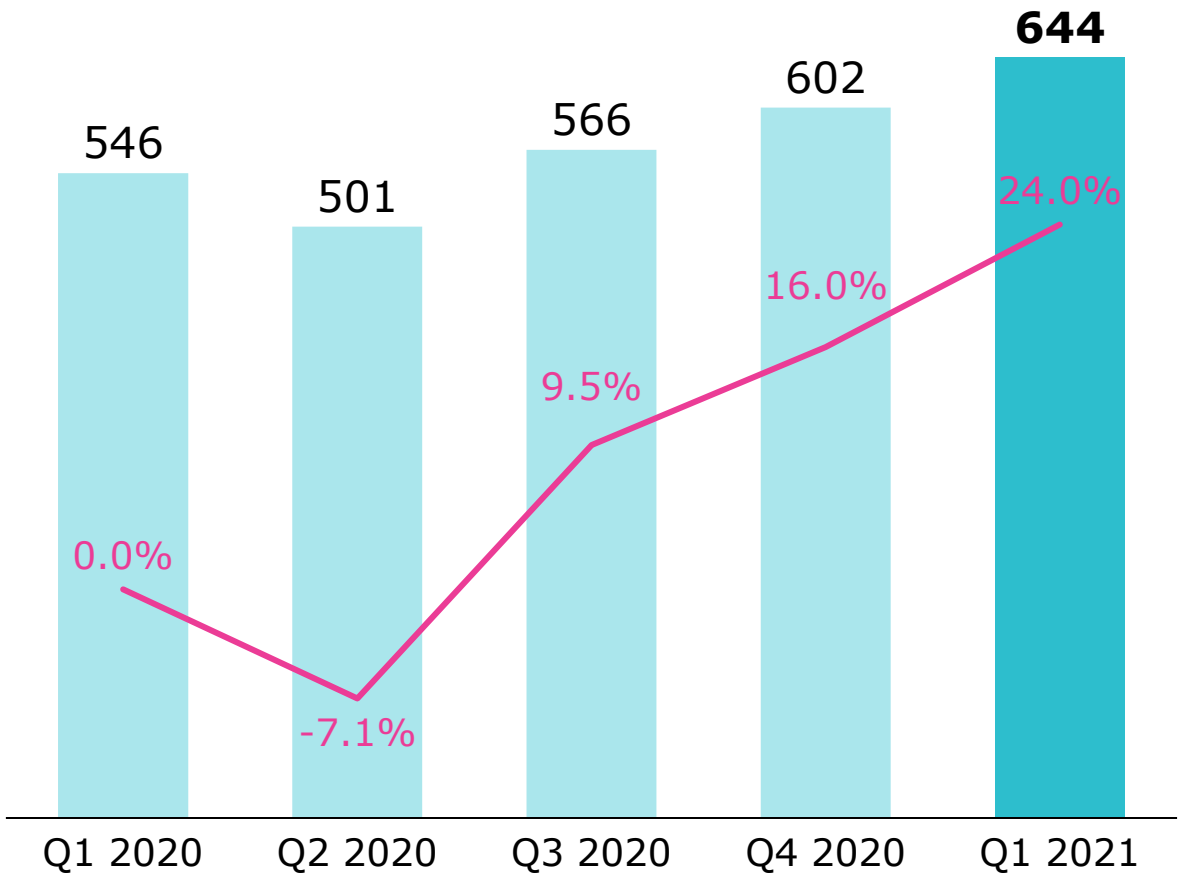
Sales development [€m] - org. growth [%]



- COVID-19 related projects in **BioP Single Use and Downstream remain key drivers** of ~ 50% additional pandemic-related growth
- Unprecedented growth across all regions particularly strong in **Asia** (>50% org.) in large parts driven by the recovery vs. Q1 2020 lockdown in China
- **Pharma & Biotech** customer segment remains by far the strongest growth driver
- **Comps will be getting tough** from Q2 2021 onwards, as base starts including significant COVID-19 business upside
- **FX headwinds of -7%** mute absolute numbers

Research Solutions: additional COVID-19 demand has gained momentum

Sales development [€m] - org. growth [%]



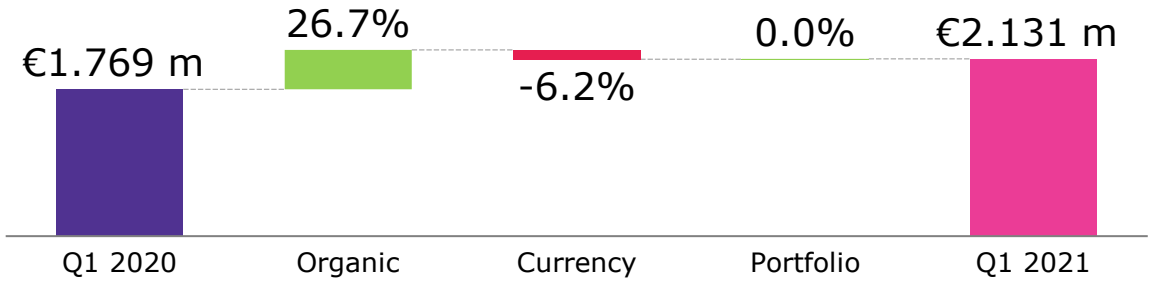
- **Ongoing core business recovery** boosted by additional **COVID-19 related demand**
- Unprecedented growth across all regions particularly strong in **Asia** (>30% org.) and **North America** (>20% org.)
- **Pharma & Biotech** customer segment strongest Q1 growth driver in absolute terms; **Diagnostics** customer segment showed fastest growth in relative terms
- Q2 2021 will be softest comp, against the COVID-19 induced lock-down dip in 2020
- **FX headwinds of -6%** mute absolute numbers

Life Science: strong core business and rising COVID-19 demand fuel record growth, particularly in Process and Research Solutions

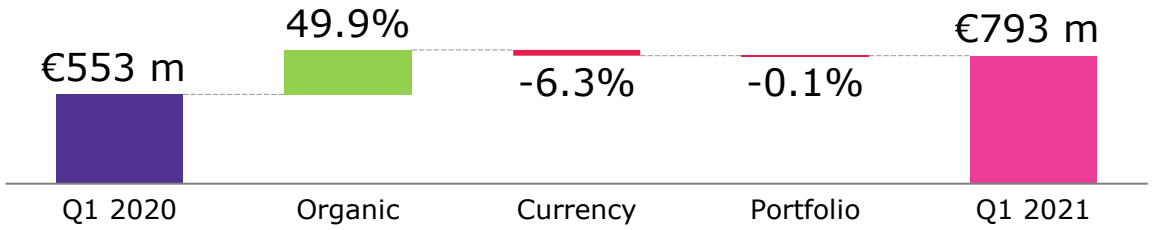
Life Science P&L

[€m]	IFRS		Pre	
	Q1 2020	Q1 2021	Q1 2020	**Q1 2021**
Net sales	1,769	2,131	1,769	**2,131**
M&S*	-498	-501	-497	**-500**
Admin	-89	-82	-80	**-74**
R&D	-75	-75	-75	**-75**
EBIT	345	593	357	**607**
EBITDA	541	779	-	-
EBITDA pre	553	793	553	**793**
(in % of net sales)	31.2%	37.2%	31.2%	**37.2%**

Net sales bridge



EBITDA pre bridge



Comments

- Process Solutions org. growth of +38% driven by downstream & single use for COVID-19 projects; strong underlying demand supported by acceleration of capacity expansions
- Research Solutions speeding up further to an exceptional +24% organic growth, driven by recovery in base business and additional COVID-19 opportunities, mainly in diagnostics and pharma
- Applied Solutions growth (+8% org.) driven by APAC recovery against low Q1 2020
- Declining M&S in % of sales from 28% to 23% despite higher logistics cost amid pandemic
- Flat R&D spend with continued focused investments in strategic projects in high growth & emerging segments
- Business performance, operational leverage & favorable mix continue to drive strong EBITDA pre and margin expansion despite 6% FX drag

* Marketing and selling expenses

Totals may not add up due to rounding

electronics

Electronics targets attractive markets – especially in the electronics space

- Driven by digital disruptions and megatrends such as digitalization
- Heterogeneous end-user applications
- Semiconductors as the engine of all electronic systems

Electronics sales by end market

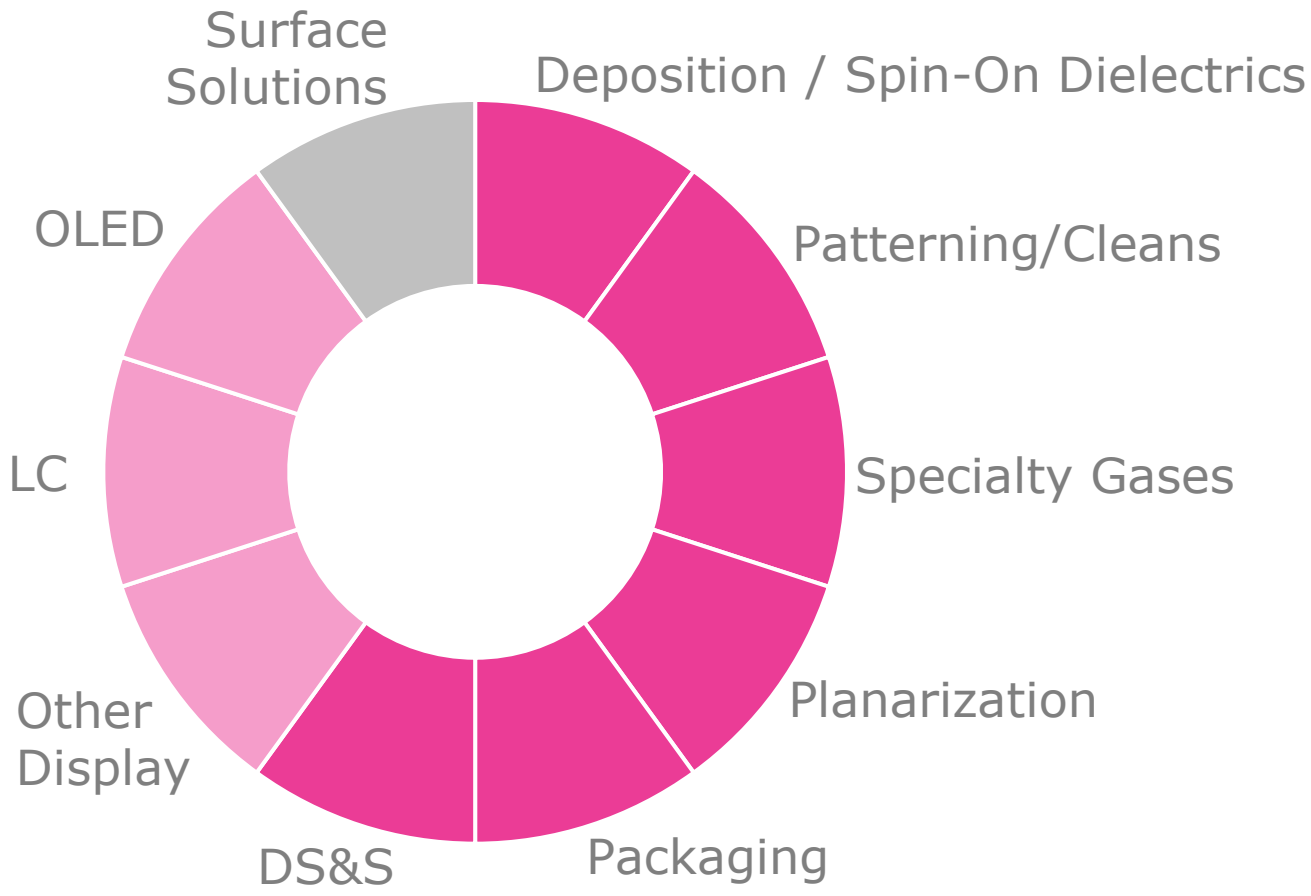
- Driven by world GDP growth
- Increasing demand in emerging markets

- Driven by world GDP growth
- Rising living standards and higher disposable income

[1]Prismark 2021; [2] Internal estimation

Electronics

Expected mid-term portfolio split



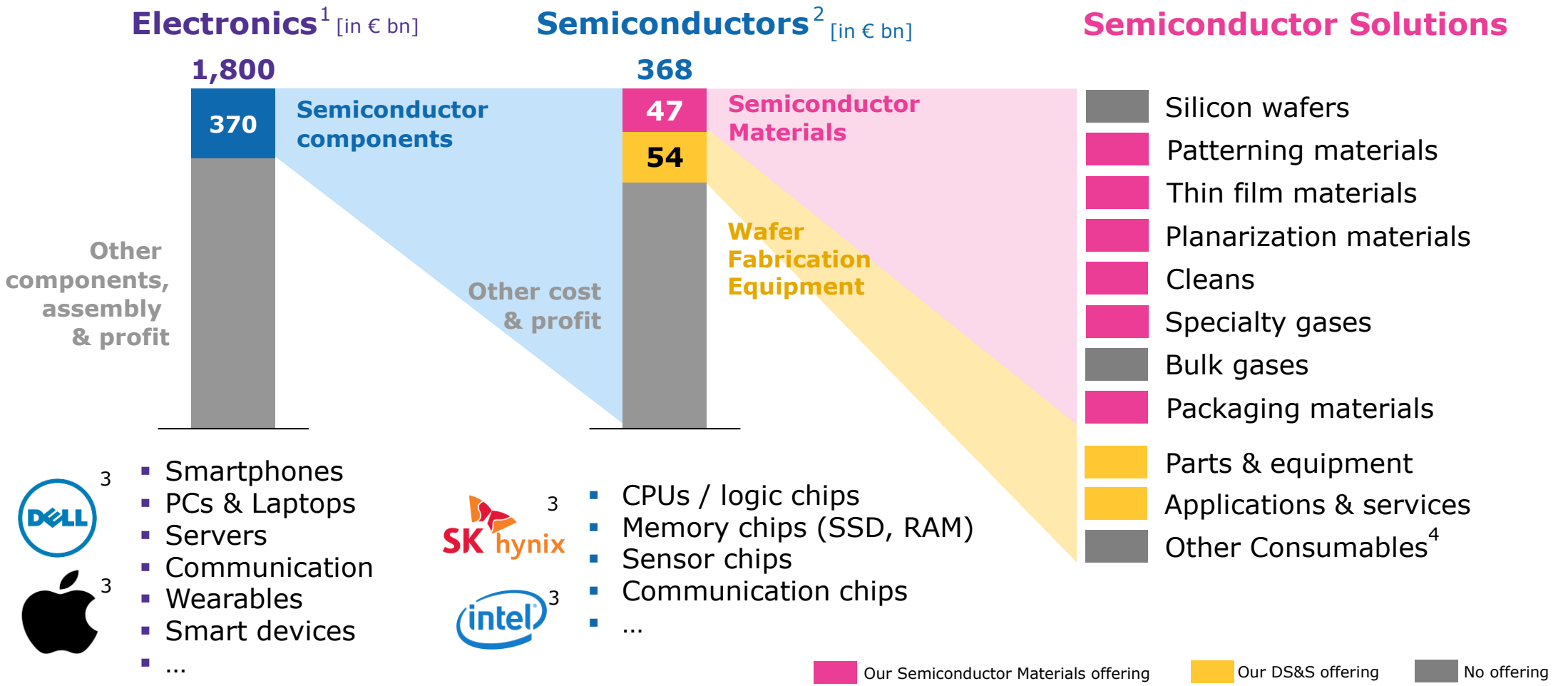
Mid-term the Electronics portfolio will consist of **~10 equally sized businesses**

>60% of them **serving chip makers**

INDICATIVE Chart

Semiconductor Solutions | Display Solutions | Surface Solutions

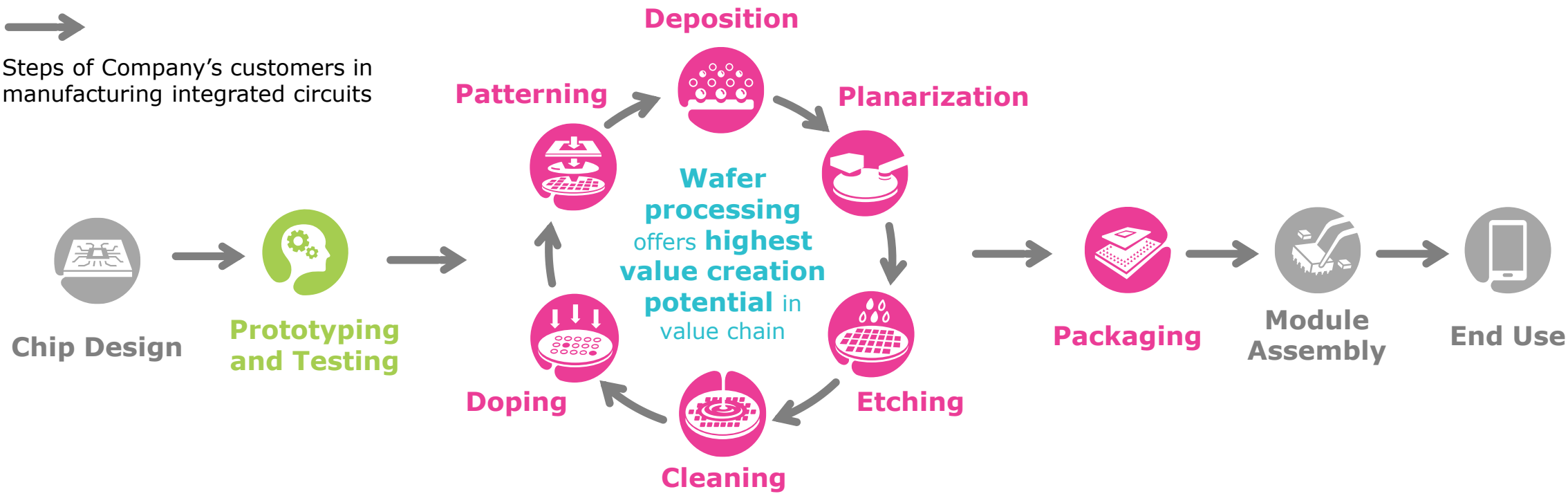
Semiconductor Solutions – integrated materials player, well positioned to serve the need of customers in semiconductor fabrication



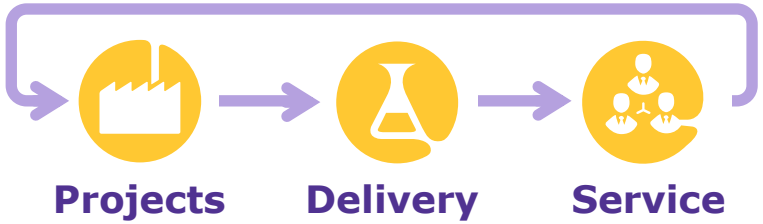
Illustrative Industry P&Ls based on Sources: [1]Prismark 2021, [2] [1]Prismark 2021 & WSTS/SIA & SEMI Q1 2020; [3]Representative player in the industry, non-exclusive list, not based on any underlying criteria; [4]e.g. Filters, Pads, etc.; CPU = Central Processing Unit; RAM = Random Access Memory; SSD = Solid State Disk; CMOS = Complementary metal-oxide semiconductor

Unique comprehensive products and services portfolio offers end-to-end solutions, well-placed in high growth segments

Steps of Company's customers in manufacturing integrated circuits



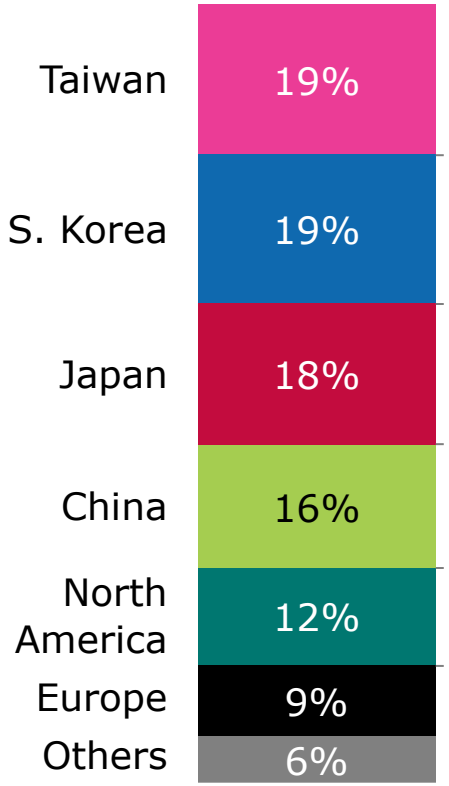
Steps in Merck's KGaA, Darmstadt, Germany Delivery Systems & Services business



- Our Semiconductor Materials offering
- Our Delivery Systems & Services offering
- Our Intermolecular products & services

Beyond a comprehensive portfolio Semiconductor Solutions also has an industry spanning customer base, supplying various end markets

2019 wafer capacity by region[1]



Selected customers per region[2]

tsmc, UMC, SAMSUNG ELECTRONICS, SK hynix, KIOXIA, SONY, SMIC, YANGTZE MEMORY, intel, Micron, life.augmented, infineon

Semiconductor Solutions has

over 100 customers

supplying all top 10 chip makers and virtually all of the top 100[3]

- Focus on logic chips
- Focus on memory chips
- Focus on other chips

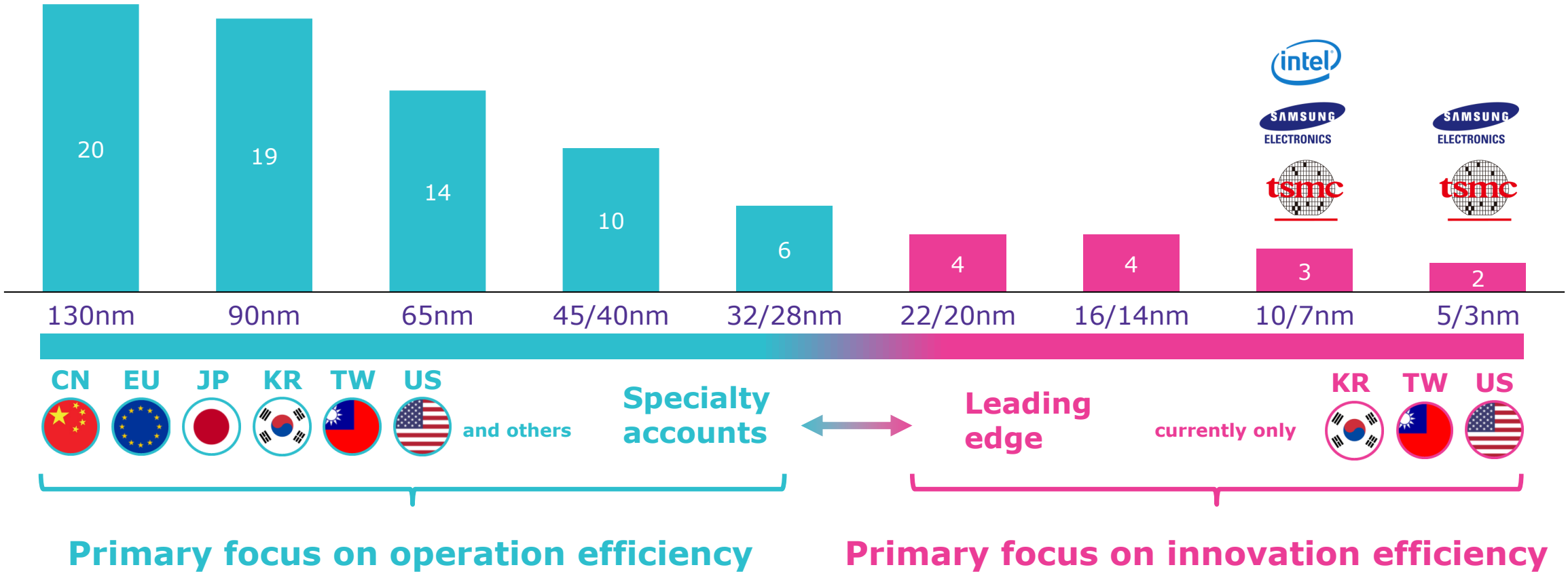
[1]SEMI World Fab Forecast Q3 2020 - Dec 2019 capacity,

[2]Representative, non-exclusive list, not based on any underlying criteria

[3]Based on H1 2020 Sales

Only 3 companies are currently running volume production ≤10nm
These companies have the largest market shares across all nodes

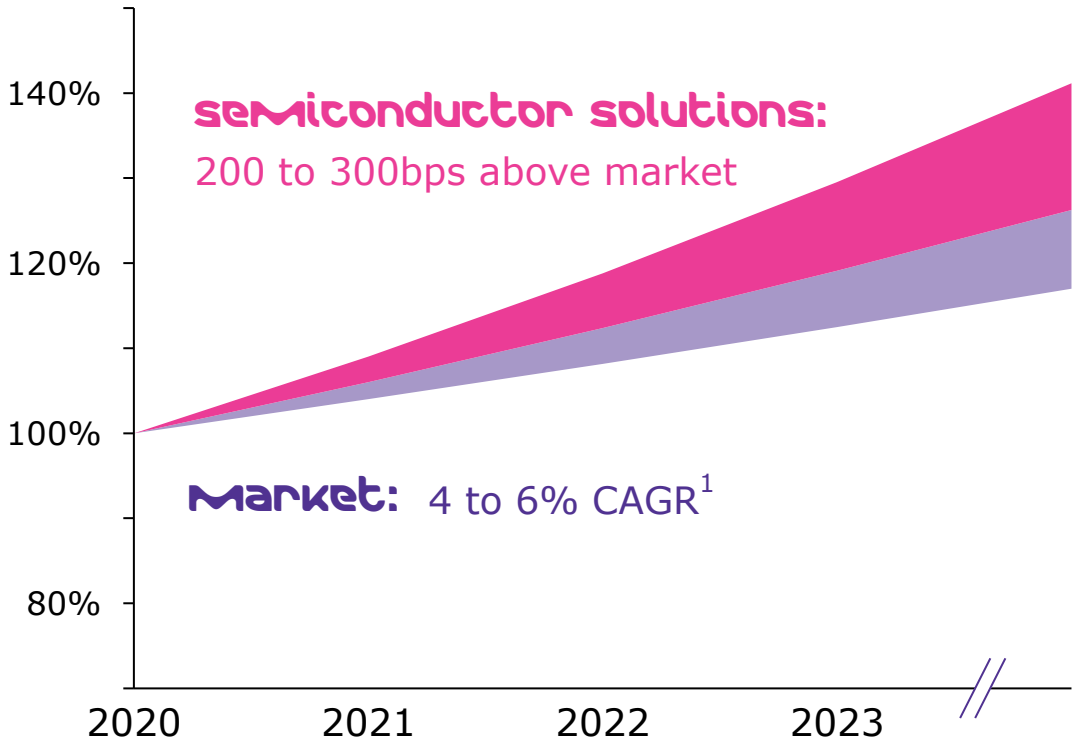
Number of companies currently running volume production per logic chip node[1]



[1]Source: Wikichip.org and own data; volume production as of Sep 2020; countries are listed in alphabetical order

Semiconductor Materials
Set to outgrow highly attractive semiconductor materials market

Semiconductor Solutions sales guidance vs. market
[Indexed 2020 = 100%]



[1]Source: Jan 2020 IC Insights 2018-2024 CAGR for wafer starts in million units

Market

- Technological trends inevitably drive **exponential data growth**
- More data requires **more chips** and **higher complexity of chips**
- **Rising materials value added** per wafer

semiconductor solutions

- **Comprehensive offering** focusing on **attractive materials categories**
- Integration **topline synergies**
- **Critical mass** and deep **customer centricity**

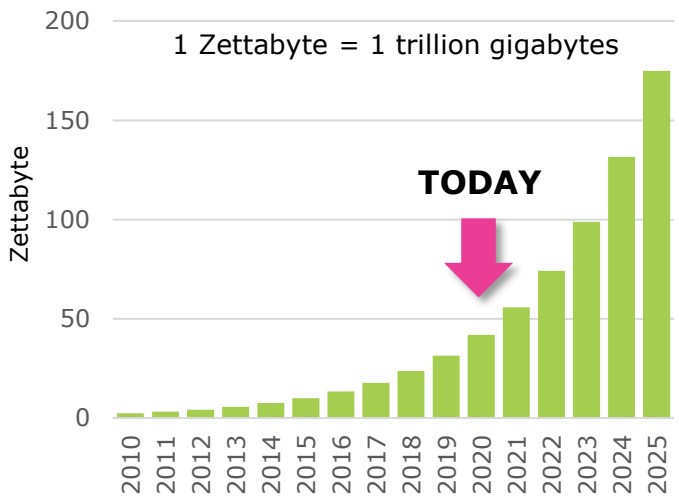
➢ Better customer understanding: know-how exchange and collaboration across **DS&S and Semiconductor Materials**

➢ Cutting-edge innovation and **R&D capabilities**

Technology trends inevitably drive exponential data growth… …more chips needed to generate, transfer, process & store data

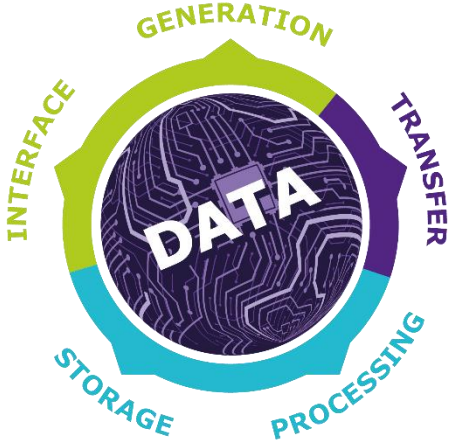
Data created worldwide is growing +30% annually

Size of global data sphere



Source: IDC DataAge 2025 Whitepaper

All segments of data application are affected by global data growth



Technology trends strongly impact relevance of data application segments

Technology market growth - examples

5G Technology[1]
>122% CAGR

Artificial Intelligence[2]
>33% CAGR

IoT Sensors[3]
>24% CAGR

Data Center Services[4]
>13% CAGR

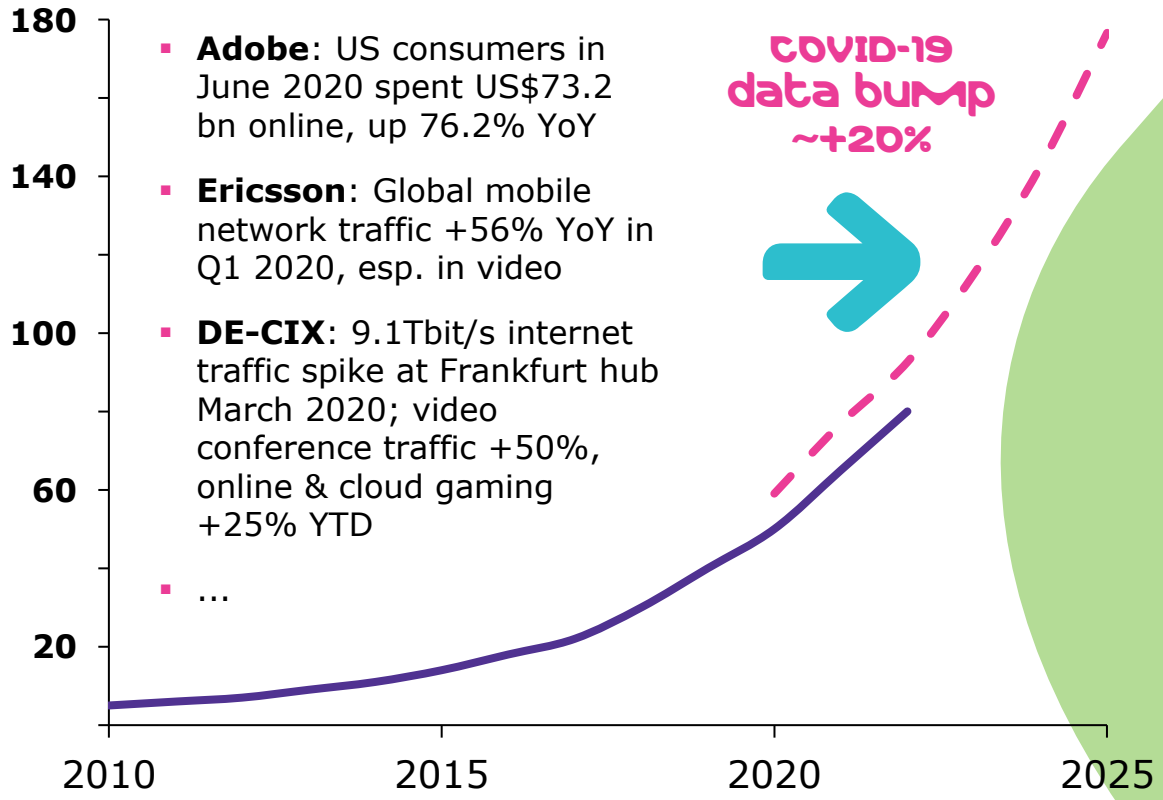
Autonomous Driving[5]
>18% CAGR

Semiconductor Solutions supports growth trend as part of "**the company behind the companies**, advancing digital living"

1) alliedmarketresearch.com, Prismark 2020, CAGR 2021-2026; 2) fortunebusinessinsights.com, post-gazette.com, CAGR 2018-2026; 3) mordorintelligence.com, computerweekly.com, CAGR 2020-2025; 4) mordorintelligence.com, Prismark 2020; CAGR 2020-2025; 5G = 5th-generation cellular wireless; IoT = Internet of Things 5) mordorintelligence.com, autonomous car market value CAGR 2020-2025

Semiconductor Solutions
COVID-19 has vaulted the "digital transformation" by ~5 years[1]

Expected COVID-19 impact on global datasphere[2]
[zetabytes]



- **Adobe**: US consumers in June 2020 spent US$73.2 bn online, up 76.2% YoY
- **Ericsson**: Global mobile network traffic +56% YoY in Q1 2020, esp. in video
- **DE-CIX**: 9.1Tbit/s internet traffic spike at Frankfurt hub March 2020; video conference traffic +50%, online & cloud gaming +25% YTD
- ...

[1]Source: McKinsey May 2020 "The COVID-19 recovery will be digital: A plan for the first 90 days";
[2]Source: Seagate, IDC April 2020, Merck KGaA, Darmstadt, Germany

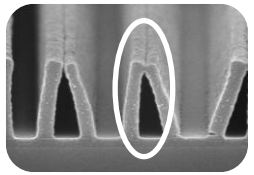
COVID-19 impact on data growth expected to be positive

1. Work-from-home/stay-at-home economy
   - Significant increase in video conferences, online shopping, online gaming, streaming
2. Change in consumers' and enterprises' digital behavior expected to be long-lasting
3. Need for more, faster & more reliable data processing, storage and bandwidth
   - Acceleration of semiconductor demand

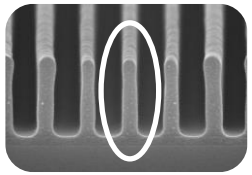
Semiconductor solutions stands ready to support increased demand

Expanding the limits of how small you can go

Pattern collapse

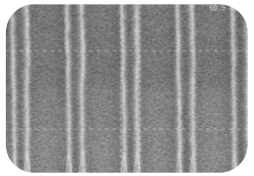


AZ® rinse materials



As lines get narrower and closer together in advanced chip generation, lines tend to “stick” due to surface tension.

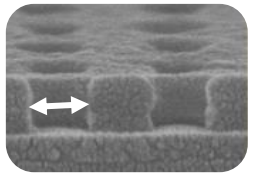
Lithography limitation



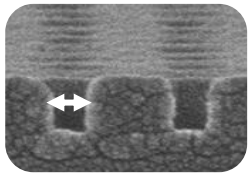
Directed self-assembly (DSA)

Block copolymer can generate small lines or contact holes by self-assembly. This allows miniaturization without expensive new equipment.

Wide features



AZ® shrink materials



Shrink materials “shrink” the gap between lines and, hence, allow the manufacture of narrower features otherwise not possible.

Group delivers highly innovative solutions for complex customer problems

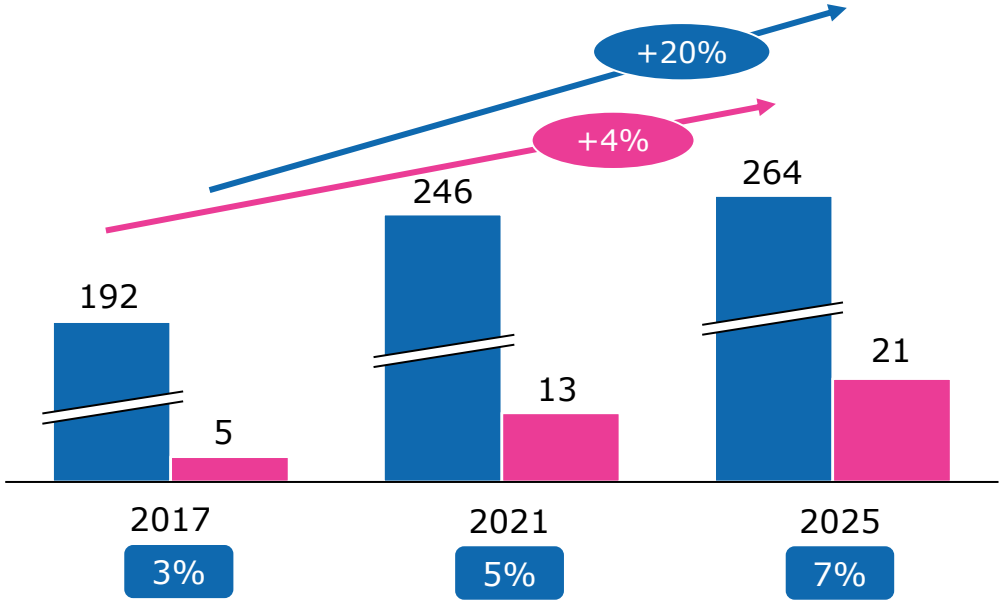
Display Solutions - OLED material market to exceed LC material market already in 2021

x% OLED shipment area / addressable material market [in % of total]

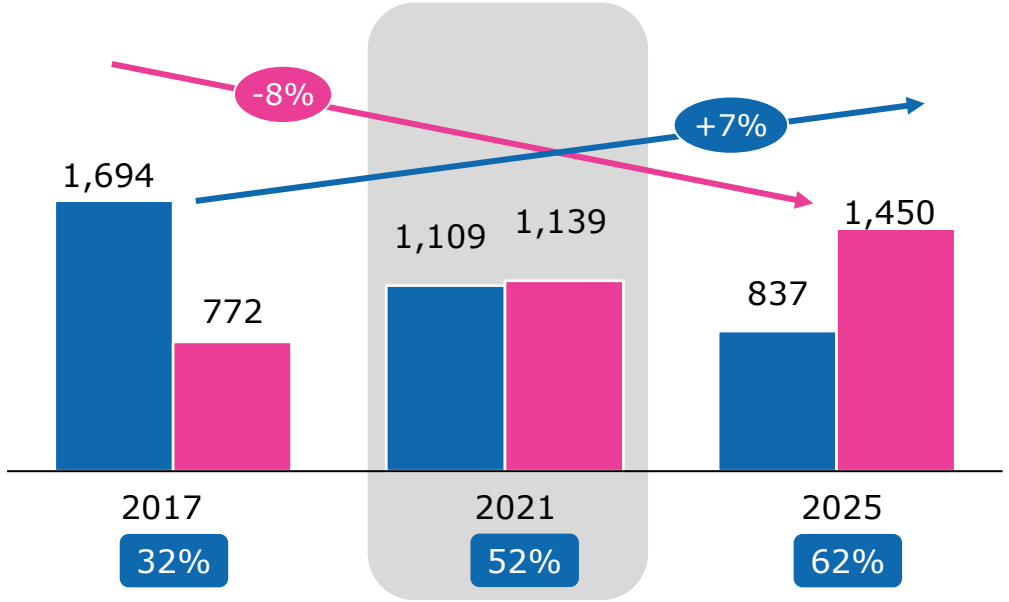
Liquid Crystals

OLED

Display shipment area[1] [km²]



Addressable material market[2] [€m]



- **Continued growth** across all technologies
- **OLED growing faster than LCD,** but **LCD to command 90+% area share** for foreseeable future

- **Material value** per OLED display **higher** than in LCD
- **OLED material market** to **exceed LC material market by 2021**, but market split between **many more players**

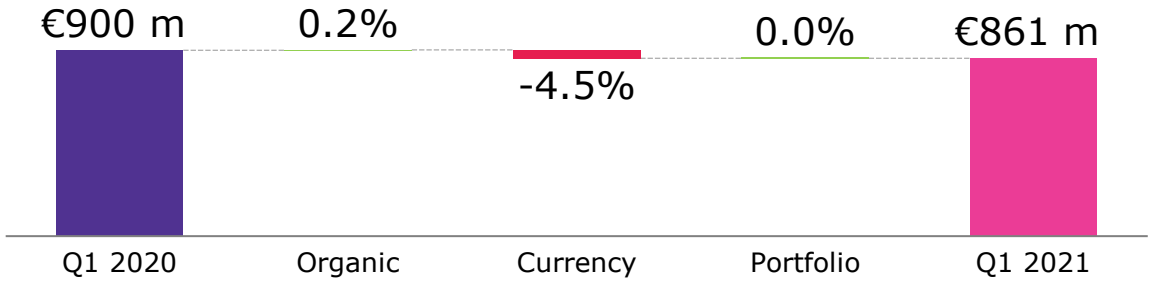
[1]Omdia; [2]Internal Business Intelligence; Acronyms: LCD = Liquid-Crystal Display, OLED = Organic Light Emitting

Electronics: year-over-year and vs. Q4 2020 Semi growth as well as recovering Surface compensate Display Solutions decline

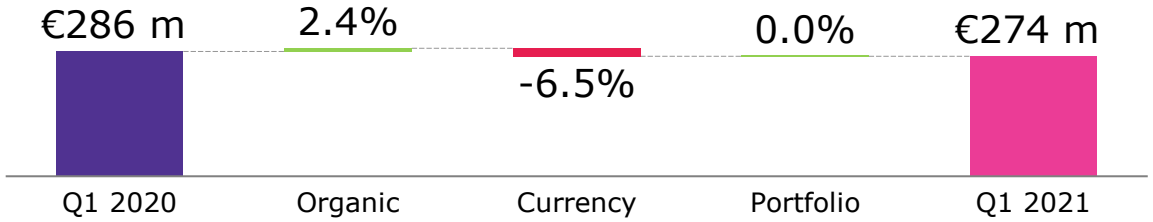
Electronics P&L

[€m]	IFRS		Pre	
	Q1 2020	Q1 2021	Q1 2020	**Q1 2021**
Net sales	900	861	900	**861**
M&S*	-136	-135	-134	**-135**
Admin	-38	-34	-38	**-33**
R&D	-71	-67	-73	**-66**
EBIT	116	126	151	**142**
EBITDA	251	260	-	-
EBITDA pre	286	274	286	**274**
(in % of net sales)	31.7%	31.8%	31.7%	**31.8%**

Net sales bridge



EBITDA pre bridge



Comments

- Semiconductor Solutions: solid Semiconductor Materials growth across all product categories muted by DS&S project launch phasing; continued confidence in strong outlook for FY 2021
- Display Solutions: down -7% organically as OLED growth not yet compensating for Liquid Crystals decline
- Surface Solutions: returning to 5% organic growth, mainly supported by recovery in the automotive industry
- Stable M&S despite higher logistic costs, while Admin and R&D are declining
- All P&L lines continue to reflect diligent cost management amid Bright Future transformation and Versum integration synergies
- EBITDA pre (+2% org.) exceeds sales growth but burdened by -7% FX headwinds

* Marketing and selling expenses

Totals may not add up due to rounding

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