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TERADYNE

Equity Research Division

Teradyne, Inc.

A testing champion venturing into robotics

Target Price: \$ 124.11

Current Price: \$ 107.80

Upside Potential: 15.13%

Recommendation: Buy

Investment Horizon: 1 year

Vienna, 23.06.2023

Team Overview

Equity Research



Florian Romen

Head of Equity Research

- Task distribution
- Story guideline



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Associate

- Valuation
- Financial Modelling



Matthias Koerner

Associate

- Financial Modelling
- Product portfolio



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Associate

- Business Model
- Product Overview



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Associate

- Company Overview
- Share Analysis



Alen Taric

Analyst

- Market Overview



Daniel Sprosec

Analyst

- Peer Benchmarking
- Product Overview

MUTARES

sazun
m&a-PLUS

zeb

ANDRITZ

BDO

- BSc. – 6th Sem.

i5 invest

SMATRIC
Empowering New Mobility

isi

ING

- BSc. – 6th Sem.

TTTech
UniCredit

EY
mondi

- MSc 2nd Sem.

PRIMETALS
TECHNOLOGIES
ZAPORIZHSTAL

- MSc Finance (Webster)

UNIQA

- BSc. – 4th Sem.

Deloitte.

RSM

Lilly

STRABAG

- BSc. (WU)

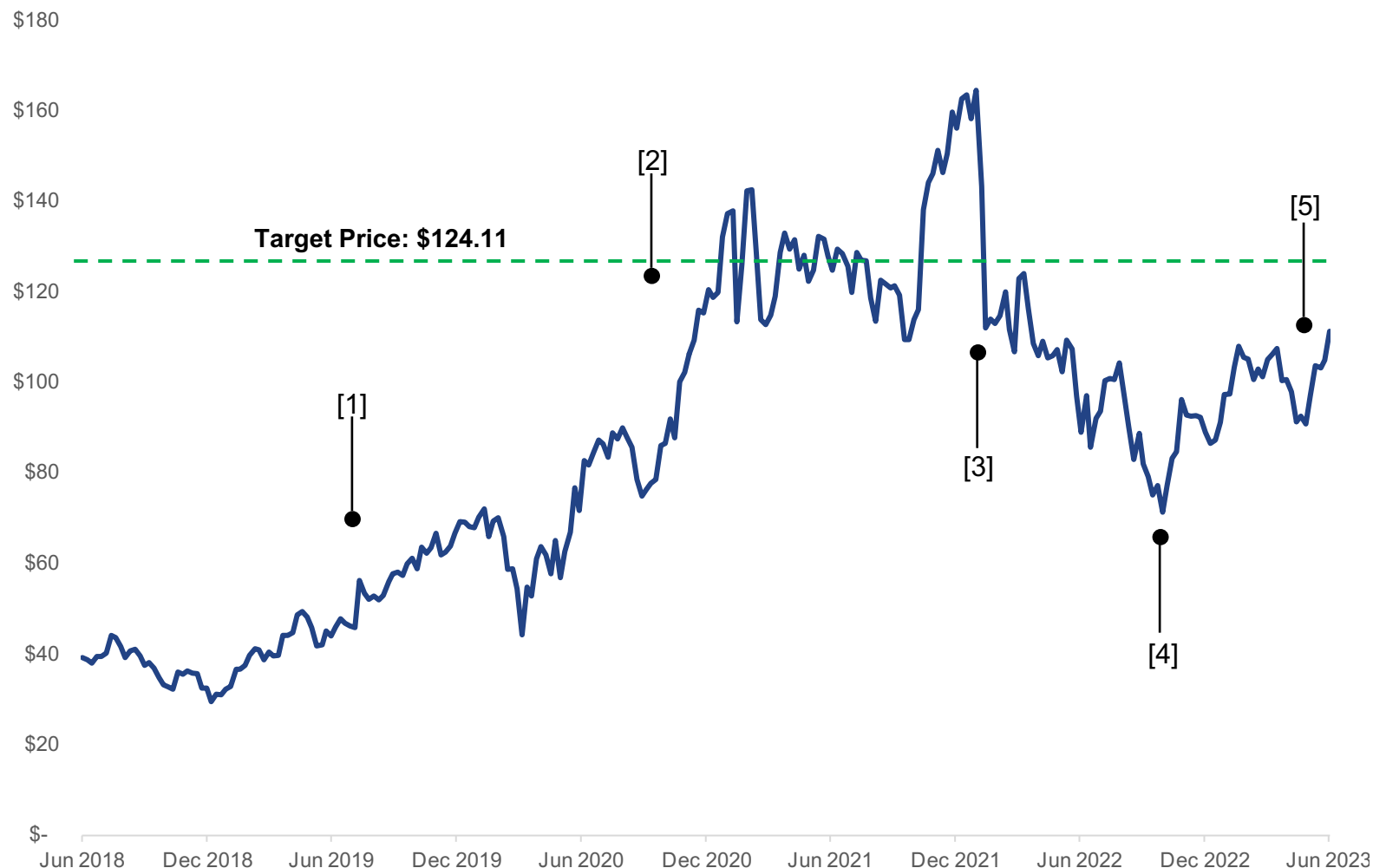
Raiffeisen
Capital Management

EURAM BANK

- BSc. – 2nd Sem.

Share price performance

Sensitive to the cyclical nature of the semiconductor market but overall strong performance in the past few years



Share price – Major events

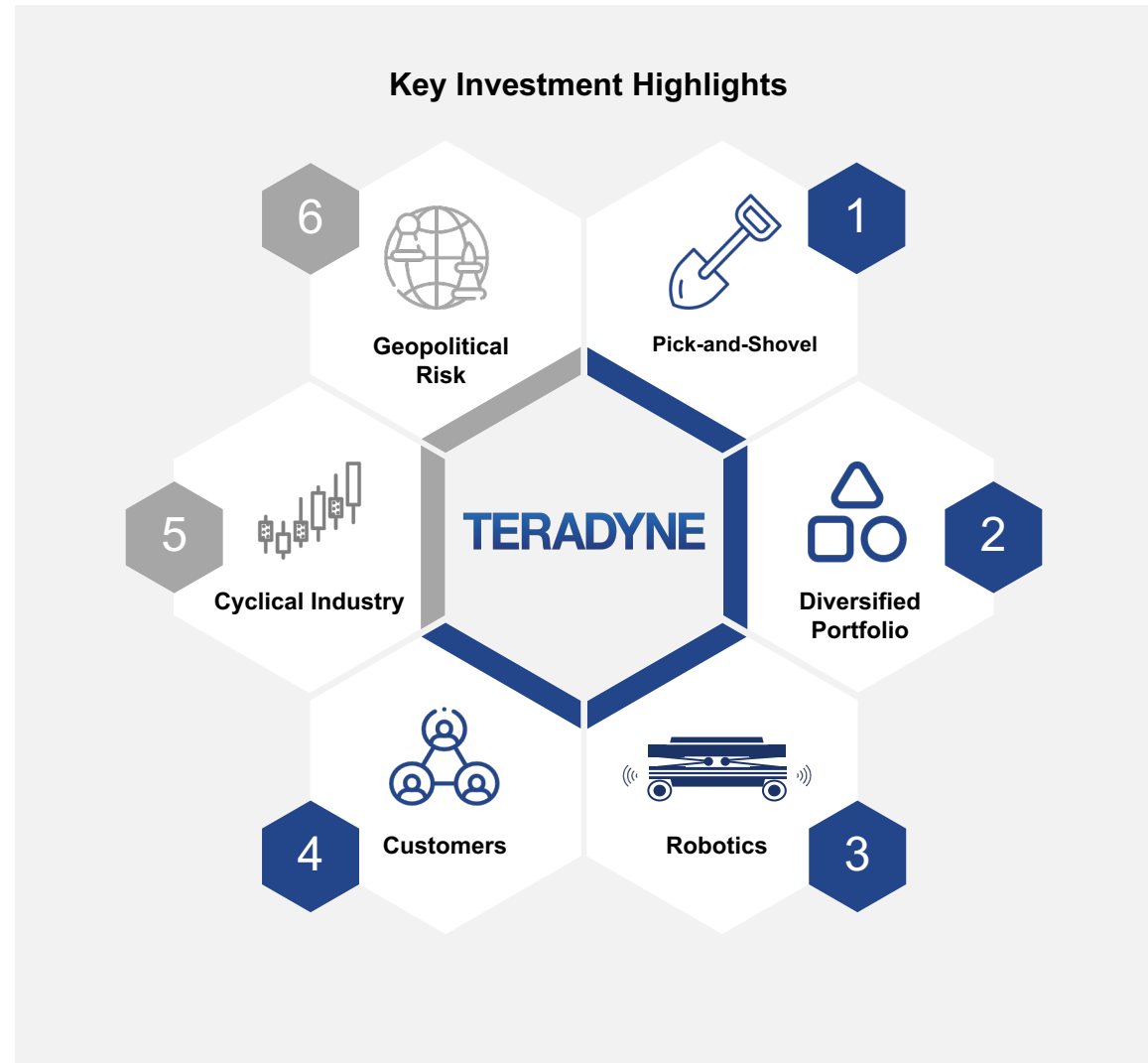
- [1] Oct 2019 (+23.3%) Acquisition of AutoGuide Mobile Robots to venture into the growing and demanding **Mobile Industrial Robots** market
- [2] Mar – Dec 2020 (+205.1%) – **Strong recovery**, especially in the technology sector, boosts the demand for semiconductor testing
- [3] Sep 2021 (-35.4%) – Patent infringement allegations and **slower technology transition** in major end markets
- [4] Oct 2022 (-29.4%) – Geopolitical tensions between US and China led to the **US banning Chinese companies from buying advanced chips and chipmaking equipment** without a license
- [5] May 2023 (+18.4%) – Release of generative AI models led to a **spike in demand for GPUs** and testing

Key Stats

- **IPO:** 14th Mar 1980
- **Ticker:** TER (NASDAQ)
- **52-week range:** 67.81-112.17 (\$)
- **Market Cap:** 16.95 bn (\$)

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Teradyne triumphs in the ATE Market while innovating robotics for industrial use



- Pick-and-Shovel Play**

Teradyne is an investment covering one of the first steps in the semiconductor value chain without being exposed to specific market risks
- Diversified Portfolio**

Successful expansion into new ventures such as robotics mitigate competitive risks under the automated test equipment (ATE) duopoly
- Robotics**

Through strategic investments and strong R&D, Teradyne managed to become market leader in the mobile industrial robots' market in just a few years
- Customers**

Teradyne counts some of the biggest semiconductor and technology players to their customer base which has historically been extremely loyal due to high switching costs
- Cyclical Semiconductor Industry**

Revenue and short-term growth are vulnerable to industry downturns impacted by macroeconomic conditions and technological advancements
- Geopolitical Risk**

Ongoing tensions and the fight over intellectual property between the US and China could harm the demand for Teradyne's products in Asia



Teradyne

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Business Overview

Company Overview

Long established player in the industry, backed by well-experienced management

Business Description



Global leader in **automated test equipment** and **industrial automation solutions**, providing services and products for semiconductor testing and robotics



Headquartered in **Massachusetts, USA**, Teradyne is now employing over **6,500 people** all over the world

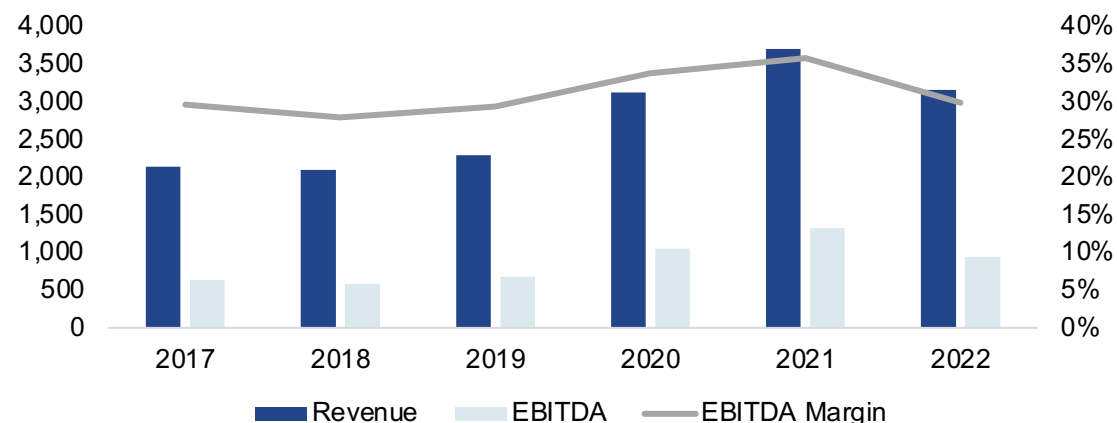


Operations across North America, Europe, the Middle East, Africa and Asia



Founded in **1960**, Teradyne is backed by more than **60 years of experience**

Financials



Management Team



Greg Smith

CEO since Feb 2023, with over 17 years at Teradyne



Sanjay Mehta

CFO since 2019, History in the semiconductor industry (Qualcomm)



Rick Burns

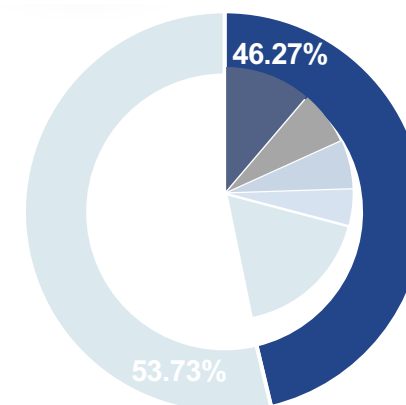
President (Test Div.), over 16 years at Teradyne



Brad Robbins

President LitePoint over 10 years at Teradyne

Shareholder Structure



- Institutions
- Public and Other
- Vanguard Group Inc.
- Fidelity
- Blackrock
- JP Morgan Asset Management
- Others

Asia has been a key hub for automated test equipment manufacturers

Key Sites

Headquarter in Massachusetts, US

Besides the HQ, Teradyne also operates R&D centers in California, Illinois and Oregon that provide support to US customers

Asia-Pacific Semiconductor Hub

Due to the production of semi-conductors, Teradyne's biggest facility is situated in Taipei

European Partnerships

Besides providing semiconductor testing equipment in Germany, Teradyne has forged partnerships in France, UK and Italy

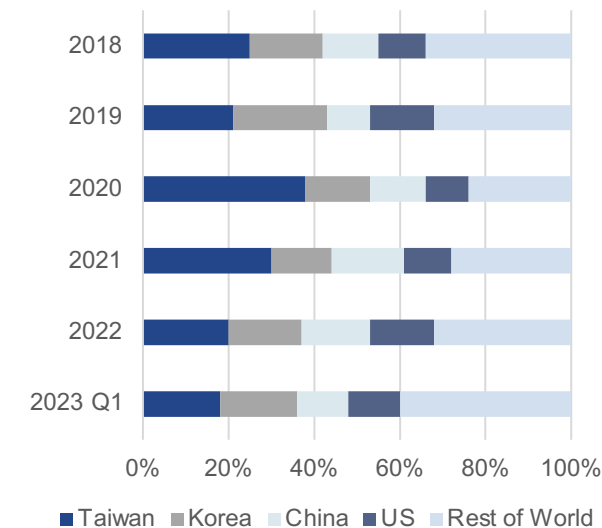
Market Outlook

North America fastest growing market in 2023 Q1 for semiconductor equipment

Market Expansion to India

Chip migration to India is increasing as the country becomes a preferred destination for semiconductor manufacturing, leveraging its skilled workforce and growing market potential

Revenue by Geographie



Key Ideas




China, Taiwan, South Korea and Japan make up for more than half of the company's revenue



Declining dependence on Taiwan, which reduces geopolitical risk in case of further tensions

Unpacking Teradyne’s business model consisting of test solutions, automation and industrial applications

Business Segments



Semiconductor Testing






Digital/Mixed Signals

Wireless

Automotive and Power


Memory

System Level Test




Teradyne provides test solutions to researchers and manufacturers of a wide range of integrated circuits (IC). Teradyne-tested ICs are utilized in **computers, communications, automotive, identification, and internet applications.**


Robotics & Testing




Robotics – enabling customers to increase **operational efficiency** by **combining** the power of **automation and human skill**




Wireless Testing – provides high throughput and enables the **rapid and cost-effective transition** of breakthrough technologies from the lab to high-volume manufacturing



Storage Testing – focuses on improving overall **equipment efficiency, time to market** and **cost of ownership** for hard disk drive (HDD) manufacturers



Production Board Testing – provides **reliable high-quality PCB testing** at the greatest fault coverage rate possible without losing throughput





Defence & Aerospace – delivers **cutting-edge capabilities, exceptional reliability,** and world-class services to military facilities and the defence industry

Value Chain



Human Resources

Partnering with leading engineering universities to acquire the brightest talents






Partnerships

Engineers and partners are researching and developing products to meet future market demands





Acquisition

The active acquisition strategy facilitated Teradyne’s entrance into the new high-growth markets









Production

Teradyne uses its manufacturing expertise to teach the contract manufacturers about making its products



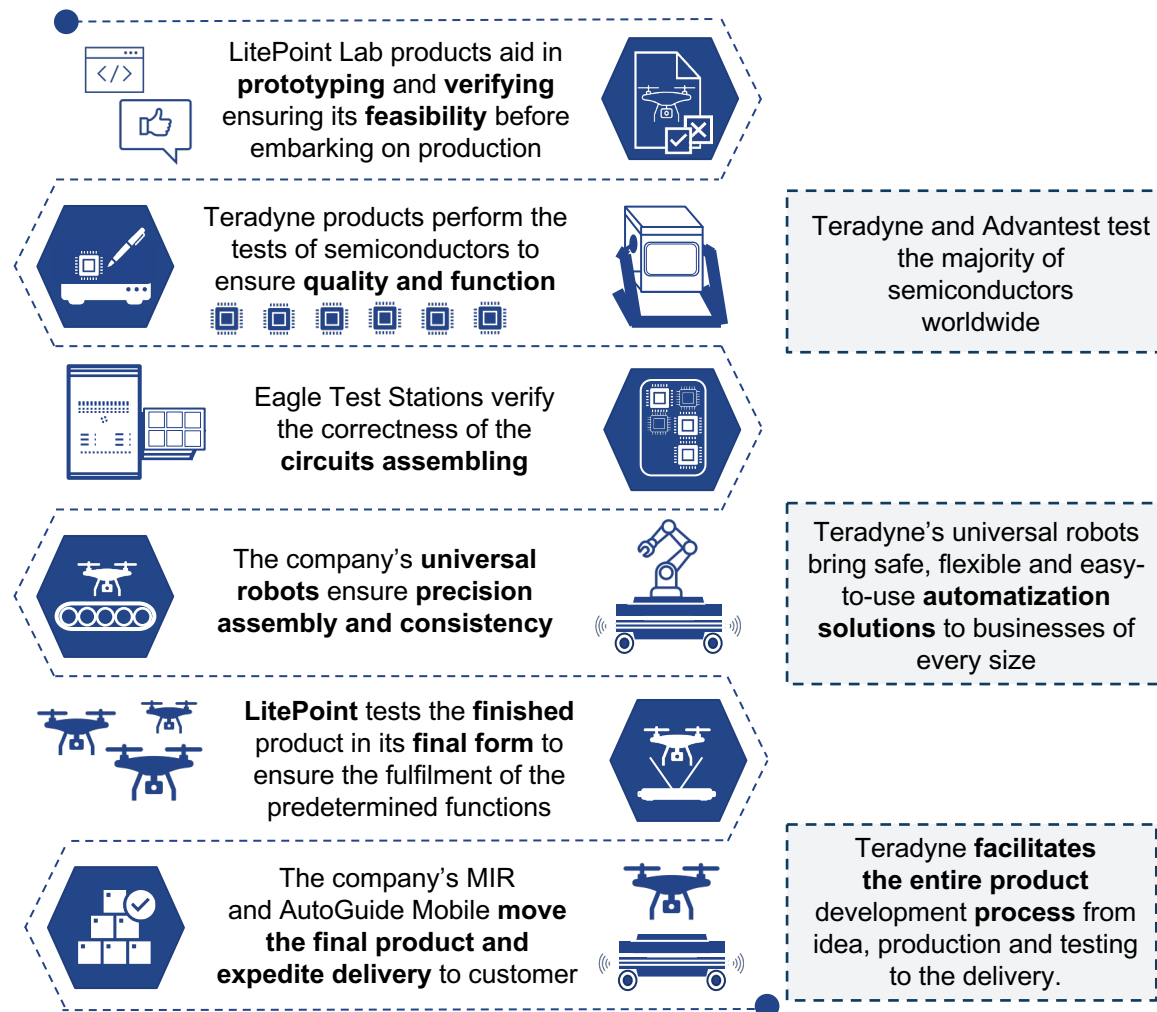
Customers

Teradyne’s customers include some of the biggest chip makers and electronic assembly companies in the world

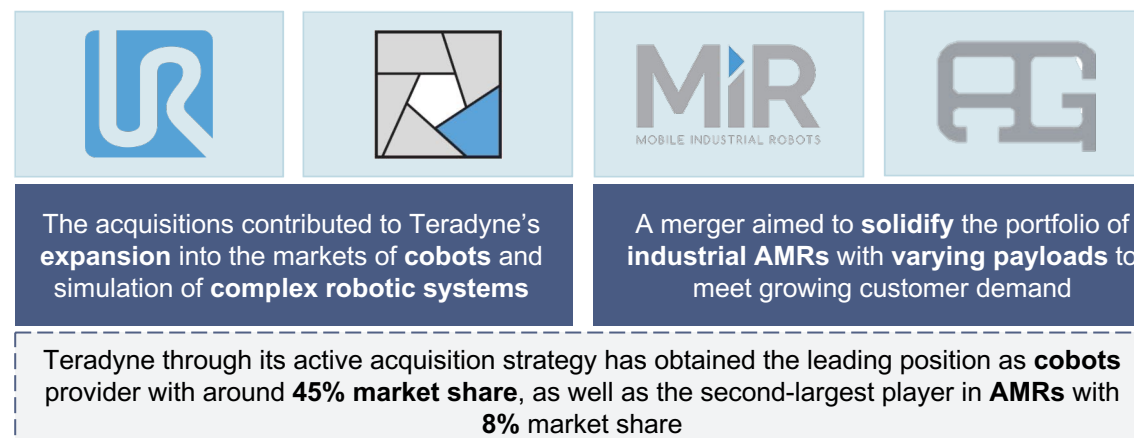


Teradyne extends its product portfolio and market reach through strategic acquisitions and research capabilities

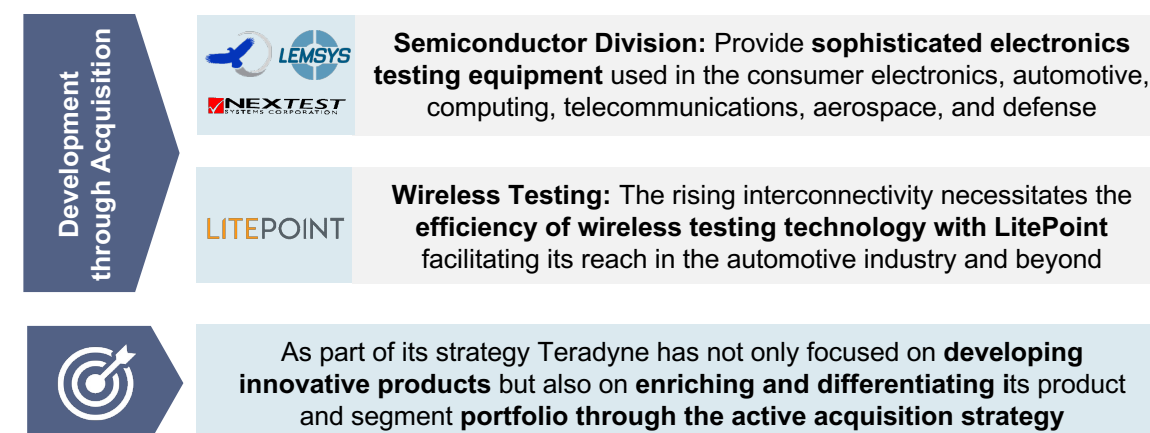
Value Chain Coverage



Industrial Automation Group – Acquisitions



Further Development of the Existing Segments



A photograph of a Teradyne WUTIS autonomous mobile robot (AMR) in a factory setting. The robot is a dark grey, rectangular unit with a flat top surface. Two black, rectangular blocks are placed on top of the robot. The robot is positioned on a light blue-grey floor with a white line. In the background, there are yellow industrial structures, possibly part of a conveyor system or shelving, and a large window letting in bright light. The overall scene is a clean, industrial environment.

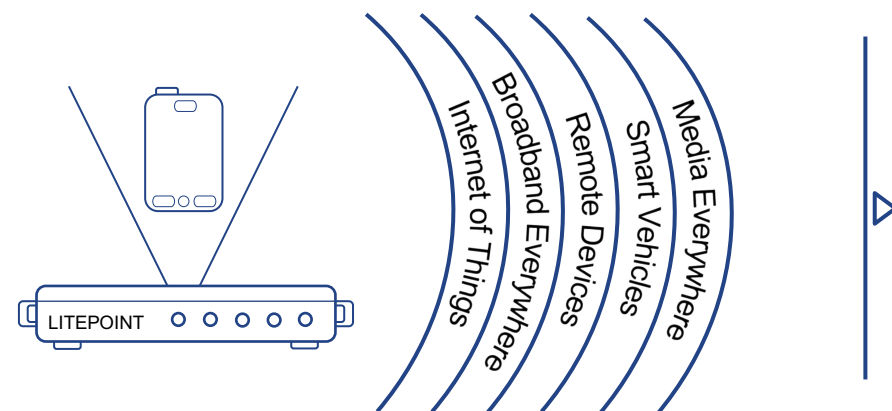
Teradyne

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Products & Customers

Accelerating wireless connectivity testing with cutting-edge solutions

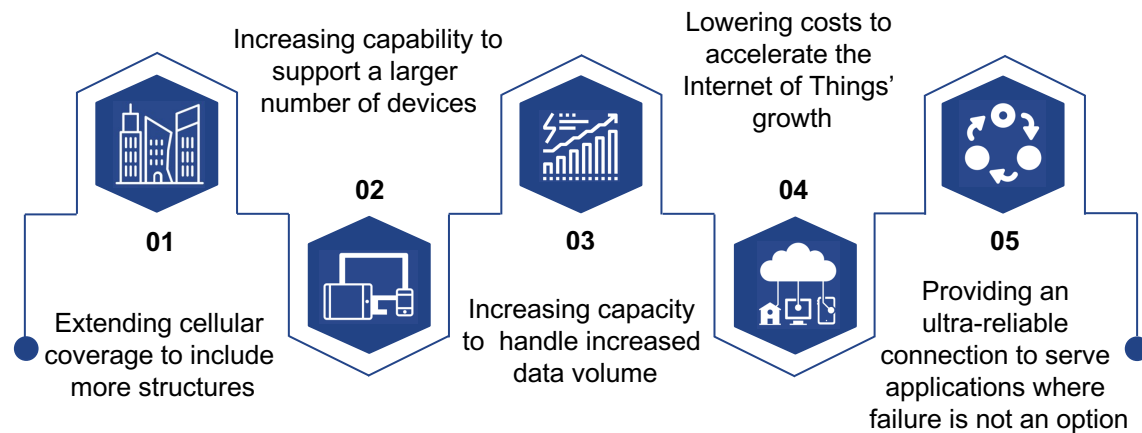
Wireless Testing



Next-Gen Connectivity Technologies

UWB	First fully-integrated test solution to calibrate and validate device with UWB technology
5G	First fully-integrated exclusively over-the-air box test for 5G mm Wave
WiFi	Largest installed base of production WiFi tester
V2X	Facilitation of the revolutionization of the automotive industry – autonomous driving

The Benefits of Litepoint



Partnerships

Partnership with **Qualcomm Technologies** to develop 5G test solutions **accelerating small cell deployment**, which offers less **power consumption** and superior **performance** enabling **greater coverage** and throughput in dense urban areas.

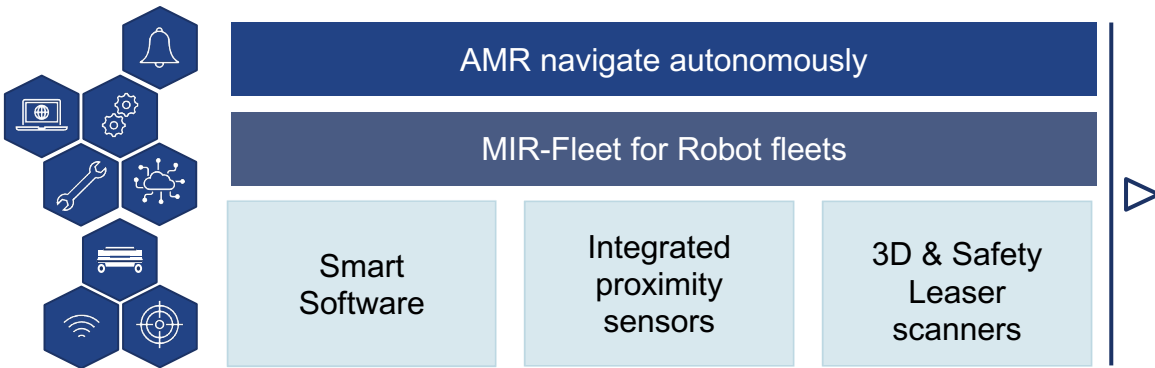
LitePoint 's test platform was **chosen to validate Broadcom Wi-Fi 7 ecosystem solutions**, which is crucial for **next-generation applications**, i.e. augmented and virtual reality

LitePoint joined the **Car Connectivity Consortium (CCC)** to ensure a consistent end-user experience for **keyless entry in automobiles and trucks**.

Mobile Industrial Robots

A leading supplier of autonomous mobile robots through strategic acquisitions

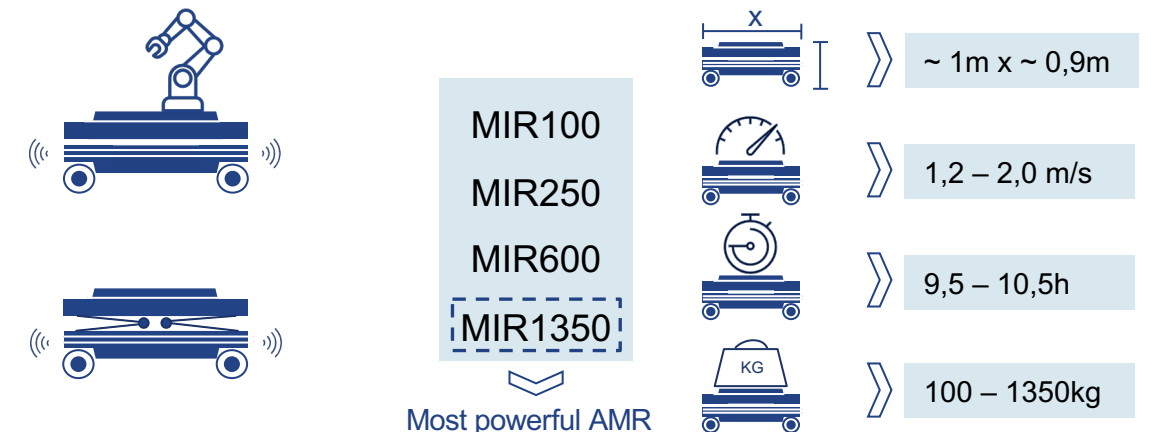
The Future will be Smart & Intuitive



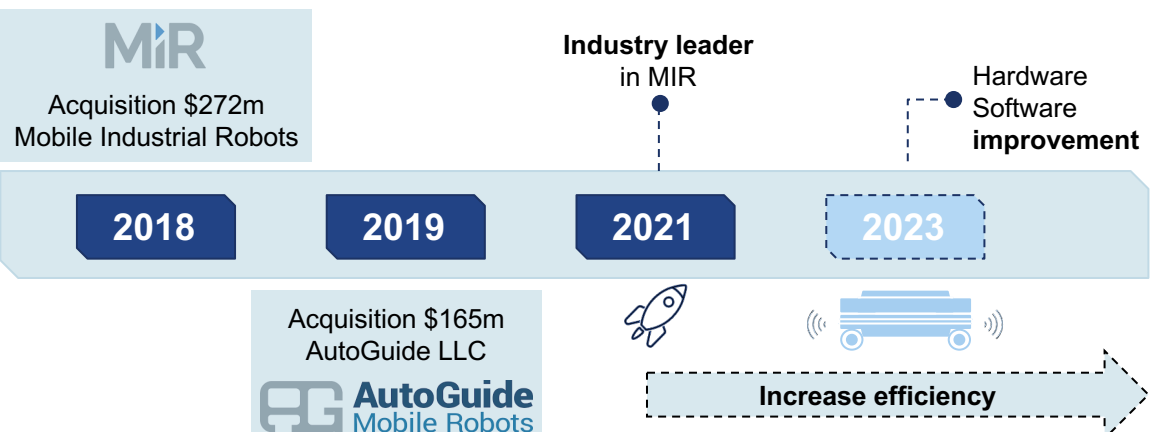
Advantages of Mobile Industrial Robots

- Adaptability & cost efficiency
- Enhance operational efficiency
- Safe work environment
- Integration and scalability
- Easily integrated into existing production environment

Product Overview

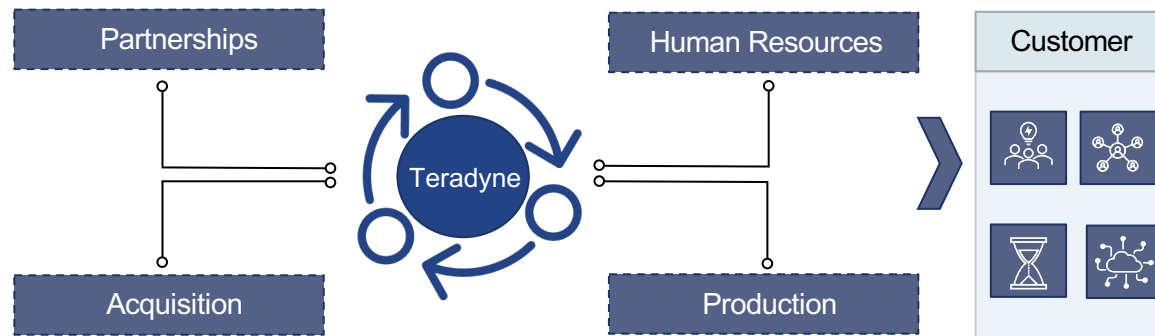


Success Timeline

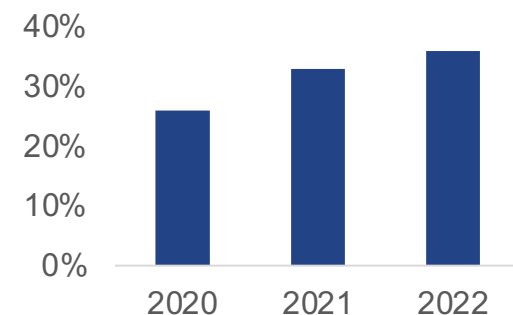


Strategic partnerships enable a fast innovation track record for the existing customer base

Partnership Development



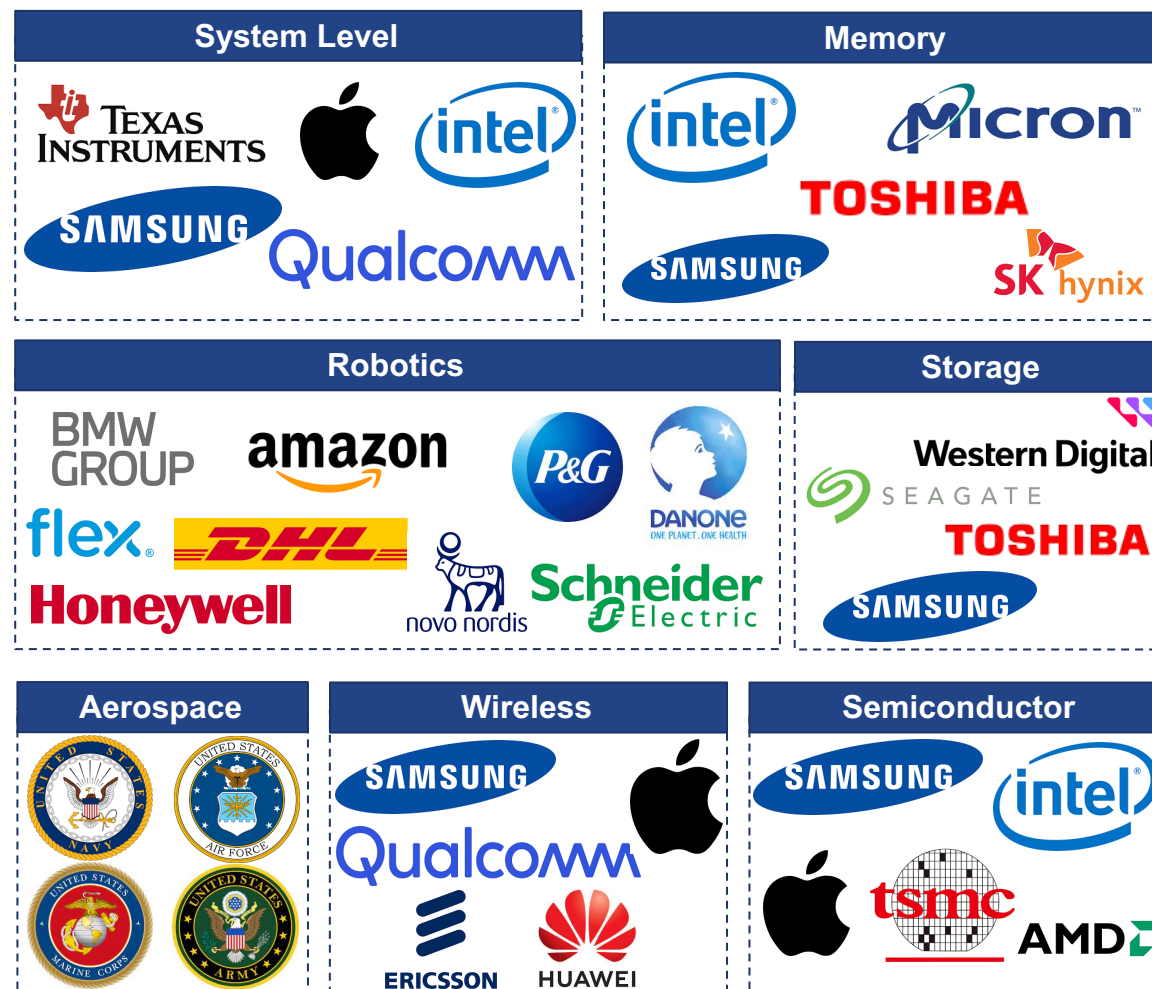
Customer Concentration



Revenue concentration of biggest aggregated customers increases regularly

- High switching costs
- Loyalty
- Adaptable product portfolio

Customer Base





Teradyne

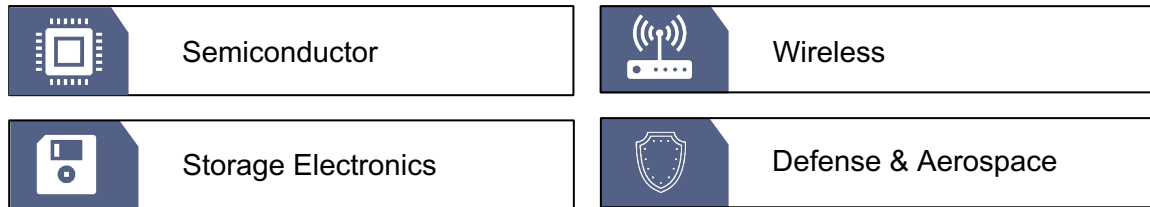
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Market & Industry Overview

Industry & Market Overview I

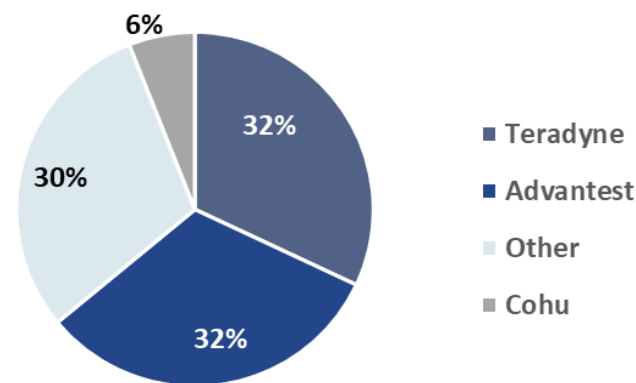
The ATE market is very diverse and connected to many different industries

Automated Test Equipment Market (ATE)



The market for test products is concentrated with a **number of significant customers** accounting for a **substantial** portion of the purchase of test equipment. Teradyne expects sales with their customers to **rise** in the foreseeable future.

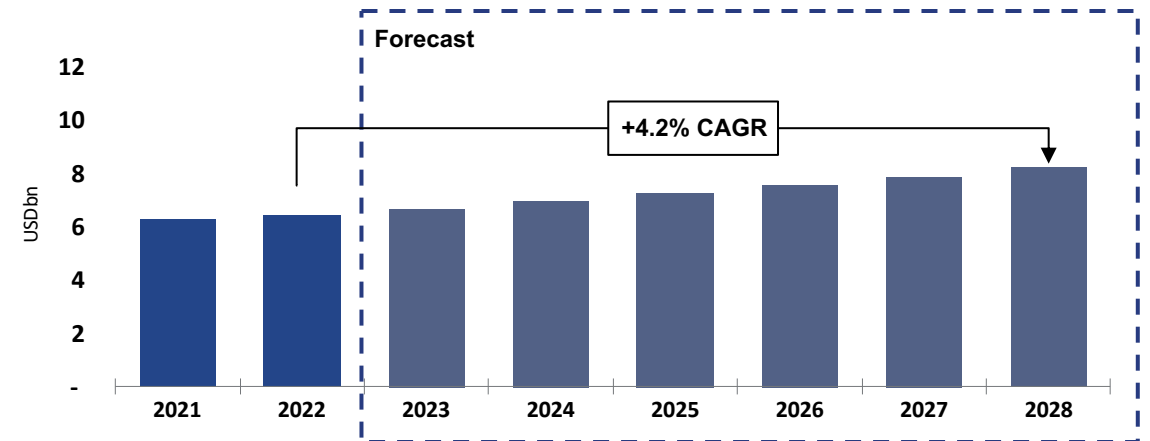
Market Share by Companies of the ATE market



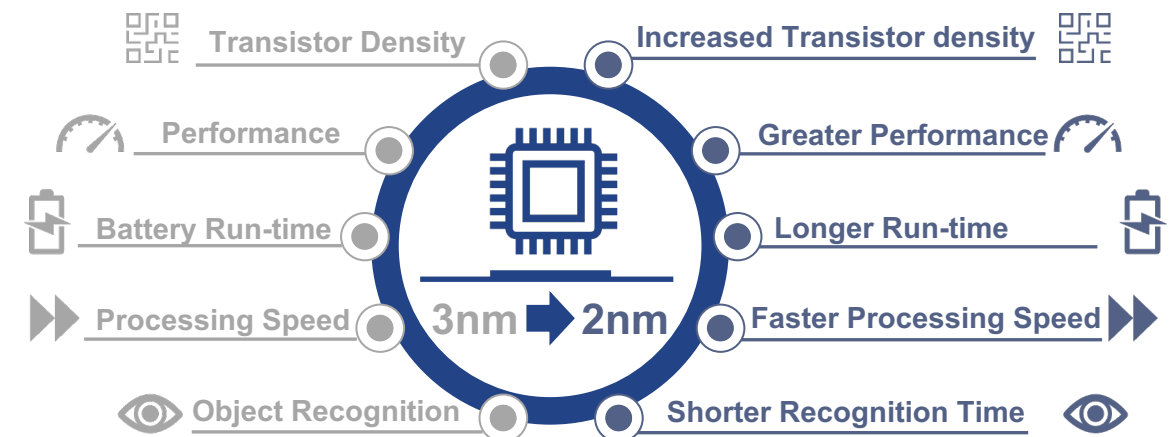
The ATE market operates under a duopoly structure, wherein Teradyne and Advantest, emerged as the dominant players with Teradyne following a more diversified business model due to its promising robotics segment



Global Automated Test Equipment (ATE) Market Outlook



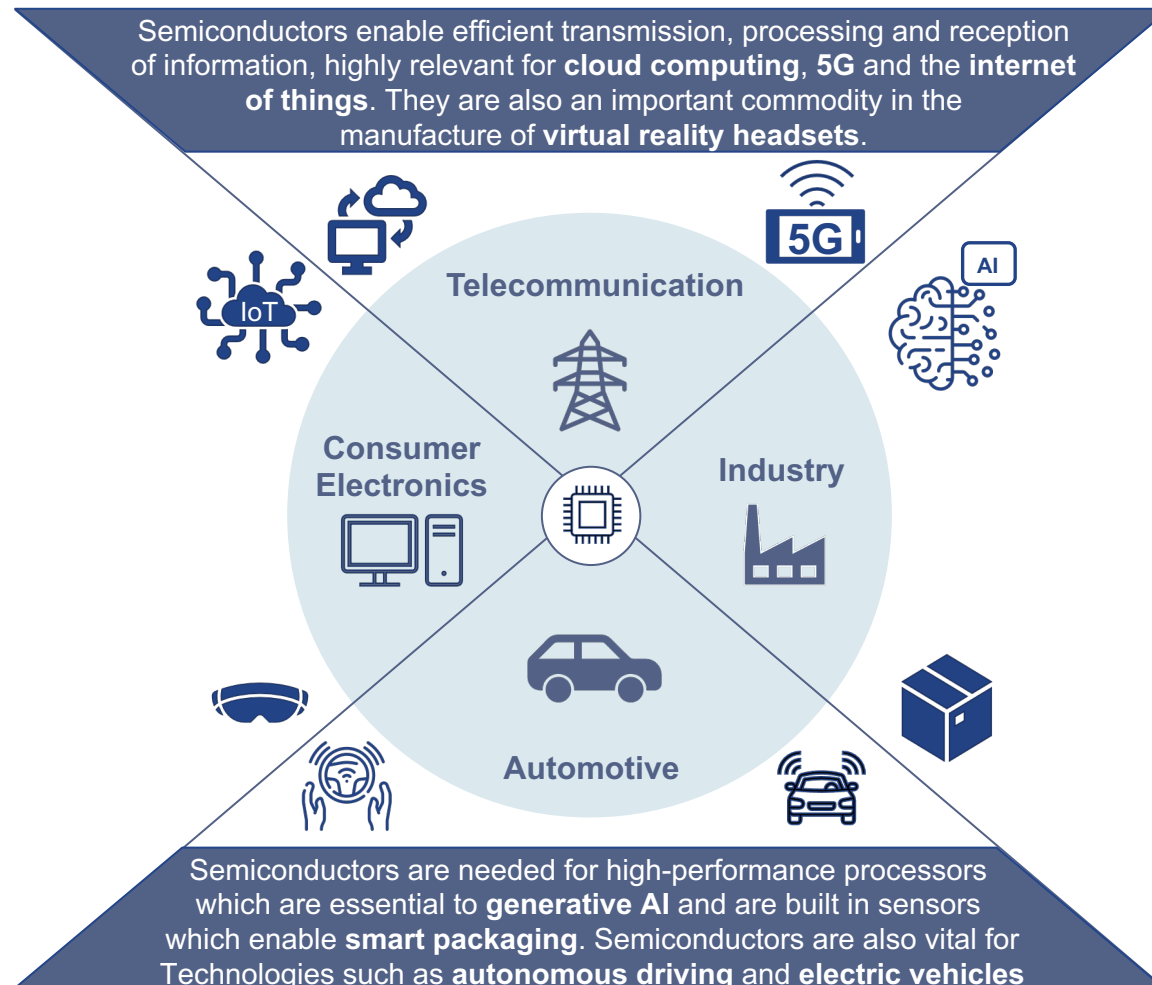
The Switch from 3nm to 2nm is Transforming the Industry



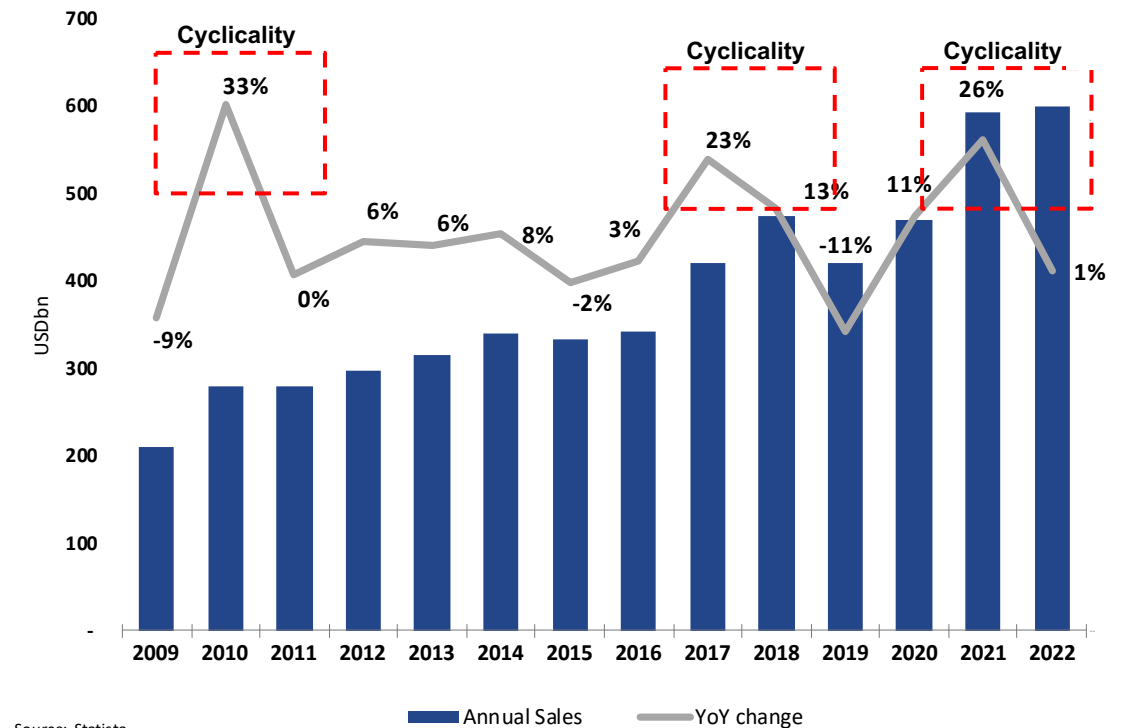
Industry & Market Overview II

Teradyne is profiting from mega trends in the industry while hedging themselves against the cyclicity in the market

Overview of Teradyne's Semiconductor Markets and Main Trends



Cyclicality of the Semiconductor Market



Teradyne hedges itself against market cyclicity by **diversifying** their product portfolio, serving a **broad range of other industries**, being **active globally** and having a technological advantage over their peers

The robotics market has made a lot of change and in the future

Threats

Opportunities



While robotics can lead to long-term cost savings, the **initial investment** can be high



The robotics market may face **regulatory challenges** as governments grapple with defining standards, safety guidelines, and legal frameworks



Robotics often involves **complex** systems and integration with existing infrastructure



Questions surrounding **privacy, security, liability**, and the impact on human interaction need to be addressed

19th Century
Major progress in production capabilities



20th Century
The first industrial robotics arm went to work in an automotive plant

21st Century
Robots re-engineer warehouses and manufacturing



Studies show that robots **reduce work-related injuries** by 1.2 cases per 100 workers in a one-year period



Robots can work tirelessly and consistently, leading to increased **productivity**

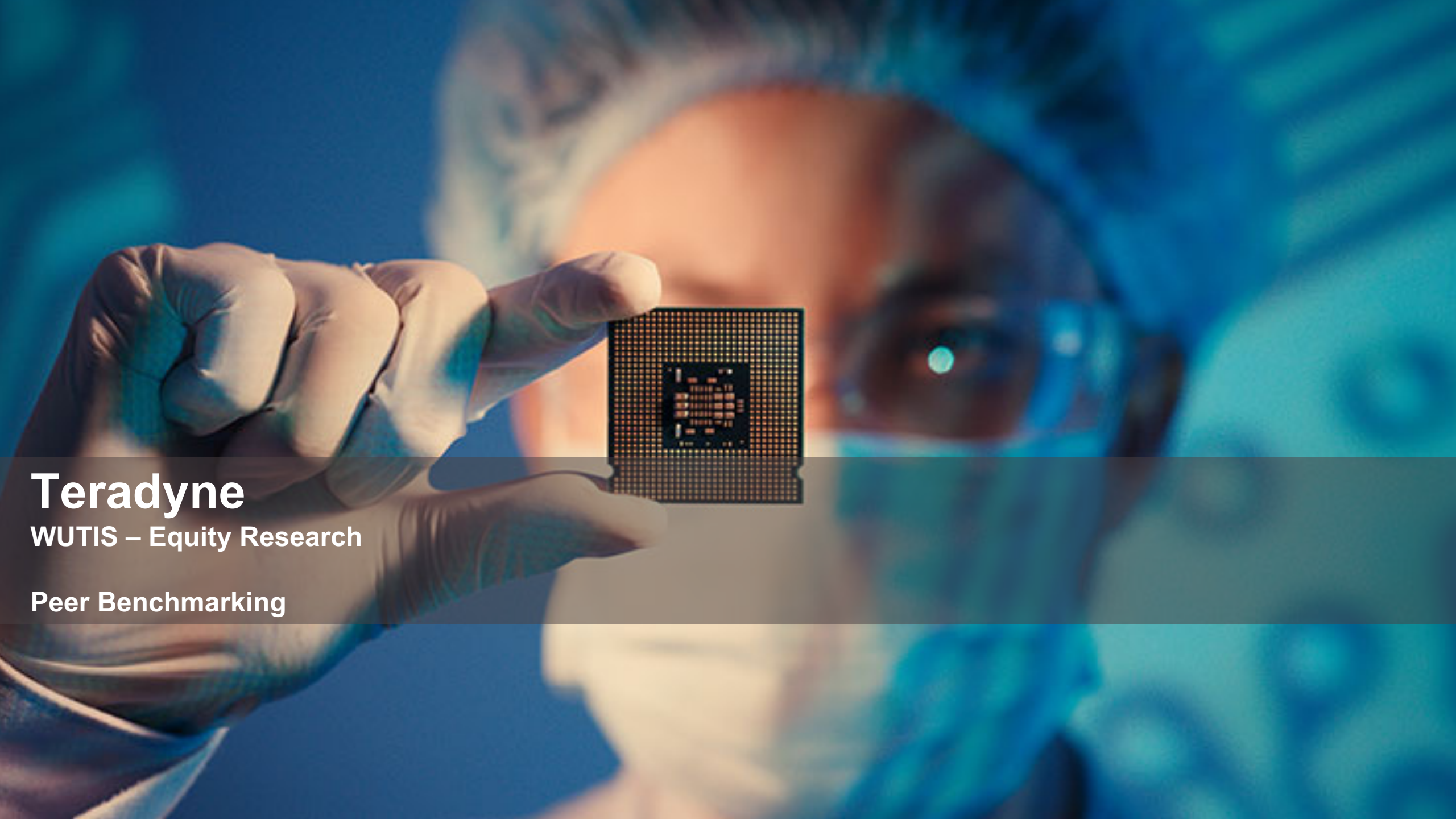


Robotics provides opportunities for **automation** across various industries. It can streamline processes, increase efficiency, and reduce costs



The robotics market fosters **innovation**, driving advancements in various technologies





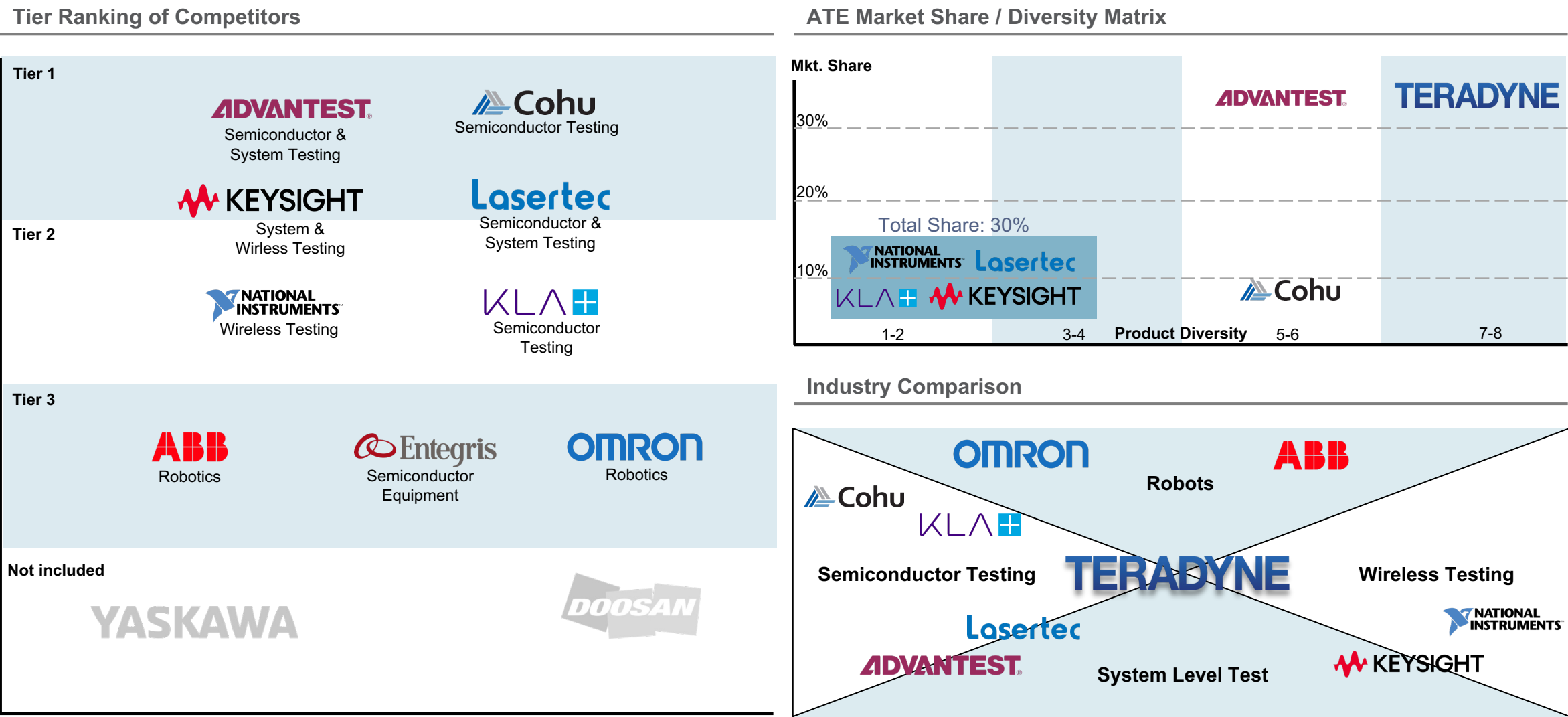
Teradyne

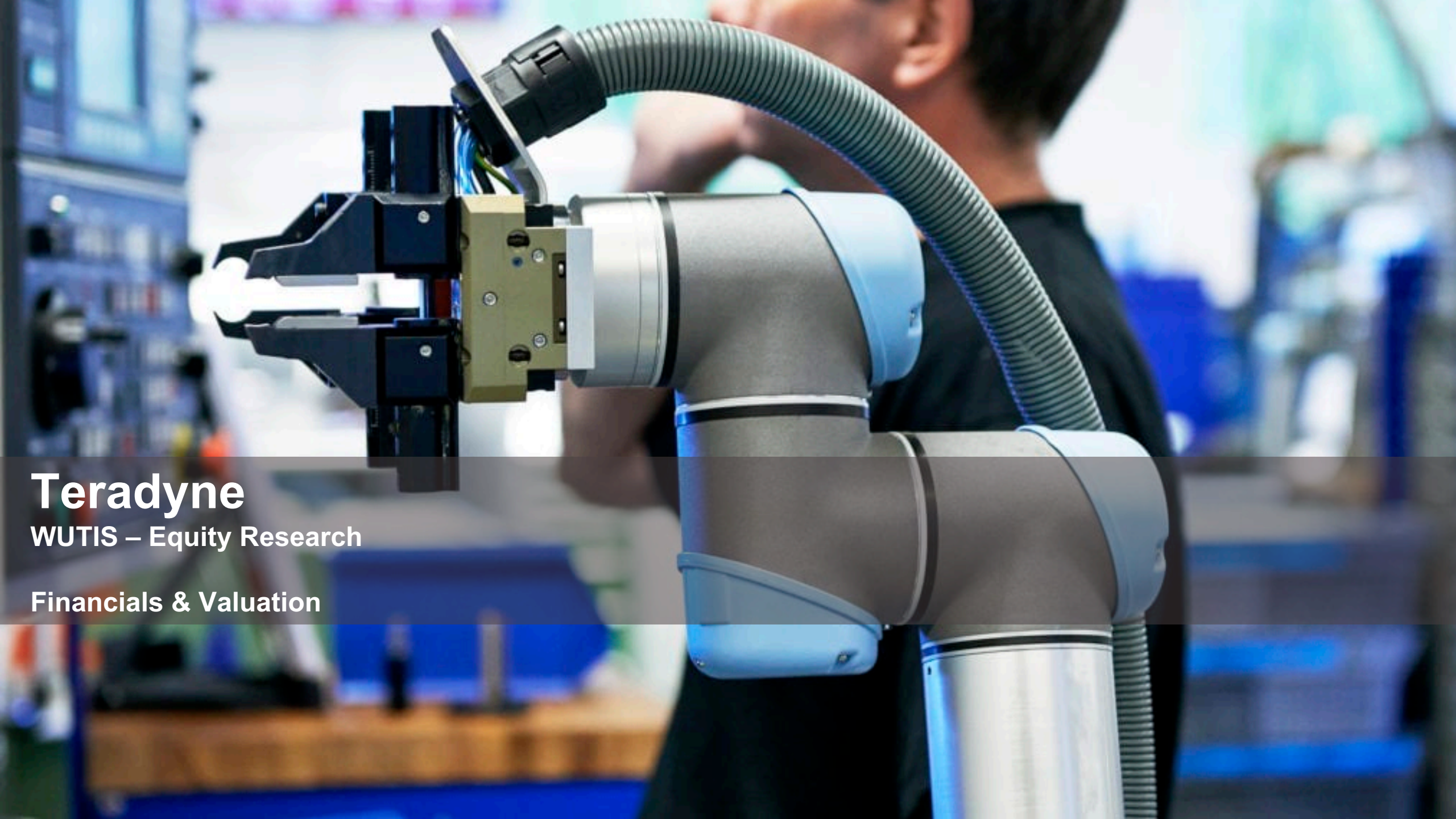
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Peer Benchmarking

Peer Benchmarking

A clear duopoly with Advantest, however, slight advantage for Teradyne





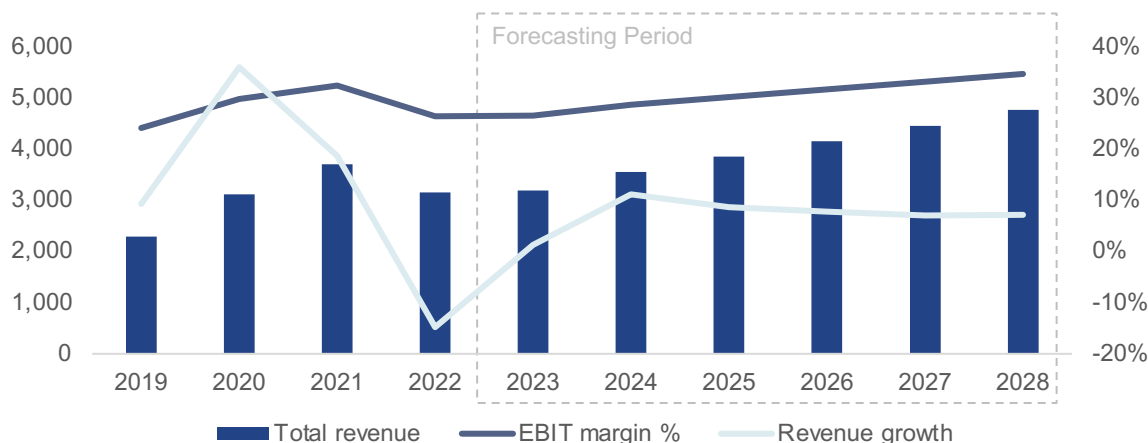
Teradyne

WUTIS – Equity Research

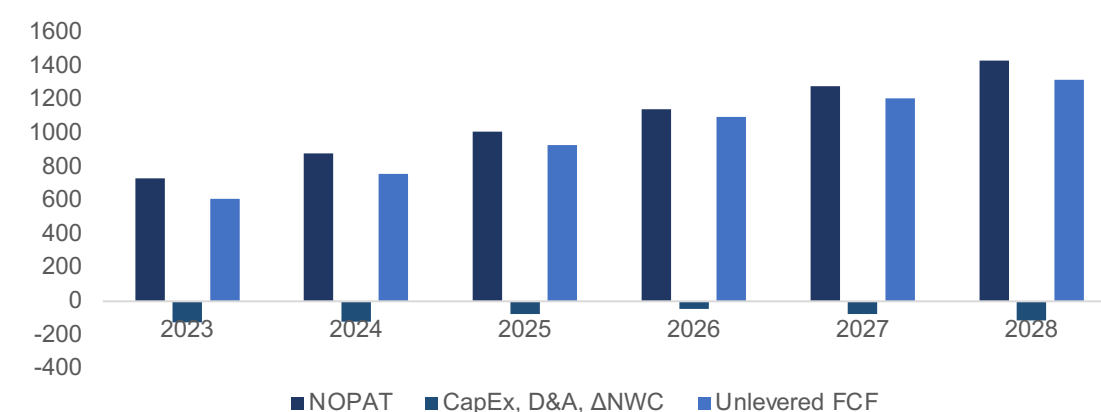
Financials & Valuation

Segment diversification into high-growth industries and operating efficiencies offset downturns in 2022 & 2023

Revenue & Margin Development (in USD m)



FCF Composition (in USD m)



Revenue Forecast Rationale

Market Growth	CAGR	×	Revenue Share	=	Total Revenue
System-on-a-Chip	6.42%				
Memory	-0.46%				
System	5.64%				
Universal Robots	11.72%				
MiR	17.63%				
Wireless	4.48%				

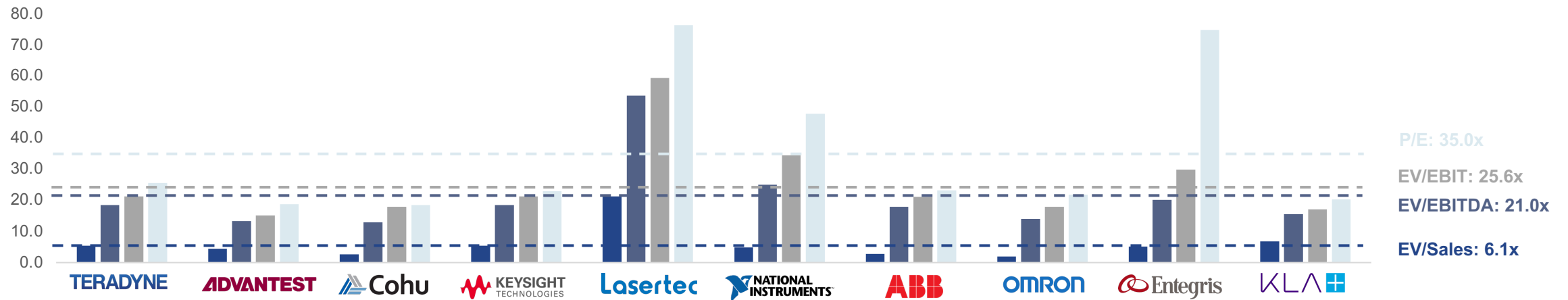
Assumptions

	Costs: We expect COGS and SG&A to decrease over the long-run with R&D and CapEx rising due to technological trends and developments in the chip industry as well as efforts in new robotics operations
	Cash conversion cycle: Based on semiconductor cyclicality and current global macroeconomic developments, inventory on hand is expected to remain high and start to slightly decrease in 2024
	WACC: Separate WACCs for the planning period and the terminal value were used, to account for debt repayments and share buybacks, complemented by a 2% long-term growth rate

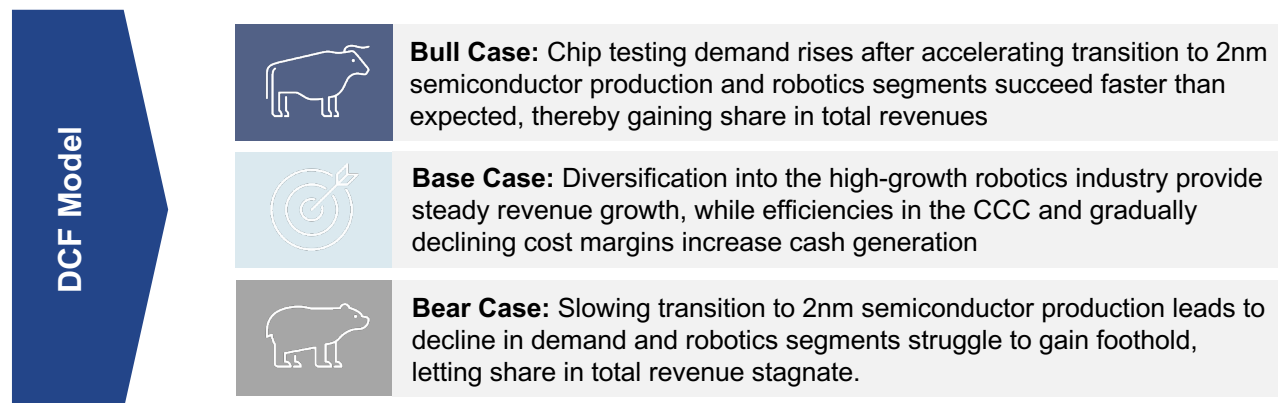
Valuation II

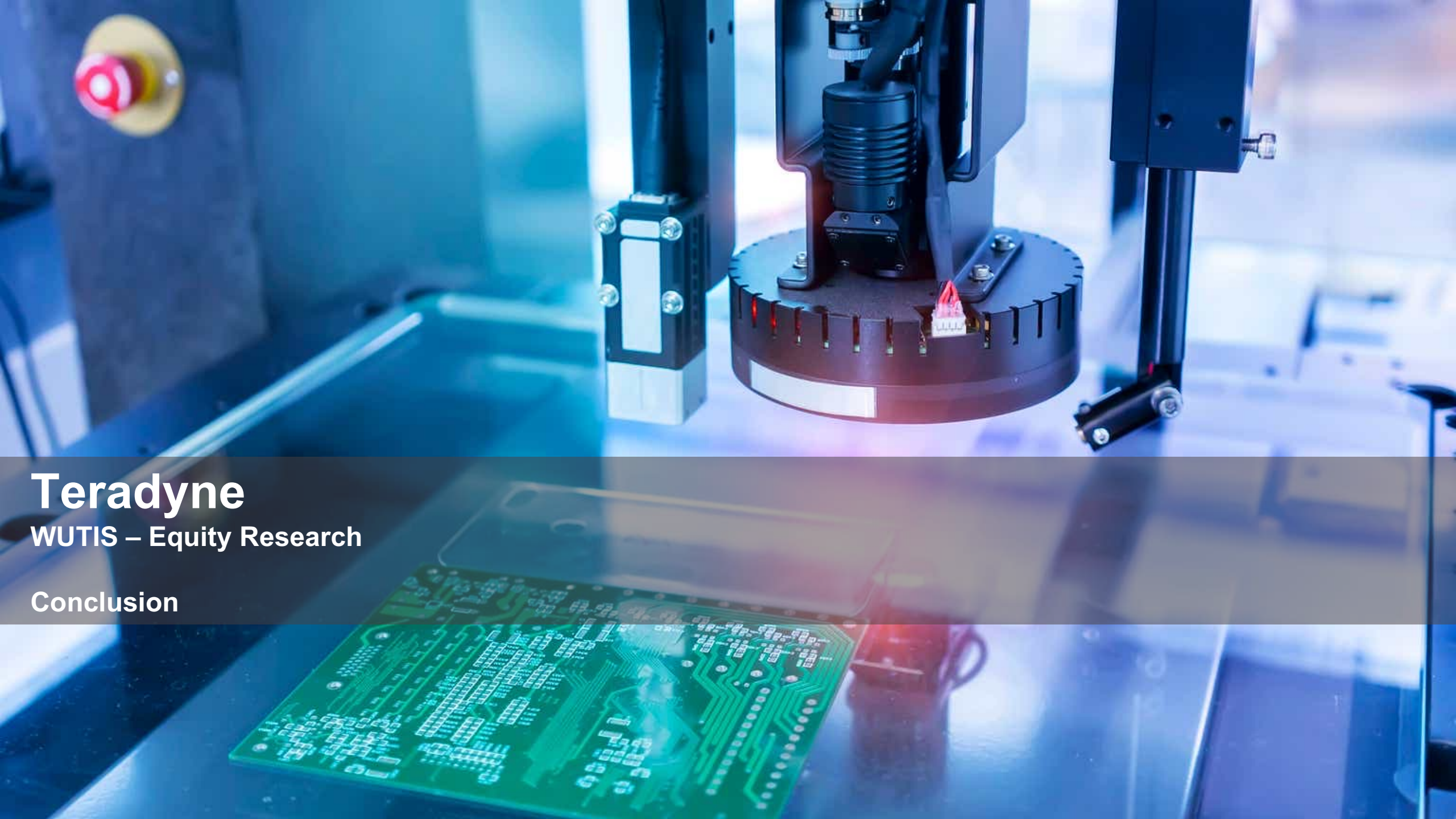
Different valuation approaches imply optimistic share price outlook

Multiples Valuation



Valuation Summary





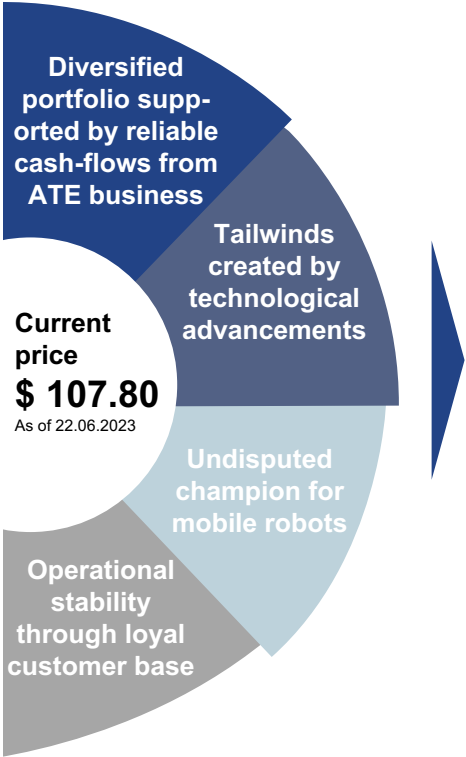
Teradyne

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Conclusion

Conclusion

Promising market evolution and diversification strategy provide for a significant upside potential





Teradyne

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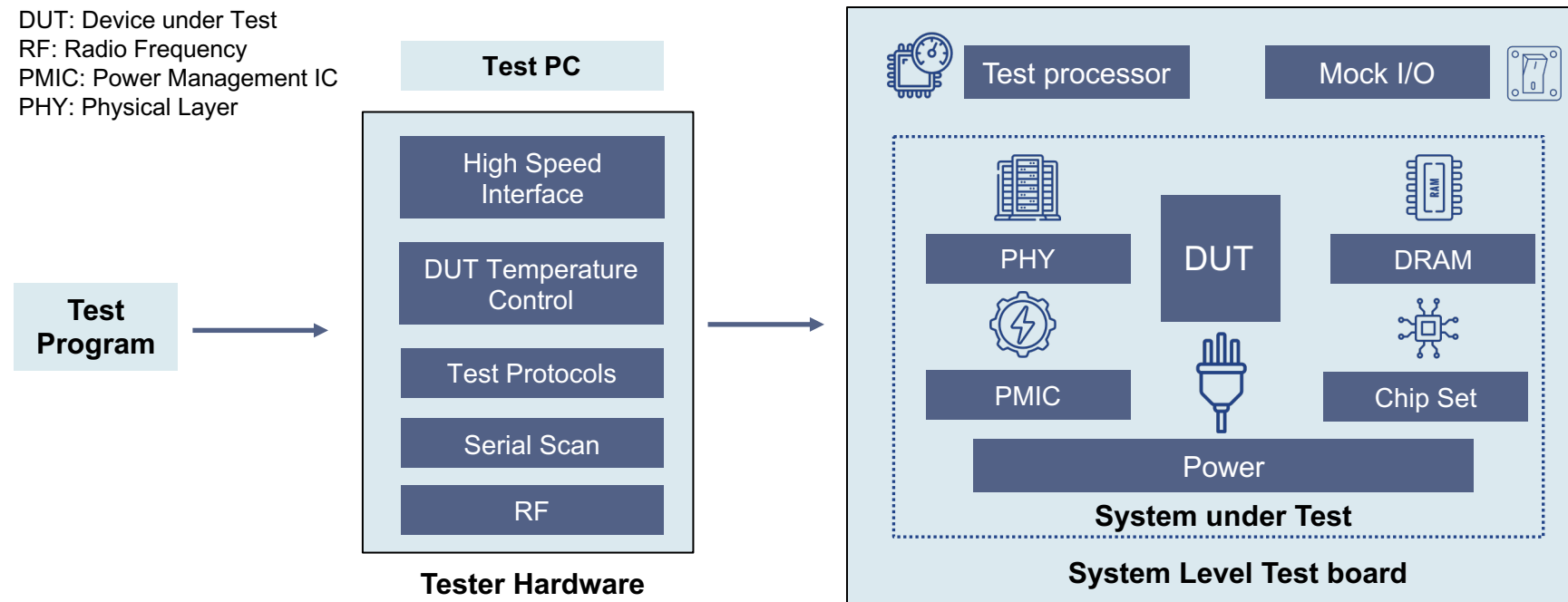
Appendix

Appendix: System Level Test (SLT)

With maximum precision to cutting edge testing outcomes

System Level Test

DUT: Device under Test
RF: Radio Frequency
PMIC: Power Management IC
PHY: Physical Layer



Advantages

More **precise** testing through real-life function tests

Possibility for **full** and **partial** SLTs, making tests more flexible

SLT provides a **wider range** of complicated scenarios which are hard to find manually

Helps to **identify** marginal **errors** in **design**



- More accurate presentation of problems leads to better **quality**
- SLTs help to **optimise** the cost-of-test/quality ratio
- **Recreate** the end-use environment as closely as possible
- Tests the way hardware and software **interact** together

The process


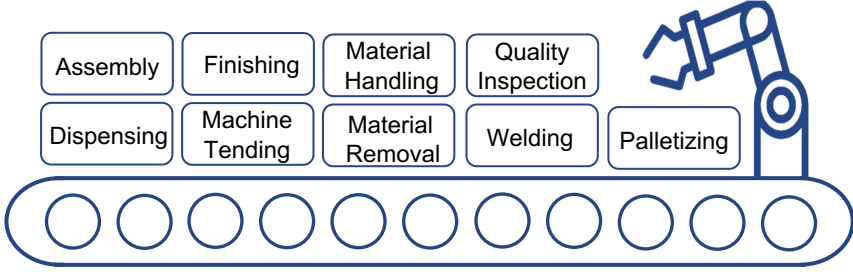
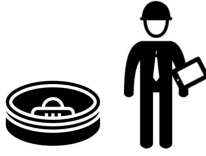
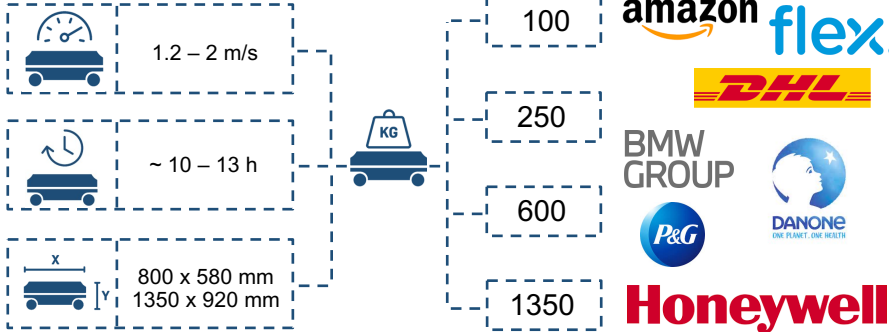

To **perform** a **SLT** in production environment **requires** to **build** a **system**

This system is then **implemented** on a **test board**, which looks very **similar** to the **final production** board in which the tested device will later be implemented

The test itself is run as a **software code**. The SLT testers are able to accomodate **multiple** testing **approaches**

Appendix: The New Era of Robotics

Teradyne has a market leading portfolio of robotics solutions

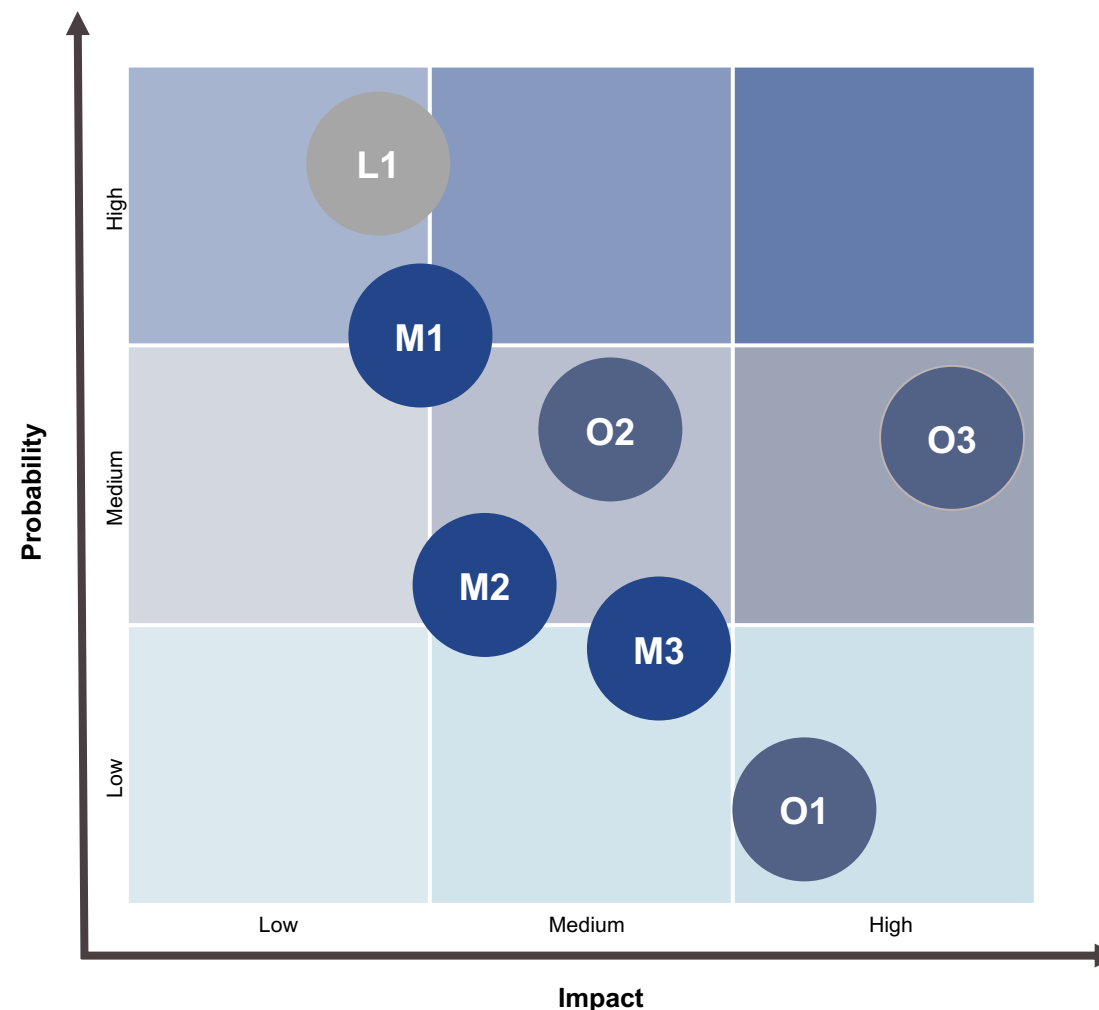
<h3>Collaborative Robots or Cobots</h3>  <p>Cobots operate alongside humans. They are lightweight, simple-to-programme robotic arms with flexible architecture that may be educated to execute an infinite number of applications.</p>		<ul style="list-style-type: none"> Easy Programming & Setup Flexible Automation Collaborative and Safe
<h3>Autonomous Mobile Robots</h3>  <p>AMRS enable users to handle internal logistics swiftly and cost-effectively, without the need for infrastructure improvements, they provide simple deployment, greater safety, and increased in-house logistics efficiency.</p>		<ul style="list-style-type: none"> Integration & Scalability Cost-effective & Agile Intelligent Navigation
<h3>Motion Control Software for Robots</h3>  <p>The program is used to control and simulate robotic motions in real-time across a wide range of industries and applications regardless of hardware or operating system.</p>	<ul style="list-style-type: none"> Simple, web-based interfaces Could be run on a smartphone, tablet or computer MiRAcademy with a variety of online courses Requires minimum programming knowledge Simplifies the complexity of the implementation 	<ul style="list-style-type: none"> Intuitive & User-friendly Easily Configurable Out-of-box Solutions

Appendix: Risks

The cyclical nature of the market and the complexity of the industry puts Teradyne on their toes






M1	The semiconductor industry has a cyclical nature that affects Teradyne's financial performance
M2	ATE technology is rapidly evolving, and there is always a risk of existing equipment becoming outdated as new technologies emerge
M3	As the market becomes saturated , Teradyne may struggle to differentiate themselves and maintain market share
O1	ATE companies must maintain stringent quality control measures to ensure accurate and reliable testing. Failure to effectively monitor and control the quality of testing processes can lead to negative results
O2	ATE companies may face risks associated with a lack of skilled personnel , difficulty in attracting and retaining talent leading to operational inefficiencies and compromised testing capabilities
O3	Since Taiwan is a very important market of Teradyne, the conflict between Taiwan and China can have a huge negative impact
L1	ATE systems used in certain industries, such as aerospace, automotive, or healthcare, often need to meet strict regulatory and compliance requirements

Market (M) – Operations (O) – Legislation (L)



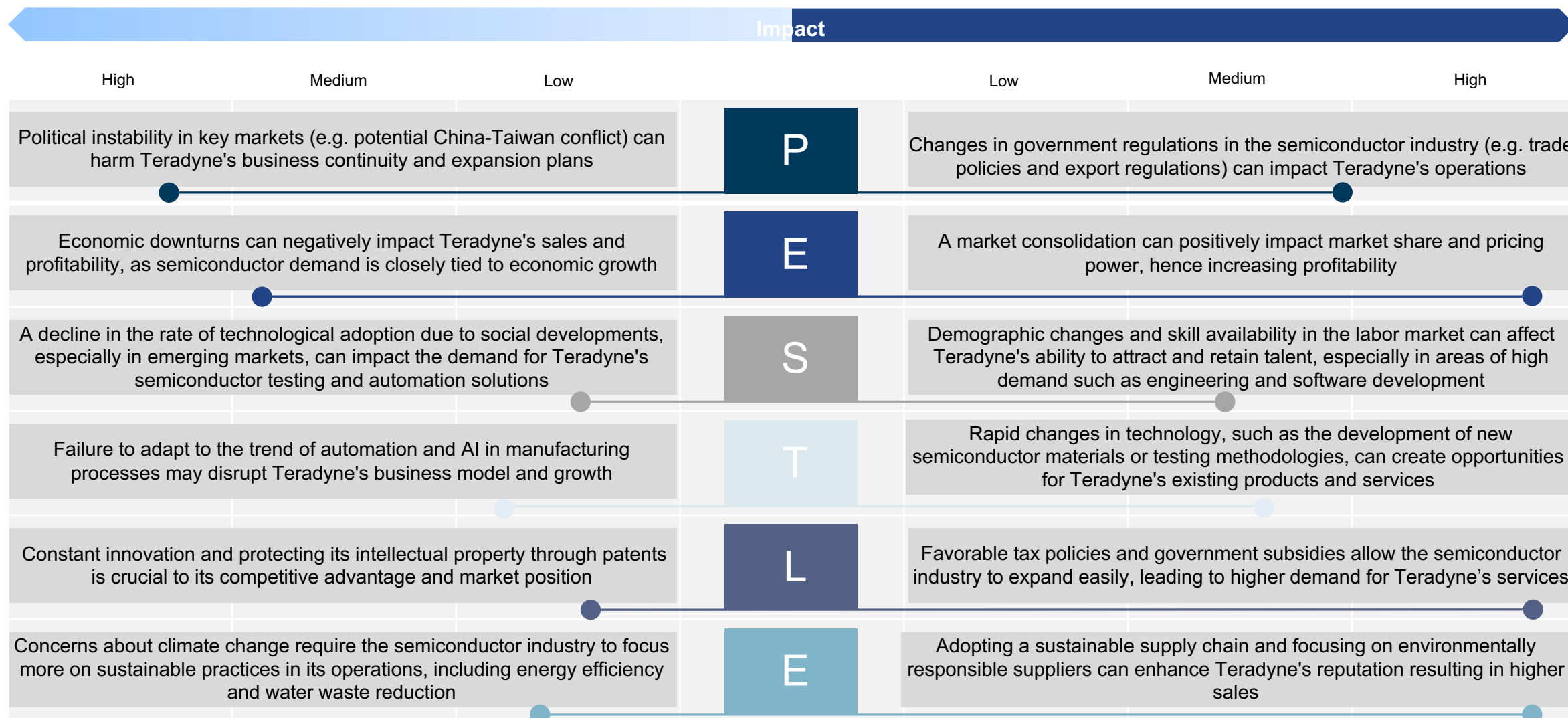
Appendix: Catalysts

A variety of events may impact Teradyne's share price

Catalyst	Type	Influenced Factor	Estimated Impact on Share Price
Product Innovation	Soft	Revenue Pipeline	<ul style="list-style-type: none"> Medium – Product innovation drives revenue growth and market share expansion for Teradyne that invests heavily in R&D 
Acquisition – Robotics	Hard	Revenue, Margins	<ul style="list-style-type: none"> Teradyne's acquisition track record in the robotics segment is sure to continue in 2023 as the CEO announced in Q1 
Technological Advancements	Soft	Revenue	<ul style="list-style-type: none"> Strong – Technological advancements especially in the semiconductor industry (3nm to 2nm) can boost Teradyne's product demand 
Competitor	Soft	Revenue Reputation	<ul style="list-style-type: none"> If important hardware for AI advancements is mainly provided by companies that are Advantest's customers, this could negatively impact Teradyne's reputation with investors 
Global Semiconductor Shortage	Soft	Revenue Projects	<ul style="list-style-type: none"> Strong – A potential Taiwan would harm Teradyne by disrupting the semiconductor supply chain, leading to production delays and potentially reducing customer demand 

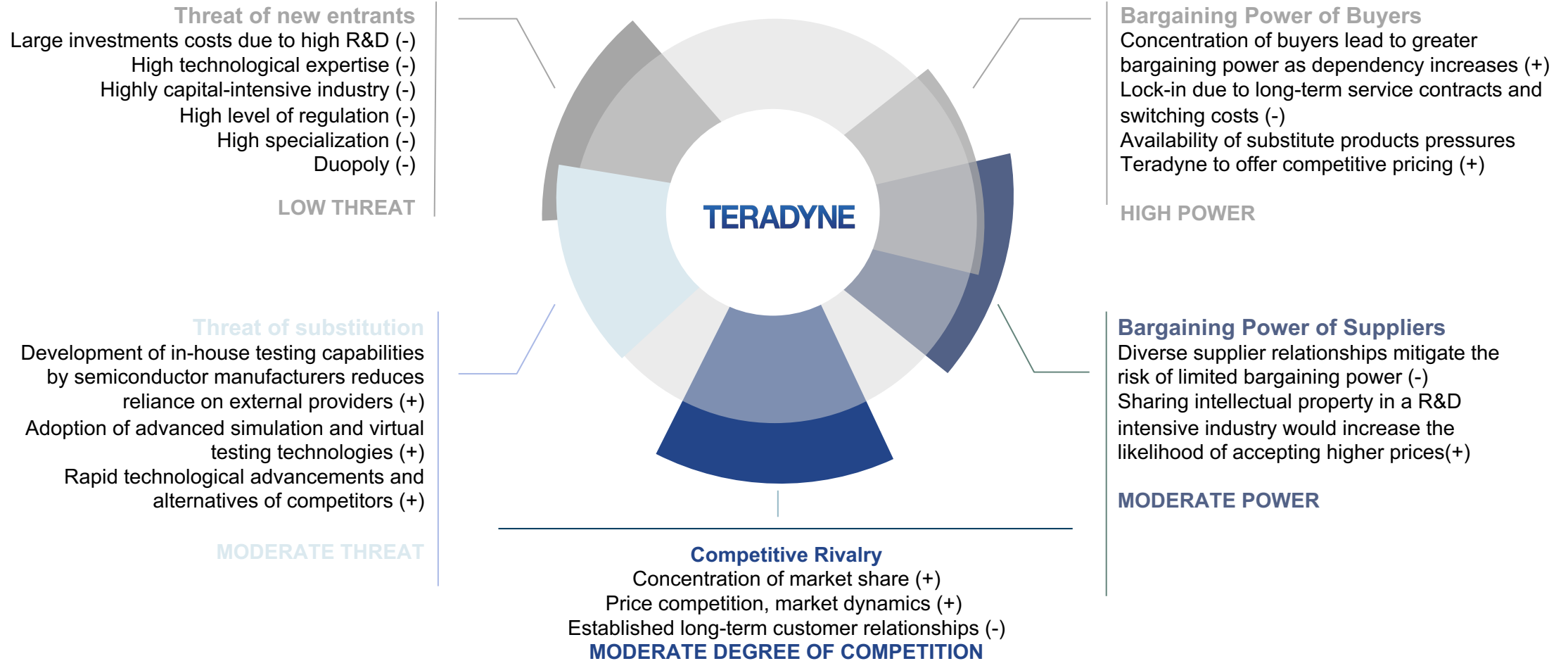
Appendix: PESTLE Analysis

Teradyne is subjected to several risks and opportunities generated by the macro environmental factors



Appendix: Porter's Five Forces

The semiconductor testing industry is characterized by a high rivalry among competitors



Appendix: SWOT Analysis

Strengths predominate weaknesses, enabling growth

STRENGTHS

- Technological expertise: Teradyne's technological expertise enables innovative solutions, staying ahead of advancements, delivering high-quality products, and maintaining a competitive edge
- Established market presence: A long history and strong reputation in the semiconductor testing and automation industry, has built Teradyne a solid customer base and brand recognition
- Diverse product portfolio: Despite its focus on testing, Teradyne has recently invested into other segments such as robotics and automation

OPPORTUNITIES

- Industry growth and technological advancements: The rise of new technologies such as AI, 5G and IoT generates growing demand for advanced testing and automation solutions
- Increasing demand for automotive electronics: The adoption of electric vehicles, advanced driver assistance systems, and connected car technologies creates the need for reliable and efficient testing solutions
- Expansion into emerging markets: Due to rapid economic growth and industrial development in these markets, the demand for semiconductor testing and automation solutions is increasing

TERADYNE

- Dependence on the semiconductor industry: Since Teradyne's business is tied to the semiconductor industry to a large extent, the company is exposed to fluctuations and downturns in the industry
- Reliance on key customers: The concentration of a significant portion of its revenue from a few key customers exposes Teradyne to risks associated with customer preferences, market competition, and losing key customers
- High R&D and capital expenditure requirements: The high costs and the constant strive for innovation can harm profitability as the company needs to stay ahead of competitors

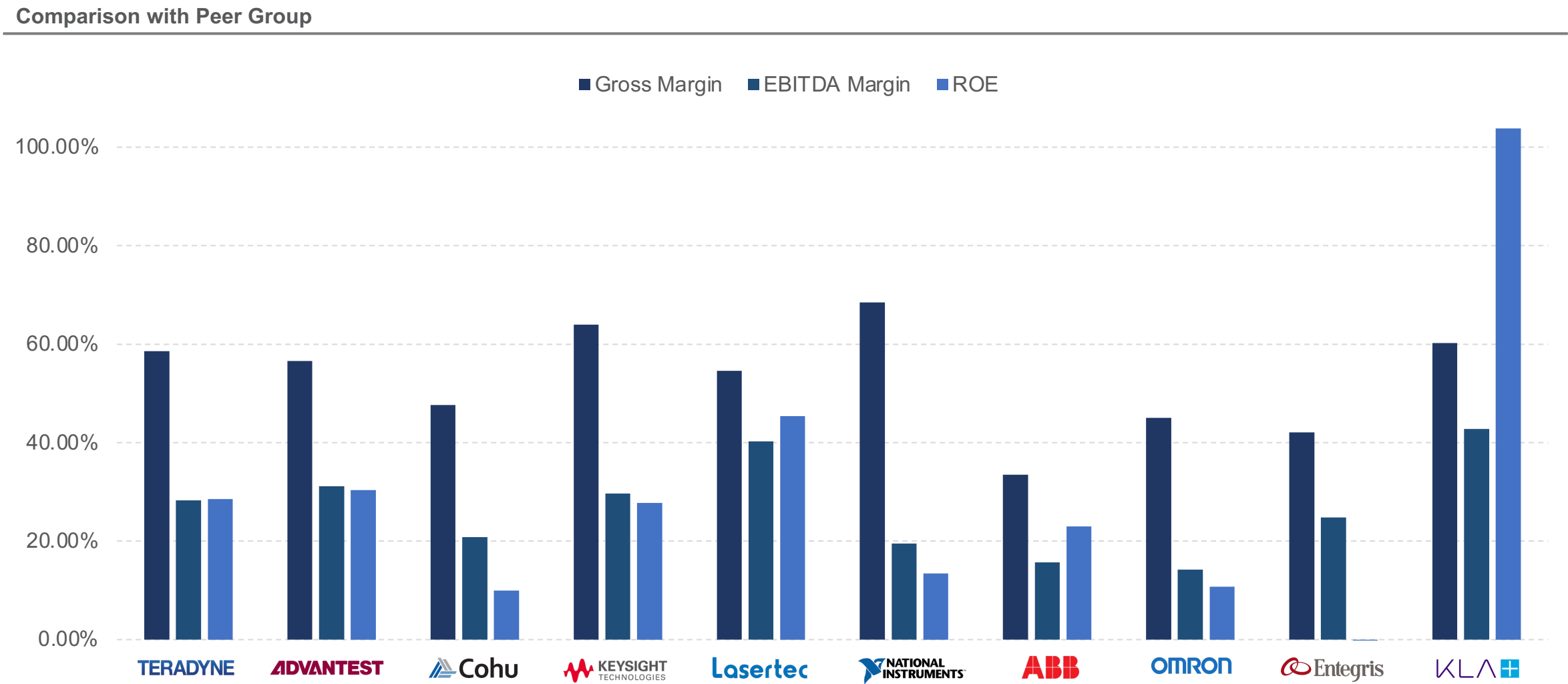
WEAKNESSES

- Intense market competition: Due to numerous players trying to increase their market share, Teradyne must differentiate itself through its technological expertise, superior product quality, customer relationships, and strong brand reputation
- Rapid technological advancements: Failure to stay at the forefront of technological advancements or developments in the wrong pose threat that Teradyne's testing become outdated
- Global supply chain challenges: Teradyne's complex global supply chain network is exposed to various factors such as geopolitical tensions, changes in trade policies and natural disasters

THREATS

Appendix: Peer Benchmarking I

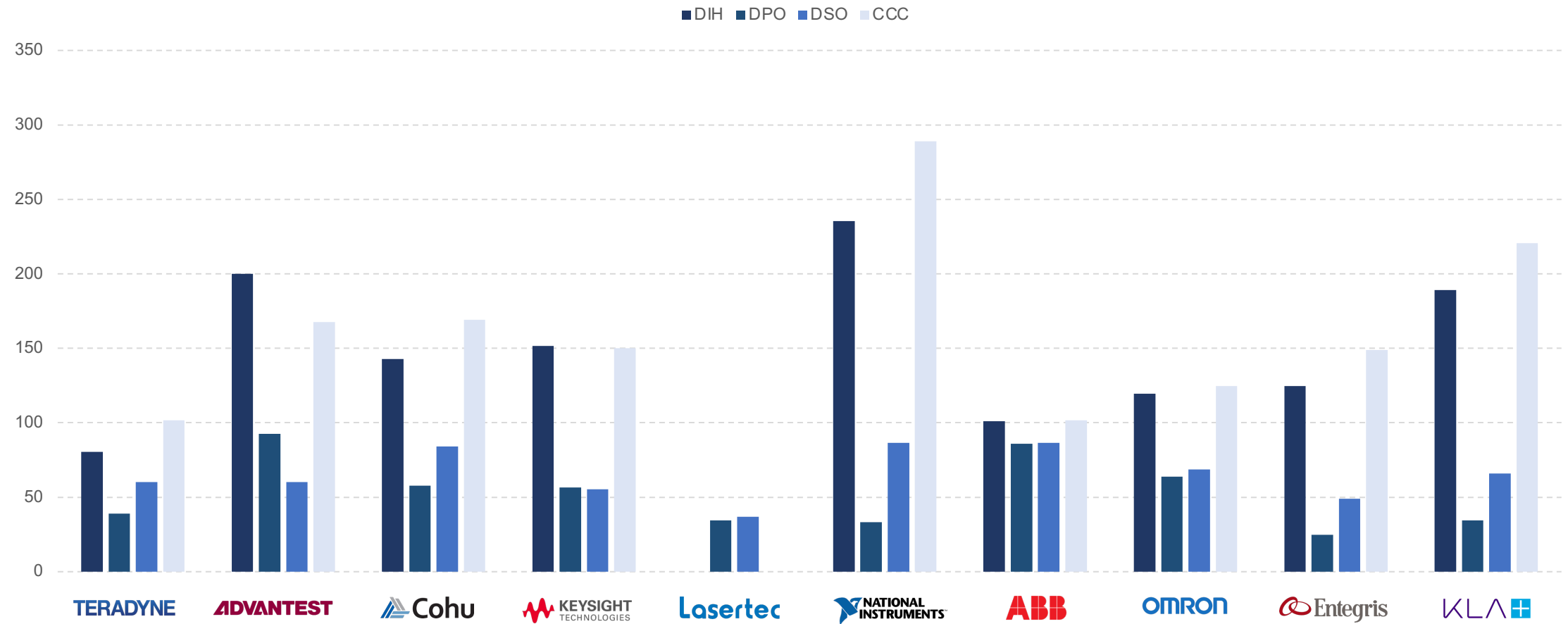
Relevant financial metrics support investment in Teradyne



Appendix: Peer Benchmarking II

Relevant financial metrics support investment in Teradyne

Comparison with Peer Group





Appendix: Income Statement

Integrated Model

In USDm

	Historical Period					Forecasting Period					
	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Balance Sheet Check	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK

Live Case

Base Case

Income Statement											
Revenue	2,101	2,295	3,121	3,703	3,155	3,172	3,526	3,832	4,130	4,421	4,737
Cost of sales	(880)	(955)	(1,336)	(1,496)	(1,288)	(1,311)	(1,410)	(1,502)	(1,587)	(1,664)	(1,748)
Gross profit	1,220	1,340	1,786	2,207	1,867	1,861	2,115	2,330	2,543	2,756	2,989
Gross margin %	58.1%	58.4%	57.2%	59.6%	59.2%	58.7%	60.0%	60.8%	61.6%	62.3%	63.1%
SG&A	(391)	(437)	(465)	(548)	(558)	(561)	(605)	(638)	(667)	(692)	(720)
Engineering and development	(302)	(323)	(375)	(428)	(441)	(418)	(456)	(485)	(513)	(538)	(565)
Acquired intangible assets amortisation	(39)	(40)	(31)	(21)	(19)	(38)	(42)	(46)	(50)	(53)	(57)
Restructuring and other	(15)	14	13	(9)	(17)	(3)	(3)	(4)	(4)	(4)	(5)
EBIT	474	554	928	1,201	832	840	1,009	1,157	1,310	1,469	1,643
EBIT margin %	22.6%	24.1%	29.7%	32.4%	26.4%	26.5%	28.6%	30.2%	31.7%	33.2%	34.7%
Interest expense	(22)	(22)	(24)	(18)	(4)	(6)	(3)	(3)	(4)	(4)	(4)
Interest income	20	17	6	3	6						
Other expenses	(5)	(23)	(9)	(25)	6						
EBT	468	526	901	1,161	840	834	1,006	1,153	1,306	1,465	1,639
Provision for income taxes	(16)	(58)	(117)	(146)	(125)	(107)	(130)	(149)	(168)	(189)	(211)
Net income from continuing operations	452	467	784	1,015	716	727	876	1,005	1,138	1,276	1,428
Net income for discontinued operations, net of tax	0	0	0	0	0	0	0	0	0	0	0
Net income	452	467	784	1,015	716	727	876	1,005	1,138	1,276	1,428
Profit margin %	21.5%	20.4%	25.1%	27.4%	22.7%	22.9%	24.8%	26.2%	27.6%	28.9%	30.1%
Net income attributable to non-controlling interests	0	0	0	0	0	0	0	0	0	0	0
Net income attributable to Teradyne Inc.	452	467	784	1,015	716	727	876	1,005	1,138	1,276	1,428

Appendix: Balance Sheet

Balance Sheet											
Assets											
Cash and equivalents	927	774	914	1,122	855	926	991	1,340	1,845	2,459	3,184
Marketable securities	190	137	522	244	40	93	93	93	93	93	93
Accounts receivable, less allowance for credit losses	291	362	498	551	491	472	546	591	634	675	720
Inventories, net	154	197	222	243	325	213	356	379	400	420	441
Prepayments and other current assets	171	189	259	416	547	562	555	547	534	519	504
Total current assets	1,732	1,659	2,415	2,576	2,258	2,267	2,541	2,949	3,507	4,166	4,942
Property and equipment, net	280	320	395	387	419	485	535	564	566	604	678
Operating lease right-off-use assets, net	0	58	55	69	74	74	74	74	74	74	74
Marketable securities	88	104	118	134	111	111	111	111	111	111	111
Deferred tax assets	71	75	88	102	143	143	143	143	143	143	143
Retirements plans assets	17	18	17	15	12	12	12	12	12	12	12
Other assets	12	10	9	24	29	29	29	29	29	29	29
Acquired intangible assets, net	125	125	101	76	53	53	53	53	53	53	53
Goodwill	382	416	454	426	403	403	403	403	403	403	403
Total non-current assets	974	1,128	1,237	1,233	1,243	1,309	1,360	1,389	1,391	1,429	1,503
Total assets	2,707	2,787	3,652	3,809	3,501	3,576	3,901	4,338	4,898	5,595	6,445
Liabilities and Equity											
Accounts payable	101	127	134	153	140	134	154	165	175	185	195
Accrued employees compensation and withholdings	149	164	220	254	212	299	299	299	299	299	299
Deferred revenue and customer advances	78	105	135	146	148	148	148	148	148	148	148
Other accrued liabilities	78	71	78	124	112	197	197	197	197	197	197
Operating lease liabilities	0	19	21	20	19	19	19	19	19	19	19
Contingent consideration	35	9	0	0	0	0	0	0	0	0	0
Income taxes payable	36	44	81	89	65	65	65	65	65	65	65
Current debt	0	0	33	19	50	0	0	0	0	0	0
Total current liabilities	476	539	701	805	746	862	882	892	903	912	923
Retirement plans liabilities	117	134	151	151	116	116	116	116	116	116	116
Long-term deferred revenue and customer advances	33	46	58	55	45	45	45	45	45	45	45
Long-term contingent consideration	36	31	7	0	0	0	0	0	0	0	0
Deferred tax liabilities	21	14	11	6	3	3	3	3	3	3	3
Long-term other accrued liabilities	38	20	19	15	16	16	16	16	16	16	16
Long-term operating lease liabilities	0	46	42	56	64	55	61	66	71	76	82
Long-term income taxes payable	84	83	75	67	59	59	59	59	59	59	59
Long-term debt	380	395	377	89	0	0	0	0	0	0	0
Total non-current liabilities	708	768	741	440	304	294	300	306	311	316	321
Convertible common share	0	0	4	2	0	0	0	0	0	0	0
Common stock	22	21	21	20	19	19	19	19	19	19	19
Additional paid-in capital	1,672	1,720	1,765	1,812	1,756	1,756	1,756	1,756	1,756	1,756	1,756
Accumulated other comprehensive loss	(13)	(19)	34	(6)	(50)	(50)	(50)	(50)	(50)	(50)	(50)
Retained earnings	(158)	(242)	387	737	726	694	994	1,414	1,959	2,641	3,476
Total Teradyne Inc. stockholders' equity	1,522	1,480	2,211	2,564	2,451	2,420	2,719	3,140	3,684	4,367	5,201
Total liabilities and equity	2,707	2,787	3,652	3,809	3,501	3,576	3,901	4,338	4,898	5,595	6,445

Appendix: Cash Flow Statement

Cash Flow Statement											
Operating Activities											
Net income (loss)	452	467	784	1,015	716	727	876	1,005	1,138	1,276	1,428
Depreciation & amortization	113	121	127	125	111	104	138	183	233	221	211
Investment Impairments	0	15	0	0	0	0	0	0	0	0	0
Other non-cash items	75	27	27	57	24	0	0	0	0	0	0
Changes in accounts receivable	(18)	(70)	(129)	(58)	51	19	(75)	(45)	(43)	(42)	(45)
Changes in inventories	(29)	(27)	(8)	6	(81)	112	(143)	(23)	(21)	(20)	(21)
Changes in prepayments and other assets	(58)	(24)	(64)	(176)	(141)	(15)	8	8	12	16	15
Changes in accounts payable	14	49	73	129	(61)	(6)	20	11	10	10	10
Changes in deferred revenue	13	39	40	10	(6)	0	0	0	0	0	0
Changes in retirement plan contribution	(4)	(5)	(5)	(5)	(5)	0	0	0	0	0	0
Changes in income taxes	(80)	(14)	25	(6)	(30)	0	0	0	0	0	0
Net cash provided from operating activities	477	579	869	1,098	578	941	824	1,138	1,329	1,461	1,598
2											
Investing Activities											
Purchase of PPE	(114)	(135)	(185)	(132)	(163)	(131)	(189)	(211)	(235)	(259)	(285)
Proceeds from government subsidy for PPE	8	0	0	0	0	0	0	0	0	0	0
Purchase of marketable securities	(919)	(663)	(900)	(662)	(287)	53	0	0	0	0	0
Proceeds from maturities of marketable securities	1,270	612	480	660	223	0	0	0	0	0	0
Proceeds from sale of marketable securities	846	106	35	266	268	0	0	0	0	0	0
Proceeds from sale of asset	0	0	0	0	3	0	0	0	0	0	0
Purchase of investment and acquisition	(169)	(80)	0	(12)	0	0	0	0	0	0	0
Proceeds from insurance	1	3	1	0	0	0	0	0	0	0	0
Net cash used by investing activities	923	(157)	(570)	120	44	(78)	(189)	(211)	(235)	(259)	(285)
Financing Activities											
Repurchase of common stock	(823)	(500)	(88)	(600)	(752)	(500)	(500)	(500)	(500)	(500)	(500)
Payment of convertible debt principle	0	0	0	(343)	(67)	(50)	0	0	0	0	0
Dividend payments	(67)	(61)	(66)	(66)	(70)	(67)	(76)	(84)	(94)	(94)	(94)
Payments related to net settlement of employee stock compensation awards	(20)	(15)	(23)	(32)	(33)	0	0	0	0	0	0
Issuance of common stock under stock purchase and stock option plans	21	29	29	33	29	0	0	0	0	0	0
Payments of contingent consideration	(14)	(28)	(9)	0	0	0	0	0	0	0	0
Lease payments			(3)	14	7	(9)	6	5	5	5	5
Net cash used by financing activities	(903)	(574)	(158)	(1,009)	(893)	(627)	(570)	(579)	(588)	(589)	(588)
Effect of exchange rates	0	(1)	(1)	(2)	4						
Net increase (decrease) in cash, equivalents, and restricted cash	497	(153)	140	208	(267)	237	65	348	506	614	725

Appendix: Key Assumptions

Scenarios						
1	Base					
Income statement						
Total revenue growth	1.2%	11.2%	8.7%	7.8%	7.1%	7.2%
COGS (as % of total revenue)	-40.8%	-40.0%	-39.2%	-38.4%	-37.7%	-36.9%
SG&A (as % of total revenue)	-17.7%	-17.2%	-16.6%	-16.1%	-15.7%	-15.2%
Engineering and Development expenses (as % of total revenue)	-13.2%	-12.9%	-12.7%	-12.4%	-12.2%	-11.9%
Acquired intangible assets amortization (as % of total revenue)	-1.2%	-1.2%	-1.2%	-1.2%	-1.2%	-1.2%
Restructuring and other (as % of total revenue)	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%
Cash Conversion Cycle						
DSO	56.8	56.6	56.3	56.0	55.8	55.5
DIH	92.1	92.1	92.1	92.1	92.1	92.1
DPO	39.6	39.8	40.0	40.3	40.5	40.7
Prepayments as % of sales	17.35%	15.73%	14.27%	12.94%	11.74%	10.65%
PP&E						
CapEx (as % of total revenue)	-5.2%	-5.4%	-5.5%	-5.7%	-5.9%	-6.0%
2	Bull					
Income statement						
Total revenue growth	1.4%	11.9%	9.0%	8.2%	7.6%	7.8%
COGS (as % of total revenue)	-38.8%	-37.6%	-36.5%	-35.4%	-34.3%	-33.3%
SG&A (as % of total revenue)	-17.0%	-16.3%	-15.7%	-15.0%	-14.4%	-13.9%
Engineering and Development expenses (as % of total revenue)	-13.2%	-12.8%	-12.4%	-12.0%	-11.7%	-11.3%
Acquired intangible assets amortization (as % of total revenue)	-1.2%	-1.2%	-1.2%	-1.2%	-1.2%	-1.2%
Restructuring and other (as % of total revenue)	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%
Cash Conversion Cycle						
DSO	52.7	52.5	52.2	52.0	51.7	51.5
DIH	87.5	85.8	84.0	82.4	80.7	79.1
DPO	38.7	38.5	38.3	38.0	37.8	37.6
Prepayments as % of sales	16.48%	14.64%	13.01%	11.55%	10.26%	9.12%
PP&E						
CapEx (as % of total revenue)	-5.2%	-5.3%	-5.4%	-5.5%	-5.6%	-5.7%
3	Bear					
Income statement						
Total revenue growth	0.8%	9.9%	8.1%	7.0%	6.0%	6.0%
COGS (as % of total revenue)	-40.8%	-40.8%	-40.8%	-40.6%	-40.4%	-40.2%
SG&A (as % of total revenue)	-17.9%	-17.9%	-17.9%	-17.8%	-17.7%	-17.6%
Engineering and Development expenses (as % of total revenue)	-13.2%	-13.3%	-13.5%	-13.6%	-13.7%	-13.9%
Acquired intangible assets amortization (as % of total revenue)	-1.2%	-1.2%	-1.2%	-1.2%	-1.2%	-1.2%
Restructuring and other (as % of total revenue)	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%
Cash Conversion Cycle						
DSO	55.5	55.5	55.5	55.5	55.5	55.5
DIH	96.7	97.7	98.7	99.6	100.6	101.7
DPO	40.7	40.7	40.7	40.7	40.7	40.7
Prepayments as % of sales	17.35%	16.06%	14.86%	13.76%	12.73%	11.78%
PP&E						
CapEx (as % of total revenue)	-5.2%	-5.5%	-5.7%	-6.0%	-6.3%	-6.6%

Key valuation assumptions	
Long term growth rate	2.50%
WACC (Planning Period)	9.82%
WACC (Terminal Value)	8.50%
Tax rate	-12.88%

Appendix: Revenue Assumptions

Revenue scenarios		Forecasting Period									
In USDm		2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
1	Base										
Segment market growth											
SoC		-1.7%	3.4%	23.9%	11.8%	-0.8%	9.1%	8.6%	7.0%	5.8%	5.8%
Analog		-6.4%	0.2%	31.6%	21.7%	2.1%	6.4%	10.3%	8.7%	7.5%	7.5%
Logic		-0.2%	8.2%	27.7%	15.0%	-0.7%	12.3%	11.4%	9.8%	8.3%	8.3%
Micro		1.4%	1.9%	12.4%	-1.3%	-3.7%	8.6%	4.2%	2.6%	1.5%	1.5%
Memory		-31.7%	6.1%	29.2%	-11.2%	-16.3%	27.0%	4.2%	2.6%	1.2%	1.2%
System		5.6%	5.6%	5.6%	5.6%	5.6%	5.6%	5.6%	5.6%	5.6%	5.6%
Storage test		6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%
Aerospace & Defence		5.9%	5.9%	5.9%	5.9%	5.9%	5.9%	5.9%	5.9%	5.9%	5.9%
Production board test		5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
Universal Robots				18.6%	16.5%	13.3%	12.0%	11.6%	11.6%	11.6%	11.5%
Mobile Industrial Robots				30.0%	28.1%	26.4%	24.8%	23.3%	21.9%	20.5%	19.3%
Wireless Test		11.9%	2.1%	10.7%	0.3%	5.7%	3.0%	5.0%	4.8%	3.9%	3.5%
Connectivity		22.2%	6.7%	12.1%	0.2%	5.2%	5.1%	4.8%	4.5%	5.4%	4.3%
Cellular		7.3%	-6.6%	13.6%	-5.7%	5.5%	-2.4%	3.8%	3.7%	0.0%	0.0%
Location		6.3%	6.3%	6.3%	6.3%	6.3%	6.3%	6.3%	6.3%	6.3%	6.3%
Revenue share											
SoC		56.1%	60.2%	60.7%	54.1%	54.1%	54.1%	54.1%	54.1%	54.1%	54.1%
Memory		11.6%	12.2%	10.7%	11.9%	11.2%	10.6%	9.9%	9.3%	8.6%	8.0%
System		12.5%	13.1%	12.6%	14.9%	14.9%	14.9%	14.9%	14.9%	14.9%	14.9%
Universal Robots		10.8%	7.1%	8.4%	10.3%	11.1%	11.9%	12.7%	13.4%	14.2%	15.0%
Mobile Industrial Robots		2.1%	1.9%	1.8%	2.4%	3.2%	4.0%	4.7%	5.5%	6.2%	7.0%
Wireless Test		6.8%	5.5%	5.9%	6.4%	5.5%	4.6%	3.7%	2.8%	1.9%	1.0%
Corporate and other		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Sum check		OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Teradyne revenue growth											
Revenue growth		9.24%	36.01%	18.63%	-14.79%	1.22%	11.16%	8.67%	7.78%	7.05%	7.16%
Total revenue		2,295.0	3,121.5	3,702.9	3,155.0	3,193.5	3,550.0	3,857.8	4,157.8	4,450.9	4,769.5

2	Bull										
Segment market growth											
SoC											
3nm transition tailwind factor											
Analog	-1.7%	3.4%	23.9%	11.8%	-0.9%	10.0%	8.6%	7.0%	5.8%	5.8%	
Logic	-6.4%	0.2%	31.6%	21.7%	2.1%	6.4%	10.3%	8.7%	7.5%	7.5%	
Micro	-0.2%	8.2%	27.7%	15.0%	-0.7%	12.3%	11.4%	9.8%	8.3%	8.3%	
Memory	1.4%	1.9%	12.4%	-1.3%	-3.7%	8.6%	4.2%	2.6%	1.5%	1.5%	
System											
Storage test	-31.7%	6.1%	29.2%	-11.2%	-16.3%	27.0%	4.2%	2.6%	1.2%	1.2%	
Aerospace & Defence	5.6%	5.6%	5.6%	5.6%	5.6%	5.6%	5.6%	5.6%	5.6%	5.6%	
Production board test	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	
Universal Robots	5.9%	5.9%	5.9%	5.9%	5.9%	5.9%	5.9%	5.9%	5.9%	5.9%	
Mobile Industrial Robots	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	
Wireless Test											
Connectivity	11.9%	2.1%	10.7%	0.3%	5.7%	3.0%	5.0%	4.8%	3.9%	3.5%	
Cellular	22.2%	6.7%	12.1%	0.2%	5.2%	5.1%	4.8%	4.5%	5.4%	4.3%	
Location	7.3%	-6.6%	13.6%	-5.7%	5.5%	-2.4%	3.8%	3.7%	0.0%	0.0%	
	6.3%	6.3%	6.3%	6.3%	6.3%	6.3%	6.3%	6.3%	6.3%	6.3%	
Revenue share											
SoC	56%	60%	61%	54%	53%	52%	51%	50%	49%	48%	
Memory	12%	12%	11%	12%	11%	11%	10%	9%	9%	9%	
System	13%	13%	13%	15%	14%	14%	13%	13%	12%	12%	
Universal Robots	11%	7%	8%	10%	12%	14%	15%	17%	18%	20%	
Mobile Industrial Robots	2%	2%	2%	2%	4%	5%	6%	7%	9%	10%	
Wireless Test	7%	6%	6%	6%	5%	4%	3%	2%	1%	0%	
Corporate and other	0%	0%	0%	0%	0%	0%	0%	1%	1%	1%	
Sum check	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	
Teradyne revenue growth											
Revenue growth					1.37%	11.91%	8.97%	8.20%	7.60%	7.78%	
Total revenue					3,198.3	3,579.3	3,900.2	4,219.9	4,540.6	4,893.9	
Upside from base case					12%	7%	3%	5%	8%	9%	
3	Bear										
Segment market growth											
SoC											
3nm transition headwind											
Analog	-1.7%	3.4%	23.9%	11.8%	-1.0%	7.0%	8.6%	7.0%	5.8%	5.8%	
Logic	-6.4%	0.2%	31.6%	21.7%	2.1%	6.4%	10.3%	8.7%	7.5%	7.5%	
Micro	-0.2%	8.2%	27.7%	15.0%	-0.7%	12.3%	11.4%	9.8%	8.3%	8.3%	
Memory	1.4%	1.9%	12.4%	-1.3%	-3.7%	8.6%	4.2%	2.6%	1.5%	1.5%	
Memory	-31.7%	6.1%	29.2%	-11.2%	-16.3%	27.0%	4.2%	2.6%	1.2%	1.2%	
System	5.6%	5.6%	5.6%	5.6%	5.6%	5.6%	5.6%	5.6%	5.6%	5.6%	
Storage test	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	
Aerospace & Defence	5.9%	5.9%	5.9%	5.9%	5.9%	5.9%	5.9%	5.9%	5.9%	5.9%	
Production board test	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	
Universal Robots	18.6%	16.5%	16.5%	13.3%	12.0%	11.6%	11.6%	11.6%	11.6%	11.5%	
Mobile Industrial Robots	30.0%	28.1%	26.4%	24.8%	23.3%	21.9%	20.5%	19.3%	19.3%	19.3%	
Wireless Test											
Connectivity	11.9%	2.1%	10.7%	0.3%	5.7%	3.0%	5.0%	4.8%	3.9%	3.5%	
Cellular	22.2%	6.7%	12.1%	0.2%	5.2%	5.1%	4.8%	4.5%	5.4%	4.3%	
Location	7.3%	-6.6%	13.6%	-5.7%	5.5%	-2.4%	3.8%	3.7%	0.0%	0.0%	
	6.3%	6.3%	6.3%	6.3%	6.3%	6.3%	6.3%	6.3%	6.3%	6.3%	
Revenue share											
SoC	56%	60%	61%	54%	54%	54%	54%	54%	54%	54%	
Memory	12%	12%	11%	12%	12%	12%	12%	12%	12%	12%	
System	13%	13%	13%	15%	15%	15%	15%	15%	15%	15%	
Universal Robots	11%	7%	8%	10%	10%	10%	10%	10%	10%	10%	
Mobile Industrial Robots	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	
Wireless Test	7%	6%	6%	6%	6%	6%	6%	6%	6%	6%	
Corporate and other	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
Sum check	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK	
Teradyne revenue growth											
Revenue growth					0.76%	9.87%	8.09%	6.99%	6.03%	5.98%	
Total revenue					3,179.2	3,492.8	3,775.3	4,039.2	4,282.9	4,538.9	
Downside from base case					-37%	-12%	-7%	-10%	-14%	-16%	

Appendix: Supporting Schedules

Supporting Schedules

In USDm

	Historical Period					Forecasting Period						
	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	
Working Capital Schedule												
Current Assets												
Accounts receivable	291	362	498	551	491	494	546	591	634	675	720	
Inventories	154	197	222	243	325	331	356	379	400	420	441	
Prepayments and other current assets	171	189	259	416	547	550	555	547	534	519	504	
Total current assets	616	748	979	1210	1364	1375	1457	1517	1569	1614	1666	
Current Liabilities												
Accounts payable	101	127	134	153	140	142	154	165	175	185	195	
Accrued employees compensation and withholdings	149	164	220	254	212	212	212	212	212	212	212	
Deferred revenue and customer advances	78	105	135	146	148	148	148	148	148	148	148	
Other accrued liabilities	78	71	78	124	112	112	112	112	112	112	112	
Operating lease liabilities	0	19	21	20	19	19	19	19	19	19	19	
Contingent consideration	35	9	0	0	0	0	0	0	0	0	0	
Income taxes payable	36	44	81	89	65	65	65	65	65	65	65	
Current debt	0	0	33	19	50	0	0	0	0	0	0	
Total current liabilities	476	539	701	805	746	699	710	721	731	741	751	
NWC	139	209	278	405	617	676	747	796	837	873	914	
Change in NWC	69	70	127	213	59	70	49	42	36	41		

PP&E Schedule

Calculating average useful lives												
Closing NBV	280	320	395	387	419	485	535	564	566	604	678	
Opening NBV + CapEx		414	505	527	550							
D&A		94	110	140	132	99	138	183	233	221	211	
Average useful lives (in years)		4	5	4	4							
Total average (in years)	4											
CapEx	-114	-135	-185	-132	-163	-165	-189	-211	-235	-259	-285	
Depreciation of remaining PP&E						99	99	99	99	23		
Depreciation of CapEx							39	39	39	48		
								45	45	45	45	
									50	50	50	
										55	55	
											61	

Debt Schedule

Convertible senior notes												
Principal						50	0	0	0	0	0	0
Repayments						-50	0	0	0	0	0	0

Lease Schedule

Short-term operating leases	19	21	20	19	19	19	19	19	19	19	19	
as % of revenue	0.85%	0.66%	0.54%	0.59%	0.59%	0.53%	0.49%	0.45%	0.42%	0.39%		
Long-term operating leases	46	42	56	64	55	61	66	71	76	82		
as % of revenue	2.00%	1.35%	1.52%	2.03%	1.72%	1.72%	1.72%	1.72%	1.72%	1.72%		
Total lease liabilities	65	63	76	83	73	79	85	90	95	100		

Interest

Opening current debt	0	0	33	19	50	0	0	0	0	0	0	
Opening current leases	0	19	21	20	19	19	19	19	19	19	19	
Opening current interest-bearing debt	0	0	19	54	39	69	19	19	19	19	19	
Opening non-current debt	380	395	377	89	0	0	0	0	0	0	0	
Opening non-current leases	0	46	42	56	64	55	61	66	71	76	76	
Opening non-current interest bearing debt	0	380	441	419	145	64	55	61	66	71	76	
Total interest bearing debt	0	380	460	473	185	133	73	79	85	90	95	
Interest expense	-22	-22	-24	-18	-4	-6	-3	-3	-4	-4	-4	
Interest rate	5.8%	5.3%	3.8%	2.0%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	

Share repurchase program

Share repurchase program 2023	2,000											
Assumed share repurchase program 2027	2,000											
2022 program expected purchase						500	500	500	500			
Assumed 2026 program expected purchase										500	500	
Total						500	500	500	500	500	500	

Dividend

Annual dividend per share (in \$)	-0.43	-0.49	-0.54	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	-0.60	
Total dividend payout	-67	-76	-84	-94	-94	-94	-94	-94	-94	-94	-94	

WACC Calculation

Beta

Historic Approach

5-year monthly	Teradyne		S&P 500	
Date	Adj. Close	Return	Adj. Close	Return
Annualized average return				8.8%
Covariance (Teradyne, S&P 500)		0.00421		
Variance (S&P 500)		0.00276		
Historical beta (levered)		1.53		
Tax rate		13%		
Debt (as of 12/31/2022)		120		
Marketcap (as of 12/31/2022)		14,608		
Debt/equity		0.01		
Unlevered beta		1.51		
Adjusted unlevered beta		1.34		

Peer Group Approach

	in million		in million	
Company	Levered Beta (5Y)	Debt	Market Cap	D/E
Advantest Corp.	1.28	50,844	2,359,782	0.02
Keysight Technologies Inc.	1.08	2,021	26,507	0.08
Cohu Inc.	1.58	67	1,667	0.04
TestResearch Inc.	0.35	45	14,953	0.00
National Instruments Corp.	1.19	570	7,709	0.07
Anritsu Corp.	0.31	4,734	162,351	0.03
ABB Ltd.	1.02	8,869	63,428	0.14
Omron Corp.	1.12	45,368	1,637,799	0.03
Median	1.10			0.03
Levered peer group beta 1.10				
Median peer group D/E ratio 0.03				
Tax rate 13%				
Unlevered beta Teradyne 1.07				
Adjusted unlevered beta 1.05				

WACC		
Harris Pringle Formula	Planning Period	Terminal Value
Unlevered cost of equity	9.8%	8.5%
Tax rate	13%	13%
Levered cost of debt	4.3%	4.3%
Debt/equity	0.82%	2.77%
WACC	9.82%	8.50%

Cost of equity		
Risk-free rate	3.59%	2.28%
Unlevered peer group beta	1.05	1.05
Implied market risk premium	5.9%	5.94%
Unlevered cost of equity	9.8%	8.5%

Cost of debt		
	Planning Period	Terminal Value
Interest coverage ratio (YTD 2022)	223.7	223.7
Credit rating according to Damoderan	AAA	AAA
Assumed credit spread	0.7%	0.7%
Risk-free rate	3.6%	2.3%
Cost of debt using default spread	4.3%	3.0%

Risk-free rate	
10-year US Treasury Bonds	Avg. Annual Yield
2012	1.80%
2013	2.35%
2014	2.54%
2015	2.14%
2016	1.84%
2017	2.33%
2018	2.91%
2019	2.14%
2020	0.89%
2021	1.45%
2022	2.95%
2023	3.59%
Long-run average 10-year treasury yield	2.28%

Appendix: DCF

DCF In US\$M	Historical Period				Forecasting Period					
	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
EBIT	554	928	1,201	832	840	1,009	1,157	1,310	1,469	1,643
Taxes	-58	-117	-146	-125	-107	-130	-149	-168	-189	-211
NOPAT	495	812	1,054	707	732	879	1,008	1,142	1,280	1,432
+ Depreciation & Amortization	94	110	140	132	99	138	183	233	221	211
- CAPEX	-135	-185	-132	-163	-165	-189	-211	-235	-259	-285
+/- Change in Net Working Capital	-69	-70	-127	-213	-59	-70	-49	-42	-36	-41
Unlevered FCF	386	667	935	463	608	758	931	1,098	1,206	1,317
Discount rate					109.82%	120.60%	132.44%	145.45%	159.73%	175.41%
Present Value of Unlevered FCF					553	629	703	755	755	751

Terminal value & Equity Bridge

Perpetuity Approach

Planning Period WACC	9.82%
Terminal Value WACC	8.50%
Long term growth rate	2.50%
Terminal Value	22,485
Present Value of Free Cash Flows	4,145
Present Value of Terminal Value	13,780
% of EV	76.88%
Total Enterprise Value	17,925
- Interest Bearing Liabilities	133
+ Cash and Cash Equivalents	855
- Non-controlling interest	
Equity Value	18,647
Shares Outstanding	156.05
Implied Equity Value per Share	119.50
Current Share Price	107.80
Upside Potential	10.85%

Sensitivity Analysis

Planning Period WACC

		WACC (planning period)				
		9.00%	9.50%	9.82%	10.50%	11.00%
long-term g	2.00%	113.05	112.59	112.31	111.71	111.29
	2.20%	115.79	115.33	115.05	114.45	114.03
	2.50%	120.24	119.78	119.50	118.90	118.48
	2.70%	123.46	123.00	122.72	122.12	121.70
	2.90%	126.91	126.46	126.17	125.58	125.15

Terminal Value WACC

		WACC (terminal value)				
long-term g	2.00%	132.59	121.59	112.31	104.51	97.76
	2.20%	136.62	124.89	115.05	106.81	99.72
	2.50%	143.28	130.29	119.50	110.53	102.87
	2.70%	148.18	134.23	122.72	113.21	105.12
	2.90%	153.50	138.48	126.17	116.07	107.51

Appendix: Multiples

In USDm

Company	Reporting Date	HQ	Shareprice	Shares outstanding	Market Cap	Interest bearing Debt	Cash and Equivalents	Minority interest	Preferred equity	TTM Sales	TTM EBITDA	TTM EBIT	P/E	EPS*
Teradyne	02.04.23	US	97.69	155.80	15220.10	128.89	894.39	0.00	0.00	3017.20	875.20	764.70	25.64	3.81
Advantest Corp.	31.03.23	JPN	96.44	184.20	17764.25	376.42	635.63	0.00	0.00	4153.00	1401.80	1243.20	18.73	5.15
Cohu Inc.	01.04.23	US	36.78	47.20	1736.02	67.30	324.30	0.00	0.00	794.39	165.00	118.60	18.58	1.98
Keysight Technologies Inc.	31.01.23	US	146.52	178.10	26095.21	2021.00	2228.00	0.00	0.00	5551.00	1641.00	1422.00	22.89	6.40
Test Research Inc.	31.12.22	TWN	64.50	236.20	488.93	1.50	46.70	0.00	0.00	218.60	73.70	70.20	7.95	8.11
Anritsu Compnay	31.03.23	JPN	8.81	131.70	1160.28	35.10	273.20	1.70	0.00	822.30	129.30	87.10	16.94	0.52
National Instruments Corp.	31.03.23	US	57.95	131.50	7620.43	570.20	139.60	0.00	0.00	1708.50	333.20	241.80	47.89	1.21
ABB	31.03.23	CH	36.23	1.926.60	69800.72	9895.00	4825.00	693.00	0.00	30340.00	4761.00	4018.00	23.22	1.56
Yaskawa Electric Corp.	28.02.23	JPN	41.96	261.50	10972.54	738.50	313.50	56.20	0.00	4123.50	652.50	506.60	28.54	1.47
Doosan	31.12.22	KOR	70.52	17.80	1255.26	5683.20	1717.50	6441.00	0.00	12868.00	1310.60	842.50	-2.58	-27.35
Omron	31.12.23	JPN	60.49	196.80	11904.43	336.50	780.90	20.40	0.00	6497.90	924.20	727.00	21.92	2.76
Entergris Inc.	31.12.22	US	109.34	149.70	16368.20	169.00	561.60	0.00	0.00	3282.00	849.60	570.30	74.89	1.46
KLA Corp.	31.12.22	US	445.00	137.20	61054.00	52.30	1584.90	0.00	0.00	9211.90	4015.00	3651.60	20.30	21.92
Lasertec Corp	31.12.22	JPN	21025.00	90.20	1896455.00	10000.00	23494.00	0.00	0.00	90378.00	35975.00	32492.00	76.36	275.34

CCA

Company	Reporting Date	HQ	TEV	TEV/Sales	TEV/EBITDA	TEV/EBIT	P/E
Teradyne	02.04.23	US	16,243.38	5.38	18.56	21.24	25.64
Advantest Corp.	31.03.23	JPN	18,776.30	4.52	13.39	15.10	18.73
Cohu Inc.	01.04.23	US	2,127.62	2.68	12.89	17.94	18.58
Keysight Technologies Inc.	31.01.23	US	30,344.21	5.47	18.49	21.34	22.89
Lasertec Corp	31.12.22	JPN	1,929,949.00	21.35	53.65	59.40	76.36
National Instruments Corp.	31.03.23	US	8,330.23	4.88	25.00	34.45	47.89
ABB	31.03.23	CH	85,213.72	2.81	17.90	21.21	23.22
Omron	31.12.23	JPN	13,042.23	2.01	14.11	17.94	21.92
Entergris Inc.	31.12.22	US	17,098.80	5.21	20.13	29.98	74.89
KLA Corp.	31.12.22	US	62,691.20	6.81	15.61	17.17	20.30
			Minimum	2.01	12.89	15.10	18.58
			Median	5.04	18.19	21.22	23.06
			Mean	6.11	20.97	25.58	35.04
			Max	21.35	53.65	59.40	76.36

TEV/Sales Multiple

		TEV	Cash	Debt	Equity Value	Shares Outstanding	Shareprice
Minimum	2.0	6,055.96	894.39	128.89	7,079.24	155.8	45.44
Mean	6.1	18,438.27	894.39	128.89	19,461.55	155.8	124.91
Max	21.4	64,429.86	894.39	128.89	65,453.14	155.8	420.11

TEV/EBITDA

		TEV	Cash	Debt	Equity Value	Shares Outstanding	Shareprice
Minimum	12.9	11285.41	894.39	128.89	12,306.69	155.8	79.00
Mean	21.0	18356.25	894.39	128.89	19,379.53	155.8	124.39
Max	53.6	46951.81	894.39	128.89	47,975.09	155.8	307.93

TEV/EBIT

		TEV	Cash	Debt	Equity Value	Shares Outstanding	Shareprice
Minimum	15.1	11549.42	894.39	128.89	12,572.70	155.8	80.70
Mean	25.6	19558.72	894.39	128.89	20,582.00	155.8	132.11
Max	59.4	45421.40	894.39	128.89	46,444.68	155.8	298.10

P/E

		EPS	Shareprice
Minimum	18.6	3.81	70.77
Mean	35.0	3.81	133.51
Max	76.4	3.81	290.93

Target share price 128.73

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