



Robotics Venture Capital Report

FCF DeepTech Series

Q3 2023



EXECUTIVE SUMMARY

FCF OVERVIEW

ROBOTICS VENTURE CAPITAL MARKET

ROBOTICS IPO EXITS

ROBOTICS M&A EXITS

The FCF DeepTech Series is a standardized set of reports, tracking European VC funding trends within four main DeepTech verticals and can be used as a quick reference for investors, corporates and professionals

More advanced, detailed and / or customized reports are available upon request

FCF DeepTech Series

FCF analyzes and tracks the European funding trends within four main DeepTech verticals. Each quarter, one of the four verticals is examined individually. FCF defines DeepTech companies as firms whose product or service offerings are based on heavy R&D, patent development, substantial scientific advances and high-tech engineering, creating real technological innovations (in contrast to Internet-Platform companies applying 'state-of-the-art' technology to transform a non-digital business model to a digital one)

FCF DeepTech Verticals



CleanTech

Developers of technologies that seek to reduce the environmental impact of human activities or to significantly reduce the amount of natural resources consumed through such activities



Advanced Manufacturing

Companies utilizing innovative and novel technologies to improve products or processes related to manufacturing



Internet of Things (IoT)

Companies that provide a product that is enabled with sensors and actuators, embedded in physical objects, and / or software that uses this sensor data to improve the user experience or allows for sharing of this data with a network of other devices



Robotics and Drones

Automated or remote-controlled mechanical devices and technology. This includes machinery programmed to perform repetitive tasks, precision tasks and remote-operated movement or travel (e.g. UAVs, etc.)

Recipients

The FCF DeepTech Series targets the following recipients:

- Corporates / Executives
- Institutional Investors
- Venture Capital Investors
- Family Offices / HNWIs
- Advisors

Availability

The FCF DeepTech Series is available on FCF's website at '<https://www.fcf.de/de/research/>'

To recommend colleagues or fellow investors to be added to the mailing list, kindly send an email with the respective contact information

If you have questions, comments or ideas, please do not hesitate to contact us

This edition of the FCF DeepTech Series focuses on VC funding developments within the European Robotics vertical

The European Robotics vertical has been split into six main subsectors

- (i) Commercial Robots,*
- (ii) Consumer Robots,*
- (iii) Drones,*
- (iv) Industrial Robots,*
- (v) Medical Robots, and*
- (vi) Robotic Enablers*

Robotics Subsectors

The Robotics vertical includes companies that provide automated or remote-controlled mechanical devices and technologies, as well as companies producing solutions to enable these devices and technologies. Potential uses include the performance of repetitive and precision tasks, as well as automated or remote-controlled movement and travel. The Robotics vertical has been further divided into following subsectors:



Commercial Robots

Developer of robotic solutions designed to complete company-specific day-to-day tasks in a commercial setting, which include industries such as gastronomy, hospitality and retail



Consumer Robots

Provider of robotic solutions that ease the life of consumers by automating or supporting the completion of daily chores and solving problems the average consumer faces



Drones

Developer of remote-controlled or automated pilotless aircrafts for the completion of aerial tasks as well as the movement of goods



Industrial Robots

Companies engaged in the development of robots intended to support industrial companies in their daily operations in fields such as construction, manufacturing and plant maintenance



Medical Robots

Companies focused on developing robotic solutions for use in medical setting and the assistance of patients



Robotic Enablers

All provider of hardware and software technologies that enable the development and use of robotic and drone solutions

Selection of Companies

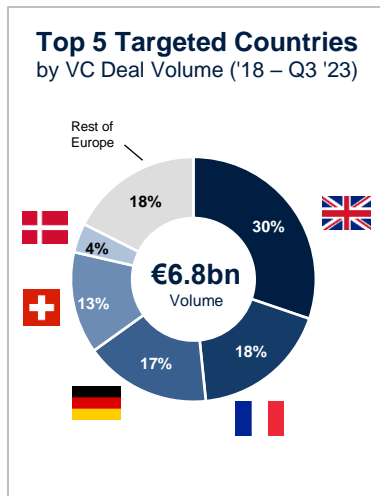
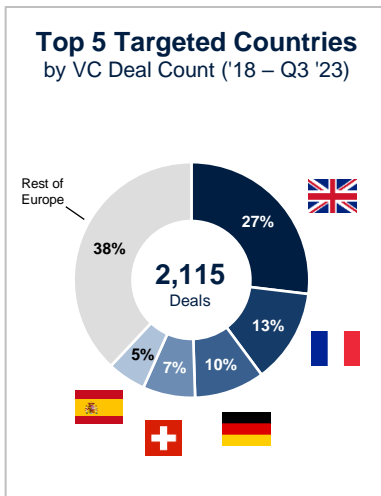
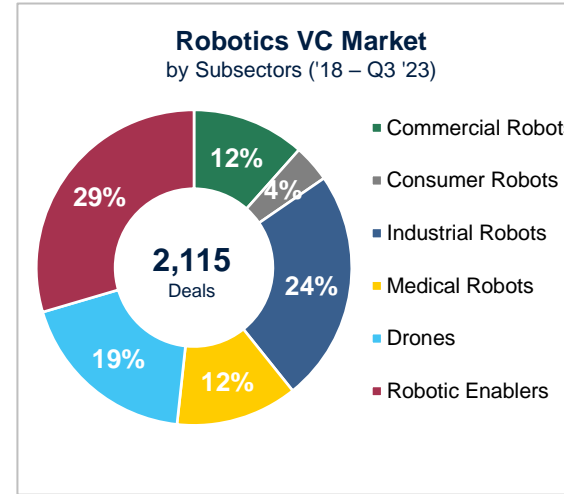
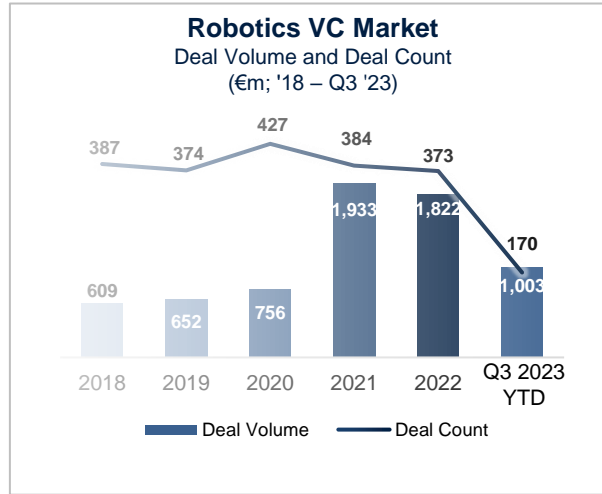
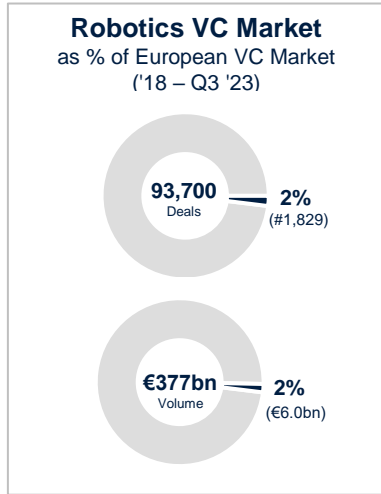
The companies were selected based on the following criteria:

- Companies that have raised venture capital since 2018
- Venture capital funding round > €1m (for completeness, deals with undisclosed volumes also included)
- Company HQ located in Europe
- Company operating within the Robotics vertical

Data

All input data is provided by Pitchbook and S&P Capital IQ and has not been independently verified by FCF. For additional information and disclaimer, please refer to the last page

European Robotics – Venture Capital Facts & Figures



Top 3 Robotics Companies by VC Volume Raised ('18 – Q3 '23)

#	Company	HQ	Vol. (€m)
1	CMR SURGICAL	UK	962
2	EXOTEC	France	388
3	AGILE ROBOTS	Germany	322
Top 3 Total			1,672

Top 3 VC Investors by Deal Count ('18 – Q3 '23)

#	Investors	HQ	Deal Count
1	Innovate UK	UK	103
2	Horizon 2020 European Union Funding for Research & Innovation	EU	85
3	PLUGANDPLAY	USA	35
Top 3 Total			223





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ROBOTICS M&A EXITS

FCF seeks to provide its clients with financing solutions

- (i) at the lowest cost,*
- (ii) with the highest flexibility,*
- (iii) in the shortest period of time,*
- (iv) with the highest closing probability, and with*
- (v) financing partners that integrate well into their strategy*

Who We Are

- Specialized Investment Bank and Financing Specialist
- Advising public and private small- / midcap companies
- Advisor for structuring and placement of financing transactions:
 - All instruments: Unbiased approach to all available corporate financing instruments (no product selling approach), allowing for customized financing structures
 - All investors: Close and trusted relationships with senior executives of virtually all relevant equity and debt investors
 - Fast process: Process management skills and direct / personal access to institutional debt and equity investors enable fast transactions
- More than 150 transactions with a total placement volume in excess of EUR 5.0 billion since foundation in 2005
- More than 15 professionals headquartered in Munich

Capital Markets Capabilities and Services

Equity	Private / Pre-IPO	<ul style="list-style-type: none"> ■ Venture capital ■ Growth capital 	<ul style="list-style-type: none"> ■ Private equity
	Public	<ul style="list-style-type: none"> ■ Initial Public Offering (IPO) / Capital increase ■ Dual-track (IPO and alternative transaction) 	<ul style="list-style-type: none"> ■ pursued in tandem ■ Private investment in Public Equity (PIPE) ■ Block trade
Debt	Short-term Debt	<ul style="list-style-type: none"> ■ Receivables / Factoring / Asset-backed securities ■ Borrowing base / Inventory 	<ul style="list-style-type: none"> ■ Working capital / Revolving credit facility ■ Guarantees / Letter of credit
	Long-term Debt	<ul style="list-style-type: none"> ■ Bank loan facility / Syndicated loans ■ Sale-and-lease-back / Leasing ■ Corporate bonds (public / private placement) ■ High yield / PIK bond 	<ul style="list-style-type: none"> ■ Promissory note (<i>Schuldscheindarlehen</i>) ■ Second lien / Subordinated loans ■ Venture debt ■ Unitranches
	Hybrid	<ul style="list-style-type: none"> ■ Mezzanine capital 	<ul style="list-style-type: none"> ■ Convertible bonds

Selected Transactions

<p>European Investment Bank Debt Facility</p> <p>In Ovo B.V.</p> <p>EUR 40m</p> <p>August 2023</p>	<p>Debt Facility</p> <p>JORA Holding GmbH & Co. KG</p> <p>~ EUR 30m</p> <p>June 2023</p>	<p>Acquisition Loan Facility</p> <p>KKA Management GmbH</p> <p>EUR 20m</p> <p>May 2023</p>	<p>Capital Increase</p> <p>aerofols GmbH</p> <p>[confidential]</p> <p>March 2023</p>	<p>M&A (Sell-Side)</p> <p>Energieinsel</p> <p>[confidential]</p> <p>March 2023</p>	<p>M&A (Sell-Side)</p> <p>PMG Projekttraum Management GmbH</p> <p>[confidential]</p> <p>March 2023</p>	<p>M&A (Sell-Side)</p> <p>SER / RUZ Group</p> <p>[confidential]</p> <p>February 2023</p>	<p>European Investment Bank Debt Facility</p> <p>German Bionic Systems GmbH</p> <p>EUR 15m</p> <p>December 2022</p>	<p>Financial Advisory</p> <p>Mitteldeutsche Flughafen AG</p> <p>[confidential]</p> <p>December 2022</p>	<p>Syndicated Loan</p> <p>ante Holding GmbH & Co. KG</p> <p>[confidential]</p> <p>December 2022</p>	<p>Working Capital Facility</p> <p>CHO-Time Group</p> <p>EUR 7m</p> <p>November 2022</p>	<p>Software-Leasing Facility</p> <p>Leading Global Device-as-a-Service Company</p> <p>EUR 10m</p> <p>October 2022</p>
<p>Interest Rate Hedging</p> <p>Mitteldeutsche Flughafen AG</p> <p>EUR 150m</p> <p>October 2022</p>	<p>European Investment Bank Debt Facility</p> <p>Evum Motors GmbH</p> <p>> EUR 12m</p> <p>September 2022</p>	<p>Factoring Facility</p> <p>JORA Holding GmbH & Co. KG</p> <p>EUR 25m</p> <p>September 2022</p>	<p>Equity Transaction – Joint Venture with Family Office</p> <p>Doppstadt Group</p> <p>> EUR 50m</p> <p>September 2022</p>	<p>Acquisition Loan and Working Capital Facility</p> <p>Bencis</p> <p>> EUR 20m</p> <p>May 2022</p>	<p>Acquisition Loan Facility</p> <p>Lloyd Fonds AG</p> <p>[confidential]</p> <p>April 2022</p>	<p>European Investment Bank Debt Facility</p> <p>numares AG</p> <p>EUR 20m</p> <p>February 2022</p>	<p>Syndicated Loan</p> <p>Schnellecke Logistics SE</p> <p>EUR 70m</p> <p>December 2021</p>	<p>Syndicated Loan</p> <p>KWD Automotive AG & Co. KG</p> <p>EUR 70m</p> <p>December 2021</p>	<p>Syndicated Loan</p> <p>[confidential]</p> <p>Top 25 Pharmaceutical Company</p> <p>EUR 80m</p> <p>November 2021</p>	<p>Syndicated Loan, Factoring, Real Estate Sale & Lease-Back</p> <p>[confidential]</p> <p>Top 10 German Food Company</p> <p>EUR 85m</p> <p>October 2021</p>	<p>Syndicated Loan</p> <p>Ziegler Holzindustrie GmbH & Co. KG</p> <p>EUR 230m</p> <p>August 2021</p>



1

financing advisor in Germany, purely focusing on corporate financing transactions



More than
15

investment banking professionals



More than
100

years of aggregated, investment banking / financing experience



More than
150

completed transactions



More than
5 bn

total volume of advised & closed transactions since 2005



Network

access to more than 4000 international financial institutions



2000

contacts to family offices and ultra-high-net-worth individuals worldwide



More than
25

international conferences organized



More than
150

articles and research papers published



Leading

advisor for financing transactions with EIB in the DACH region

FCF advised Quantum-Systems GmbH on a > € 10m development debt facility from the European Investment Bank (EIB) to fund the strong growth of the firm subsequent to an equity financing round



EIB Debt Facility

Quantum-Systems GmbH

> € 10m

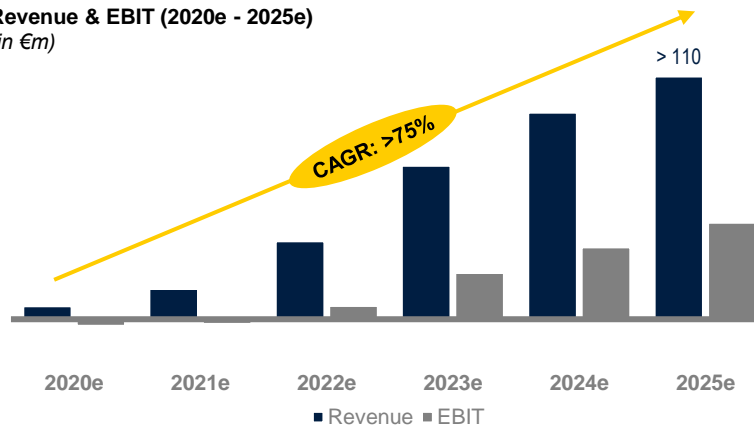
July 2021

Company Description

- Quantum-Systems GmbH (Quantum) is a developer and global leader in the automatic transition, eVTOL¹ fixed wing UAS² technology with applications in the surveying and defense and security sector
- The drones' hybrid functions combine eVTOL and common aircraft characteristics, thereby achieving long range and silent flights
- The highly efficient UAS are fully autonomous and powered with AI technology, enabling clients to benefit from the megatrend autonomous data collection solutions
- Clients – governments and firms operating in the areas of smart farming, surface mining, surveying and infrastructure – benefit from the best-in-class data quality, enabling real-time position detection
- Quantum was founded in 2015 and is headquartered in Oberpfaffenhofen (west of Munich) at a special-purpose airfield and currently employs more than 60 staff

Key Financials

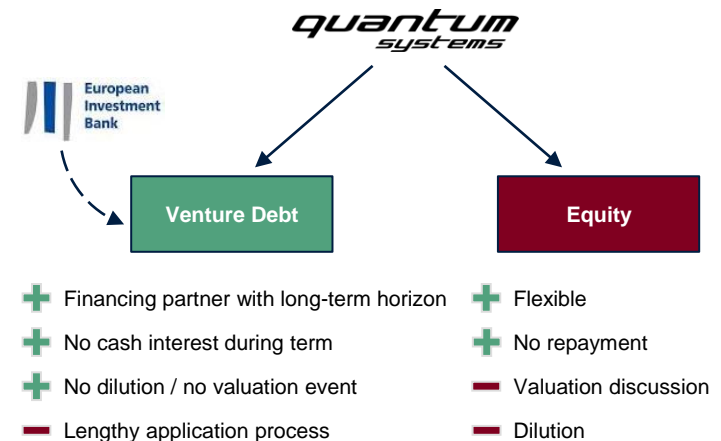
Revenue & EBIT (2020e - 2025e)
(in €m)



Financing Options

- Prior to the EIB financing, Quantum was able to secure equity financing from several top-class strategic investors
- In addition to the equity financing, the venture debt instrument was taken up by Quantum to secure additional firepower to support the strong growth trajectory whilst minimizing the dilution to existing investors and the founders
- The secured funds will be aimed at further expanding R&D capabilities in autonomous flight and AI technology alongside strengthening integration of system-critical components of eVTOL UAS within clients' operating infrastructure
- The EIB financing provided the required funding:
 - Without dilution / valuation discussion
 - Already available during pre break-even growth phase

Transaction Highlights



¹ electric Vertical Take-Off & Landing, ² unmanned aerial systems

Case Study: ROBART GmbH

€ 9m European Investment Bank Growth Finance Facility

FCF advised ROBART GmbH on a € 9m development debt facility from the European Investment Bank (EIB) to fund the scale up of the business

Company Description

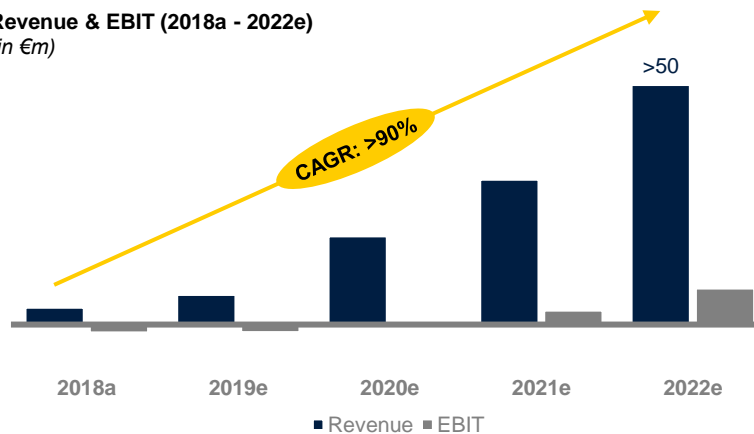
- ROBART GmbH (ROBART) is the technology leader in the field of AI-navigation systems for home appliance robots
- The company develops innovative navigation solutions, combining AI software, patented LIDAR technology and IoT services, enabling intelligent robotic navigation and human-robot interaction
- ROBART's products and services help its customers - blue-chip home appliance manufacturers - to accelerate the product development of intelligent robotic products
- Customers can choose from development services, plug & play navigation kits or entire private-label produced robotic products
- The company's expertise is planned to be rolled-out in other up-coming fields of mobile robotics (security, homecare, professional cleaning etc.)
- ROBART, located in Linz, Austria and branches in the US, China and Germany, was founded in 2009 and employs approx. 50 employees

Financing Options

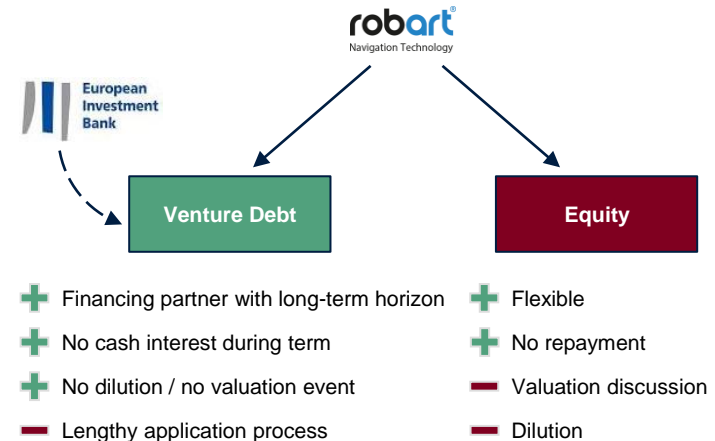
- Up to the transaction, ROBART was financed with venture capital by several blue chip venture capital / corporate venture firms
- In order to accelerate growth, the company intended to raise further financing, especially to fund the expansion of its sales & marketing efforts, working capital requirements and further R&D spending
- Equity financing with existing and new investors was considered but the combination of the amount required and the valuation obtainable would have resulted in high dilution for the founders
- The EIB financing provided the required funding:
 - Without dilution / valuation discussion
 - In tranches tailored to the business liquidity needs
 - Without cash interest during the term of the loan
 - With a five year term long enough to reach break-even

Key Financials

Revenue & EBIT (2018a - 2022e)
(in €m)



Transaction Highlights



EIB Debt Facility

ROBART GmbH

€ 9m

February 2020

Case Study: Hydrogenious LOHC Technologies GmbH

Capital Increase

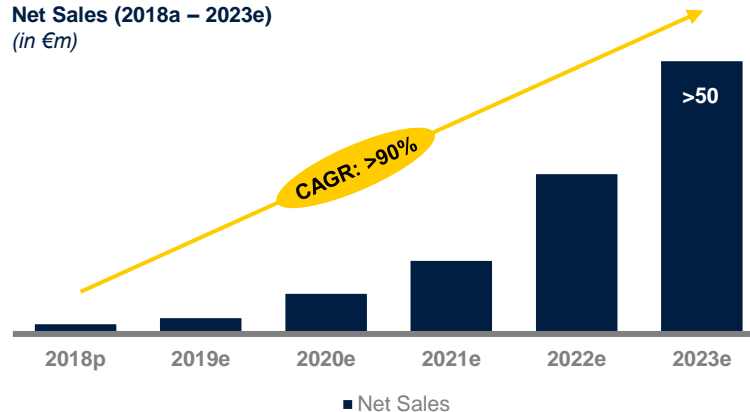
FCF advised Hydrogenious Technologies GmbH and its shareholders on the successful completion of a capital increase (total volume € 17m), further funding the scale up

Company Description

- Developer of a hydrogen storage technology designed to store hydrogen in Liquid Organic Hydrogen Carriers (LOHC) – the revolution in hydrogen storage and transport
- Disruptor of the hydrogen logistics markets, enabling hydrogen to be transported in a non-toxic, non-flammable and non-explosive state
- Innovator, capitalizing on the emerging megatrend of hydrogen mobility, enabling the efficient the transport and distribution of hydrogen to Hydrogen Refueling Stations (HRS)
- Global leader in 'next-generation' mobile, 'on-board' LOHC technology
- Key partners (e.g. Clariant, MAN, Sasol, United Hydrogen, etc.) have been brought onboard to support in the development / testing phase
- Hydrogenious was founded in 2013 by Dr. Daniel Teichmann and Profs. Arlt, Schlücker and Wasserscheid in Erlangen, Germany. At present, the company employs ~65 FTEs

Key Financials

Net Sales (2018a – 2023e)
(in €m)



Investor Profiles



AP Ventures, formerly part of Anglo American Platinum, is a venture capital firm backed amongst others by Anglo American Platinum, a major global mining company



Covestro is a major German company which produces specialty chemicals for heat insulation foams and transparent polycarbonate plastics



Mitsubishi Corporation is Japan's largest trading company / conglomerate and a member of the Mitsubishi keiretsu



Vopak is the world's leading tank storage company that stores and handles various oil, chemicals, edible oils and natural gas-related products

Transaction Highlights

- The Company mandated FCF to structure and place a €17m Series B financing round aimed at launching further commercial pilot projects and scaling up the technology
- FCF identified and approached a extensive list of relevant international venture capital, strategic and selected Family Office investors
- Hydrogenious received strong interest from investors, securing a strong negotiating position in terms of valuation and contractual terms, all the while ensuring closing probabilities were maximized
- Hydrogenious and FCF were able to secure the investment of three new strategically valuable investors, in addition to a further commitment from its anchor investor AP Ventures, that offer new joint commercialization projects whilst providing substantial firepower in future financing rounds

Capital Increase



Hydrogenious LOHC Technologies GmbH

€ 17m

July 2019

Case Study: Synapticon GmbH

~ € 10m Capital Increase with Family Office

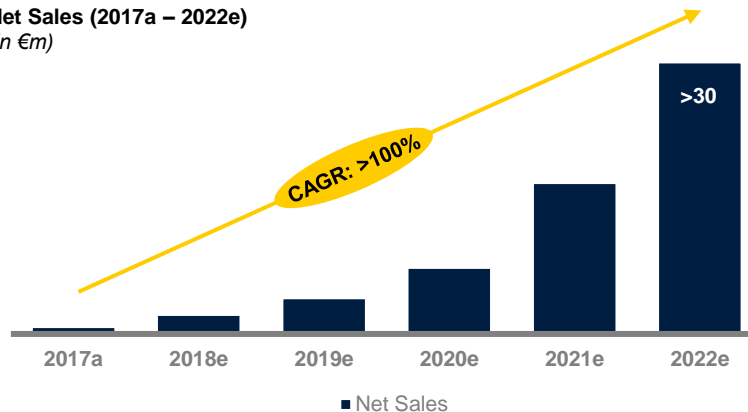
FCF advised Synapticon GmbH and its shareholders on the successful completion of a capital increase (total volume ~ € 10m), further funding the company's successful growth strategy and global commercialization plans

Company Description

- Provider of motion control solutions for the Advanced Manufacturing industry, combining advanced software and electromechanics to deliver high performance servo drives (key electromechanical robotic motion control component)
- Comprehensive product portfolio spanning servo drives, integrated drive units and SoC (System on Chip) based on proprietary software SOMANET and sold as either customized or off-the-shelf solutions
- Clients are blue chip Advanced Manufacturing and automation machinery OEMs (KUKA, Comau, Schunk, etc.) as well as emerging Asian Advanced Manufacturing companies
- Acting as a one-stop supplier, the company offers turn-key solutions that drastically reduce the overall time-to-market
- Founded in 2012, based in Schönaich, Germany, the company currently employs 50 people in four locations (Germany, Serbia, USA and China)

Key Financials

Net Sales (2017a – 2022e)
(in €m)



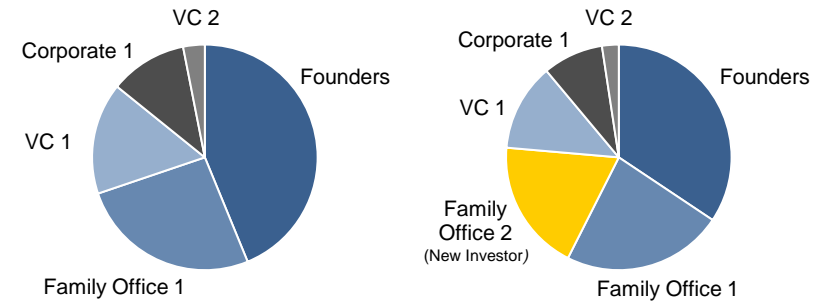
Capital Increase

Synapticon GmbH

~ € 10m

January 2019

Shareholdings (pre & post)



Transaction Highlights

- Synapticon is the innovation leader in robotic motion control and is scaling its operations in order to further develop / commercialize its product portfolio
- To finance and realize its business strategy, Synapticon mandated FCF to structure a ~ € 10m financing round
- FCF identified and approached a competitive list of relevant international venture capitalists as well as selected family offices
- Synapticon received a high number of submitted Lols, enabling a strong negotiating position with regards to valuation and contractual terms, while at the same time maximizing closing probability
- FCF and Synapticon were able to onboard a value-added family office as a new financing partner with strong industrial 'know-how' while also securing pro-rata participation from the existing shareholders



EXECUTIVE SUMMARY

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ROBOTICS VENTURE CAPITAL MARKET

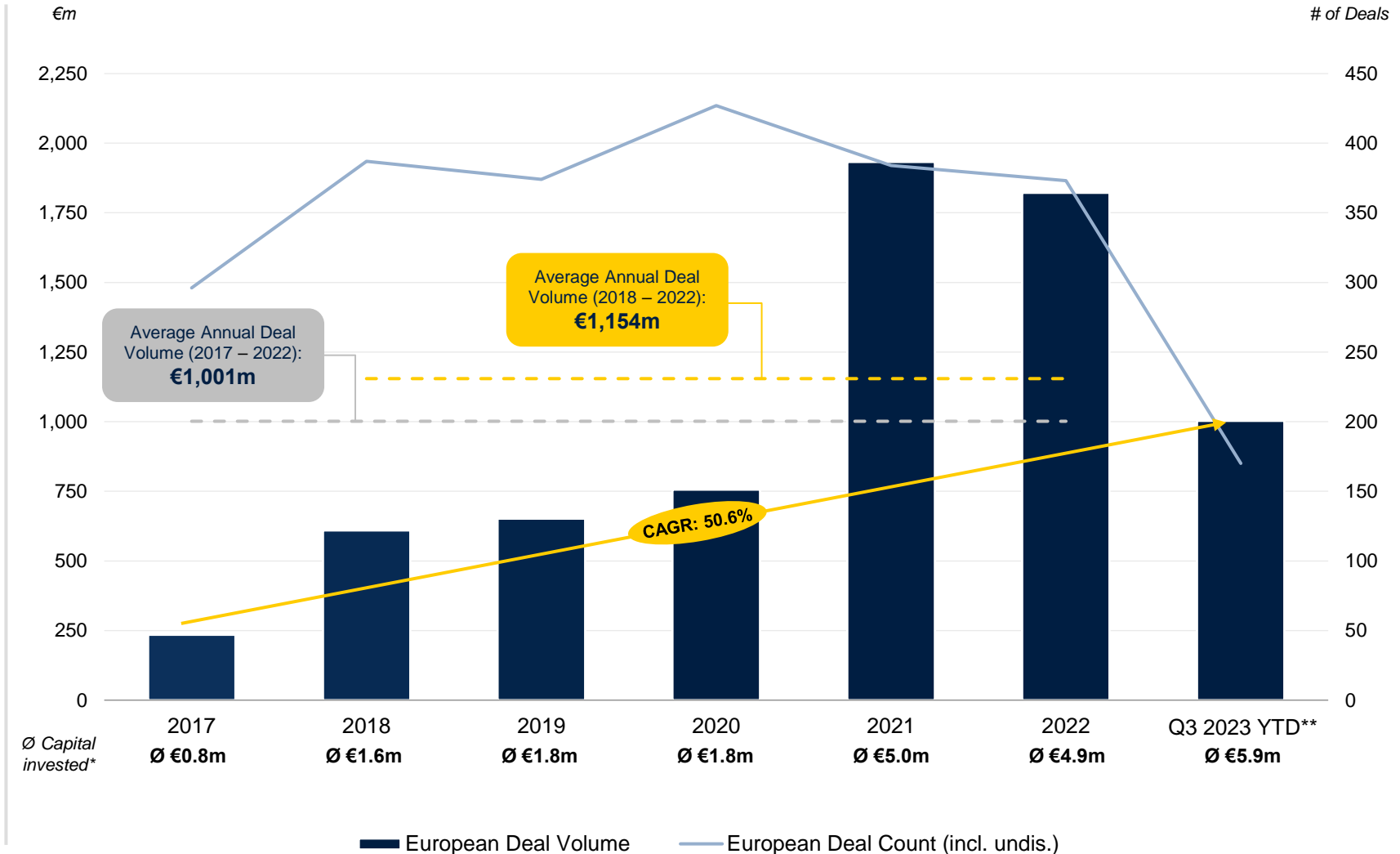
ROBOTICS IPO EXITS

ROBOTICS M&A EXITS

European Robotics Venture Capital Market Development

After a steady upward trend between 2017 and 2020, annual financing volumes peaked in 2021 (€1.9bn). Since then, both, deal volume and count dropped, indicating the arrival of the VC winter in this sector.

Funding volumes in Q3 '23 YTD still exceed pre-COVID levels, but indicate a reduction on a full-year basis vs. 2022



European Robotics Countries ('18 – Q3 '23*)

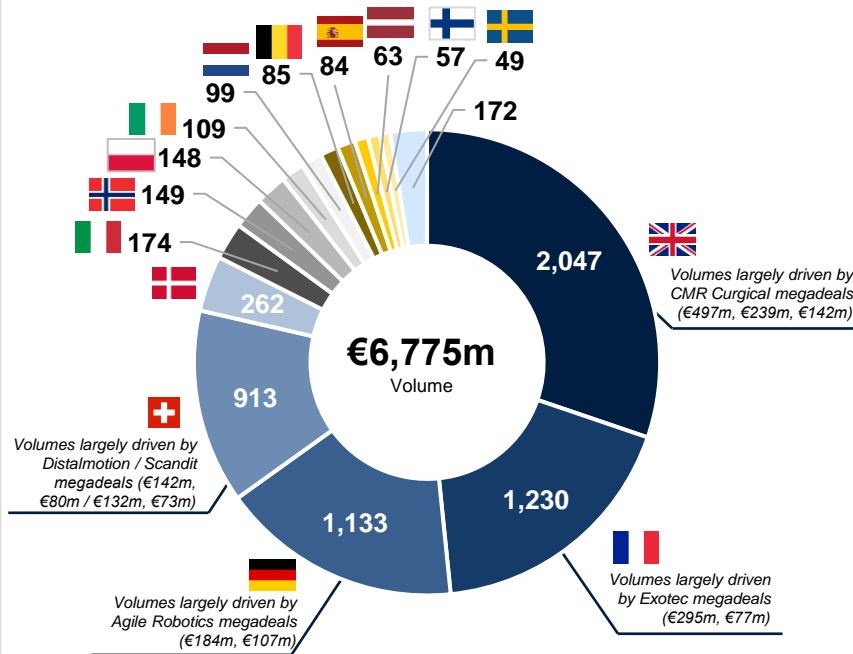
by Deal Count & Volume

For both metrics, deal volume and count, the top 3 countries consist of the UK (1st rank), France (2nd) and Germany (3rd)

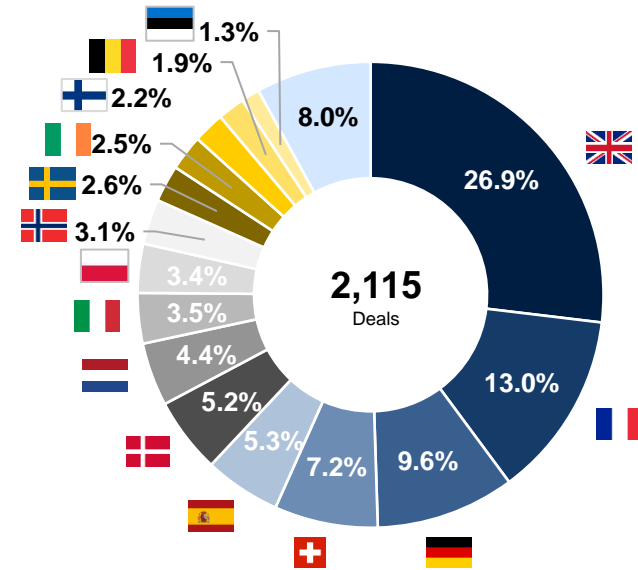
Even when adjusting for the mega deals enclosed, the Top 3 league ranking remains the same

The Top 3 countries represent over 65% and almost 50% of the total European Robotics market with respect to deal volume and count, respectively. This shows that this market is clearly dominated and driven by deals from UK-, France-, and Germany-based Robotics start-ups

Deal Volume (in EURm)



Deal Count (incl. undisclosed deals)



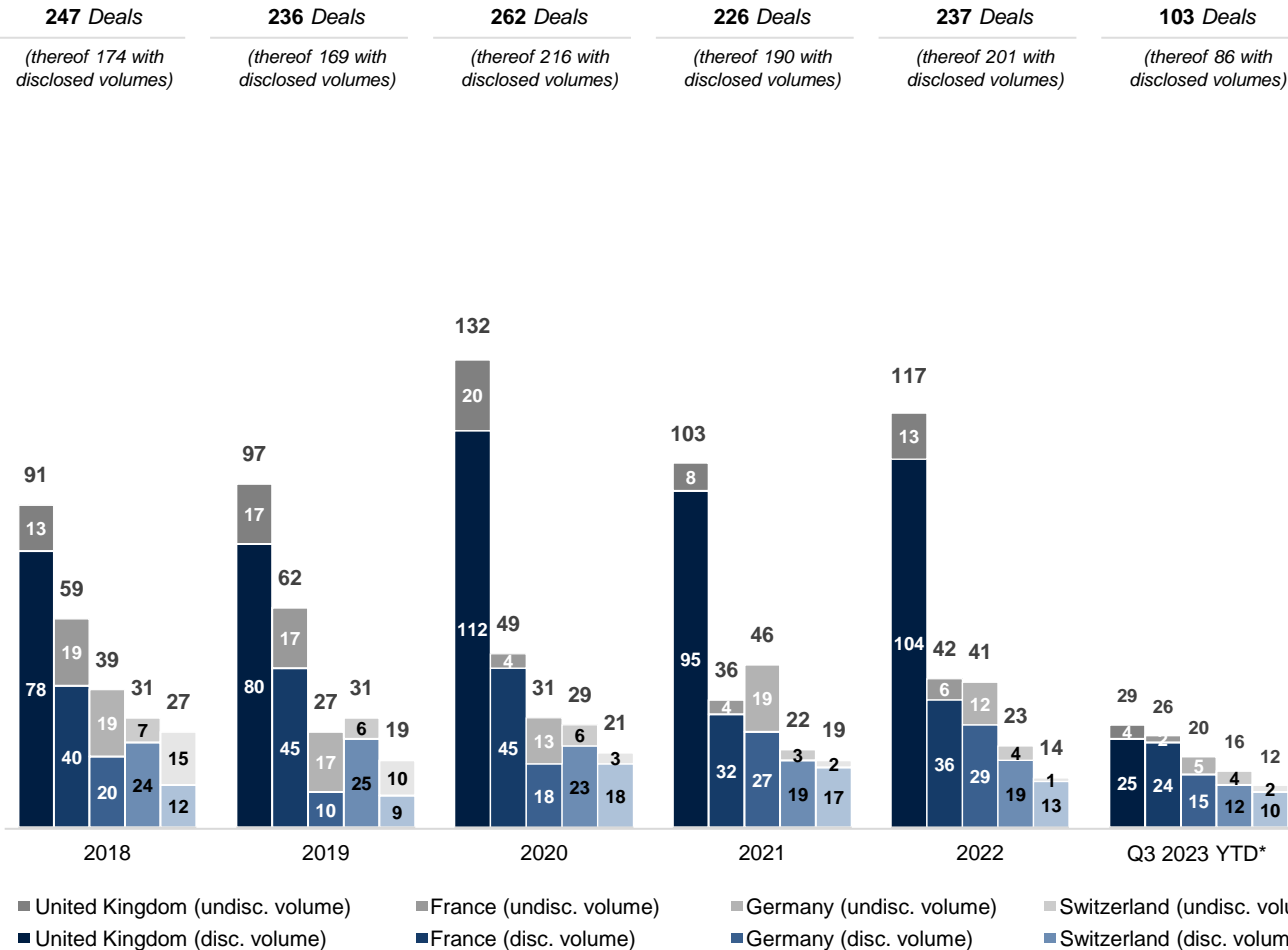
Top 5 Targeted European Robotics Countries ('18 – Q3 '23*) – Part I

by Deal Count per year

Since 2018, United Kingdom has recorded the largest number of deals with a total of 569 VC funding rounds. France and Germany complete the Top 3 ranking with 274 and 204 deals, respectively

While the number of deals across all countries almost constantly declined over the past years, the share of disclosed volumes has been increasing, indicating more later-stage and more prominent / larger deals

Deal Count (incl. deals with undisclosed deal volumes)



Top 5 Targeted European Robotics Countries ('18 – Q3 '23*) – Part II

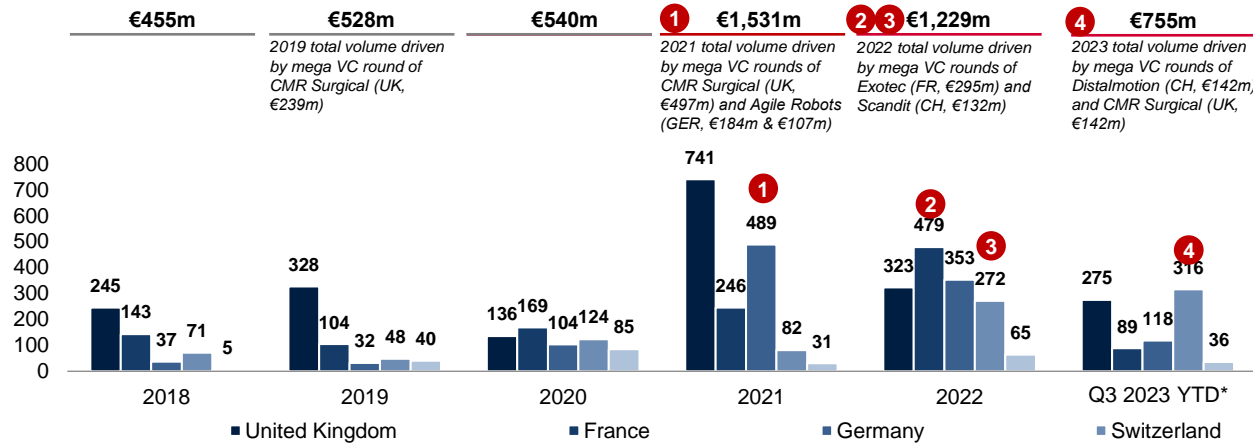
by Deal Volume

United Kingdom leads the Top 5 Targeted Countries in terms of deal volume (€2,047m) followed by France (€1,230m), Germany (€1,133m) and Switzerland (€913m) – disclosed deals only

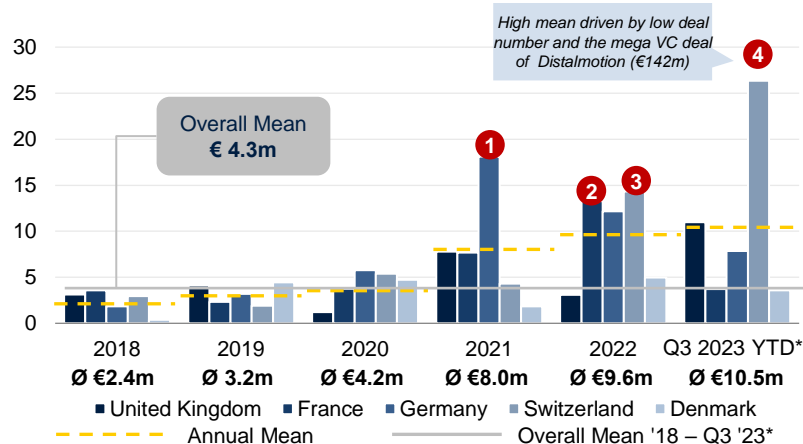
However, large rounds by CMR Surgical (€962m, 47% of UK), Exotec (€388m, 32% of France), Agile Robots (€322m, 28% of Germany) and Distalmotion / Scandit (€222m / €231m, 50% of Switzerland) heavily influence the countries' volumes

German companies also only disclose 43% of their deal sizes, indicating that total deal volume is also somewhat understated

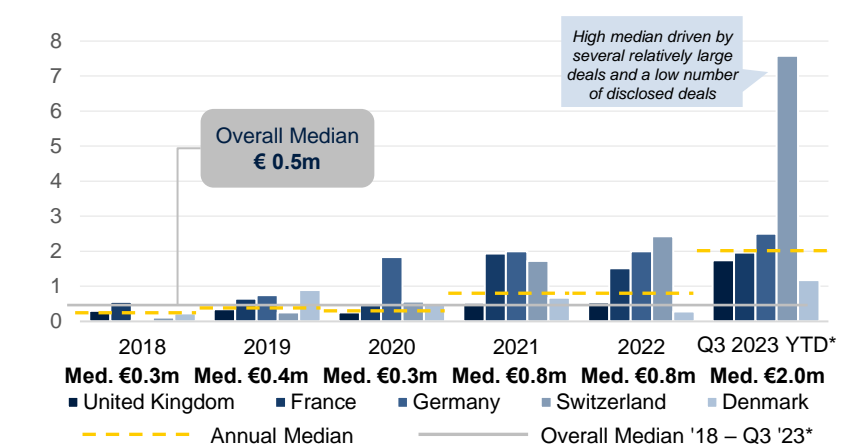
Deal Volume (in €m, excl. deals with undisclosed deal volumes)



Mean Deal Size (in €m, excl. deals with undisclosed deal volumes)



Median Deal Size (in €m, excl. deals with undisclosed deal volumes)



European Robotics Subsector Analysis ('18 – Q3 '23*)

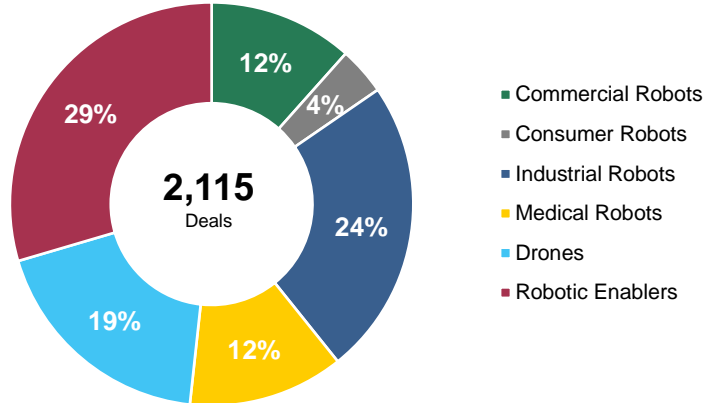
by Deal Count & Volume

'Robotic Enablers' and 'Industrial Robots' are the two largest subsectors by deal count, accounting for 53% of the overall deal count

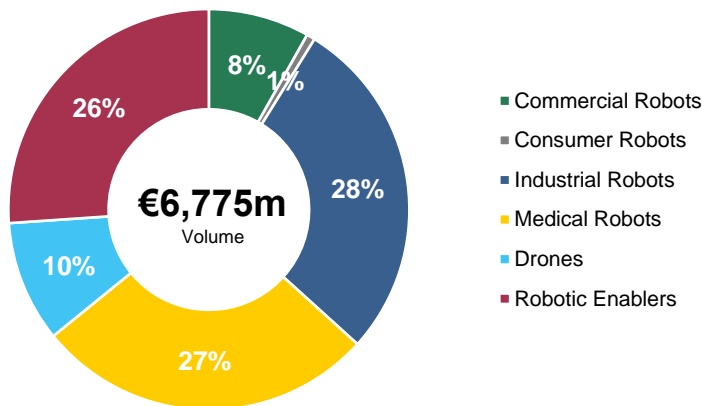
'Industrial Robots' and 'Medical Robots' are the largest subsector by deal volume, accounting each for 55% of the overall deal volume, closely followed by 'Robotic Enablers' with 26%

Adjusting for the mega funding rounds of CMR Surgical (€962m), the 'Medical Robots' subsector would only account for 12% of the total deal volume

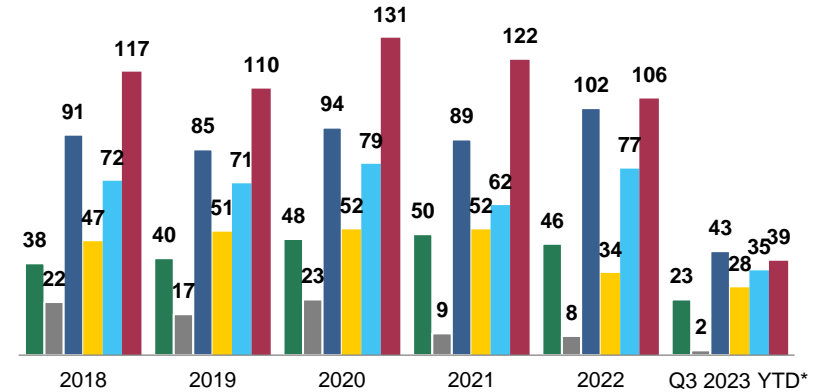
Deal Count (incl. undisclosed deals)



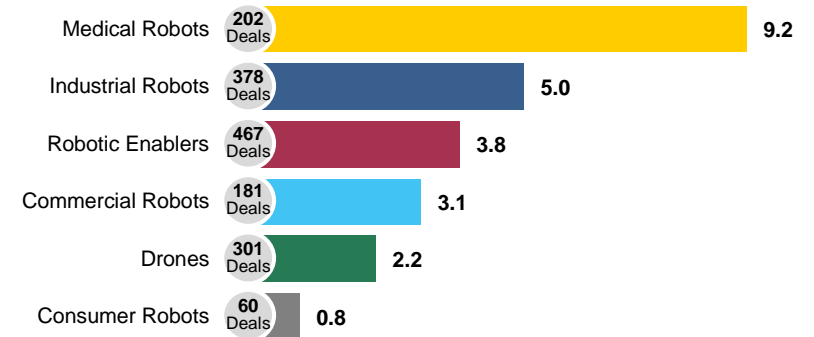
Deal Volume (excl. undisclosed deals)



Deal Count over Time (incl. undisclosed deals)



Average Deal Volume (in €m; excl. undisclosed deals)

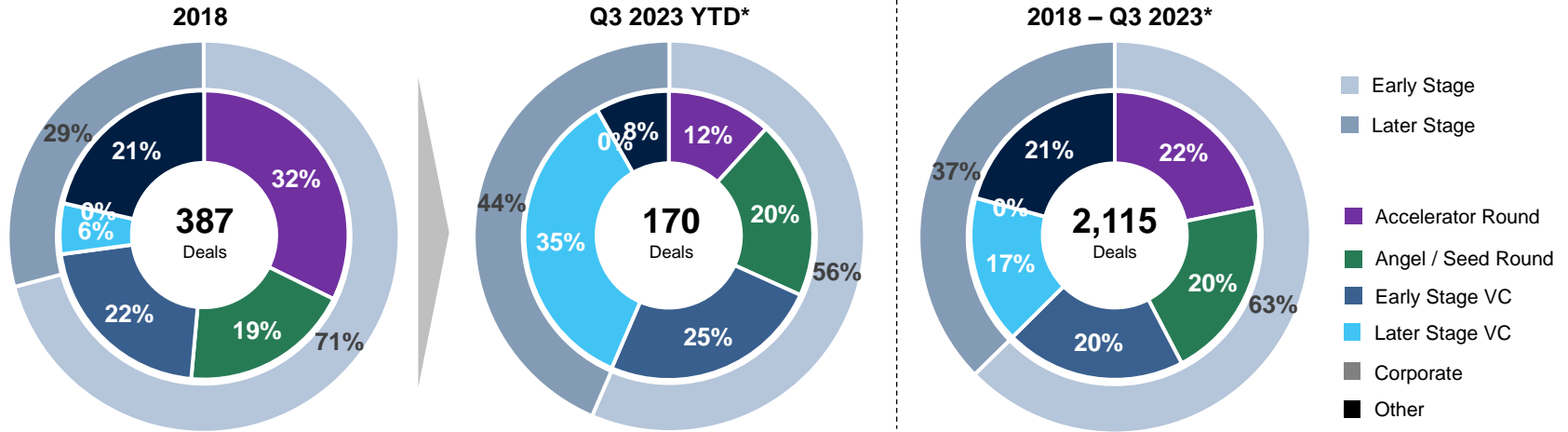


European Robotics Stage Analysis ('18 – Q3 '23*) by Deal Count

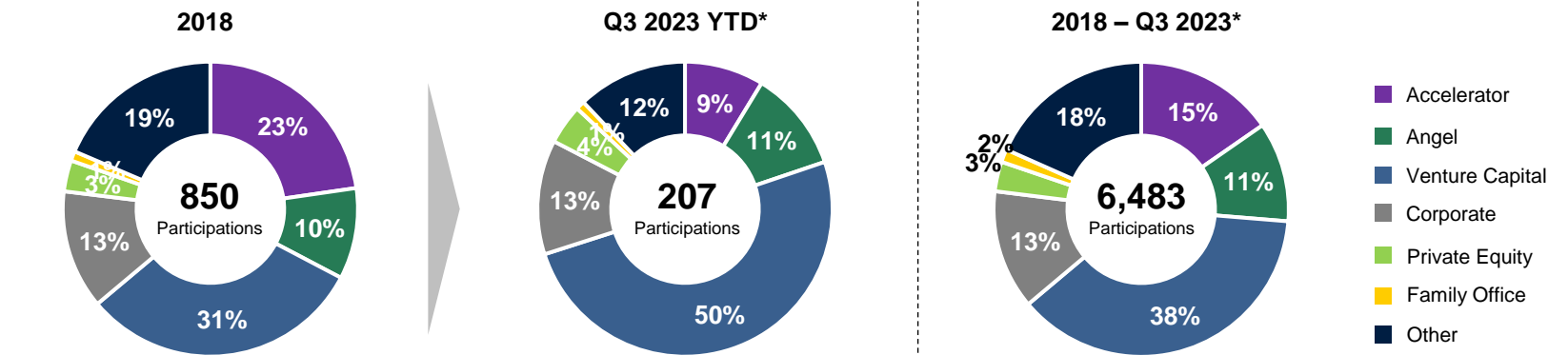
The robotics industry has matured in the last 5 years. In 2018, early stage deals (Accelerator-, Early Stage VC- and Angel / Seed Rounds) accounted for 71% of all deals while Q3 2023 YTD* saw this share drop to 56%

The shift to later stage deal types is also reflected in the significantly lower participation of Accelerators over time – 23% in 2018 vs 9% in Q3 2023 YTD*

Deal Type by Deal Count



Investor Type by Participations

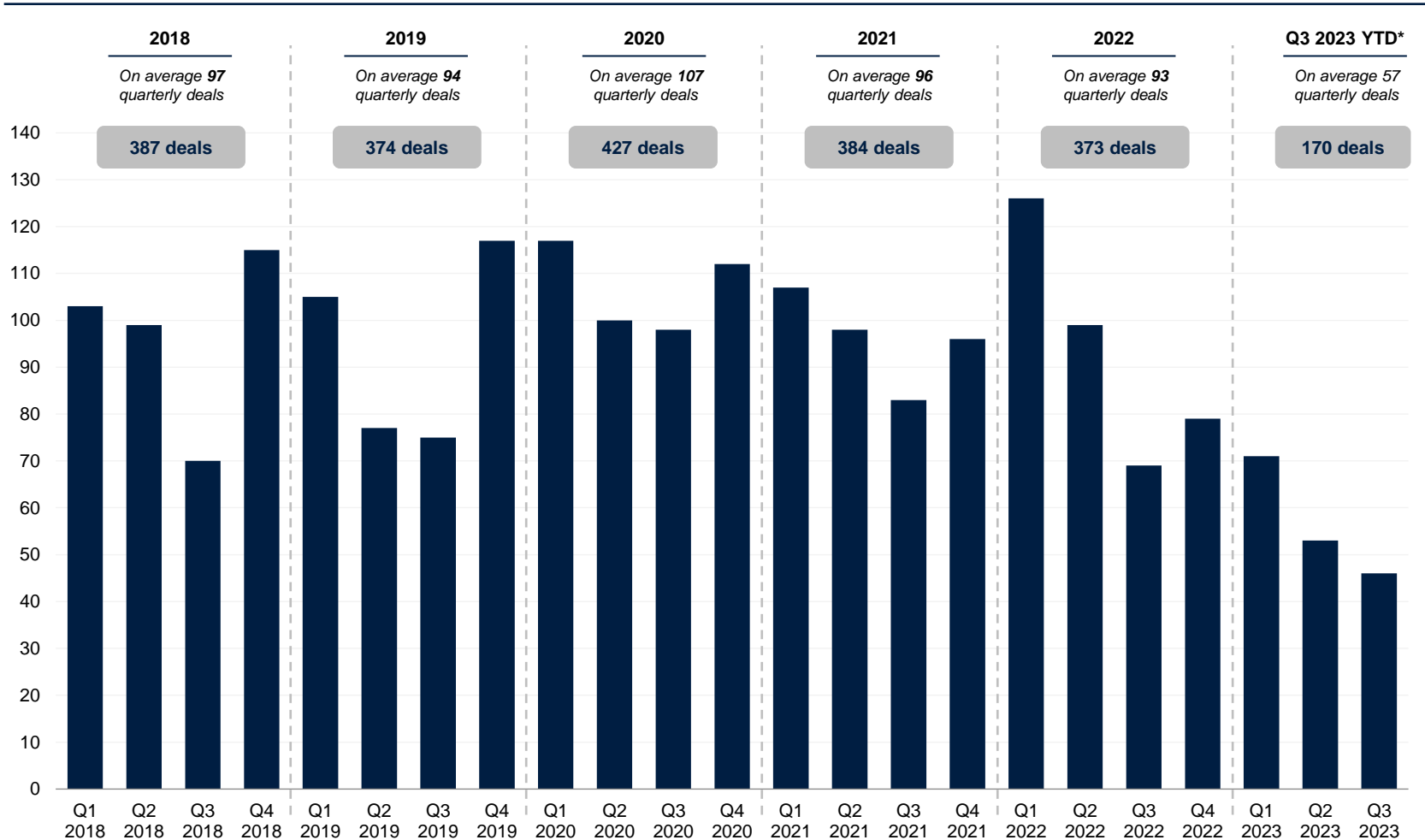


Quarterly Robotics Venture Capital Deal Count ('18 – Q3 '23*)

Looking at the number of quarterly Robotics venture capital transactions, no clear overall quarterly trend is observable

Only a small seasonality (Q1 & Q4 typically stronger than Q2 & Q3) sticks out. However, the overall downward trend since 2021 weakens the “strong Q4”

Deal Count (incl. deals with undisclosed deal volumes)



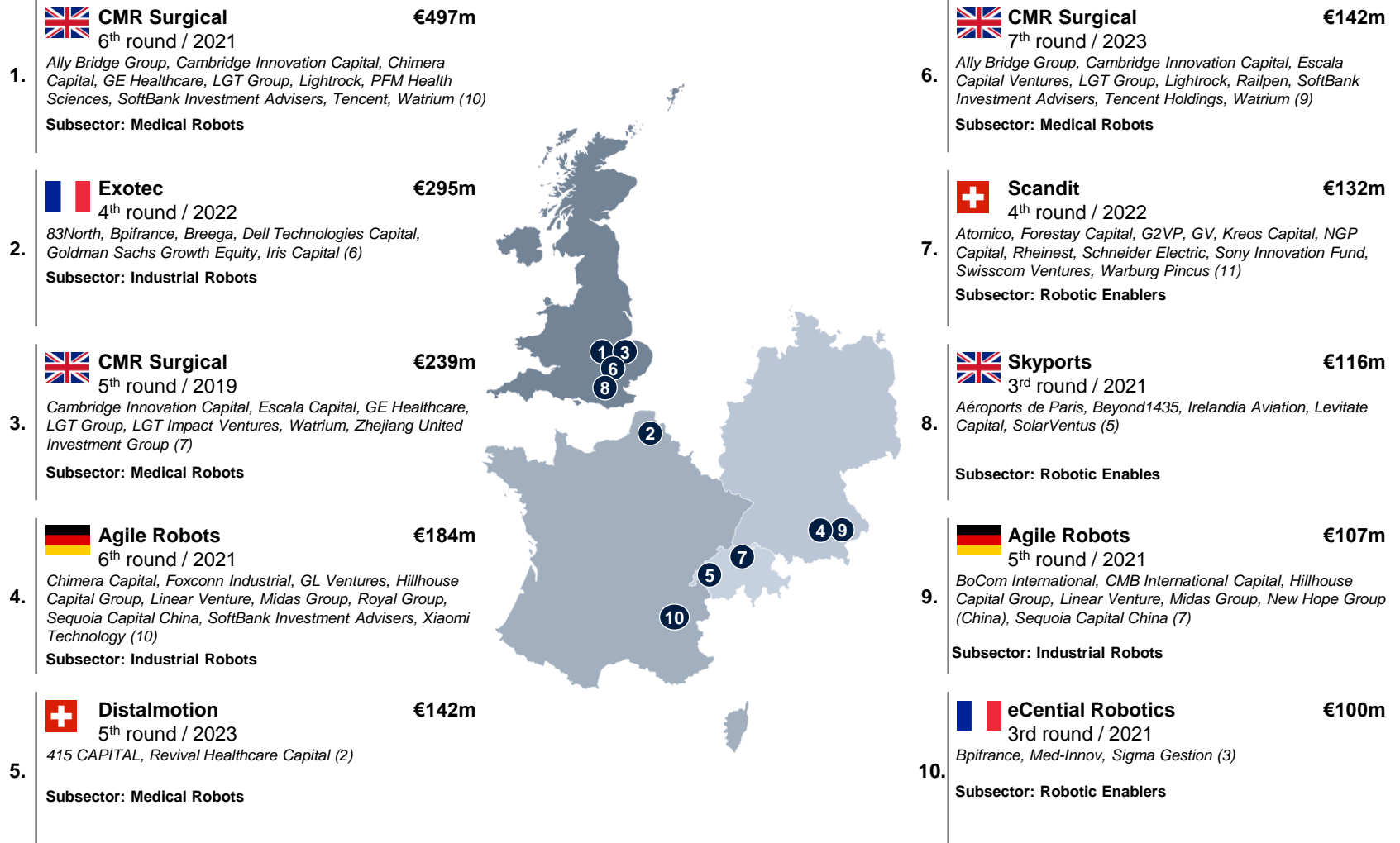
Source: PitchBook as of 01.10.2023, FCF Equity Research
 * Only includes deals from 01.01. – 30.09.2023

Top 10 European Robotics Deals ('18 – Q3 '23*)

by Deal Volume

CMR Surgical dominates the Top 10 list in the Robotics sector with 3 high volume deals

Medical and Industrial Robots are the leading sectors in the Top 10 list, representing 70% of the largest deals whilst Robotic Enablers account for the remaining 30%



Annual Top 10 European Robotics Deals ('18 – '20)

by Deal Volume

2018 (Top 10 account for 56% of annual deal volume)

1.		CMR Surgical Cambridge Innovation Capital, Erik Langaker, Escala Capital, LGT Group, Sandwater, Silk Road Fund Company, Vestland Invest, Watrium (8)	€85m / 4 th round
2.		Sypwai Lifeasapa Foundation (1)	€76m / Grant
3.		Quantum Surgical Ally Bridge Group (1)	€50m / 1 st round
4.		Scandit Atomico, GV, NGP Capital, Salesforce Ventures (4)	€26m / 2 nd round
5.		Magazino Cellcom Resources, Henderson Group, Fiege, Körber, Zalando (5)	€20m / 2 nd round
6.		Medical Microinstruments Andera Partners, Fountain Healthcare Partners, Gus Castello, John Engels, Panakes Partners, Samba Tech (6)	€20m / 1 st round
7.		Delair Intel Capital, BPI France (2)	€17m / 1 st round
8.		Unifly DFS Deutsche Flugsicherung, Federal Holding and Investment Company, PMV, Qbic Fund, Terra Motors, VITO (6)	€17m / 3 rd round
9.		Prophesee 360 Capital Partners, iBionext, Intel Capital, Renault Retail Group, Robert Bosch Venture Capital, Supernova Invest (6)	€15m / 4 th round
10.		Exotec 360 Capital Partners, Breega Capital, Iris Capital (3)	€15m / 2 nd round

2019 (Top 10 account for 56% of annual deal volume)

		CMR Surgical Cambridge Innovation Capital, Escala Capital, GE Healthcare, LGT Group, LGT Impact, Watrium, Zhejiang United Investment (7)	€239m / 5 th round
		Prophesee 360 Capital Partners, European Investment Bank, iBionext, Intel Capital, Robert Bosch Venture Capital, Supernova Invest (6)	€25m / 5 th round
		OnRobot Bonnesen, Bøgh-Sørensen, Day One Capital, European Investment Bank, Gundersen, Nordic Secondaries Fund, Sandal (family investment offices), VF Venture (8)	€25m / 3 rd round
		arculus 7 Atomico, La Famiglia, Spark Capital, Visionaries Club (4)	€15m / 1 st round
		Wingtra Brick & Mortar Ventures, Credit Suisse Entrepreneur Capital, Gentian Investments, Helvetica Capital, Verve Ventures, Wingman Ventures, Zürcher Kantonalbank (7)	€12m / 2 nd round
		Azur Drones n.a.	€12m / 4 th round
		Blue Ocean Robotics Bo Stærmosse, Juliana Drivhuse, Nordic Eye Venture Capital, Steen Hastrup (4)	€11m / 3 rd round
		Ekim Daphni, Eutopia, Partech, Qualgro (4)	€10m / 2 nd round
		Synapticon 7 Industries Holding, Blue World Group, High-Tech Gründerfonds, JoVa Direkt Invest, SE Ventures, Unternehmertum Venture Capital Partners (6)	€10m / 3 rd round
		LabGenius Air Street Capital, Christopher Gibson, Felicis Ventures, GigaFund, Inovia Capital, Lux Capital, Matthew Clifford, Nathan Benaich, Obvious Ventures, Patrick Pichette, Philipp Moehring, Torsten Reil (12)	€10m / 2 nd round

2020 (Top 10 account for 49% of annual deal volume)

		Exotec 83North, Breega Capital, Dell Technologies, Iris Capital (4)	€77m / 3 rd round
		Scandit Ariel Luedi, Atomico, Forestay Capital, G2 Venture Partners, GV, GVP Global, Hammer Team, Kreos Capital, NGP Capital, Salesforce Ventures, a.o.(14)	€73m / 3 rd round
		On Robot n.a.	€41m / 5 th round
		Robocath ANAXAGO, CLIIIF, CS Group, GO Capital, MicroPort Scientific, Silk Road Fund (6)	€40m / 5 th round
		Wandelbots 83North, Alexander Rinke, Atlantic Labs, EQT Ventures, Franz Haniel & Cie, M12, Next47, Paua Ventures, SAP.IO (9)	€27m / 3 rd round
		Lightpoint Medical Biomedical Catalyst, European Commission, Horizon 2020 SME Instrument, Innovate UK, National Cancer Institute, National Institutes of Health, Technology Strategy Board, Wellcome Trust (8)	€23m / Grant
		Magazino European Investment Bank, F-Log Ventures, Fiege Logistik, Jungheinrich, Körber, Zalando (6)	€21m / 3 rd round
		Yuanda Robotics Yuanda China Holdings (1)	€20m / 1 st round
		ANYbotics ACE&Company, EquityPitcher Ventures, Gentian Investments, Swisscom Ventures (4)	€19m / 3 rd round
		Blue Ocean Robotics Richard Sussman (1)	€18m / 4 th round

Annual Top 10 European Robotics Deals ('21 – Q3 '23*)

by Deal Volume

2021 (Top 10 account for 65% of annual deal volume)

1.	 CMR Surgical Ally Bridge Group; Cambridge Innovation Capital; Chimera Capital; GE Healthcare; LGT Group; Lightrock; PFM Health Sciences; SoftBank Investment Advisers; Tencent; Watium (10)	€497m / 6 th round
2.	 Agile Robots Chimera Capital, Foxconn Industrial, GL Ventures, Hillhouse Capital Group, Linear Venture, Midas Group, Royal Group, Sequoia Capital China, SoftBank Investment Advisers, Xiaomi Technology (10)	€184m / 6 th round
3.	 Skyports Aéroports de Paris, Beyond1435, Irelandia Aviation, Levitate Capital, SolarVentus (5)	€116m / 3 rd round
4.	 Agile Robots BoCom International, CMB International Capital, Hillhouse Capital Group, Linear Venture, Midas Group, New Hope Group, Sequoia Capital China (7)	€107m / 5 th round
5.	 eCential Robotics Bpifrance; Med-Innov; Sigma Gestion (3)	€100m / 3 rd round
6.	 ACCREA Engineering Government of the Republic of Poland (1)	€90m / Grant
7.	 NEUREA Robotics n.a.	€71m / 1 st round
8.	 Quantum Surgical Ally Bridge Group, Bpifrance, Caisse d'Epargne (3)	€40m / 3 rd round
9.	 Prophesee iBionext, In-Q-Tel, Inno-Chip, Renault Retail Group (France), Robert Bosch Venture Capital, Sinovation Ventures, Xiaomi Ventures (7)	€28m / 6 th round
10.	 Micropsi Industries Ahren Innovation Capital, Amplifier (Berlin), M Ventures, Metaplanet Holdings, Project A, VSquared Ventures (6)	€27m / 5 th round

2022 (Top 10 account for 50% of annual deal volume)

 Exotec 83North, Bpifrance, Breega, Dell Technologies Capital, Goldman Sachs Growth Equity, Iris Capital (6)	€295m / 4 th round
 Scandit Atomico, Forestay Capital, G2VP, GV, Kreos Capital, NGP Capital, Rheinst, Schneider Electric, Sony Innovation Fund, Swisscom Ventures, Warburg Pincus (11)	€132m / 4 th round
 Distalmotion 415 CAPITAL, Revival Healthcare Capital (2)	€80m / 4 th round
 Wandelbots 83North, Atlantic Labs, EQT Ventures, Franz Haniel & Cie, Insight Partn., M12, Next47, Paua Ventures, Silverhorn Investment Advisors (9)	€74m / 4 th round
 Medical Microinstruments Andera Partners, b2venture, BioStar Capital, Deerfield Management, Fountain Healthcare Partners, Panakes Partners, RA Capital Management, Sambatech, Wellington Partners (9)	€73m / 3 rd round
 Wingcopter BMH Beteiligungs-Managementgesellschaft Hessen, Drone Fund, Expa, Futury Capital, Hessen Kapital, Itochu, REWE Group, Salvia, SYNERJET, XAI technologies, Xplorer Capital (11)	€56m / 3 rd round
 CloudNC Atomico, Autodesk, British Patient Capital, Episode 1 Ventures, Lockheed Martin, QVentures, XTX Markets (7)	€54m / 8 th round
 Advastore Cherry Ventures, DN Capital, Movendo Capital (3)	€50m / 1 st round
 Prophesee 360 Capital, Bosch Ventures, European Investment Bank, iBionext, Intel Capital, Prosperity7 Ventures, Sinovation Ventures, Xiaomi Ventures (8)	€50m / 7 th round
 Blue Ocean Robotics A.P. Moller Holding (1)	€45m / 5 th round

2023* (Top 10 account for 61% of annual deal volume)

 Distalmotion 415 CAPITAL, Revival Healthcare Capital (2)	€142m / 5 th round
 CMR Surgical Ally Bridge Group, Cambridge Innovation Capital, Escala Capital Ventures, LGT Group, Lightrock, Railpen, SoftBank Investment Advisers, Tencent Holdings, Watium (9)	€142m / 7 th round
 NEUREA Robotics HV Capital, Lingotto (London), Primepulse, VSquared Ventures (4)	€50m / 2 nd round
 EcoRobotix 4FOX Ventures, Aqton, BASF Venture Capital, Cibus Fund, Flexstone Partners, Swisscanto Private Equity, Swisscom Ventures, Technologiefonds, Verve Ventures, Yara Growth Ventures (10)	€47m / 6 th round
 ANYbotics Aramco Ventures, Bessemer Venture Partners, EquityPitcher Ventures, NGP Capital, Swisscanto Private Equity, Swisscom Ventures, Verve Ventures, Walden Catalyst (8)	€45m / 4 th round
 Verity (Hardware) A.P. Moller Holding, Airbus Ventures, Exor, Fontinalis Partners, Qualcomm Ventures, ROBO Global Index, Sony Innovation Fund, Verve Ventures (8)	€40m / 5 th round
 Dronamics Eleven Ventures, Founders Factory, Speedinvest, Tawazun Strategic Development Fund (4)	€40m / 4 th round
 Automata Octopus Ventures (1)	€36m / 4 th round
 Ganymed Robotics BNP Paribas Développement, Cap Horn Finance, Cathay Capital Private Equity, Cathay Health, Crédit Mutuel Innovation, European Innovation Council Fund, Kurma Partners (7)	€36m / 4 th round
 ROCSYS European Investment Bank, FORWARD.one, Graduate Entrepreneur, Skandinaviska Enskilda Banken (4)	€33m / 4 th round

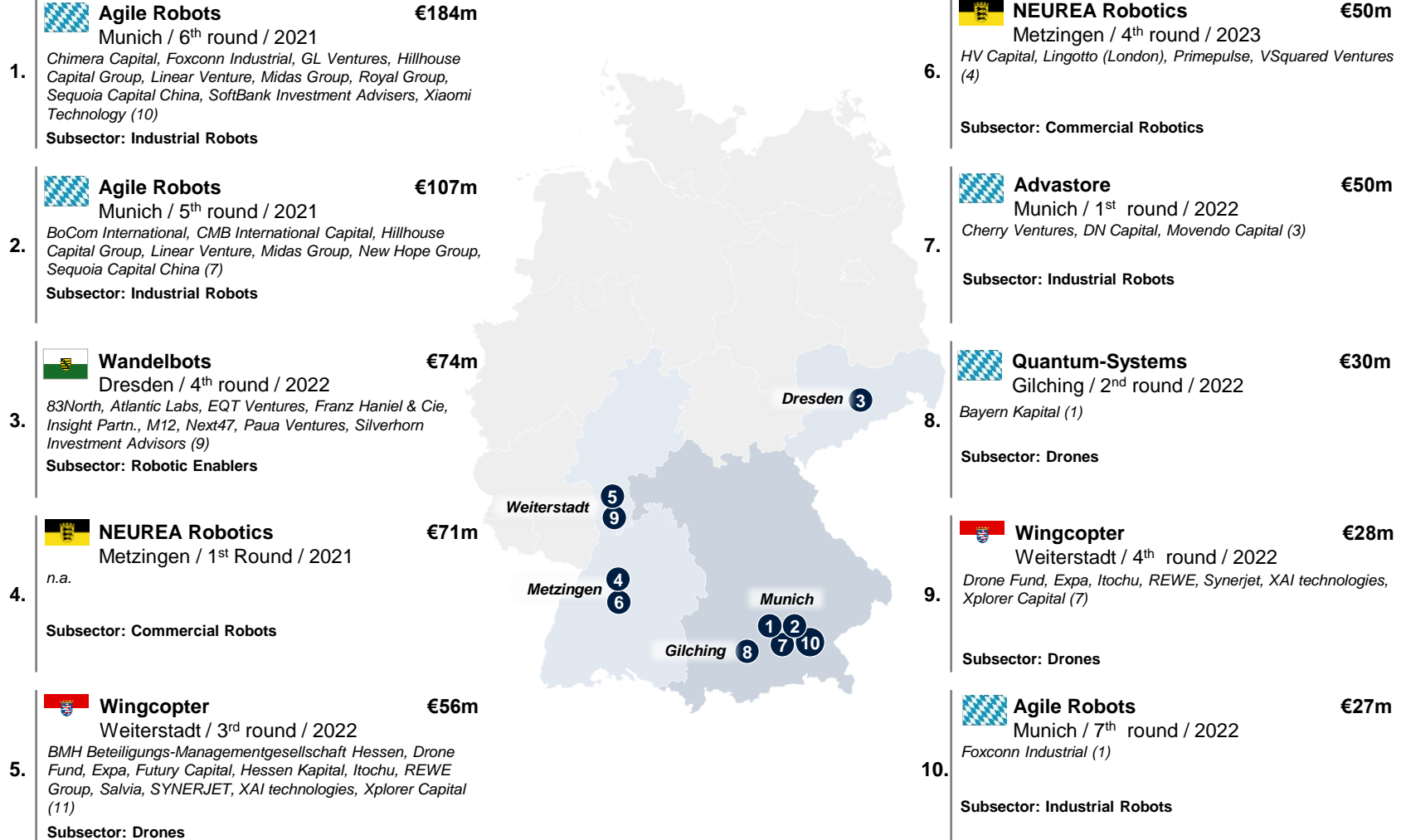
Top 10 German Robotics Deals ('18 – Q3 '23*)

by Deal Volume

Agile Robots leads the Top 10 ranking for German deals with 3 transactions since 2018, raising €349m in total

Companies based in South Germany (Bavaria and Baden-Wuerttemberg) account for 70% of deals in the Top 10

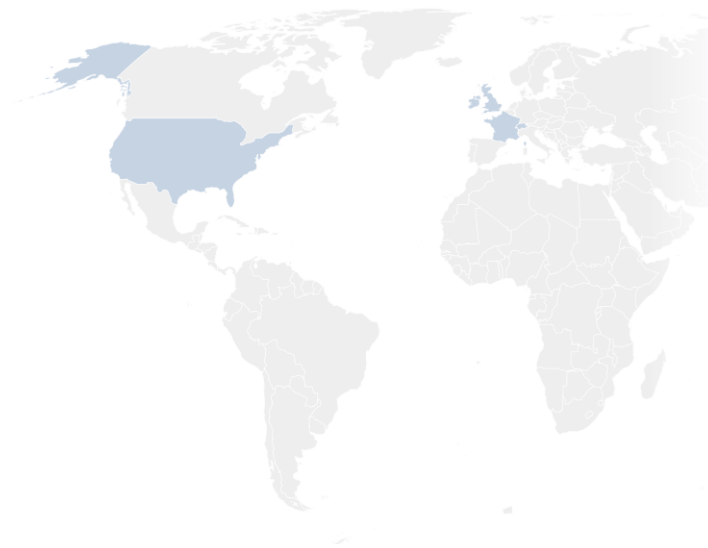

'Robotic Enablers' and 'Industrial Robots' subsectors account for each 40% of the deal count in the Top 10 German Robotic Deals





Most Active Investors in European Robotics Companies ('18 – Q3 '23*) by Deal Count


The Top 10 investors by deal count invested in 368 (or 17%) of the total number of deals that took place in the European Robotics sector since 2018


UK's innovation agency 'Innovate UK' lead the ranking with 103 deals, followed by EU-vehicles (Horizon 2020 (SME) & European Union) and US-based accelerator 'Plug and Play Tech' (85 and 35 deals, respectively)


- 
- 


Deal Count: 103
Deals: Lightpoint Medical, BotsAndUs, Wootzano, Ross Robotics, Rivelin Robotics, Vollant Autonomy, Muddy Machines, Small Robot Company, Innvotek, Urban-Air Port [...]
 - 


Deal Count: 85
Deals: Ganymed Robotics (2), Lightpoint Medical, Wingtra, FPD Recycling, IMSystems, Tripleye, XSun (2), BotsAndUs, Macco, AGADE, Deneb, Odd.Bot, Aeronex, Akara Robotics [...]
 - 


Deal Count: 35
Deals: Gideon Brothers (2), Apian, Cartken, Agointelli, Ducktrain, WAKU Robotics (2), Galam Robotics, Delivers.AI, Tractonomy Robotics, Imperium Drive, Extend Robotics [...]
 - 


Deal Count: 32
Deals: Exotec, eCential Robotics (2), Quantum Surgical, Wandercraft, Delair, Naio Technologies, Mob Energy, dydu, Ludocare, Pollen Robotics, Uavia, GenSensor [...]
 - 

Deal Count: 29
Deals: Isochronic (2), Bionomous, Emovo, Bota Systems (2), Komp-ACT, SEED Biosciences, Flybotix (2), Scewo, aiEndoscopic, RigiTech, AICA, No-touch Robotics, Saeki, Volrio [...]
 - 

Deal Count: 21
Deals: Japet (2), Rovenso (2), Mojo, Reach Industries (2), Emys (3), Robo Wunderkind, HausBots (2), Rebartek (2), Babybe (4), Lynx Sight, Reest
 - 

Deal Count: 18
Deals: Acres Machinery, ICP NewTech (2), CPS, Manna Drone Delivery, Eiratech Robotics, Iamus Technologies (4), Izario, Konree Innovation, Palliare, XOCEAN (3) [...]
 - 

Deal Count: 17
Deals: CloudNC (3), EyPick, Automata, Headlight AI, Holotron, Mimica (2), Muddy Machines (2), Plumerai, Imperium Drive, Semblr Technologies, Squaremind, Seyo, Theo
 - 

Deal Count: 15
Deals: AutoPickr, Bettering Our Worlds, Calyo, E-Nano, Iona., Reach Industries, Marble, Phase Space, Ai Build (2), Bot-Hive (2), Smith Autonomous, Sorair Technologies, ZOA Robotics
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Deal Count: 13
Deals: BladeBU, Bot-Hive (2), Calyo, Flare Bright, Fox Robotics, Muddy Machines, HausBots, Service Robotics (2), Extend Robotics, Zelimo



EXECUTIVE SUMMARY

FCF OVERVIEW

ROBOTICS VENTURE CAPITAL MARKET

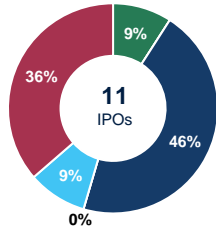
ROBOTICS IPO EXITS

ROBOTICS M&A EXITS

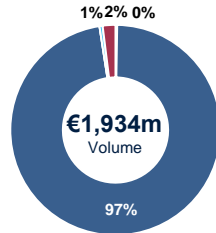
European Robotics VC-Backed IPO Market Overview ('18 – Q3 '23*)

IPOs by Subsector

Number of IPOs

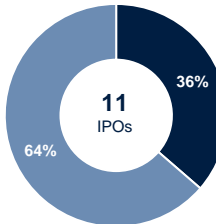


Issuing Volume



- Commercial Robots
- Consumer Robots
- Industrial Robots
- Medical Robots
- Drones
- Robotic Enablers

Price Range

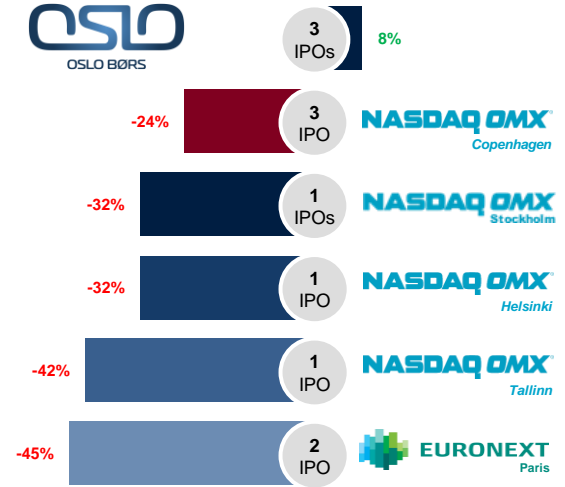


- Within Range
- Above Range
- Below Range

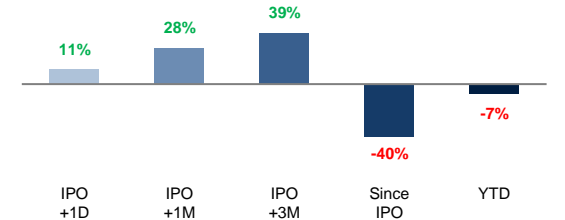
Robotics IPOs by Volume

IPO Date	Company	Exchange	HQ	Volume (€m)	MCap (€m)	Since IPO %
20/10/2021	AutoStore Holdings Ltd.	OSLO OSLO BØRS	DK	1,849.6	11,476.3	-57.9%
01/12/2021	Digital Workforce Services Oyj	NASDAQ OMX Helsinki	FI	25.5	72.5	-46.5%
20/04/2021	Argeo AS	OSLO OSLO BØRS	DK	17.4	22.4	-53.3%
30/11/2020	Nordic Unmanned AS	OSLO OSLO BØRS	DK	9.3	25.8	-93.2%
21/02/2019	Arcure S.A.	EURONEXT Paris	FR	7.9	34.9	-65.7%
03/06/2022	Clevon AS	NASDAQ OMX Tallinn	EE	5.0	48.0	-77.1%
24/06/2021	BOA Concept SAS	EURONEXT Paris	FR	4.8	15.9	43.1%
21/11/2018	Scape Technologies A/S	NASDAQ OMX	DK	4.7	15.7	-87.4%
26/06/2018	Odico A/S	NASDAQ OMX	DK	4.0	15.8	-80.0%
19/06/2020	Shape Robotics A/S	NASDAQ OMX	DK	3.6	9.0	172.3%
15/03/2021	Ekobot AB	NASDAQ OMX Stockholm	SE	2.0	3.7	-94.4%

Performance** and Issuance by Exchange



Mean IPO Performance

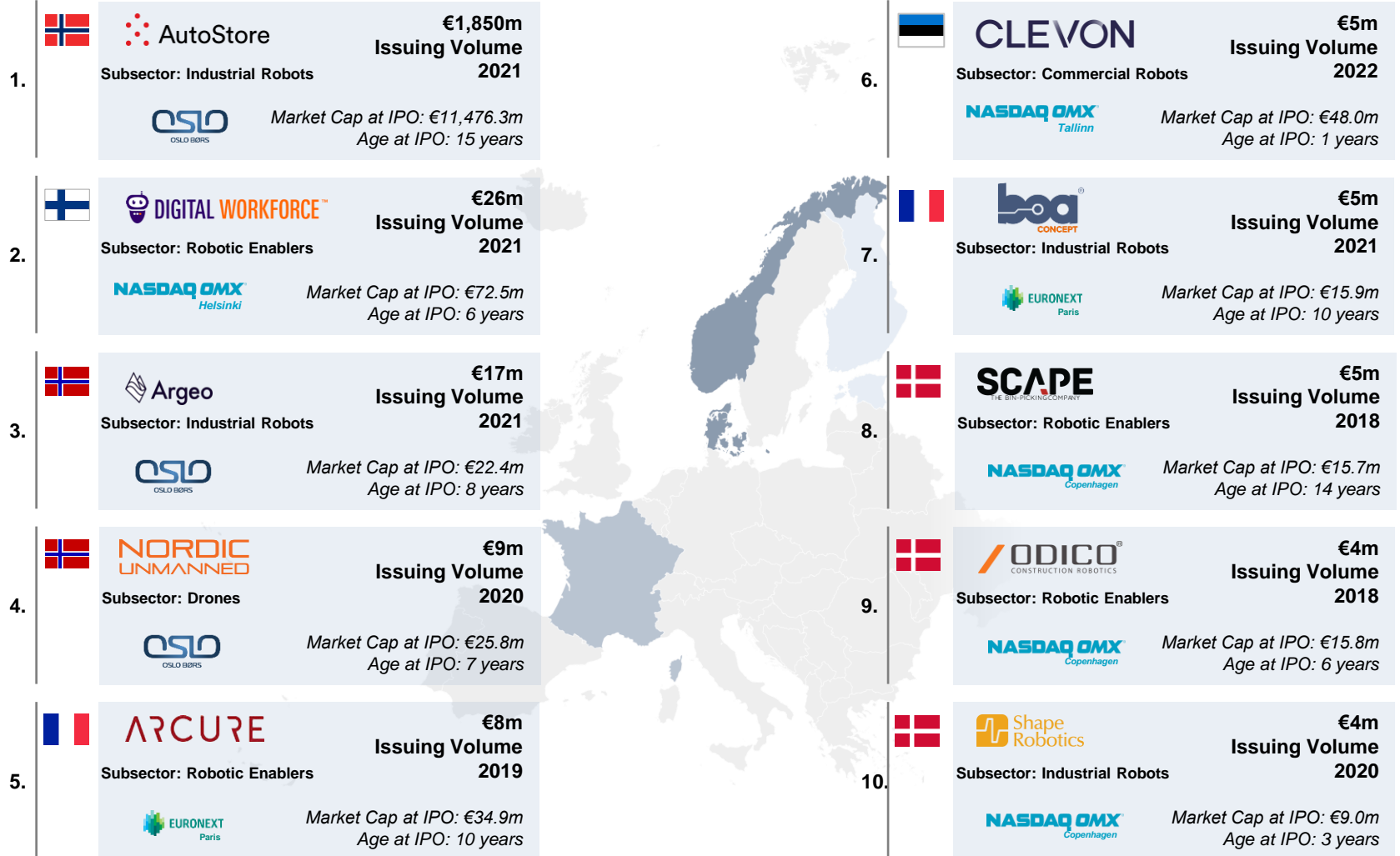


Top 10 Venture-Backed Robotics IPO Exits ('18 – Q3 '23*) by Issuing Volume

Of the Top 10 largest European Robotics IPOs over the last 5 years, 7 IPOs involved Nordic companies, followed by 2 French, and 1 Estonian companies

The largest listing by far was the AutoStore Holdings IPO in 2021 with a volume of €1.8bn. All other Top 10 Robotic IPOs in the last 5 years range in volume between €26m and €4m

NASDAQ OMX (Stockholm, Helsinki or Tallinn) and Euronext Paris executed the majority of IPOs, indicating their investors' focus on innovative young technologies companies as well as a certain home bias of those young start-ups





EXECUTIVE SUMMARY

FCF OVERVIEW

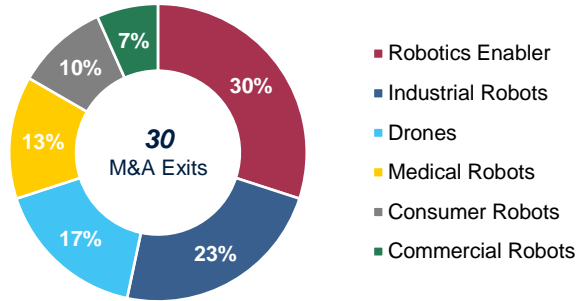
ROBOTICS VENTURE CAPITAL MARKET

ROBOTICS IPO EXITS

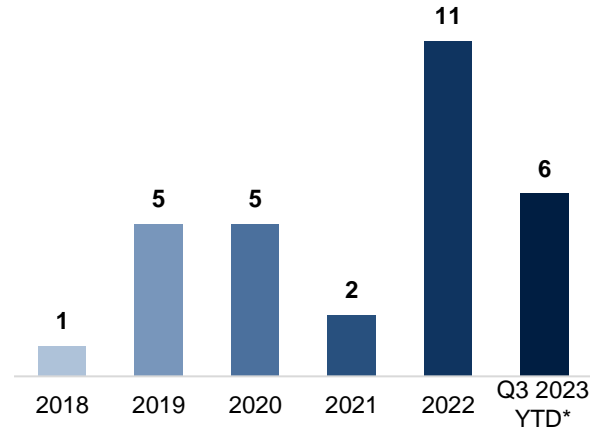
ROBOTICS M&A EXITS

Overview of Robotics VC-Backed M&A Exits ('18 – Q3 '23*)

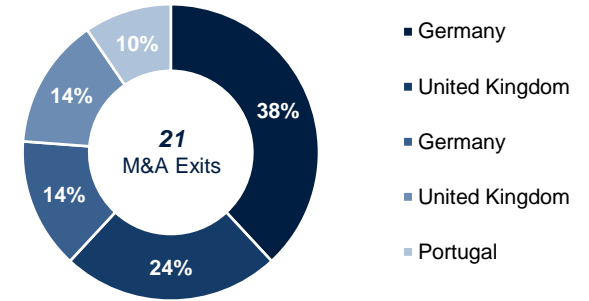
Number of M&A Exits by Subsector



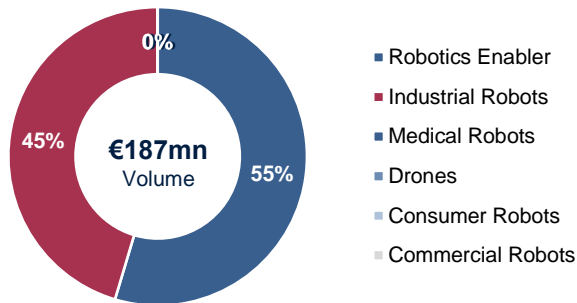
Number of M&A Exits over Time



Top 5 Target Countries (# of M&A Exits)



Disclosed Volume of M&A Exits by Subsector

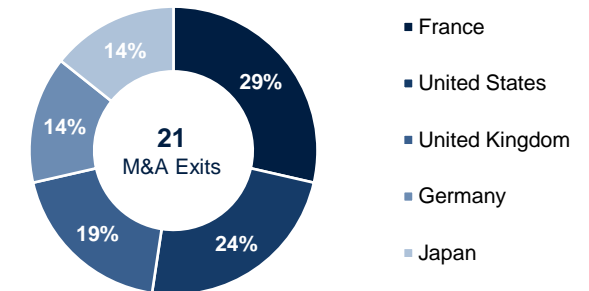


Top 3 Acquirers by Volume (in €m)

#	Investor	HQ	Volume (€m)	# Deals	Target
1	JUNGHEINRICH		102	1	
2	Waters THE SCIENCE OF WHAT'S POSSIBLE™		73	1	
3	SCOTT		12	1	

Total Top 3 Acquirers: 187 Volume, 3 Deals

Top 5 Acquirer Countries (# of M&A Exits)

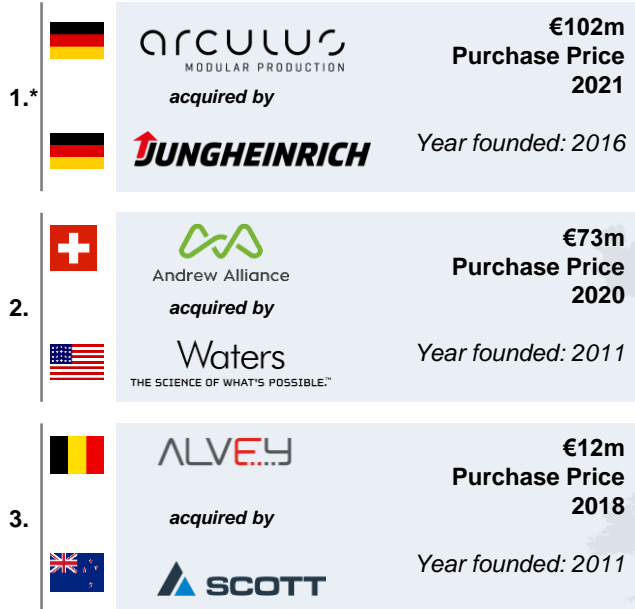


Top 3 Venture-Backed Robotics M&A Exits ('18 – Q3 '23*) by Purchase Price

Only 3 M&A transactions in 18 – Q3 '23* have a disclosed purchase price

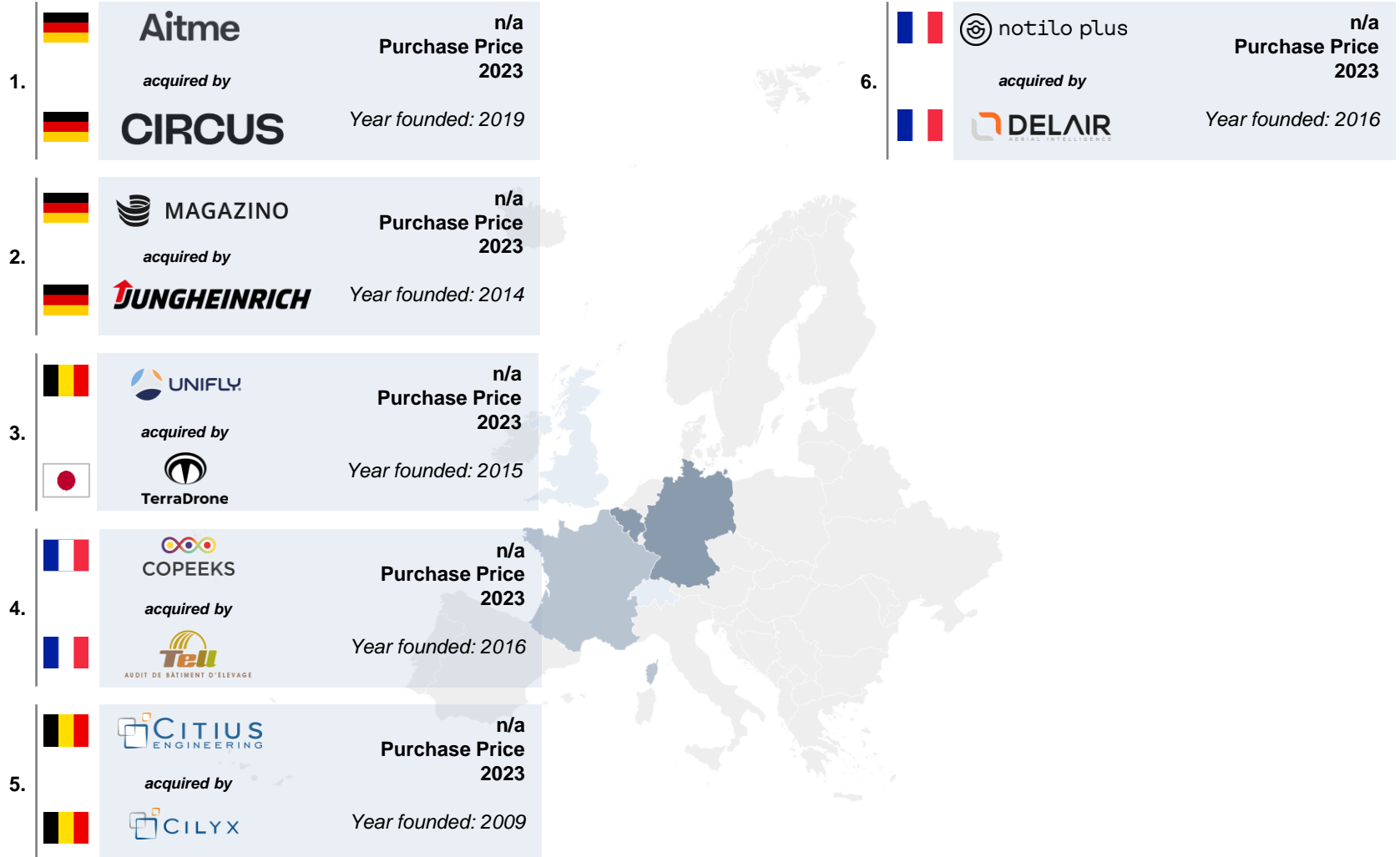
Jungheinrich's acquisition of arculus leads this league table of Robotics M&A Exits with a transaction volume of €102m, followed by Waters purchase of Andrew Alliance with €73m

The smallest M&A exit was the acquisition of Alvey by Scott in 2018 (€12m volume)



Top Venture-Backed Robotics M&A Exits in Q3 '23 YTD*

So far in 2023*, 6 Robotics start-ups were acquired. For all transactions, purchase prices were not disclosed



Source: PitchBook as of 01.10.2023, FCF Equity Research

Note: Top 10 deals sorted by deal volume and following by deal date (newest to oldest)

* Only includes deals from 01.01 – 30.09.2023

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