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Digitalization and Globalization of Medical Devices

2018

Consolidated ER&D Spending : E-R&D spend is highly consolidated among top 5 OEMs; Imaging and Non-imaging remain primary spend segments

Total R&D spend

$ 24 - 25 Billion

41%

R&D spend contribution by Top 5 R&D spenders

Dominant Sub-verticals
Non-imaging diagnostics, Surgical and Prosthetics

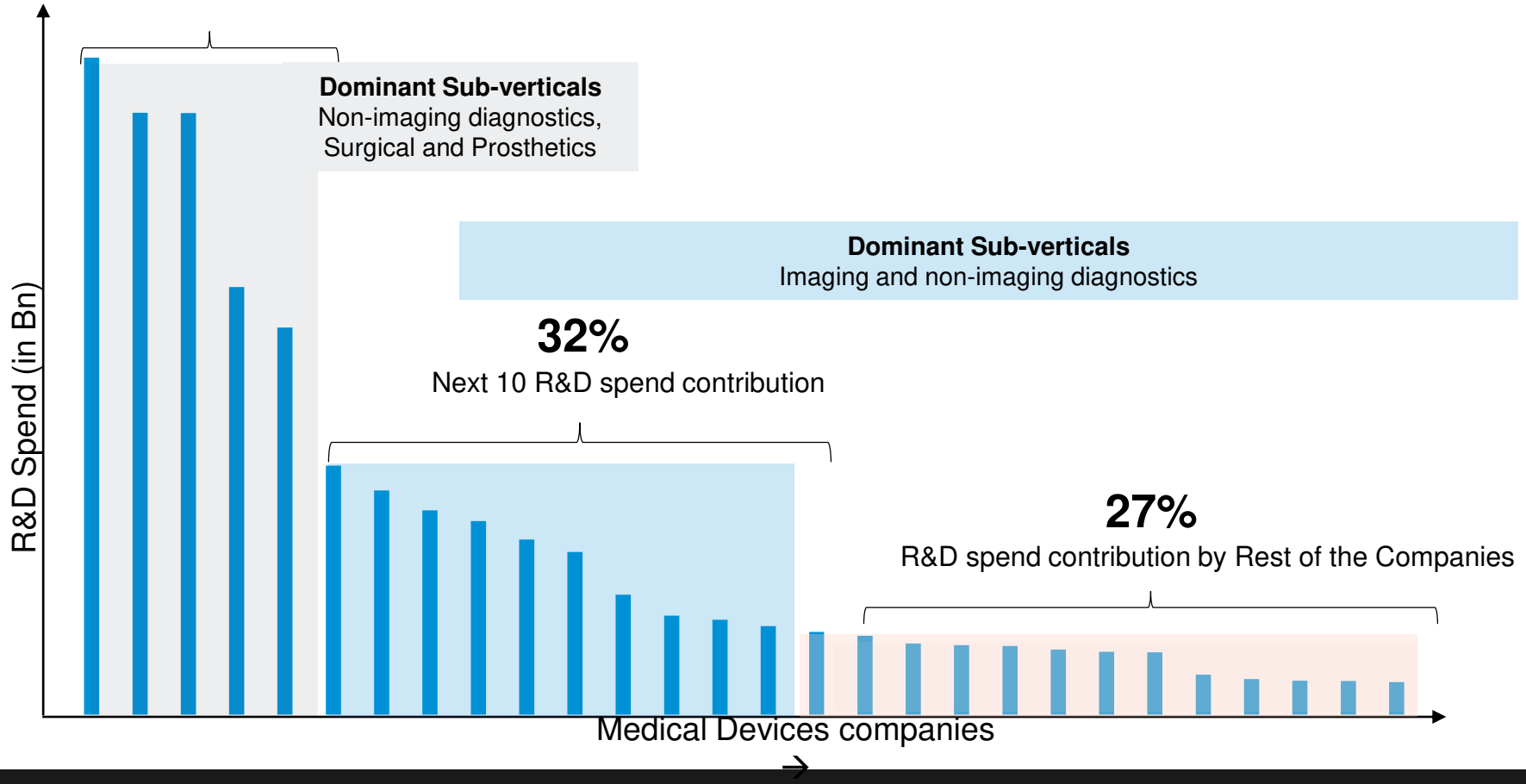
Dominant Sub-verticals
Imaging and non-imaging diagnostics

32%

Next 10 R&D spend contribution

27%

R&D spend contribution by Rest of the Companies



- Global R&D spend is highly consolidated among top 5 R&D spenders

Region wise R&D Spend

Region	% of R&D Spend
North America	59%
Europe	34%
APAC	7%

Top 10 R&D Spenders

Philips	$2.3 – 2.5 Bn
Abbott	$2.1 – 2.3 Bn
Medtronic	$2.1 – 2.3 Bn
GE Healthcare	$1.4 – 1.6 Bn
Siemens Healthineers	$1.3 – 1.5 Bn

Note: Analysis is based on the DRAUP's proprietary engineering database, updated in Feb, 2018

Source : DRAUP

Digital Transformation of R&D : Medical Devices R&D spend is expected to reach ~$32 Bn in the next 5 years, largely driven by investments in digital centric use-cases

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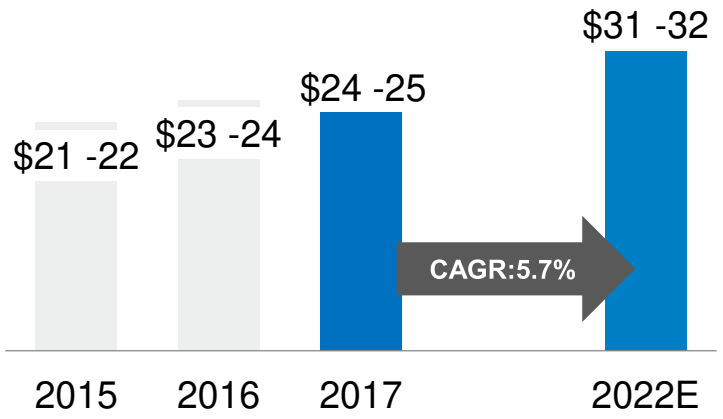
G500 Medical Devices R&D Spend
(In USD billion)



Key Digital Transformation Themes

Preventive Care

- Enhanced focus on preventive care has warranted use of **predictive analytics**
- **AI, Cyber Security, Bigdata, IoT** and combination products will drive spending on devices

Point-Of-Care (POCT) Testing

- Focus on affordable pricing, faster detection and reduction in hospital stays are key factors driving consumer device adoption
- Target to reduce the amount of manual labour involved in diagnosing disorders and move from lab to clinic model driving the market for devices

Real Time Monitoring

- Increased usage of devices for continuous monitoring and digital therapeutics have led to higher demand levels of wearables
- Predictive care to manage chronically ill patients and reduce overall visits

12K
Software Engineering job openings Across 32 OEMs during 2017

20
Digital CoEs Set-up by OEMs in last 3 years

~11%
Expected CAGR (2017-2022) growth in software sub-segment

*Analysis of top 32 R&D spenders
Note: Analysis is based on the DRAUP's proprietary engineering database, updated in Feb, 2018

Source : DRAUP

R&D Spend Distribution: Diagnostics Devices is the prime spend segment; Explosive adoption of EMR, Point of Care Solutions and Connected devices are the key growth driver

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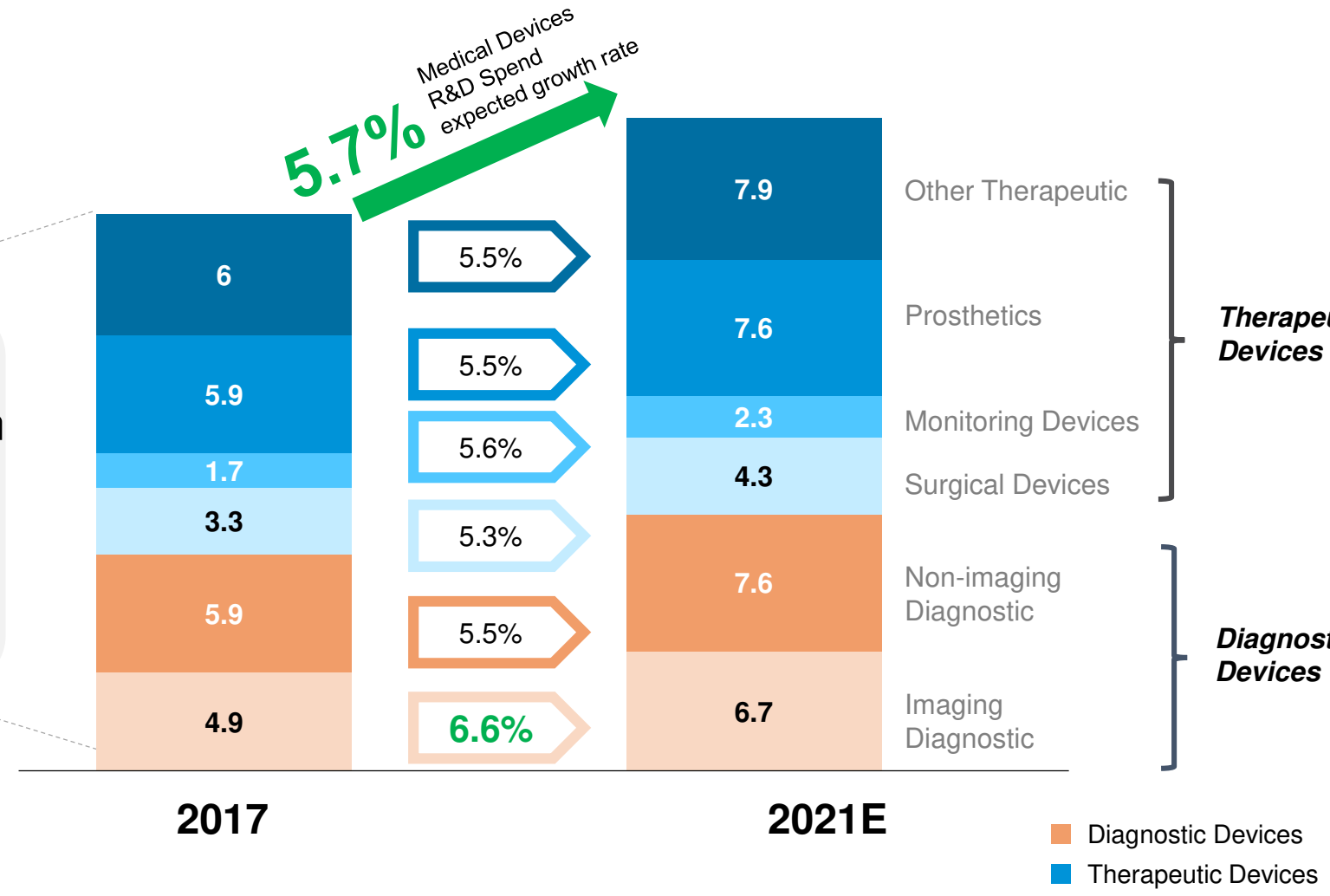
Medical Devices R&D Spend Distribution across Sub-verticals



$24-25Bn

Medical Devices Global R&D Spend

Therapeutic Devices

- Investments in **monitoring devices** is majorly driven by the demand of **connected home care solutions** as a part of value-based care.

Diagnostic Devices

- **60% growth of** global **EMR adoption** since last 5 years
- **Imaging Diagnostics** is **experiencing maximum growth** in R&D spending because of the huge amount of data being generated
- **Point of care solution** in non-imaging diagnostic is the major driving force for growth in this segments.

Note: Analysis is based on the DRAUP's proprietary engineering database, updated in Feb, 2018

Source : DRAUP

Consolidated R&D talent footprint : Medical OEMs lag in Globalisation of R&D, largely restricted by regulatory challenges, proximity to markets and low R&D budgets (1/2)

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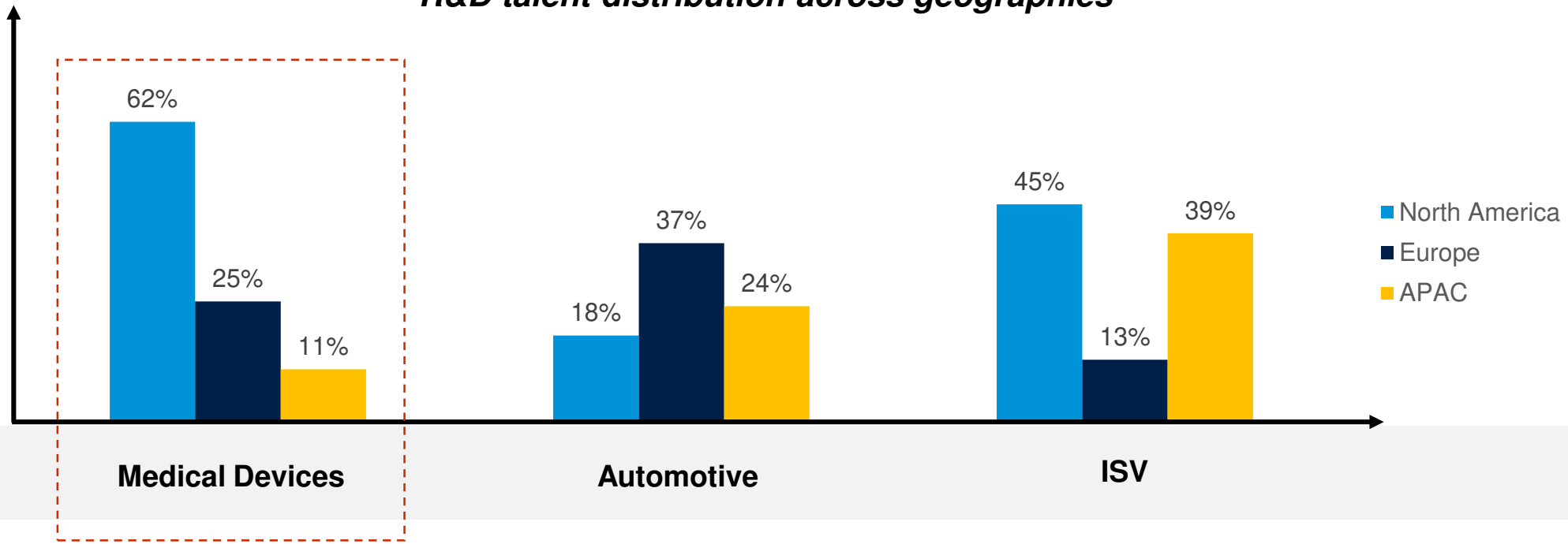
R&D talent distribution across geographies



Reason for consolidation

- Consolidated to the US due to proximity to market

Reason for globalisation

- US Market has matured
- Localisation in emerging markets
- Leveraging Global software talent hotspots like India & China
- Scalability of software products is easier

Note: Analysis is based on the DRAUP's proprietary engineering database, updated in Feb, 2018

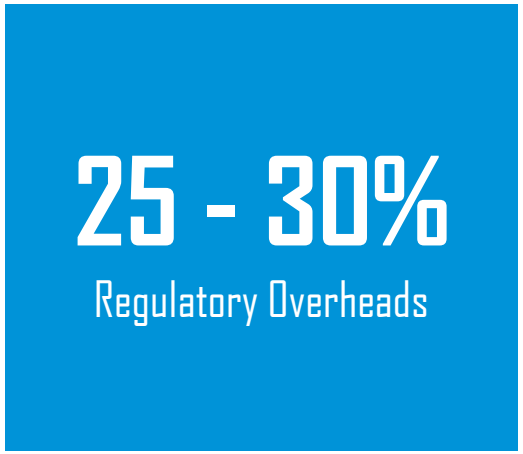
Source : DRAUP

Why are Medical Devices companies apprehensive about globalisation?

Proximity to market

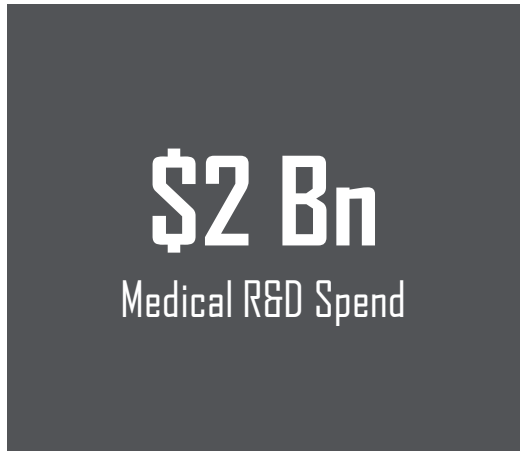
United States is still a major market for Medical Devices companies, taking up **over ~45% of the market share**. And these companies prefer being close to their customer and market.

Regulation and Compliance



The FDA regulations for USA are quite stringent and companies have to **pay around 25 – 30% regulatory overheads** of the total cost to take the product to the market. Having already invested heavily in the US market, companies are apprehensive to shifting to new locations.

Low R&D Budget



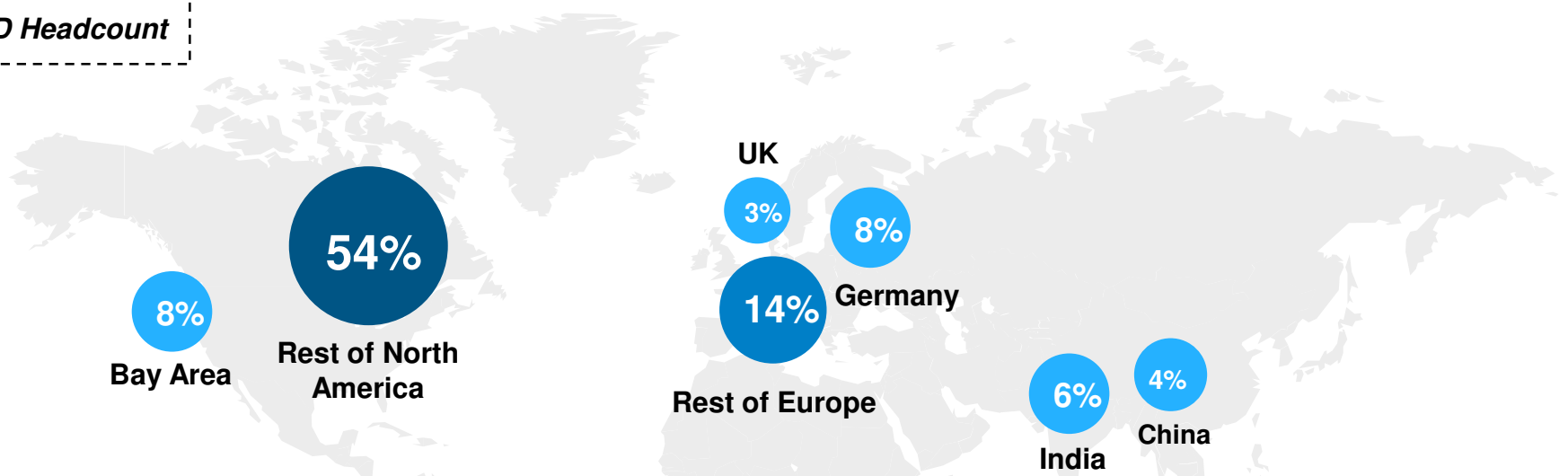
Companies in Medical Devices have low R&D budgets. Medical Devices companies have a **median R&D spend of around $2Bn** whereas companies in the automotive and hi tech sectors have a median R&D spend of around $5Bn

Source : DRAUP

Consolidated R&D talent footprint : Nearly ~90% of the global engineering headcount is consolidated in North America and Europe

76k – 77k
R&D Headcount

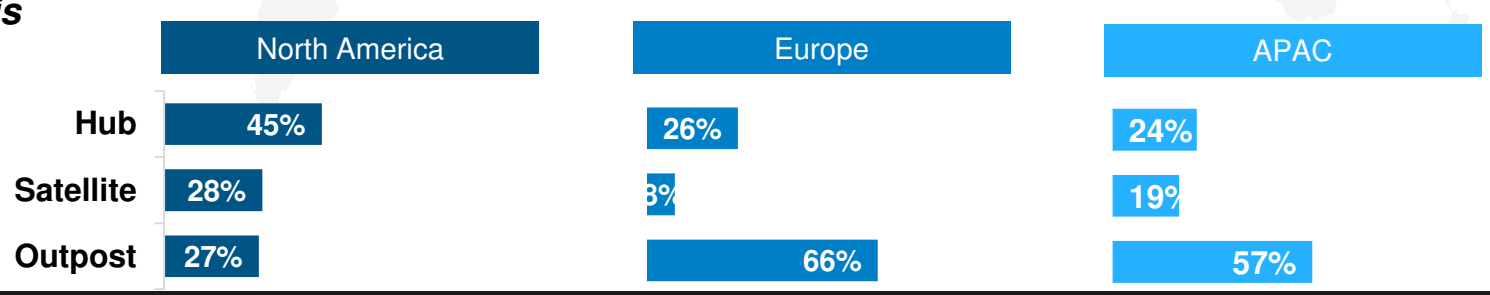
Medical Devices R&D Footprint



Top Players

Medtronic, ThermoFisher SCIENTIFIC, Roche, ThermoFisher SCIENTIFIC, PHILIPS Healthcare, GE Healthcare, GE Healthcare, SIEMENS Healthineers

Hub Spoke Analysis



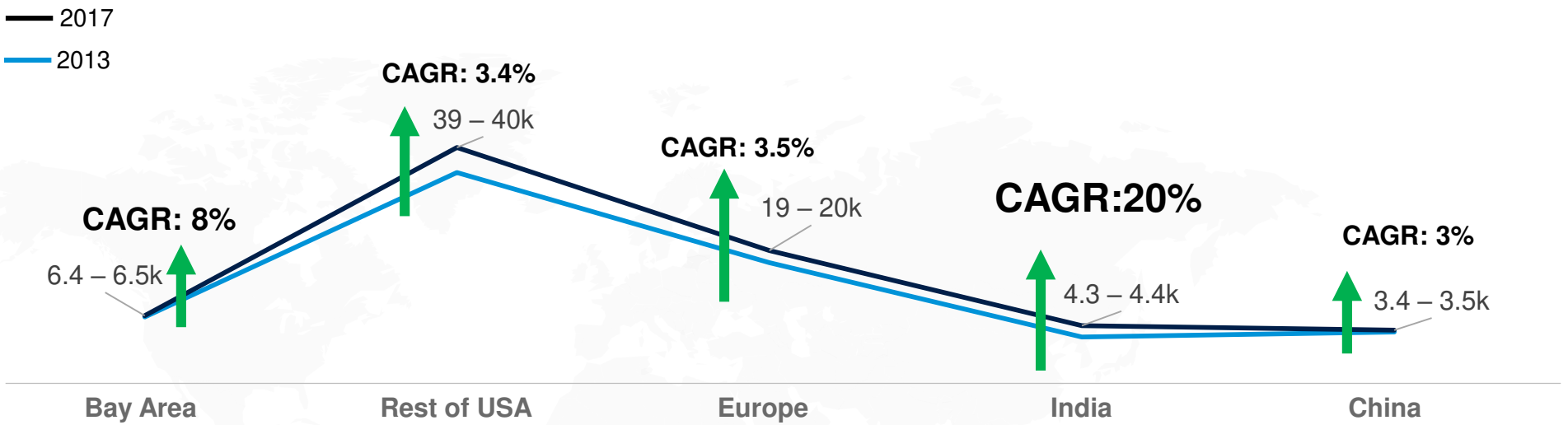
- Medical Devices R&D is consolidated in the United States and is not very globalised
- Medical Devices OEMs are not leveraging low-cost talent hotspots like India and China
- Most of the hubs are located in North America, indicating that the decision making is still governed from the US

Note: Analysis is based on the DRAUP's proprietary engineering database, updated in Feb, 2018

Source : DRAUP

Expanding R&D talent footprint : Over past 3 years, OEMs have started expanding R&D globally, especially setting up centers in India and Bay Area

Global Medical R&D center distribution and growth



- **Tech Giants** are building software centric solutions out of bay area and have developed a rich Med Device ecosystem.
- **Thermo fischer** and **GE Healthcare** have opened software COEs in Bay Area.

- UK has seen a rise in the Medical Device talent in the last three years.

- **GICs in India** are getting empowered and engaging in strategic partnerships with Service Providers.
- **Bangalore** and **NCR** are two major hotspots in India for MD investment.

- **Fresenius, Medtronic and Thermo Fischer** have opened multiple R&D centers in China since 2009.
- **Suzhou** and **Shanghai** are two major hotspots in China.

- Medical Devices R&D investment in India and China has been growing at tremendous rates of 63% and 57% respectively
- MD companies are leveraging these locations to develop **imaging and non-imaging diagnostic** solutions

Note: Analysis is based on the DRAUP's proprietary engineering database, updated in Feb, 2018

Source : DRAUP