

The Role of Emerging Economies in the Global Medical Device and Equipment Markets

Perspective from Boston Analytics

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The term ‘emerging markets’ is associated with progress, growth, and opportunity

*“Racking my brain, at last I came up with a term that sounded more positive and invigorating: **emerging markets**. ‘Third world’ suggested stagnation; ‘emerging markets’ suggested progress, uplift and dynamism.”, Antoine van Agtmael ^{(A),(1)}*

Definition of Emerging Markets

Emerging markets are nations with social or business activity in the process of rapid growth and industrialization. Emerging markets are countries that are restructuring their economies along market-oriented lines and offer a wealth of opportunities in trade, technology transfers, and foreign direct investment

Characteristics of Emerging Markets⁽²⁾

- High economic growth
- Large population base
- Transitional societies that are undertaking domestic economic and political reforms
- Regional economic powerhouses

Note:

(A) Antoine van Agtmael coined the term ‘Emerging Markets’ in 1981 while launching “Third-World Equity Fund” to invest in developing-countries.

Source:

(1) Ins and outs, Acronyms BRIC out all over, September 18, 2008, Economist.

(2) What Are Emerging Markets?, Chuan Li, University of Iowa.

In practice, the definition of emerging economies differs according to the source

List of Emerging Economies

| FTSE | MSCI | Economist | S&P | Dow Jones | |
|----------------|----------------|----------------|----------------|----------------|--------------|
| Brazil | Brazil | Brazil | Brazil | Argentina | Philippines |
| Chile | Chile | Chile | Chile | Bahrain | Poland |
| China | China | China | China | Brazil | Qatar |
| Colombia | Colombia | Colombia | Czech Republic | Bulgaria | Romania |
| Czech Republic | Czech Republic | Czech Republic | Egypt | Chile | Russia |
| Egypt | Egypt | Egypt | Hungary | China | Slovakia |
| Hungary | Hungary | Hong Kong | India | Colombia | South Africa |
| India | India | Hungary | Indonesia | Czech Republic | Sri Lanka |
| Indonesia | Indonesia | India | Malaysia | Egypt | Thailand |
| Malaysia | Malaysia | Indonesia | Mexico | Estonia | Turkey |
| Mexico | Mexico | Malaysia | Morocco | Hungary | UAE |
| Morocco | Morocco | Mexico | Peru | India | |
| Pakistan | Peru | Morocco | Philippines | Indonesia | |
| Peru | Philippines | Peru | Poland | Jordan | |
| Philippines | Poland | Philippines | Russia | Kuwait | |
| Poland | Russia | Poland | South Africa | Latvia | |
| Russia | South Africa | Russia | Taiwan | Lithuania | |
| South Africa | South Korea | Saudi Arabia | Thailand | Malaysia | |
| Taiwan | Taiwan | Singapore | Turkey | Mauritius | |
| Thailand | Thailand | South Africa | | Mexico | |
| Turkey | Turkey | South Korea | | Morocco | |
| UAE | | Taiwan | | Oman | |
| | | Thailand | | Pakistan | |
| | | Turkey | | Peru | |

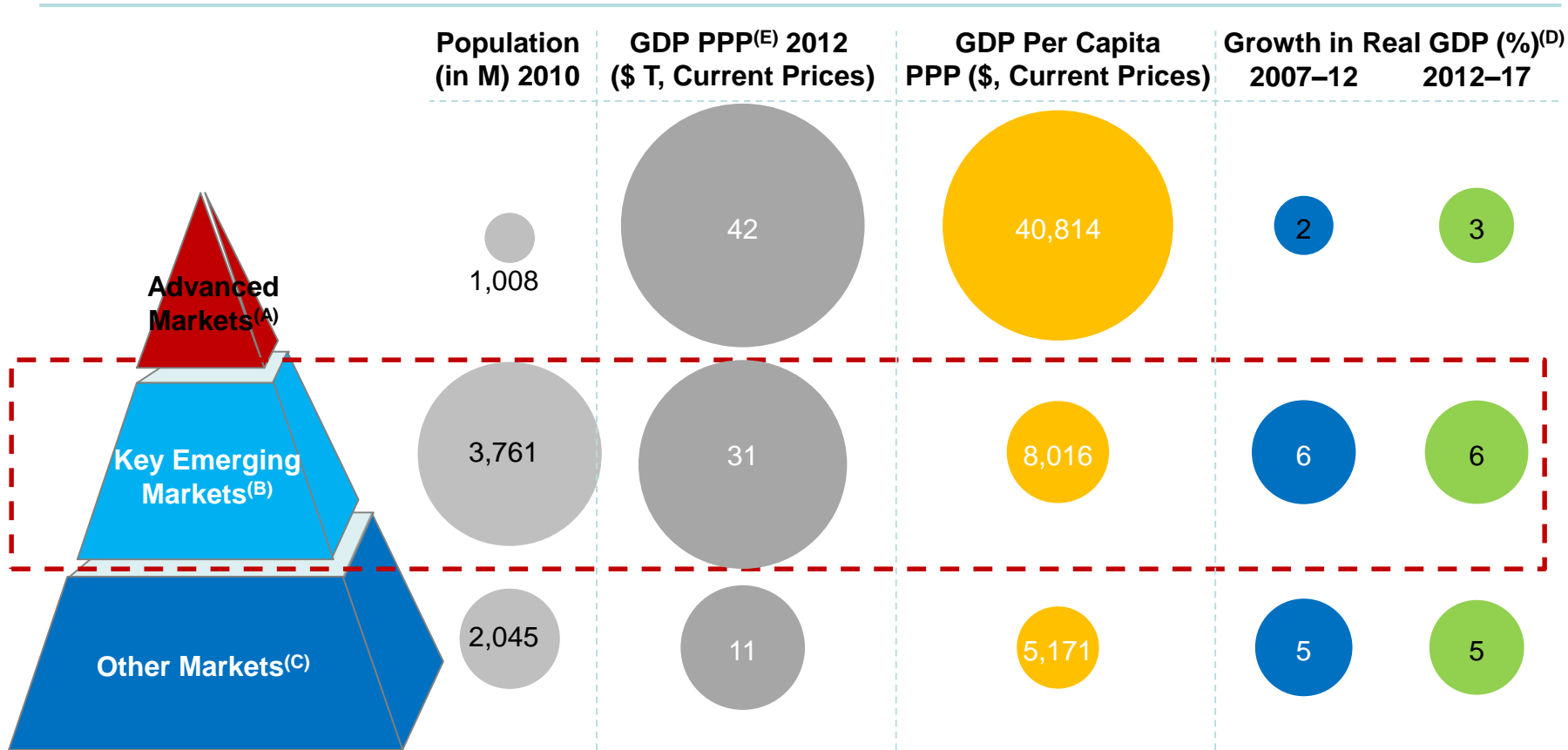
Emerging economies which are common across the sources have been shortlisted as “Key Emerging Economies” for the purpose of this study

| Common Key Emerging Economies |
|-------------------------------|
| Brazil |
| Chile |
| China |
| Czech Republic |
| Egypt |
| Hungary |
| India |
| Indonesia |
| Malaysia |
| Mexico |
| Morocco |
| Peru |
| Philippines |
| Poland |
| Russia |
| South Africa |
| Thailand |
| Turkey |

BRIC Economies

Emerging economies or markets are growing economic powerhouses with a large consumer base who currently represent very little in GDP per capita

Demographic Dynamics of Different Countries



- Notes:
- (A) Includes 34 countries out of 35 countries listed as 'Advanced' (excluding Czech Republic) as per IMF based on multiple parameters such as per-capita income level, export diversification, degree of integration into the global financial system, human development index , etc. It includes the USA and Canada in North America, most nations in Western Europe, Japan, Australia, New Zealand, etc.
 - (B) Set of 18 countries common across the lists of Emerging Markets identified as Key Emerging Markets in previous slide
 - (C) 137 countries including other emerging markets and the rest of the world
 - (D) Real GDP in local currency
 - (E) PPP = Purchasing Power Parity

Source:
 (1) IMF World Economic Outlook Database, October 2013

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Emerging markets typically represent three opportunities for medical device and equipment manufacturers



Source:
(1) BA Knowledge Repository.

In order to pursue these opportunities, a set of fundamental questions must be answered however



Key Questions:

1. What are the specific local market opportunities?
2. What is the future demand for medical devices and equipment versus today?
3. What are the demand drivers and how volatile are they?
4. What are the key challenges?

Key Questions:

1. What % of the top players' manufacturing bases are in emerging markets?
2. In which countries and why?
3. What are the key drivers shaping the continued move to manufacturing in emerging countries?
4. What trends exist, if any?

Key Questions:

1. Which companies have established R&D centers in emerging markets and why?
2. What are the benefits?
3. What are the key drivers of an increased focus on R&D in emerging markets?
4. What trends exist, if any?

Source:
(1) BA Knowledge Repository.

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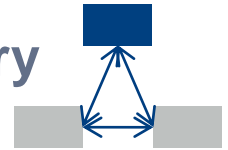
Case Study: Philips India

Case Study: GE Healthcare India

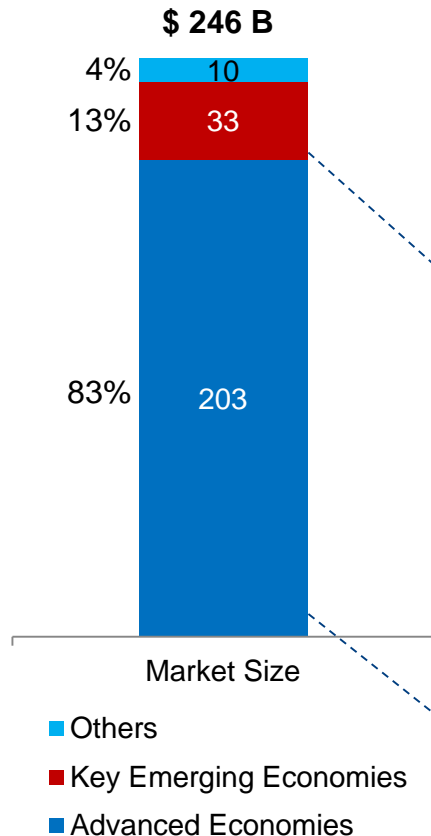
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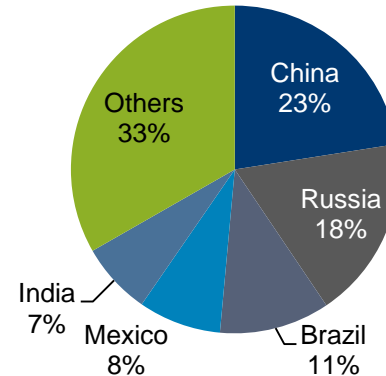
The share of the global medical device and equipment industry which resides in key emerging markets is currently small



Global Medical Devices and Equipment Market in 2010⁽¹⁾

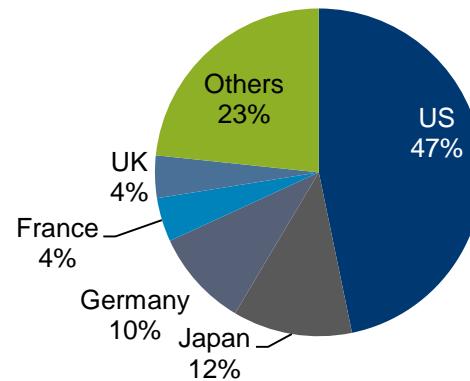


Share of Countries in Global Medical Devices and Equipment Market (2010)⁽¹⁾



BRIC countries together constitute 59% of the total market in key emerging economies

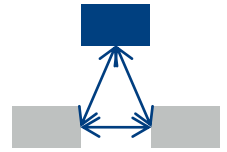
100% = \$ 33 B



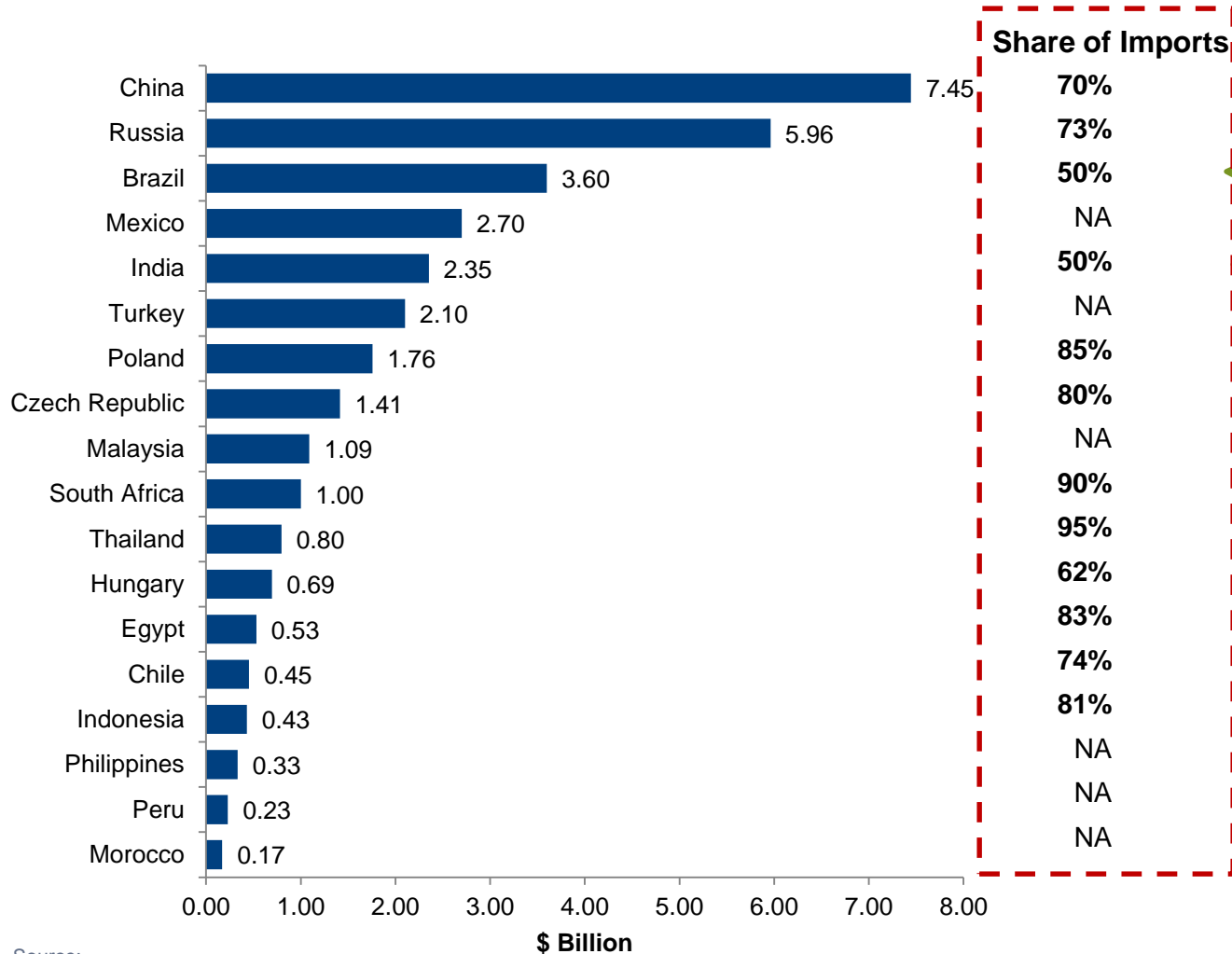
100% = \$ 203 B

Source:
 (1) Medical Devices Market Analysis, 2010, Espicom Business Intelligence.

A significant portion of the demand is currently met through imports as opposed to local production



Medical Devices and Equipment Market and Share of Imports in Key Emerging Economies (2010)



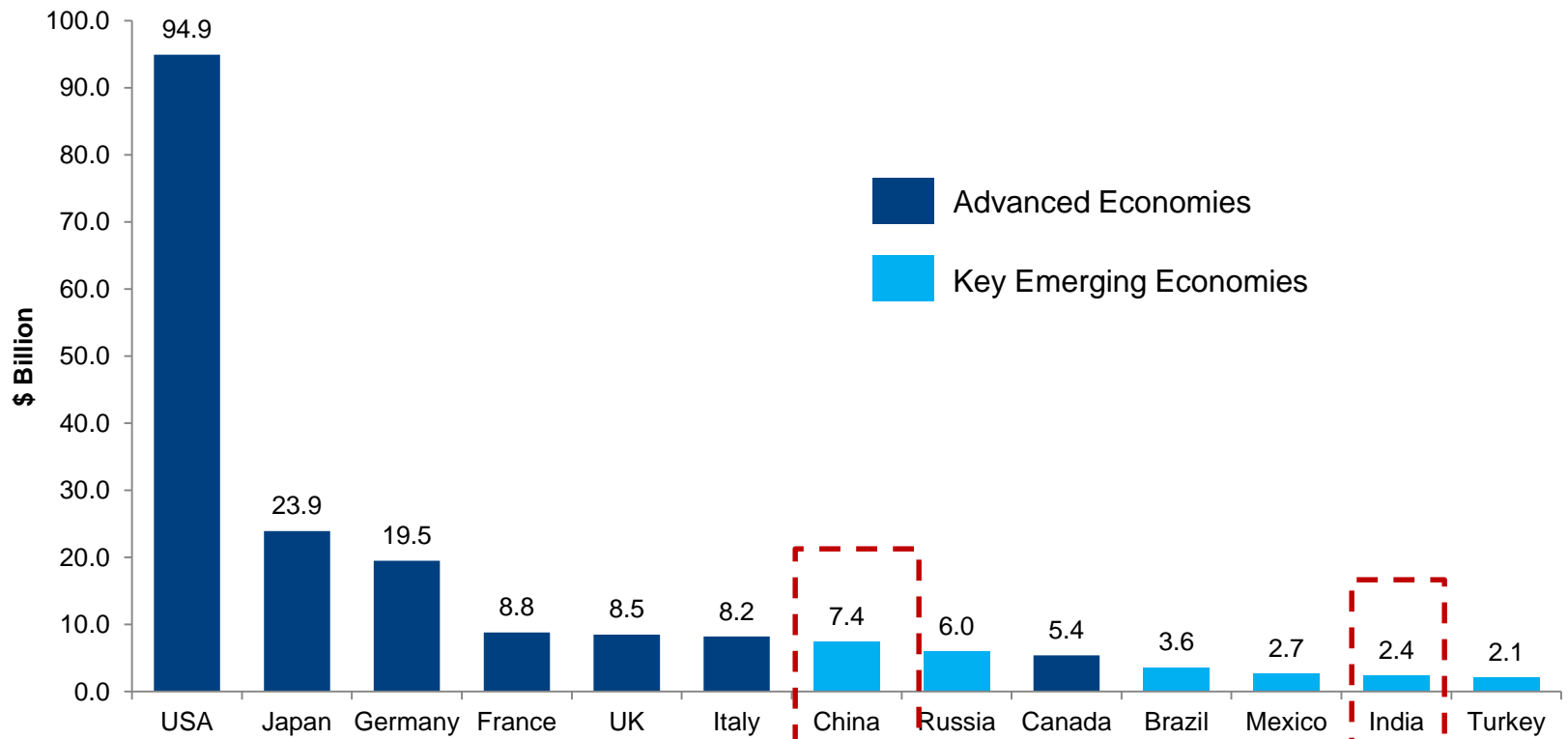
While Multinationals are serving the majority of the demand, they face strong competition in some of these countries

Source:
(1) Espicom Business Intelligence.

Compared to advanced economies, the market is considerably under penetrated when per capita spend is considered



Medical Devices and Equipment Market by Country (2010)⁽¹⁾



| | | | | | | | | | | | | | |
|--|-----|-----|-----|-----|-----|-----|-------|-----|-----|-----|-----|-------|----|
| Population 2010 (M)⁽²⁾ | 310 | 127 | 82 | 63 | 62 | 60 | 1,341 | 140 | 34 | 193 | 109 | 1,216 | 71 |
| Per Capita Market (\$) | 306 | 188 | 239 | 140 | 137 | 136 | 6 | 42 | 158 | 19 | 25 | 2 | 29 |

Source:

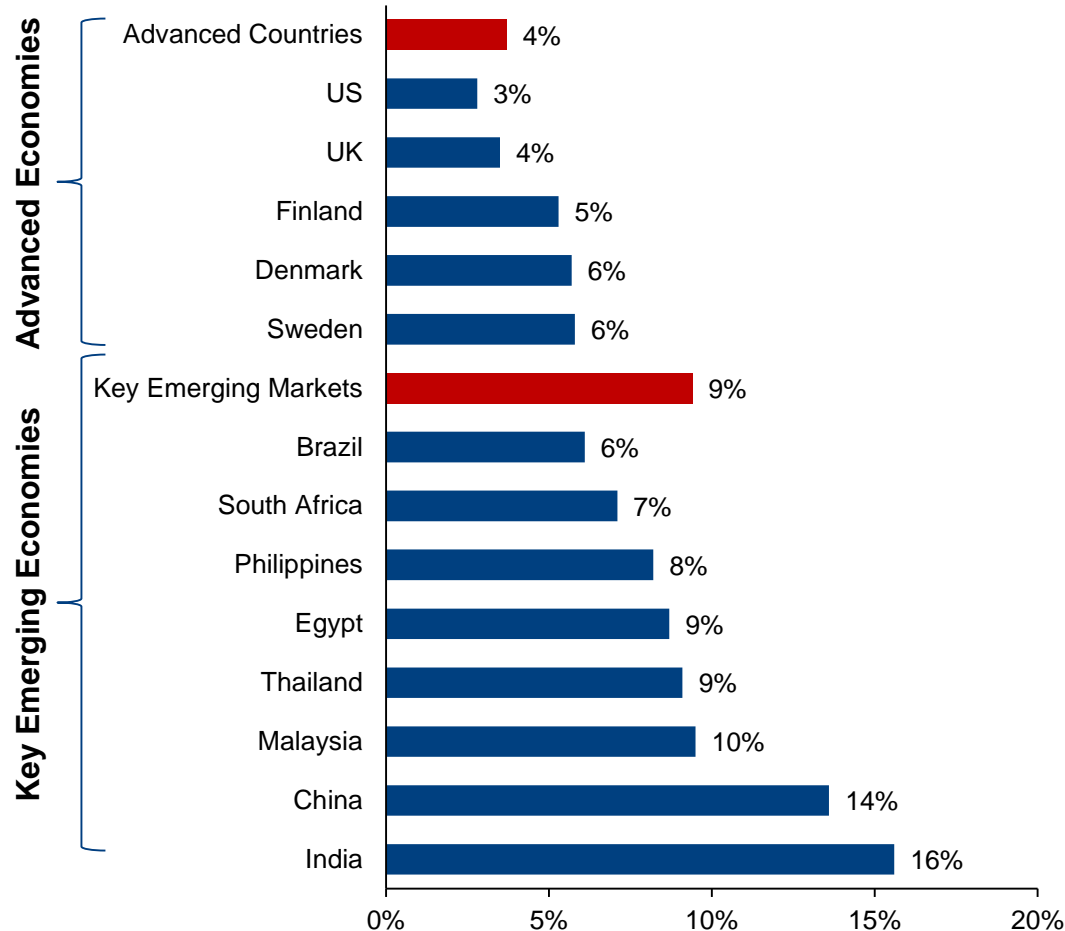
(1) Espicom Business Intelligence.

(2) IMF World Economic Outlook Database, 2010.

Although small in size, the market in key emerging economies is expected to grow faster than advanced economies



YoY Growth in Medical Devices and Equipment Market by Countries (2010–2015)⁽¹⁾



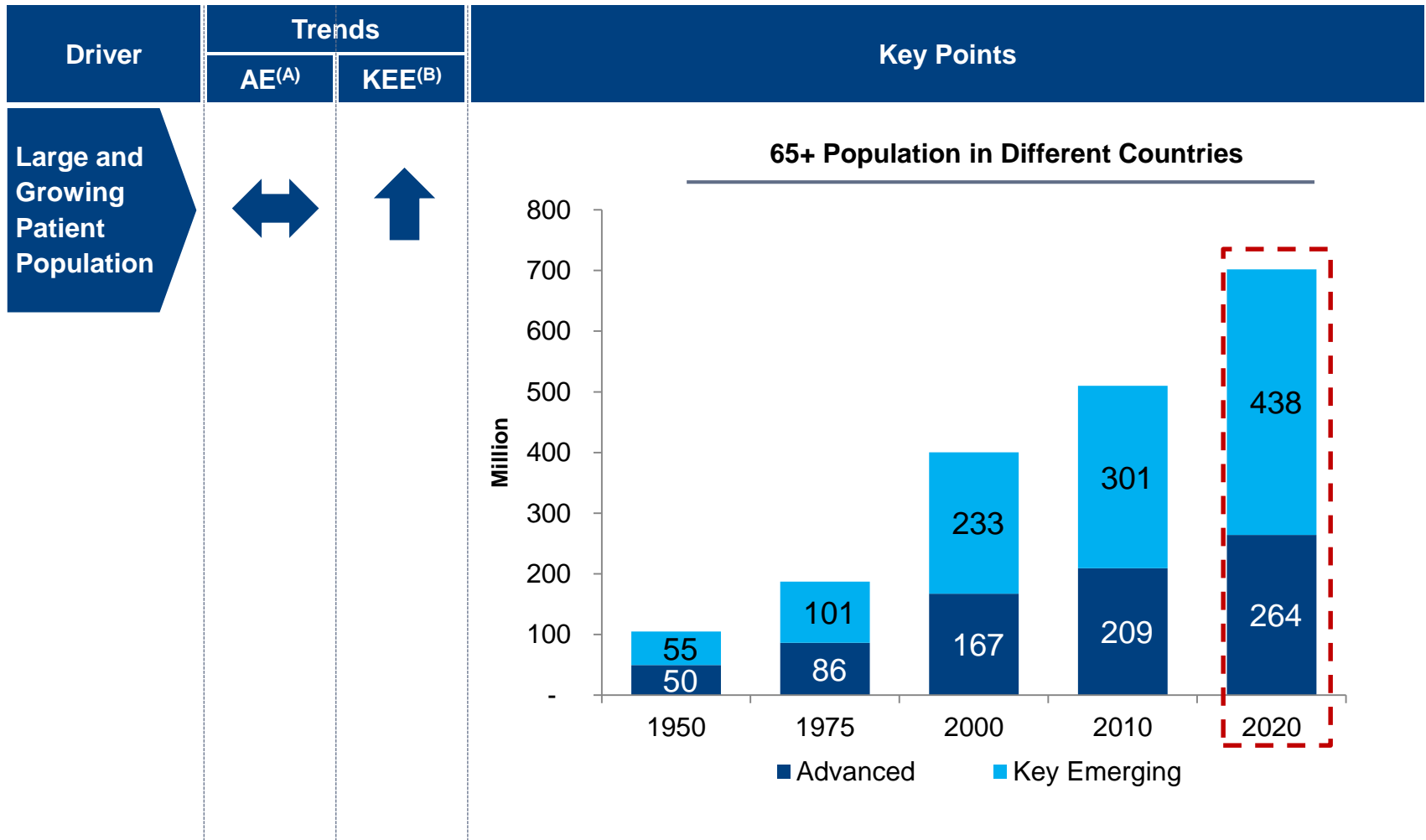
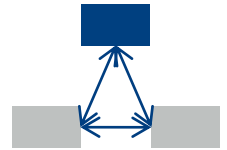
Key Points

The growing demand is driven by:

1. Large and growing patient population
2. Increasing investment in healthcare infrastructure
3. Increase in healthcare insurance penetration

Source:
(1) Espicom Business Intelligence.

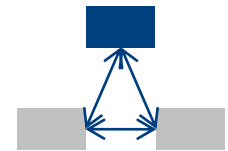
Large and growing patient population



Note:
 (A) AE = Advanced Economies.
 (B) KEE = Key Emerging Economies.

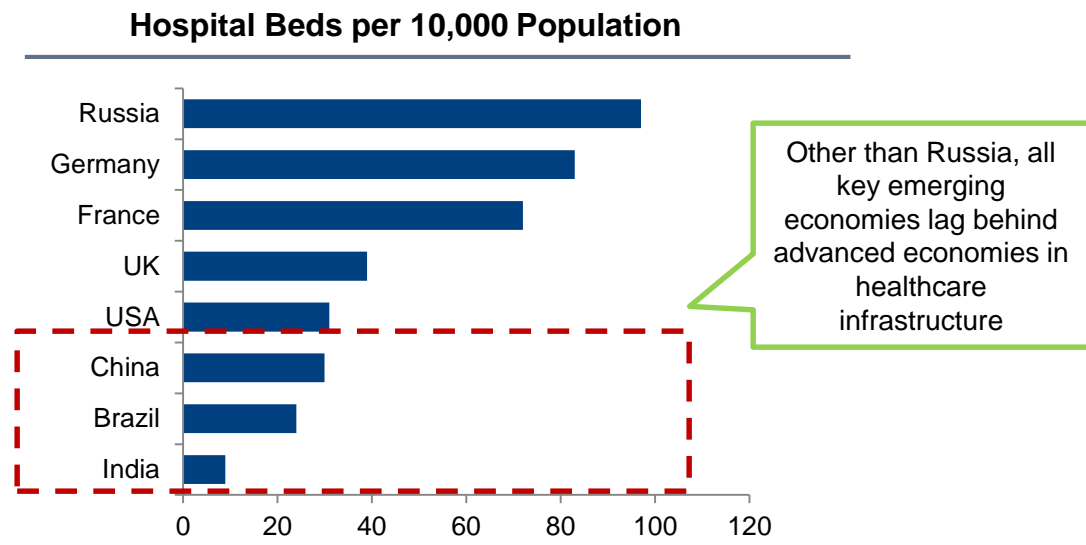
Source:
 (1) IMF World Economic Outlook Database, 2010.
 (2) World Health Statistics 2010, WHO.

Increasing investment in healthcare infrastructure



| Driver | Trends | | Key Points |
|--------|-------------------|--------------------|------------|
| | AE ^(A) | KEE ^(B) | |

Investment in Infrastructure

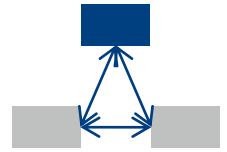


- Given the low penetration of healthcare services and poor delivery infrastructure, emerging economies are witnessing significant investments in infrastructure
- The government in China has committed heavily to the construction of thousands of hospitals, healthcare centres, clinics
- India is witnessing significant increase in investment in hospital construction driven primarily by private sector
- Under its National Health Insurance (NHI) scheme, South African government is promoting public-private partnerships to develop and upgrade hospitals

Note:
 (A) AE = Advanced Economies.
 (B) KEE = Key Emerging Economies

Source:
 (1) World Health Statistics 2010, WHO.

Increase in healthcare insurance penetration



| Driver | Trends | | Key Points |
|--------|-------------------|--------------------|------------|
| | AE ^(A) | KEE ^(B) | |

Increase in Healthcare Insurance Penetration



Share of Private Insurance within total Private Healthcare Expenditures

| Country | 2000 | 2007 | Growth in Share |
|---------|-------|-------|-----------------|
| Brazil | 33.9% | 39.4% | 2.2% |
| China | 1.0% | 7.1% | 32.3% |
| France | 61.6% | 63.9% | 0.5% |
| Germany | 40.8% | 40.1% | (0.2%) |
| India | 1.0% | 2.1% | 11.2% |
| Japan | 1.7% | 13.7% | 34.7% |
| Russia | 8.1% | 9.6% | 2.5% |
| UK | 15.6% | 6.9% | (11.0%) |
| USA | 60.3% | 63.5% | 0.7% |

- Rising cost of healthcare and increased number of private payors has increased healthcare insurance in emerging markets

Note:

- (A) AE = Advanced Economies.
- (B) KEE = Key Emerging Economies.

Source:

- (1) World Health Statistics 2010, WHO.

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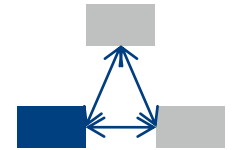
Case Study: Philips India

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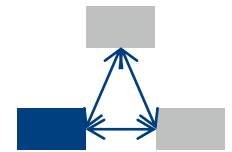
The medical device and equipment market is highly consolidated with 30 players constituting 80% of the global market



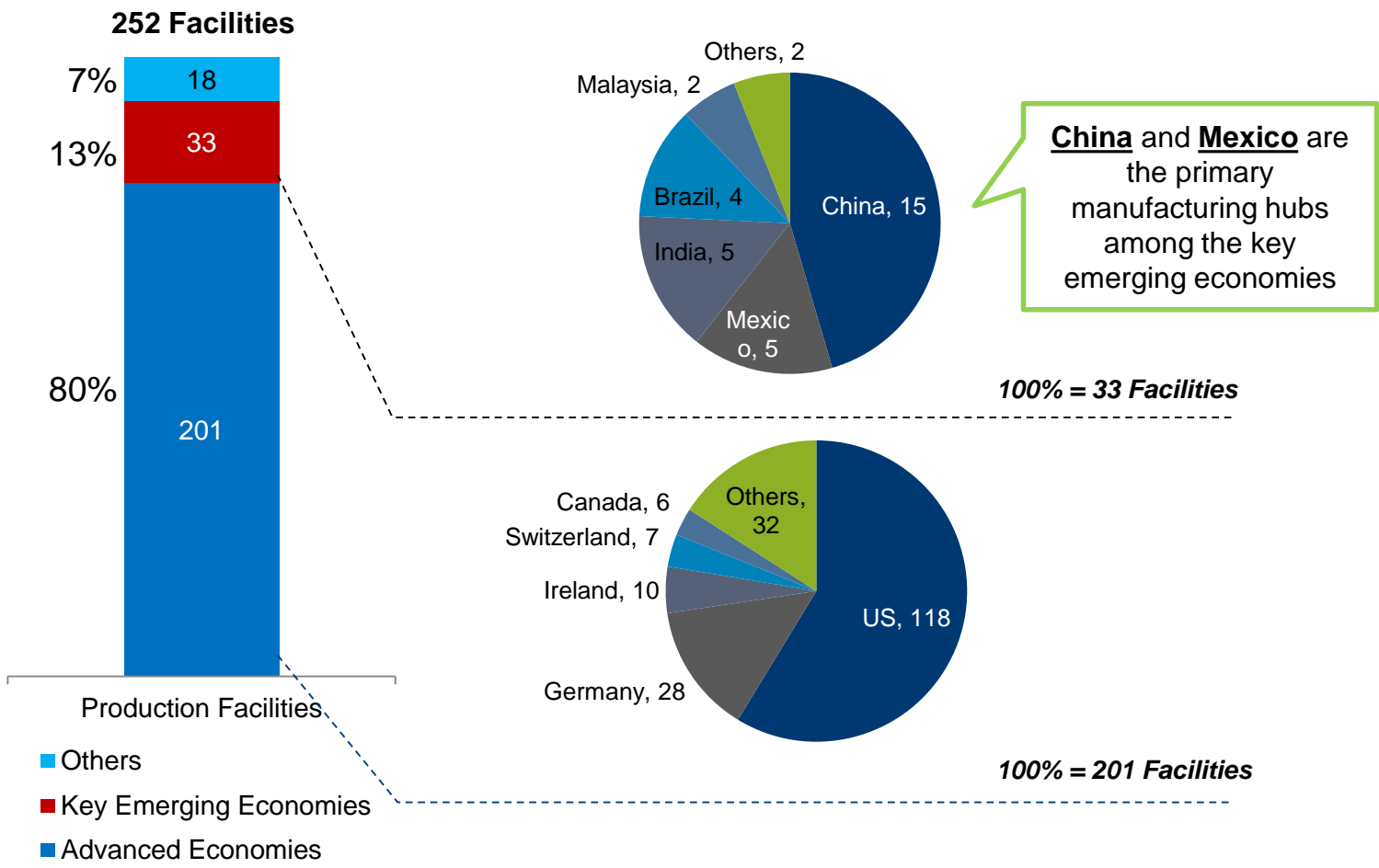
| S.No | Company | Medical Device and Equipment Sales 2009 (\$ B) | Share in Global Market | Cumulative Share |
|------|------------------------|--|------------------------|------------------|
| 1 | Johnson & Johnson | 23.6 | 9.59% | 9.59% |
| 2 | Siemens Healthcare | 17.4 | 7.07% | 16.67% |
| 3 | GE Healthcare | 16.0 | 6.50% | 23.17% |
| 4 | Medtronic | 14.6 | 5.93% | 29.11% |
| 5 | Baxter International | 12.6 | 5.12% | 34.23% |
| 6 | Philips Healthcare | 11.2 | 4.55% | 38.78% |
| 7 | Abbott Laboratories | 8.4 | 3.41% | 42.20% |
| 8 | Boston Scientific | 8.2 | 3.33% | 45.53% |
| 9 | Covidien | 7.8 | 3.17% | 48.70% |
| 10 | Becton Dickinson | 7.2 | 2.93% | 51.63% |
| 11 | Stryker | 6.7 | 2.72% | 54.35% |
| 12 | B. Braun | 5.8 | 2.36% | 56.71% |
| 13 | St. Jude Medical | 4.7 | 1.91% | 58.62% |
| 14 | Cardinal Health | 4.6 | 1.87% | 60.49% |
| 15 | 3M Healthcare | 4.3 | 1.75% | 62.24% |
| 16 | Zimmer | 4.1 | 1.67% | 63.90% |
| 17 | Olympus Medical | 4.0 | 1.63% | 65.53% |
| 18 | Hospira | 3.9 | 1.59% | 67.11% |
| 19 | Smith & Nephew | 3.8 | 1.54% | 68.66% |
| 20 | Toshiba | 3.7 | 1.50% | 70.16% |
| 21 | Synthes | 3.4 | 1.38% | 71.54% |
| 22 | Beckman Coulter | 3.3 | 1.34% | 72.89% |
| 23 | Danaher | 3.1 | 1.26% | 74.15% |
| 24 | Terumo | 3.1 | 1.26% | 75.41% |
| 25 | Alcon | 3.0 | 1.22% | 76.63% |
| 26 | Fresenius Medical | 2.9 | 1.18% | 77.80% |
| 27 | Biomet | 2.5 | 1.02% | 78.82% |
| 28 | CR Bard | 2.5 | 1.02% | 79.84% |
| 29 | Dentsply International | 2.2 | 0.89% | 80.73% |
| 30 | Varian Medical | 2.2 | 0.89% | 81.63% |
| | Others | 45.2 | 18.37% | 100.00% |
| | Total | 246 | 100.00% | |

81.63%

Role of key emerging markets in the manufacturing of key players is limited to a few countries and sites



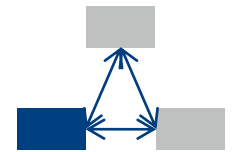
Production Facilities of Global Medical Devices and Equipment Companies



Note:
 (A) Data is for 18 (constituting 46% of the world market) of the top 30 medical devices manufacturers. Please refer to Appendix for details.

Source:
 (1) Websites and Reports of Top Medical Devices and Equipment Manufacturers.
 (2) BA Analysis.

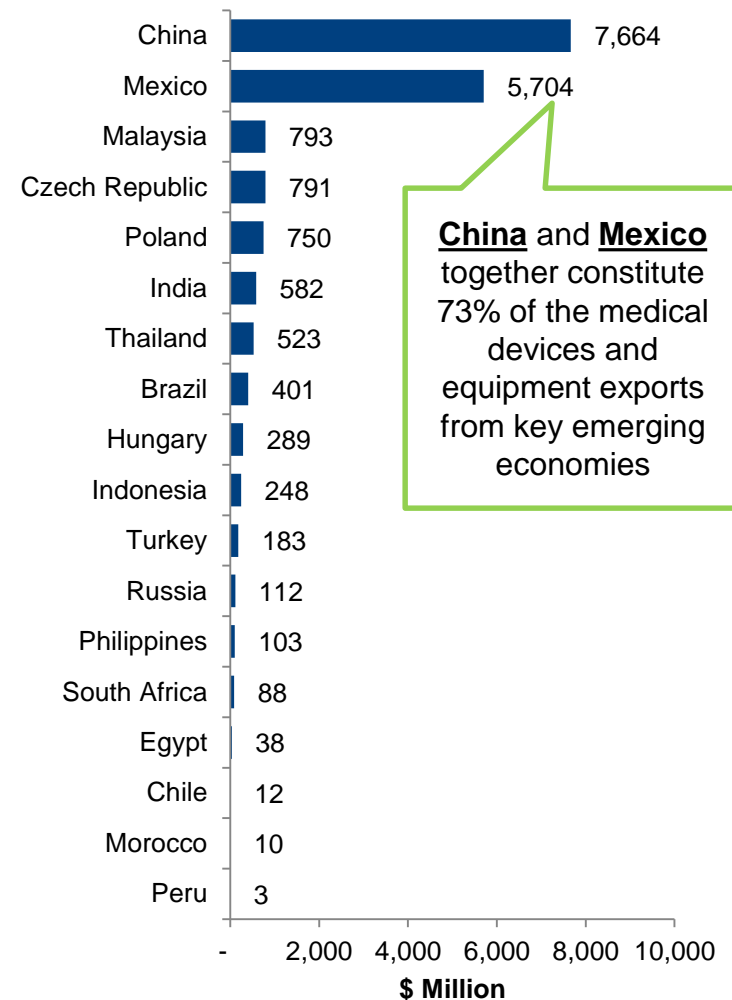
China and Mexico are the only two emerging economies among the top 15 exporters of medical devices



Share of Countries in Global Medical Devices and Equipment Exports (\$ B)

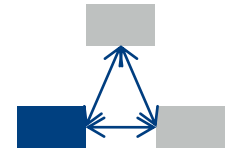
| Country | Type | Total Exports | Share in Global Exports |
|---------------|---------------------|---------------|-------------------------|
| USA | Advanced | 37.01 | 22.99% |
| Germany | Advanced | 21.69 | 13.47% |
| Netherlands | Advanced | 10.86 | 6.74% |
| France | Advanced | 9.10 | 5.65% |
| Switzerland | Advanced | 8.73 | 5.42% |
| Belgium | Advanced | 8.51 | 5.28% |
| Ireland | Advanced | 8.10 | 5.03% |
| China | Key Emerging | 7.66 | 4.76% |
| Japan | Advanced | 6.39 | 3.97% |
| Mexico | Key Emerging | 5.70 | 3.54% |
| UK | Advanced | 5.53 | 3.43% |
| Italy | Advanced | 3.25 | 2.02% |
| Singapore | Advanced | 3.07 | 1.91% |
| Denmark | Advanced | 2.49 | 1.54% |
| Sweden | Advanced | 2.48 | 1.54% |

Exports of Medical Devices and Equipment from Key Emerging Economies

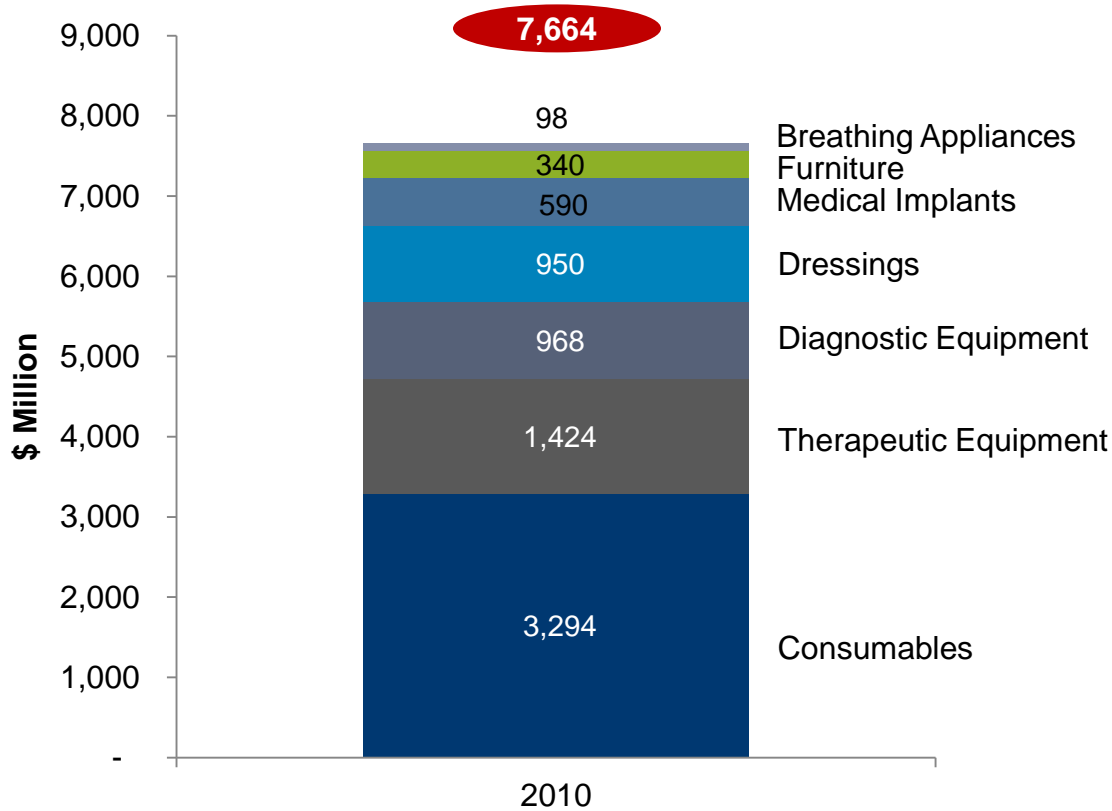


Source:
 (1) Trade by Commodity Statistics 2001-2010, International Trade Centre.

The major share of medical device and equipment exports from China however are low value consumables



Exports of Medical Devices and Equipment from China by Category

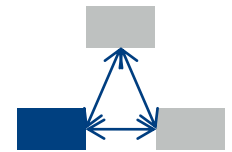


Key Points

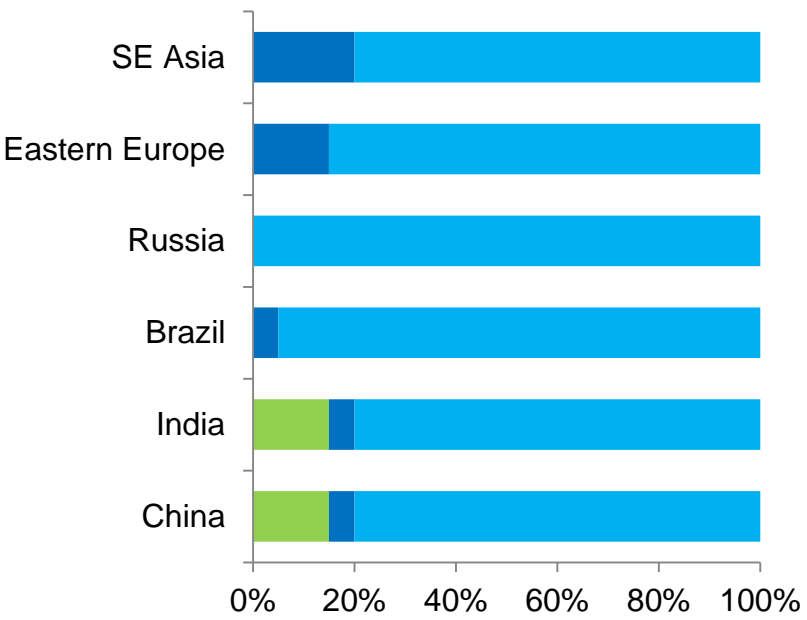
- Nearly 50% of China's exports are consumables
- While foreign players are increasingly establishing facilities in China, the share of high value technology exports is expected to go up in future

Source:
 (1) Trade by Commodity Statistics 2001-2010, International Trade Centre.

Manufacturing models are expected to change, particularly in Brazil, China and India

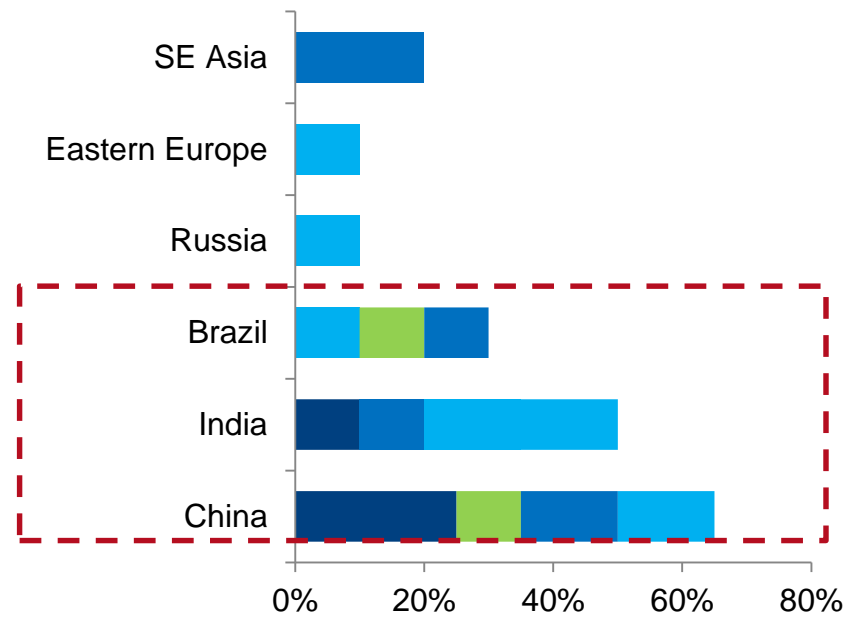


Which option best describes your current manufacturing operations model in each country/region?



- Make in country (region) for sale in country
- Make in country (region) for export
- Make in country (region) for both local sale and export
- No manufacturing presence in country (region)

If you are planning to change models, which manufacturing models are you considering?

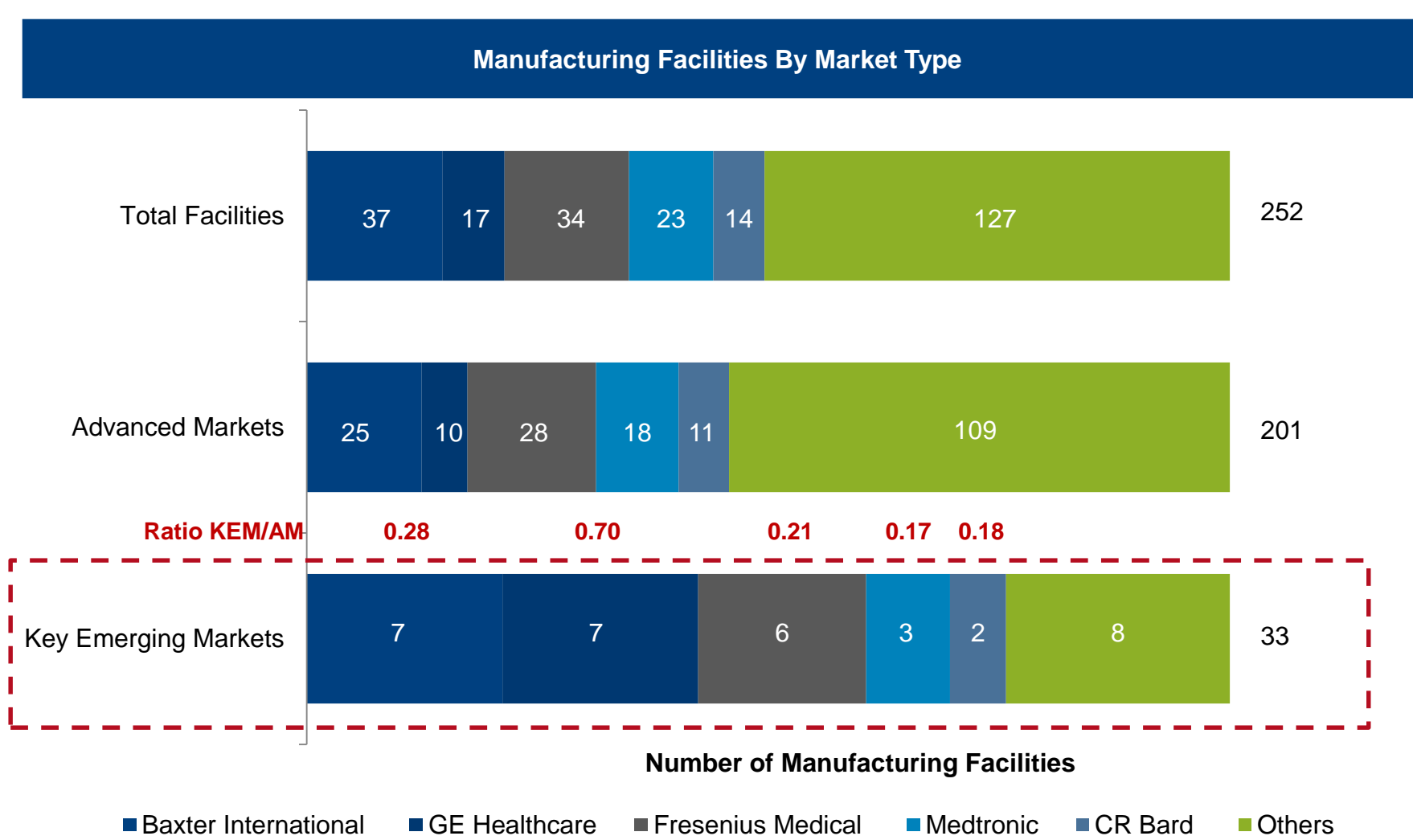
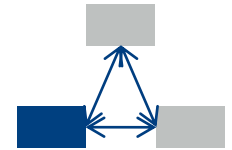


- Make in country (region) for sale in country
- Make in country (region) for export
- Make in country (region) for both local sale and export
- No manufacturing presence in country (region)

Note:
(A) Please refer to Appendix for details.

Source:
(1) PRTM Medical Device Supply Chain Priorities in Emerging Markets Survey, April 2011.

Baxter and GE Healthcare have the largest number of manufacturing facilities in key emerging economies



Note:
 (A) Data is for 18 out of the top 30 medical devices and equipment manufacturers. Please refer to Appendix for details.

Source:
 (1) Websites and Reports of Top Medical Devices and Equipment Manufacturers.
 (2) BA Analysis.

Low cost of manufacturing and access to local markets are the major drivers for manufacturing offshore



| Driver | Details | Imp. | Preferred Destination | | Upcoming/other Destination |
|---------------------------------|--|-------------------------|-----------------------|-------|--|
| | | | Destination | Trend | |
| Proximity to Home Markets | <ul style="list-style-type: none"> Lower delivery costs Reduced working capital (inventory) Shorter time to market Proximity to sources of technical support | Medium (Blue circle) | Mexico | ↑ ↑ | |
| Greater Access to Local Markets | <ul style="list-style-type: none"> Access to local healthcare market in host country | High (Red circle) | China | ↑ ↑ | <ul style="list-style-type: none"> India Brazil |
| Lower Manufacturing Cost | <ul style="list-style-type: none"> Particularly in case of low-tech product manufacturing | High (Red circle) | China | ↑ ↓ | <ul style="list-style-type: none"> Mexico Vietnam India |
| Government Incentives | <ul style="list-style-type: none"> Government subsidies for local manufacturing, e.g., "Made-in-China" subsidies | Low (Light blue circle) | China | ↑ ↑ | |

Cost of manufacturing in China has gone up significantly in the past few years due to rising labor cost, appreciation in Yuan, increase in freight cost

● High
 ● Medium
 ● Low

Source:
(1) BA Analysis.

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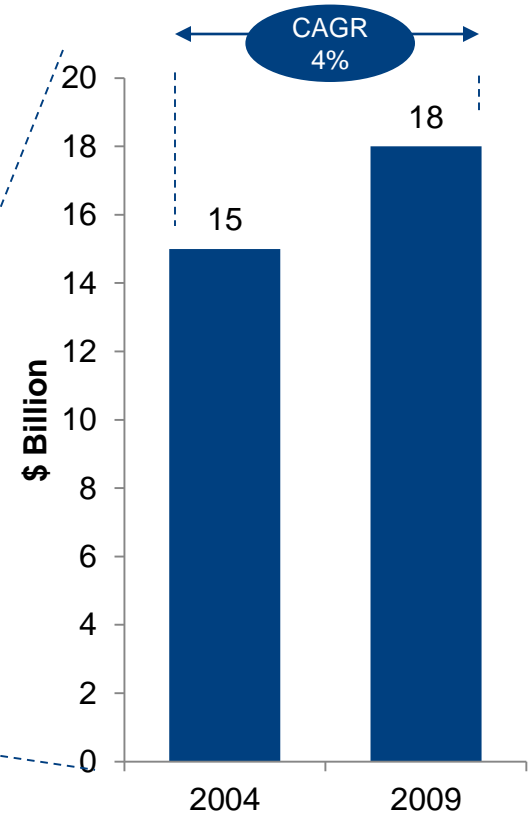
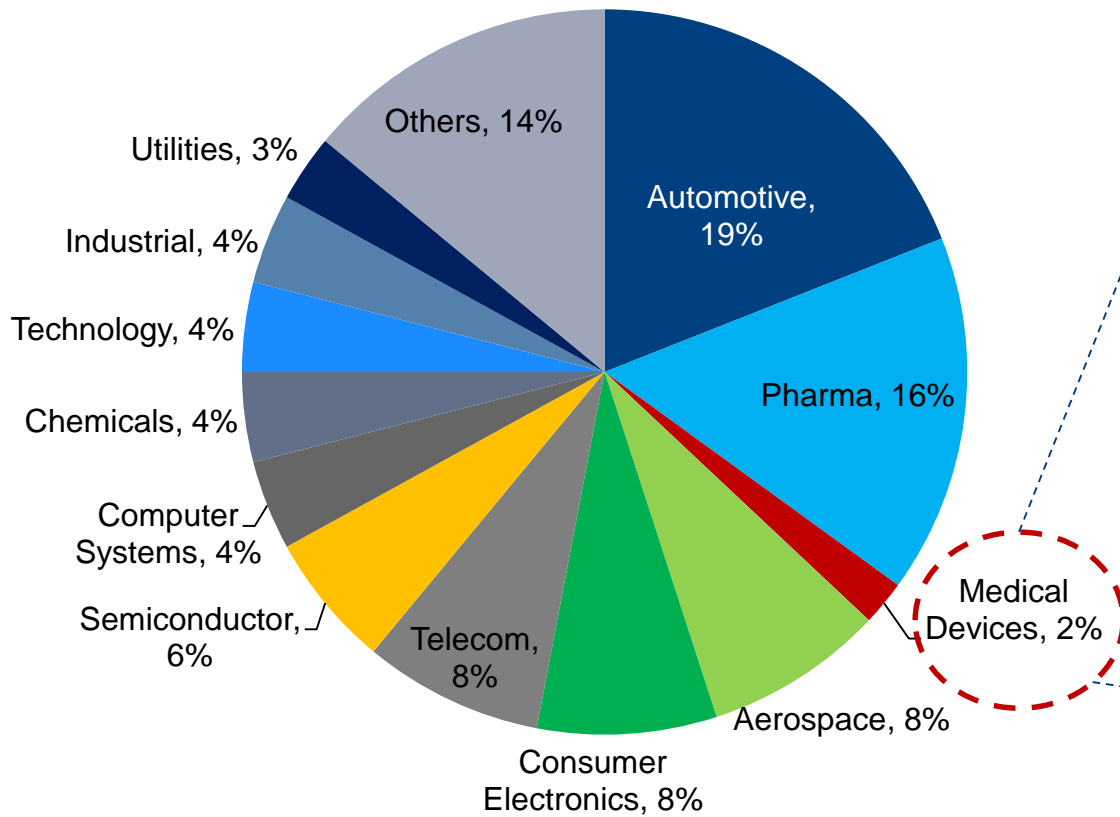
Appendix

Engineering R&D (ER&D) spend in global medical device and equipment industry has grown at a CAGR of 4% in recent years



Engineering Spend by Sector (2004)

Growth in Global Medical Devices and Equipment ER&D (2004–2009)



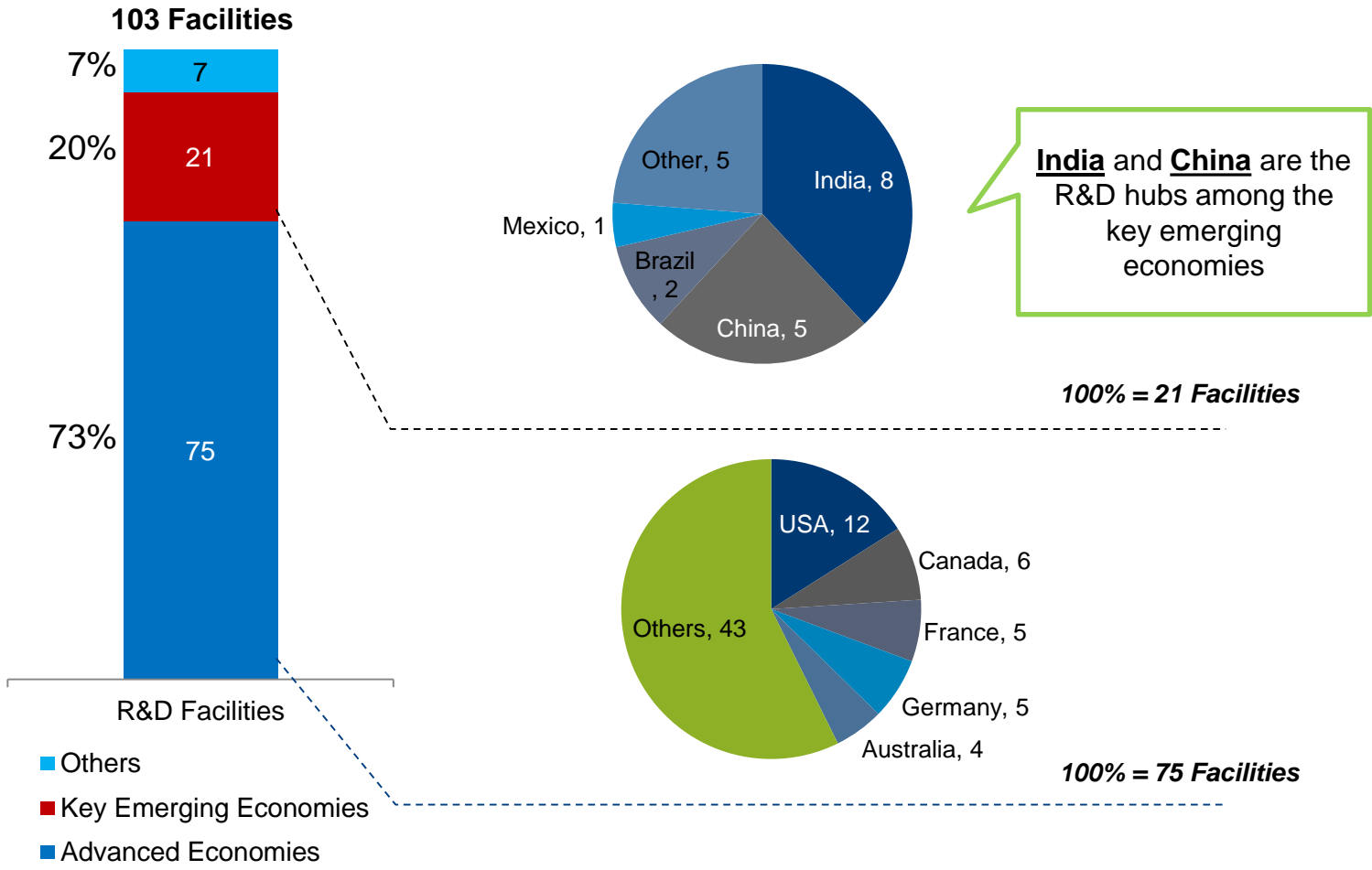
100% = \$ 746 B

Source:
 (1) Nasscom-Booz Allen Hamilton Research on ER&D Offshoring.

Role of key emerging markets in the R&D strategies of key players is also limited to few countries



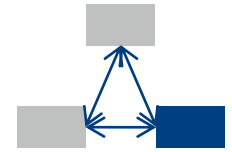
Locations of R&D Facilities of Global Medical Devices Companies



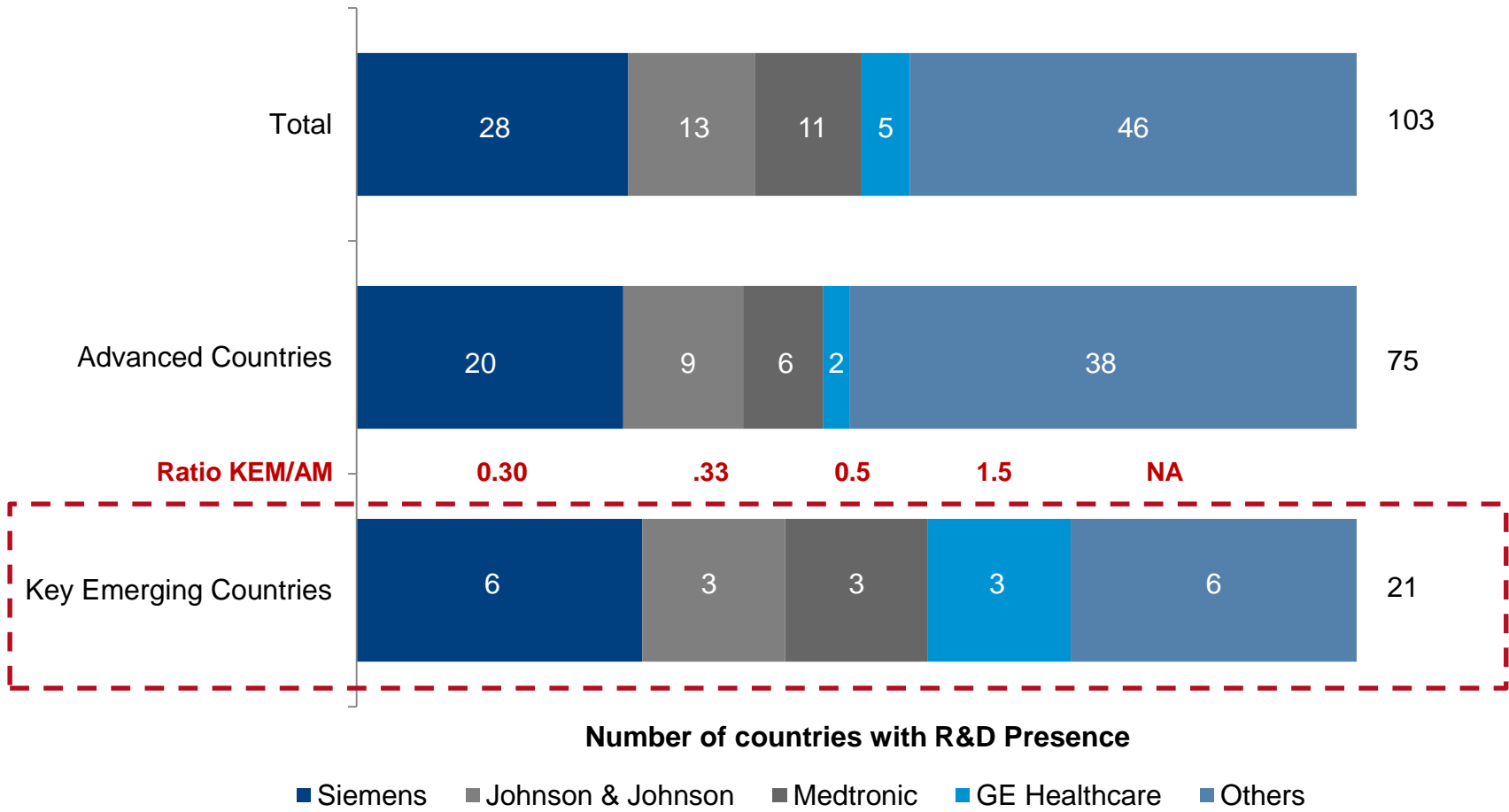
Note:
 (A) Data is for 14 (constituting 57% of the world market) out of the top 30 medical devices and equipment manufacturers. Please refer to Appendix for details.

Source:
 (1) Websites and Reports of Top Medical Devices and Equipment Manufacturers.
 (2) BA Analysis.

Siemens has the greatest number of R&D investments in key emerging markets



Share of Global Medical Devices and Equipment Players in R&D Facilities



Note:

(A) Data is for 14 out of the top 30 medical devices and equipment manufacturers. Please refer to Appendix for details.

Source:

(1) Websites and Reports of Top Medical Devices and Equipment Manufacturers.
 (2) BA Analysis.

Gathering local insights is one of the primary reasons for setting up R&D facilities in developing markets



Key Point

Reason

Reasons Stated by Companies

SIEMENS

PHILIPS
sense and simplicity



Johnson & Johnson

Local insights

Access to local knowledge, innovations, and perspectives which could help foster new ideas for both the local and global markets



Lower cost operations

Opportunity to reduce costs through lower cost operations and lower cost labor force



Faster response time

Proximity to local market as well as manufacturing facilities could help increase response time



Large talent pool

Access to large highly skilled workforces in some countries



Access to research universities

Opportunities to collaborate with local interested universities and sophisticated suppliers of the region



Government incentives

Tax savings and other incentives which encourage the establishment of a local R&D center

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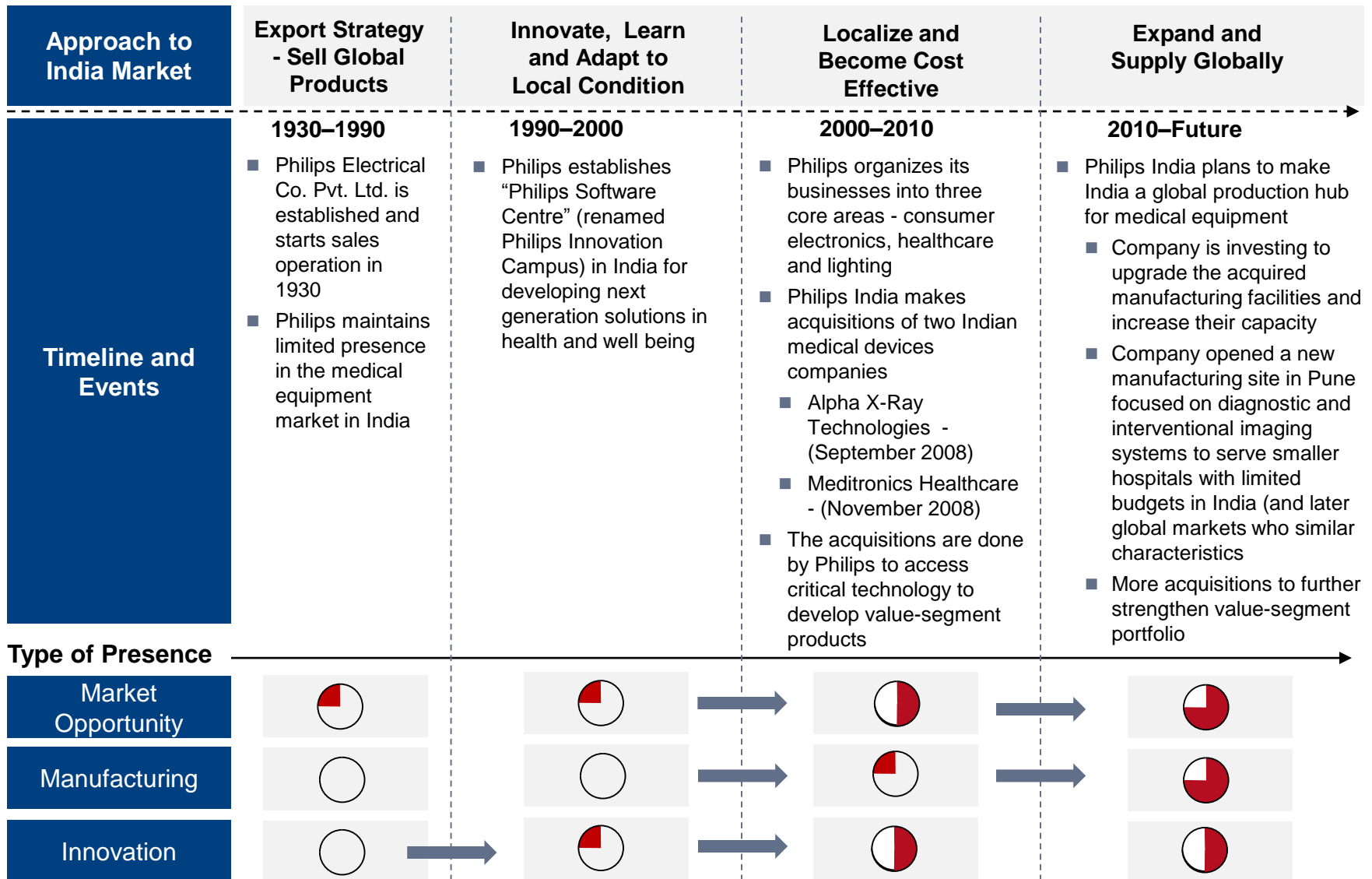
Appendix

Philips' major growth thrust and expansion in the last two decades is an example of growing importance of emerging markets



Source:
(1) BA Knowledge Repository.

Philips started expanding its presence in Indian healthcare market in 1990s while has been present in the market since 1930s

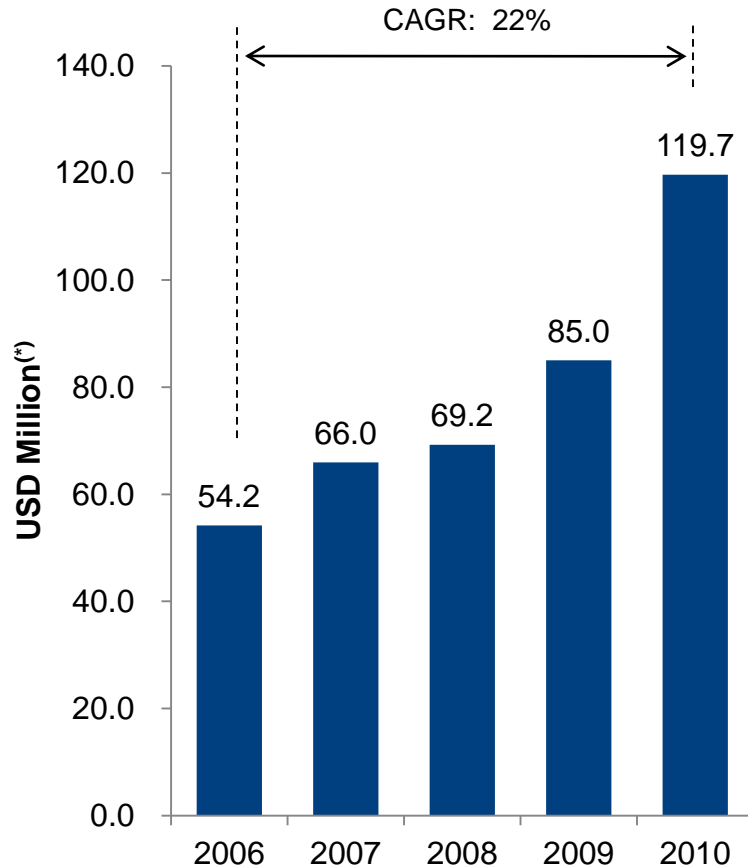


Source:
 (1) Philips Investor Presentations.
 (2) BA Research

Philips India Healthcare has shown rapid growth after acquisition of Alpha X-Ray Technologies and Meditronics



Growth in Philips' India Healthcare Revenues



Key Points

Key Drivers

- Indian economy resilient to the global financial meltdown
- Stronger distribution channels and product portfolio with the acquired companies in Cardiovascular and X-Ray “value” spaces
- Population growth and unmet healthcare needs

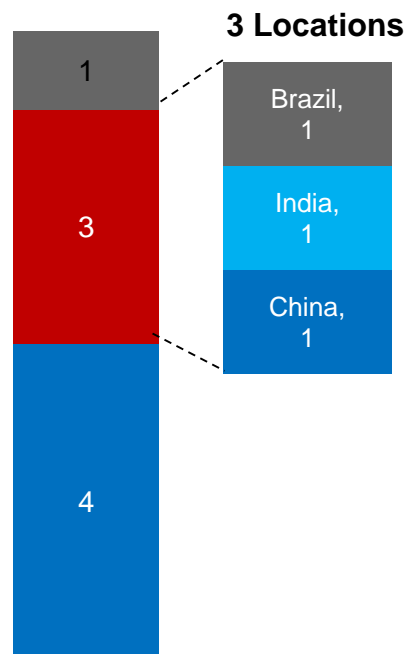
Note: (*) Figures converted from Rupee to USD at rate: 1USD = 51.76 Rupee

Source:
(1) BA Research

Philips is in the process of fully integrating the acquired firms



Production Locations^(A): 8



Production Locations

- Others
- Key Emerging Economies
- Advanced Economies

Note:

(A) Countries.

Source:

(1) BA research

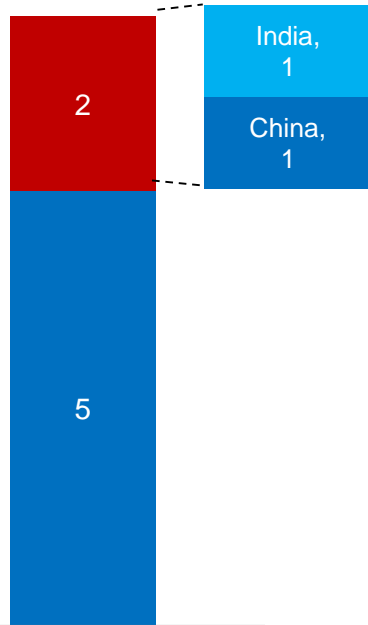
Philips Healthcare Manufacturing Strategy In India

| | Alpha X-Ray Technologies Pvt. Ltd. | Meditronics Healthcare Pvt. Ltd. | Philips Development and Manufacturing Center |
|----------------------|---|---|--|
| Established | 1989 | 1979 | 2012 |
| Acquired | September, 2008 | November, 2008 | Not Applicable |
| Ownership | 100% acquired by Philips India Ltd. | 100% acquired by Philips India Ltd. | 100% by Philips India Ltd. |
| Objective | Clinically-proven economy segment products | | Manufacture value segment products for local and export market |
| Product Manufactured | Cardiovascular and X-ray imaging solutions | Diagnostic and interventional X-ray equipment | Cardiovascular and X-ray equipments |
| Current Focus | Products mainly cater to Indian firms, but has designed its products keeping international market in mind | Meditronics sells products in India and internationally with sales presence in 52 countries | Smaller Indian hospitals at first, then expand to other emerging markets and finally developed nations for entry level diagnostics upgrade |

Significant portion of research efforts at Philips Innovation Centre in India is dedicated to healthcare sector



Total 7 Facilities **2 Facilities**



Research Facilities

- Key Emerging Economies
- Advanced Economies

Philips Innovation Campus - PIC (Initially Philips Software Centre)

| | |
|-----------------------------------|---|
| Established | 1996 |
| Total Strength (2010) | <ul style="list-style-type: none"> ■ 1,198 scientists, researchers, and engineers ■ About 500 professionals dedicated to healthcare |
| Objective | <ul style="list-style-type: none"> ■ Works closely with product development teams to deliver end-to-end solutions that meet the emerging needs in India |
| Key Areas of Research | <ul style="list-style-type: none"> ■ Cardiology: Early disease detection and developing connected equipment ■ Perinatal care: Improvement in care of babies and mothers before, during, and after delivery. Solutions for the Neonatal Intensive Care Unit (NICU) ■ Oncology/women's health: Solutions for cervical cancer, colposcopy |
| 2010 Developments | <ul style="list-style-type: none"> ■ In 2010, PIC received ISO 13485 certificate for hardware medical components and software development (competence in healthcare product development), and the ISO 20000 certification for global support |
| Future Strategy / Projects | <ul style="list-style-type: none"> ■ Launch of "value" products in the area of pre-natal care |

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Case Study: GE Healthcare India

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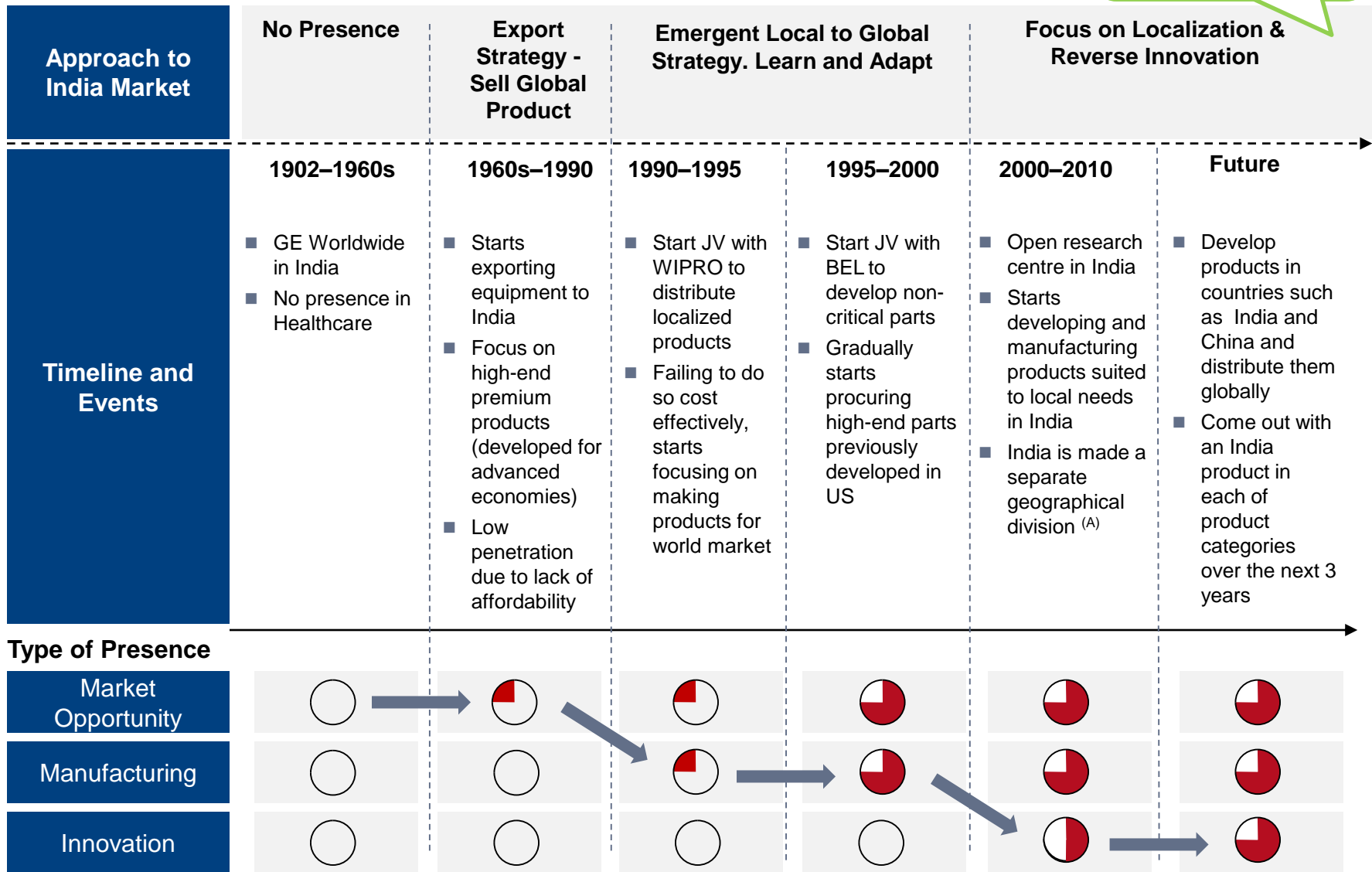
GE Healthcare is an example of a firm who has embraced all three opportunities which India represents



Source:
(1) BA Knowledge Repository.

GE Healthcare's presence in India has evolved overtime from an opportunistic player to a committed partner

To-date, GE has developed 14 products in India for India



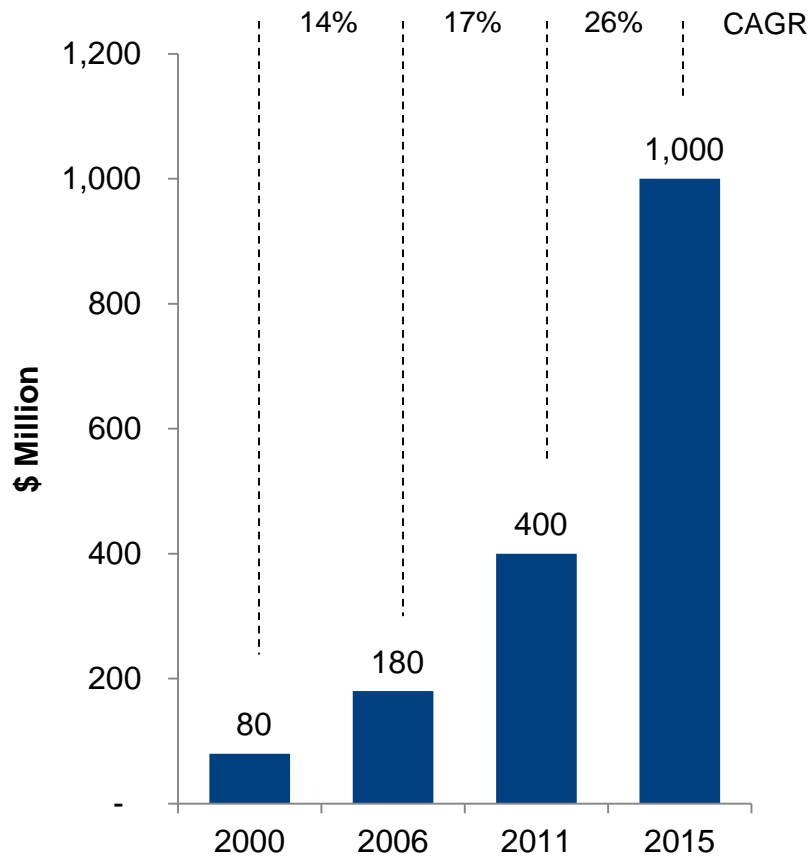
Source:
 (1) GE Investor Presentations.
 (2) Billions of Entrepreneurs, Tarun Khanna.

Note:
 (A) Geographic regions include: US, Europe, Latin America, India, China, Asia-Pacific, ME and Africa

GE Healthcare's revenue in India has grown by double digits over the last 10 years and is expected to reach \$ 1B in 2015



Growth in GE Healthcare India Revenues



% figure refers to CAGR

Key Points

Key Drivers

- Strong economy and increasing spend on healthcare
- Growth of Public-Private partnership opportunities in India
- Population growth and unmet healthcare needs

Positioning of GE Healthcare

- Value product strategy
- Localization
- In-house financing solutions

Source:
(1) GE Investor Presentations.

Currently, GE Healthcare has three plants in India developing products both for local market and exports

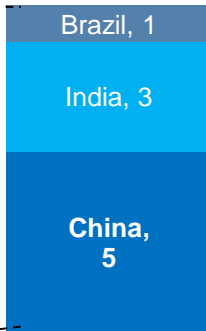


Total 19 Facilities



Production Facilities

9 Facilities



GE Healthcare Manufacturing Strategy In India

| | 1 | 2 | 3 |
|----------------------|--|--|---|
| | Wipro GE Healthcare | GE BE Pvt Ltd | Datex Ohmeda India |
| Established | 1991 | 1997 | 2003 |
| Ownership | JV | JV | GE Healthcare |
| Objective | Manufacture products that meet Indian price points | Produce components for export to other countries | Become leader in anesthesia machines |
| Product Manufactured | Ultrasound equipment, Cardiology products | X-ray tubes, CT systems, HV tanks and detector modules | Anesthesia machines, Patient monitoring systems |
| Current Focus | Manufactures high end equipment for India and ROW | Manufactures medium to low end equipment for India and ROW | NA |

■ Key Emerging Economies

■ Advanced Economies

Source:

(1) http://www.gehealthcare.com/company/pressroom/releases/pr_release_10322.html.

(2) <http://www.expresshealthcare.in/201004/market11.shtml>.

GE Healthcare is developing products both for local and international market in its India based innovation centre

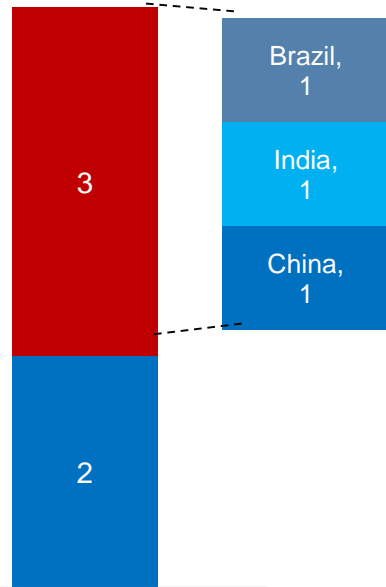


GE spends an average of \$50 million every year on R&D for healthcare solutions in India

John F. Welch Technology Centre, Bangalore

The Healthcare Global Technology Operations Centre

Total 5 Facilities
3 Facilities



Production Facilities

- Key Emerging Economies
- Advanced Economies

Innovation is focused on cost, quality and accessibility

Established

Year 2000

Total Strength

- 4,000 scientists, researchers, and engineers

Objective

- Develop value products relevant to Indian healthcare workers and institutions
- To establish a research arm in South Asia

Key Areas of Research

- Molecular imaging and diagnostics, capacitive micro-machined ultrasound transducers (cMUTs), volume CT, next generation MRI (massively parallel MR, 7 Tesla Imaging Systems), advanced navigation technologies for interventional X-ray applications, X-ray, time of flight positron emission tomography, and computational biology & biostatistics




Current Strategy

- Exploit opportunities in emerging markets such as India
- Pioneer the “value segments” in advanced economies
- Actively pursue reverse innovation i.e. developing products in emerging countries and distributing them globally

Source:

- (1) <http://www.geostrategypartners.com/GE%20Healthcare%20BOP%20Article.pdf>.
- (2) <http://pharmabiz.com/PrintArticle.aspx?aid=70768&sid=1>

GE Healthcare has developed several innovative products in India for both local and international markets



| Strategy | Localization | Reverse Innovation | |
|---|---|--|---|
| Product Requires minimal training; analysis costs less than \$.20 per unit, can be operated and maintained using local supply chain | Made in India for India Market  MAC i | Made in India for India and Global Market  MAC 400 | Made in India for Global Market  MAC 800 |
| | <ul style="list-style-type: none"> Designed to meet local conditions. Battery operated, weigh less than 1 KG and runs even in hot and dusty conditions | <ul style="list-style-type: none"> Designed in India for India, but being exported to China as well over 100 additional countries. Is easy to use and is battery operated | <ul style="list-style-type: none"> An improved version of MAC 400. Developed in India in 2007, but eventually manufactured in China |
| Price | <ul style="list-style-type: none"> \$ 500 (compared to imported ECGs at \$ 2,500) | <ul style="list-style-type: none"> \$ 800 (compared to imported ECGs at \$ 2,500) | <ul style="list-style-type: none"> NA |
| Target Market | <ul style="list-style-type: none"> Rural India where 75% of population resides and does not have access to health clinics or electricity | <ul style="list-style-type: none"> Rural population in emerging markets who cannot afford expensive health care | <ul style="list-style-type: none"> Small clinics and hospitals in US Created new applications for accident sites and operation theaters |
| Year of Launch | <ul style="list-style-type: none"> 2009 | <ul style="list-style-type: none"> 2008 | <ul style="list-style-type: none"> 2009 |

Source:

(1) <http://pharmabiz.com/PrintArticle.aspx?aid=70768&sid=1>

GE Healthcare has developed several innovative products in India both for both local and international markets (Contd.)

2013, GE will release a CT system for 40% of the cost

| Strategy | Reverse Innovation | |
|----------------|---|--|
| Product | <p>Made in India for India and Other Markets</p>  <p>LOGIQ 100</p> <ul style="list-style-type: none"> ■ A portable and compact ultrasound imaging system | <p>Made in India for South Asian Markets</p>  <p>TEJAS DR-F</p> <ul style="list-style-type: none"> ■ A digital X-ray system |
| | Price | <ul style="list-style-type: none"> ■ \$ 1,000 (compared to \$ 10,000 for similar imported equipment) |
| Target Market | <ul style="list-style-type: none"> ■ The product was mainly targeted for Tier I Hospitals and clinics in India and other countries | <ul style="list-style-type: none"> ■ 90-95% of the X-ray systems used in India are analog units. TEJAS is a revolutionary product to mark the entry of digital X-ray system in India |
| Year of Launch | <ul style="list-style-type: none"> ■ Late 1990s | <ul style="list-style-type: none"> ■ 2008 |

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Case Study: GE Healthcare India

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Key Takeaways

- Emerging markets typically represent three opportunities for medical device and equipment manufacturers:
 1. **Local Market Opportunity:**
 - Emerging markets represent a relatively small, but rapidly growing market opportunity driven by three factors unlikely to change, i.e., a growing patient population, increase investment in healthcare infrastructure and increased healthcare insurance penetration
 2. **Cost Effective Manufacturing:**
 - While China and Mexico have historically been the main centers of manufacturing, India and Brazil are increasingly becoming cited as places for investment. Local manufacturing cannot only help reduce costs, but also provide greater access to local markets
 3. **Source of Innovation:**
 - Manufacturers have begun to view emerging markets as a source of innovative new product ideas that are not only better suited to local markets, but could potentially serve the global market as well
- GE Healthcare's strategy in India is an inspiring story to watch as it commits to making India one of its primary focal areas for growth and pursues each of the above three opportunities simultaneously via a coordinated strategy

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Manufacturing facilities of top medical devices and equipment manufacturers

| Company | Revenues (\$ B) | Share in World Market | Manufacturing Facilities | | | |
|------------------------|-----------------|-----------------------|--------------------------|------------------------|-----------|------------|
| | | | Advanced Economies | Key Emerging Economies | Others | Total |
| 3M Healthcare | 4.3 | 1.7% | 3 | 0 | 0 | 3 |
| Abbott Laboratories | 8.4 | 3.4% | 17 | | 1 | 18 |
| Alcon | 3 | 1.2% | 2 | 0 | 0 | 2 |
| B. Braun | 5.8 | 2.4% | 1 | 0 | 0 | 1 |
| Baxter International | 12.6 | 5.1% | 25 | 7 | 5 | 37 |
| Biomet | 2.5 | 1.0% | 1 | 1 | 0 | 2 |
| Boston Scientific | 8.2 | 3.3% | 6 | | 2 | 8 |
| Covidien | 7.8 | 3.2% | 1 | | | 1 |
| CR Bard | 2.5 | 1.0% | 11 | 2 | 1 | 14 |
| Dentsply International | 2.2 | 0.9% | 24 | 1 | 2 | 27 |
| Fresenius Medical | 2.9 | 1.2% | 28 | 6 | | 34 |
| GE Healthcare | 16 | 6.5% | 10 | 7 | | 17 |
| Hospira | 3.9 | 1.6% | 12 | 1 | 2 | 15 |
| Medtronic | 14.6 | 5.9% | 18 | 3 | 2 | 23 |
| St Jude Medical | 4.7 | 1.9% | 9 | 1 | 1 | 11 |
| Stryker | 6.7 | 2.7% | 19 | 1 | 1 | 21 |
| Varian | 2.2 | 0.9% | 4 | 1 | 0 | 5 |
| Zimmer | 4.1 | 1.7% | 10 | 2 | 1 | 13 |
| Total | 112.4 | 45.7% | 201 | 33 | 18 | 252 |

R&D facilities of top medical devices and equipment manufacturers (cont'd)

| Company | Revenues (\$ B) | Share in World Market | R&D Facilities | | | |
|----------------------|-----------------|-----------------------|--------------------|------------------------|----------|------------|
| | | | Advanced Economies | Key Emerging Economies | Others | Total |
| 3M Healthcare | 4.3 | 1.7% | | 1 | | 1 |
| Abbott Laboratories | 8.4 | 3.4% | 13 | 2 | - | 15 |
| Alcon | 3.0 | 1.2% | 4 | - | - | 4 |
| B. Braun | 5.8 | 2.4% | 1 | - | - | 1 |
| Baxter International | 12.6 | 5.1% | 4 | - | - | 4 |
| Becton Dickinson | 7.2 | 2.9% | 4 | - | - | 4 |
| Boston Scientific | 8.2 | 3.3% | 2 | - | 2 | 4 |
| GE Healthcare | 16.0 | 6.5% | 2 | 3 | | 5 |
| Hospira | 3.9 | 1.6% | 2 | 1 | - | 3 |
| Johnson & Johnson | 23.6 | 9.6% | 9 | 3 | 1 | 13 |
| Medtronic | 14.6 | 5.9% | 6 | 3 | 2 | 11 |
| Philips | 11.2 | 4.6% | 7 | 2 | - | 9 |
| Siemens | 17.4 | 7.1% | 20 | 6 | 2 | 28 |
| Zimmer | 4.1 | 1.7% | 1 | - | - | 1 |
| Total | 140.3 | 57.0% | 75 | 21 | 7 | 103 |

PRTM Medical Devices Survey

| Particular | Details |
|--------------------|---|
| Organizer | Medical Device Supply Chain Council, an informal network of senior industry executives from leading medical devices and equipment manufacturers |
| Survey Agency | PRTM, a leading global consulting firm |
| Survey Respondents | Supply chain and operations executives from leading medical devices and equipment manufacturers |

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