Medical Devices Global Value Chain: Opportunities and Challenges for Upgrading

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Agenda

1. Medical Devices Global Value Chains
   - Key trends
   - GVC mapping

2. Costa Rica in the Medical Devices GVC

3. Comparative Perspectives

4. Opportunities & Challenges for Costa Rica
1. Medical Devices
Global Value Chain
Medical Devices Industry: Key Trends

• Mix of low- and high-value items (from disposable catheters to home test kits to MRIs)

• Growing global demand: developed countries still strongest, but emerging markets strengthening

• Production is highly concentrated geographically & among top firms in med devices GVC

• BUT increased offshoring creating opportunities for other countries → lower costs, leverage human capital & target new markets
Medical Devices Global Value Chain

Research & Product Development
- Prototype
- Process Development
- Regulatory Approval
- Process Development
- Sustaining Engineering

Components Manufacturing
- Software Development
- Electronics/Electrical Components
- Precision Metal Works
- Plastics Extrusion & Molding
- Weaving/Knitting Textiles

Assembly
- Assembly
- Packaging
- Sterilization

Distribution
- Final Products
  - Capital Medical Equipment
  - Therapeutic Devices
  - Surgical & Medical Instruments
  - Disposables
- Marketing & Sales
  - Market Segments
    - Cardiovascular
    - Orthopedics
    - Infusion Systems
    - Others

Input Suppliers
- Resin
- Metals
- Chemicals
- Textiles

Post-Sales Services
- Training
- Consulting
- Maintenance, Repair

Buyers
- Wholesale distributors
- Doctors & Nurses
- Hospitals (Public/Private)
- Individual Patients
2. Costa Rica in the Medical Devices Global Value Chain
Key Trends in Costa Rica’s Medical Devices GVC

• **Product upgrading**: General increase in complexity of products → Growing confidence in ability to meet regulatory requirements.

• **Market segment diversification**: Disposables → Instruments → Therapeutics. (Shift toward higher-value products)

• **Forward and backward linkages**: In 2009-12, upstream (inputs) and downstream (sterilization) firms established in country; increase in country-capabilities & domestic value-added

• **Disposables, Instruments & Therapeutics categories are highly concentrated despite large number of entrants**:
  - Disposables: Baxter & Hospira
  - Instruments: Arthrocare & Boston Scientific
  - Therapeutics: Allergan & St. Jude Medical

• These six firms together exported 85% of the medical devices from Costa Rica.
Local firms are mainly in packaging & support services (12 of 19) versus 4 in limited role in plastics molding & metal finishing and 1 OEM with exports under $2 million.
Evolution of Costa Rican Medical Device Exports


- **Disposables** still the largest product category exported, but no longer a strong growth area.
- Exports in **surgical instruments** have grown steadily since 2005.
- **Therapeutics** has become 2nd largest category since 2008; likely to increase as newly established firms complete transfer of new product lines.
- Limited export of highest value **capital equipment**
# Firms in Costa Rica Medical Devices Sector

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| **Up to 2000**  
24 firms:  
8 US  
15 CR  
1 German | 4 OEMs  
8 Components  
1 Input distributor  
7 Packaging  
1 Finishing  
3 Support services | Disposables | Drug delivery; Women’s health | Intravenous tubing (I) Mastectomy bra (I) | Hospira; Baxter; Amoena; Corbel |
| **2001–2004**  
13 firms:  
9 US  
3 CR  
1 Colombian | 3 OEMS  
6 Components  
1 Finishing  
1 Logistics provider  
2 Support services | Instruments | Endoscopic surgery | Biopsy forceps (II) | Arthrocare; Boston Scientific; Oberg Industries |
| **2005–2008**  
8 firms:  
7 US  
1 Puerto Rico | 2 OEM  
4 Components  
1 Packaging  
1 Finishing | Therapeutics | Cosmetic surgery; Women’s health & urology | Breast implants (III) Minimally invasive devices for uterine surgery (II) | Allergan; Tegra Medical; Specialty Coating Systems |
| **2009–2012**  
21 firms:  
16 US  
1 CR  
1 Ireland  
1 Japan  
2 Joint ventures (US-CR) | 5 OEMs  
7 Components  
2 Non-OEM assemblers  
1 Input Distributor  
2 Sterilization  
2 Packaging | Therapeutics  
Disposables  
Instruments | Cardiovascular Drug delivery | Heart valves (III) Dialysis catheters (III) Guide wires (III) Compression socks (I) | Abbott Vascular  
St. Jude Medical  
Covidien  
Moog  
Synergy Health  
Volcano Corp. |
Upgrading Success: A Leading Medical Devices MNC in Costa Rica

2004
First production plant opens in Costa Rica

Functional Upgrading

- 2004: Manufacturing functions
- 2012: Engineering for process improvements
  ➔ Focused on cardiology segment; strategy – to alleviate R&D costs in the US.

Product & Process Upgrading

- Biopsy forceps ➔ Labor intensive, basic metal works & extrusion.
- Urethral stent ➔ Thermoforming, laser marking, coating capabilities.
- Today – CR facilities cover 42 manufacturing processes.

Market Diversification

- Gastroenterology segment ➔ Urology ➔ Cardiovascular

Forward Linkages

- Recent co-location of sterilization vendors will allow the firm to export directly to global distribution centers

2005

Exports: <US$20 million

2008

Second plant opens. First plant begins restructuring

2010

Initial plant reopens after restructuring

Exports: >US$100 million

2011
3. Upgrading in the Medical Devices GVC: A Comparative Perspective
Evolution of Brazilian Medical Device Exports

- **Disposables** are both the largest product category exported and an area of growing exports.
- **Medical equipment** surpassed **dental products** as the second largest export category in 2002.
- Export statistics hide the sectors of greatest importance, since the main export items tend to be low-tech. Brazilian government and private sector actors are working to promote price-competitive, mid-tech exports.
Brazil’s Position in the Medical Devices GVC

**Research & Product Development**
- Prototype
- Regulatory Approval
- Process Development
- Sustaining Engineering

**Components Manufacturing**
- Software Development
- Electronics development
- Precision metal works
- Plastics extrusion & molding
- Weaving/Knitting Textiles

**Assembly / Production**
- Assembly
- Packaging
- Sterilization

**Distribution & Marketing**
- Wholesale distributors
- Doctors & Nurses
- Hospitals (Public/Private)
- Individual Patients

**Post-Sales Services**
- Training
- Consulting
- Maintenance, Repair

**Input Suppliers**
- Resin
- Metals
- Chemicals
- Textiles

**Market Segments**
- Dental (26)
- Disposables (20)
- Implants (32)
- Laboratory (22)
- Medical Equipment (120)
- Radiology (10)

**Number of National Firms**
- 0 - 20
- 21 - 40
- > 40

82% of national firms are SMEs
GE Healthcare in Brazil: Market-Seeking Offshoring

GE seeks to gain access to Brazil’s rapidly growing healthcare market. Industrial policy tools create further incentives for local production.

- The Brazilian informatics law: tax incentives for local production and R&D
- The Dilma administration approved a 25% preference for the national healthcare system to purchase locally manufactured medical devices.
- Certification by ANVISA, the regulatory arm of the Ministry of Health, is required to distribute medical devices in Brazil. ANVISA certification is very difficult and time-consuming (1 year on average), so MNCs frequently find it easiest to acquire local companies.

GE is pushing for relaxed ANVISA requirements, but through its control of the largest public healthcare system in the world, the Brazilian government is in a strong bargaining position.
4. Opportunities and Challenges for Upgrading in Costa Rica’s Medical Devices GVC
Opportunities for Costa Rica

- **Product upgrading** → Therapeutics & capital equipment
  - Increasing value of products produced in country
  - Synergies with IT sector

- **Improve capability of local & foreign suppliers**
  - Automation to increase overall supply w/o increasing labor costs
  - Capture more value from participation in technology- and capital-intensive production processes

- **Strengthen backward & forward linkages** in chain
  - Locally available inputs → lower inventory needs and costs
  - Sterilization → opens up possibility for direct distribution
Opportunities for Costa Rica (cont’d)

• **Diversification across geographic end-markets** for functional upgrading in marketing, distribution & incremental R&D
  
  – e.g., Mexico
  
  • Growing supply (exports) and demand (domestic)
  • Cultural & language bridge
  • Close to the US
  • Mature industry with training opportunities
  • Leverage offshore services experience
Challenges for Costa Rica’s Med Devices Sector: Expansion & Upgrading

• **Expansion of manufacturing segments -- constrained**
  - Shortage of human capital, increased attrition & wage inflation.
    - All levels: Direct labor, technicians and esp. engineering staff
    - Sector competes with other priority sectors such as offshore services firms for engineering talent.
  - Transportation infrastructure limits continued growth, particularly in the Central Valley

• **Functional upgrading into R&D**
  - Cost and skills driven due to limited CR domestic market & EPZ incentives → Need to explore potential regional market
  - Limited R&D – need to build academic strengths in cutting edge technology
Challenges for Costa Rica (cont’d)
Building local linkages

• Expand opportunities for local firms
  • Local firms have limited presence in EPZs due to follow sourcing by MNC partners → enhance supplier development programs
  • Sourcing decisions made globally → look for regional expansion opportunities.
  • Limited scale, access to finance & technological expertise inhibit local firms from becoming reliable suppliers of critical inputs & services → look for upstream and downstream GVC opportunities.