Global Value Chain measurement

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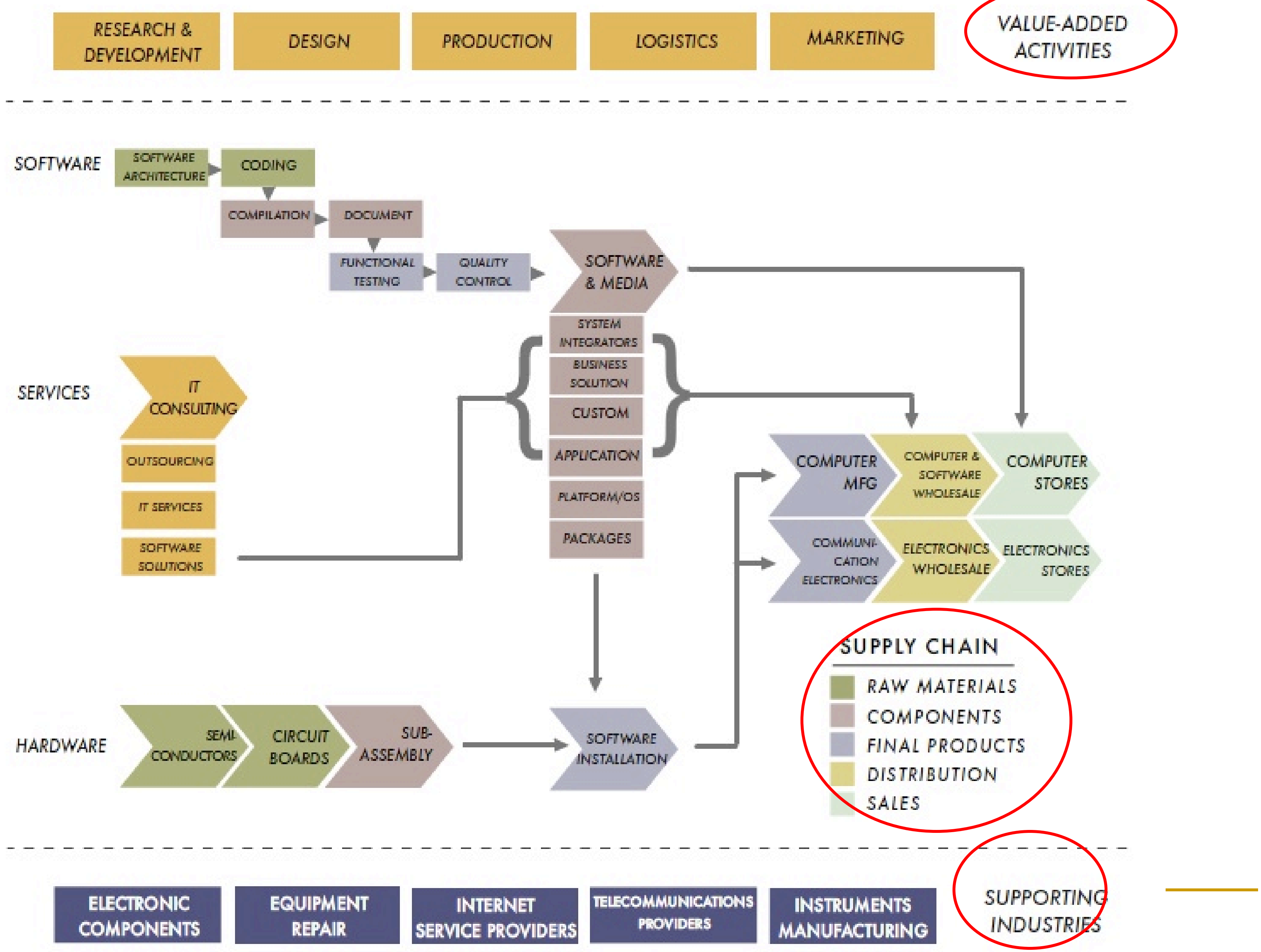
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CIRCUIT BOARDS
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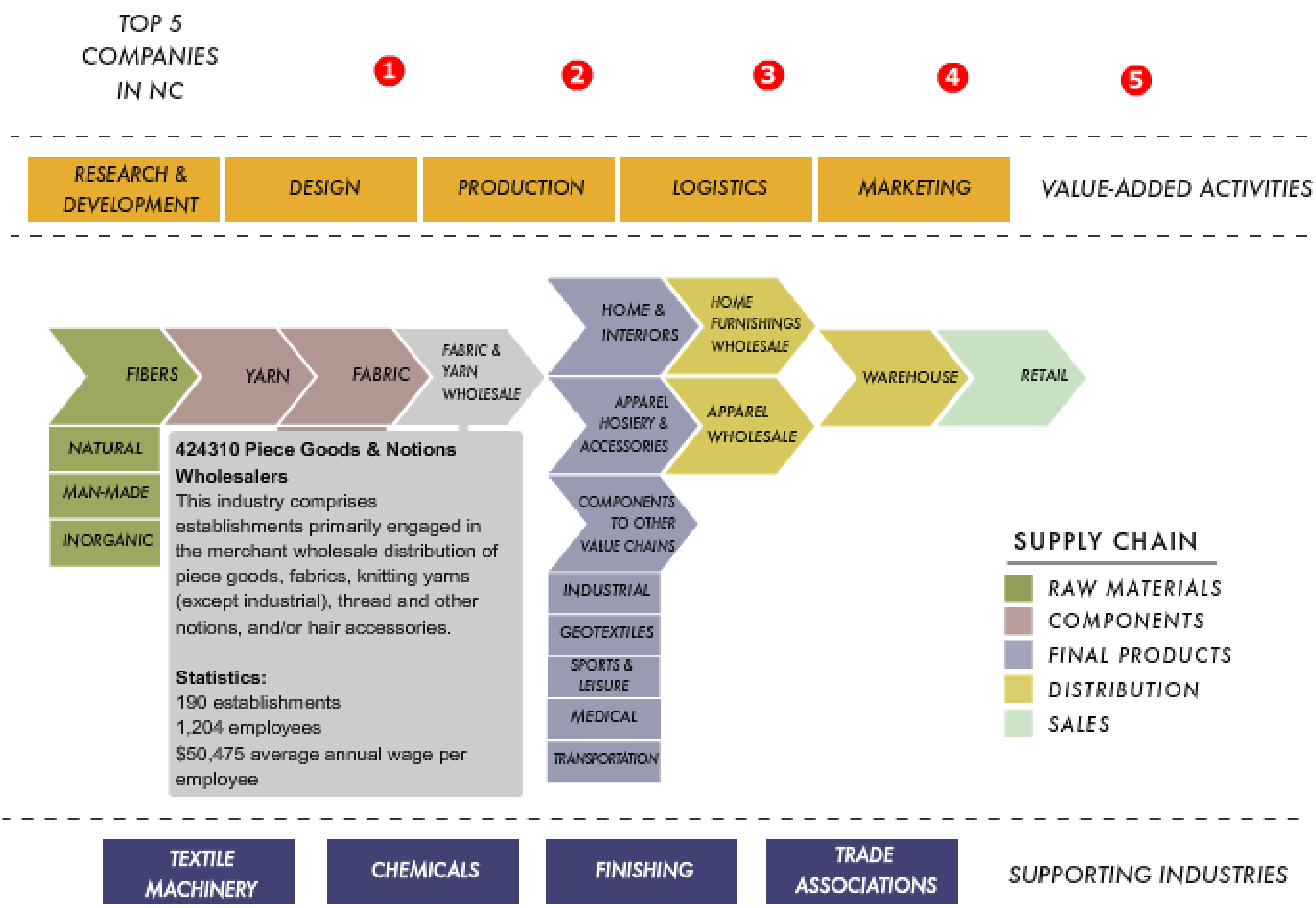
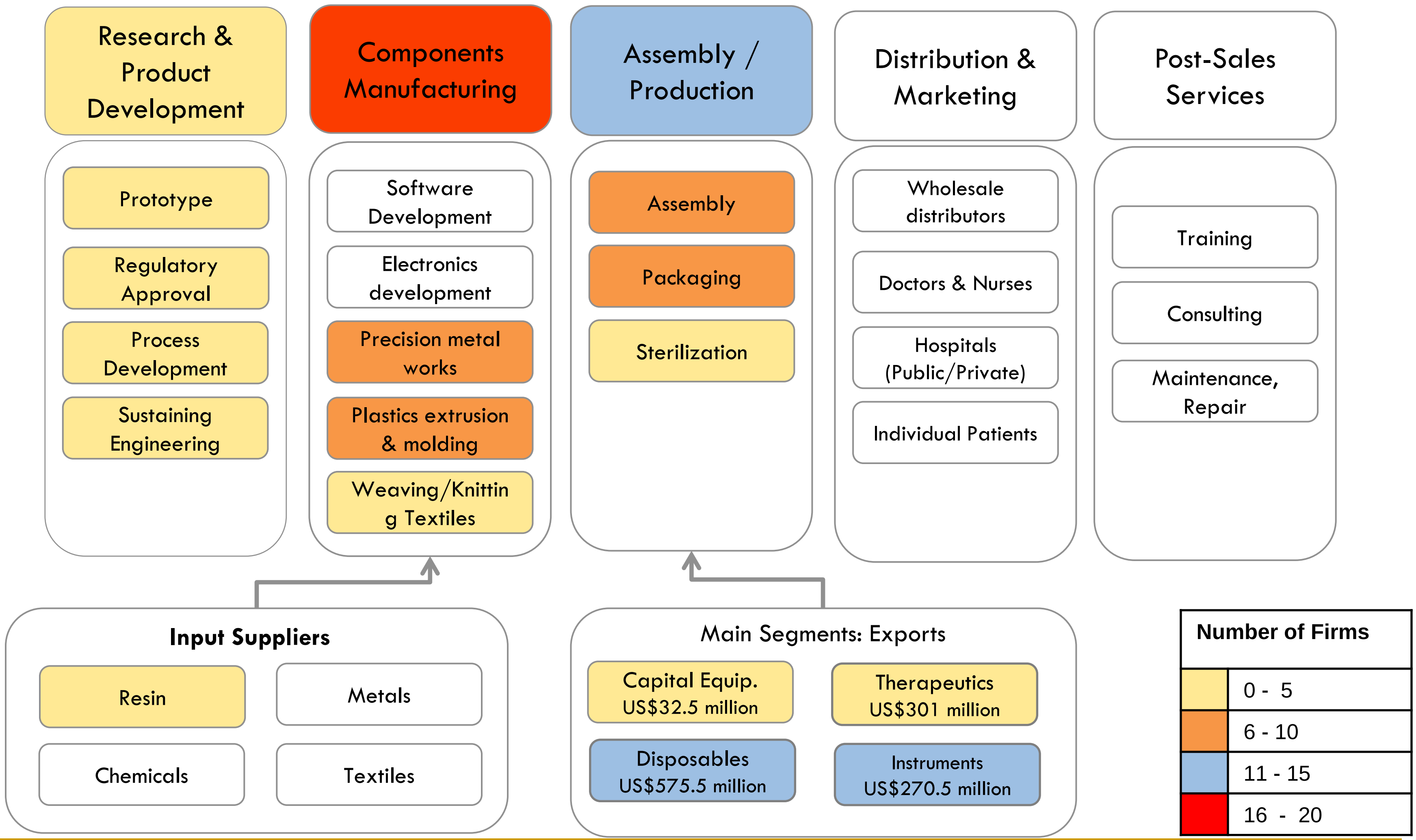
ELECTRONIC COMPONENTS
EQUIPMENT REPAIR
INTERNET SERVICE PROVIDERS
TELECOMMUNICATIONS PROVIDERS
INSTRUMENTS MANUFACTURING
SUPPORTING INDUSTRIES

The Textile Value Chain



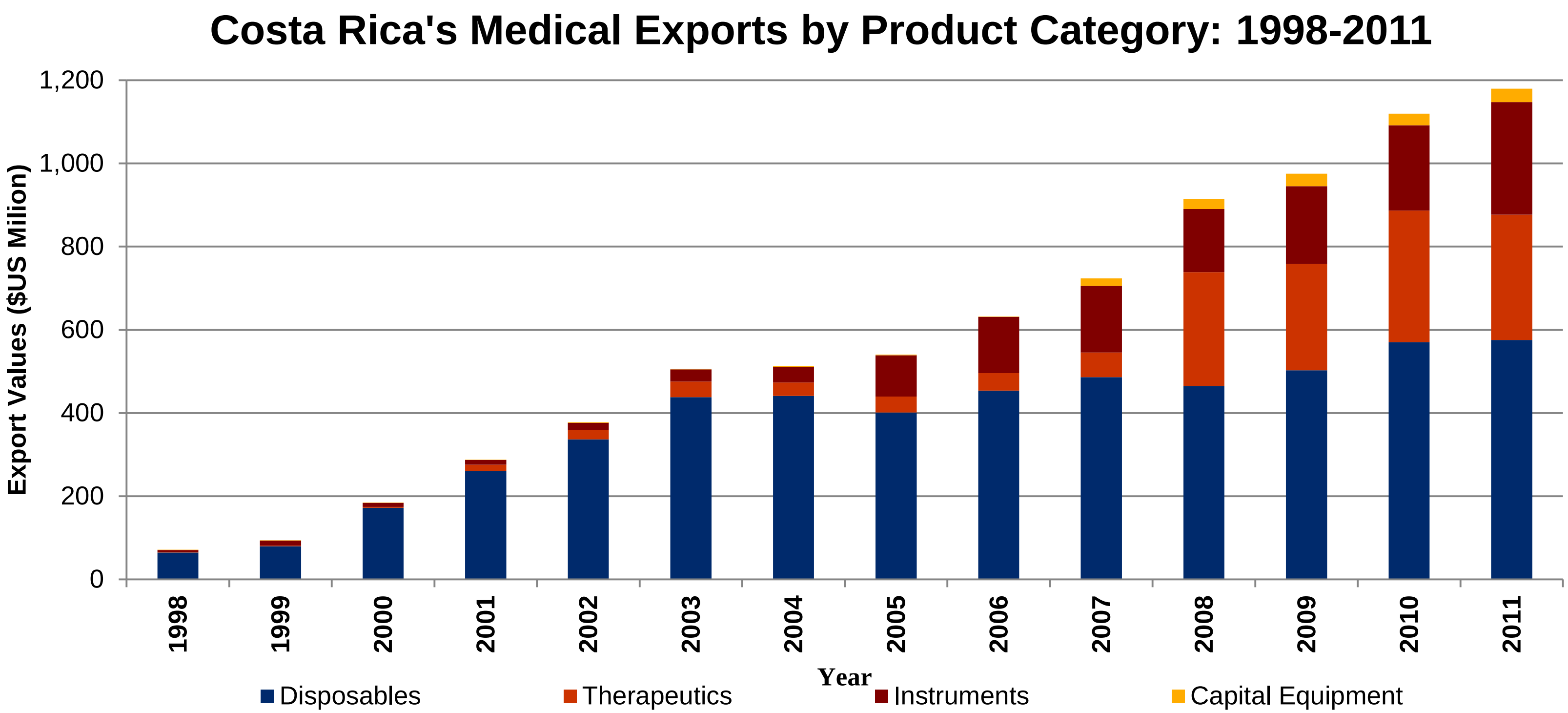
Source: North Carolina in the Global Economy Project (http://www.soc.duke.edu/NC_GlobalEconomy/)

COSTA RICA IN THE MEDICAL DEVICES GVC



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** (eg. Electronic/software devices)

Firms in Costa Rica Medical Devices Sector

Entry Year	Firm Characteristics	Main Product Export Category	Core Market Segments	Product Examples	Select Firms
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.

2004	2005	2008	2010	2011
First production plant opens in Costa Rica (10,000m^2)	**Exports: US$18 million**	Second plant opens. (32,000m^2) First plant restructuring	Initial plant reopens after restructuring	**Exports: US$120 million**

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.
- Guide Wires ➔ Sophisticated Laser cutting & welding.
- Today – CR facilities cover 42 manufacturing processes.

Market Diversification

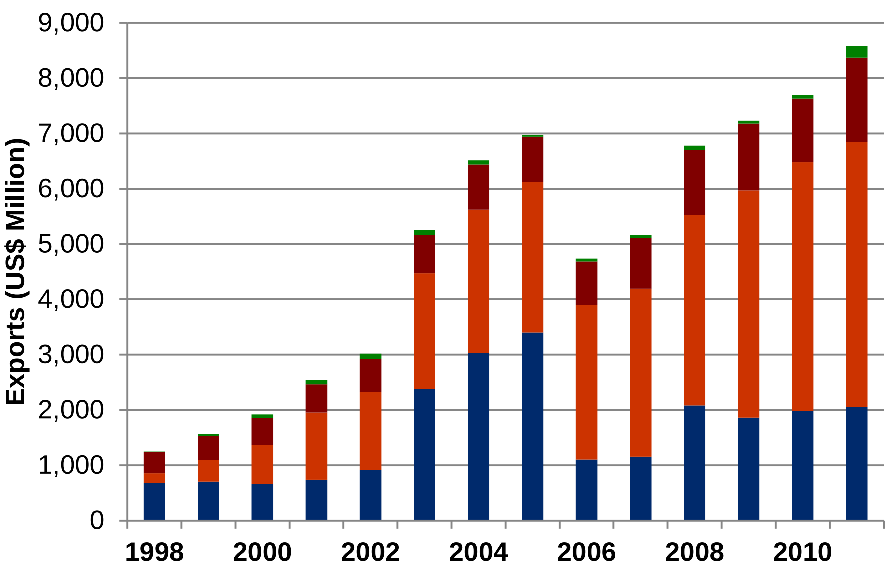
- Gastroenterology segment ➔ Urology ➔ Cardiovascular

Forward Linkages

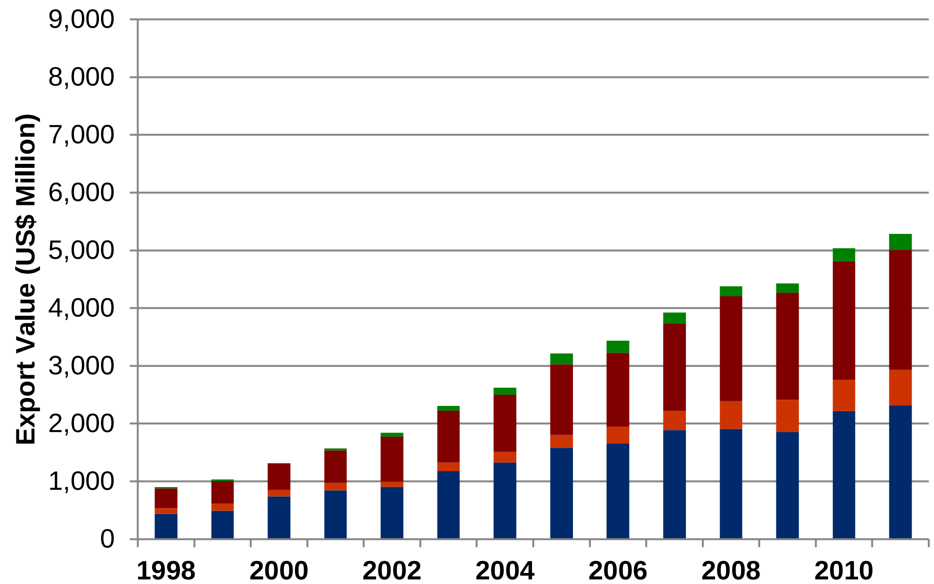
- Recent co-location of **sterilization** vendors will allow the firm to export directly to global distribution centers

IRELAND AND MEXICO: MEDICAL DEVICE EXPORTS 1998-2011

IRELAND



MEXICO



- Most mature of the three locations
- 2005 shock forced upgrading strategy
- Significant growth in therapeutics & entry into capital equipment production

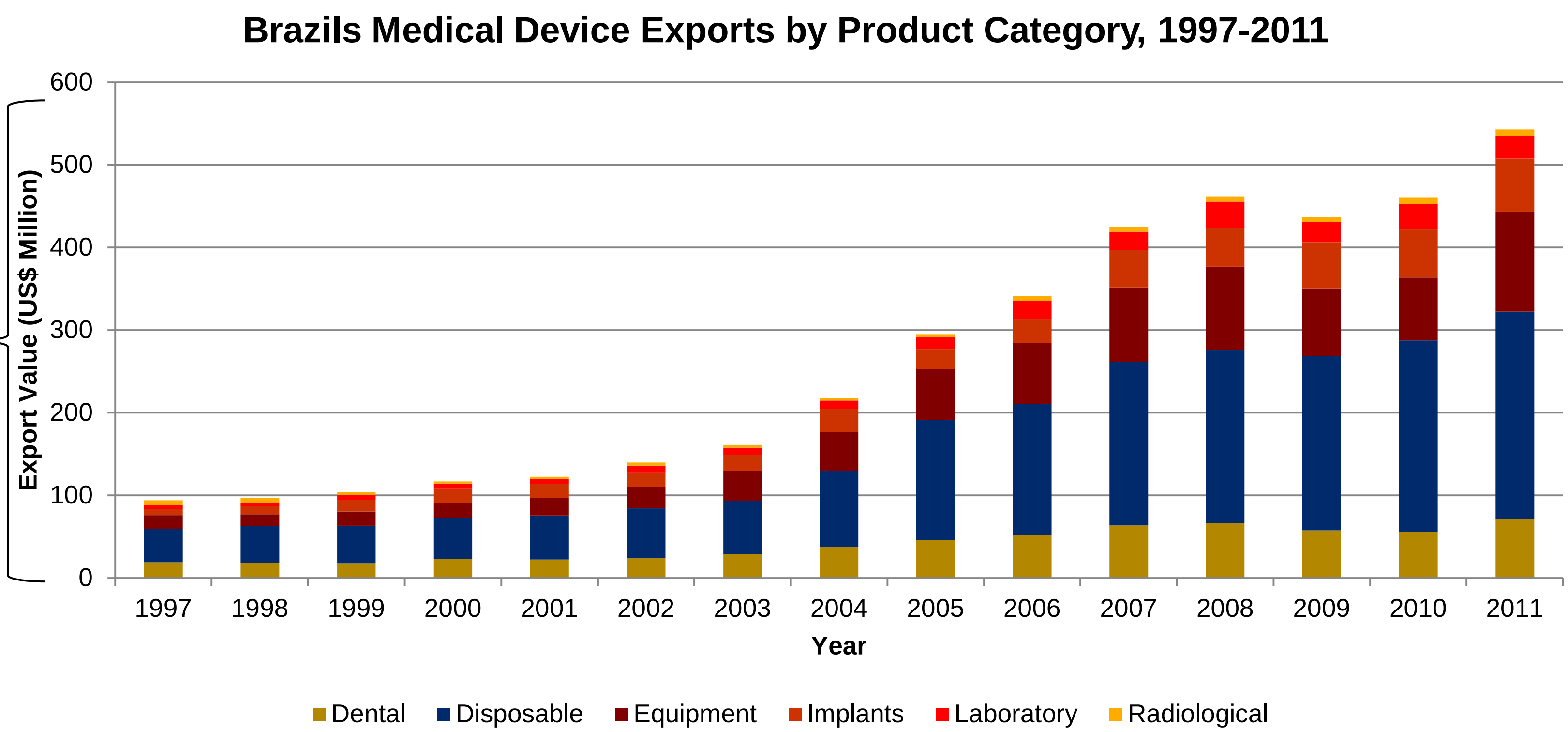
- Stabilizing disposables exports
- Strong focus in instruments
- Growing gains in capital equipment ➔ participation in electronics value chains

EVOLUTION OF BRAZILIAN MEDICAL DEVICE EXPORTS

Costa Rica 2x

Mexico 10x

Ireland 18x



- **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