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GEO-SOURCING TRENDS 2011

ANALYSING THE LATEST SOURCING TRENDS AND PHARMERGING
MARKETS

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MARCH 23, 2011



THOMSON REUTERS

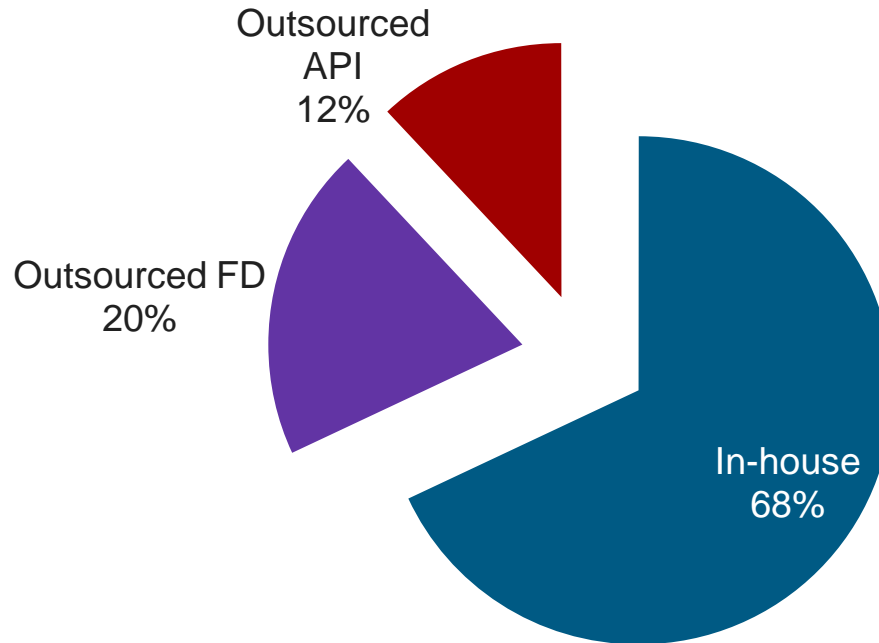
THOMSON REUTERS GENERICS & API INTELLIGENCE

- 20 years experience in tracking API manufacturing and generics
- An industry pioneer in research and analysis of global API manufacturing activity
- Develop and market the Newport database family
- More than 300 customers and 3,000 users across 43 countries in the Innovator, Generic, OTC and API manufacturing industries
- Serving the needs of
 - Business Development & Licensing Professionals
 - Portfolio Selection Teams
 - R&D and Regulatory Specialists
 - API Sourcing Specialists
- Team based in Portland, Maine, USA

AGENDA

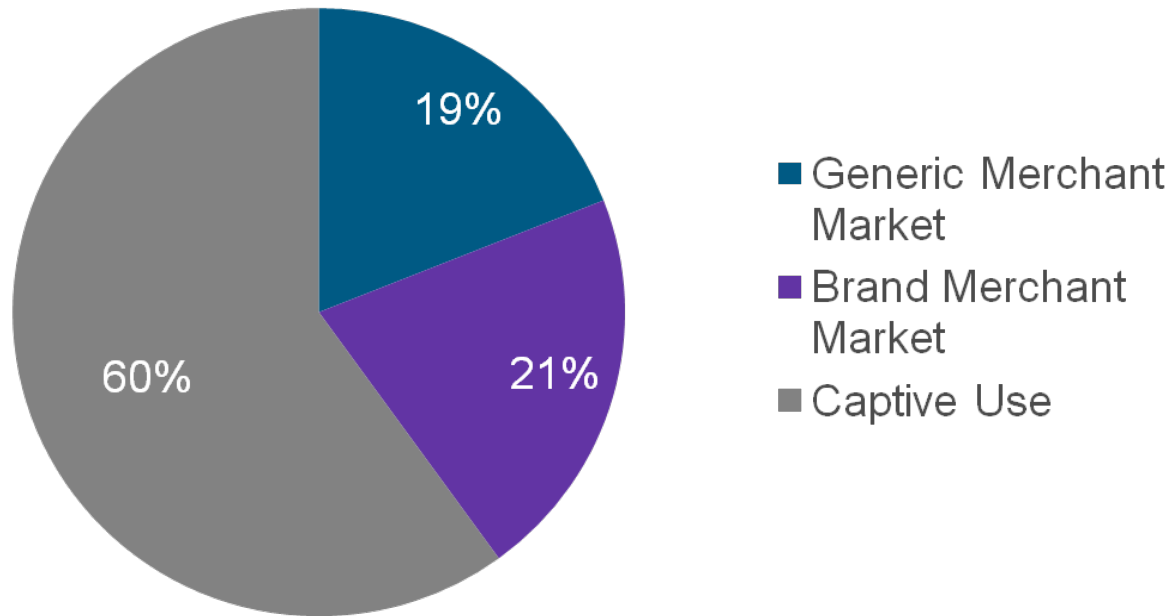
- Examining sourcing trends
- Evolution of sourcing markets
- Analyzing rising costs
- Western shift
- Pharmerging markets
- Prospects for the future

GLOBAL MANUFACTURING



- China and India projected to represent 10% worldwide outsourcing

GLOBAL API CONSUMPTION



- Global API market expected value of \$108 billion in 2015
- China and India hold 60% of Western EU API market

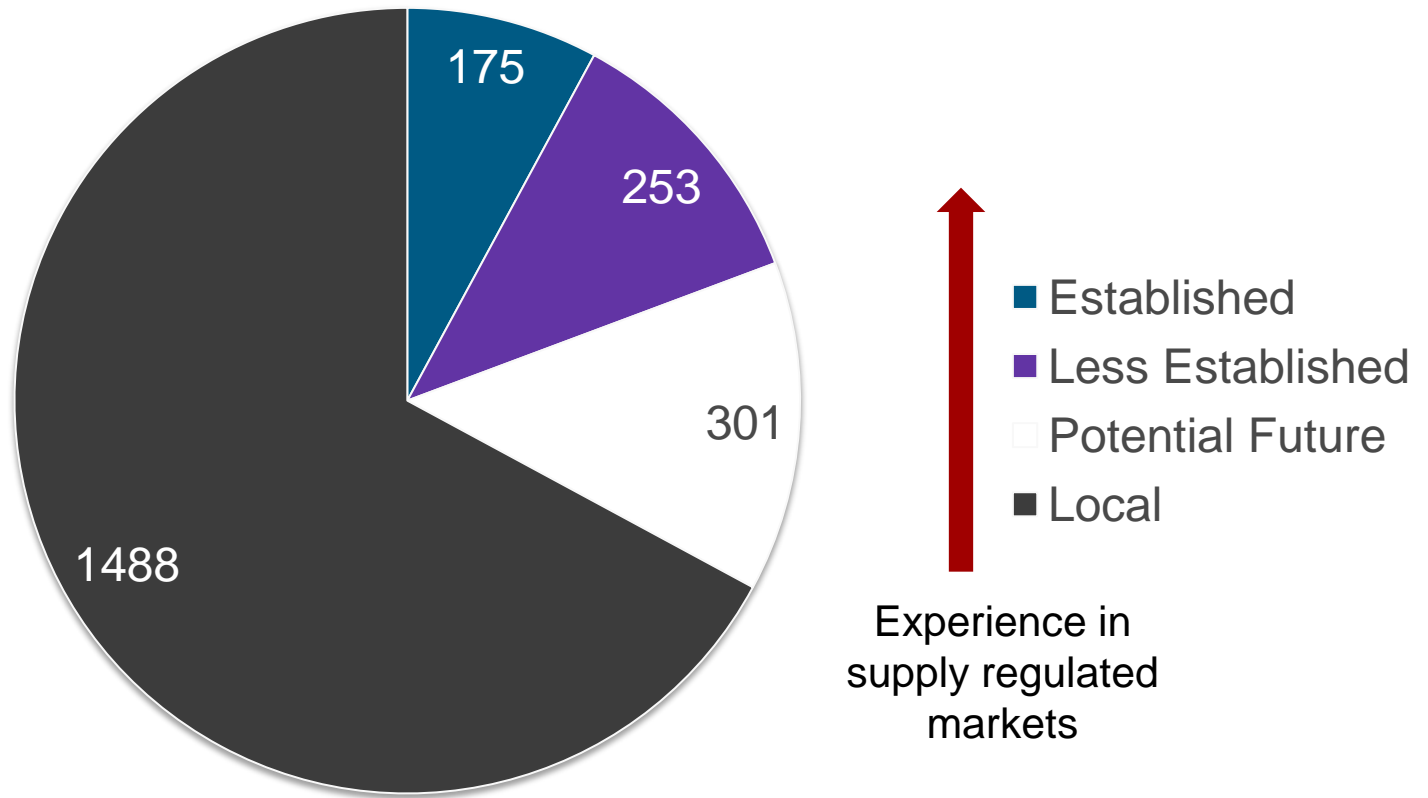
MERGERS & ACQUISITIONS

| Company | Backward Integrated? | Target |
|-------------------|----------------------|-------------------------------|
| Teva | ✓ | Barr, IVAX, Sicor, ratiopharm |
| Sandoz (Novartis) | ✓ | Hexal, Eon, Ebewe |
| Mylan | ✓ | Merck Generics, Matrix |
| Watson | ✓ | Andrx, Arrow, Sekhsaria |
| Hospira | ✓ | Mayne, Orchid |
| Perrigo | ✓ | Agis |
| Zentiva (Sanofi) | ✓ | Eczacibasi, Sicomed |
| Actavis | ✓ | Amide, Alpharma |
| Dr Reddy's | ✓ | Betapharm |

DRIVERS OF SOURCING DECISIONS

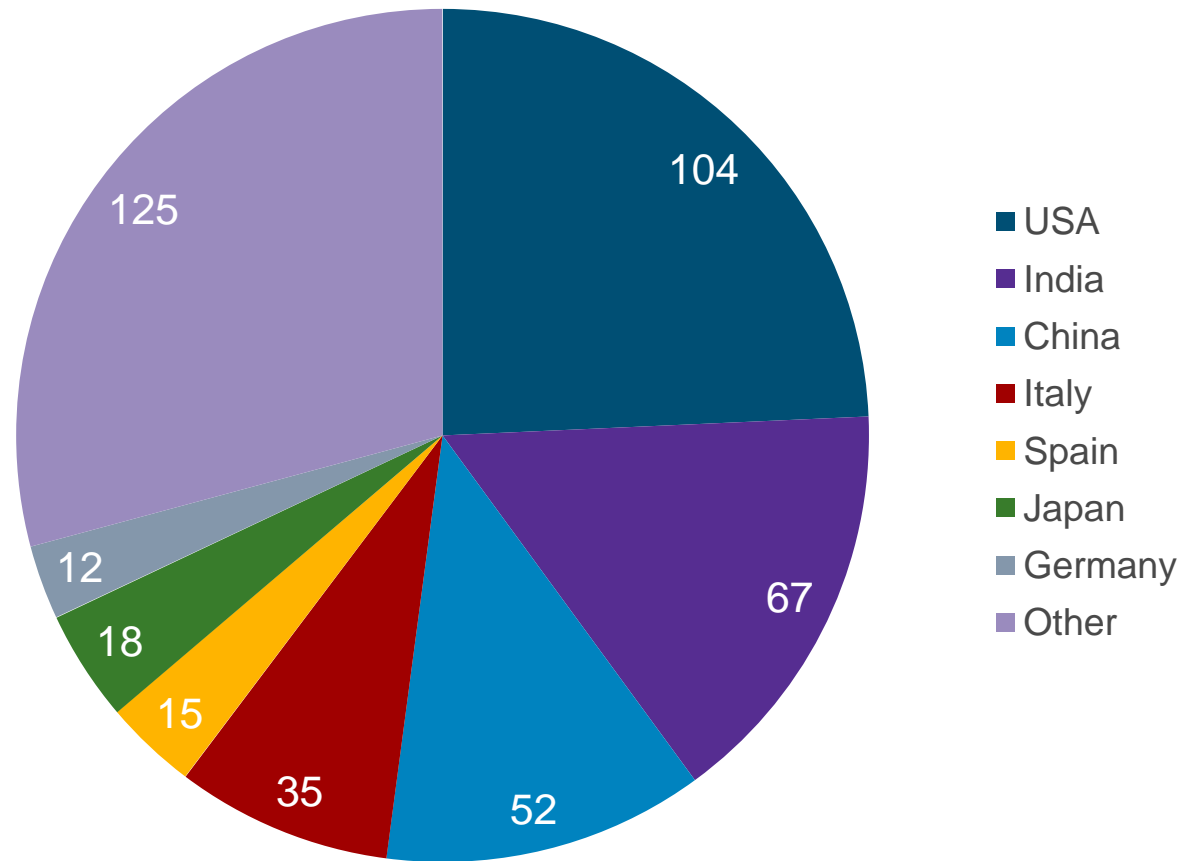
- Capabilities
- Capacity
- Quality
- Speed
- Relationships
- Cost
- Regulations
- Risk
- PR
- Logistics

API MANUFACTURING LANDSCAPE

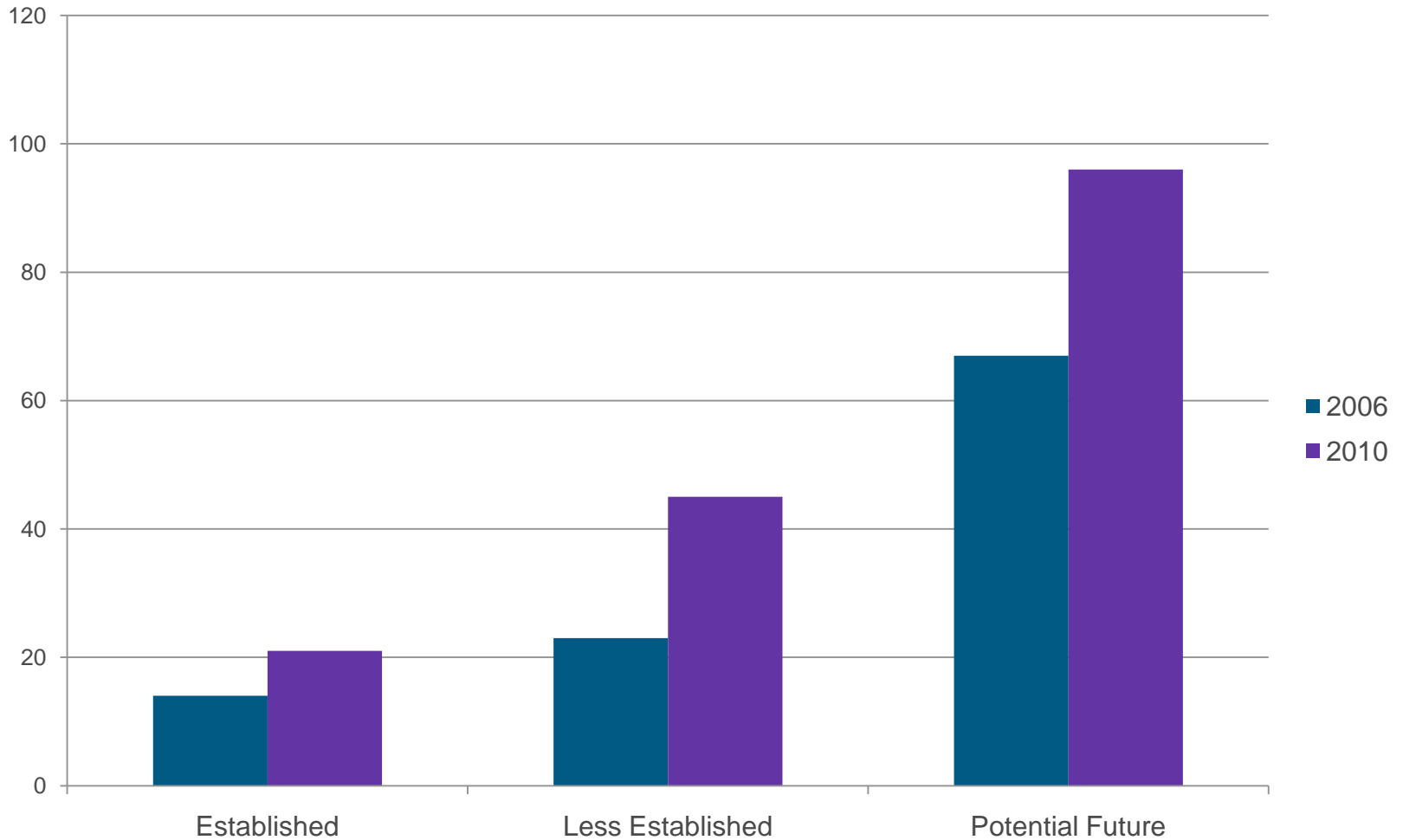


REGIONAL HUBS – API MANUFACTURING

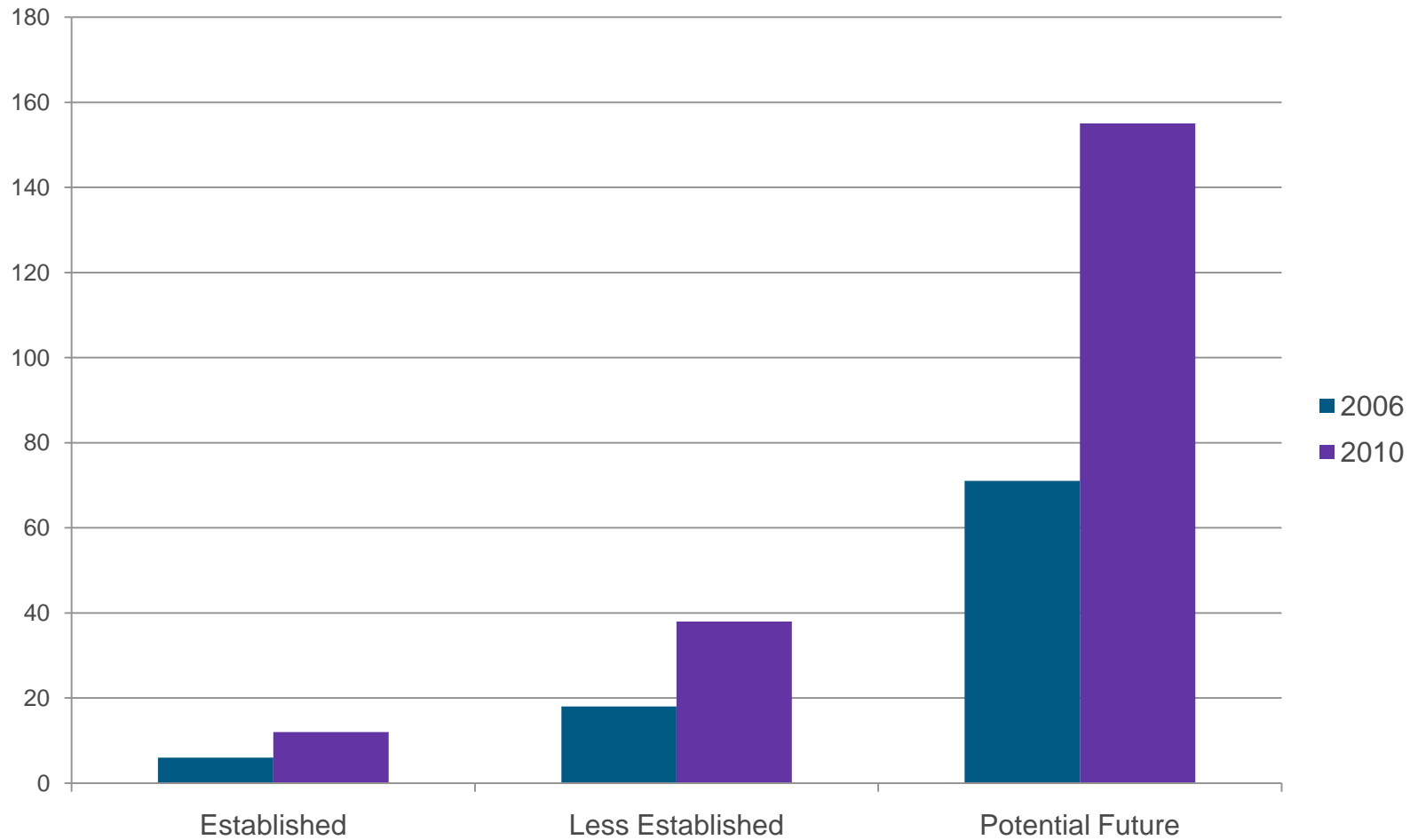
Over 1/3 of the 400+ experienced manufacturers are in India and China



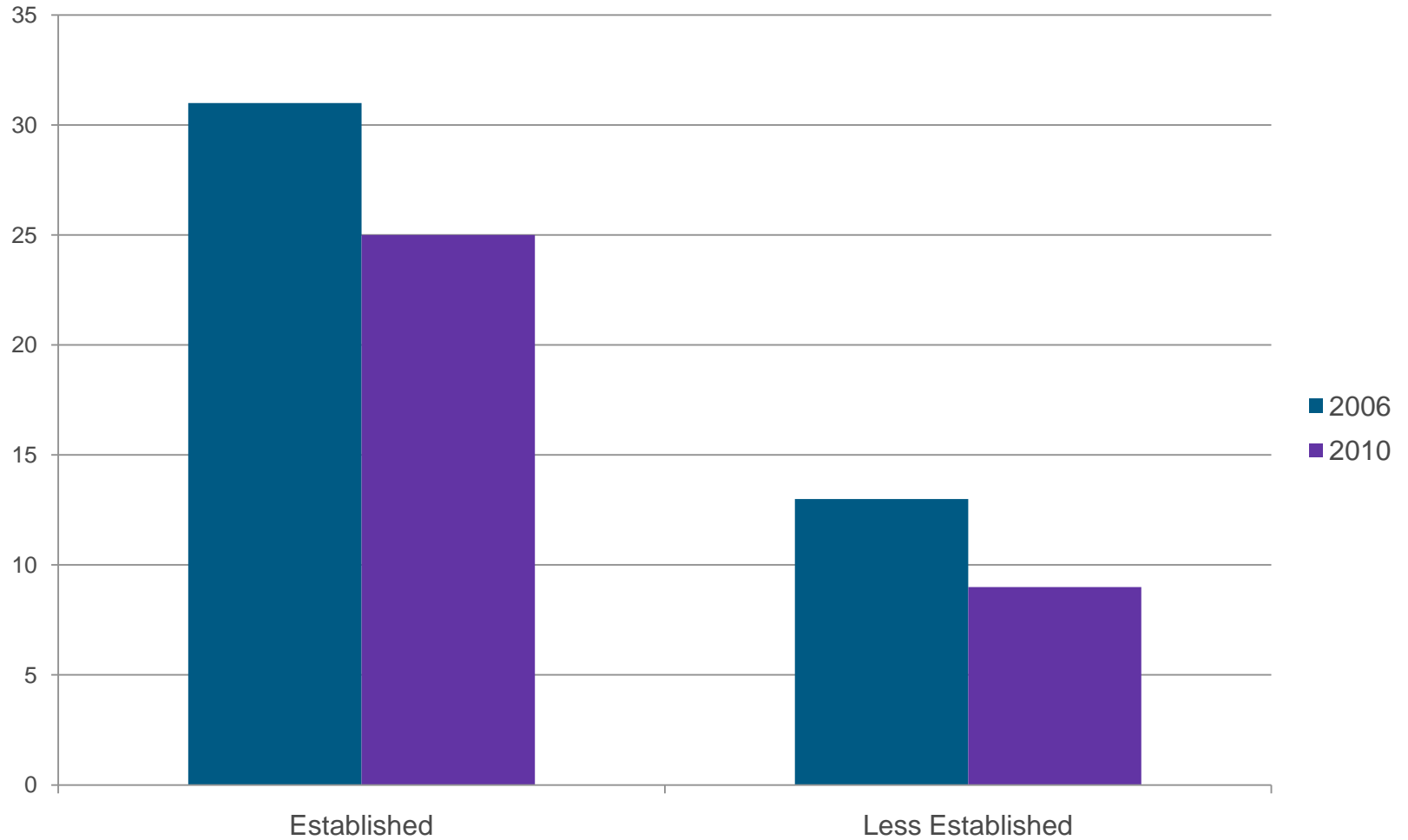
API MANUFACTURER RATINGS - INDIA



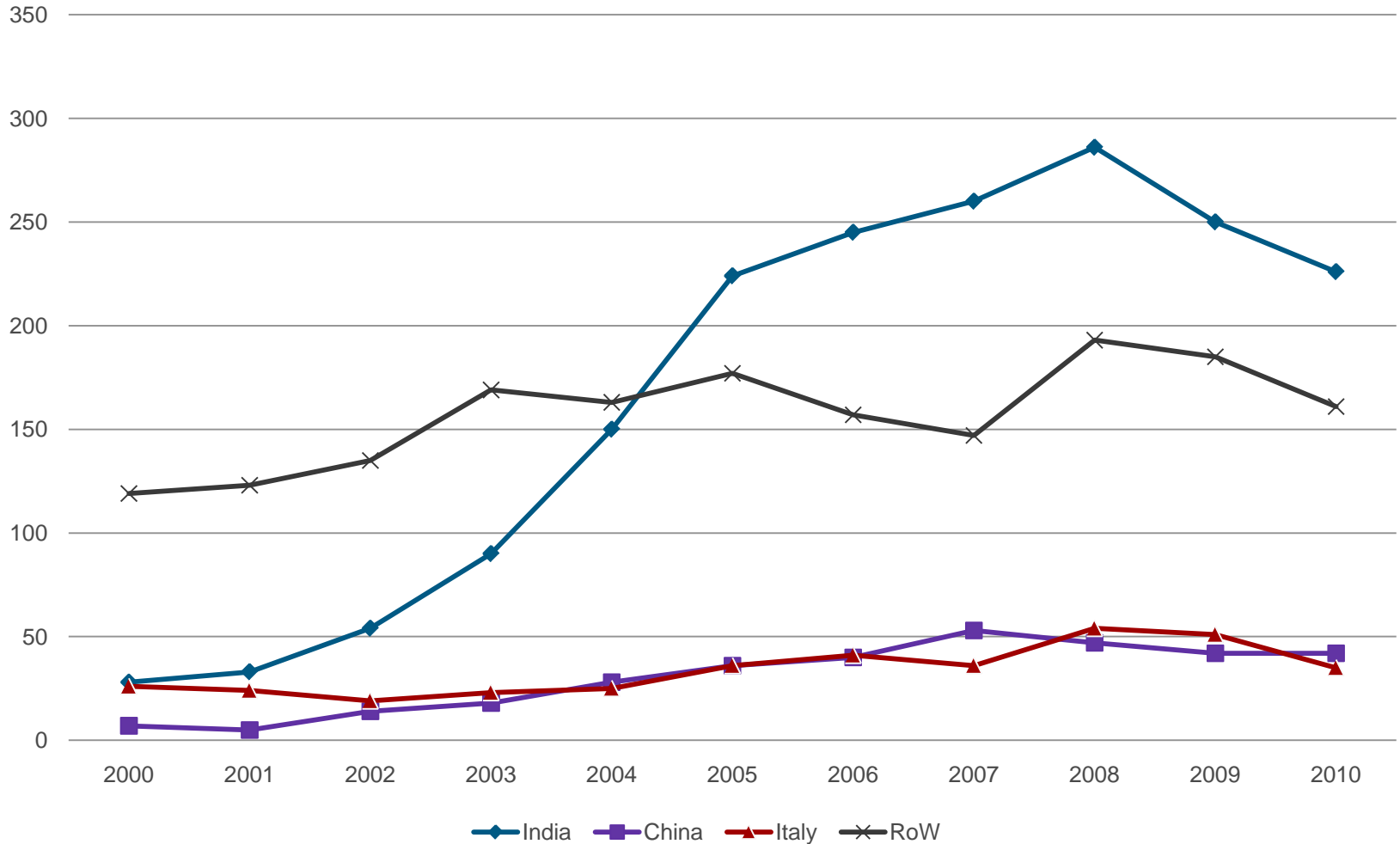
API MANUFACTURER RATINGS - CHINA



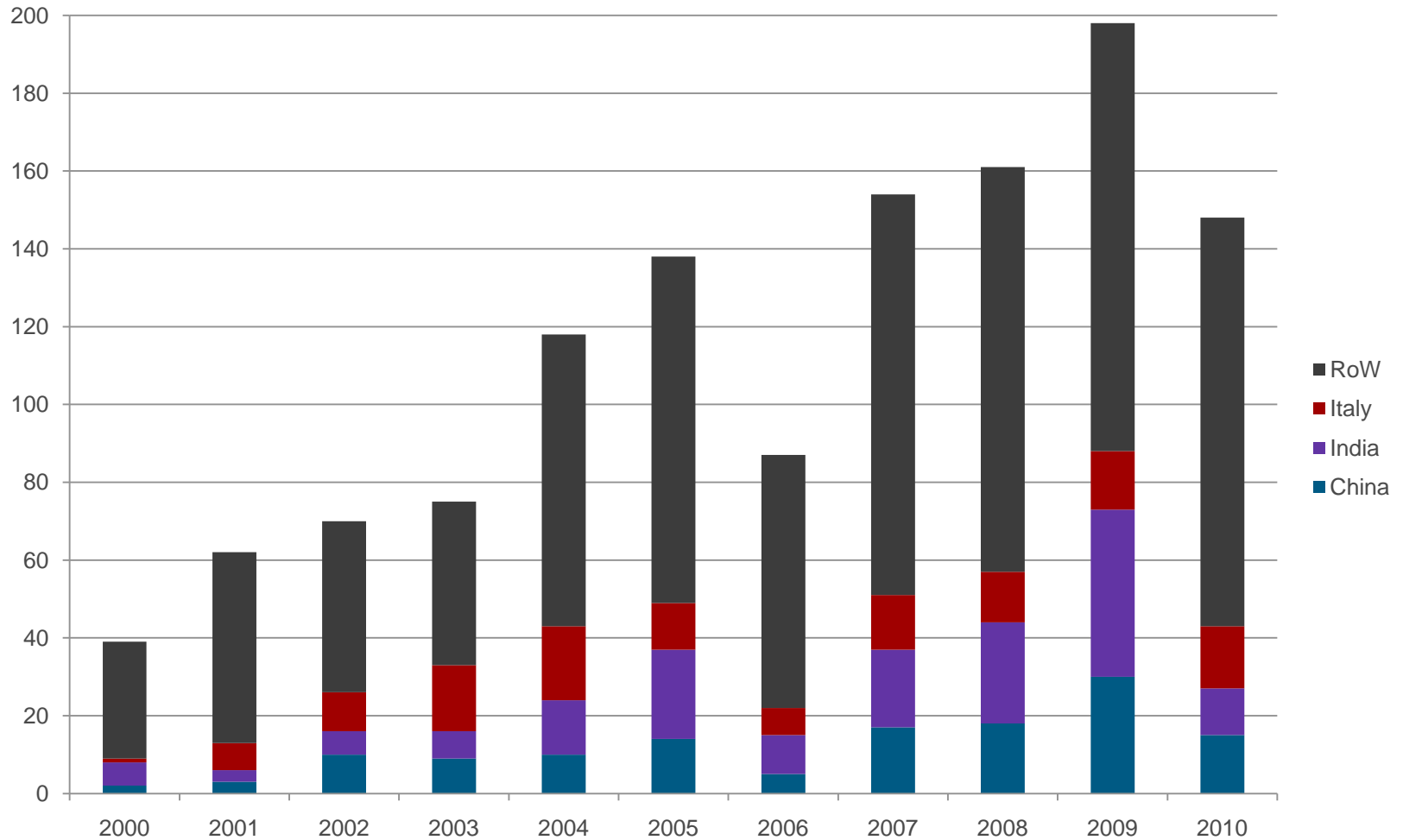
API MANUFACTURER RATINGS - ITALY



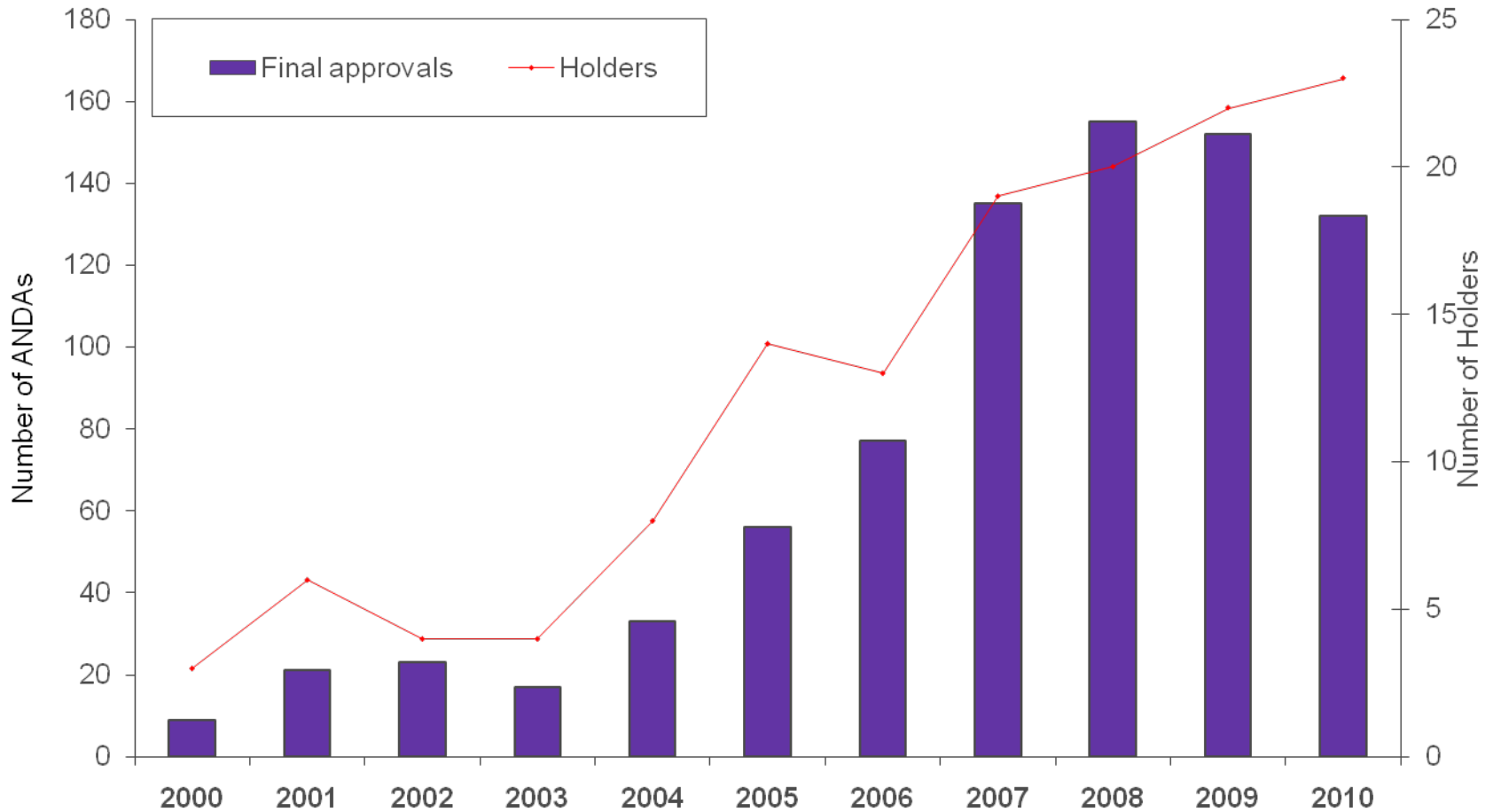
US TYPE II DMF FILINGS



US FDA INSPECTIONS



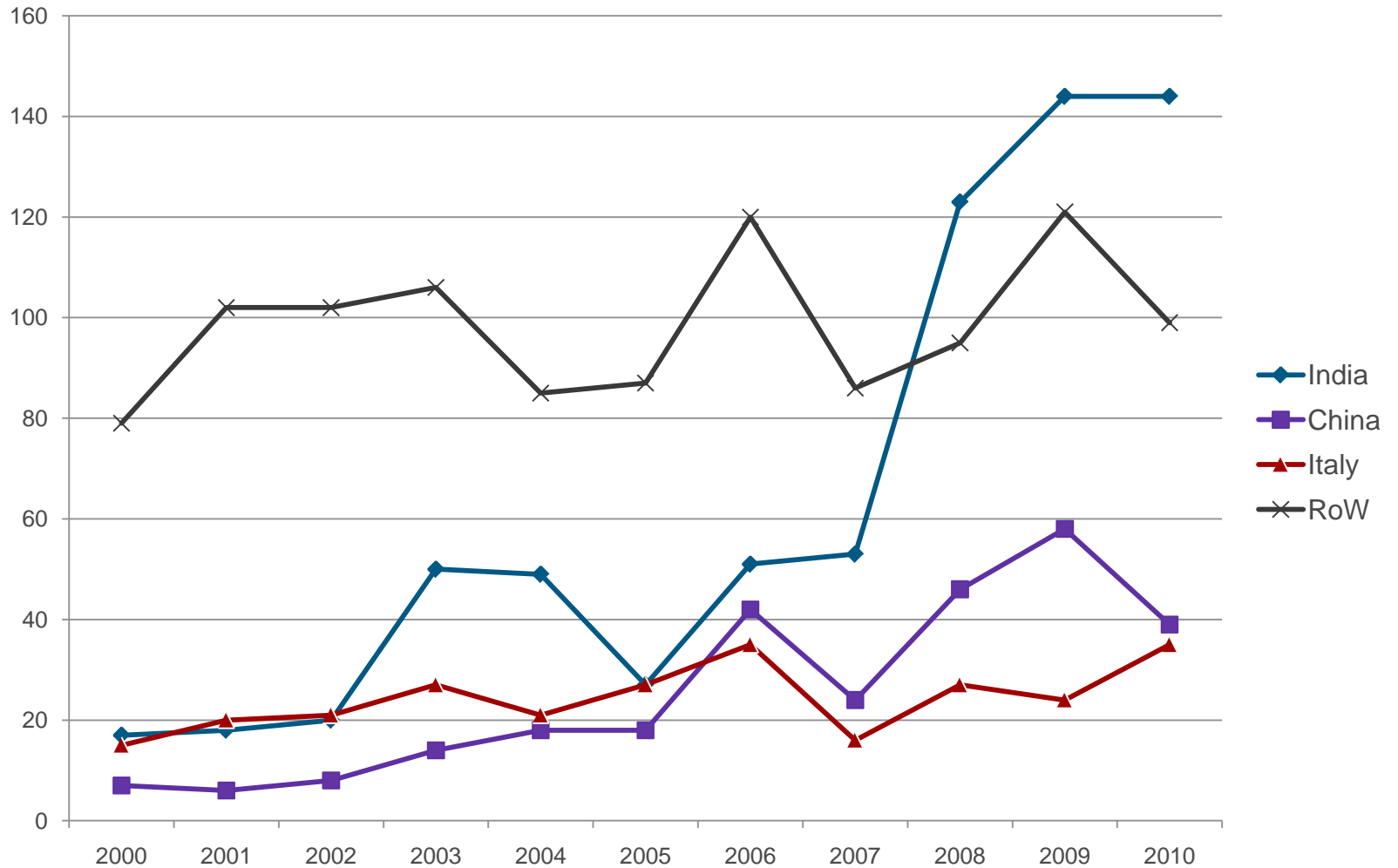
US ANDAS – INDIAN COMPANIES



US ANDAS – CHINESE COMPANIES

- Chinese ANDAs
 - First final approval in December 2010 (Novast)
- Three additional companies with final ANDAs acquired from companies like Ranbaxy, Par, Actavis
 - Zhejiang Huahai (Huahai US Inc)
 - Beijing Pharmaceutical (Beijing Double Crane)
 - Yabao Pharma Group (Beijing Yabao) (ANDAs discontinued)
- Additional filings waiting for approval
- FDA backlog slowing down manufacturing transfer to China

EUROPEAN COS FILINGS



SOURCING DRIVERS - INDIA

- Cost advantage
 - 50% less to make drugs, trials at 10% of the cost, research at 15%
- Capital efficiency
 - Up-front costs 25-50% less due to local labor, materials and equipment
- Improved process engineering drives down costs
- Capacity increasing annually
 - 2000-2004 tripled
 - Second and third tier companies now investing and reaching into regulated markets
- Rich talent pool
 - 125,000 chemical engineers and 25,000 pharmacists graduate each year
- FDA approved infrastructure only eclipsed by the US

SUPPLY AGREEMENTS - INDIA

| Company | Partner | Activity |
|---------|---------------|-----------------------------|
| Divi's | AstraZeneca | naproxen, esomeprazole API |
| Hikal | Degussa | API and intermediates |
| Dishman | Solvay | eprosartan API |
| Neuland | Bausch & Lomb | besifloxacin, ofloxacin API |
| Alembic | Greenstone | azithromycin API |
| Cipla | Boehringer | amlodipine API |
| Ranbaxy | AstraZeneca | esomeprazole API |

SOURCING DRIVERS - CHINA

- Talented pool of scientists and engineers
- Lower cost base
- Improving IP and anti-counterfeiting environment
- Leadership (cost and/or technical) in certain product classes
 - Fermentation-based APIs
 - Intermediates
 - Base chemicals
- Scale of infrastructure
- Government support for R&D

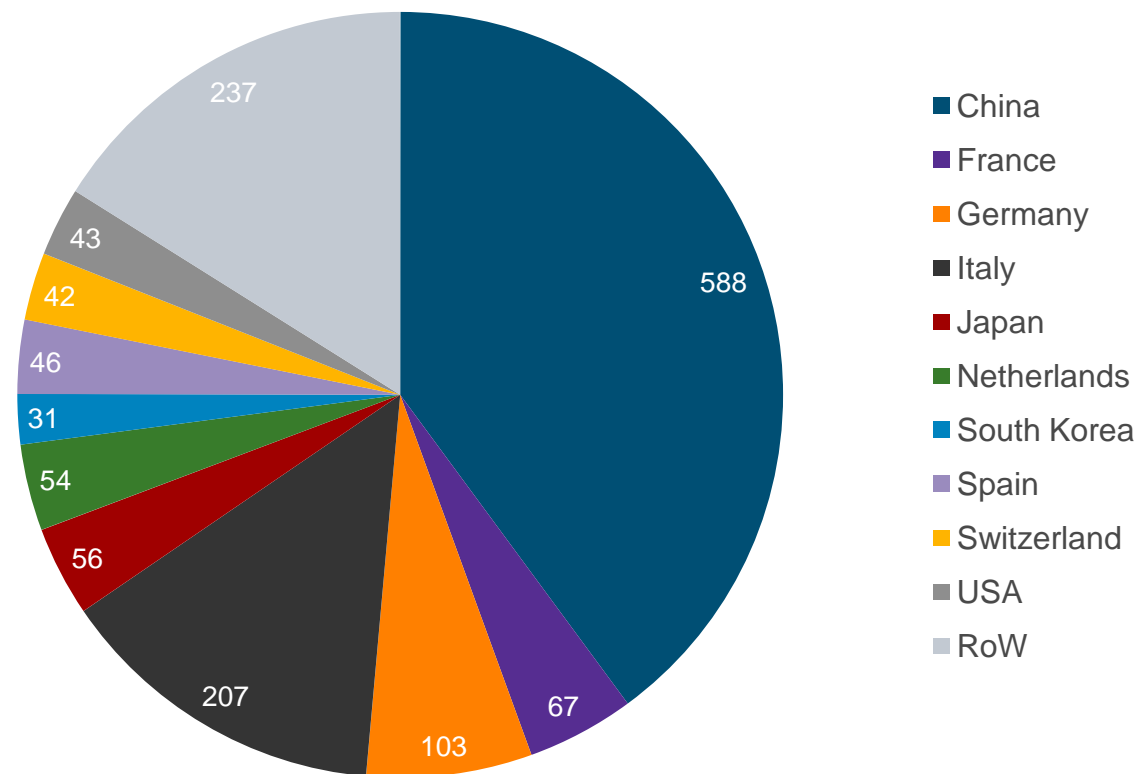
SUPPLY AGREEMENTS - CHINA

| Company | Partner | Activity |
|--------------------|------------|--------------------------------|
| Zhejiang Huahai | Merck | API, intermediates |
| Zhejiang Hisun | Eli Lilly | capreomycin API, vet drugs |
| Zhejiang Hisun | Alpharma | vancomycin API supply |
| Ningbo Smart | Novartis | diclofenac sodium API |
| Chongqing Huapont | Janssen | API supply |
| Hubei Shine Star | Flamma | amino acid & derivative supply |
| Hisoar | Boehringer | API, intermediates |
| Zhejiang Medicines | Hospira | vancomycin API |
| Shenzhen Hepalink | APP | heparin |
| Aurisco | Xellia | mometasone API |

SOURCING CHALLENGES

| Cost Type | China | India | Europe | U.S. |
|-----------------|--|--|--------|--------|
| Labor | \$  | \$  | \$\$\$ | \$\$\$ |
| Environmental | \$\$\$  | \$ | \$ | \$ |
| Energy | \$\$  | \$\$ | \$ | \$ |
| IP Protection | \$\$  | \$\$ | \$\$ | \$\$ |
| cGMP Monitoring | \$\$\$ | \$\$ | \$ | \$ |

INDIAN IMPORT REGISTRATIONS



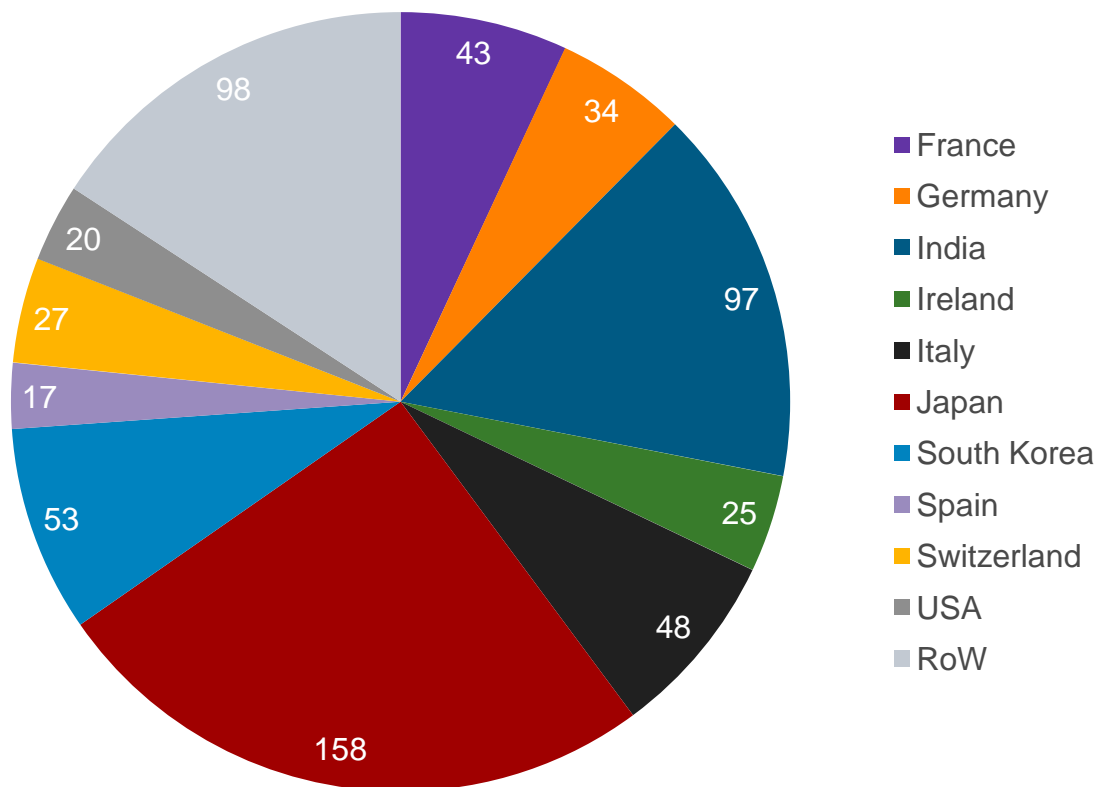
Top Companies

- Organon
- Zhejiang Hisun
- Evonik Rexim SAS
- Kyowa Hakko Kirin
- BASF
- ACS Dobfar SpA
- Archimica SpA

Top Products

- clavulanate potassium
- erythromycin thiocyanate
- cefotaxime sodium
- thiamine mononitrate
- amoxicillin sodium
- amoxicillin
- ceftriaxone sodium

CHINESE IMPORT REGISTRATIONS



Top Companies

- Kyowa Hakko Kirin Co Ltd
- Ajinomoto Co Inc
- Ranbaxy Laboratories Ltd
- Societe Oril
- Orchid Chemicals
- Dr Reddy's Laboratories Ltd
- Janssen Pharmaceutica NV
- Evonik Rexim SAS

Top Products

- clavulanate potassium
- cefixime
- cephalexin
- amoxicillin
- cefaclor
- ceftizoxime sodium

WESTERN SHIFT

| Company | Partner | Activity |
|-----------|--|---------------|
| Albemarle | Dr Reddy's | Ibuprofen API |
| DSM | Guangzhou Baiyunshan & Shandong Xinhua | Cefalexin API |

- Indian companies purchasing EU made API
- Returning projects
 - Pfizer Center Source
 - tried to establish steroid production in China and Taiwan, moved production back to US and improved processes
 - Custom (UK)
 - set up a facility in China, returned to UK due difficulty finding quality management, demand from customers for EU made product

QUALITY ISSUES

- Suspended COSs from Indian & Chinese companies
 - Fleming, Shantong Jinyang, Calyx, Tianjin Zhongan
- Heparin from China
- Ranbaxy imports banned
- Apotex sourcing issues
- Aurobindo restricted imports

SPECIALIZED MANUFACTURING

- High Potency
 - Lucrative targets for API manufacturers
 - Many companies investing (SAFC, Novasep)
- Continuous Process & Separation
 - Indian companies using enzymatic catalysts
 - More Asian companies investing in micro-reactor technology
- Micronization
 - Improves formulation and dissolution properties
 - Better bioavailability, less API needed

FOLLOW-ON BIOLOGIC DEVELOPMENT

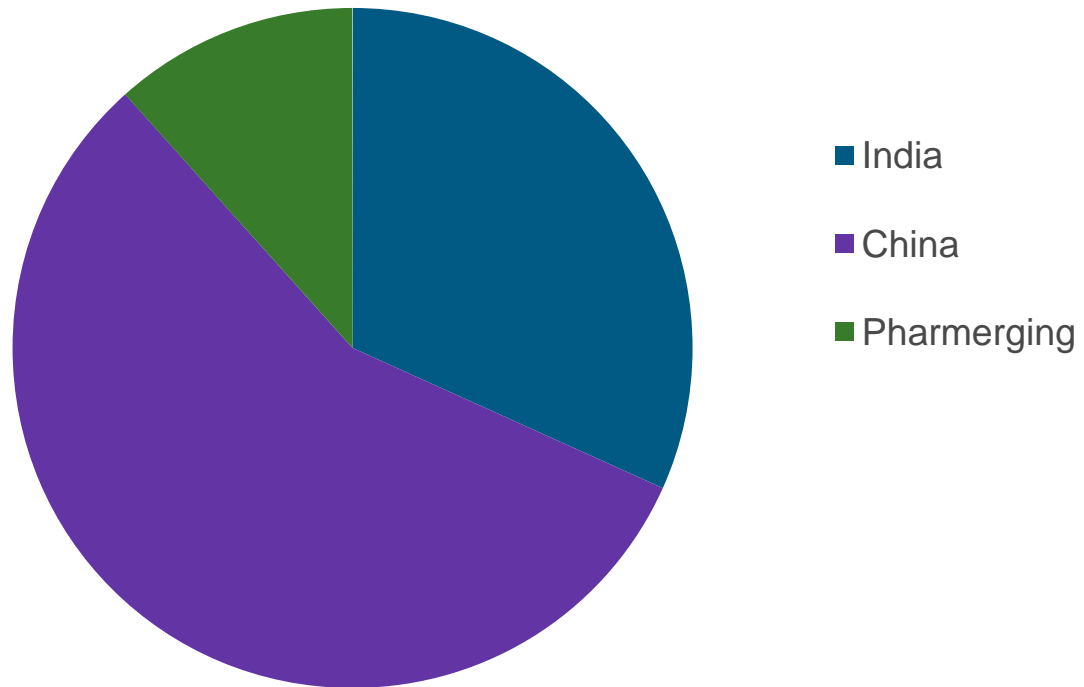
| Company | Proteins | Antibodies | Vaccines | Launches |
|------------|----------|------------|----------|------------|
| Teva | FP | UD | FP | EPO, GCSF |
| Sandoz | FP | UD | | EPO, HGH |
| Biocon | FP | UD | FP | GCSF |
| Hospira | FP | UD | | EPO, HGH |
| Zydus | FP | UD | | GCSF |
| STADA | FP | UD | | EPO |
| Actavis | FP | | | Via Bioton |
| Ranbaxy | FP | UD | FP | |
| Dr Reddy's | FP | FP | | GCSF |
| Apotex | FP | UD | FP | |
| Cipla | | UD | | |

Key: FP = Full Production, UD = Under Development

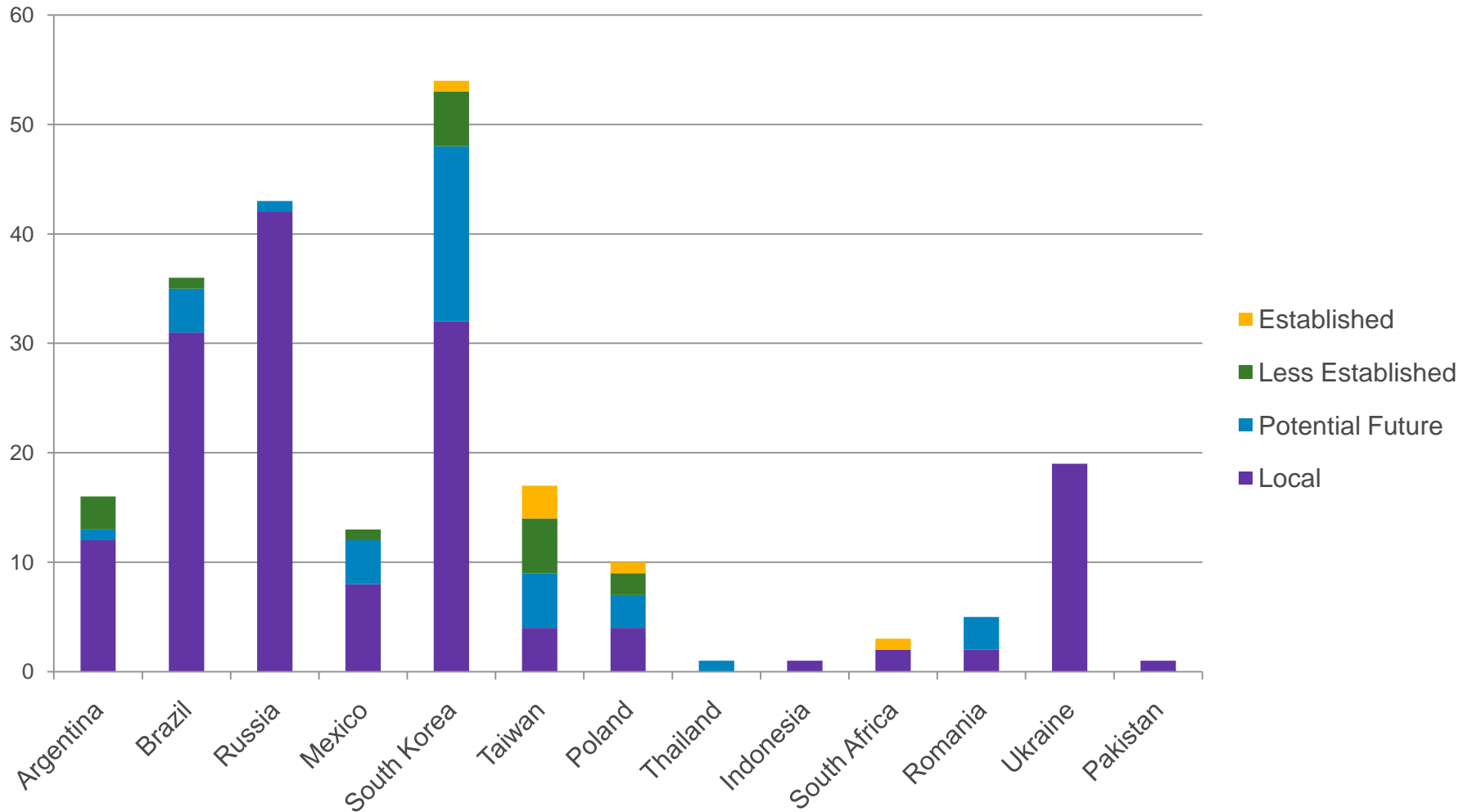
PHARMERGING MARKETS

- Predicted to expand by \$90bn during 2009-2013
- Emerging Markets:
 - Argentina, Poland, Thailand, Indonesia, South Africa, Romania, Ukraine, Pakistan, Mexico, South Korea, Taiwan, Brazil, Russia

Location of API
Manufacturers



PHARMERGING API MANUFACTURERS



FUTURE PROSPECTS SECOND WAVE EMERGING MARKETS

- Many sourcing challenges
- Little experience with regulated markets
- Small API industry
- Limited dose capabilities
 - Some specialties in Argentina (high potency, biologics)
- No indications of significantly better price at acceptable quality than in India or China

FUTURE PROSPECTS - INDIA

- Increased emphasis on FD for regulated markets
- Increased CRAMS business
- Greater reliance on China for APIs and advanced intermediates
- Increased costs as Chinese materials become more expensive and salaries rise
- Increased investment into local market
- Continued emphasis on large batch production

FUTURE PROSPECTS - CHINA

- Strengthened SFDA oversight
- New GMP regulations
- Greater EHS, waste treatment enforcement
- Increased costs of labor
- Improvements in quality, technical packages, IP
- Additional companies will expand into finished dose for regulated markets
- Many companies will stay focused on local market

FUTURE PROSPECTS - EUROPE

- Majority of APIs coming off-patent post 2015 are specialist driven
- Continued investment in process improvements and niche product manufacturing
- EGA proposed regulations to allow stockpiling and export to countries with less IPR
- Continued pricing pressures and competition from India & China

THANK YOU

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