

The Worldwide OEM Electronics Manufacturing Market

Presented by Randall Sherman

NEW VENTURE RESEARCH CORPORATION

A Technology Market Research Company

Nevada City, California

Who is New Venture Research?

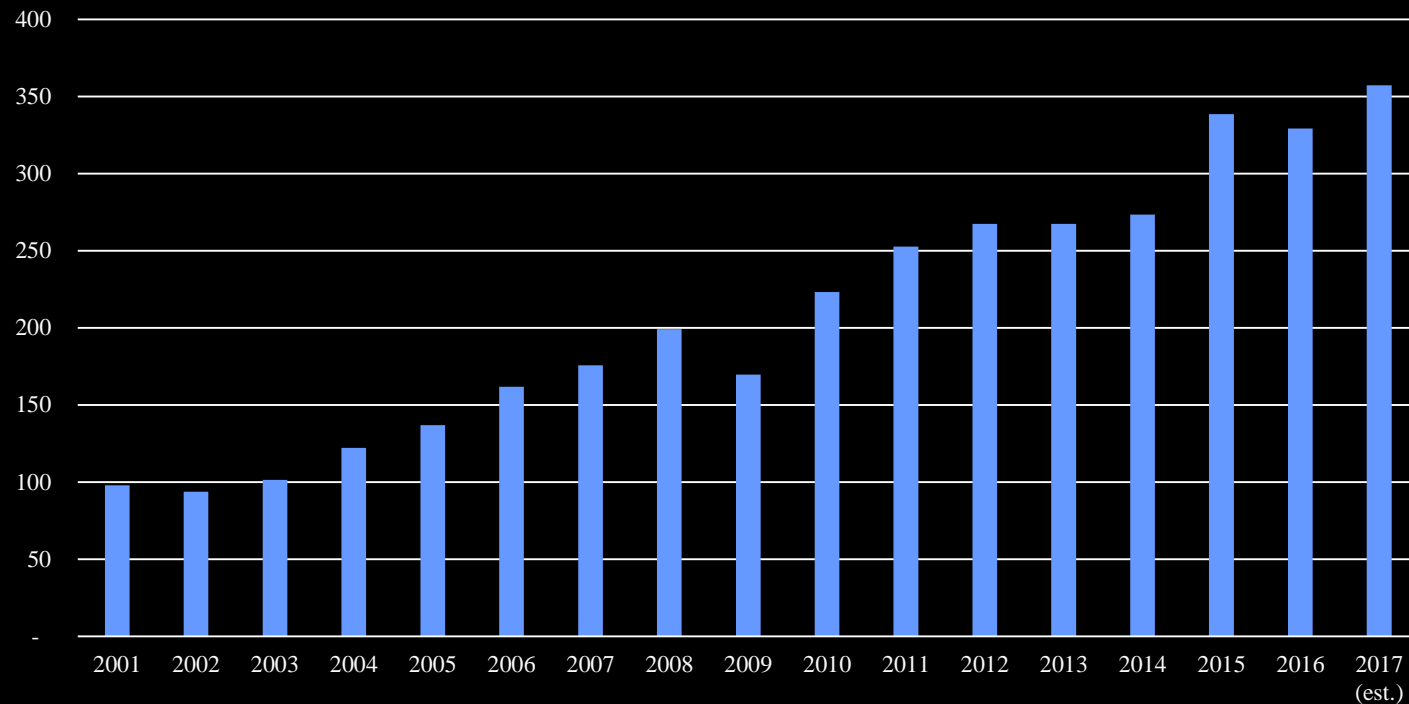
Specialists in contract manufacturing and outsourcing management consulting services for 20+ years

Consultants and publishers of syndicated and private client research on the OEM, EMS and Embedded Computing industries

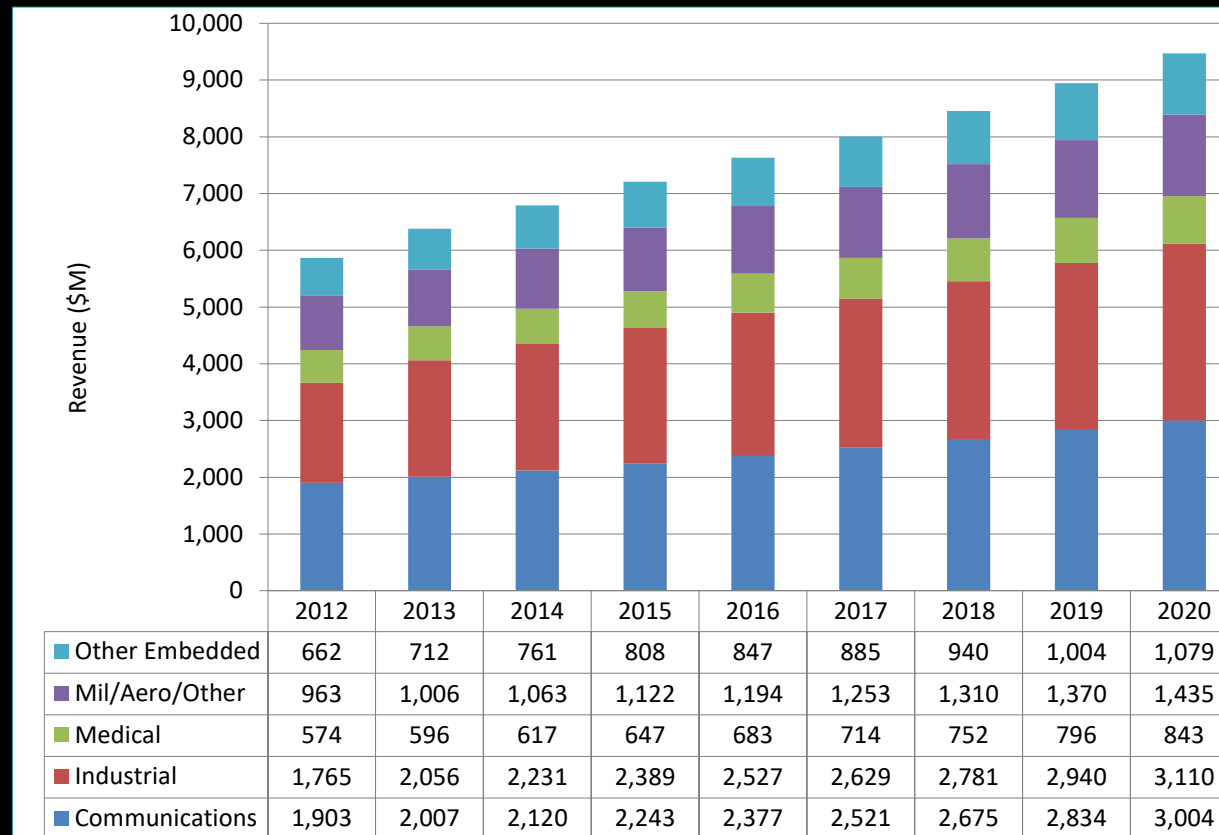
- *The Worldwide Contract Electronic Manufacturing Services Market – 2017 Edition*
- *The Worldwide OEM Electronics Assembly Market – 2017 Edition*
- *The Worldwide IC Packaging Market – 2017 Edition*
- *Advanced IC Packaging Technologies, Materials and Markets – 2017 Edition*
- *Contract Manufacturing Opportunities in the Printed Electronics Market*
- *Nanotechnology Markets and Trends*

The Last 17 Years Have Been A Wild Ride!

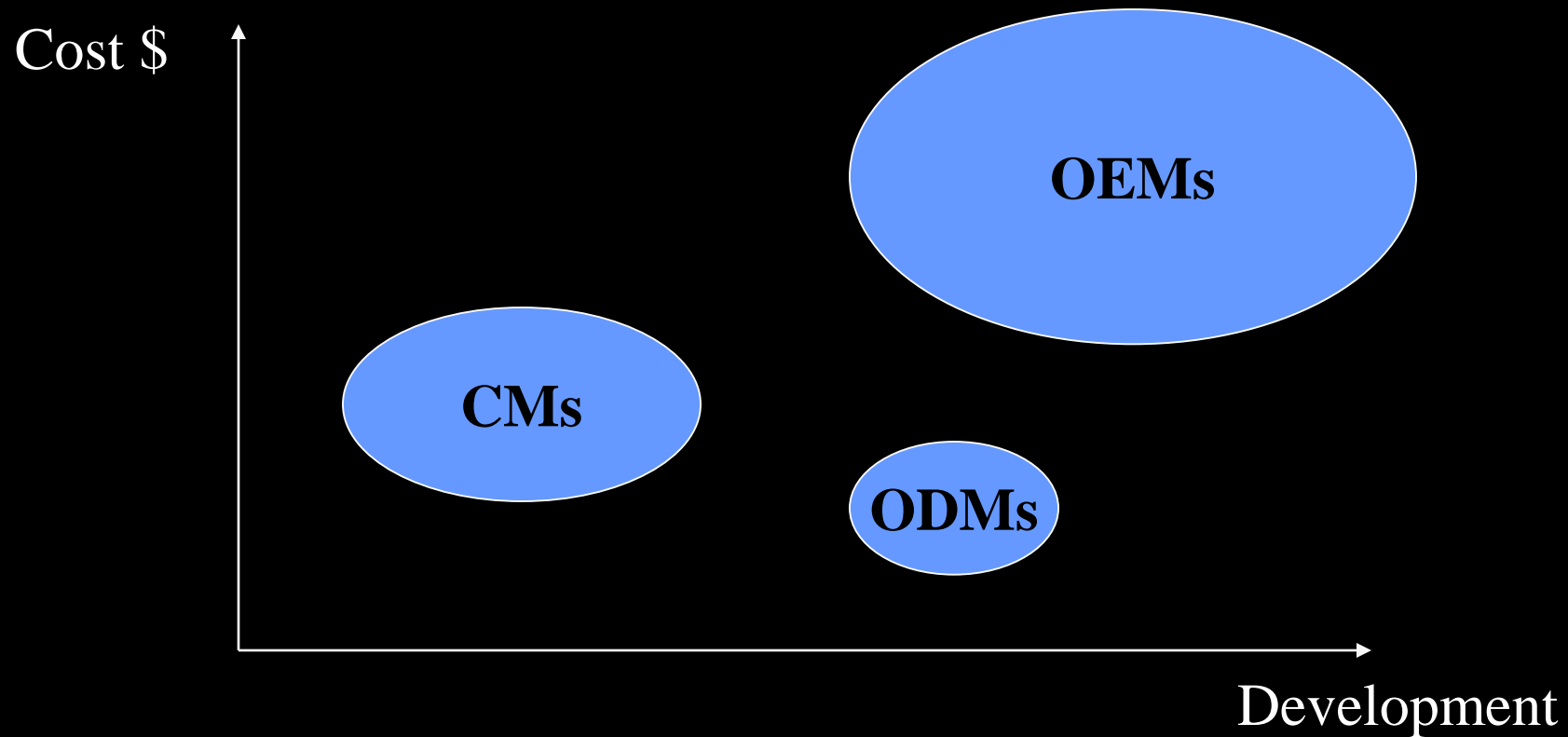
EMS Market \$B, 2001 - 2017



Embedded Computing Market (\$M), 2012 - 2020



Supplier Differences in Value-Add/Cost



OEM/EMS Competitive Trends

- Expansion up and down the supply chain for Tier One
 - Materials/component manufacturing (LEDs, PV cells, multichip modules, displays, SiP, MCM)
- More verticalization in Lower Tiers
 - ODM type services dominate in computer, consumer and communications commodity industries
- Increased separation between EMS and OEM product development/ownership
 - Except for Asian commodity products, OEM customers will become more dependent on their EMS and embedded computing partners, forging more equitable relationships

Industrial Product Outsourcing

29 Product Segments, 100 Top OEM Companies

- Process Control (Automation/Programmable Logic Controllers, Construction/Agricultural/Mining, Electric Motors, Electrical Distribution/Smart Grid, Elevator Systems, Environmental Management, Fluid Control/Hydraulics, Marine/Waste Water, Oil/Gas, Power Supplies, Robotics, Smart Meters, UPS/Batteries)
- Test & Measurement (Inspection Equipment, Instruments/Metrology, Semiconductor Equipment, Test Hardware)
- Other Industrial (ATM/Gaming/Vending, HVAC, Laundry/Home Appliances, Lighting/LEDs, Security/Safety, Tools, Handling/Specialty/Other)
- Clean Energy (Fuel Cells, Inverters, Solar PV, Tidal/Other, Wind Energy)

Medical Product Outsourcing

FDA Oversight of Class One, Two and Three Equipment

- Medical Diagnostics (X-Ray, MRI, Nuclear, In-Vitro, tomography imaging, dialysis, oncology, endoscopy, blood glucose measuring devices, and home test equipment)
- Therapeutic (Pacemakers, stents, catheters, wire guides, orthopedics, nutrition delivery, ventilation, respiratory care, exercise therapy)
- Monitoring and Surgical (Patient, cardiac, anesthesia, molecular / life sciences, defibrillators, ophthalmic, life support)

Predictions for EMS in the Future

- The EMS value-proposition has been demonstrated and proven and the industry will continue to grow, albeit at a slower rate
- Leading/bleeding edge of manufacturing technology will be a key differentiator and separator in OEM partnerships
- EMS/Embedded suppliers have learned to choose their customers more carefully, leading to stronger profits and healthy companies

Predictions for EMS in the Future

- The Asian commodity model will be challenged, either from economic downturn, worker disintegration or cultural implosion. The ODM business model is built on a potential house of cards but survives through hard work and dedication
- The EMS industry will remain highly concentrated due to the customer and product base. Consolidation of weaker suppliers is inevitable
- EMS model will evolve and become accepted as the de facto manufacturing model of the future as the old OEM skill-set becomes obsolete and unsustainable, especially among commodity products

Manufacturing Trends to Watch

- Printed Electronics
- Nanotechnology/Materials Science
- 3D Manufacturing
- Advanced Packaging, SiP, MCM

Manufacturing Trends to Watch – Printed Electronics

- The inevitable demise of SMT (batch vs. discrete)
- Printing circuits on variable/flexible substrates (glass, plastic, metal, organic/inorganic materials)
- Printing multiple/integrated functions (logic, memory, power, display, antennas, amplifiers)
- Immediate applications include logic, memory, RFID, OLEDs, solar PV, packaging, toys, 4-bit/8-bit devices

Manufacturing Trends to Watch - Nanotechnology

- Design of thin film materials an atomic/molecular assembly level
- Applications include thin films, electronics, biomaterials and energy production
- Impact will significantly affect performance, cost and quality over the long run (10-15 years)

Manufacturing Trends to Watch – 3D Manufacturing/Fabrication

- Incremental/additive/holographic rendering of products using digital and lenticular printing techniques
- New products being created (food, electronics, medical/dental, automotive, aerospace, prototypes)
- Emerging applications include footwear, jewelry, industrial design, architecture, construction, education, GIS, application engineering

Summary

- EMS will be the manufacturing engine to drive electronics growth and innovation for the next decade.
- Embedded computing companies will continue to survive in their niche, but ostensibly be threaten by large EMS companies with deep technical and financial resources.
- Partnering between EMS and OEMs/Embedded Computing companies will seed technology innovation and be more synergistic in the future, emerging as the dominant business model for the future of advanced electronics.

Conclusion

“It is not the strongest species that survive,
nor the most intelligent, but the ones most
responsive to change.”

Charles Darwin



NEW VENTURE RESEARCH CORPORATION

**A Technology Market Research Company
Nevada City, California**