

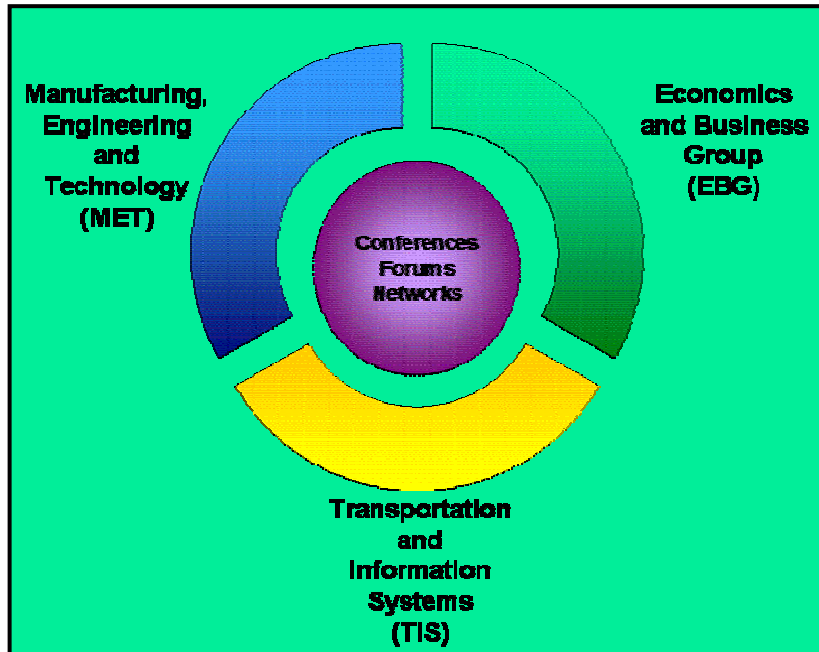
Automotive Industry Restructuring; Opportunities in the Chaos

Industrial Technology & Strategy Review Board Meeting

August 14, 2006

*Dr. Jay Baron
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About CAR



Mission

“..... To assist the global automotive industry’s competitiveness and technological advancement through unbiased research and support”

www.cargroup.org

CAR is an independent, not-for-profit organization with research activities in manufacturing, economics, and transportation.

CAR was formerly OSAT with a 25-year history at the Univ. of Michigan prior to spinning off and recently becoming independent.

- Dr. David Cole, Chairman, Auto Industry Analyst
- Dr. Jay Baron, President, Functional Build Research - 15 years
- Dr. Sean McAlinden, Chief Economist, Auto Industry Analyst

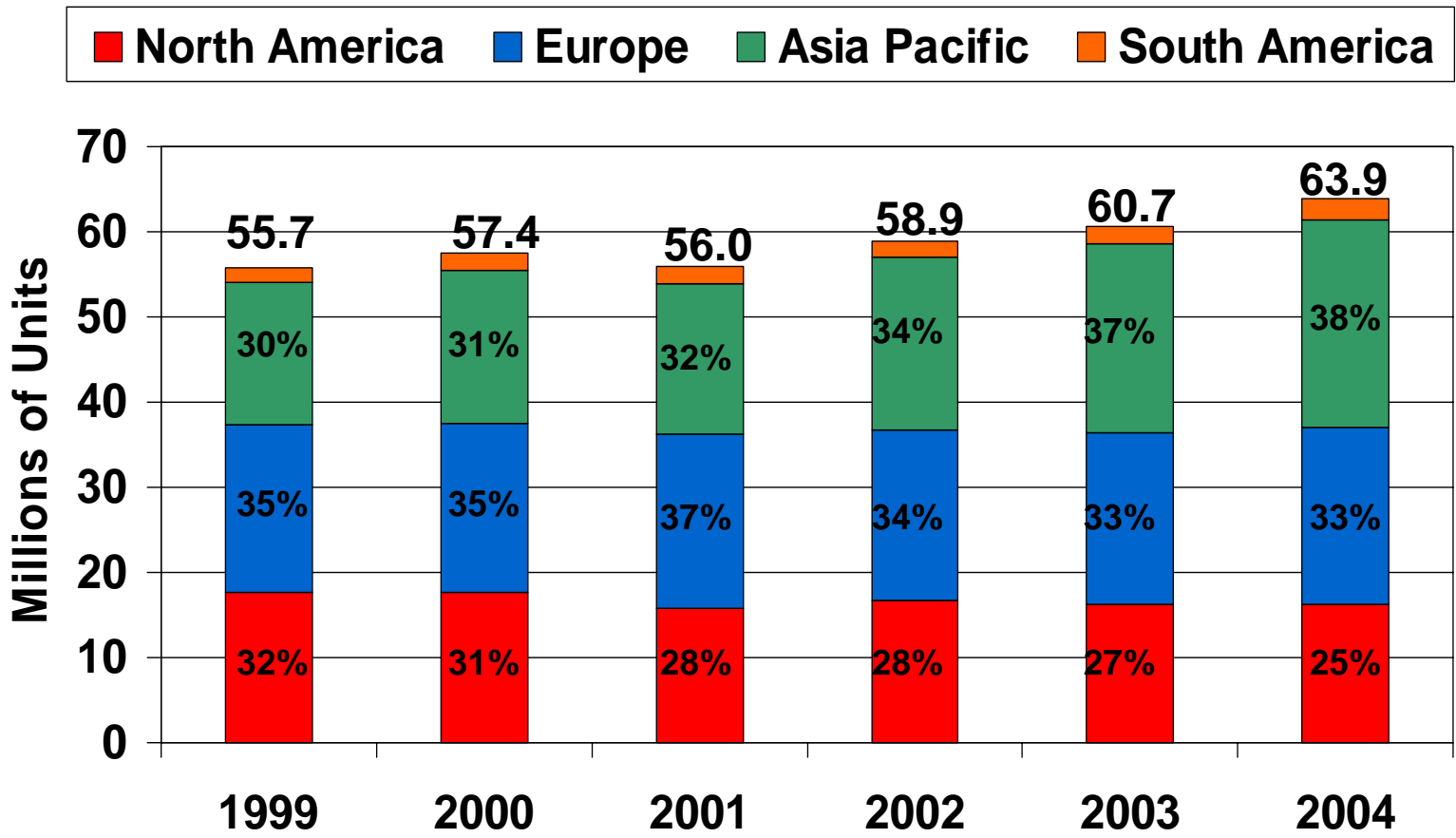
Global Auto Industry Three World Centers?



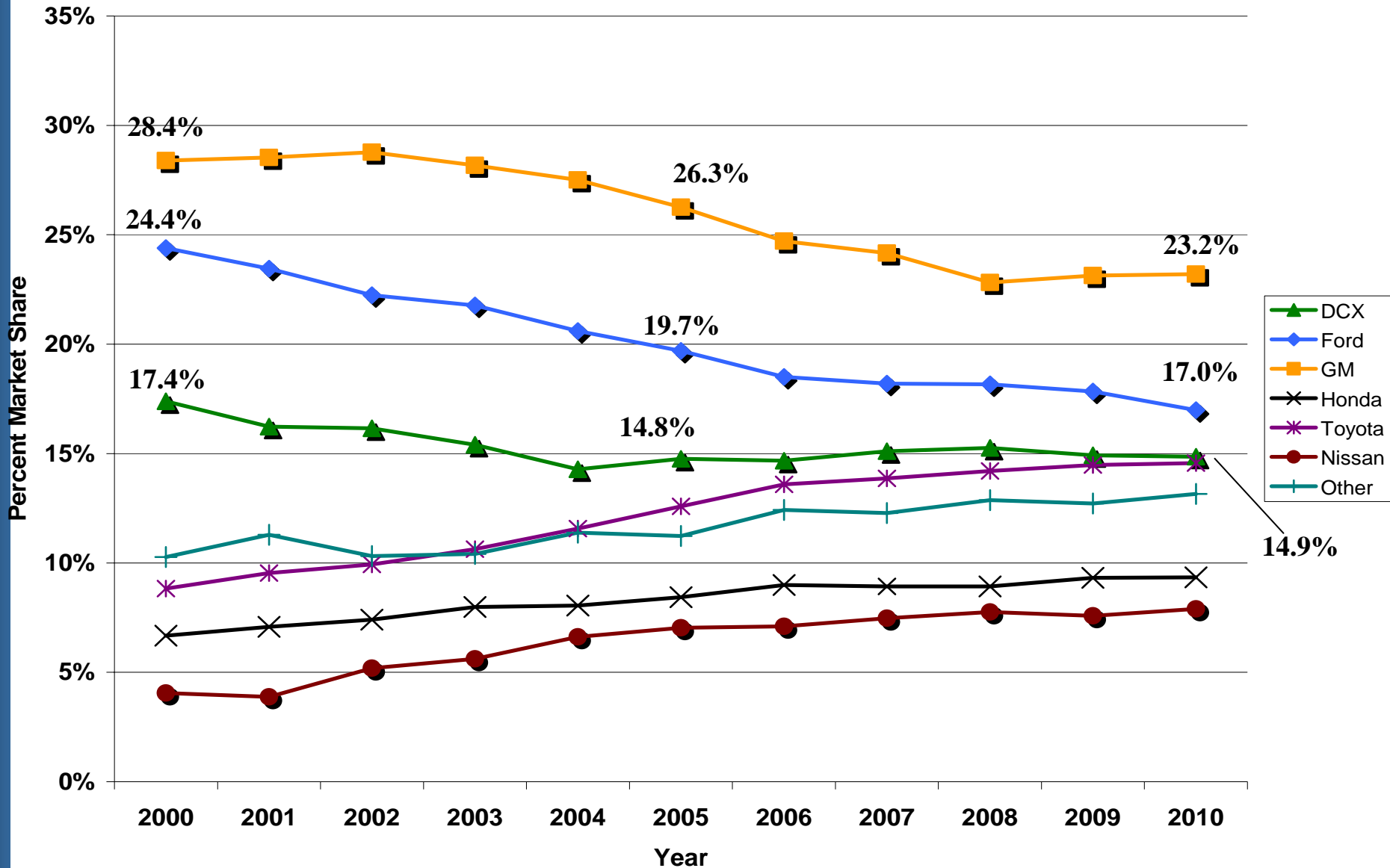
Global Automotive Production

Generally, the Auto Industry is Healthy

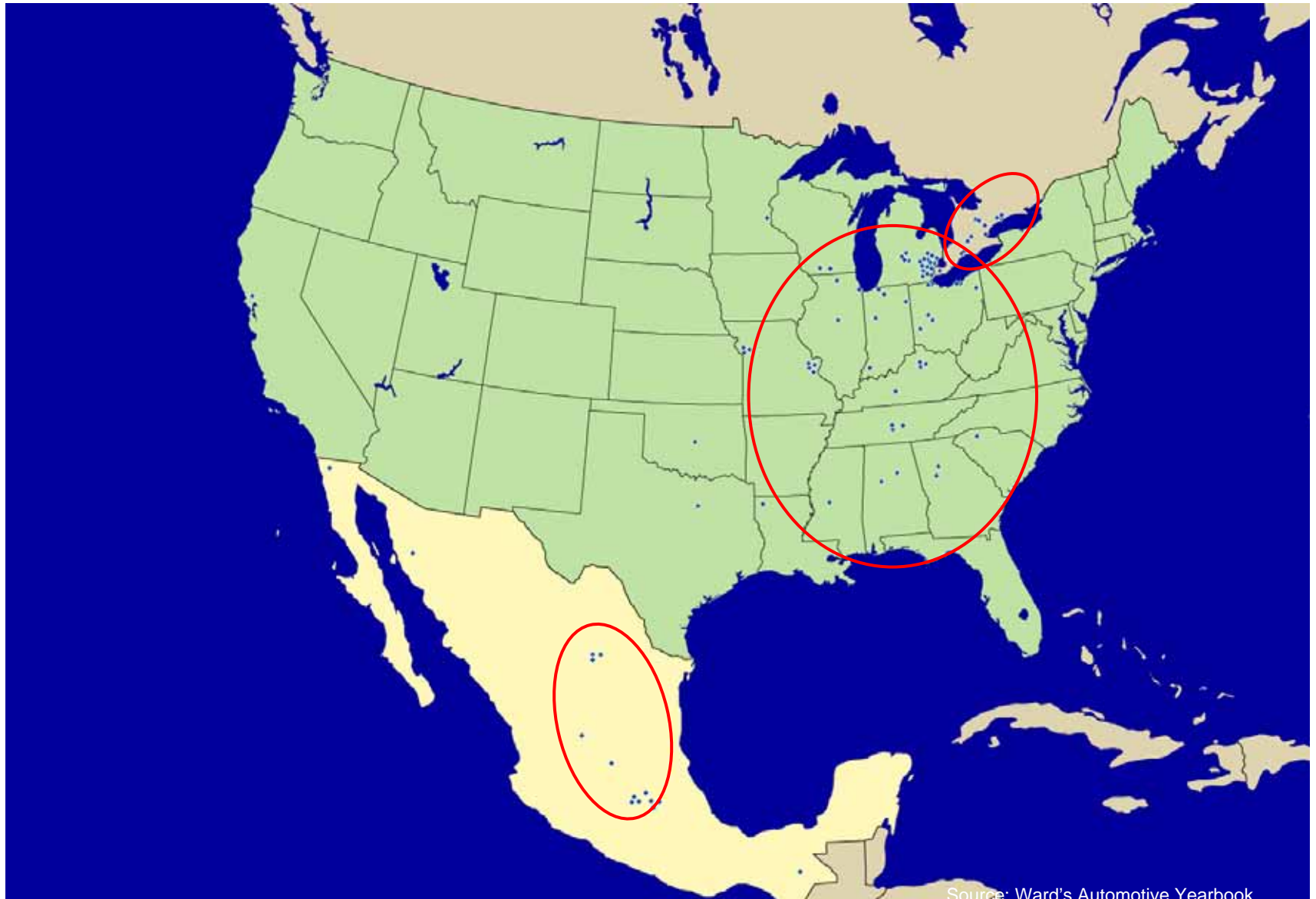
- ▲ World sales volume is growing
- ▲ As a percentage of global sales, Europe holding steady, Asia-Pacific growing, NA declining



U.S. Light Vehicle Market Share 2000-2010



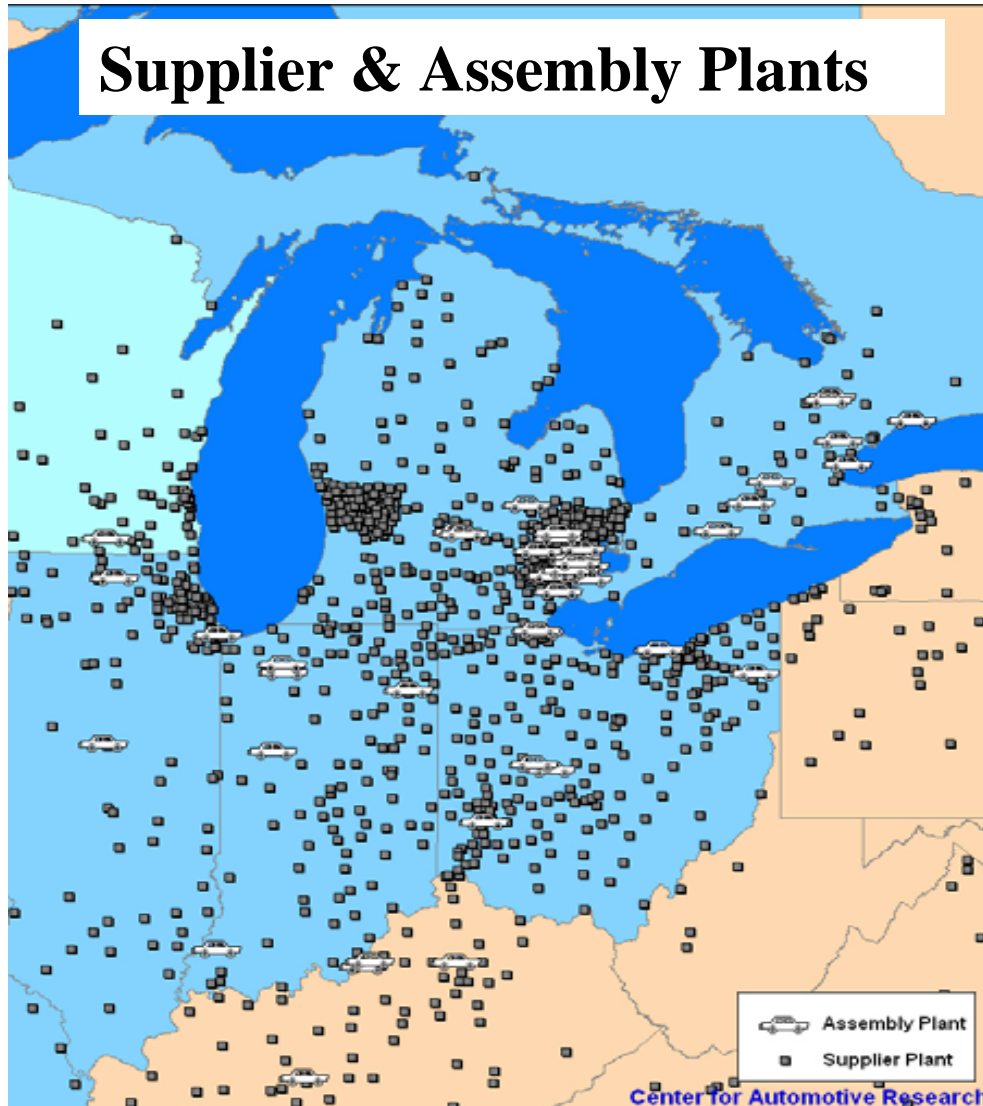
North American Assembly Facilities



Source: Ward's Automotive Yearbook

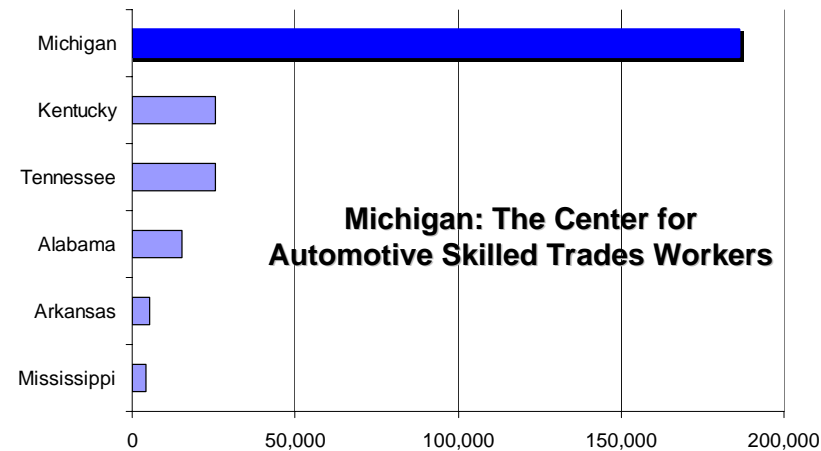
Michigan: North America's Automotive Manufacturing Center

Supplier & Assembly Plants

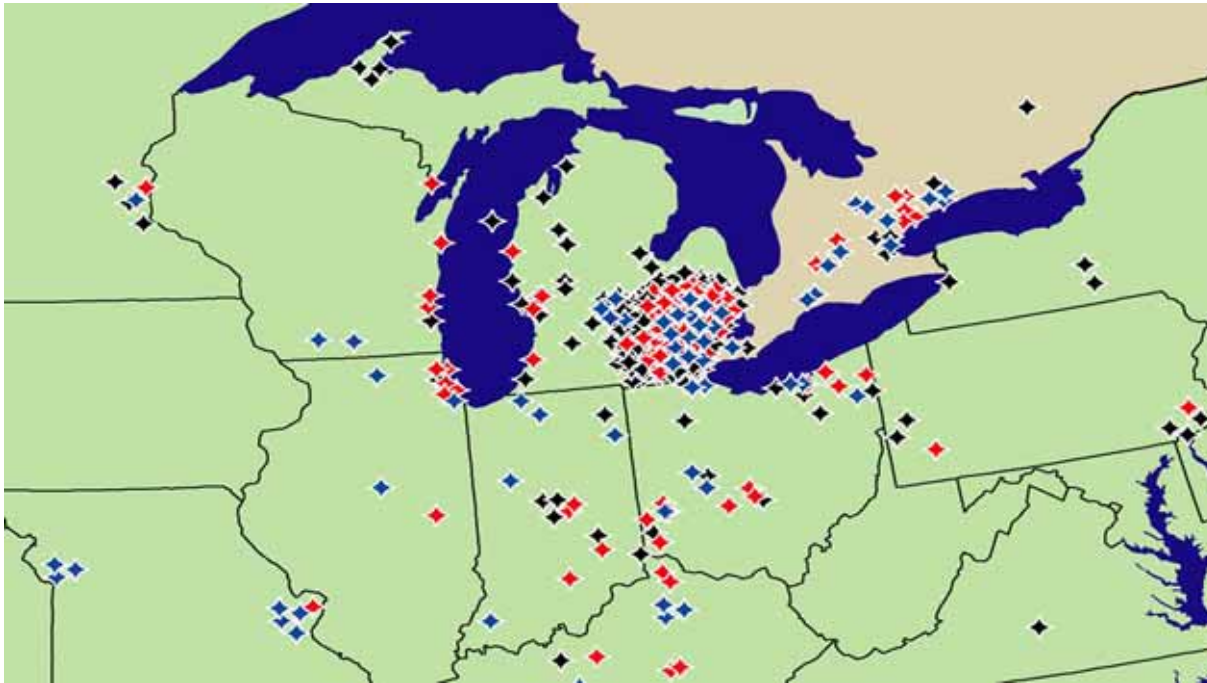


▲ Michigan employs 1 out of every 4 automotive workers in the U.S.

186,000 Skilled Trades



Great Lakes Region Assembly, Supplier Headquarters and R&D



You don't come to Michigan for low wages – you come for technology solutions.

- ▲ 60% of the top 150 automotive suppliers to North America are headquartered in Michigan
- ▲ Over 215 Automotive R&D Companies in Michigan - over 50% are Engineering Centers
- ▲ \$10.3 billion research annually (more than all other states combined)

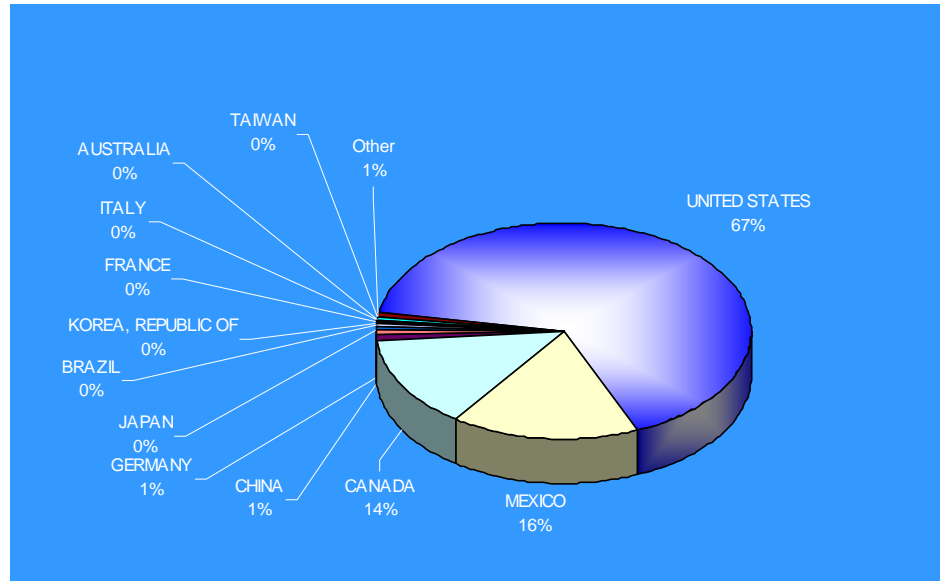
US Original Equipment and Aftermarket Parts Market

Year	Size of U.S. Parts Market (\$US Billion)	China (\$US Billion)	China (%)	Japan (\$US Billion)	Japan (%)
1997	\$193.6	\$0.3	0.2%	\$10.9	5.6%
1998	\$211.0	\$0.4	0.2%	\$9.6	4.5%
1999	\$242.2	\$0.6	0.2%	\$10.3	4.3%
2000	\$225.6	\$0.8	0.4%	\$12.0	5.3%
2001	\$214.2	\$1.0	0.4%	\$11.1	5.2%
2002	\$218.8	\$1.3	0.6%	\$11.2	5.1%
2003	\$236.0	\$1.7	0.7%	\$11.4	4.8%
2004	\$244.0	\$2.4	1.0%	\$13.0	5.3%
2005	\$238.7	\$3.2	1.3%	\$13.8	5.8%

- ▲ China imports growing rapidly, but still small share
- ▲ Japan imports are stable; increasing domestic sources

Vehicle Content

Chevrolet HHR



2007 Chevrolet Tahoe



Country	% of Dollar Value Content Supplied
Mexico	64%
United States	30%
Japan	2%
Canada	1%
Korea	1%
China	1%

“Lowest landed cost”

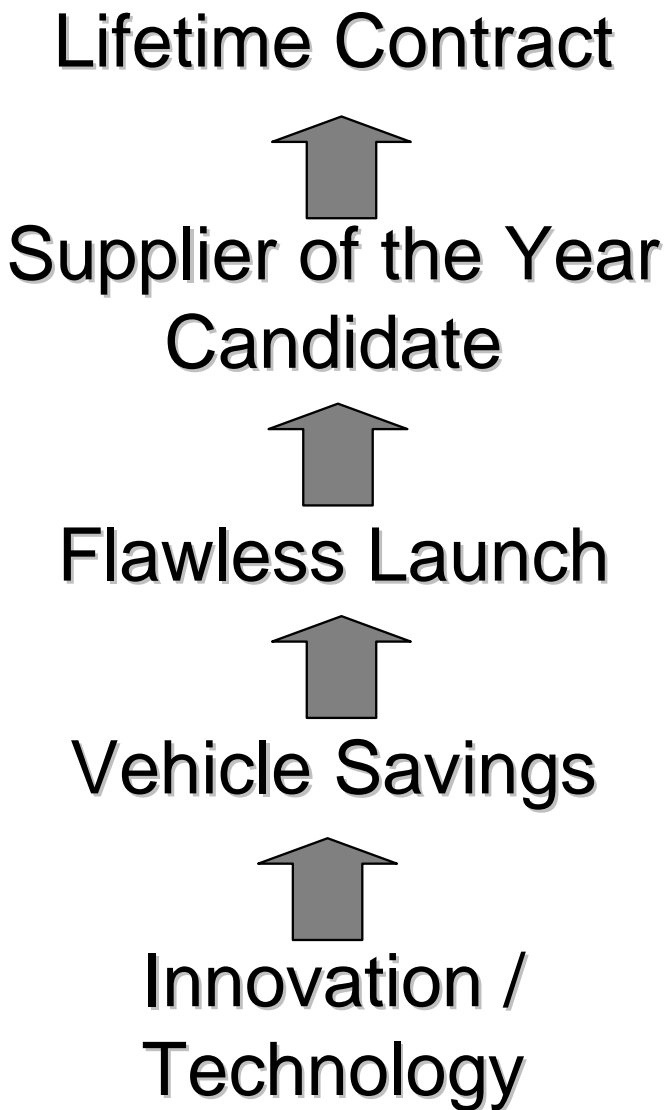
Bo Anderson, VP, GM, Global Purchasing and Supply Chain

Country	% of Dollar Value Content Supplied
United States	62%
Mexico	25%
Canada	9%
China	3%
Korea	.2%
Japan	<.1%

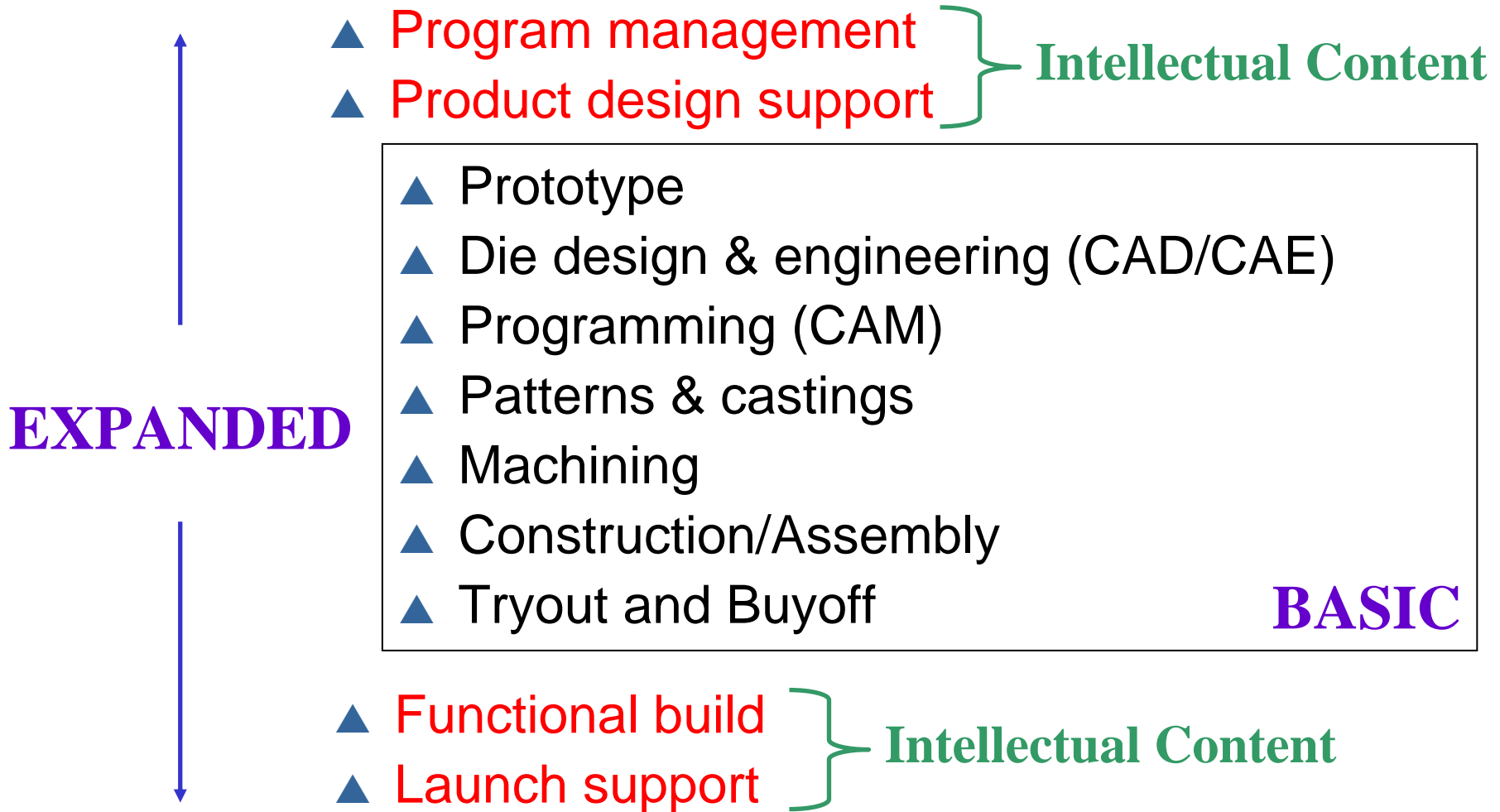
North American Suppliers

- Traditional North American suppliers are attempting to reach out to the new domestics. (Toyota, Honda, Nissan, BMW, Daimler, Hyundai)
- They are having very limited success.
- ▲ Foreign suppliers are relocating to North America. Continuing their established relationships, but now in new North American facilities.

Translation



Die Engineering and Construction



Example: International Tooling Model



Local Program Management: UTC

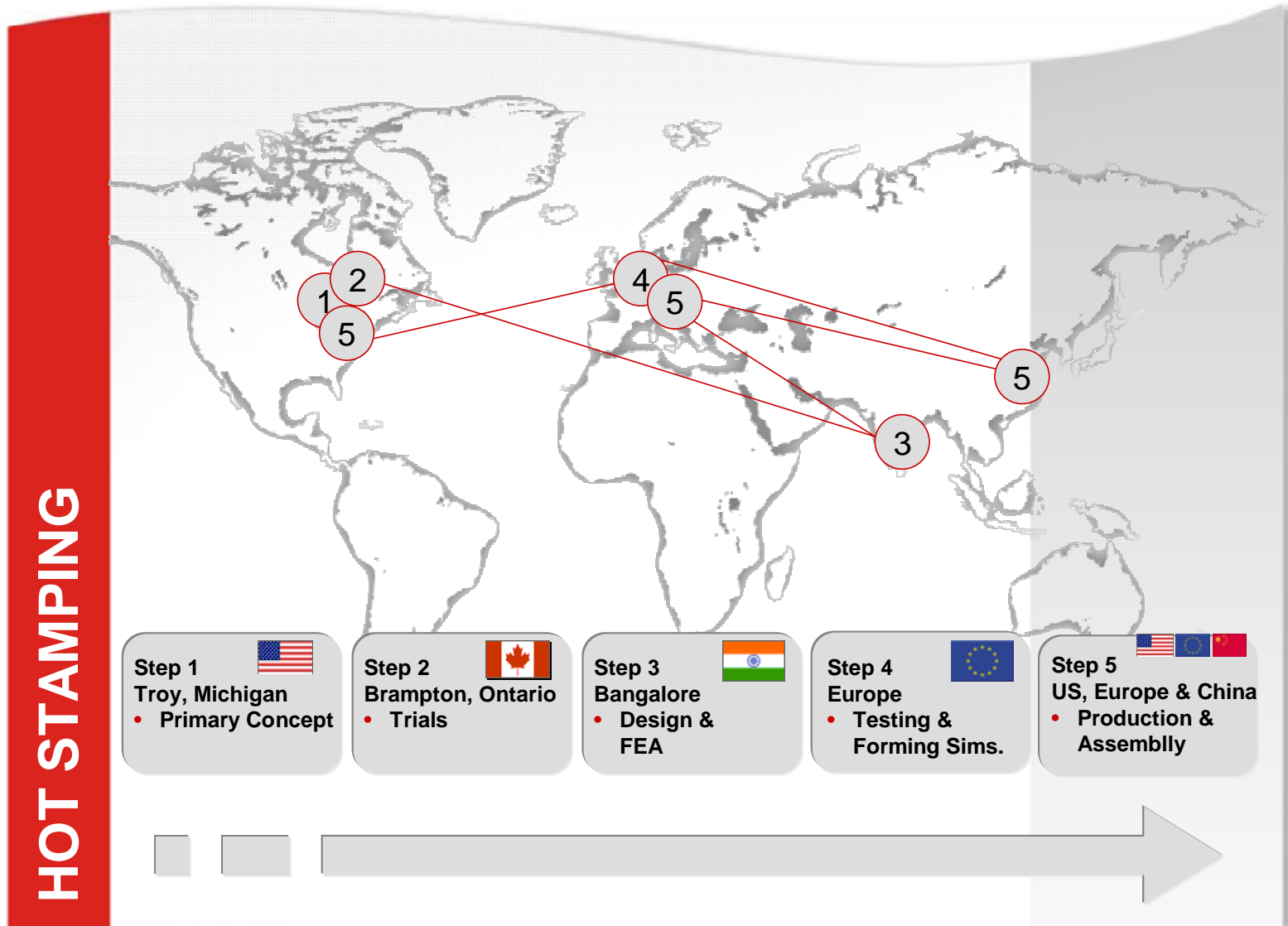
**Large Tooling
System Order**

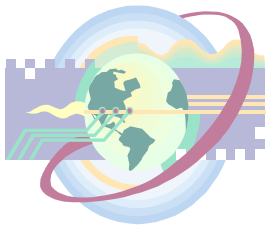


Dies & Molds
Fixtures
Prototypes

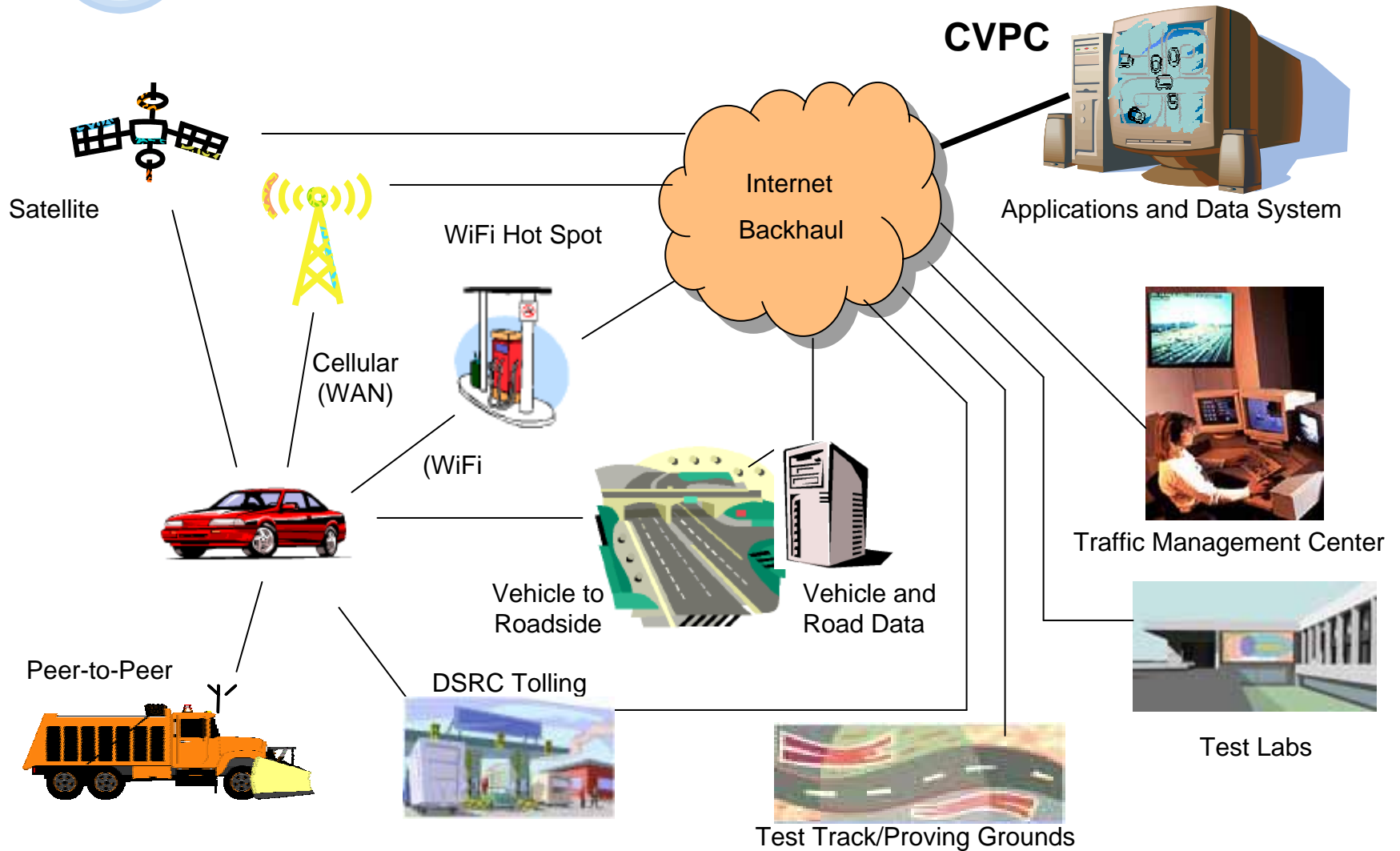
	UTC		Import
	Large, Complex	Prog. Dies, Molds, Special	Simple, Labor Intensive
	~25%	~25%	~50%
product evaluation	Local	Local	Local
feasibility	Local	Local	Local
process engineering	Local	Local	Local
patterns (if applicable)	Local	Local	Foreign
machining	Local	Local	Foreign
assembly	Local	Local	Foreign
tryout	Local	Local	Local
launch support	Local	Local	Local

Example: Global R&D Model





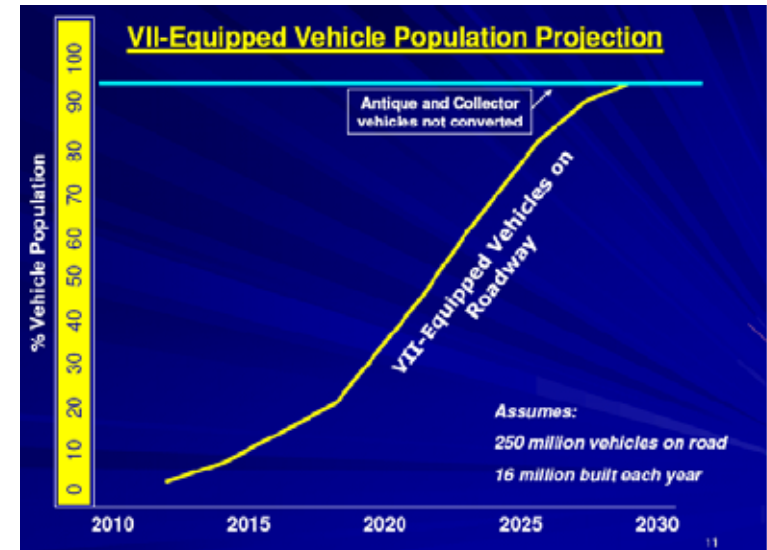
Connected Vehicle Proving Center



Vehicle Infotainment and Communications

- ▲ Amount of automotive electronics will *quadruple* in the next five years.
- ▲ “VII is becoming acknowledged at the biggest change in passenger and commercial transportation since the inception of the interstate highway system.” Steudle/MDOT
- ▲ In 2002 an average vehicle had 74 sensors, by 2010 that number is expected to reach 175 or more.
- ▲ Electronics and software are expected to represent: 80–90% of vehicle innovations through 2010. (Automotive Software Foundry)
- ▲ Between 2007-2011, telematics sales growth is forecast as:

	Global	North America
OEM Monitored	267%	717%
OEM Non-monitored	717%	2512%
Aftermarket Monitored	629%	866%
Aftermarket Non-Monitored	425%	662%



CVPC



Program Structure:

- Virtual testing lab with server and network connections to link test beds, traffic management centers, controlled access roads, bench test labs and integration facility
 - Useable by public and private entities as the reference environment for evaluating and qualify products, applications, architectures, communication protocols, etc.
 - Evolve into Certification/Validation laboratory for Consumer Electronics, nomadic devices, automaker tests, etc.
- ▲ One-of-a kind facility to process data, evaluate, train, and showcase connected vehicle and digital highway products, etc.
 - ▲ Michigan partnership with auto& telecommunications industries, states, DOT, USDOT
 - ▲ Links.... dedicated controlled access roads, proving grounds, test tracks, independent bench test laboratories, and traffic management centers

Automotive Research and Testing Center (ARTC)

1. Identify perceived strengths/weaknesses of Taiwan supply industry for automotive (N.A. interviews / global generalizations).
2. Assess growth of electronics in powertrain, safety, chassis and telematics.
3. Identify supply chain relationships and development phases.
4. Assess integration of Taiwan industry with North American industry; identify strategic partnership opportunities.
 - Partnerships
 - Joint ventures
 - Investments, etc.

*And don't forget
Michigan is also a nice place to live ...*

