



## **Robert Eller Associates, Inc.**

CONSULTANTS TO THE PLASTICS AND RUBBER INDUSTRIES

# **OPPORTUNITIES FOR ADVANCED TECHNOLOGY NONWOVENS IN AUTO INTERIORS AND EXTERIORS**

**PRESENTED BY:**

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**TECHTEXTIL**

**SYMPOSIUM**

**NORTH AMERICA 2006**

**Atlanta, GA**

**March 31, 2006**

B/mydocs/papers/techtex06

# **PRESENTATION HIGHLIGHTS**

- **AUTO INDUSTRY OVERVIEW**
- **AUTO SUPPLY CHAIN IMPLOSION/  
IMPLICATIONS FOR NONWOVENS**
- **NONWOVEN PATHS-TO-MARKET**
- **GLOBAL NONWOVENS DIFFERENCES**
- **COMPETITIVE MATERIALS/PROCESS  
COUPLES**
- **VALUE ADD STRATEGIES**
- **TARGET MODULES**

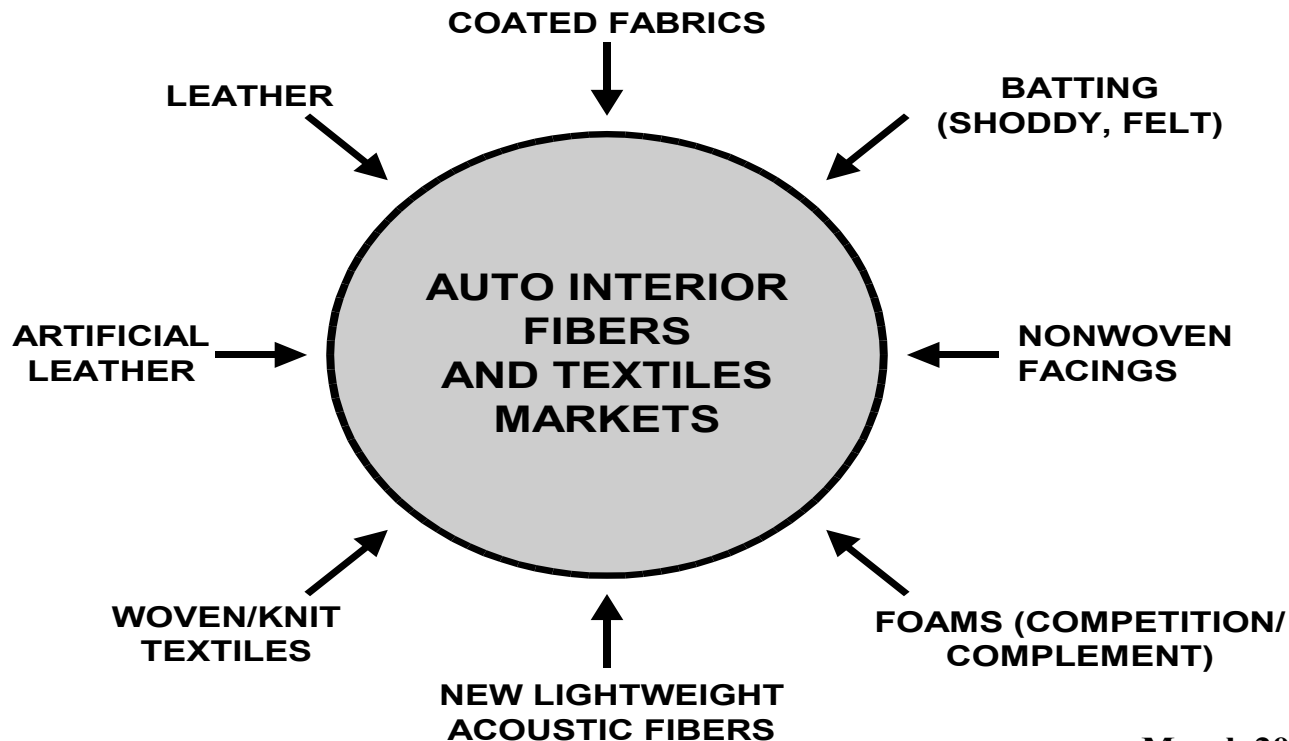
# **SOURCES/REFERENCES**

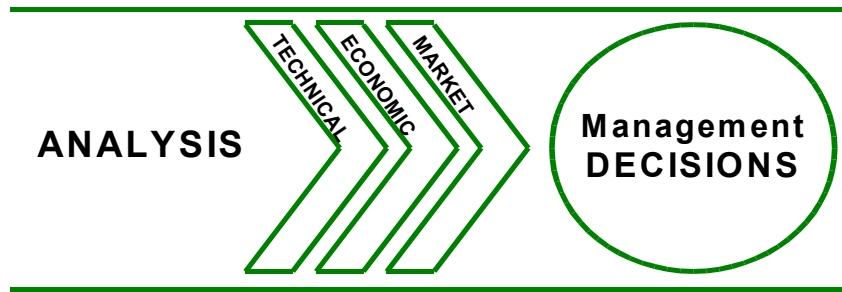
- **ADVANCED TECHNOLOGY NONWOVENS  
MULTICLIENT: ROBERT ELLER  
ASSOCIATES, INC./JOHN R. STARR INC.**
- **AUTOMOTIVE INTERIOR SOFT TRIM  
MULTICLIENT: ROBERT ELLER  
ASSOCIATES INC.**

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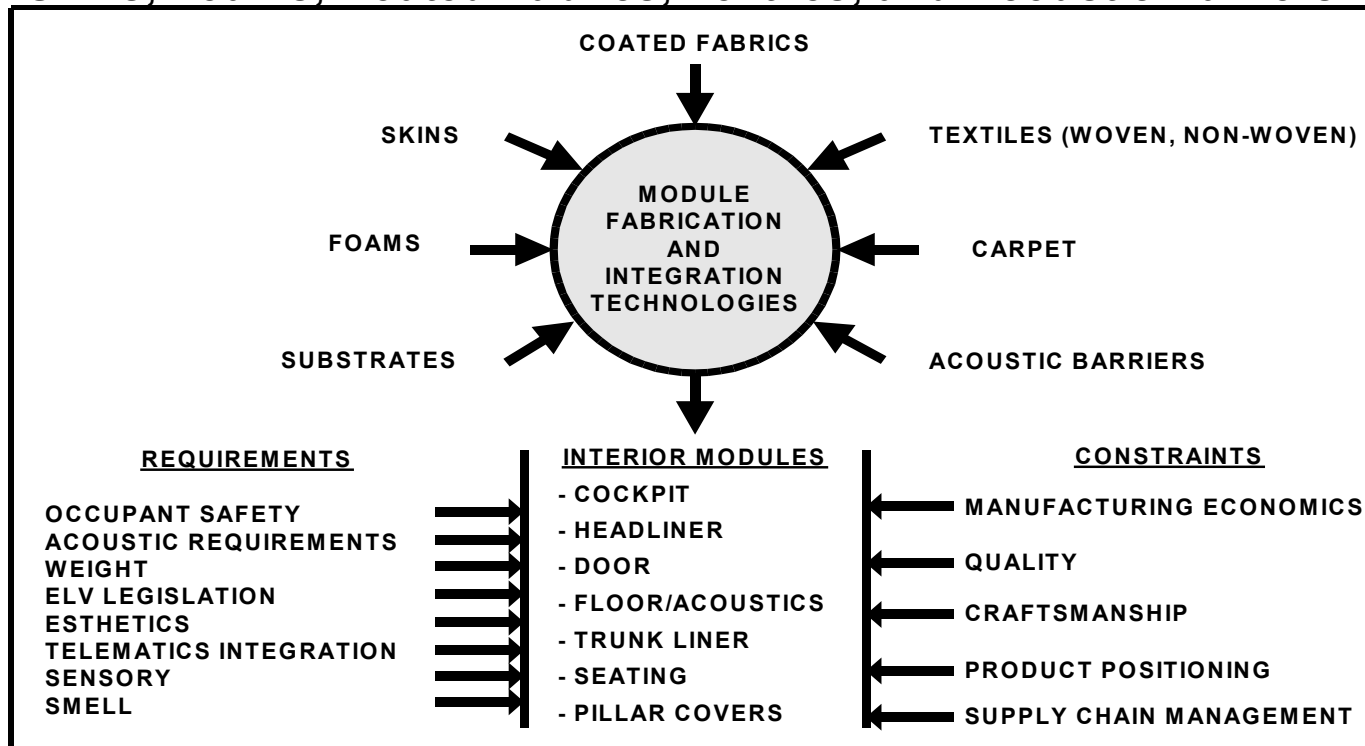
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**Opportunities for Advanced Technology  
Nonwoven Fabrics for Automotive Interior  
Surface and Construction Applications  
in NAFTA and Europe**





## Automotive Interior Soft Trim: Skins, Foams, Coated Fabrics, Textiles, and Acoustic Barriers



**Prospectus for a Global Multiclient Industry Analysis**  
**Robert Eller Associates, Inc.**

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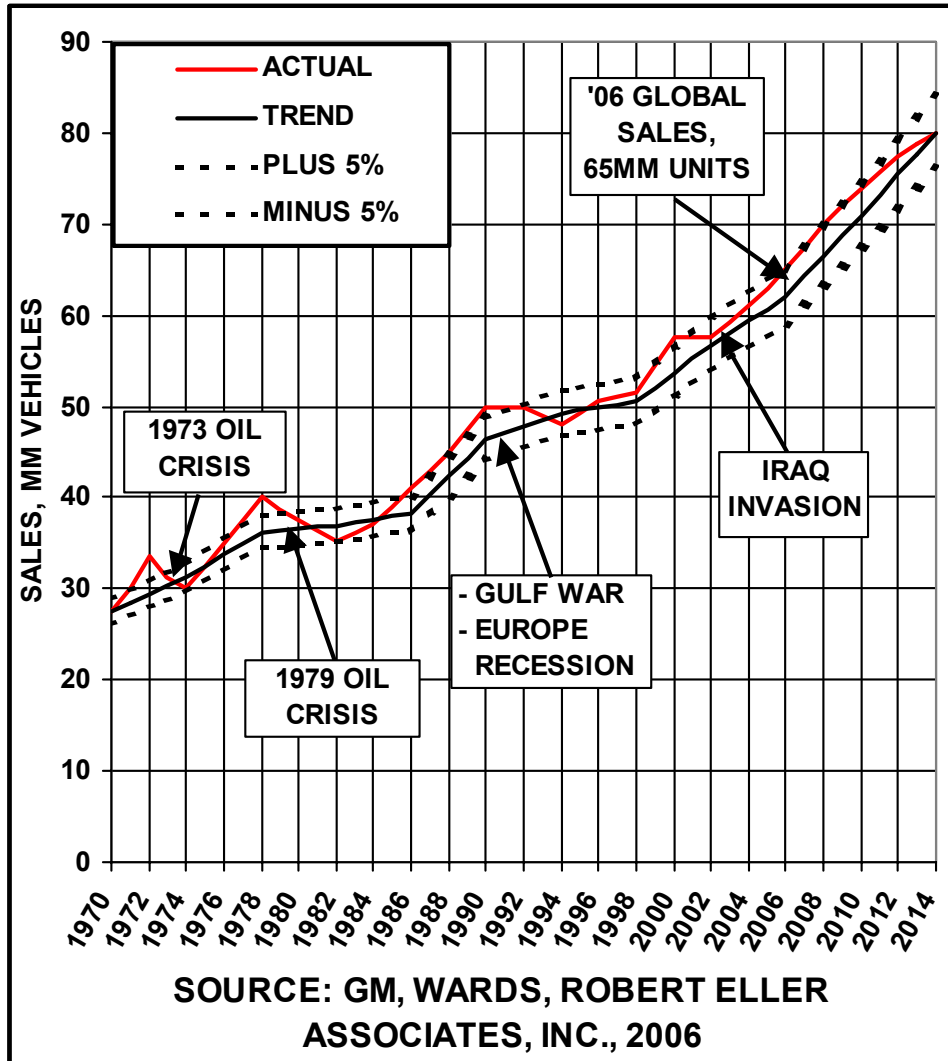
# OPERATING HYPOTHESES

- **VEHICLE PRICES CONTINUE DOWNWARD**
- **THE SUPPLY CHAIN WILL BE RESHAPED**
- **GLOBAL AUTOPLASTICS/TEXTILES TECHNOLOGY CONVERGENCE (U.S. 3-5 YEAR LAG BEING REDUCED)**
- **SEVERE MATERIALS PRICE PRESSURE CONTINUES**
- **SEVERE PROFITABILITY PRESSURES DRIVE NW SUPPLIERS TO SEEK VALUE ADD STRATEGIES**
- **ACOUSTICS PERFORMANCE AND LIGHT-WEIGHTING CONTINUE AS DRIVING FORCES**
- **THE NONWOVENS MATERIALS/PROCESS COUPLE CAN OFFER SYSTEMS COST SAVINGS AND VALUE ADD OPPORTUNITIES**
- **MONOMATERIALS CONSTRUCTIONS PREFERRED**
- **POLYOLEFIN-BASED MODULE CONSTRUCTION CONTINUES SHARE GAIN**
- **PLASTOMER-BASED ELASTIC NONWOVENS ENTERING MARKET**
- **MAJOR CONSTRUCTION SHIFTS (TRUNK, FLOOR, HEADLINERS, DOOR TRIM)**

# GLOBAL AUTO INDUSTRY CHARACTERISTICS

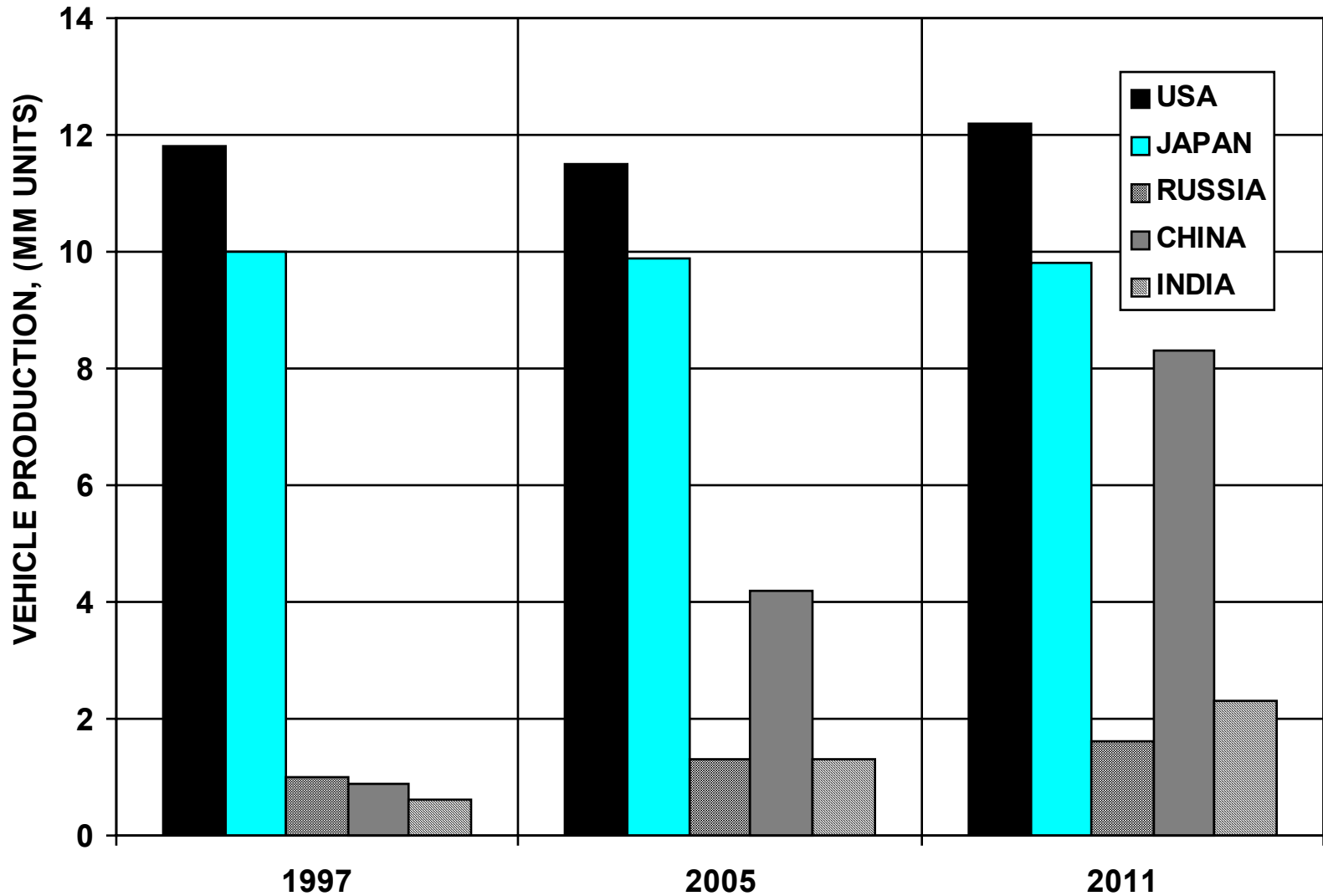
- PRODUCTION GROWTH 3%/YR. THROUGH 2012
- DEMAND HISTORY +/- 5% OFF TREND SINCE 1970
- GLOBAL OVERCAPACITY
- STAGNANT U.S./EUROPE DEMAND
- DEMAND GROWTH SHIFT TO ASIA PACIFIC
- MINI/SMALL CAR (B SEGMENT) SHARE GAIN
- GROWTH OF DOMESTIC ASIA PACIFIC OEMs
- SHARE LOSS BY U.S./EUROPEAN DOMESTIC OEMs
- “HIGH” U.S. FUEL PRICES CONTINUE
- NO MAJOR U.S. ENERGY POLICY SHIFT THRU 2010

# GLOBAL LIGHT VEHICLE PRODUCTION TREND LINE



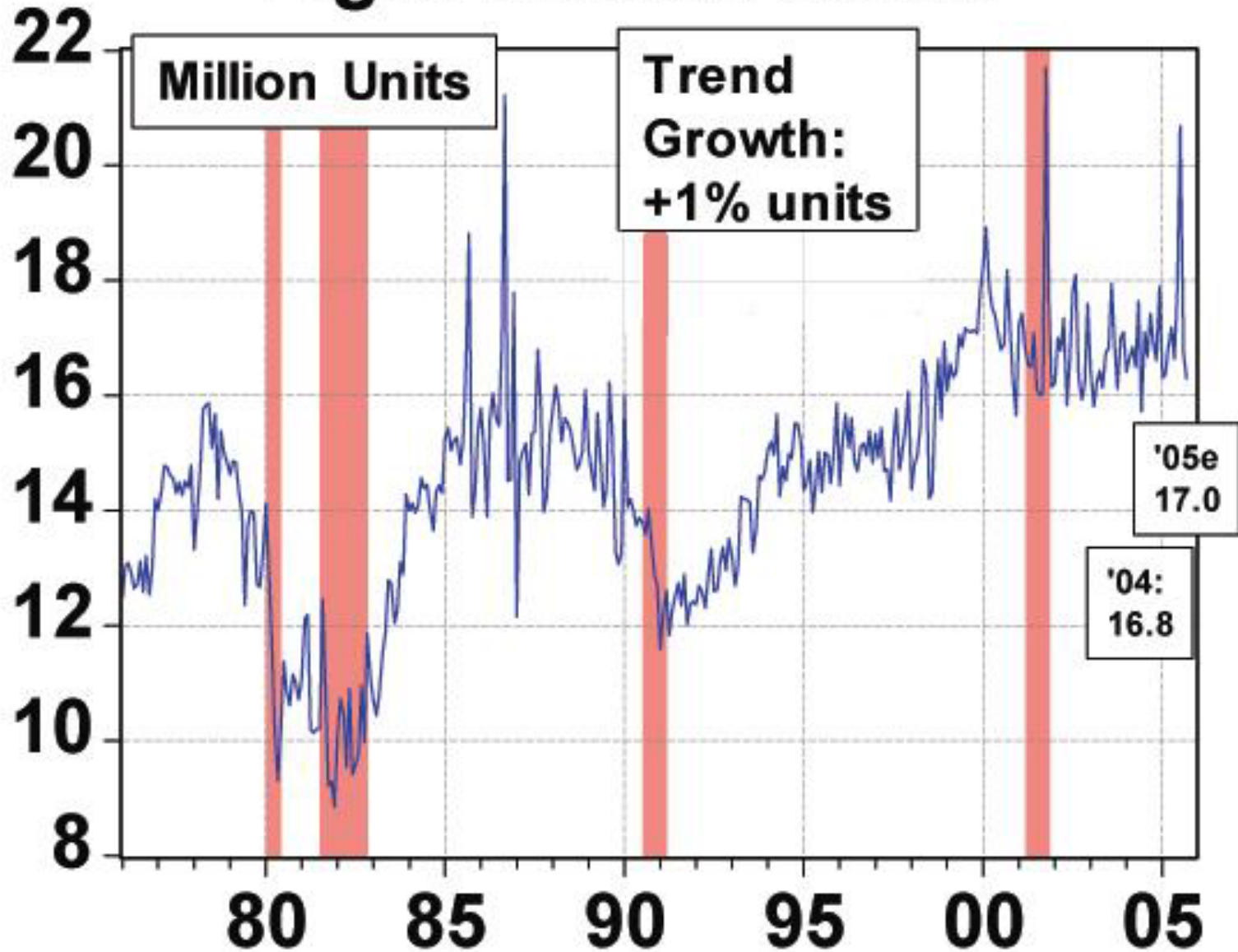
- **2011 GLOBAL SALES COULD REACH 75MM UNITS**
- **GLOBAL AAG = 3%/YR.**
- **ASIA PACIFIC GROWTH 7.5-8.5%/YR.?**
- **WESTERN GROWTH STAGNANT OR DECLINE**
- **GLOBAL FLEET SHIFT TOWARD SMALLER CARS**
- **VARIATIONS HAVE BEEN IN +/- 5% BAND SINCE 1970**

# LIGHT VEHICLE PRODUCTION SHIFT, 1997-2011



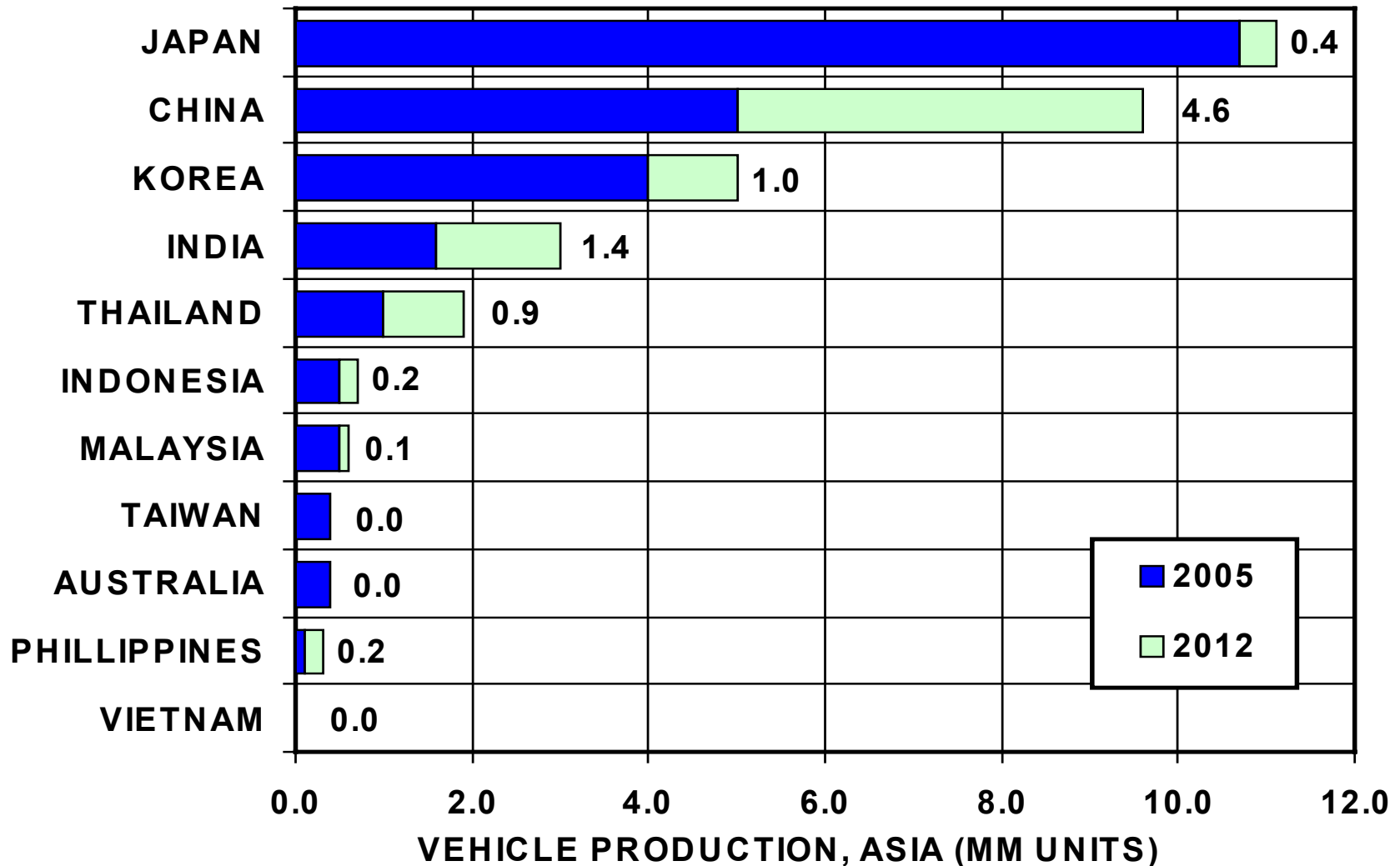
SOURCE: ROBERT ELLER ASSOCIATES, INC., 2006

# Light Vehicle Sales



SOURCE: CLEAR VIEW ECONOMICS L.L.C., 2006

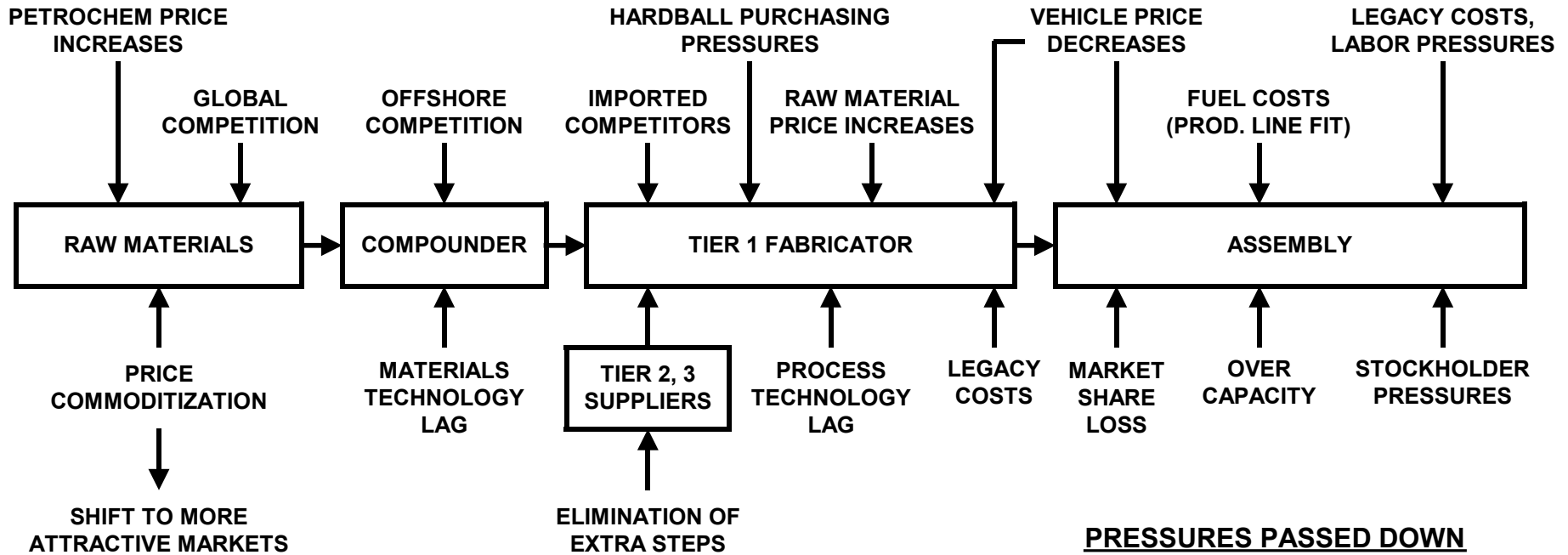
# PROJECTED AUTOMOBILE PRODUCTION IN ASIA: 2005-2012



7 MM NEW VEHICLES ARE EXPECTED TO COME FROM CHINA, INDIA, AND THAILAND BY 2012.

SOURCE: CSM, ROBERT ELLER ASSOCIATES, INC., 2006

# AUTOPLASTIC SUPPLY CHAIN IMPLOSION



## PRESSURES PASSED DOWN THE SUPPLY CHAIN:

- ← PRICING PRESSURES
- ← SUPPLY CHAIN "MANAGEMENT"
- ← DEMAND SLOWDOWN
- ← REVISED SPECIFICATIONS
- ← GLOBALIZATION PRESSURES

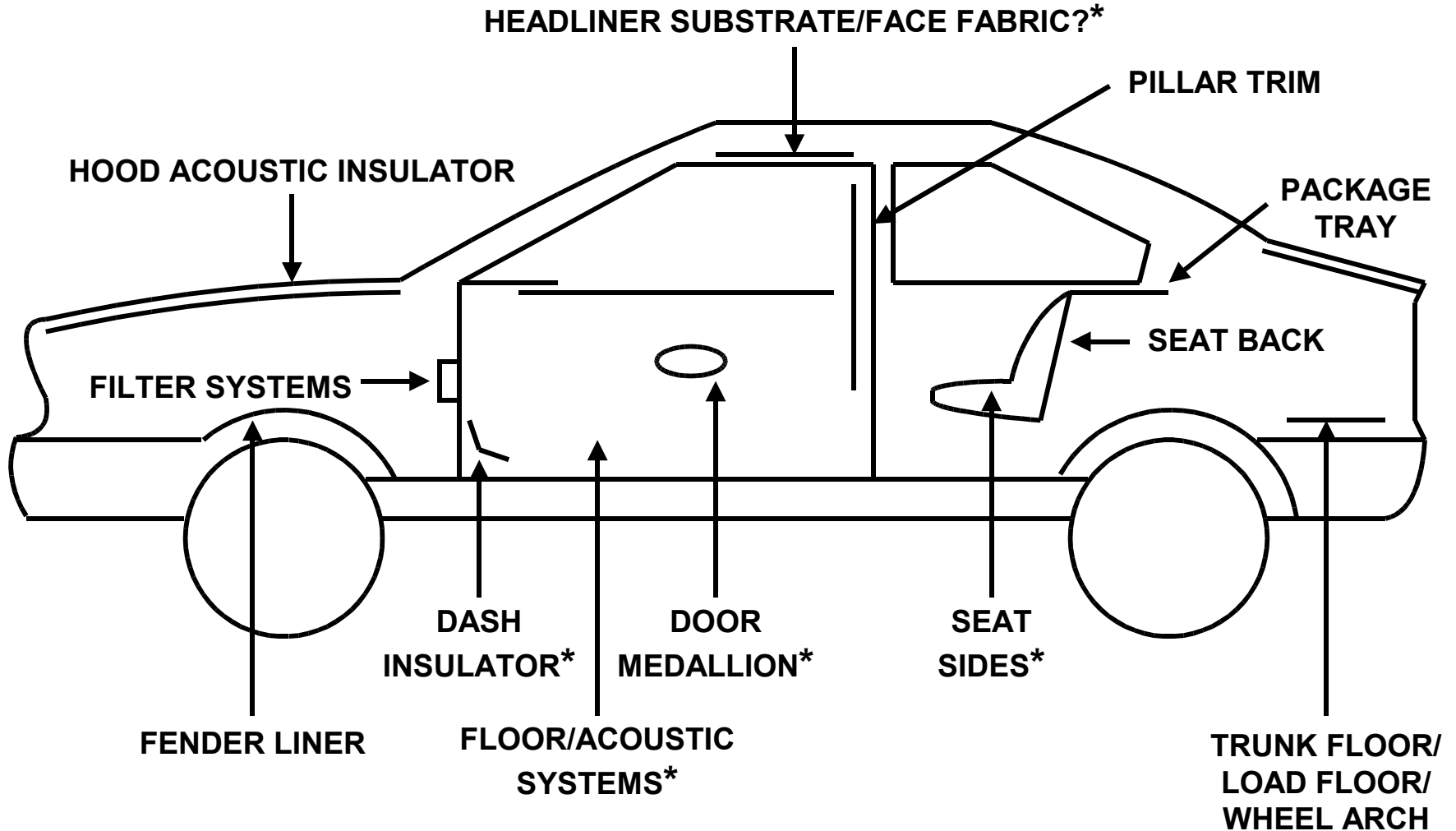
## ELIMINATE/REDUCE THE INEFFICIENCIES:

- MULTIPLE STEPS
- EXCESSIVE LOGISTICS
- SCRAP GENERATION
- INEFFICIENT PROCESS TECHNOLOGIES
- SALES/MARKETING COSTS
- EXCESS LABOR COSTS
- OVER-GLOBALIZATION?

**SOURCE: ROBERT ELLER ASSOCIATES, INC., 2006**

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# ADVANCED TECHNOLOGY NONWOVEN TARGETS



\*INDICATES FOAM/FIBER INTERFACE

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SOURCE: ROBERT ELLER ASSOCIATES, INC., 2006

# EUROPE/NAFTA NONWOVEN DIFFERENCES

TARGET MODULE/ KEY PARAMETER	NONWOVEN POSITION
TRUNK/FLOOR MODULE CONSTRUCTION SHIFTS	<ul style="list-style-type: none"> <li>-DEVELOPMENT TARGET IN BOTH REGIONS</li> <li>-EUROPEAN “BEER CRATE” LEGISLATION</li> <li>-“TALL CARS” INCREASING FASTER IN NAFTA</li> <li>-EUROPEAN SPARE TIRE COVER DESIGNS MORE ADVANCED</li> </ul>
RECYCLING PRESSURES	<ul style="list-style-type: none"> <li>-SIGNIF. IN EUROPE/VERY MODERATE IN NAFTA</li> <li>-FAVORS PO MONO-MATERIAL CONSTRUCTIONS</li> </ul>
WEIGHT REDUCTION PRESSURES	<ul style="list-style-type: none"> <li>-HIGHER IN EUROPE</li> <li>-INCREASE IN NAFTA DUE TO:               <ul style="list-style-type: none"> <li>-“HIGH”FUEL PRICES</li> <li>-SLOWLY CHANGING FLEET MIX</li> </ul> </li> </ul>
HEADLINER FACE FABRIC	<ul style="list-style-type: none"> <li>-HIGHLY PENETRATED BY NWs IN EUROPE</li> </ul>
NW CARPET SURFACE	<ul style="list-style-type: none"> <li>-HIGHER (65%) IN EUROPE(STARTING IN U.S.)</li> </ul>
ACOUSTIC PERFORMANCE. REQUIREMENTS	<ul style="list-style-type: none"> <li>-DIFFERENT FREQUENCIES, SIMILAR PERFORMANCE REQUIREMENTS</li> </ul>
USE OF LIGHTWEIGHT FIBER CONSTRUCTIONS	<ul style="list-style-type: none"> <li>-SIMILAR (SLIGHTLY MORE ADVANCED IN EUROPE)</li> </ul>

# AUTO INDUSTRY SHIFT IMPLICATIONS

AUTO INDUSTRY FACTOR	NONWOVEN EFFECT
SUPPLY CHAIN IMPLOSION	REDUCE TIER 2, 3 SUPPLIERS
PROFIT PRESSURES	ROLL GOODS SUPPLY SHIFT
WEIGHT SAVINGS VALUE GAIN	-GROWTH OF ACOUSTICS NWs -HEADLINER TARGET
POLYOLEFINS FOAM INCREASE	POLYOLEFIN NW INCREASE
INCREASE PP IN INTERIORS	FAVORS PP NONWOVENS
MONOMATLS CONSTRUCTIONS	FAVORS PP NONWOVENS
GLOBAL VEHICLE SHARE GAIN	-TECHNOLOGY CONVERGENCE -"GLOBAL" SUPPLIERS
ACOUSTIC IMPROVEMENT REQ'D	MICRODENIER NW PENETRATION
B-VEHICLE SHARE GROWTH	-REDUCE SQ M/VEHICLE -INCREASE NW USAGE
TECHNOLOGY CONVERGENCE	U.S. NEARS EUROPE/JAPAN TECH.

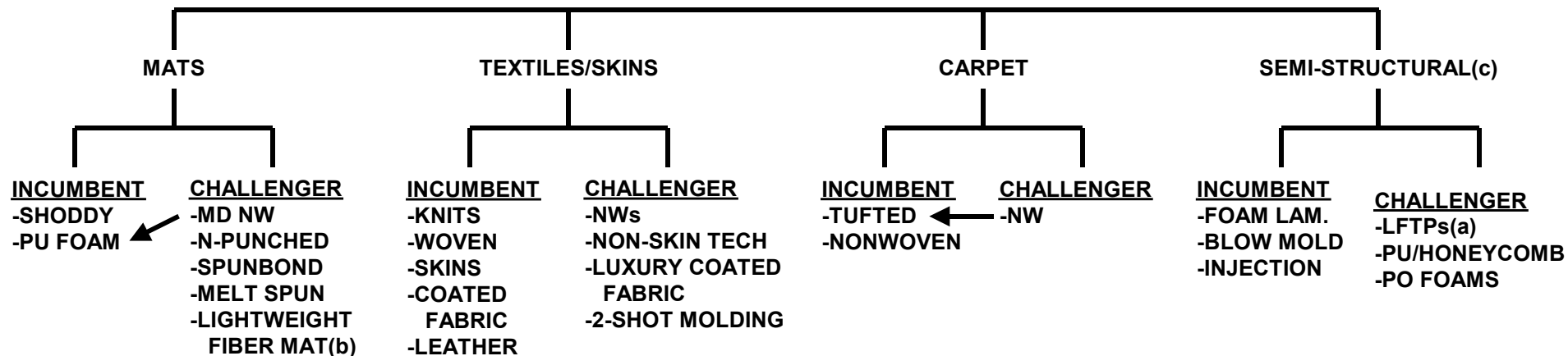
# ADVANCED TECHNOLOGY NW OPPORTUNITIES/CHALLENGES

PARAMETER	IMPLICATION
NONWOVEN PERFORMANCE CAPABILITIES	MIRODENIER SHARE GAIN ELASTIC NONWOVENS IMPROVED UV RESISTANCE
VALUE CHAIN POSITION SHIFT	SUPPLIERS MUST ADD VALUE TO ROLL GOODS
WEIGHT/MAT'LS COST SAVE	-GROWTH OF PP NWs
PROCESS COST REDUCTION	-IN MOLD FORMING/BACKMOLDING
PET BICO MARKET SHARE GAIN	-FOLLOWED BY PP?
QUALITY IMPROVEMENT	ELASTIC NWs?/IN MOLD QUALITY
TECHNOLOGY CONVERGENCE	U.S. NEARS EUROPE/JAPAN TECH.

# **SUPPLY CHAIN STRATEGIES FOR NW SUPPLIERS**

- **FORWARD/BACKWARD INTEGRATION**
  - LAMINATION
  - PRE-FORMED ROLL GOODS
  - HIGH VOLUME TAILORED ROLL GOODS
- **ADAPT NEW NW MATERIALS/PROCESS TECHNOLOGIES**
  - ELASTIC NW<sub>s</sub>
  - ALTERNATIVES TO FLAME LAMINATION
  - IMPROVED BACKMOLDING
- **SANDWICH LAYER CONSOLIDATION**
  - ALL-FIBER CONSTRUCTIONS
- **REDUCE SECONDARY OPERATIONS**
  - LASER SCORING
  - IN MOLD TRIM

## INCUMBENTS AND CHALLENGERS IN NONWOVENS CONSTRUCTIONS



**NOTES:**

(a) AZDEL SUPERLITE®, SYMALITE

(b) FROM RIETER, C+A, LEAR, PELZER, FAURECIA INCORPORATING MICRO-DENIER NONWOVENS

(c) E.G., EXTERIOR WHEEL ARCH LINER, LOAD FLOORS/TRUNK MODULE, HEADLINER

**SOURCE: ROBERT ELLER ASSOCIATES, INC., 2006**

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# ADDING VALUE VIA IMPROVED FUNCTIONAL CHARACTERISTICS

<b>VALUE-ADDED STRATEGY</b>	<b>NONWOVEN EXAMPLE/TARGET MODULE</b>
<b>IN-MOLD DECORATION</b>	<b>-PILLAR TRIM</b>
<b>WEIGHT SAVE</b>	<b>-FLOOR/ACOUSTICS, HEADLINER</b>
<b>SURFACE ESTHETICS</b>	<b>-MICRO-DENIER NONWOVENS -NEGATIVE FORMING</b>
<b>-BETTER ACOUSTICS -IMPROVED DRAPE -REDUCED WRINKLING</b>	<b>MICRO-DENIER NONWOVENS</b>
<b>CRAFTSMANSHIP/QUALITY</b>	<b>-JCI CRAFTECH® PROCESS -OTHER IN-MOLD PROCESSES</b>
<b>ELASTIC NONWOVENS</b>	<b>-VIA NEW PO RESINS</b>
<b>LUXURY FABRICS</b>	<b>PENETRATING SEATING, DOOR TRIM, INSTRUMENT PANEL</b>

# **IN-MOLD FORMING AND SANDWICH CONSOLIDATION**

- **NUMEROUS METHODS AVAILABLE**
- **PROCESS COST SAVE POTENTIAL**
- **PO FOAM/TEXTILE LAMINATES EVOLVING IN EUROPEAN FLEET**
- **BASED ON PET AND PO TEXTILES**
- **INCREASED POLYOLEFIN SUBSTRATE MOLDING RESINS ACCELERATES PO NWs**
- **ROLE IN ENERGY MANAGEMENT COMPONENTS (e.g., B-PILLAR)**

# EPP SEMI-STRUCTURE/TEXTILE COVERING CONCEPT



SOURCE: TARACELL

# **NONWOVEN/PO FOAM LAMINATES**

- **NONWOVEN/PO FOAM LAMINATES SHOW POTENTIAL FOR PENETRATION INTO INTERIOR SOFT TRIM MODULES BASED ON:**
  - **IMPROVED THERMOFORMABILITY VS. TEXTILE/PO FOAM LAMINATES**
  - **IMPROVED RECYCLABILITY WITH DOMINANT PO SUBSTRATES**
  - **MATERIAL AND PROCESS COST SAVINGS**
- **TEXTILE/PO FOAM LAMINATES → PENETRATION OF PO NWs**
- **UV RESISTANCE, ABRASION RESISTANCE ELASTIC PROPERTIES AND MICRODENIER WEIGHTS WILL FACILITATE PO NONWOVENS PENETRATION**

# FLOOR/TRUNK TARGETS

- **DASH MAT/PASSENGER COMPARTMENT**
  - **ELIMINATE/REDUCE HEAVY LAYER**
  - **MICRODENIER NW PENETRATION HAS STARTED**
- **TRUNK MODULE**
  - **GROWTH OF CONSOLIDATED TRUNK MODULE**
  - **NEED FOR SEMI-STRUCTURAL PROPERTIES**
  - **ROLE FOR HONEYCOMB CONSTRUCTION**
- **BOTH**
  - **FOAM/FIBER COMPETITION**
  - **NEED FOR FORMING PROCESS TECHNOLOGY SHIFTS**
  - **ROLE IN THRU-THE-FLOOR CONSTRUCTION**

# EXAMPLE OF DASH MAT LAYER CONSTRUCTION



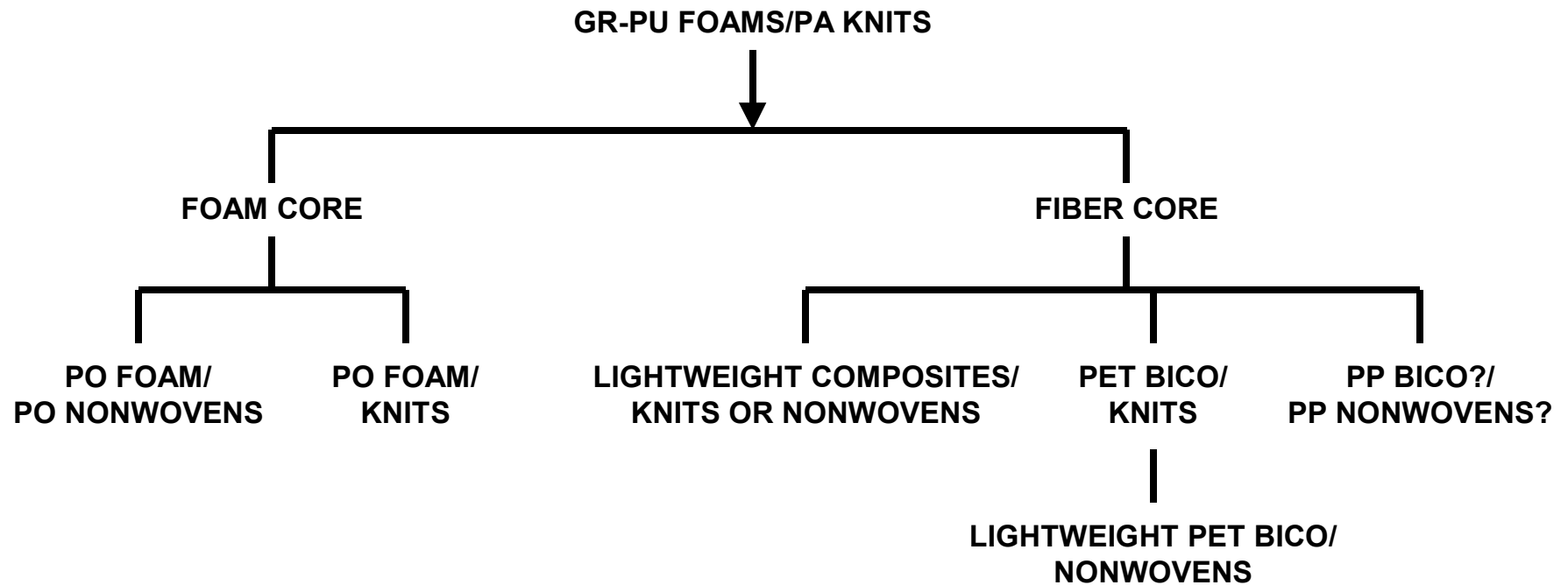
**HEAVY LAYER**

**ACOUSTIC  
BATTING**

**CARPET**

SOURCE: COLLINS & AIKMAN

# HEADLINER CONSTRUCTION SHIFTS/ROLE OF NONWOVENS



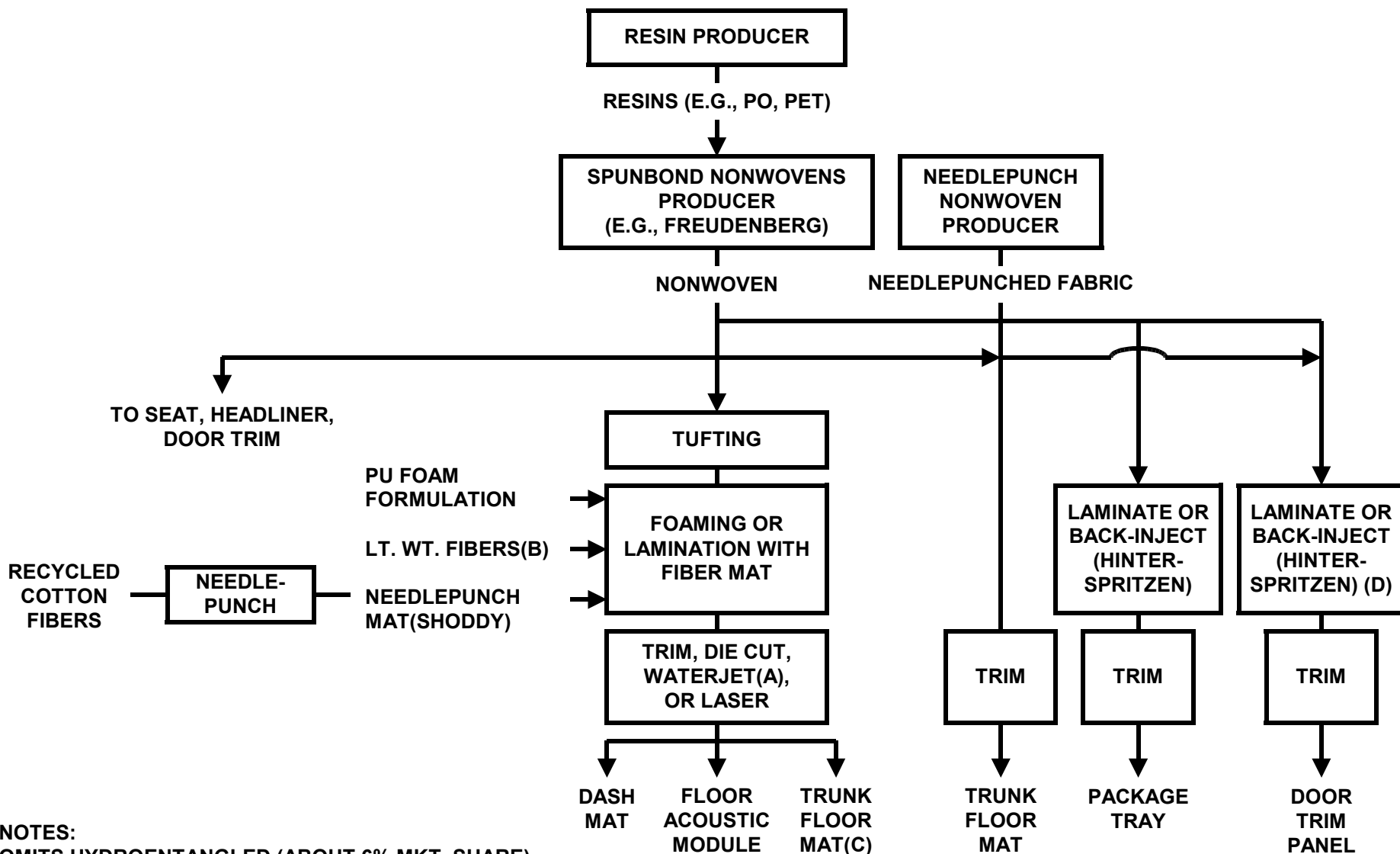
## NOTES:

- OVERHEAD MODULE DESIGN CHANGES COULD SHIFT HEADLINER CONSTRUCTION REQUIREMENTS
- ROLE OF HEADLINER IN THRU-THE-ROOF OVERHEAD MODULE

**SOURCE: ROBERT ELLER ASSOCIATES, INC., 2006**

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lg/myfiles/visio/HdInrNW06.vsd

# PATHS TO MARKET FOR AUTOMOTIVE NONWOVENS

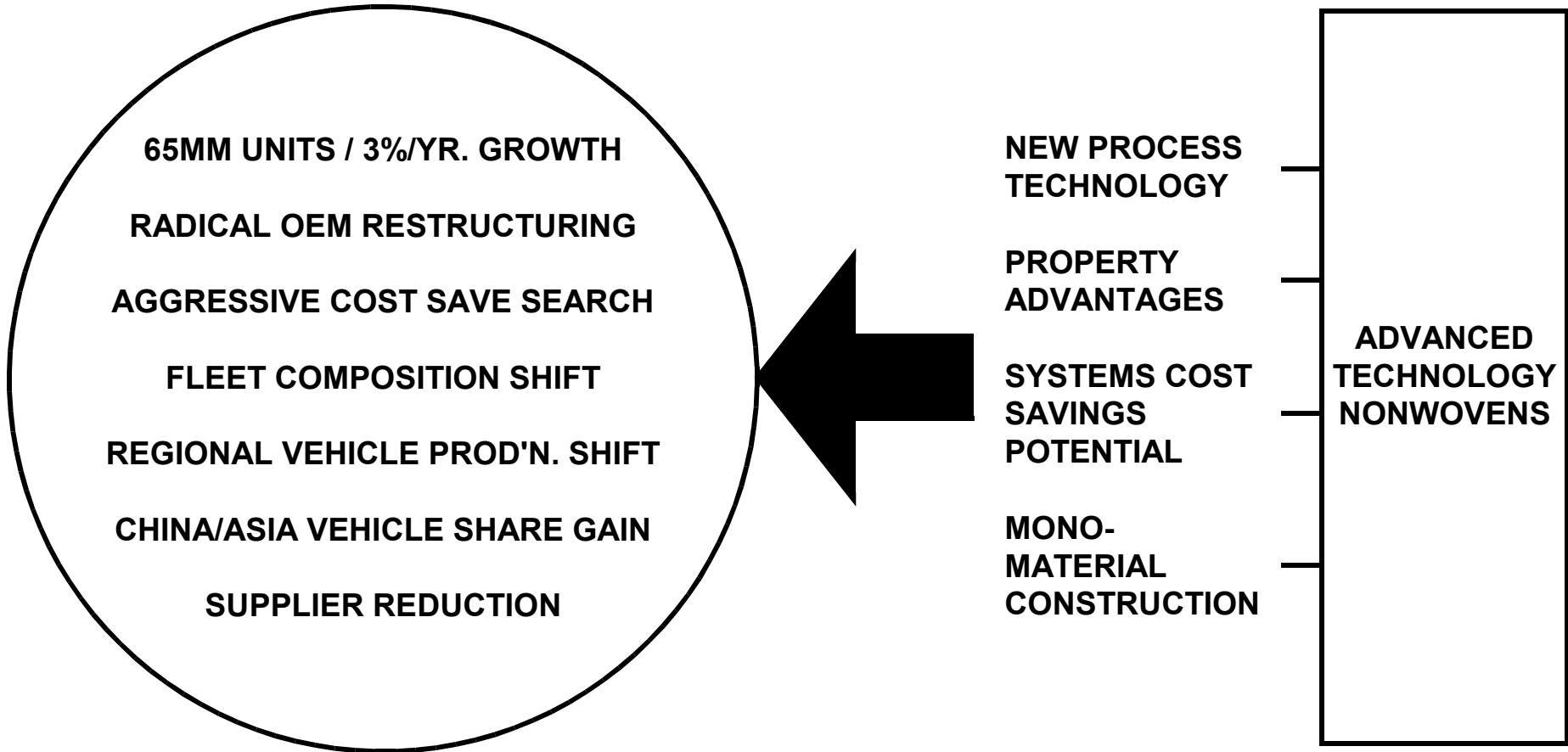


- NOTES:  
 (A) DOMINANT METHOD  
 (B) E.G., AcT™ (C+A), ULTRALIGHT™ (RIETER), SonoTec AT (LEAR), DUAL IMPEDANCE FIBER (PELZER)  
 (C) HIGH END VEHICLES ONLY  
 (D) EPP FOAMS MAY BE USED FOR HINTERSPRITZEN



# AUTO DEMAND/ OPPORTUNITIES

# ENABLERS



**SOURCE: ROBERT ELLER ASSOCIATES, INC., 2006**

# SUMMARY

- **PROFITABILITY PRESSURES WILL INTENSIFY**
- **VEHICLE GROWTH WILL BE IN ASIA PACIFIC**
- **SUPPLY CHAIN SHIFTS OFFER OPPY'S/CHALLENGES FOR NWs**
- **POLYOLEFIN FOAM/NW LAMINATES WILL GAIN SHARE**
- **ADVANCED TECHNOLOGY NWs OFFER VALUE ADD POTENTIAL AND SYSTEMS COST SAVINGS VIA:**
  - **MONOMATERIAL CONSTRUCTIONS**
  - **ELASTIC NONWOVENS**
  - **IMPROVED ACOUSTIC PROPERTIES (ELIMINATION OF HEAVY LAYER (PARTIAL IN FLOOR SYSTEMS))**

# **SUMMARY (CONT'D.)**

- **KEY TARGETS ARE**
  - **HEADLINERS (SUBSTRATE/FACE FABRIC, NW vs. KNIT COMPETITION)**
  - FLOOR/ACOUSTIC SYSTEMS (MICRODENIER NWs)**
  - DOOR MODULES (PO NW/PO FOAM LAMINATE**
- **PO NONWOVENS PENETRATION WILL BE FACILITATED BY:**
  - **UV RESISTANCE**
  - **ABRASION RESISTANCE**
  - **ELASTIC PROPERTIES**
  - **MICRODENIER WEIGHTS/ACOUSTIC PROPERTIES**
  - **BICOMPONENT FIBERS**

# THANK YOU



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