The CU-ICAR Project
Embedding the Automotive Industry in South Carolina

Presentation Outline

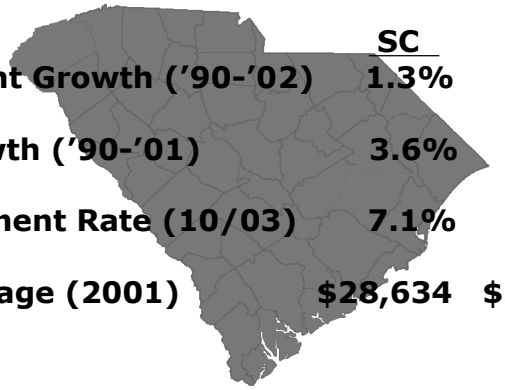
I. Context
   - South Carolina
   - Upstate of South Carolina
   - Clemson University

II. Clemson University-International Center for Automotive Research

III. Challenges

Context: South Carolina

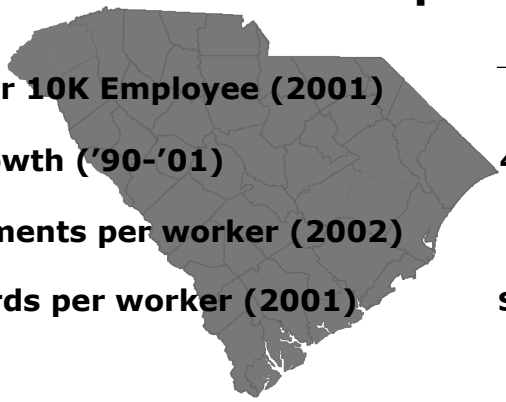
Economic Performance



	SC	US
Employment Growth ('90-'02)	1.3%	1.5%
Wage Growth ('90-'01)	3.6%	3.9%
Unemployment Rate (10/03)	7.1%	6.0%
Average Wage (2001)	$28,634	$35,550

Context: South Carolina

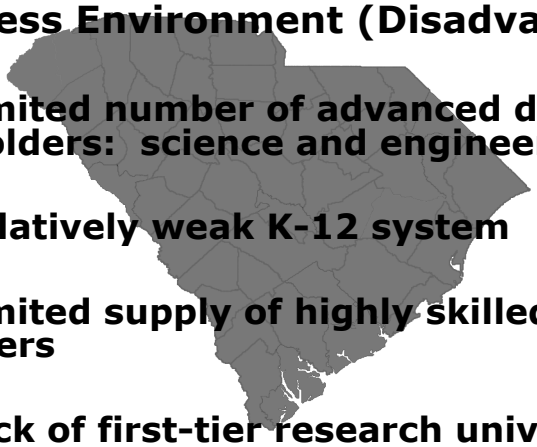
Innovation Output



	SC	US
Patents per 10K Employee (2001)	3.6	7.7
Patent Growth ('90-'01)	4.3%	6.5%
VC Investments per worker (2002)	$3	$155
SBIR Awards per worker (2001)	$2.56	$8.50

Context: South Carolina

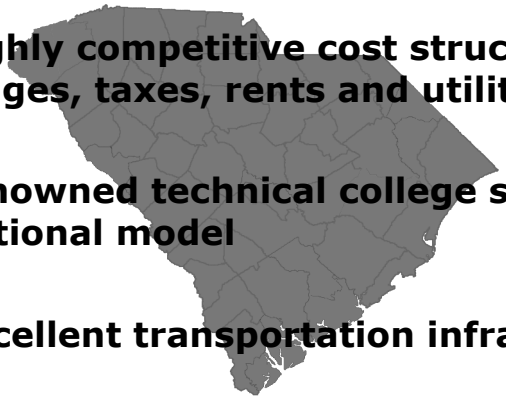
Business Environment (Disadvantages)



- **limited number of advanced degree holders: science and engineering**
- **relatively weak K-12 system**
- **limited supply of highly skilled workers**
- **lack of first-tier research universities**

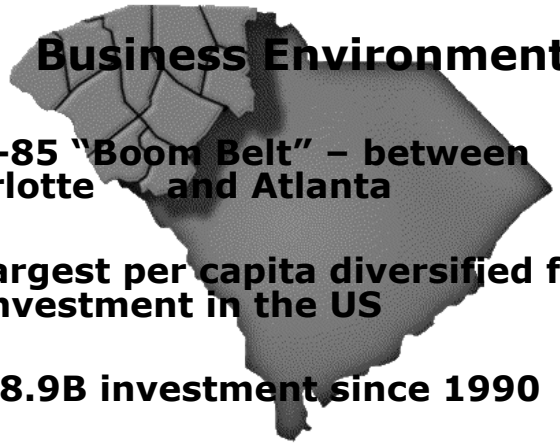
Context: South Carolina

Business Environment (Advantages)



- **highly competitive cost structure: wages, taxes, rents and utilities**
- **renowned technical college system: national model**
- **excellent transportation infrastructure**
- **high quality of life**

Context: Upstate South Carolina



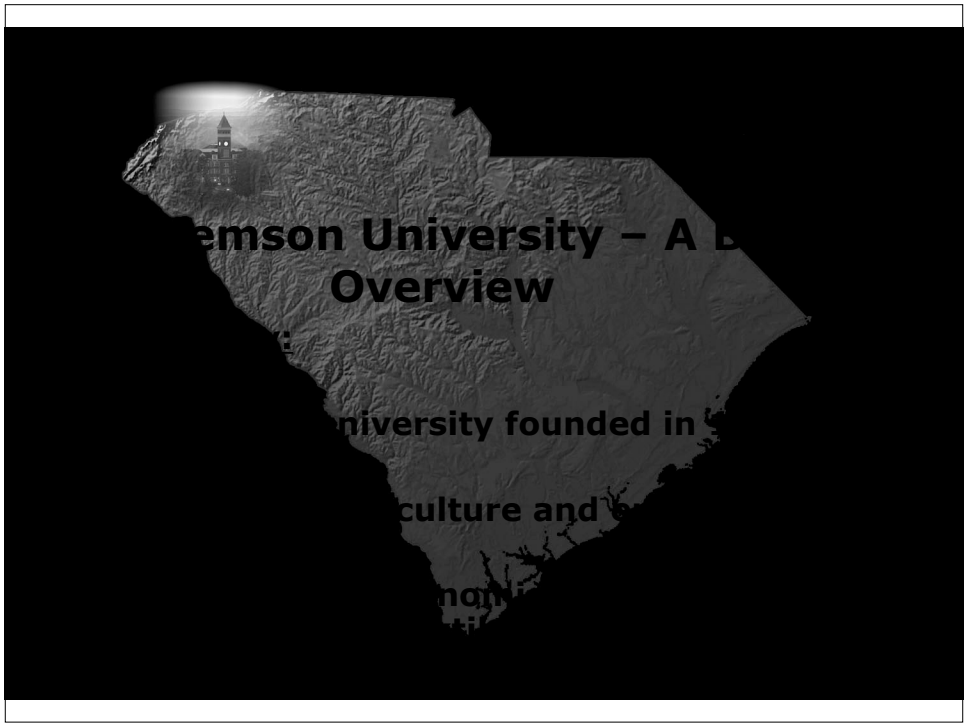
Business Environment

- I-85 "Boom Belt" – between Charlotte and Atlanta
- largest per capita diversified foreign investment in the US
- $8.9B investment since 1990
- lowest unionization rate in the US

Context: Upstate South Carolina

Business Environment (con't)

- best workforce training program in the US
- progressive business climate
- strong industry/government/education collaboration
- excellent quality of life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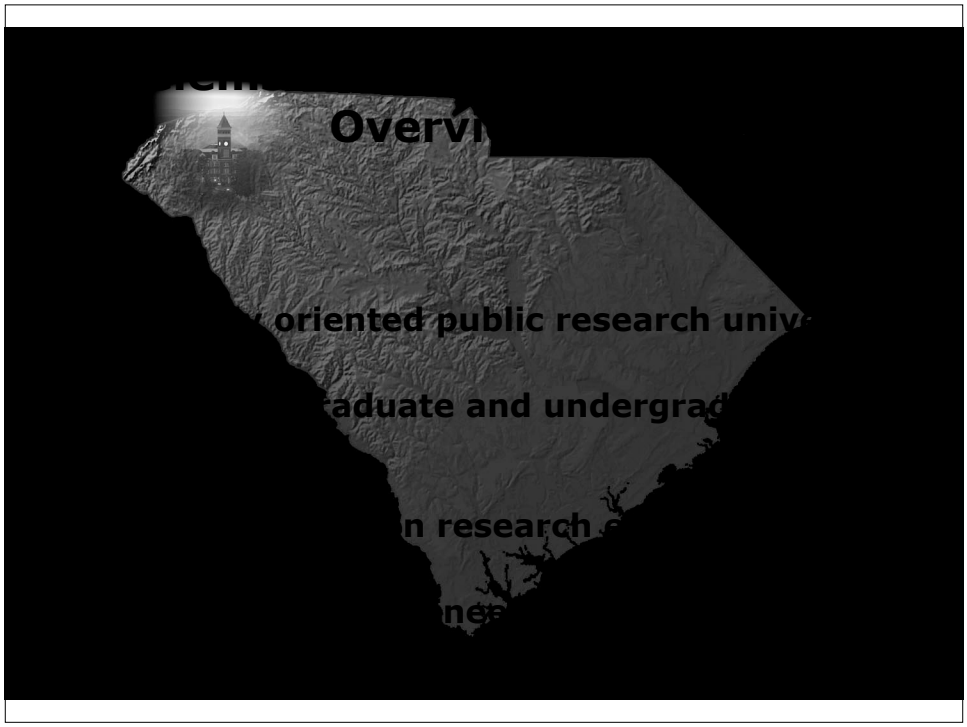
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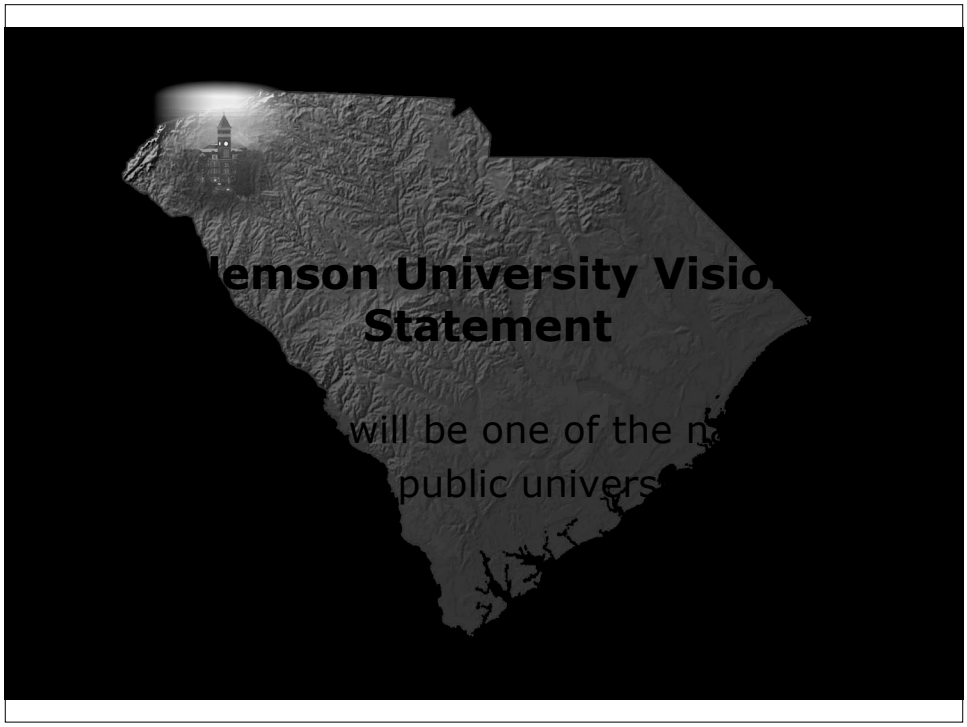
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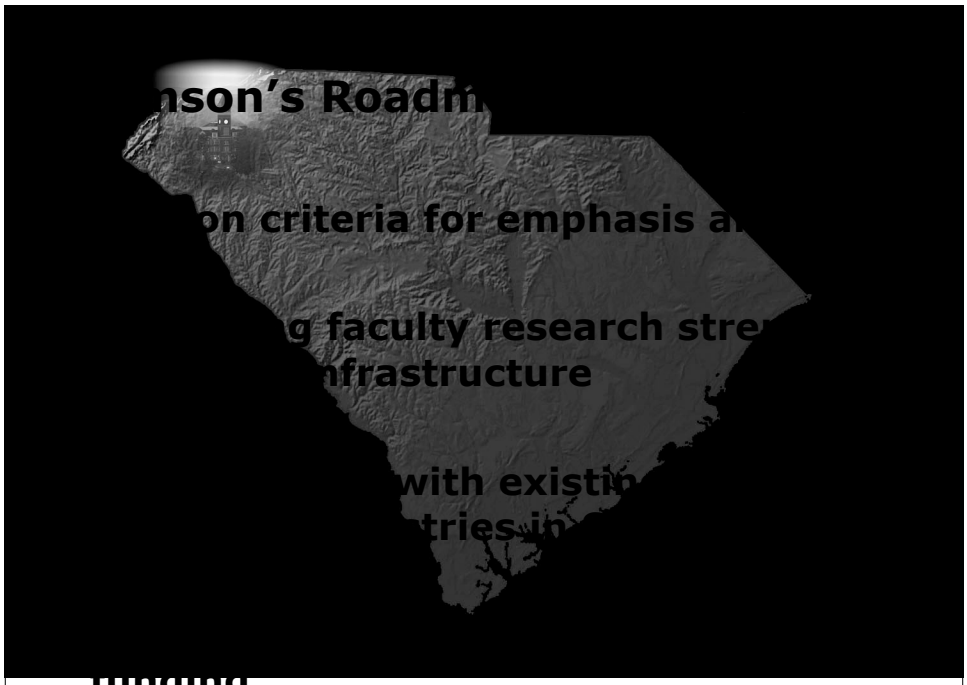
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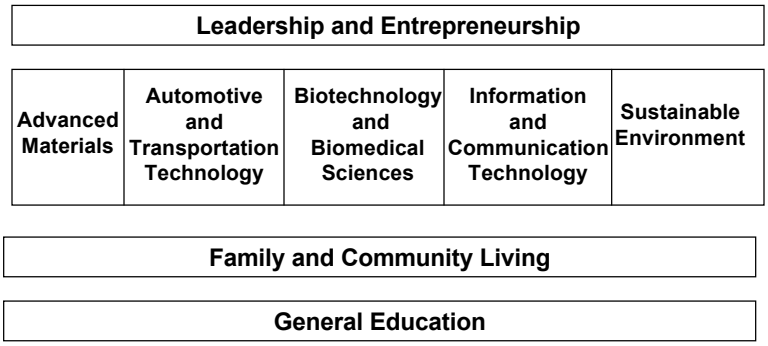
Clemson University Emphasis Areas

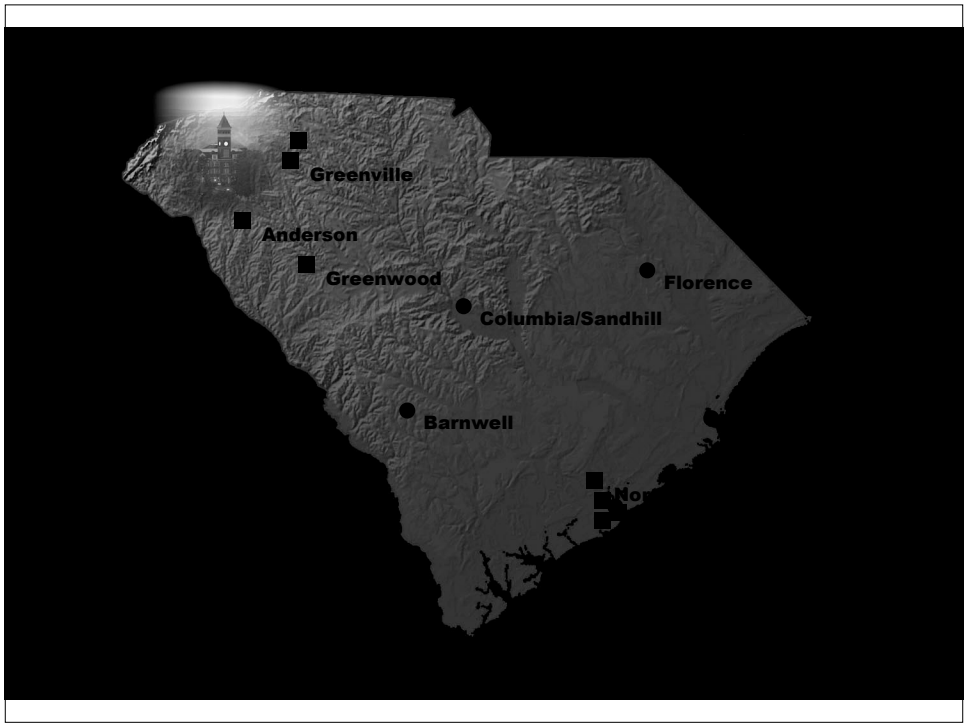


Philosophical Premises

- **Innovation drives productivity, standard of living and leadership in global markets**
- **Innovation economy thrives in regional clusters**
- **Innovation is a "contact sport"**

"Clusters" and Economic Development: *Lessons Learned*

- **Target areas where there is existing capability at research university(s) and a key user(s) in the region**
- **Recruit "superstar" researchers, build graduate programs**
- **Construct research parks and incubators**
- **Recruit young firms and R&D-intensive activities (international firms), network into the university activities**
- **Cultivate entrepreneurial resources (experienced entrepreneurs, law firms, seed capital sources . . .)**
- **Maintain high quality of life (low taxes, school quality, health care, arts/outdoor)**



CUICAR
CLEMSON UNIVERSITY INTERNATIONAL CENTER FOR AUTOMOTIVE RESEARCH

The Clemson University-ICAR Vision

To be the premier automotive and motorsports research and educational facility in the world.

The Mission

CLEMSON UNIVERSITY INTERNATIONAL CENTER FOR AUTOMOTIVE RESEARCH

- **To establish world-class facilities for automotive/motorsports research.**
- **To provide internationally recognized graduate automotive engineering programs.**
- **To be the university/industry interface for the associated engineering, management, marketing and communication disciplines.**

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Why South Carolina?

- **Southeast is now the largest US regional automotive cluster**
- **Dominated by international manufacturing facilities – OEM, Tier I, II & III**
- **Over 200 automotive companies in South Carolina**
- **2/3 of major US racing teams located between Charlotte and Atlanta**

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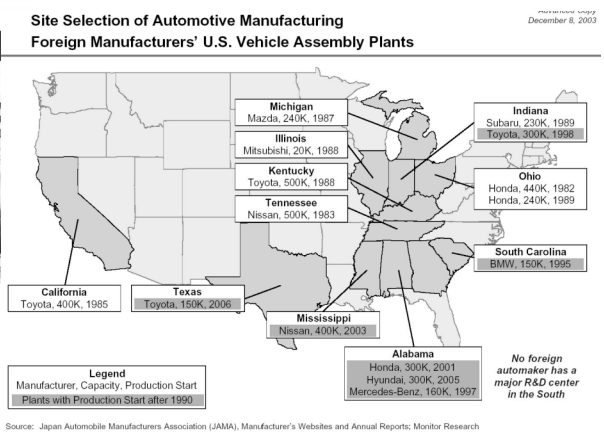
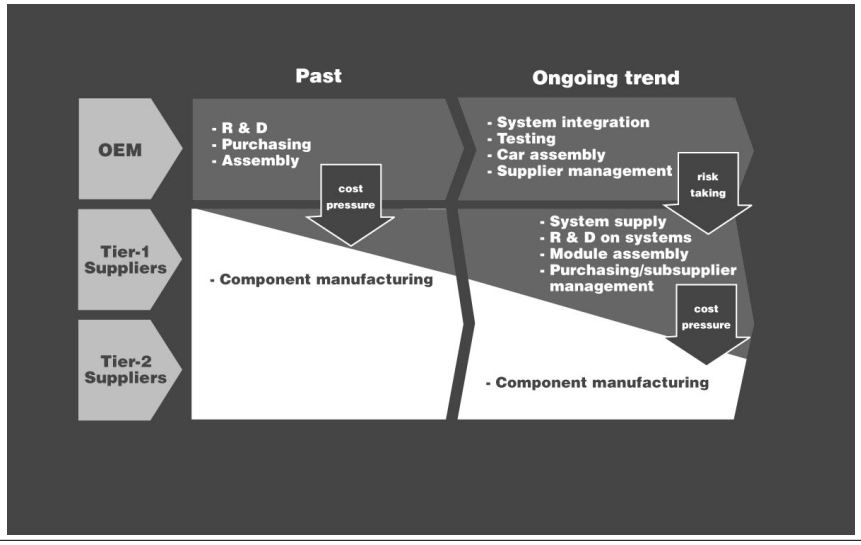
Industry Migration



"Southeast is now the U.S. center of a global industry with no supporting R&D facility at a time when more R&D being pushed down to suppliers…"

Cost pressure on tier suppliers will increasingly be complemented by risk taking



SC Economic Impact

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- **Largest economic impact industry in SC - BMW and suppliers' investment over $4 billion and over 9,000 related employment**
- **Over 200 Automotive Companies in SC**
- **115 First or Second Tier Automotive Suppliers in the State**

US Motorsports Corridor

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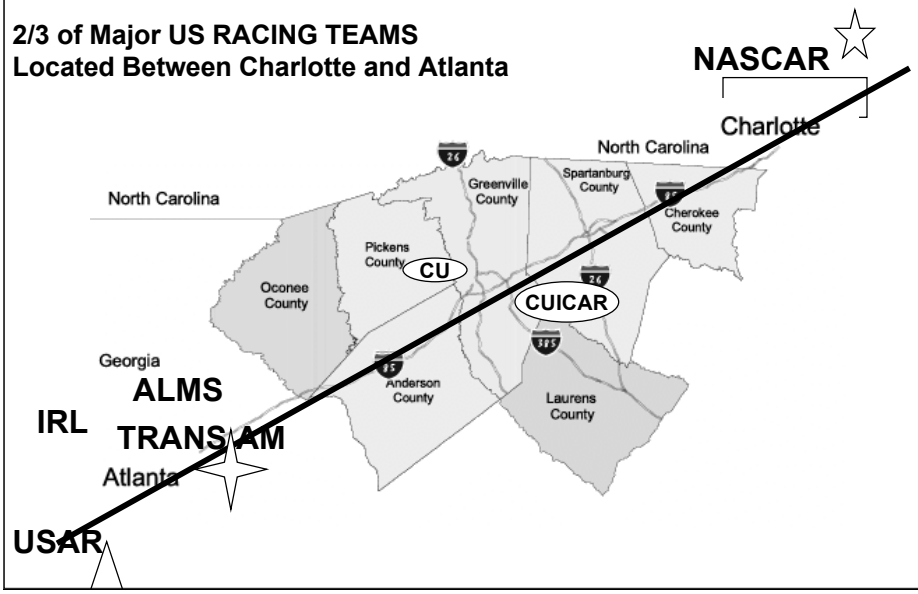
2/3 of Major US RACING TEAMS Located Between Charlotte and Atlanta



South Carolina Competitiveness Initiative

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Phase I Final Presentation
(December 8, 2003)

Automotive Cluster

Vision Element: A center of R&D in the Southeast

Action Agenda:

- **Continue to support Auto Research Park (CU-ICAR)**
- **Develop cluster specific institutions for collaboration**
- **Support engineering training**

Dr. Michael E. Porter
Professor of Economics
Harvard University

Carolinas Competitiveness Forum
~~(April 30, 2004)~~

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. . . focus on a few industries to form a deeper infrastructure

Automotive: clear advantage needed against the Midwest/Mississippi Valley

e.g. ICAR at Clemson University needs to be further developed beyond BMW, Michelin, IBM and MS

Dr. Kenichi Ohmae
Former Director of McKinsey & Co.
Author bestselling book:
The Borderless World

How?

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A Public/Private Partnership

CLEMSON UNIVERSITY

- **Driven by its vision to be among the nation's top 20 public universities**

SOUTH CAROLINA DEPARTMENT OF COMMERCE/LOCAL AND REGIONAL ECONOMIC DEVELOPMENT PARTNERS

- **Economic development through building knowledge-based cluster industries**

PRIVATE SECTOR

- **Companies with a strategic interest in automotive/motorsports research, development, education or advanced manufacturing**

How?

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South Carolina Investments Driving Innovation

- **Research Centers of Economic Excellence (2002)**
- **Research Infrastructure Bond Act (2004)**
- **Innovation Center Act (2005)**
- **Venture Capital Investment Act (2004, 2005)**

Private Sector Investments Announced

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BMW

- Portion of Economic Development Incentive
- Endowed Chairs (2)

Michelin

- Endowed Chair (1)
- Access to Proving Grounds

Timken

- R&D Facility
- Endowed Chair (1)

SUN Microsystems

- Computational Center Equipment & Start-up Funds

Investment Summary

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Land:	**$ 7.0 M** **$ 14.0 M**
Infrastructure:	**$ 45.5 M**
Buildings:	**$ 79.0 M**
Faculty:	**$ 36.0 M**
Equipment/Other:	**$ 27.7 M**
TOTAL:	**$209.2 M**

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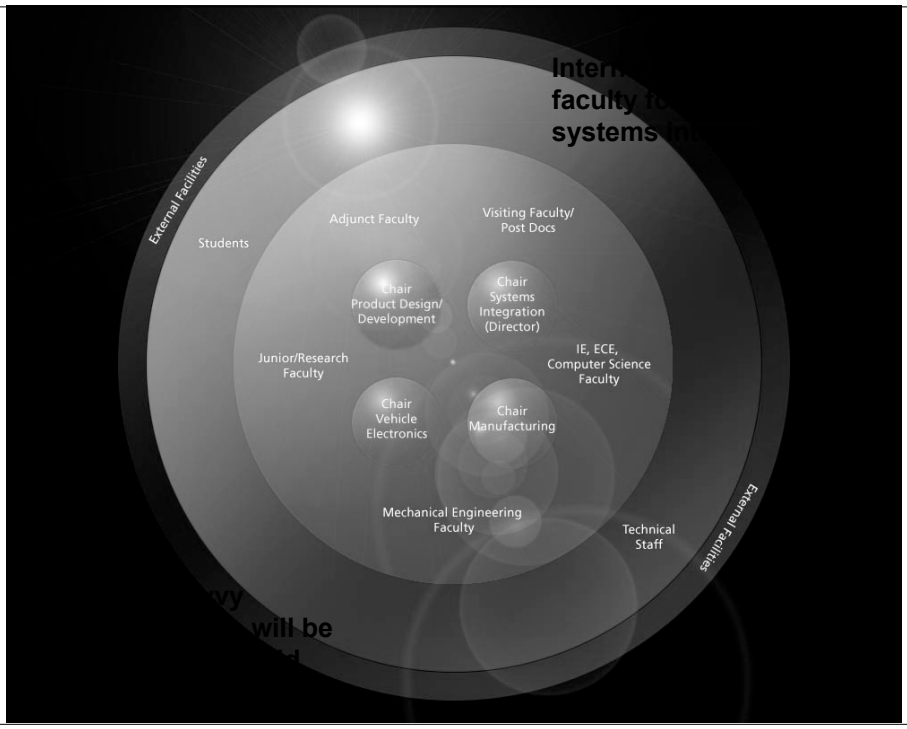
The CU-ICAR Graduate Program Concept

Graduate Program in Automotive Engineering (M.S. and Ph.D)

- **Emphasis in product realization and system integration**
  - **Underlying principles using the automobile as a platform**
  - **Graduates marketable in all manufacturing environments**



Potential Research Facilities

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- **Information Technology Research Center (ITRC)**
- **High performance computing – modeling and simulation**
- **Full-scale wind tunnel**
- **Fuel economy and alternative fuels**
- **Safety/crashworthiness**
- **Chassis testing**
- **Tire and wheel testing**
- **Acoustic and environmental testing**

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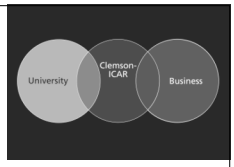
CU-ICAR

- **252-acre project controlled by Clemson University**
- **Common architectural guidelines, covenants and conditions**
- **Class A office and research laboratory facilities**

CU-ICAR
A True University Research Campus



CU-ICAR will be a research campus, not a traditional research or business park

Embraces the Campus Culture
Campus Programs Drive Development

Diverse Campus Environment
Includes Start-ups, small business, non-profits, major companies, government agencies

Designed for Interaction
Dense, mixed-use, urban environment

Relationships are key
Partnership Developers build communities and measure interaction

Technology Neighborhood #1

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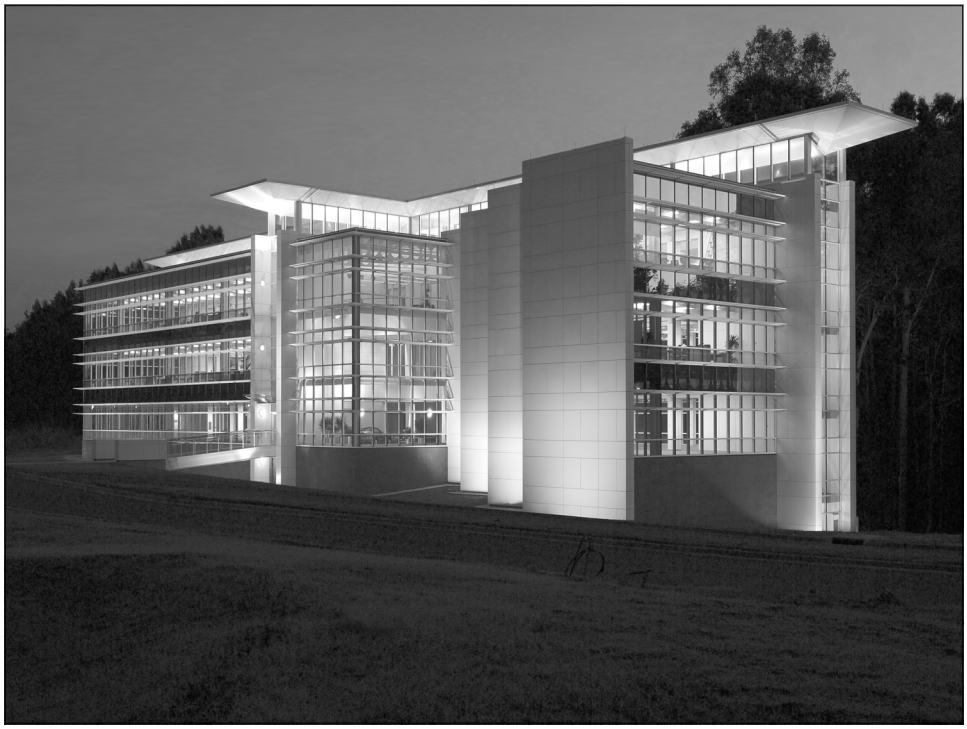
Information Technology Research Center

ITRC Building: 85,000 sqft

Initial Focus:

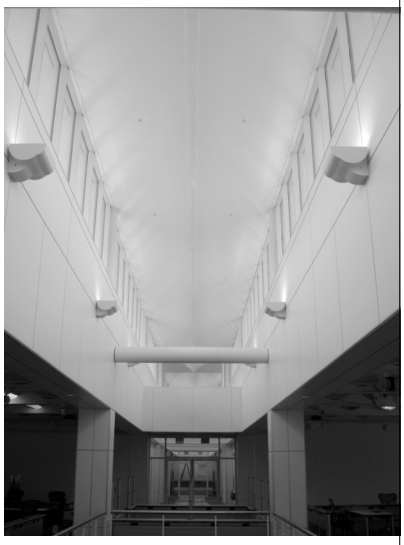
- **-- Automotive business IT and logistics**
- **-- Supply chain management and logistics**
- **-- Vehicle diagnostics**

Announced Partners: BMW, IBM and Microsoft



BMW – ITRC

Clearstory



Interior Office

CLEMSON UNIVERSITY INTERNATIONAL CENTER FOR AUTOMOTIVE RESEARCH

The Carroll A. Campbell Jr. Graduate Engineering Center

A 80,000 sqft facility dedicated to:

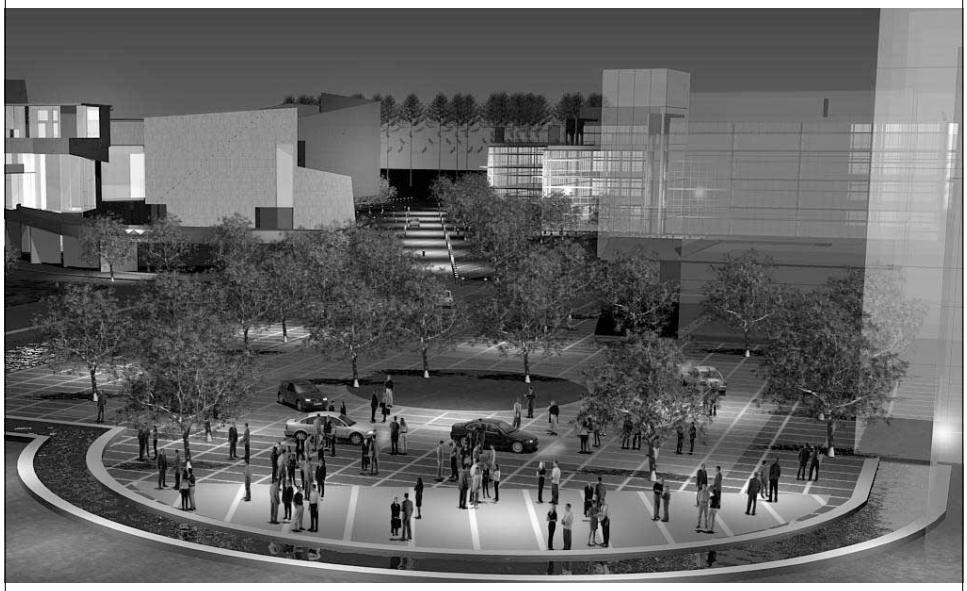
- **Systems Integration Research Activities**
- **Graduate Program in Automotive Engineering**
  - **Linked to education and research activities in the College of Engineering and Science, as well as other Clemson University Units**

Carroll A. Campbell Jr.

Graduate Engineering Center

Carroll A. Campbell Jr.

Graduate Engineering Center



Private Sector High Potential Prospects

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Original Equipment Manufacturers
- US (1)
- European (1)
- Japanese (3)
- Chinese (1)

Automotive Suppliers
- European (3)
- Japanese (1)

Motorsports
- US (3)
- European (2)

Technology Partners
- US (2)
- European (1)

Challenges

Accountability – Legislature/Taxpayers

- Number of Jobs
- Salary/Wages per Job

Workforce

- K-12
- Technical Colleges

Sustainability

- University Commitments – Personnel and Funds
- Support from Stakeholders

"Driving the Future"

Clemson University's International Center for Automotive Research is:

- **A powerful statement to the global automobile and motorsports industries about competing in the future.**
- **A key initiative to move Clemson University to one of the top public universities in the country.**
- **A pivotal role in driving the economy of South Carolina with a regional industry cluster model.**

Driving the Future