Basque Competitiveness

Professor Michael E. Porter
Institute for Strategy and Competitiveness
Harvard Business School

Bilbao, Basque Country
April 18th, 2002

The Basque Economy
Situation in 1990

• High unemployment rates
• Reliance on heavy industries that were contracting, e.g. Steel and Shipyards
• The crisis led to a concerted effort to improve competitiveness

• A competitiveness strategy was put in place and implemented over a sustained period
• As of 2002, the Basque Country has made significant progress
  – Unemployment rates are down
  – Prosperity levels are up
  – Industrial structure has been upgraded
• At higher income levels, the Basque country faces the next set of challenges for the competitiveness of its business environment
Agenda

• Foundations of competitiveness and the role of regions
  • Basque competitive performance
  • Basque competitiveness: The next agenda
Sources of Rising Prosperity

• A region’s or nation’s standard of living (wealth) is determined by the productivity with which it uses its human, capital, and natural resources. The appropriate definition of competitiveness is productivity
  – Productivity depends both on the value of products and services (e.g. uniqueness and quality) as well as the efficiency with which they are produced
  – It is not what industries a region or nation competes in that matters for prosperity, but how firms compete in those industries
  – Productivity in a region or nation is a reflection of what both domestic and foreign firms choose to do in that location. The location of ownership is secondary for national prosperity
  – The productivity of “local” industries is of fundamental importance to competitiveness, not just that of traded industries

• Regions or nations compete in offering the most productive environment for business
• The public and private sectors play different but interrelated roles in creating a productive economy
Determinants of Productivity and Productivity Growth

Macroeconomic, Political, Social, and Legal Context for Development

Microeconomic Foundations of Development

- A sound macroeconomic, political, social, and legal context creates the potential for competitiveness, **but is not sufficient**
- Competitiveness ultimately depends on improving the **microeconomic capability** of the economy and the **sophistication of local competition**
Innovation and Prosperity

Prosperity

Productivity

“Incompetitiveness”

Innovative Capacity

- Innovation is more than just scientific discovery
- There are no low-tech industries, only low-tech firms
Productivity and the Microeconomic Business Environment

Context for Firm Strategy and Rivalry

- A local context that encourages efficiency, investment, and sustained upgrading
- Open and vigorous competition among locally based rivals

Factor (Input) Conditions

- High quality, specialized inputs available to firms:
  - human resources
  - capital resources
  - physical infrastructure
  - administrative infrastructure
  - information infrastructure
  - scientific and technological infrastructure
  - natural resources

Demand Conditions

- Sophisticated and demanding local customer(s)
- Unusual local demand in specialized segments that can be served globally
- Customer needs that anticipate those elsewhere

Related and Supporting Industries

- Presence of capable, locally-based suppliers and firms in related fields
- Presence of clusters instead of isolated industries

- The microeconomic business environment consists of the array of assets, information, rules, policies, and institutions surrounding competition
The California Wine Cluster

- **Grapestock**
- **Fertilizer, Pesticides, Herbicides**
- **Grape Harvesting Equipment**
- **Irrigation Technology**

**Growers/Vineyards**

**State Government Agencies** (e.g., Select Committee on Wine Production and Economy)

**Wineries/Processing Facilities**

**Educational, Research, & Trade Organizations** (e.g. Wine Institute, UC Davis, Culinary Institutes)

**California Agricultural Cluster**

- **Winemaking Equipment**
- **Barrels**
- **Bottles**
- **Caps and Corks**
- **Labels**
- **Public Relations and Advertising**
- **Specialized Publications** (e.g., Wine Spectator, Trade Journal)

**Food Cluster**

**Tourism Cluster**

Sources: California Wine Institute, Internet search, California State Legislature. Based on research by MBA 1997 students R. Alexander, R. Arney, N. Black, E. Frost, and A. Shivananda.
Institutions for Collaboration
Selected Institutions for Collaboration in San Diego

Private Sector
- UCSD CONNECT
- San Diego Chamber of Commerce
- San Diego MIT Enterprise Forum
- Corporate Director’s Forum
- San Diego Dialogue
- Service Corps of Retired Executives, San Diego

Joint Private / Public
- San Diego Regional Economic Development Corporation
- Center for Applied Competitive Technologies
- San Diego World Trade Center

Informal Networks
- Linkabit Alumni
- Hybritech Alumni
- UCSD Alumni
- Scripps Research Institute Alumni

Public Sector
- San Diego Association of Governments
- San Diego Regional Technology Alliance
- San Diego Science and Technology Council
- Office of Trade and Business Development
- Small Business Development and International Trade Center

Source: Clusters of Innovation project (www.compete.org)
Stages Of Competitive Development

Factor-Driven Economy

Investment-Driven Economy

Innovation-Driven Economy

Input Cost

Efficiency

Unique Value

Global Competitiveness Report 2001
The Relationship Between Microeconomic Competitiveness and GDP Per Capita, 2000 Data


* Adjusted for Purchasing Power Parity
Geographic Levels and Competitiveness

- World Economy
  - Broad Economic Areas
    - European Union
    - Iberian Peninsula, South-West France
  - Nations
    - Spain
  - States, Provinces
    - Basque Country
  - Cities, Metropolitan Areas
    - San Sebastian
Economic Performance
Productivity Levels by UK Region

Gross Value Added per Hour Worked, UK=100, 1999

Productivity Change relative to UK average, 1999-96

Source: Office for National Statistics
Economic Performance
Prosperity and Productivity by UK Region

Source: Office for National Statistics

R² = 0.86
Innovation and Prosperity
R&D per Employee vs. Average Wages by UK Region

R² = 0.85 (including dummy for London)

Source: Office for National Statistics
## Regional Economic Performance Measures

### Overall Economy
- **Employment Growth**
  - Rate of employment growth
- **Unemployment**
  - Percentage of persons unemployed
- **Workforce Participation**
  - Proportion of population in the workforce
- **Average Wages**
  - Payroll per person
- **Wage Growth**
  - Growth rate of payroll per person
- **Cost of Living**
  - Cost of living index
- **Productivity**
  - Output per employee or total factor productivity
- **Exports**
  - Value of manufactured and commodity exports per worker

### Innovation Output
- **Patents**
  - Number of patents and patents per worker
- **Establishment Formation**
  - Growth rate of establishments
- **Venture Capital Investments**
  - Value of venture capital invested
- **Fast Growth Firms**
  - Number of firms on the Inc. 500 list
- **Initial Public Offerings**
  - Number of initial public offerings
- **Productivity growth**
  - Growth in output per employee or total factor productivity
## Top 50 Patent Holders in Massachusetts
### Total of 1995-1998

<table>
<thead>
<tr>
<th>Rank</th>
<th>Organization Title</th>
<th>Patentor Type</th>
<th>Total Patents, 1995-1998</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>DIGITAL EQUIPMENT CORPORATION</td>
<td>Corporation</td>
<td>382</td>
</tr>
<tr>
<td>2</td>
<td>MASSACHUSETTS INSTITUTE OF TECHNOLOGY</td>
<td>Corporation</td>
<td>369</td>
</tr>
<tr>
<td>3</td>
<td>POLAROID CORPORATION</td>
<td>Corporation</td>
<td>220</td>
</tr>
<tr>
<td>4</td>
<td>MASSACHUSETTS GENERAL HOSPITAL</td>
<td>Institute</td>
<td>138</td>
</tr>
<tr>
<td>5</td>
<td>ANALOG DEVICES, INC.</td>
<td>Corporation</td>
<td>136</td>
</tr>
<tr>
<td>6</td>
<td>HARVARD COLLEGE, PRESIDENT AND FELLOWS</td>
<td>University</td>
<td>105</td>
</tr>
<tr>
<td>7</td>
<td>GENETICS INSTITUTE, INC.</td>
<td>Corporation</td>
<td>82</td>
</tr>
<tr>
<td>8</td>
<td>BOC CORP.</td>
<td>Corporation</td>
<td>82</td>
</tr>
<tr>
<td>9</td>
<td>GENERAL ELECTRIC COMPANY</td>
<td>Corporation</td>
<td>79</td>
</tr>
<tr>
<td>10</td>
<td>MOTOROLA, INC.</td>
<td>Corporation</td>
<td>79</td>
</tr>
<tr>
<td>11</td>
<td>QUANTUM CORP. (CA)</td>
<td>Corporation</td>
<td>79</td>
</tr>
<tr>
<td>12</td>
<td>BOSTON SCIENTIFIC CORPORATION</td>
<td>Corporation</td>
<td>77</td>
</tr>
<tr>
<td>13</td>
<td>HEMLETT-PACKARD COMPANY</td>
<td>Corporation</td>
<td>69</td>
</tr>
<tr>
<td>14</td>
<td>CHARLES STARK DRAPER LABORATORY, INC.</td>
<td>Corporation</td>
<td>66</td>
</tr>
<tr>
<td>15</td>
<td>SAINT GOBAIN/NORTON INDUSTRIAL CERAMICS CORP.</td>
<td>Corporation</td>
<td>65</td>
</tr>
<tr>
<td>16</td>
<td>RAYTHEON COMPANY</td>
<td>Corporation</td>
<td>64</td>
</tr>
<tr>
<td>17</td>
<td>BOSTON UNIVERSITY</td>
<td>University</td>
<td>63</td>
</tr>
<tr>
<td>18</td>
<td>BRIGHAM AND WOMEN’S HOSPITAL</td>
<td>Institute</td>
<td>62</td>
</tr>
<tr>
<td>19</td>
<td>DANA-FARBER CANCER INSTITUTE, INC.</td>
<td>Institute</td>
<td>60</td>
</tr>
<tr>
<td>20</td>
<td>TEXAS INSTRUMENTS, INCORPORATED</td>
<td>Corporation</td>
<td>59</td>
</tr>
<tr>
<td>21</td>
<td>GILLETTE COMPANY</td>
<td>Corporation</td>
<td>57</td>
</tr>
<tr>
<td>22</td>
<td>SHIPLEY COMPANY INC.</td>
<td>Corporation</td>
<td>52</td>
</tr>
<tr>
<td>23</td>
<td>UNITED STATES OF AMERICA, AIR FORCE</td>
<td>U.S. Government</td>
<td>52</td>
</tr>
<tr>
<td>24</td>
<td>LISCO, INC.</td>
<td>Corporation</td>
<td>50</td>
</tr>
<tr>
<td>25</td>
<td>HYBRIDON, INC.</td>
<td>Corporation</td>
<td>48</td>
</tr>
<tr>
<td>26</td>
<td>CHILDREN’S MEDICAL CENTER CORPORATION</td>
<td>Institute</td>
<td>47</td>
</tr>
<tr>
<td>27</td>
<td>JOHNSON &amp; JOHNSON PROFESSIONAL INC.</td>
<td>Corporation</td>
<td>47</td>
</tr>
<tr>
<td>28</td>
<td>SUN MICROSYSTEMS, INC.</td>
<td>Corporation</td>
<td>47</td>
</tr>
<tr>
<td>29</td>
<td>OSRAM SYLVANIA INC.</td>
<td>Corporation</td>
<td>47</td>
</tr>
<tr>
<td>30</td>
<td>ACUSHNET COMPANY</td>
<td>Corporation</td>
<td>45</td>
</tr>
<tr>
<td>31</td>
<td>NORTHEASTERN UNIVERSITY</td>
<td>University</td>
<td>44</td>
</tr>
<tr>
<td>32</td>
<td>SEPRACOR INC.</td>
<td>Corporation</td>
<td>42</td>
</tr>
<tr>
<td>33</td>
<td>GENZYME CORPORATION</td>
<td>Corporation</td>
<td>41</td>
</tr>
<tr>
<td>34</td>
<td>AGFA DIVISION, BAYER CORPORATION</td>
<td>Corporation</td>
<td>40</td>
</tr>
<tr>
<td>35</td>
<td>ANALOGIC CORPORATION</td>
<td>Corporation</td>
<td>40</td>
</tr>
<tr>
<td>36</td>
<td>AVERY DENNISON CORPORATION</td>
<td>Corporation</td>
<td>39</td>
</tr>
<tr>
<td>37</td>
<td>BETH ISRAEL HOSPITAL ASSOCIATION</td>
<td>Institute</td>
<td>37</td>
</tr>
<tr>
<td>38</td>
<td>C. R. BARD, INC.</td>
<td>Corporation</td>
<td>34</td>
</tr>
<tr>
<td>39</td>
<td>UNITED STATES OF AMERICA, NAVY</td>
<td>U.S. Government</td>
<td>34</td>
</tr>
<tr>
<td>40</td>
<td>AMOCO CORPORATION</td>
<td>Corporation</td>
<td>33</td>
</tr>
<tr>
<td>41</td>
<td>GTE LABORATORIES, INC.</td>
<td>Corporation</td>
<td>33</td>
</tr>
<tr>
<td>42</td>
<td>CHIRON DIAGNOSTICS CORPORATION</td>
<td>Corporation</td>
<td>32</td>
</tr>
<tr>
<td>43</td>
<td>KOPIN CORPORATION</td>
<td>Corporation</td>
<td>32</td>
</tr>
<tr>
<td>44</td>
<td>COGNEX CORPORATION</td>
<td>Corporation</td>
<td>30</td>
</tr>
<tr>
<td>45</td>
<td>W. R. GRACE &amp; CO.-CONN.</td>
<td>Corporation</td>
<td>30</td>
</tr>
<tr>
<td>46</td>
<td>CBA CORNING DIAGNOSTICS CORP.</td>
<td>Corporation</td>
<td>29</td>
</tr>
<tr>
<td>47</td>
<td>FOXBORO COMPANY</td>
<td>Corporation</td>
<td>29</td>
</tr>
<tr>
<td>48</td>
<td>UNITED TECHNOLOGIES CORPORATION</td>
<td>Corporation</td>
<td>28</td>
</tr>
<tr>
<td>49</td>
<td>VLT CORPORATION</td>
<td>Corporation</td>
<td>28</td>
</tr>
<tr>
<td>50</td>
<td>TROPX, INC.</td>
<td>Corporation</td>
<td>28</td>
</tr>
</tbody>
</table>

Data Source: CHI Research, USPTO
The Composition of Regional Economies
United States

<table>
<thead>
<tr>
<th>Traded Clusters</th>
<th>Local Clusters</th>
<th>Natural Resource-Driven Industries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Share of Employment</td>
<td>32.1%</td>
<td>67.1%</td>
</tr>
<tr>
<td>Employment Growth, 1993 to 1999</td>
<td>2.5%</td>
<td>2.8%</td>
</tr>
<tr>
<td>Average Wage</td>
<td>$41,678</td>
<td>$26,049</td>
</tr>
<tr>
<td>Relative Wage</td>
<td>134.0</td>
<td>83.8</td>
</tr>
<tr>
<td>Wage Growth</td>
<td>5.0%</td>
<td>3.8%</td>
</tr>
<tr>
<td>Relative Productivity</td>
<td>144.1</td>
<td>79.3</td>
</tr>
<tr>
<td>Patents per 10,000 Employees</td>
<td>20.48</td>
<td>1.38</td>
</tr>
<tr>
<td>Number of SIC Industries</td>
<td>592</td>
<td>241</td>
</tr>
</tbody>
</table>

Note: 1999 data, except relative productivity which is 1997 data, and patents data which is 1998 data
Specialization of Regional Economies
Selected U.S. Geographic Areas

Note: Clusters listed are the three highest ranking clusters in terms of share of national employment
Specialization of Regional Economies
Research Triangle

Note: (y-axis, x-axis)
Source: Cluster Mapping Project, Institute for Strategy and Competitiveness, Harvard Business School

Copyright © 2002 Professor Michael E. Porter
# The Evolution of Regional Economies
## Research Triangle

### Building the Foundation

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>1950s</td>
<td>Alcatel establishes presence</td>
</tr>
<tr>
<td>1960s</td>
<td>IBM establishes manufacturing facility</td>
</tr>
<tr>
<td>1961</td>
<td>National Institute of Environmental Health Sciences offered space at Research Triangle Park</td>
</tr>
<tr>
<td>1971</td>
<td>Chemstrand establishes a fiber R&amp;D facility</td>
</tr>
<tr>
<td>1974</td>
<td>U.S. Environmental Protection Agency opens field office</td>
</tr>
</tbody>
</table>

### New Cluster Development

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>1971</td>
<td>Troxler Electronics becomes the first locally based tenant at Research Triangle Park</td>
</tr>
<tr>
<td>1980</td>
<td>Glaxo opens R&amp;D center</td>
</tr>
<tr>
<td>1982</td>
<td>Union Carbide opens R&amp;D facility</td>
</tr>
<tr>
<td>1984</td>
<td>Sumitomo Electric Lightwave founded</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>1974</td>
<td>Univ. of North Carolina Lineberger Comprehensive Cancer Center founded</td>
</tr>
<tr>
<td>1982</td>
<td>General Electric sets up research and manufacturing facility</td>
</tr>
<tr>
<td>1983</td>
<td>Northern Telecom establishes U.S. subsidiary</td>
</tr>
<tr>
<td>1995</td>
<td>Covance opens manufacturing facility</td>
</tr>
<tr>
<td>1996</td>
<td>Redback Networks establishes operations</td>
</tr>
</tbody>
</table>

### Innovation Expands

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>1994</td>
<td>Biogen builds mfg. facility</td>
</tr>
<tr>
<td>1995</td>
<td>Rhone-Poulec acquires Red Hat Software</td>
</tr>
<tr>
<td>1996</td>
<td>Union Carbide operations established</td>
</tr>
<tr>
<td>2000</td>
<td>Biogen builds mfg. facility</td>
</tr>
</tbody>
</table>

---

Source: Clusters of Innovation project ([www.compete.org](http://www.compete.org))
Evolution of the Regional Economy
San Diego

- Climate and Geography
- U.S. Military

1910
1930
1950
1970
1990

- Hospitality and Tourism
- Transportation and Logistics
- Power Generation
- Aerospace Vehicles and Defense
- Communications Equipment
- Analytical Instruments
- Information Technology
- Education and Knowledge Creation
- Medical Devices
- Bioscience Research Centers
- Biotech / Pharmaceuticals
- Sporting and Leather Goods
The Development of Clusters
History of the San Diego Biotech / Pharma Cluster

1955
- Salk Institute Founded
- Scripps Research Institute Founded

1960
- UCSD Connect Founded

1964
- UCSD Founded

1976
- Burnham Institute Founded

1978
- Hybritech Founded

1985
- UCSD Connect Founded
- Hybritech Sold to Eli Lilly

1986

1991
- Biomedical Industry Council Founded
- Nanogen Founded
- Biocom Founded
- Novartis Agricultural Discovery Institute Founded

Source: Clusters of Innovation project (www.compete.org)
Agenda

• Foundations of competitiveness and the role of regions

• Basque competitive performance

• Basque competitiveness: The next agenda
Unemployment Rate
Southern European Countries and Regions

Source: European Commission
GDP per Capita
Southern European Countries and Regions

GDP per capita (PPP), EU-15 = 100

Source: European Commission
Basque Business Environment

Recent Changes

Context for Firm Strategy and Rivalry

- Increasing levels of inward/outward FDI
- Increasing export orientation of companies
- Strong increase in private R&D expenditures

Demand Conditions

- Exposure to sophisticated demand from new inward FDI, e.g. in automotive
- Demand from local companies increasingly selling to international markets

Factor (Input) Conditions

- Upgrading of the transportation and ICT infrastructure
- Strengthening of local financial markets
- Investments in universities, new research centers and technology parks
- Increasing number of researchers

Related and Supporting Industries

- Initiation of cluster efforts in, for example, automotive, aeronautics, machine tool, and knowledge cluster
- Upgrading of supporting business services

Demand Conditions

• Upgrading of the transportation and ICT infrastructure
• Strengthening of local financial markets
• Investments in universities, new research centers and technology parks
• Increasing number of researchers
Basque Business Environment

Recent Changes

Government Policy

- Improved **tax incentives** for business investment
- Creation and support of **institutions** to implement the upgrading of the business environment
  - E.g., Euskalit (Basque Quality Foundation)
  - E.g., Basque Council for Science, Technology and Innovation
  - E.g., Basque Technology Network
- Support of **cultural initiatives** (Guggenheim Museum Bilbao)
- Launch and support of **cluster initiatives**
- Creation of **technology parks**
- Aggressive participation in **EU Science & Technology programs**
Clusters in the Basque Country
Export and Production Levels

Source: Basque government
## Basque Clusters

### Examples

<table>
<thead>
<tr>
<th>Machine Tools</th>
<th>Aeronautics</th>
</tr>
</thead>
<tbody>
<tr>
<td>• High percentage of foreign sales (71% of companies are habitual exporters)</td>
<td>• 75% of all manufactured products are exported</td>
</tr>
<tr>
<td>• Customers</td>
<td>• 18% of all income is earmarked for R&amp;D.</td>
</tr>
<tr>
<td>• Mainly German companies</td>
<td>• The most important companies in this cluster are</td>
</tr>
<tr>
<td>• Top aeronautical and automotive multinationals (Airbus, McDonnell Douglas, General Motors, Mercedes Benz, Peugeot, Renault, Chrysler, Volkswagen).</td>
<td>- Gamesa Group (Embraer, Sikorsky and Sino Swearingen)</td>
</tr>
<tr>
<td>• 4,570 direct and 4,000 indirect jobs</td>
<td>- Turbo Engine Industry (aircraft engines, e.g.: Airbus)</td>
</tr>
</tbody>
</table>

Source: Basque government
Basque Economic Performance in the 1990s

Summary

- Strong rebound after the crisis in the late 80s
- Prosperity approaching EU-average level
- Innovation between Spanish and Italian level
- Business environment has been significantly upgraded in a joint effort of public and private sector institutions
- The Basque country is one of the few regions in Europe that has made significant progress in upgrading their traditional industrial base
Challenges for the Basque Country in 2002

• At higher wage levels, the Basque country has to compete with other increasingly sophisticated business locations
  – E.g., large parts of France, Germany, and the Netherlands have similar levels of prosperity

• Other lower wage locations are catching up
  – Upgrading in other parts of Southern Europe
  – EU entry of countries like Poland and the Czech Republic with a well educated labor force, strong industrial tradition, and a location close to large European markets

• Weak world economy provides a more challenging environment for upgrading

• A new economic strategy for the next decade will be necessary
Agenda

• Foundations of competitiveness and the role of regions

• Basque competitive performance

• Basque competitiveness: The next agenda
Basque Business Environment

**Context for Firm Strategy and Rivalry**

**Factor (Input) Conditions**
- High share of high skill employees
- Significant regional financial market
- Network of 4 universities, 3 technology parks, and other research institutions
- High share of low skill employees
- Low level of public R&D expenditure
- Lack of universities in top European league

**Demand Conditions**
- Many SMEs lack direct contact to international customers

**Related and Supporting Industries**
- Strong clusters in manufacturing areas
- Strong base of financial and business services
- Cluster initiatives effective only in some clusters
Basque Economic Strategy: The Way Ahead

• Enhance the skills of the large low-skill workforce
Educational Attainment
Southern European Countries and Regions

Share of 25-59 year old by level of educational attainment

Source: European Commission
Basque Economic Strategy: The Way Ahead

• Enhance the skills of the large low-skill workforce

• Upgrade Innovative Capacity
Innovation Environment
Availability of Researchers

R&D personal per 1,000 employees, 1999

CAGR of R&D personal per 1,000 employees, 1981 to 1999

Source: Basque government
Basque Innovation Environment

Institutions for Collaboration

Basque Technology Network (BTN)

- 10 technology centers
- 4 Universities with 51 reputable departments
- 4 Sectoral Research Centers
- 13 R&D business units
- 4 Research laboratories
- 14 Intermediary innovation organizations
- 2 Public research organizations

Technology Parks

- Zamudio (Bizkaia)
- Miñano (Alava)
- Miramón-San Sebastián (Gipuzkoa)

- A total of 156 companies and technology centers accounting for 35% of Basque business R&D

Source: Basque government
Innovation Performance
Southern European Countries and Regions

EU Patents per million people, 1997-99 average

Portugal: 2.7
Greece: 6.2
Spain: 18.5
Basque Country: 30.5
Italy: 59.7
France (South-West): 60.8
EU-15: 119.4

Source: European Commission
# Basque Holders of U.S. Patents

## Total Patents 1996-1999

<table>
<thead>
<tr>
<th>No. of Patents</th>
<th>Company</th>
<th>Site</th>
<th>Headquarter</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>TELEFONAKTIEBOLAGET LM ERICSSON</td>
<td>Bilbao</td>
<td>Stockholm, Sweden</td>
</tr>
<tr>
<td>1</td>
<td>DEGUISA, S.A.</td>
<td>Bilbao</td>
<td>Bilbao</td>
</tr>
<tr>
<td>1</td>
<td>COOK COMPOSITES AND POLYMERS CO.</td>
<td>Bilbao</td>
<td>Kansas City, USA</td>
</tr>
<tr>
<td>1</td>
<td>TUBOPLAST HISPANIA, S.A.</td>
<td>Vitoria</td>
<td>Vitoria</td>
</tr>
<tr>
<td>1</td>
<td>S.A. LORAMENDI</td>
<td>Vitoria</td>
<td>Alava</td>
</tr>
<tr>
<td>1</td>
<td>F.M. CONTROL, S.L.</td>
<td>Vitoria</td>
<td>Vitoria-Gasteiz</td>
</tr>
<tr>
<td>1</td>
<td>UNION ESPANOLA DE EXPLOSIVOS, S.A.</td>
<td>Bilbao</td>
<td>Madrid</td>
</tr>
</tbody>
</table>

Note: Among all Spanish patent holders in the US Ericsson’s Basque subsidiary ranks 54 and all other Basque patent holders rank 94.

Source: USPO, ISC analysis
# Patents by Organization

## Research Triangle MSA, 1995–1999

<table>
<thead>
<tr>
<th>Organization</th>
<th>Patents Issued from 1995 to 1999</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 International Business Machines Corporation</td>
<td>495</td>
</tr>
<tr>
<td>2 Ericsson, Inc.</td>
<td>325</td>
</tr>
<tr>
<td>3 Becton, Dickinson and Company</td>
<td>128</td>
</tr>
<tr>
<td><strong>North Carolina State University</strong></td>
<td><strong>128</strong></td>
</tr>
<tr>
<td><strong>Duke University</strong></td>
<td><strong>127</strong></td>
</tr>
<tr>
<td><strong>University of North Carolina — Chapel Hill</strong></td>
<td><strong>124</strong></td>
</tr>
<tr>
<td>7 Square D Company</td>
<td>48</td>
</tr>
<tr>
<td>8 Novartis</td>
<td>46</td>
</tr>
<tr>
<td>9 ABB Power T&amp;D Company, Inc.</td>
<td>44</td>
</tr>
<tr>
<td>10 Alcatel Network Systems, Inc.</td>
<td>43</td>
</tr>
<tr>
<td>11 Mitsubishi Semiconductor America, Inc.</td>
<td>41</td>
</tr>
<tr>
<td>12 Lord Corporation</td>
<td>36</td>
</tr>
<tr>
<td>13 Kennametal, Inc.</td>
<td>29</td>
</tr>
<tr>
<td>14 Rhone-Poulenc, Inc.</td>
<td>29</td>
</tr>
<tr>
<td>15 Telefonaktiebolaget LM Ericsson</td>
<td>28</td>
</tr>
<tr>
<td>16 Caterpillar, Inc.</td>
<td>26</td>
</tr>
<tr>
<td>17 Cree Research, Inc.</td>
<td>26</td>
</tr>
<tr>
<td>18 E.I. DuPont De Nemours and Company</td>
<td>26</td>
</tr>
<tr>
<td><strong>MCNC</strong></td>
<td><strong>25</strong></td>
</tr>
<tr>
<td>19 Raychem Corporation</td>
<td>24</td>
</tr>
<tr>
<td>20 Reichhold Chemicals, Inc.</td>
<td>24</td>
</tr>
<tr>
<td>21 American Sterilizer Company</td>
<td>21</td>
</tr>
<tr>
<td>22 Siemens Energy and Automation, Inc.</td>
<td>21</td>
</tr>
<tr>
<td>23 Northern Telecom Limited</td>
<td>20</td>
</tr>
<tr>
<td><strong>Research Triangle Institute</strong></td>
<td><strong>20</strong></td>
</tr>
<tr>
<td>24</td>
<td></td>
</tr>
</tbody>
</table>

Government R&D Spending
Public Expenditure on R&D, Share of GDP

Public R&D Spending as % of GDP, 1998

Source: EU Scoreboard, Basque government
Basque Economic Strategy: The Way Ahead

• Enhance the skills of the large low-skill workforce

• Upgrade Innovative Capacity

• Deepen clusters and extend cluster development throughout the economy
  – FDI into clusters
  – Foreign specialists for clusters
Clusters in the Basque Country

Activated Initiatives

- Automotive Suppliers
- Aeronautics
- Household appliances
- Machine-tools
- Knowledge

- High value added steel
- Energy
- Pulp & paper
- Environment
- Telecommunications
- Basque Maritime Forum

Source: Basque government
Public / Private Cooperation in Cluster Upgrading
Minnesota’s Medical Device Cluster

Context for Firm Strategy and Rivalry

- Aggressive trade associations (Medical Alley Association, High Tech Council)
- Effective global marketing of the cluster and of Minnesota as the “The Great State of Health”
- Full-time “Health Care Industry Specialist” in the department of Trade and Economic Development

Factor (Input) Conditions

- Joint development of vocational-technical college curricula with the medical device industry
- Minnesota Project Outreach exposes businesses to resources available at university and state government agencies
- Active medical technology licensing through University of Minnesota
- State-formed Greater Minnesota Corp. to finance applied research, invest in new products, and assist in technology transfer

Demand Conditions

- State sanctioned reimbursement policies to enable easier adoption and reimbursement for innovative products

Related and Supporting Industries

- Minnesota Project Outreach exposes businesses to resources available at university and state government agencies
- Active medical technology licensing through University of Minnesota
- State-formed Greater Minnesota Corp. to finance applied research, invest in new products, and assist in technology transfer
Basque Economic Strategy: The Way Ahead

- Enhance the skills of the large low-skill workforce

- Upgrade Innovative Capacity

- Deepen clusters and extend cluster development throughout the economy

- **Upgrade corporate strategies**
  - Regional and global strategies with a Basque home base
Export Performance
European Countries and Regions

Exports per capita, in 1,000 ECU, 1998

- Greece: 2.3
- Spain: 2.8
- Italy: 3.3
- Portugal: 3.4
- France: 4.6
- Basque Country: 4.7
- UK: 4.8
- Germany: 5.0
- Finland: 5.7
- Sweden: 6.8
- Ireland: 10.6
- Netherlands: 11.4

Note: Basque exports to destinations outside Spain
Source: Basque Statistical Office
# Basque Companies with Global Strategies

<table>
<thead>
<tr>
<th>IRIZAR</th>
<th>CAF</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Coach manufacturer with focus on premium segment</td>
<td></td>
</tr>
<tr>
<td>• International expansion began in 1995</td>
<td>• Railroad equipment manufacturer with focus on innovative technology</td>
</tr>
<tr>
<td>- Current operations in Brazil, Mexico, China, India, and Morocco</td>
<td>• International expansion began in 1992</td>
</tr>
<tr>
<td>- Sales in 65 countries</td>
<td>- Current operations in the US, Mexico, Brazil, Portugal, Ireland, and the UK</td>
</tr>
<tr>
<td>• Builds on Basque manufacturing supplier base</td>
<td>- 70% of sales are outside Spain</td>
</tr>
<tr>
<td>• Strong employee involvement and flat management structure; involved in upgrading of its social environment</td>
<td>• Builds on Basque manufacturing supplier base</td>
</tr>
<tr>
<td>• Leads its sector efficiency and profitability</td>
<td>• Strong investment in R&amp;D; launched railroad research center at Basque Technology Centers</td>
</tr>
</tbody>
</table>
Determinants of Relative Performance

Operational Effectiveness

- Assimilating, attaining, and extending best practice

Do the same thing better

Strategic Positioning

- Creating a unique and sustainable competitive position

Compete in a different way
Basque Economic Strategy: The Way Ahead

- Enhance the skills of the large low-skill workforce
- Upgrade Innovative Capacity
- Deepen clusters and extend cluster development throughout the economy
- Upgrade corporate strategies
- Deepen integration with neighboring nations and regions
Geographic Levels and Competitiveness

- World Economy
- Broad Economic Areas: European Union
- Groups of Neighboring Nations: Iberian Peninsula, South-West France
- Nations: Spain
- States, Provinces: Basque Country
- Cities, Metropolitan Areas: San Sebastian
## Economic Coordination With Neighboring Regions and Countries

### Illustrative Policy Levers

<table>
<thead>
<tr>
<th>Factor (Input) Conditions</th>
<th>Context for Strategy and Rivalry</th>
<th>Demand Conditions</th>
<th>Related and Supporting Industries</th>
<th>Regional Governance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improve regional transportation infrastructure</td>
<td>Agree on foreign investment promotion guidelines to limit forms of investment promotion that do not enhance productivity</td>
<td>Create joint public procurement procedures</td>
<td>Establish ongoing upgrading process in clusters that cross national borders</td>
<td>Share best practices in government operations</td>
</tr>
<tr>
<td>Create an efficient energy network</td>
<td>Simplify cross-border regulations and paperwork</td>
<td>Set common environmental standards</td>
<td></td>
<td>Improve regional institutions</td>
</tr>
<tr>
<td>Upgrade/link regional communications</td>
<td></td>
<td>Set common safety standards</td>
<td></td>
<td>Develop a regional marketing strategy</td>
</tr>
<tr>
<td>Upgrade/link financial markets</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upgrade higher education through facilitating specialization and student exchanges</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expand cross-border business and financial information access and sharing</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Context for Strategy and Rivalry

- Improved regional governance
- Shared best practices in government operations
- Improved regional institutions
- Developed a regional marketing strategy
Basque Economic Strategy: The Way Ahead

• Enhance the skills of the large low-skill workforce

• Upgrade Innovative Capacity

• Deepen clusters and extend cluster development throughout the economy

• Upgrade corporate strategies

• Deepen integration with neighboring nations and regions

• Avoid losing momentum
Organizing to Compete
Massachusetts

Governor’s Council on Economic Growth and Technology

Industry Cluster Committees
- Advanced Materials
- Biotechnology and Pharmaceuticals
- Defense
- Marine Science and Technology
- Medical Devices
- Software
- Telecommunications
- Textiles
- Information Technology

Functional Task Forces
- International Trade
- Marketing Massachusetts
- Tax Policy and Capital Formation
- Technology Policy and Defense Conversion

Issue Groups
- Cost of Doing Business
- Financing Emerging Companies
- Health Care
- Western Massachusetts
- Business Climate
- Competitive Benchmarking