Learning in Steel: Agents and Deficits

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Changing Competitive Environment in Steel

- Big 3 Integrateds
  - Minimill Challenge 70s & 80s
  - Service Centres 90s
  - Imports: Quantity (40%) & Price $375-210

- New Steels for Auto
  - Metallurgy, process control, lasers
  - Decreasing returns, capital costs, limited R & D funds

- 1998 Asian Crisis: Tipping Point?
Themes: Agents & Deficits

- Steel companies acquiring and implementing new technology
  - Traded knowledge: off the shelf tech
  - Decline of traditional in-house: Steltech
- Dofasco as new Learning Steel company
  - Location matters: McMaster Steel Research Centre: People over Tech transfer
  - Public institutions play critical role in filling deficit
Steel in Learning Region: Themes

- Steel companies embedded in a *Network of Learning* rather than a "Cluster"
- Location matters:
  - Management philosophy & strategy
  - Accelerate pace of learning curve: Dofasco EAF, Process Control
  - Alternatives to Turnkey projects
Algoma

- DSPC: Most dramatic new steel process: liquid metal to coil 3/20
  - Most limited involvement in learning channels
  - Tried Complete Turnkey: over time, sub-optimal
    - Hand off to locals: Hydraulics, optimization

- Location:
  - Logistics overcome $11-15 per ton
  - DSPC technology threat to minimills
Stelco

- Traditional Technology Leader:
  - Stelco Engineering, Steltech: Coil Box
  - Designed their own mills, 1200 engineers
  - Downsizing of late 1980s eliminated

- Stelco in 90s: Traded Knowledge
  - Co-venture: Z-Line, Mitsubishi
  - Alliances: USLAB, AISI
  - Tech Leadership: Nippon Steel
Dofasco

- New Tech Leaders
  - Vision: “Solutions in Steel”
  - Focus: Auto industry, Body-in-White
  - Downstream Processing: Powerlasers
- Strategy: Local & Traded Knowledge
  - Co-ventures: DoSol Galva (Usinor), Extragal (Brazil), Dofasco de Mexico
  - Alliances: USLAB, AISI
Steel-Govt-Academic Links

- University research: Deep Metallurgy
  - Research Chairs:
    - McMaster: Steel Research Centre
    - UBC: Centre for Metallurgical Process Engineering
    - McMaster Advanced Control Consortium
- Bessemer Project: Thin Strip Casting
Channels of Steel Learning

- Basic Research on innovative steel processes
- Consultation resources for company specific problems
- Facilitation of informal, firm-university learning networks
- Forums for discussion on industry standards
- Highly qualified personnel training & recruitment
Government Agencies: MMO

- Metals research budget: 25% to Steel
  - Seven projects: Material properties & processes
  - Three consortia: Micro alloyed forging steel
  - Technical consultation: Auto spring steels
- Workshops:
  - New Steel
  - Hard Coatings
- Writing Specs: SAE technical standards
CSTEC: Training and Skills

- Algoma: CSTEC training and recycling skills
- Dofasco: Largest user of CSTEC curriculum
- CSTEC Recruiting: 300 technician, technologist, engineering (HRDC)
- Accelerated apprenticeship schedule to replace retiring tradesmen
Steel Questions & Themes

- NAFTA Steel Industry?
- International Clusters? Usinor, Nippon
- Algoma: Stranded Asset? Location?
- Virtuous/Vicious Circles of Investment and Innovation
- Maksteel: Too much too soon?
Conclusions

- Location matters: technological transfer and human resources
- Dofasco: the leading indigenous innovator
- The challenge of innovating in capital intensive industries
- Interdependence of location and business models
- Public institutions matter – but how much? Canada/EU distinction