Rural Development – investments, opportunities, strategies

Structurally, the emerging fuel-ethanol industry is uncharacteristic of typical agricultural processing
- Fragmented balance – multinationals v. farmer-owned plants
- Dispersed ownership/production
- Few integration/assimilation activities

Information technology (IT) is a driving force in business operations, strategies, structures, ownership, and performance
- Does IT Matter? Carr
- IT Doesn’t Matter, Business Processes Do, Smith and Fingar
- The Only Sustainable Edge, Hagel and Brown
- The World is Flat, Friedman

Ace Ethanol LLC, Stanley, WI

Study background/motivation

Two workshop/focus panels of industry experts
- Minneapolis and Omaha (March '05)
  - Specialists in: Commodity futures (NYMEX, CBOT), finance, producer assns., legal structures, information technology, plant management, R&D, energy, procurement/logistics
- USDA, University of Minnesota, and Informa Economics (formerly Sparks Commodities)
- 12 follow-up interviews
  - Plant managers, directors, industry principals

“Role of Information Technology in the Fuel Ethanol Industry”

- Carr, “Not so much …”
  - IT same as other tech: railroads, electric power, telephone
  - From proprietary resource to a cost of doing business
  - Impacts erode with availability and affordability

- Smith and Fingar, “Not so fast …”
  - IT as industry maybe, but not IT business applications
  - 1st 50 years of data – storage, processing, transport
  - Next 50 years of BP – storage, processing, transport

- Hagel and Brown, “Just fast enough …”
  - Sustained business success depends on “productive friction” and “dynamic specialization”
  - IT enables work to be: digitized, decomposed, distributed
Study objectives

Is the present ethanol industry structure stable or transitional toward concentration?

How has IT altered the playing field for the medium-sized firm?
Re: Scale economies, market access, supply/value chain coordination, finance/investment, etc.

Is IT serving as a proxy for vertical integration?

To what extent is IT lowering transaction costs across -- enterprises, business processes, and/or functions?

What are the Rural Development implications?

Changing nature of business

- From vertical “Command and Control” hierarchies to:
  - Horizontal, multi-dimensional, multi-modal, collaboration
  - A global. Web-connected, IT-leveled, playing field
  - “Real time” sharing and distribution of knowledge/work -- regardless of: Geography, Distance, Language
- From “make or buy” decisions to “digitize, decompose, and move work around”
- From labor v. capital to employee v. consumer

Industry structure, then and now

Then (mid 80’s to early 90’s):
- Top 3 firms (80% of production) and ‘the rest’ (~17 plants)
- 1 billion production capacity
- Construction costs ~ $2.50/gal
- Conversion efficiency ~ 2.2 gal/bu
- 52 staffing FTEs
- 320 operation days/year

Now:
- Fragmented structure – Top 3 firms (31%), 44 of 71 plants F/O
- 4+ billion production capacity
- Construction costs ~ $.98/gal
- Conversion efficiency ~ 2.75 gal/bu
- 35 staffing FTEs
- 360 operation days/year

How did industry get ‘here’?

- Federal/State policies & incentives
  - Natural progression of an emerging industry
  - Classic “production push”, agricultural business model
- Farmer-owned facilities
  - Associated capital constraints
- $50+/barrel oil
  - From commodity-ingredient to energy substitute?
- Cheap corn, Growers’ associations, Other things …
- Information technology?

The “cookie-cutter” ethanol plant

- “Put down” quite easily in most any location
- A “one-stop ethanol shop” -- Feasibility to turn-key and beyond
- Feasibility/ Business plan
- Fund raising/Financing
- General contracting/Licensing/Permits
- Marketing/Procurement agreements
- General/Plant management
- Hand holding
  - Producer-investors through the entire process
  - Operations contracts into 5th marketing year
- Not your father’s “still on the hill”

IT and the ethanol plant “franchise”

- Process design technology
- Distributed control systems
  - Dynamic specialization
  - Process networks
  - Performance fabric
**Process design technology**

- **Old plants:**
  - Analog loop controls
  - Lever, gauge, & technician for each process component
  - Sophisticated maintenance, strip chart recording

- **Standardized design plants:**
  - Integrated circuitry
  - 1 technician for many processes
  - AI monitored, real time updates
  - Brin, Fagen/ICM, Delta-T

**Dynamic specialization**

- **Innovation -- incentives, opportunities, capabilities**
  - Marketing "partnerships" -- Ethanol, Distillers' grains (DDGs)
  - Procurement "contracts" -- Feedstock, Energy, Inputs (Enzymes)
  - Management "agreements" -- Operations/Process benchmarking

- **FAGEN/ICM services**
  - Management -- General management services, Contracted employees permanently at plant site, Strategic and daily management of plant operations, Group purchasing opportunities, Monthly benchmark information program
  - Trading -- Risk management/consulting services, Factor / product risk management -- corn, grain sorghum, natural gas / ethanol, gasoline, Market analysis services, Licensed commodity brokerage
  - Ingredients -- Grain origination, DDGS marketing services, Transportation logistics, Full accounts receivable responsibility, Credit risk assumption
  - Fuels -- Ethanol marketing (off-take contracts), Transportation logistics, Full accounts receivable responsibility, Credit risk assumption

**Distributed control systems**

- Consolidation of process management over many enterprises/plants/companies simultaneously
- Massive data collection/analysis effort
- Business/bio process metrics and benchmarking
- Precise factor/product coordination
- Sourcing/usage specifications
  - Staff reduction
  - Productivity gains
  - Cost savings!

**Marketing “partnerships”**

- Aventine Renewable Energy, 11 plants -- 560 mgd

**FAGEN/ICM services**

- Agri-Energy LLC, Luterne, MN

**United Bio Energy client list**

- 17 plants (13 FSO) -- 58 contracts

Process networks
Mobilizing specialized activity across many enterprises

- Supply chain management
  - Marketing
  - Procurement
- Product innovation/commercialization
  - DDGS product development
    - From waste stream to revenue stream
  - Bio refinery concept
    - "Up front" technologies/fractionation
- Customer relationship management
  - Complementary product and service providers

Performance fabric
Weaving together process networks

- Enabling coordination across:
  - Enterprises, companies, specialties
- That are dispersed:
  - Geographically, institutionally, dimensionally
- And are the basis for using "productive friction" to build and accelerate capabilities
  - 500 mgy ethanol marketing requirement problem
  - DDGS quality, reliability, & sufficiency problem
  - Bio-diesel production costs problem

Study results -- IT matters!

IT and ethanol industry structure:
- Plant operations and costs
- The nature of the firm
- Relationships between firm and industry
- Future dynamics

IT and plant operations

- Fosters standardization & "best practices"
  - Strips costs out of system
  - Mitigates risk
  - Squeezes time loss out of system
    - Speeds construction – ground breaking to occupancy
    - Reduces downtime – 320 to 360 days of operation/year
- Facilitates capital inflow

IT and the nature of the firm

- Digitizes and decomposes activities for outsourcing
  - Alters asset location requirements
  - Encourages labor mobility
- Further separates ownership from management
- Alters the skill sets needed for management and labor
- Encourages firm transformation

IT and the firm’s relationships

- Gives rise to the ethanol “Franchise”
  - Supports contracts-based industry structure
  - Creates “Web” of collaboration --
    - Enterprises, companies, specialties
  - Reduces bounds of uncertainty
    - Better understanding of risks helps to:
      - Reduce lenders’ equity participation requirements
      - Reduce interest rates and the overall costs of capital
      - Invite participation from outside investors
    - Alters industry/market structure
      - Physical capital v. Aggregating information assets
      - Production based v. Intellectual capital based
IT and the ethanol industry’s future

Looking to the future, we ask:
• What else can be digitized, decomposed, outsourced?
• From where will the talent to continue operations come?
• Will IT erode the same advantages it once endowed?

Rural Development implications

• Develop human capital/capacity of rural residents
  – IT capability/access is a rural business cornerstone
  – IT skill sets critical to rural business development
• Connect RD investments to rural IT-based businesses
  – Full adoption of IT improves:
    • Relative business risks
    • Chances of RD program success
    • Long term economic prospects/growth