DIGITAL OPPORTUNITY IN AGRICULTURE

Digitizing the western Canadian agriculture industry

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FOOD & AGRICULTURE INDUSTRY

World-wide agriculture:

- contributes 6% of global GDP (World Book 2016, UN-FAO)
- employs 1.3 billion people (UNCTADStat 2016)
- value ag trade exports $1.3 trillion (Agriculture Canada 2015)

- Over 500 food & agriculture tech startups raised USD$4.6 billion in 2015 (AgFunder 2015 Annual Report)
  - “agtech is the new queen of green” (Techcrunch Network, 2015).
  - Before 2013, investment in agtech was flat (CleanTech Group, 2015)
    - Why?
Canadian agriculture industry:

- single largest employer and contributor to Canada’s GDP
- $107 billion (6.7%) GDP in 2013 (Agriculture Canada 2015)
- 1 in 8 Canadians employed ag & service sector
- leading exporter several commodities
  - 3.5% total world exports
- primary production agtech customers on prairies
  - 133,840 customers Alberta, Manitoba, Saskatchewan
WESTERN CANADA PRODUCTION

Map:
1 dot = 100 farms

AB, SK, MB
Combined = 96,063 farms

Agtech customers
133,840 farm operators
(45% Canadian market)

130.1 million-acres farmland
METHODOLOGY

Assumption: Trade Shows, field days are central nodes in global knowledge economy or global information networks (Bathelt & Gibson; Golfetto, & Rinallo)

Context: exhibitors, visitors, agtech buyers (international buyers, regional producers), innovation competitions, sales strategy,

• Canada Farm Progress Show 42,000 visitors, Regina, 2015
  Innovations Showcase, International Business Center - $C 163.8 M, 146 international buyers, 15 countries,

• Agribition: 130,200 visitors, competitors, buyers
  C$5 M livestock sales, 70 countries

• w.Canada Crop Production Show (prov.trade shows)

Peer recognition for excellence innovation
## FRAMEWORK

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Organization of innovation captures finance, marketing, skills & the technology
TYPE I: TOP-DOWN DRIVEN, CLOSED INTEROPERABILITY

Case Type I: John Deere, the corporate play for control

Hardware
Software
Sensors
Satellite/Cellular
Remote access & control
Aggregation
TYPE I: TOP-DOWN DRIVEN, CLOSED INTEROPERABILITY

Case Type I: John Deere, the corporate play for control

Source: Pinkston 2015. VP Information Solutions, Intelligent Solutions Group John Deere
TYPE I: TOP-DOWN DRIVEN, CLOSED INTEROPERABILITY

Case Type I: John Deere, the corporate play for control

aggregating platform for John Deere USA, 3rd parties Climate Corp, Trimble/AgriTrend Raven

Source: Pinkston 2015. VP Information Solutions, Intelligent Solutions Group John Deere
TYPE II: TOP-DOWN DRIVEN, OPEN INTEROPERABILITY

Case Type II: Farmobile (USA), strategic networks

Solving a problem - farmers right to own their data & sell it

Skills
• developer/programmer, start-up business, farm history
• consumer digital tech to agtech (Fitbit®, iTunes)

Finance
• start-up self financed, scale up with venture capital

Market
• open interoperability - common communication codes
• $4.00/ac purchase price - $2.00/acre farmer - $2.00 firm

Technology
• processes and hardware patent protection - the system
TYPE II: TOP-DOWN DRIVEN, CPEN INTEROPERABILITY

Case Type II: Farmobile (USA), strategic networks

In the box

PUC

Data plan, storage & Simplicity app

$1,250 US/PUC/yr
install the PUC on tractor (15 min)
connect antenna cables to PUC;
data cable to machine, start-up, collect data
TYPE III: BOTTOM-UP DRIVEN, OPEN INTEROPERABILITY

Case Type III: AgSKY Technologies (Swan River, MB)

perfectly competitive entrepreneurial start-up

Solving a problem - farmers don’t have enough time to process drone images for quick decision-making

Skills
- farm know-who & know-how, developer/programmer, business

Finance
- start-up Bank of Dad, acquisition by GreenAero Technology

Market
- open access

Technology
- processes: mobile, mainframe storage, USB/e transfer
 TYPE III: BOTTOM-UP DRIVEN, OPEN INTEROPERABILITY

Case Type III: AgSKY Technologies (Swan River, MB)

perfectly competitive entrepreneurial start-up

Drone flight, images
Mosaic-ing
Actionable report
TYPE IV: BOTTOM-UP DRIVEN, CLOSED INTEROPERABILITY

Case TYPE IV: **FarmLead**, (Foam Lake, SK) primordial system generator

Solving a problem - removal single desk marketing of grains

**Skills**
- farm know-who & know-how, economics, commodity trader

**Finance**
- own networks, competitions, AB venture capital investors

**Market**
- open access, mobile platform for trading grain
- anonymized buyer/seller (voluntary attribution) rating system for transaction behavior

**Technology**
- processes: mobile, cloud, financial (insurance)
- on-line bid system
TYPE IV: BOTTOM-UP DRIVEN, CLOSED INTEROPERABILITY

Case TYPE IV: **FarmLead**, (Foam Lake, SK) primordial system generator
A. agtech leveraging DT other sectors & countries
B. farm know-how, know-who, trust & legitimacy
   • programmer/developer, OR business skill sets off-farm,
   • mentorship critical to start-up & next-phase success
C. data ownership, lock-in technology (warranty)
D. culture of trust relationships producer to seller in ag different than other sectors of DT customers, privacy of identity paramount
E. trade shows, farmer field days (epistemic community), self-organizing & hacker networks key to understanding agtech innovations and the actors
CONCLUSIONS 1

What is the current position of Canadian ICT firms in the innovation and production networks?
1. Type I model not being developed in Canada - USA driven
   - brand-loyalty, inter-generational transition in ag
   - Canadian software innovations acquisitions or third-party licensing

2. Type II networked activity - little evidence $ value of data
   - models emerging in animal (cattle) sector

3. Type III and IV (bottom-up) models - significant activity
   - local investment, developer or financial skills
   - local market - adaptation & adoption influenced by trust relationships, global potential cross-commodities
   - gaps in coordination agtech ideas with business, financial support & mentorship to reach next-level of success producer-driven global innovation networks
CONCLUSIONS 2

What policy initiatives might be needed to ensure that Canadian industry remains at forefront of ICT adoption and diffusion?
POLICY RECOMMENDATIONS

“keep going”
1. talent & mentorship programs such as Futurpreneur (competitions)
2. kick the tires events - trade shows with innovation awards & farmer field days: showcase agtech innovations & talent, build epistemic community/strategic networks of agtech & applied innovation
3. relationships with Transport Canada co-operative & collaborative

“we really need more”
4. support beyond start-up (incubator) phase
   - venture capital tax credits, business planning, strategic plans (next strategic moves), copyright, patent USA-Canada

“we need clarity - policy action - guidance principles harmonization”
5. legal basis in flux in Canada
   - ownership, privacy, and security of data & innovation: who owns the tractor? who owns the data? third party access to information/data
FOOD & AGRICULTURE INDUSTRY
Three Futures for Creating Digital Opportunities

Digitization of entire R&D, production, distribution, supply, & marketing system

1. Virtual world - seed, microbe, animal modeling
2. Reimagining the business system
3. Creating new value propositions
Disruptive digital technologies - metamorphosis of agriculture

Circa 1st decade 20th century

Circa 2nd decade 21st century

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