TUESDAY TAILGATE TALKS
JUNE 2, 2020
Featuring: Scott Downey and Nathan DeLay
TRENDS IN DIGITAL AGRICULTURE

Upstream

Annual Financings | 2012-2019

Investment in startups operating upstream, closer to the farmer and before the retailer, remained relatively steady year-over-year with a mere $100m (1.3%) increase.

Source: AgFunder Agri-Food Tech 2019 Year in Review

Downstream

Annual Financings | 2012-2019

For the first time since 2016, investment in downstream startups declined in 2019. Funding dropped nearly 8% driven by a 56% decrease in investment into meal delivery marketplaces. Since the beginning of 2019, publicly-listed Blue Apron has lost more than two-thirds of its value, which appears to be placing downward pressure on lofty valuations. Investment in retail tech categories increased substantially, however.

Source: AgFunder Agri-Food Tech 2019 Year in Review
TRENDS IN DIGITAL AGRICULTURE

Source: Erickson & Lownberg-DeBoer 2020 - Purdue/CropLife 2019
Precision Agriculture Dealership Survey
TRENDS IN DIGITAL AGRICULTURE

Source: Erickson & Lownberg-DeBoer 2020 - Purdue/CropLife 2019
Precision Agriculture Dealership Survey
Figure 1

Everett Rogers’s Diffusion of Innovation Model
TRENDS IN DIGITAL AGRICULTURE

Precision Technology Adopter Stages

<table>
<thead>
<tr>
<th>Stage</th>
<th>Innovators/Early Adopters</th>
<th>Early Majority</th>
<th>Late Majority</th>
<th>Laggards</th>
</tr>
</thead>
<tbody>
<tr>
<td>PA Tech</td>
<td>13%</td>
<td>19%</td>
<td>33%</td>
<td>34%</td>
</tr>
<tr>
<td>All Tech</td>
<td>16%</td>
<td>34%</td>
<td>34%</td>
<td>16%</td>
</tr>
</tbody>
</table>

Source: USDA Agricultural Resource Management Survey (ARMS) 2016 corn survey
## TRENDS IN DIGITAL AGRICULTURE

**Source: USDA Agricultural Resource Management Survey (ARMS) 2016 corn survey**

<table>
<thead>
<tr>
<th></th>
<th>Full sample</th>
<th>Laggards (34%)</th>
<th>Late Majority (33%)</th>
<th>Early Majority (19%)</th>
<th>Innovators/Early Adopters (13%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collect data</td>
<td>66%</td>
<td>0%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Yield monitor</td>
<td>55%</td>
<td>0%</td>
<td>68%</td>
<td>98%</td>
<td>99%</td>
</tr>
<tr>
<td>GPS Yield map</td>
<td>32%</td>
<td>0%</td>
<td>6%</td>
<td>90%</td>
<td>97%</td>
</tr>
<tr>
<td>Soil core test</td>
<td>20%</td>
<td>0%</td>
<td>19%</td>
<td>6%</td>
<td>98%</td>
</tr>
<tr>
<td>Soil sensors</td>
<td>2%</td>
<td>0%</td>
<td>0%</td>
<td>1%</td>
<td>9%</td>
</tr>
<tr>
<td>GPS soil map</td>
<td>15%</td>
<td>0%</td>
<td>6%</td>
<td>0%</td>
<td>94%</td>
</tr>
<tr>
<td>VR seeding</td>
<td>16%</td>
<td>0%</td>
<td>5%</td>
<td>35%</td>
<td>49%</td>
</tr>
<tr>
<td>VR fertilizer</td>
<td>20%</td>
<td>0%</td>
<td>11%</td>
<td>31%</td>
<td>73%</td>
</tr>
<tr>
<td>VR pesticides</td>
<td>7%</td>
<td>0%</td>
<td>8%</td>
<td>10%</td>
<td>24%</td>
</tr>
<tr>
<td>GPS guidance</td>
<td>42%</td>
<td>0%</td>
<td>40%</td>
<td>81%</td>
<td>94%</td>
</tr>
<tr>
<td>Drone/UAV/satellite</td>
<td>4%</td>
<td>0%</td>
<td>1%</td>
<td>7%</td>
<td>19%</td>
</tr>
<tr>
<td>Crop sensors</td>
<td>3%</td>
<td>0%</td>
<td>3%</td>
<td>6%</td>
<td>8%</td>
</tr>
<tr>
<td>Data computer</td>
<td>33%</td>
<td>0%</td>
<td>28%</td>
<td>63%</td>
<td>83%</td>
</tr>
<tr>
<td>Data mobile</td>
<td>14%</td>
<td>0%</td>
<td>8%</td>
<td>27%</td>
<td>43%</td>
</tr>
<tr>
<td>Ag-tech company</td>
<td>8%</td>
<td>0%</td>
<td>1%</td>
<td>19%</td>
<td>29%</td>
</tr>
<tr>
<td>Share farm data</td>
<td>31%</td>
<td>0%</td>
<td>41%</td>
<td>42%</td>
<td>69%</td>
</tr>
<tr>
<td>Corn yield (bu/acre)</td>
<td>176.81</td>
<td>169.60</td>
<td>172.26</td>
<td>189.77</td>
<td>194.15</td>
</tr>
<tr>
<td>Farm acres</td>
<td>654.26</td>
<td>277.88</td>
<td>549.80</td>
<td>931.04</td>
<td>1,484.66</td>
</tr>
<tr>
<td>Operator age</td>
<td>57.05</td>
<td>59.39</td>
<td>57.58</td>
<td>53.98</td>
<td>54.22</td>
</tr>
<tr>
<td>College</td>
<td>54%</td>
<td>41%</td>
<td>53%</td>
<td>69%</td>
<td>66%</td>
</tr>
</tbody>
</table>

Source: USDA Agricultural Resource Management Survey (ARMS) 2016 corn survey
An Airbnb For Farmland Hits A Snag, As Farmers Raise Data Privacy Concerns

New land intelligence platform aims to provide data on every U.S. parcel

Jan Shippey, Correspondent

Published 7:51 a.m. CT May 14, 2020 | Updated 1:41 p.m. CT May 15, 2020

Source: USDA Agricultural Resource Management Survey (ARMS) 2016 corn survey
What is the minimum amount of money you would be willing to accept to give up complete ownership of your yield monitor data from last year's harvest (in dollars per acre of data)?
What is the minimum amount of money you would be willing to accept to give up complete ownership of your most recent soil sample data (in dollars per acre of data)?
What is the minimum amount of money you would be willing to accept to give up complete ownership of your most recent drone or satellite imagery data (in dollars per acre of data)?

- Less than $1 per acre
- $1 - $4.99 per acre
- $5 - $9.99 per acre
- $10 - $19.99 per acre
- $20 - $49.99 per acre
- $50 - $99.99 per acre
- $100 or more per acre
Network Externalities in Farm Data

- The more people on a network, the more valuable the network (e.g. telephone, email, credit cards).

- Demand for the good rises if consumers believe a product is popular (“fad effect” or “bandwagon effect”).

- Is this true of farm data? The more farms contributing to a data network, the more valuable the network. But more valuable for who?

- Think Farmers Business Network (FBN).

Image source: “Microeconomics” 4th edition by David Besanko and Ronald R. Braeutigam
FARM DATA USAGE

Types of Data Collected by Farm Size (Acres)

Source: Purdue Center for Commercial Agriculture (CCA) direct survey of 800 corn/soy farmers of 1,000+ acres.
Source: Purdue Center for Commercial Agriculture (CCA) direct survey of 800 corn/soy farmers of 1,000+ acres.
Use of Farm Data Software by Farm Size (Acres)

Source: Purdue Center for Commercial Agriculture (CCA) direct survey of 800 corn/soy farmers of 1,000+ acres.
Use of Farm Data Software by Education and Operator Age

- **Post-Graduate Degree**
  - >65
  - 51-65
  - 36-50

- **Bachelor’s Degree**
  - >65
  - 51-65
  - 36-50

- **Some College**
  - >65
  - 51-65
  - 36-50

- **High School Degree**
  - >65
  - 51-65
  - 36-50

Source: Purdue Center for Commercial Agriculture (CCA) direct survey of 800 corn/soy farmers of 1,000+ acres.
FARM DATA USAGE

Types of Software Used by Software Users (n = 353)

<table>
<thead>
<tr>
<th>Software</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Climate FieldView</td>
<td>52%</td>
</tr>
<tr>
<td>John Deere Operations Center</td>
<td>44%</td>
</tr>
<tr>
<td>Case IH AFS Software</td>
<td>22%</td>
</tr>
<tr>
<td>Trimble</td>
<td>21%</td>
</tr>
<tr>
<td>FBN</td>
<td>19%</td>
</tr>
<tr>
<td>Encirca</td>
<td>14%</td>
</tr>
<tr>
<td>Farmers Edge</td>
<td>10%</td>
</tr>
<tr>
<td>Granular</td>
<td>9%</td>
</tr>
<tr>
<td>Other</td>
<td>24%</td>
</tr>
</tbody>
</table>

Source: Purdue Center for Commercial Agriculture (CCA) direct survey of 800 corn/soy farmers of 1,000+ acres.
FARM DATA USAGE

Number of Farm Data Software Products Used

Source: Purdue Center for Commercial Agriculture (CCA) direct survey of 800 corn/soy farmers of 1,000+ acres.
Data Sharing with Outside Service Providers (n = 800)

- **Agronomist**: 58%
- **Ag Input Supplier**: 44%
- **Equipment Dealer/Manufacturer**: 12%
- **Other**: 7%
- **Do Not Share Data**: 26%

Source: Purdue Center for Commercial Agriculture (CCA) direct survey of 800 corn/soy farmers of 1,000+ acres.
WHO DO PRODUCERS TRUST MORE WITH THEIR DATA?

<table>
<thead>
<tr>
<th>% of respondents that follow recommendations &quot;very closely&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farms that share data w/ a service provider (n=592) 31</td>
</tr>
<tr>
<td>Share w/ agronomist (n=461) 34</td>
</tr>
<tr>
<td>Share w/ input supplier (n=353) 29</td>
</tr>
<tr>
<td>Share w/ equipment dealer/manuf. (n=97) 34</td>
</tr>
<tr>
<td>Farm software users (n=223)* 44</td>
</tr>
</tbody>
</table>

* Farms that use a farm data software product that provides crop management recommendations/prescriptions.

- Farmers have greater confidence in their software recommendations than those provided by consultants.

- Farmers are more likely to follow their software recommendations if they share data and visa versa.

Source: Purdue Center for Commercial Agriculture (CCA) direct survey of 800 corn/soy farmers of 1,000+ acres.
FARM DATA USAGE

Management Decisions Influenced by Data

Seeding Rate Decisions (%)
- Not influenced by data: 19%
- Somewhat influenced by data: 51%
- Highly influenced by data: 30%

Fertilizer Decisions (%)
- Not influenced by data: 7%
- Somewhat influenced by data: 39%
- Highly influenced by data: 54%

Drainage Decisions (%)
- Not influenced by data: 29%
- Somewhat influenced by data: 40%
- Highly influenced by data: 30%

Source: Purdue Center for Commercial Agriculture (CCA) direct survey of 800 corn/soy farmers of 1,000+ acres.
## “Farmer Perspectives on Data” survey by Trust in Food, a Farm Journal Initiative & The Sustainability Consortium


### Sharing Data Barriers

<table>
<thead>
<tr>
<th>Barrier</th>
<th>Major Reason</th>
<th>Minor Reason</th>
<th>Not a Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regulation</td>
<td>42%</td>
<td>33%</td>
<td>25%</td>
</tr>
<tr>
<td>Equipment</td>
<td>34%</td>
<td>40%</td>
<td>26%</td>
</tr>
<tr>
<td>Privacy</td>
<td>36%</td>
<td>46%</td>
<td>27%</td>
</tr>
<tr>
<td>Cost</td>
<td>30%</td>
<td>45%</td>
<td>25%</td>
</tr>
<tr>
<td>Training</td>
<td>27%</td>
<td>45%</td>
<td>28%</td>
</tr>
<tr>
<td>Time</td>
<td>26%</td>
<td>46%</td>
<td>28%</td>
</tr>
<tr>
<td>Demand</td>
<td>23%</td>
<td>49%</td>
<td>28%</td>
</tr>
<tr>
<td>No benefit</td>
<td>27%</td>
<td>37%</td>
<td>35%</td>
</tr>
<tr>
<td>Data network</td>
<td>26%</td>
<td>38%</td>
<td>36%</td>
</tr>
<tr>
<td>Penalty</td>
<td>21%</td>
<td>29%</td>
<td>50%</td>
</tr>
</tbody>
</table>

### Collecting and Sharing Data

**Trust and Privacy Barriers**

**Do you trust the following entities with the security and use of your farm's data?**

- Your lenders and bankers
  - Agree: 39%  Disagree: 40%  Unsure: 21%
- Federal, state and county level government offices
  - Agree: 17%  Disagree: 60%  Unsure: 23%
- Private companies
  - Agree: 12%  Disagree: 59%  Unsure: 29%

**Data about my farm’s production and management practices should be as tightly secured as my family’s health records.**

- Agree: 68%  Disagree: 24%  Unsure: 11%

**I believe that my customers have a right to know how I manage my farm.**

- Agree: 27%  Disagree: 49%  Unsure: 24%
Tuesday Tailgate Talks
Farm Finance and Economics
June 16, 2020 | 4:30p.m. EDT
Dr. Brady Brewer & Guest

Large Commercial Producer Survey
June 30, 2020 | 4:30p.m. EDT
Dr. Brady Brewer & Dr. Dave Downey

Follow us on social media!
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Twitter: @PurdueAgBiz

Micro-Courses: Live, 2-hour sessions
(contact Aissa Good at aissa@purdue.edu to be notified when micro-course registration opens)

Scenario Planning: Creating Resilience in Uncertain Times
June 30, 2020 | 1:00p.m. EDT
Dr. Allan Gray

Organizational Resilience
July 15, 2020 | 1:00p.m. EDT
Dr. Pete Hammett

Financial Implications for Your Business
August 5, 2020 | 11:00a.m. EDT
Dr. Brady Brewer

*All summer open enrollment programs Will be distance-delivered.