

A close-up photograph of wheat stalks, showing the green grain and long, thin awns. The background is blurred, showing more wheat. A dark grey rectangular box with a diagonal line is overlaid on the left side, containing the title text. Below the box is a yellow horizontal bar containing the subtitle text.

WA AGRIBUSINESS IN THE DIGITAL AGE

Laggards or Pioneers?

Outline

1. The digital ag revolution

Excitement often leads to disappointment

2. Components of Digital Ag

How digital ag can increase competitiveness

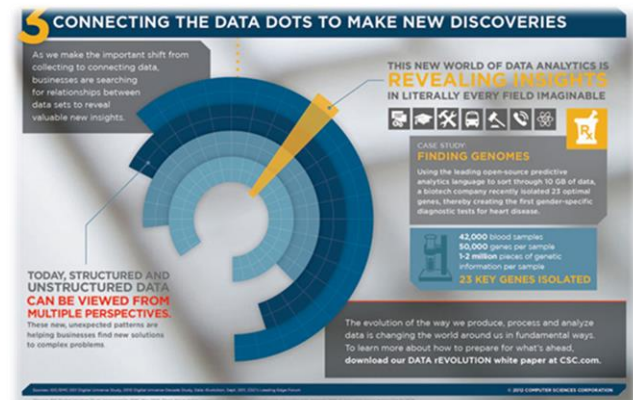
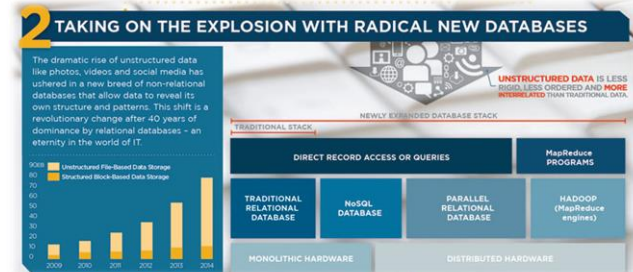
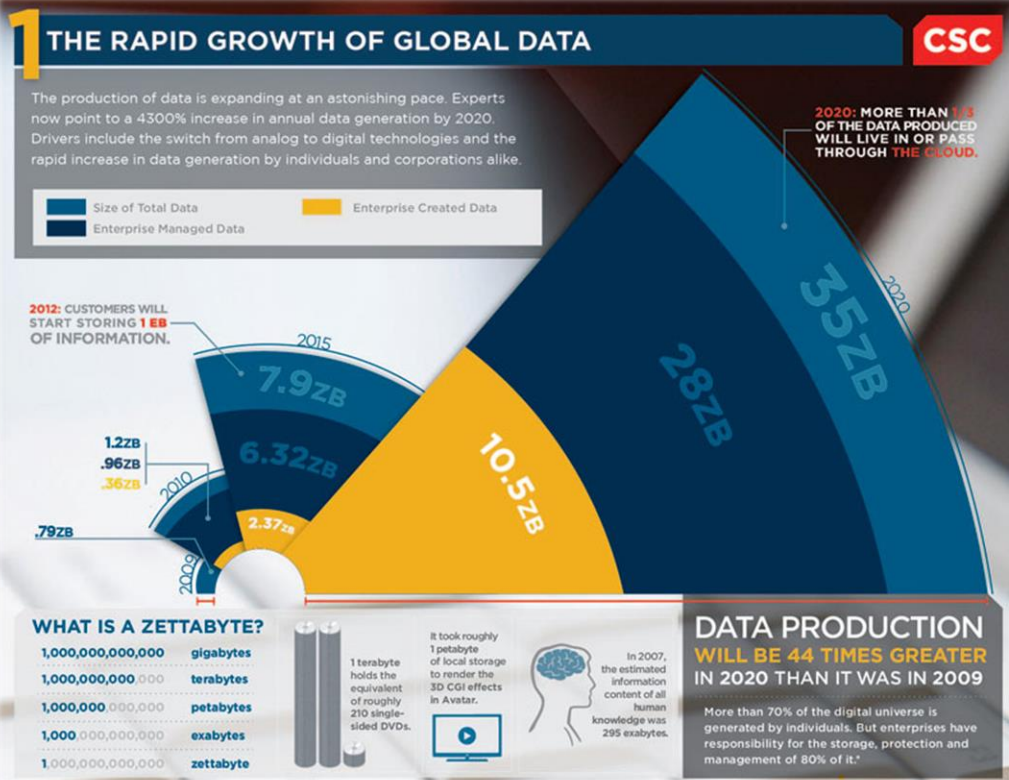
3. Review: Are we really so far behind?

Based on what I've seen so far



1. Digital agriculture revolution

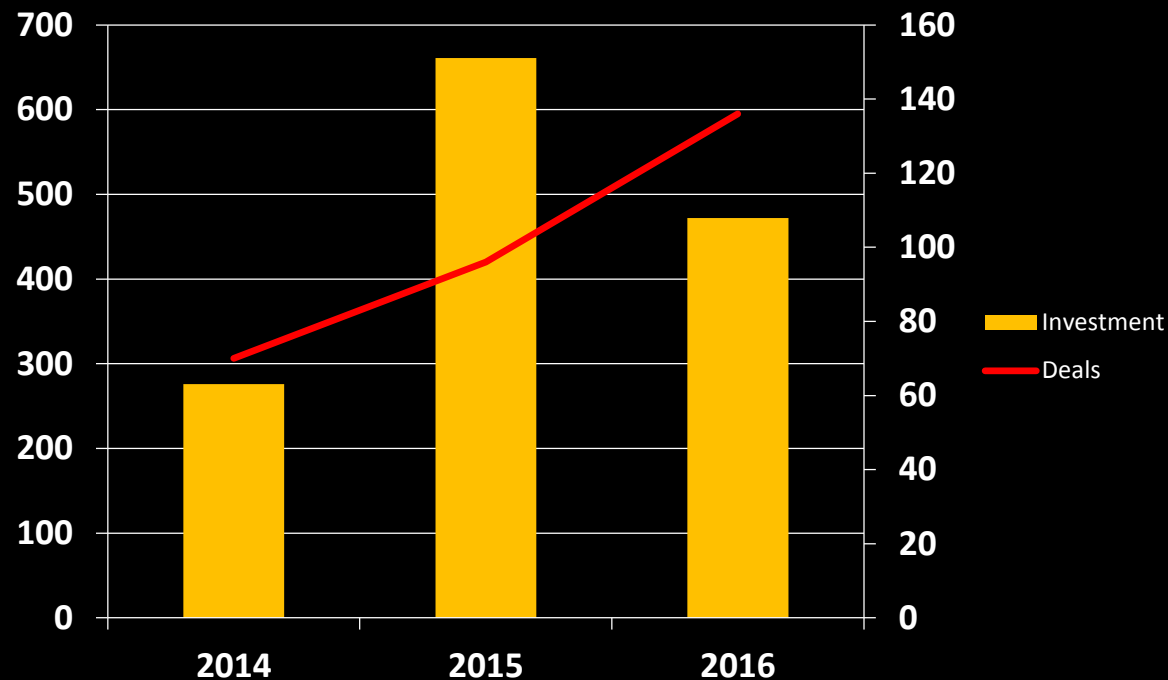
The excitement...



Big Data Revolution

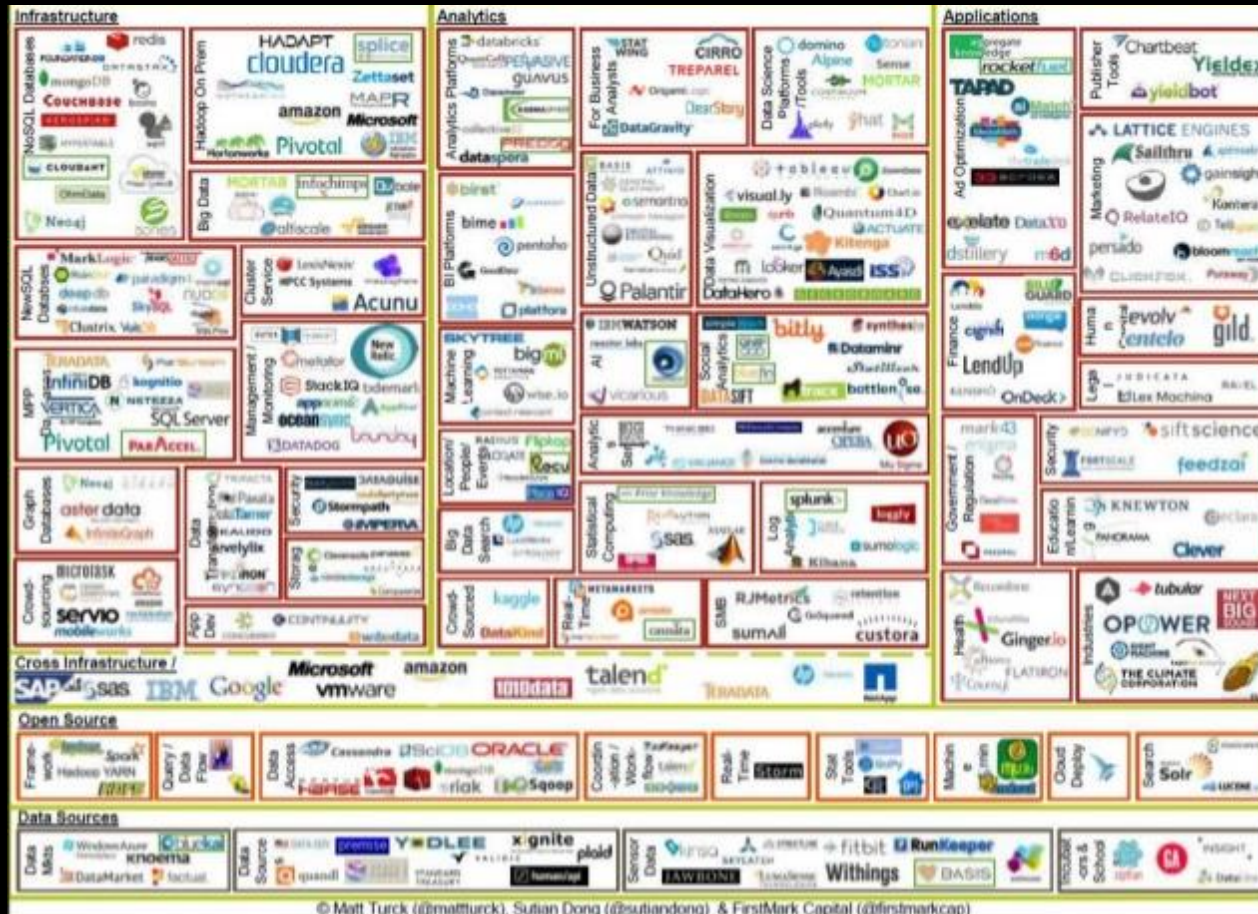
Computer Science Corporation 2012
<http://visual.ly/big-data-just-beginning-explode>

Venture capital moving into Precision Agriculture

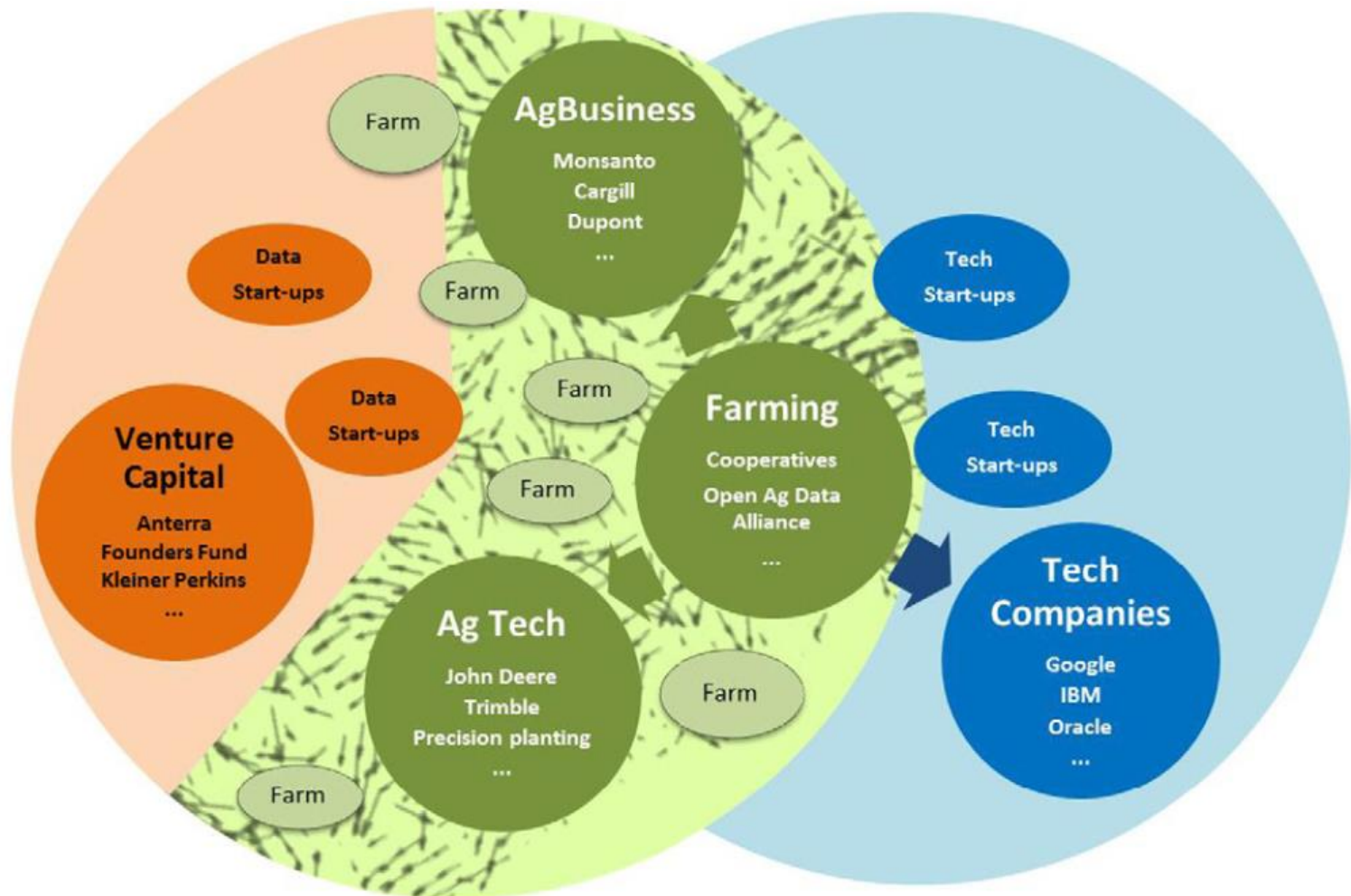


AgFunder

Businesses engaging strongly



Van t Spijker



Agbusiness players in the big data landscape. Wolfert *et al.* 2017

...and disappointment



“A few years ago, the agricultural world was full of promises about how the widespread use of data was going to change farming.”

“For farmers- and the tech companies that want them as customers – data has been a disappointment”

“..the promise of agtech hasn’t been able to keep up with expectations”

Why Big Data Hasn’t Yet Made a Dent on Farms

Startups designed to use information to boost agricultural productivity are struggling. So now tech companies are changing their approach.



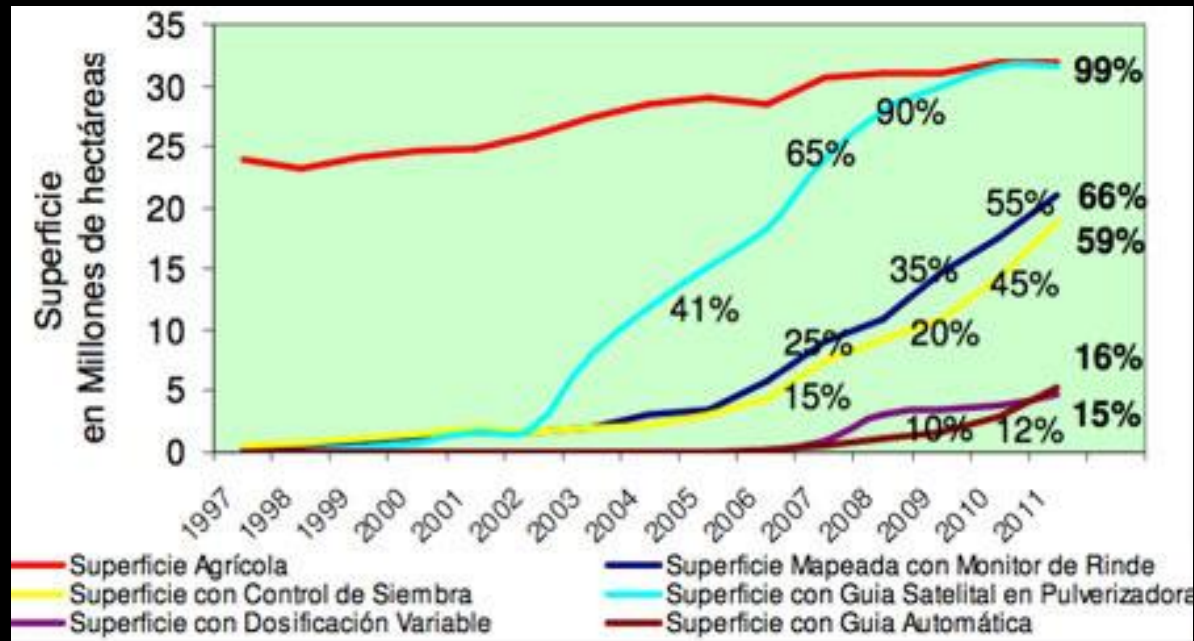
Blue River Technology's See & Spray machines scan for weeds and squirt them with pesticides. PHOTO: BLUE RIVER TECHNOLOGY

By Eliot Brown

May 15, 2017

“Everybody is still trying to figure out where the value in data is,”

Patchy adoption of precision ag



Roughly 100% of grain growers can map yield. Most don't use the data

Sector	Overall digitization ¹	Assets		Usage				Labor			GDP share %	Em- ploy- ment share %	Produc- tivity growth, 2005–14 ² %
		Digital spending	Digital asset stock	Transactions	Interactions	Business processes	Market making	Digital spending on workers	Digital capital deepening	Digitization of work			
ICT											5	3	4.6
Media			1								2	1	3.6
Professional services											9	6	0.3
Finance and insurance											8	4	1.6
Wholesale trade											5	4	0.2
Advanced manufacturing					4						3	2	2.6
Oil and gas			2								2	0.1	2.9
Utilities			2								2	0.4	1.3
Chemicals and pharmaceuticals											2	1	1.8
Basic goods manufacturing											5	5	1.2
Mining											1	0.4	0.5
Real estate	●										5	1	2.3
Transportation and warehousing	●										3	3	1.4
Education	●				3					5	2	2	-0.5
Retail trade	●										5	11	-1.1
Entertainment and recreation											1	1	0.9
Personal and local services											6	11	0.5
Government	●										16	15	0.2
Health care			6								10	13	-0.1
Hospitality	●										4	8	-0.9
Construction											3	5	-1.4
Agriculture and hunting											1	1	-0.9

The MGI Industry Digitization Index

2015 or latest available data

Relatively low digitization  Relatively high digitization

● Digital leaders within relatively undigitized sectors

- 1 Knowledge-intensive sectors that are highly digitized across most dimensions
- 2 Capital-intensive sectors with the potential to further digitize their physical assets
- 3 Service sectors with long tail of small firms having room to digitize customer transactions
- 4 B2B sectors with the potential to digitally engage and interact with their customers
- 5 Labor-intensive sectors with the potential to provide digital tools to their workforce
- 6 Quasi-public and/or highly localized sectors that lag across most dimensions

The situation so far

- Data revolution an inevitability
- Early expectations based on quick wins
- Fundamental change is a longer process
- Agriculture bottom of the class

Needs a considered perspective

2. Components

What does 'digital ag' mean?

- a) Technology
- b) Purpose
- c) Applications
- d) Science
- e) Change process

a) The technology



Technologies

- Data modelling
 - Spatial info. GIS
 - Open source, R, QGIS,... SAGA GIS
 - Visualization software,
- Control
 - Auto-steer, UGVs,
 - Robotics
 - Sprayers, selectors, packers
- Remote sensing
 - UAVs
 - Satellite
 - Airborne
 - Hyperspectral, LIDAR,
- Social Media networking
 - FB, Twitter, LinkedIn...
- Visualization
 - VR
- IoT and connected farming
 - YM, quality mapping
- 'Omics
 - Genomics .-> metabolomics
- Computing power
 - Supercomputing
 - Cloud computing

The technology

Practices

- Big data
 - Massive data, mining for trends. popular in retail. Can have sinister connotations.
- Precision ag
 - Moderate data populations, direct info & control.
- Omics
 - Genomics to metabolomics and beyond
- Analytics
 - Data to direct strategy, management and policy
- Digital Agriculture
 - “Agriculture of the future will be digitally integrated at all stages of production, from understanding genetics to transport logistics”.
CSIRO



b) Purpose

What types of change can digital ag enable?

Increasing the knowledge content

Improving eco-efficiency

Knowledge: The only truly inexhaustible resource
Growth without knowledge content is **resource-mining**
Solow and others

Increased product value



Commodities

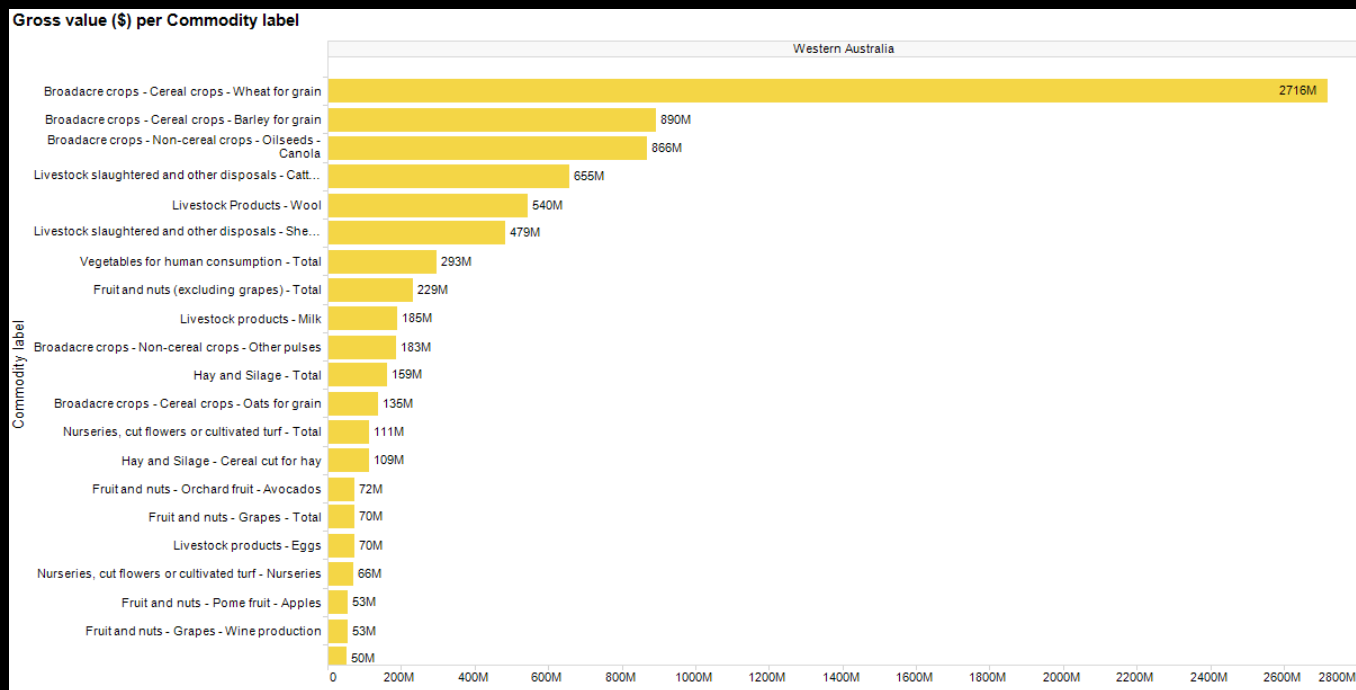
Gains in eco-efficiency

Keep production options open

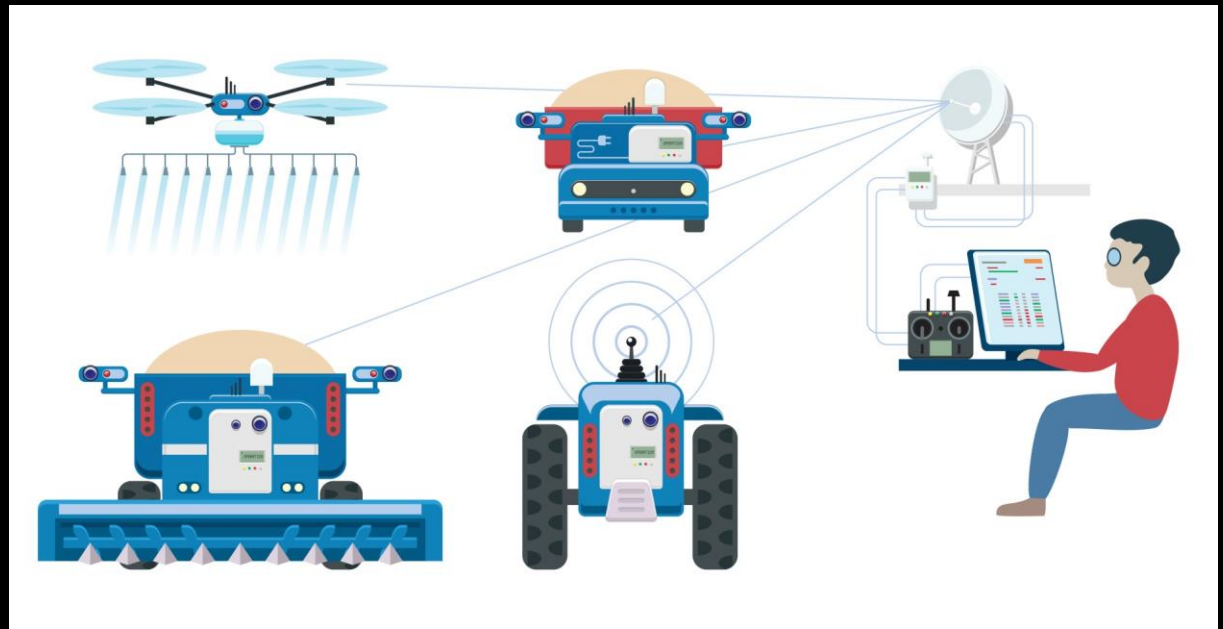
High value product:

Market niche

Production niche



ABS data for
2015

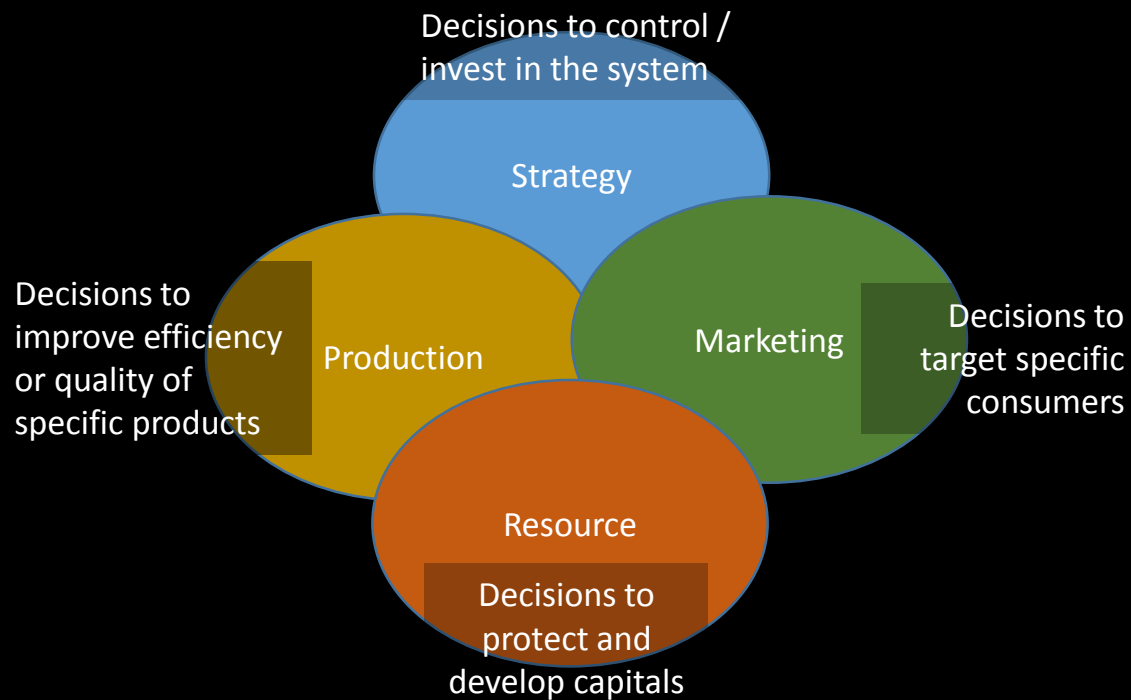


c) Applications

4 types of applications

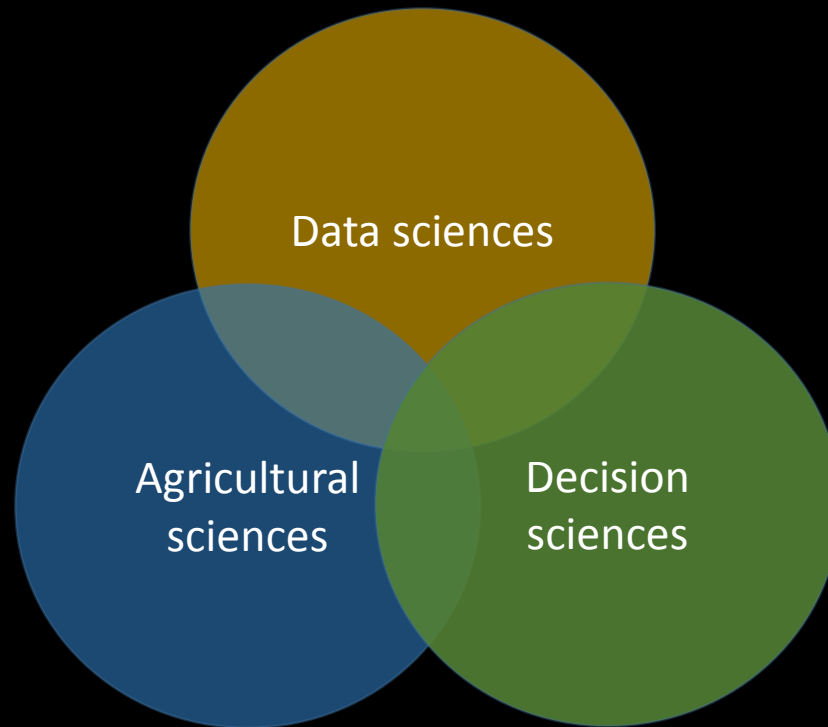


4 types of decisions



d) Science

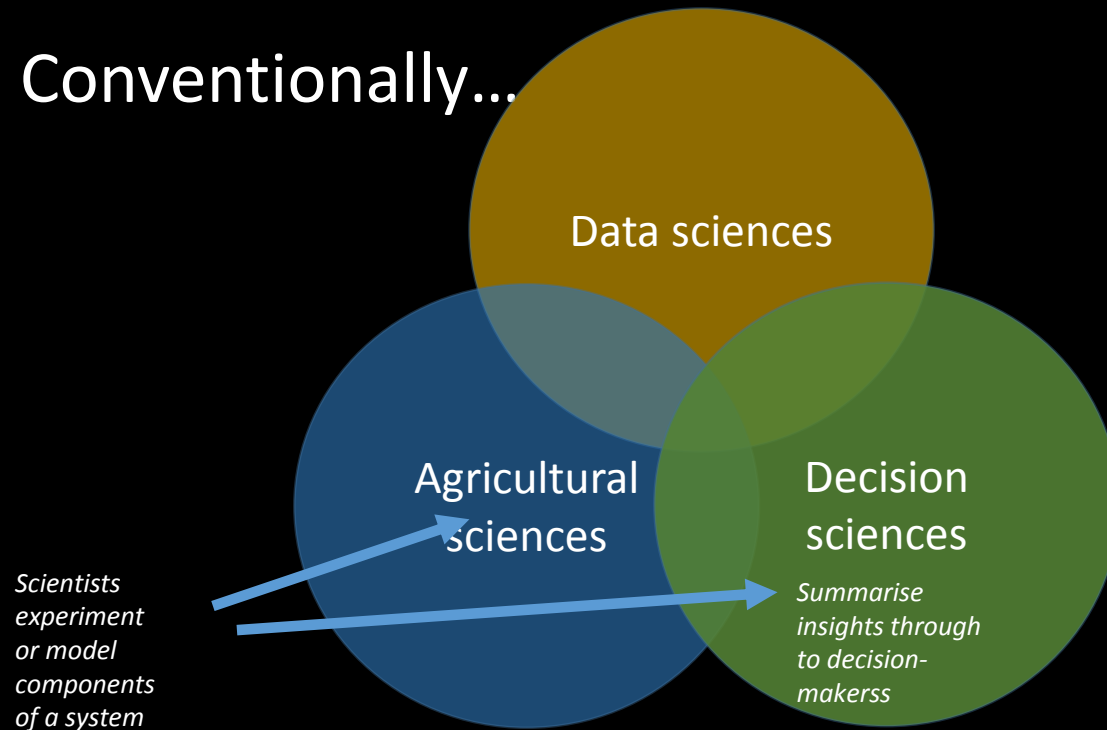
Science. 3 domains



“Everybody is still trying to figure out where the value in data is,”

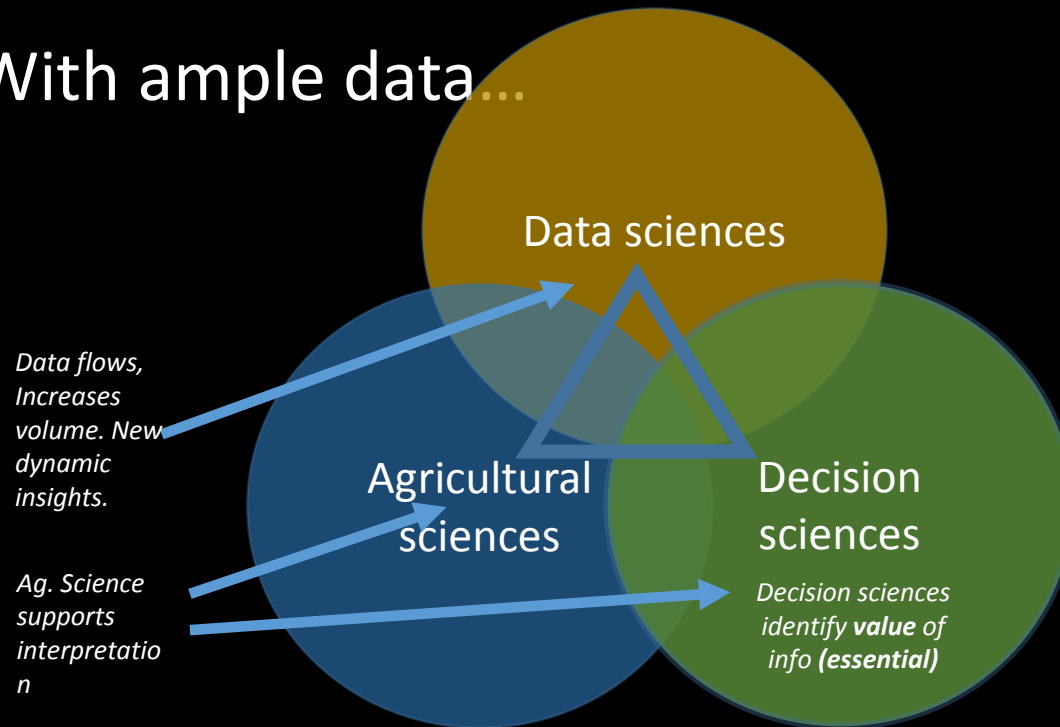
Science. 3 domains

- Conventionally...



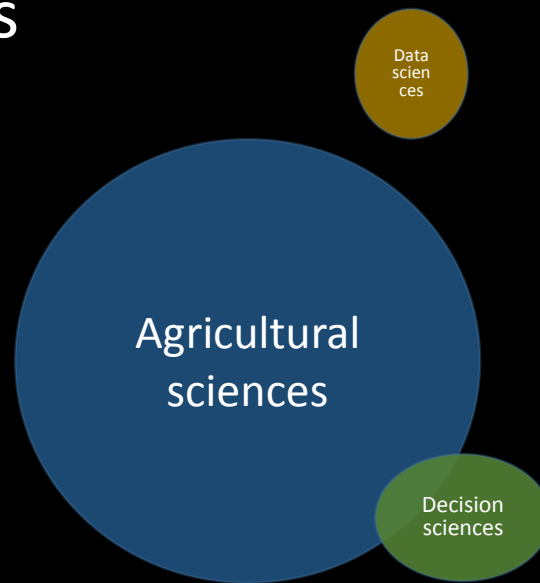
Science. 3 domains

- With ample data...



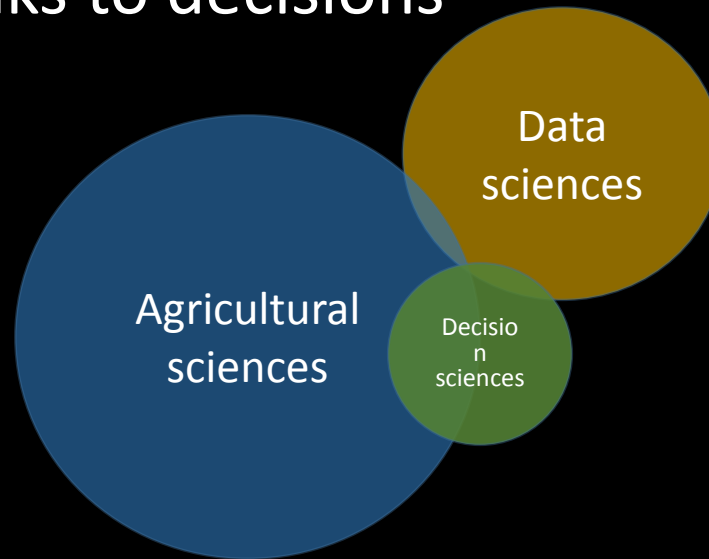
Science. 3 domains

- To start, ag. >> data. Direct links to decisions



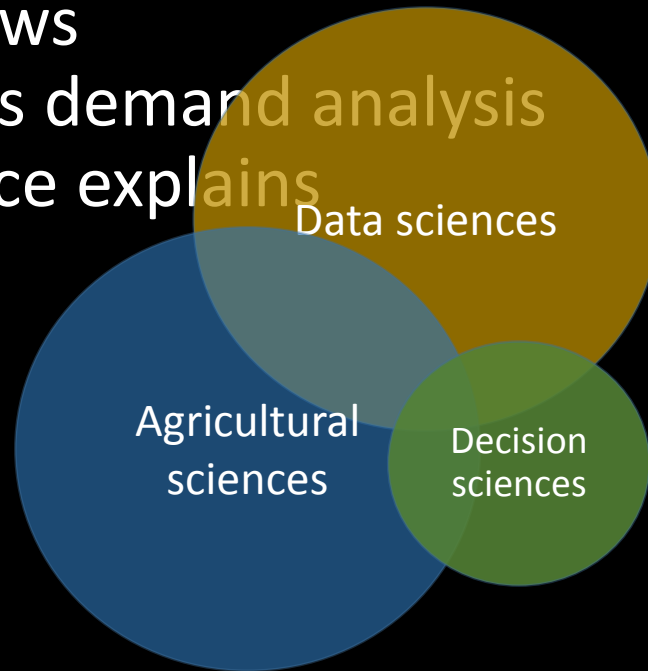
Science. 3 domains

- New data, weakly coupled to ag. science, direct links to decisions



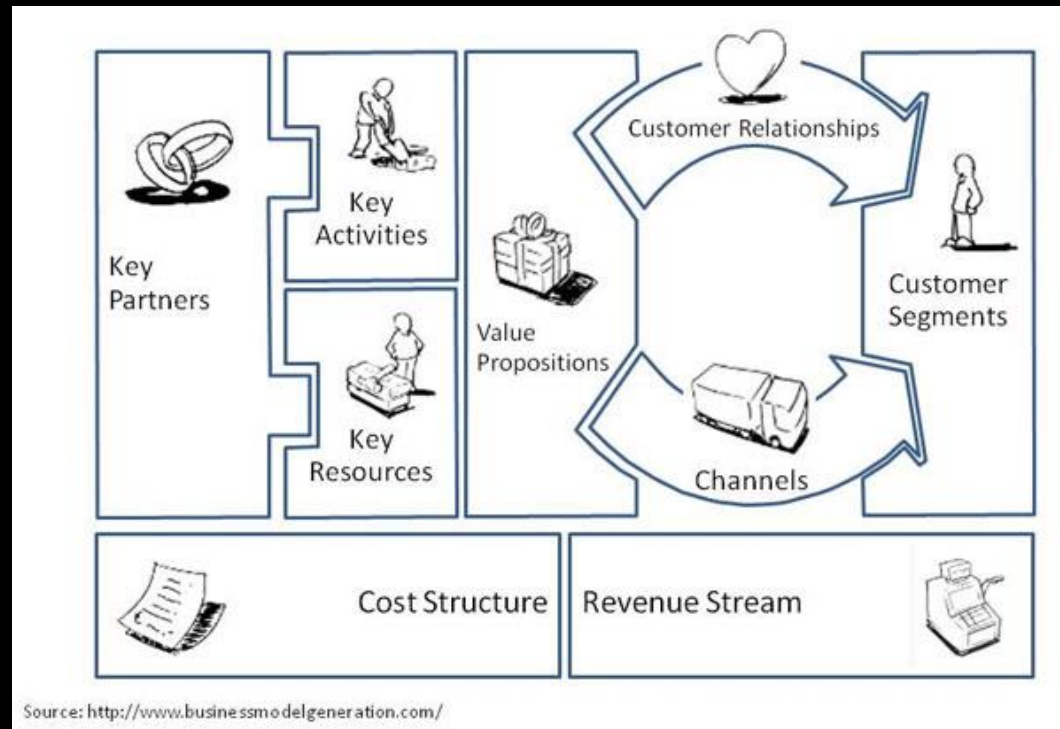
Science. 3 domains

- Data grows
Decisions demand analysis
Ag science explains



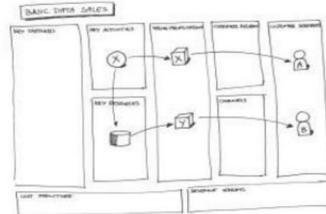
e) Change processes

5 types of business models

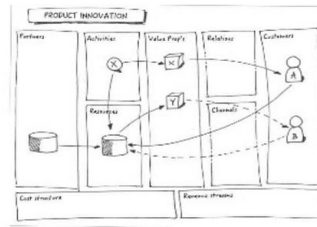


Osterwalder business model generation

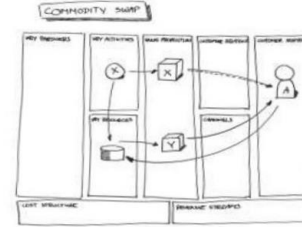
5 types of business models



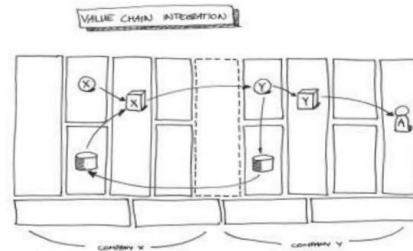
We own valuable data



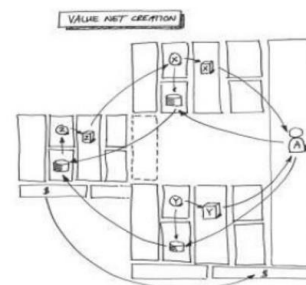
With our data we can create innovative new products



Our core product is a commodity

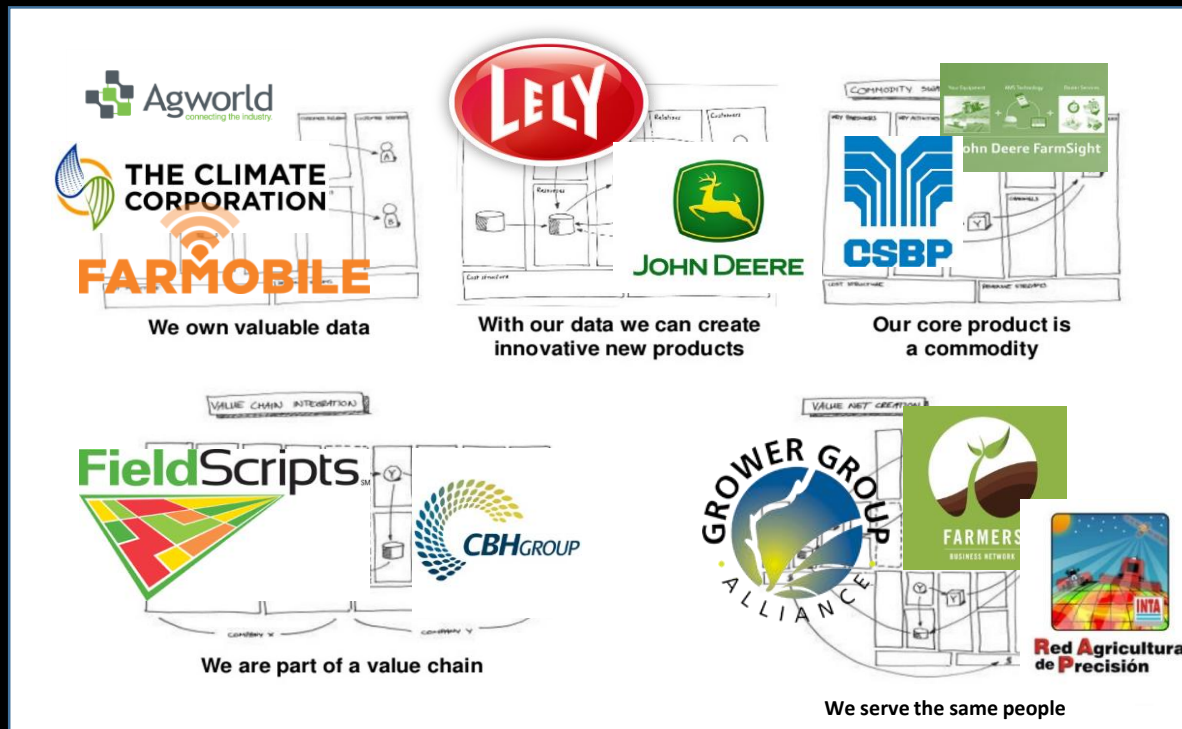


We are part of a value chain

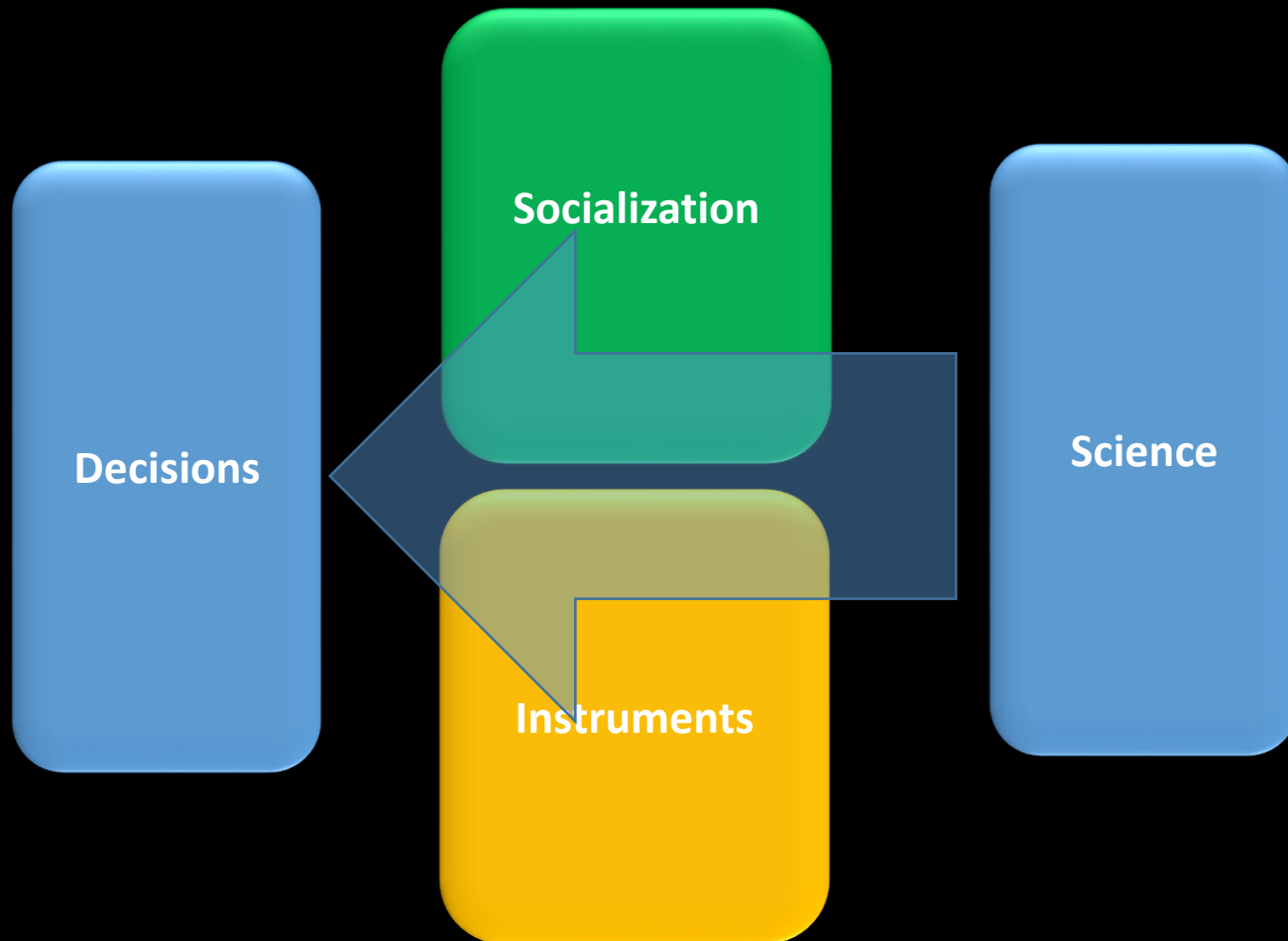


We serve the same people

5 types of business models



Feeding science through to decisions



3 Review

Laggards or pioneers?

From what I've seen so far..

- Tech

- Keen adopters
- Importers
- Connectivity an issue [demands adaptation]

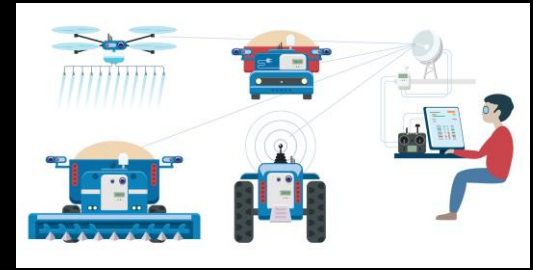


- Purpose

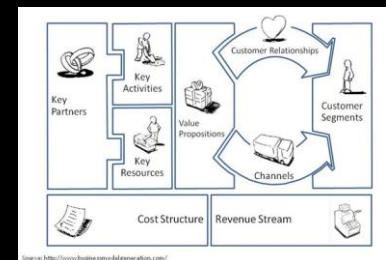
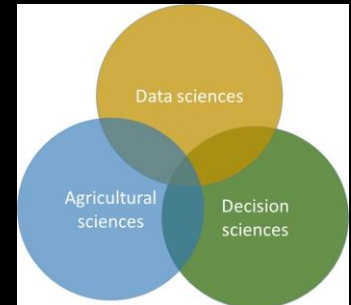
- Commodities remain big. Can be hard to change
 - Have all efficiency gains been taken?
 - Where are the fast movers?
- Rapid shift to value
 - Beef, dairy, barley
 - Low volume v high value. Truffles
- Resilience?



Review [cont]



- Applications of digital ag
 - Dispersed in 4 themes. Connection needed
 - WA has led in some areas
 - Current applications mainly in production
 - Development will require deep engagement and openness
- Science
 - Disconnected: An issue everywhere
 - Outcome orientation encourages gap-filling
- Change process
 - Challenging everywhere to generate shared value
 - Organizations essential to foster innovation
 - FA CRCs may highlight the way
 - Need to pull science together [e.g. CDA]



Conclusions: Laggard or pioneer?

- Digital agriculture already exists globally
 - Don't believe all the hype. It's very patchy
- Important to clarify goals:
 - WA has pioneered when imperative for changes is clear
- Important to look for science linkages
 - Pioneers will link science fields
- Socialization of change is key
 - Value sharing business models
 - Local leadership

My view:

Many people show characteristics of pioneers

Organization needed to enable it

Food Agility CRC?

Thank you

- *This Fellowship is a collaboration between Curtin and Murdoch Universities and the State Government.*
- *The Fellowship is the centrepiece of the Science and Agribusiness Connect initiative, made possible by the State Government's Royalties for Regions program.*