

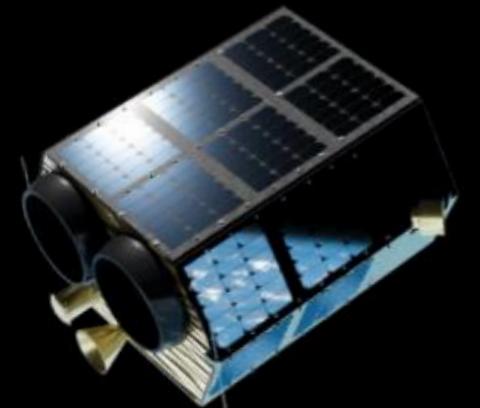
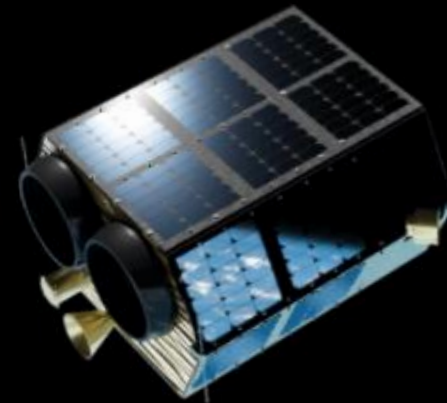
Open Innovation in Space Applications

Earth Observation for Agriculture

How to integrate customers in business model design

By: Adrien Lemal, Ph. D

**Advisors: Pr. Victor Dos Santos Paulino (TBS)
Mr. Thierry Chapuis (CNES)**



TENCHIJIN at GLANCE



Winner of Bx's Gravity #3 soil health challenge in 2021



Winner of Baywa Copernicus challenge on smart farming in 2021



Recognized as one of the 10 best Tech startup in Japan in 2020



Winner of Japan biggest Space Tech competition in 2018



Certified as one of JAXA Ventures in 2018
(JAXA: Japan Aerospace Exploration Agency)



1.

Problem

2.

Research Question

3.

Methodology

4.

Theories, Evidences

5.

Key Findings

6.

Implications

7.

Conclusions



- 1. Problem**
2. Research Question
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VALUE CHAIN

AIRBUS
DEFENCE & SPACE

MAXAR
TECHNOLOGIES

UP⁴²

aws

sobloo

Tenchijin

SUPPLIERS [x 20]

SUPPLIERS [x 50]

ACTORS with similar products [x 500]

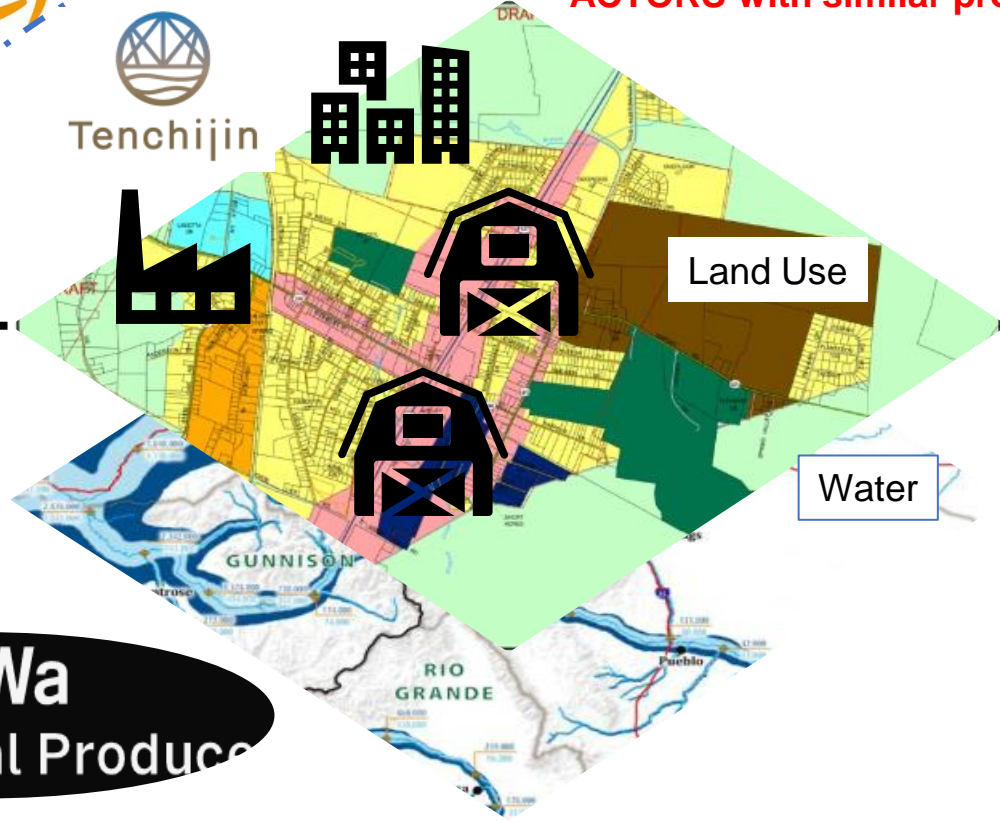
Satellite Operators

- Infrastructures
- Platforms
- Market places

- Analytics
- Insights
- Applications

CUSTOMERS

- Seeds companies
- Producers
- Growers
- Distributors
- Cooperatives
- Large farms



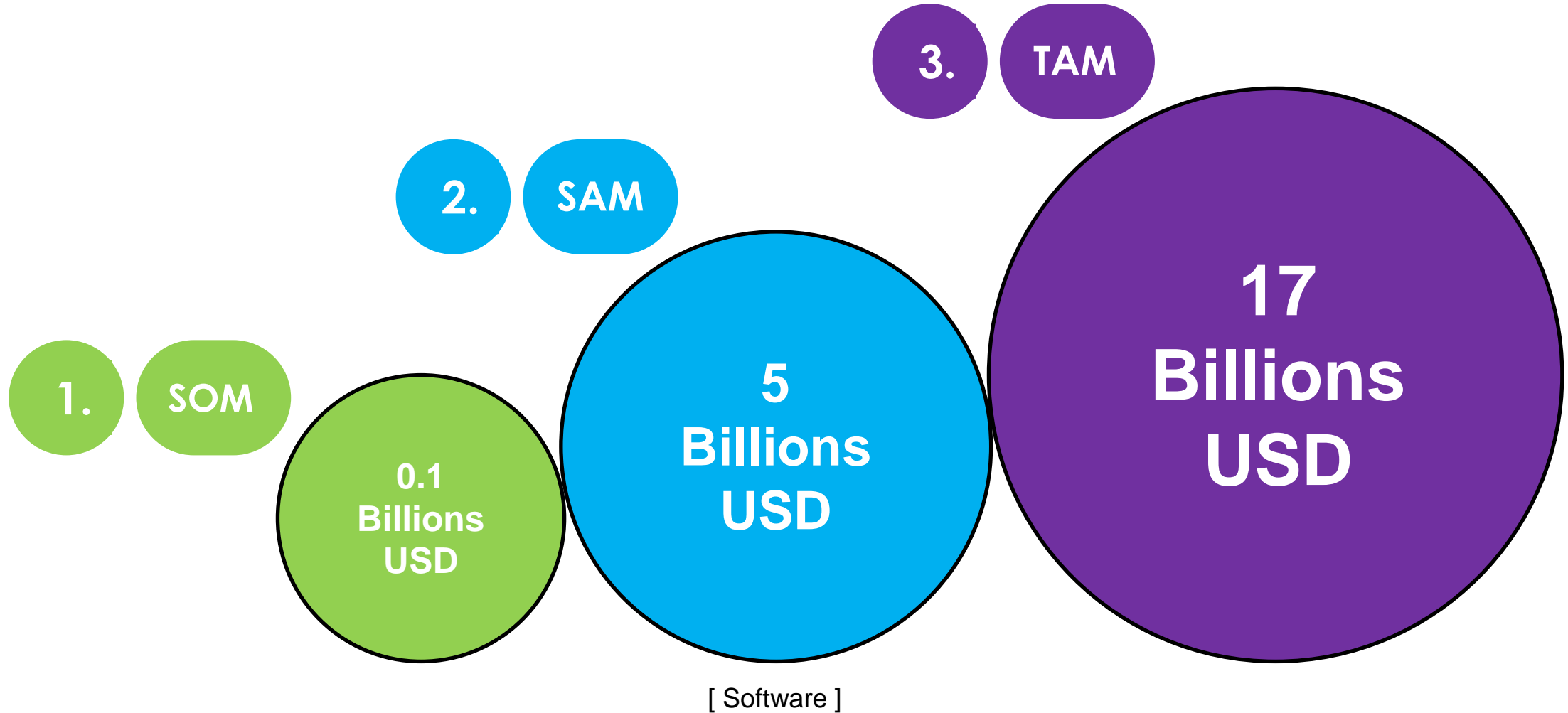
Limagrain
de la terre à la vie

Zespri
KIWIFRUIT

Bonduelle

BayWa
Global Produce

SMART FARMING MARKET SIZE





**Unclear value of
EO-based
applications**



**Solution
integration in
customers
workflows**



**Solution
Differentiation**



1. Problem
- 2. Research Question**
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Research Topic

Involving customer in the development of the innovation?



Hypothesis

The customer is more likely to participate to the design of the business model

i) if he receives incentives from the company

AND

ii) if a trustworthy relationship is created.



Research Question

How to integrate the customer in the design of the business model?

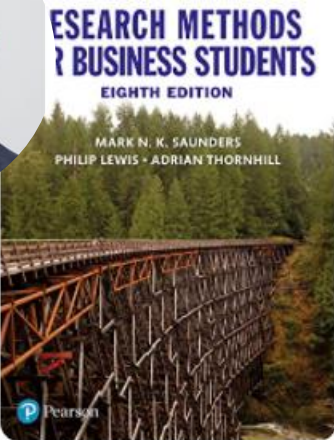


Objectives

- (In)validate the hypothesis
- Introduce business models prone to customer integration
- Source empirical evidence
- Evaluate the benefits, costs and risks for the company
- Provide guidance to integrate customers in business model design
- Managerial implications



1. Problem
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Research Philosophy

- Critical realism

Research Purpose

- Exploratory

Research Approach

- Deduction

Research Method

- Mixed

Research Strategy

- Experiment
- Survey

Time Horizon

- Longitudinal

Research Design

- Con. Triangulation

Data Collection

1. Interviews
2. Questionnaires
3. Secondary sources



What best describes your position in the value chain? *

Seed companies

Food grower

Food producer

Food distributor

Where are your farming lands located? *

United States

Canada

Latin America

Northern Europe

Western Europe

Data Analysis

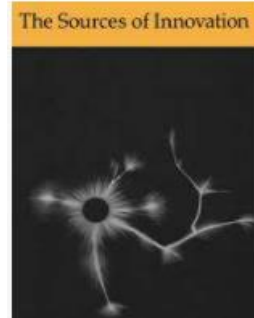
1. Qualitative Analysis
 - Identifying themes
 - Recognizing relationships
2. Quantitative Analysis

- Sorting numerical and categorical data
- Visualizing proportions, ranking, distributions
- Statistical tests: Kolmogorov, Chi Square, etc

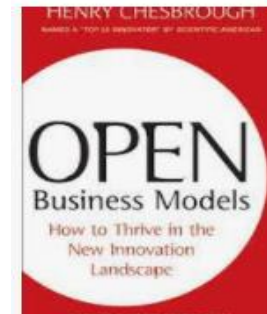
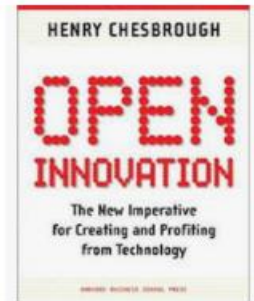


1. Problem
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1. The pioneers

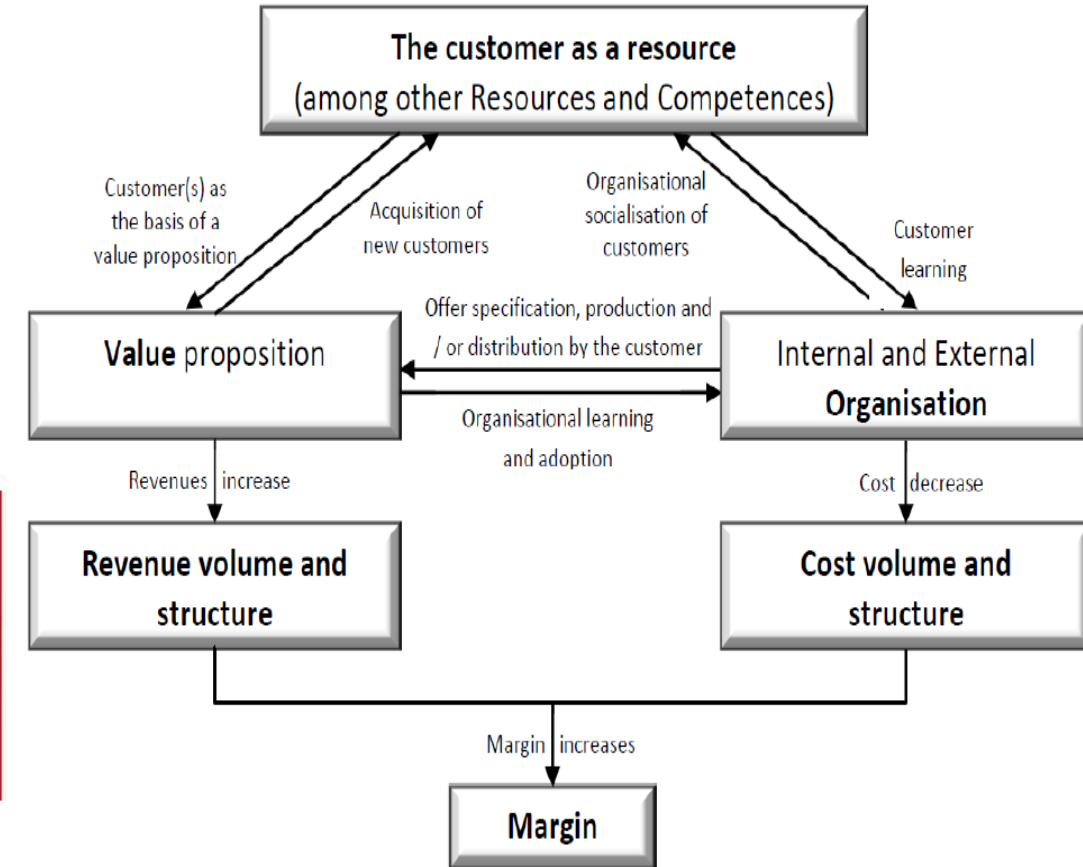


Pr. Eric von Hippel (MIT Sloan School of Management)
Lead-user theory

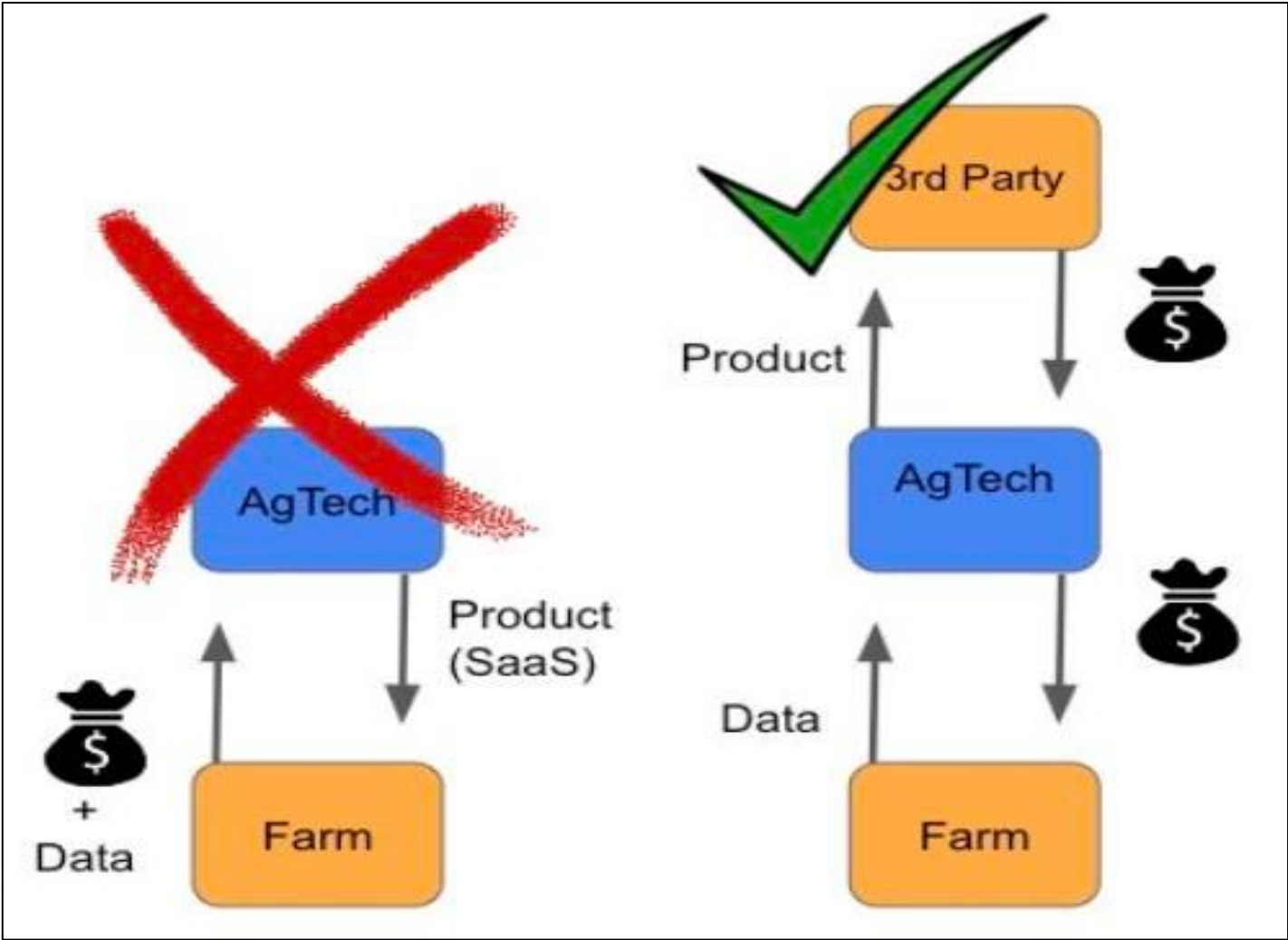


Pr. Henry Chesbrough (Harvard Business School)
Open Innovation theory

2. New developments



1. Data sharing



2. Reward pricing

\$166,500
The highest individual payout we've made to date. Will you be next?

Up to \$9
per acre, per year No-till/strip-till and cover cropping are powerful ways to support your yield potential and nutrient management over time, leaving healthier soil for future generations. With the Bayer Carbon Program, you may be able to get paid for climate-smart practices you've already implemented or plan to implement.

How it works

1. Enroll	2. Select fields	3. Implement practices	4. Get Paid
Sign up to participate in the Bayer Carbon Program through a quick and straightforward process.	Share enrolled acres through the Climate FieldView™ digital ag platform.	Begin or continue practicing no-till/strip-till and/or cover cropping on your enrolled acres and provide relevant documentation.	Receive a yearly cash payout for the verified and validated practices you've implemented by the acre.



no-till/strip-till
\$3
per acre, per year



cover crops
\$6
per acre, per year



both
\$9
per acre, per year



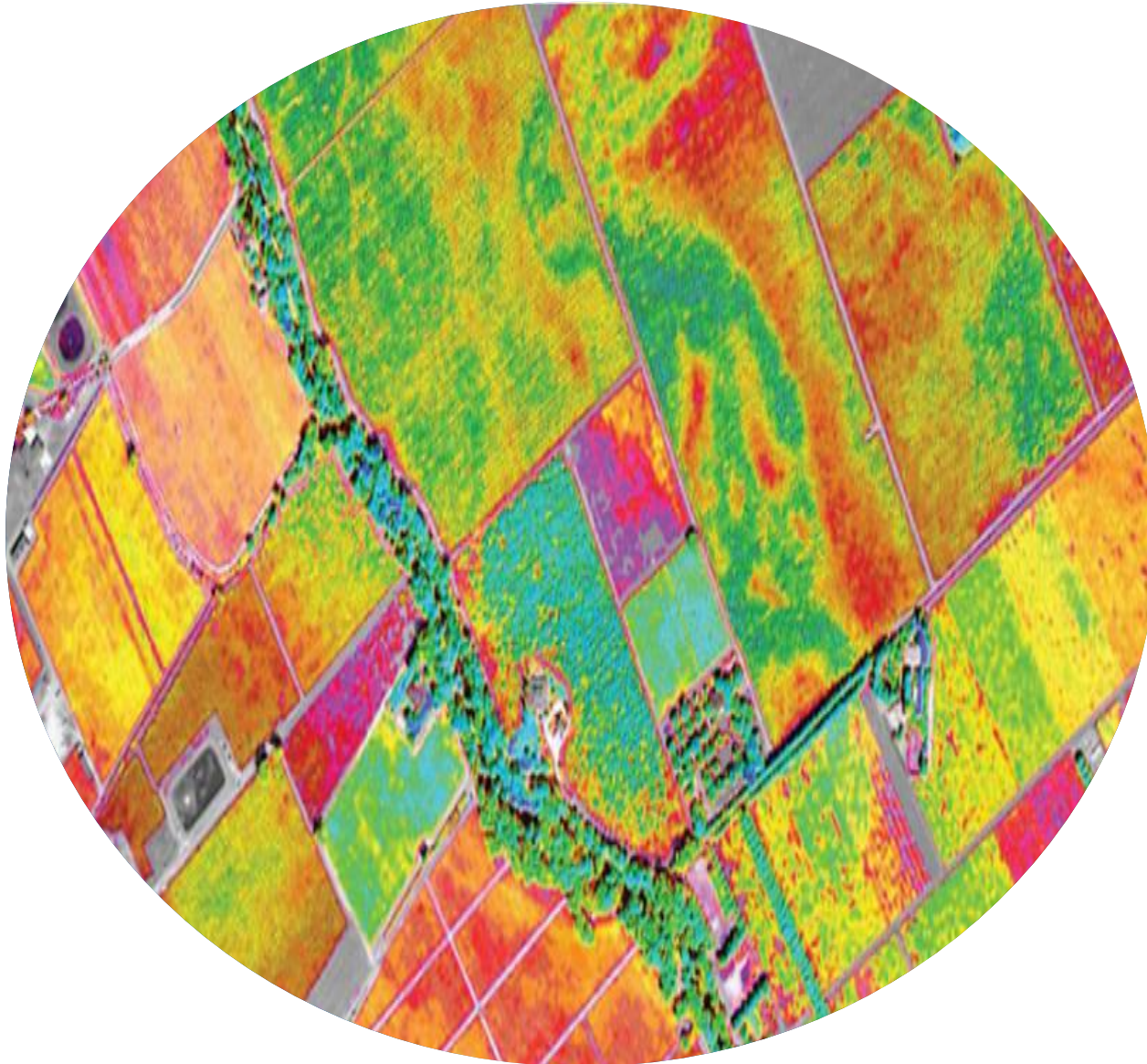
3. Outcome based

Receiving money back on purchases of seed and chemical that didn't trigger an expected yield or other outcome seems like a farmer's dream come true.

Someday, though, it may become reality through a business model called outcome-based pricing.

This summer, Bayer Crop Science has been piloting such a plan with a handful of U.S. corn farmers. Rather than selling chemical by the jug or seed by the bag or bulk unit, an outcome-based model entails selling metrics like a yield guarantee or a weed-free or disease-free field.





- (1.) Problem
- (2.) Research Question
- (3.) Methodology
- (4.) Theories, Evidences
- (5.) **Key Findings**
- (6.) Implications
- (7.) Conclusions

1.

A plethora of business models prone to customer integration



- Satellite as a service, SaaS
- Pay-per-use, Subscription
- Data, Reward, Risk sharing
- Outcome based

2.

Various methods to identify suitable customers



- Lead-User method
- SNS data mining with A.I
- Hackathons

3.

Governance

Benefits

- Reduced costs
- Better value propositions

Challenges

- Work load management
- Customers bargaining power

Risks

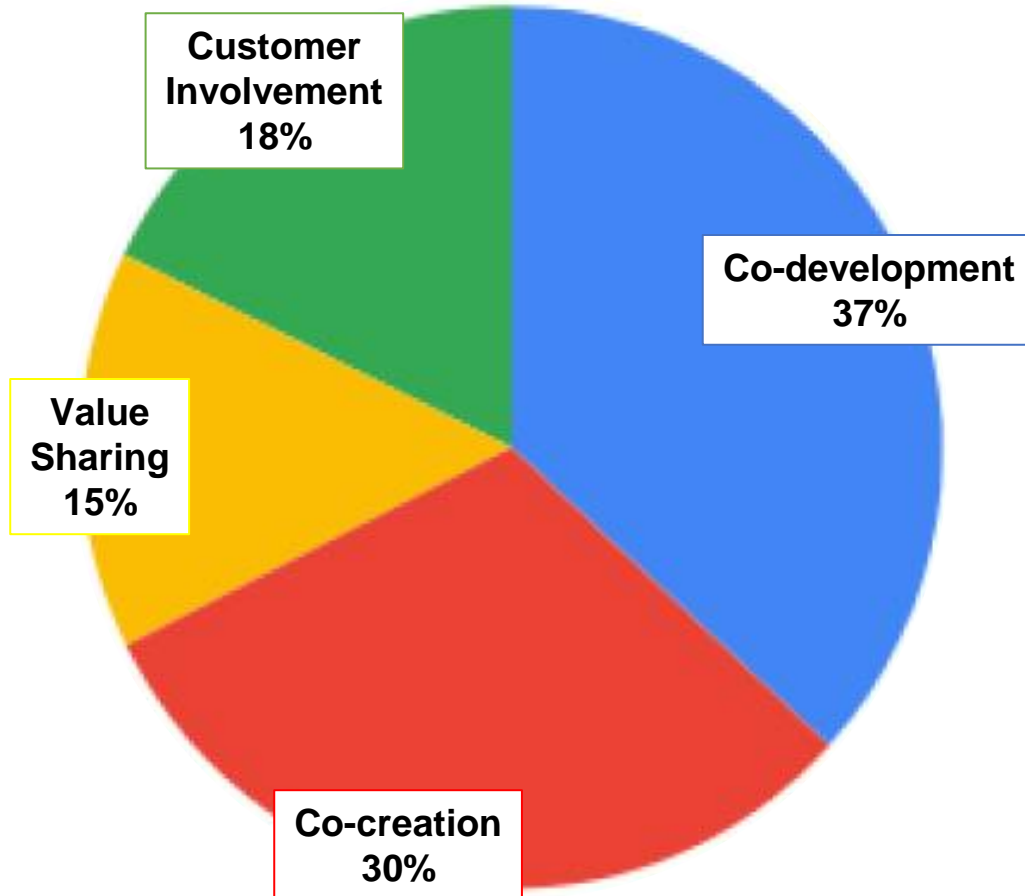
- Customers dependence
- Niche market

Solutions

- Right customers
- Right methods
- IP and staff management

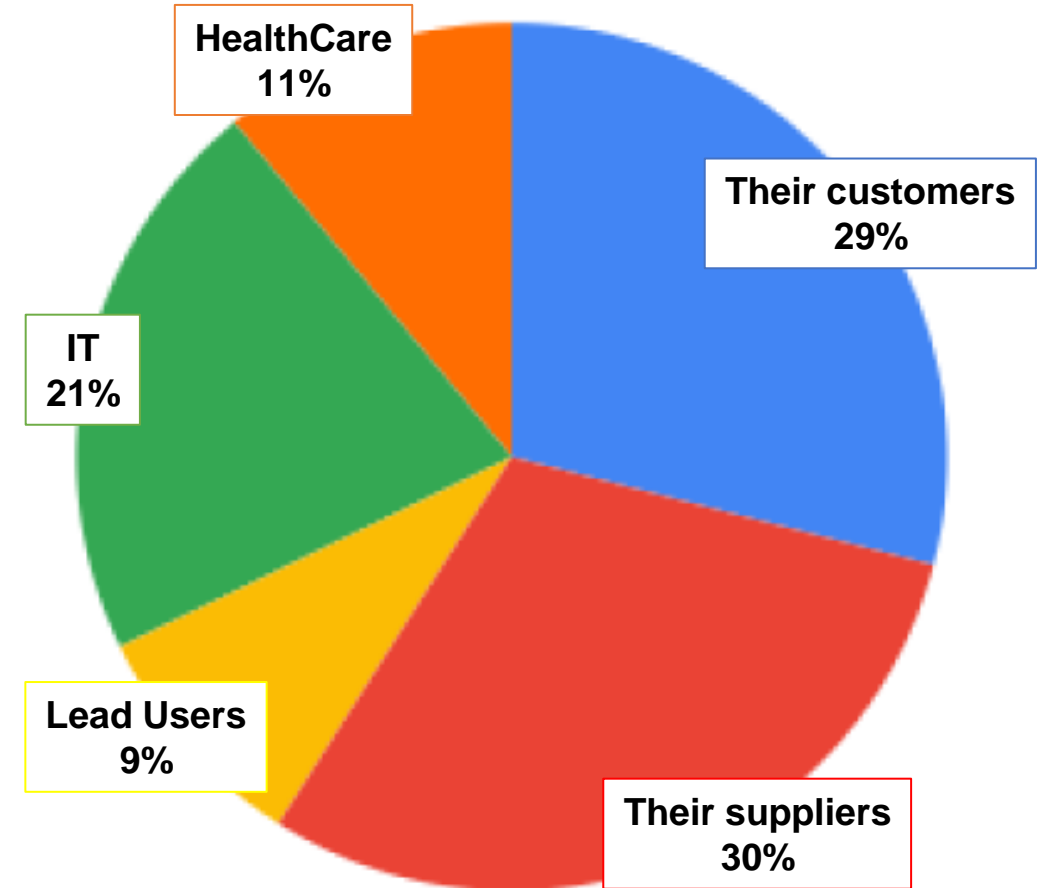
4.

Perception of Open innovation

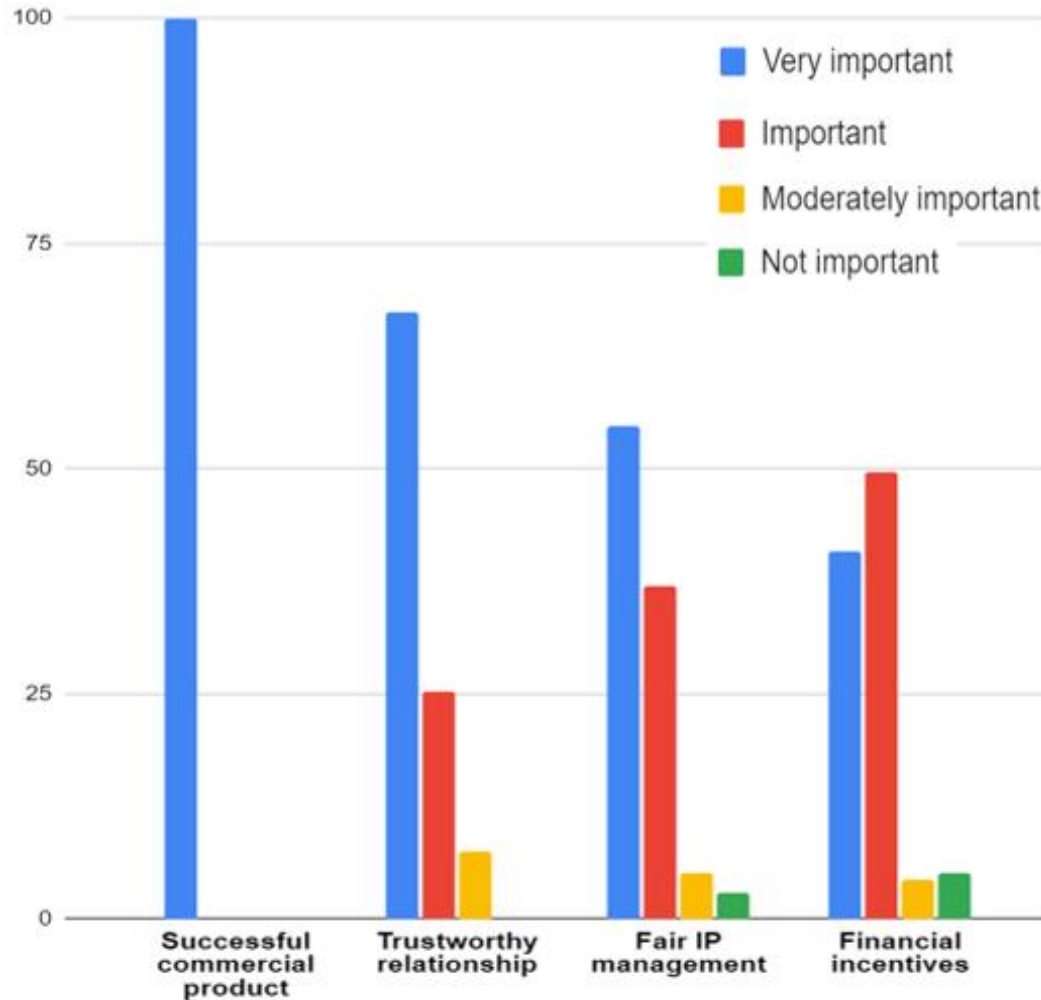


5.

Innovation sources



6. Customer integration



7. Insights on motivations

Possible parameters affecting customer decision:

- Farm size
- Geographical distribution
- Type of company
- Type of activity
- Financial resources

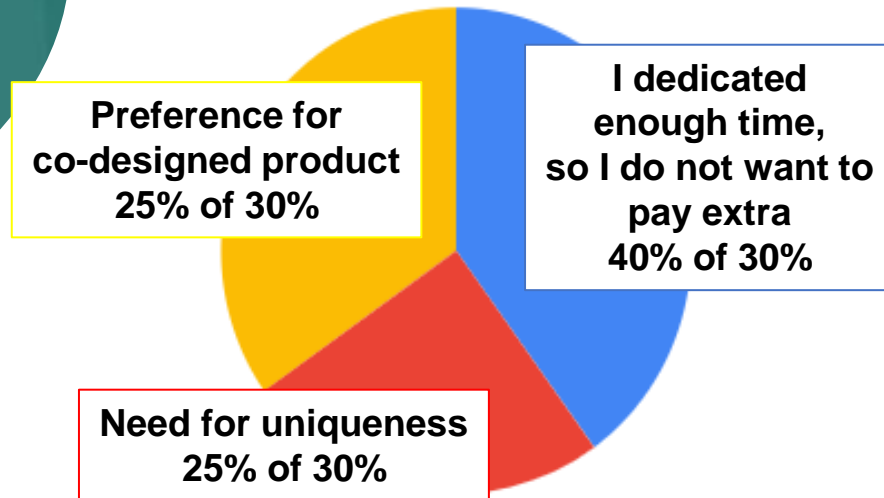
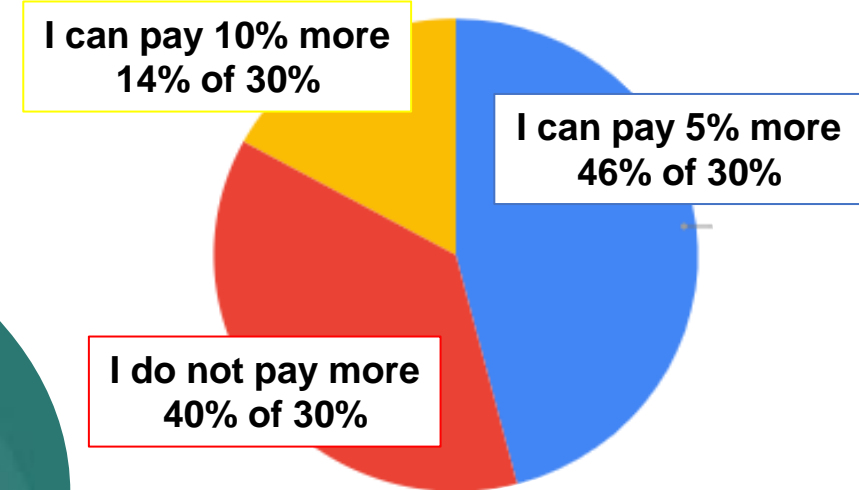
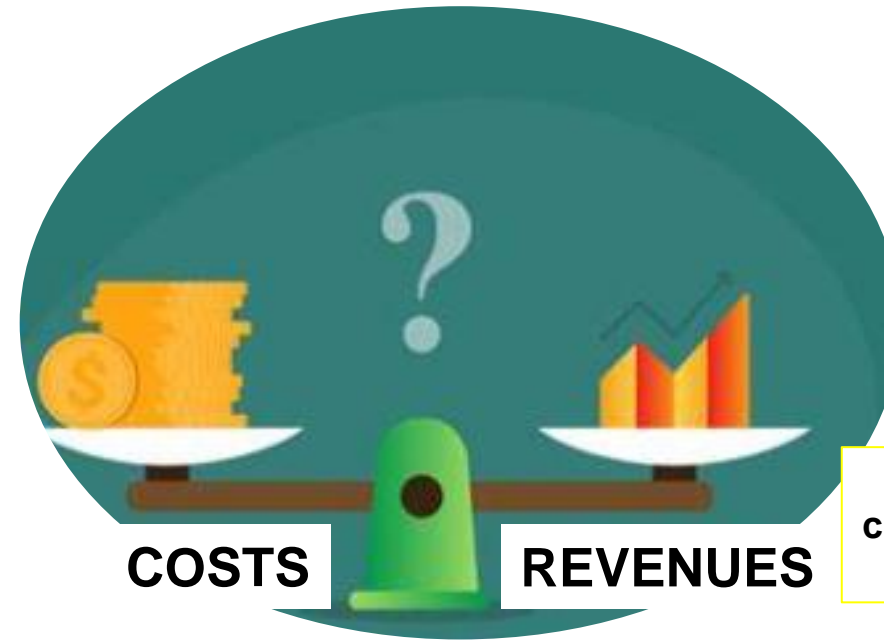
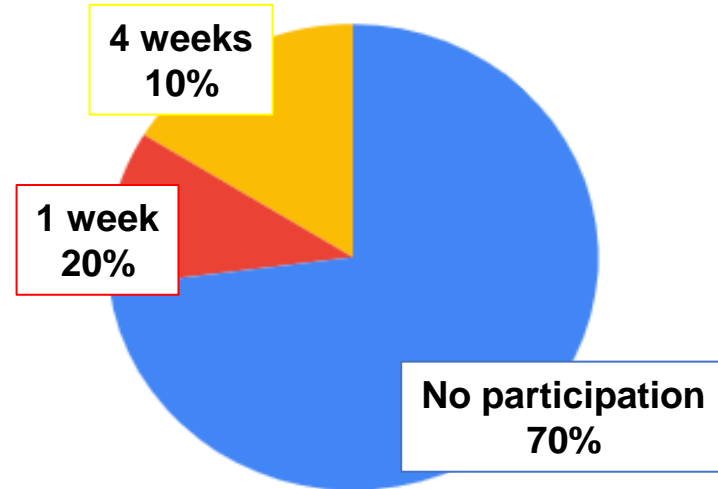
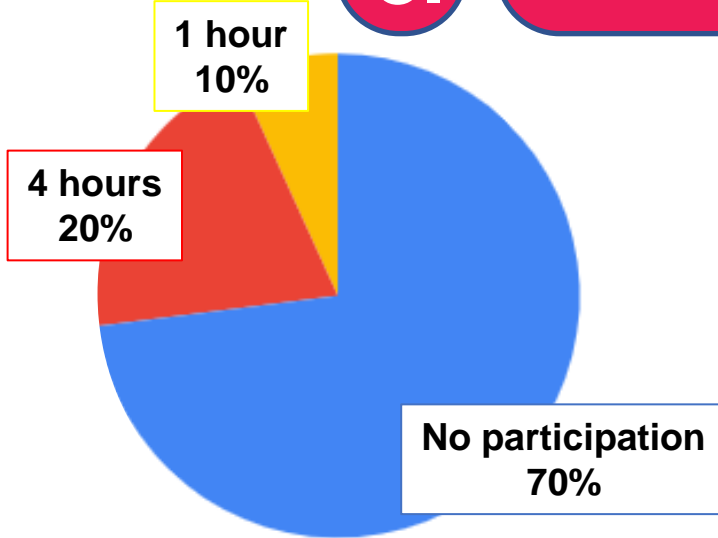
Example of correlation with Chi-square test between:
Farm Size x Trustworthy relationship

Metrics	Value
# of degree of freedom	4
Chi-square	13.82
Chi-square critical	9.49
Probability	0.05
Chi-square (p) value	0.007

There is strong correlation between the farm size and the need for trustworthy relation with the supplier for a customer to be involved in the co-design of the business model

8.

Modification of the supplier revenue model





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Select the most suitable customer and timing

- **Inclination to open innovation**
- **Motivations**
- **Bargaining power**
- **Willingness to lock-in suppliers**

Define the partnerships terms and conditions

- **Rewards and Incentives**
- **IP management**
- **etc**

Adapt the work load of TENCHIJIN employees

CUSTOMER INTEGRATION: Is it worth it?

Constantly ensure Tenchijin business latitude

Constantly monitor the new VP, SAM and SOM

Constantly monitor the ROI, profitability and revenue streams



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1.

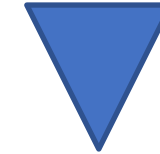
Achievements



- Comprehensive review of the theoretical and empirical background
- Generation of an original and unique database on customer integration in business model
- Analysis of the data with usual statistical methods (Chi-Square)
- Validation of the hypothesis
- Correlations between customers' motivations and resources
- Managerial implications: governance, HR, business model and marketing

2.

Perspectives



- Deep-dive the analysis with additional interviews
- Address new geographical zones
- Address the research question with different philosophy and purpose
- Underpin the empirical customer-integrated business models with comprehensive theoretical developments
- Investigate the topics of “value sharing” and “co-creation” within the SDL and Open Innovation theories

ACKNOWLEDGEMENTS

