

Mapping and analysing agri-food value chains

DeVilag Capacity-Building Programme

13 August 2020, Julia Höhler



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Welcome and introduction

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Research areas



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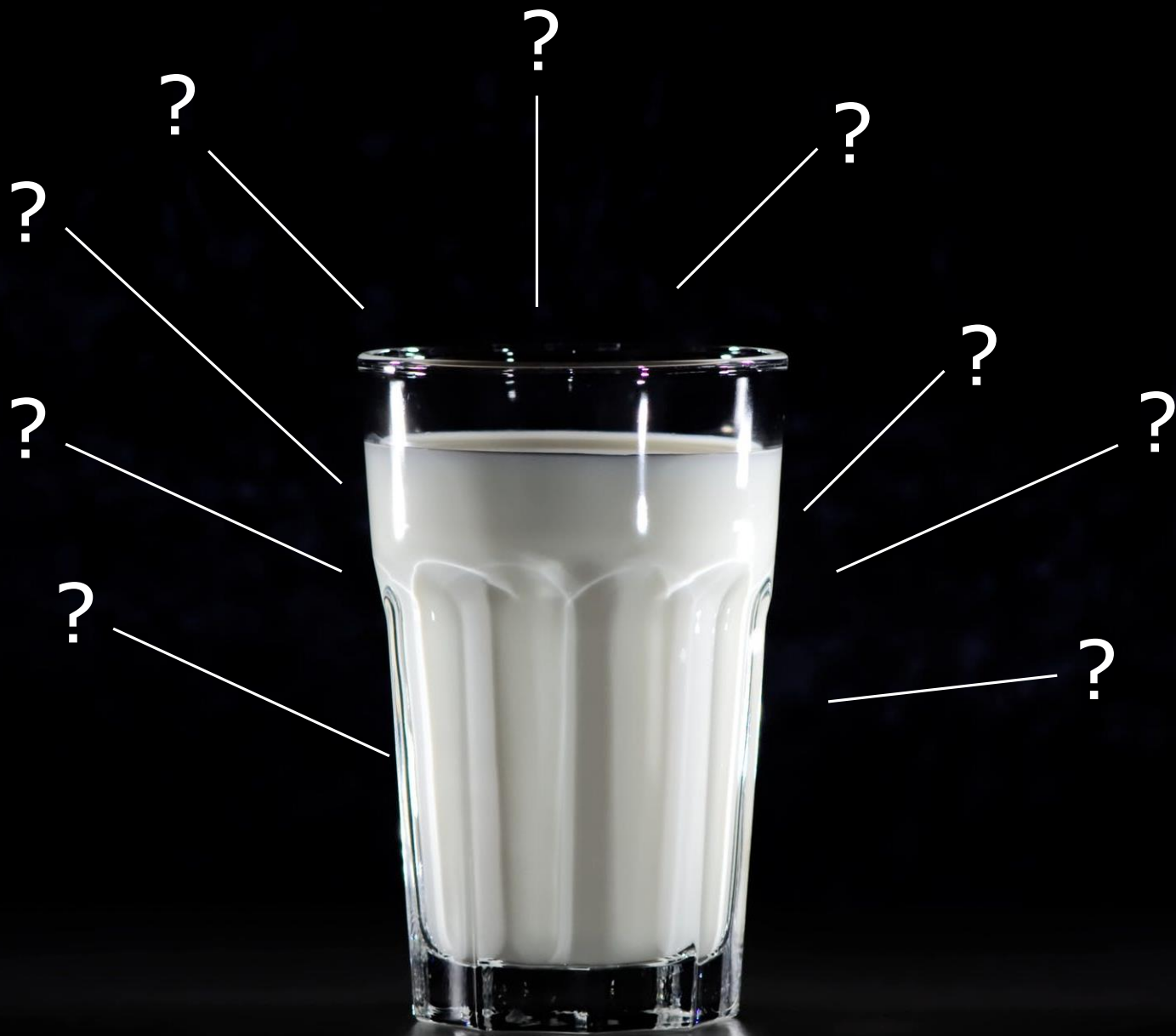


Getting to know you



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- Your name
- Your organisation
- Your favourite food



Economics

The Virus Is Interrupting Supply Chains From Watches to Lobsters

Chaos reigns from the high seas to the factory floor after key manufacturers in China shut down or ships are held in port.

By [Enda Curran](#), [Michael Sasso](#), and [Karlis Salna](#)

22. Februar 2020, 13:00 MEZ

Bloomberg, 2020

New Zealand Lobsters

New Zealand's government said on Feb. 5 that between 150 and 180 tons of live rock lobster were being held in the country in pots and tanks, at sea and on land, after Chinese buyers canceled their orders.

Outline

1. What is a(n agri-food) value chain?

Question

2. Mapping agri-food value chains

Discussion

3. Analysing agri-food value chains

Quiz



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Question

How would you define the term “agri-food value chain”?

Think for a moment and formulate a definition or a few keywords.

Go to www.menti.com and enter the code [REDACTED], then enter your response.





A supply chain consists of all parties (manufacturers, suppliers, transporters, warehouses, retailers, and customers) and, within each organization, all the functions involved, directly or indirectly, in fulfilling a customer request. (Chopra and Meindl, 2010)



Supply chain vs. value chain



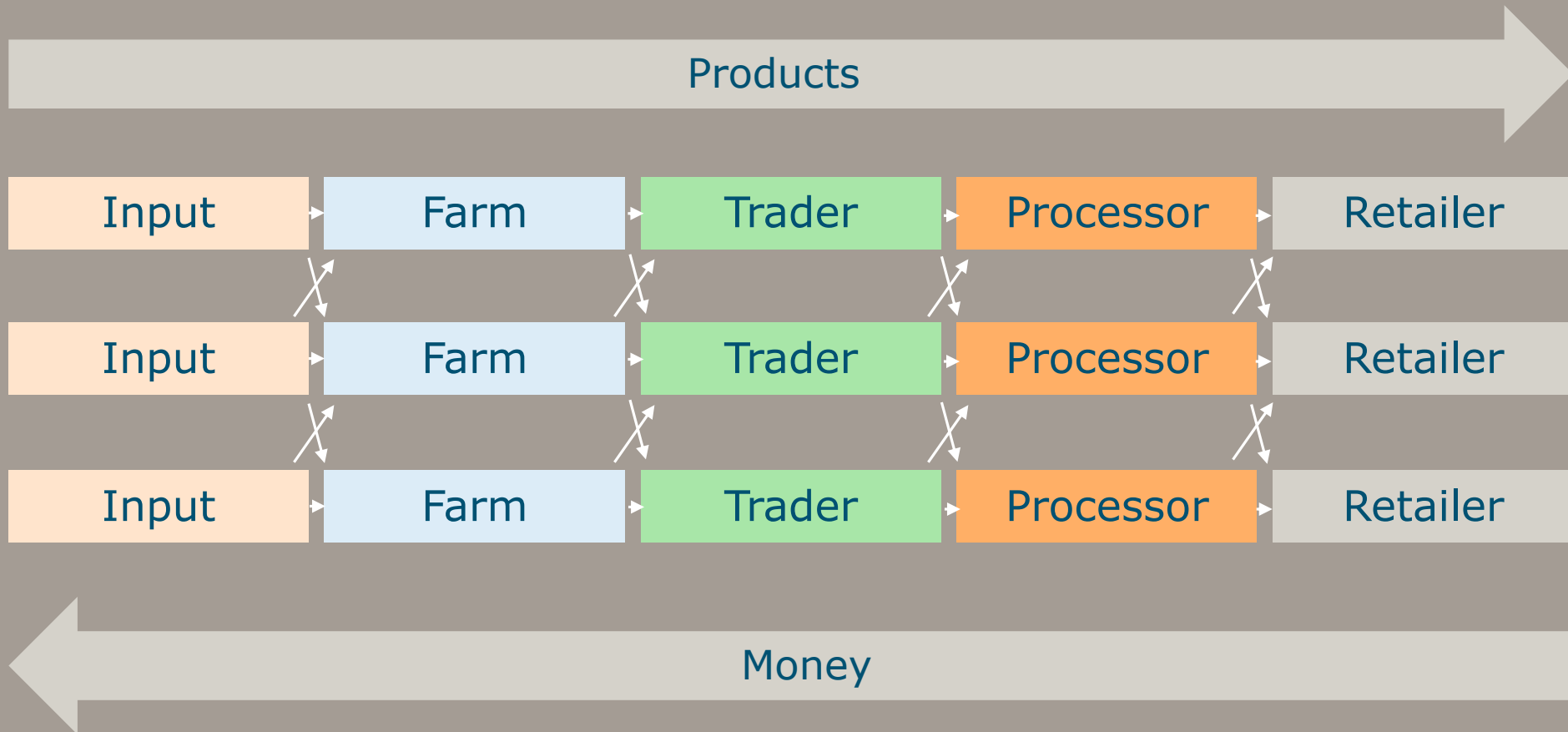
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Value chain: Focus on value creation

In food supply chains farmers are interchangeable and anonymous. In food value chains farmers and their production method are a crucial part of differentiating the food product from the competition.

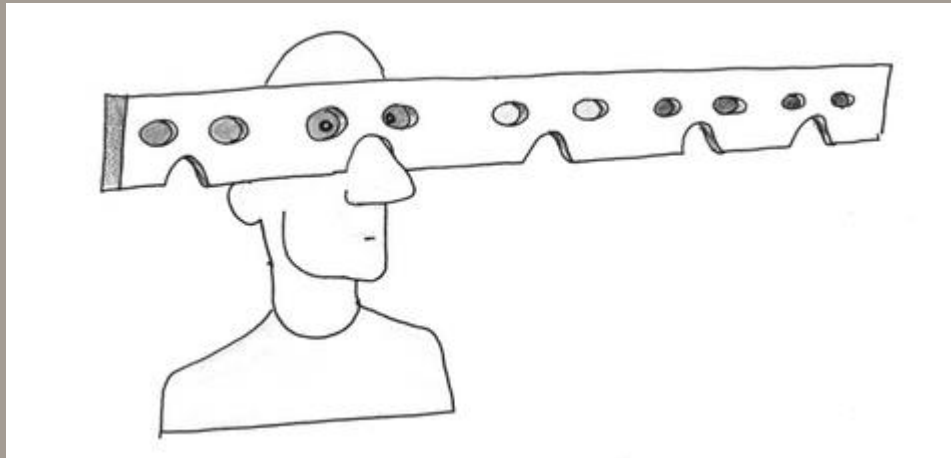
Haas and Petz (2017)

One can also think of value chains as a network



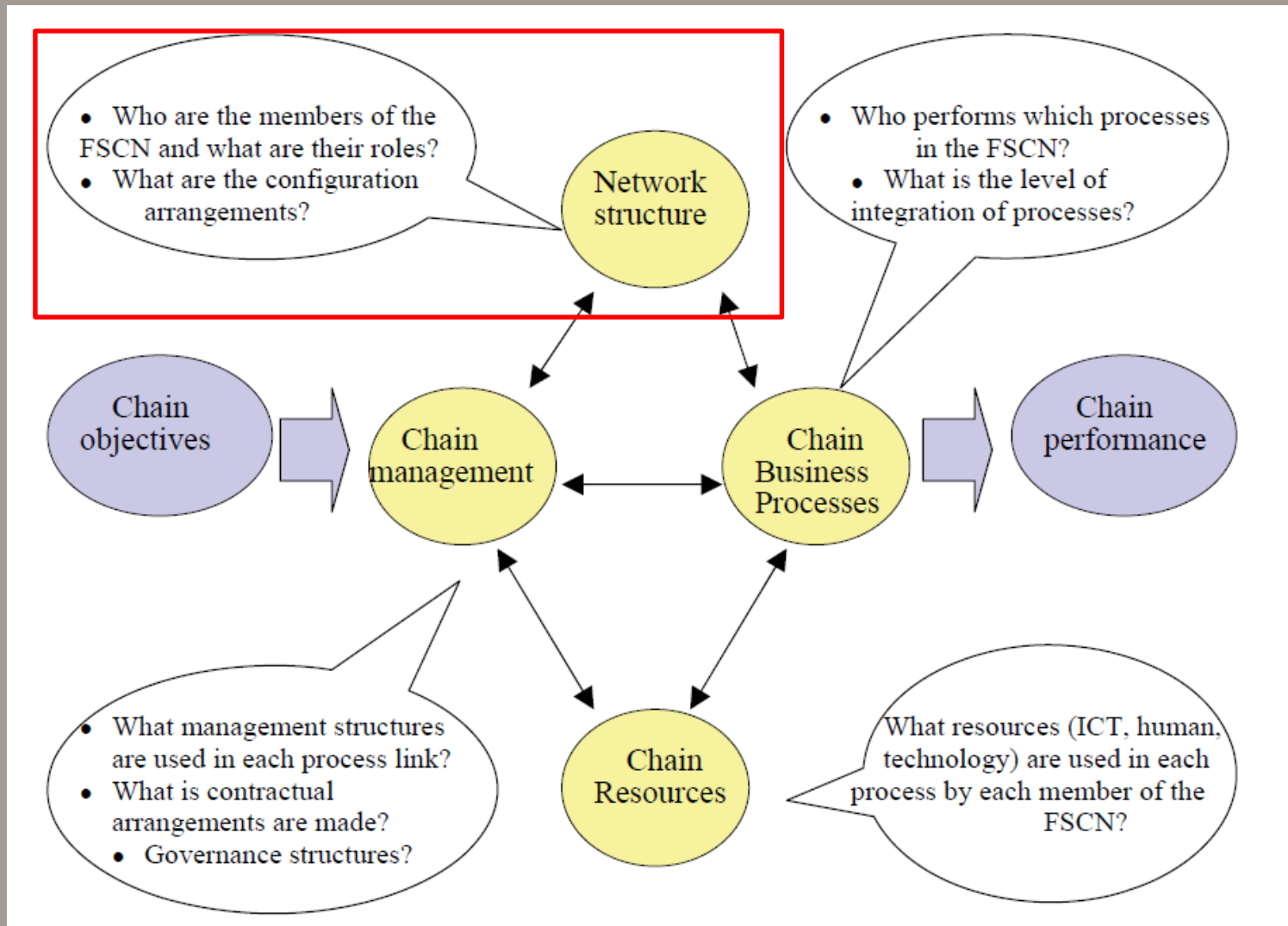
Different perspectives (Donovan et al., 2015)

- Value chains as a set of activities
- Value chains as a set of actors
- Value chains as a strategic network



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Framework for chain mapping and analysis



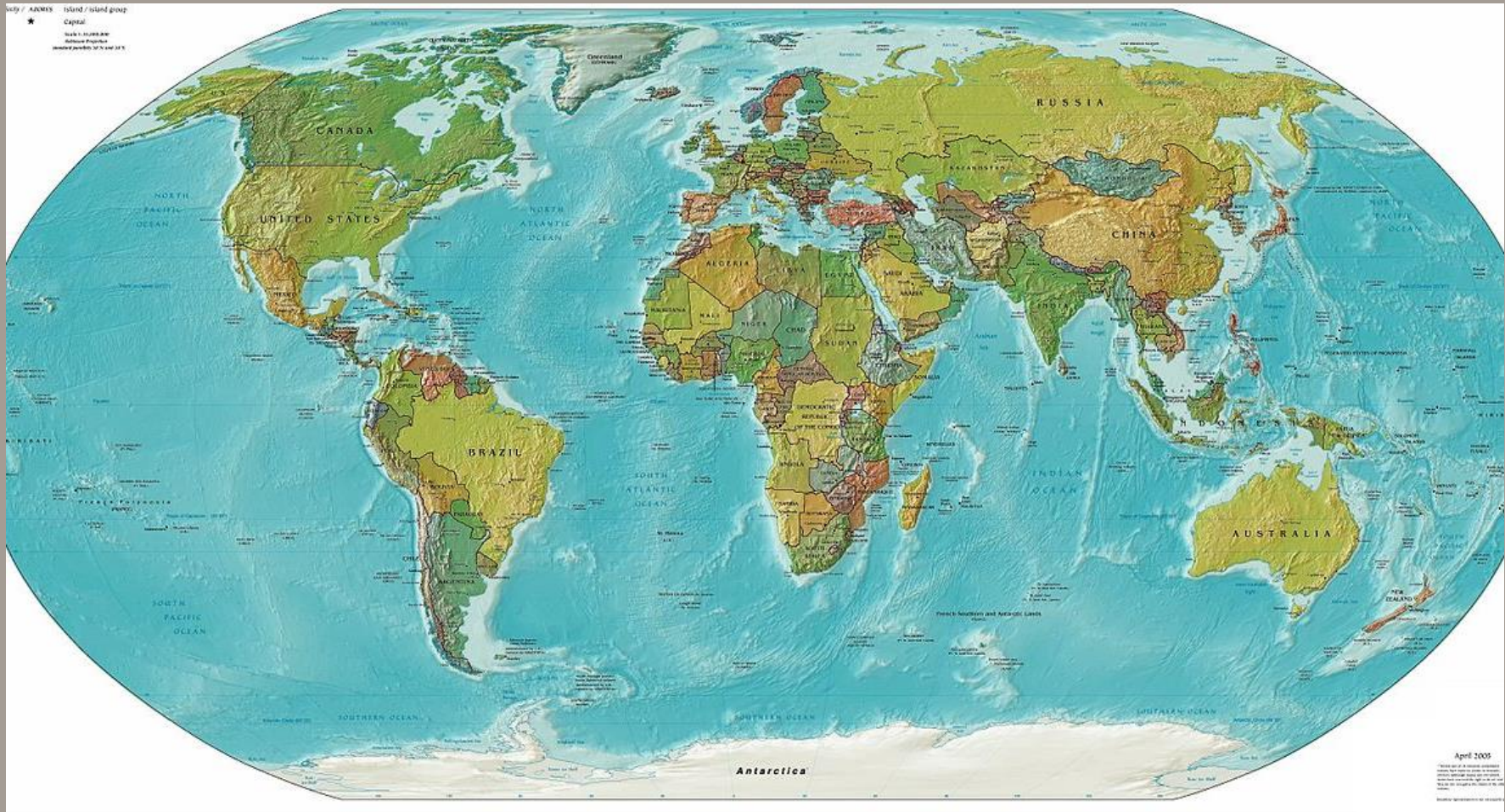
Discussion: Why do we need to map value chains?

Break-out session:
Discuss in groups of five
(four) reasons why we
should map value chains.

Time: 8 minutes



Mapping agri-food value chains



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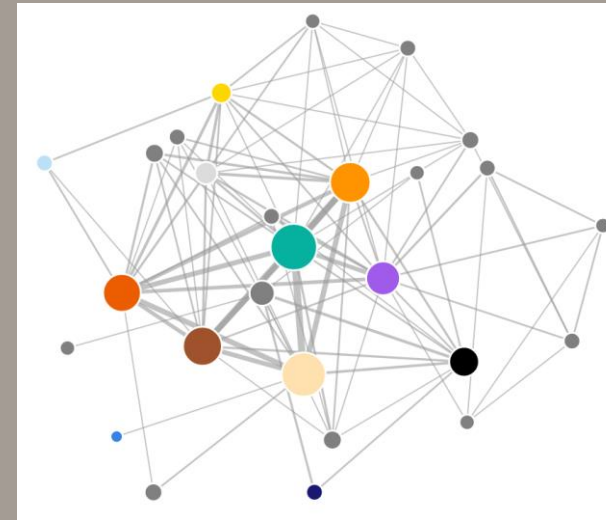


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Social Network Analysis

"The social network approach is grounded in the intuitive notion that the patterning of social ties in which actors are embedded has important consequences for those actors. Network analysts, then, seek to uncover various kinds of patterns."

Freeman, 2004



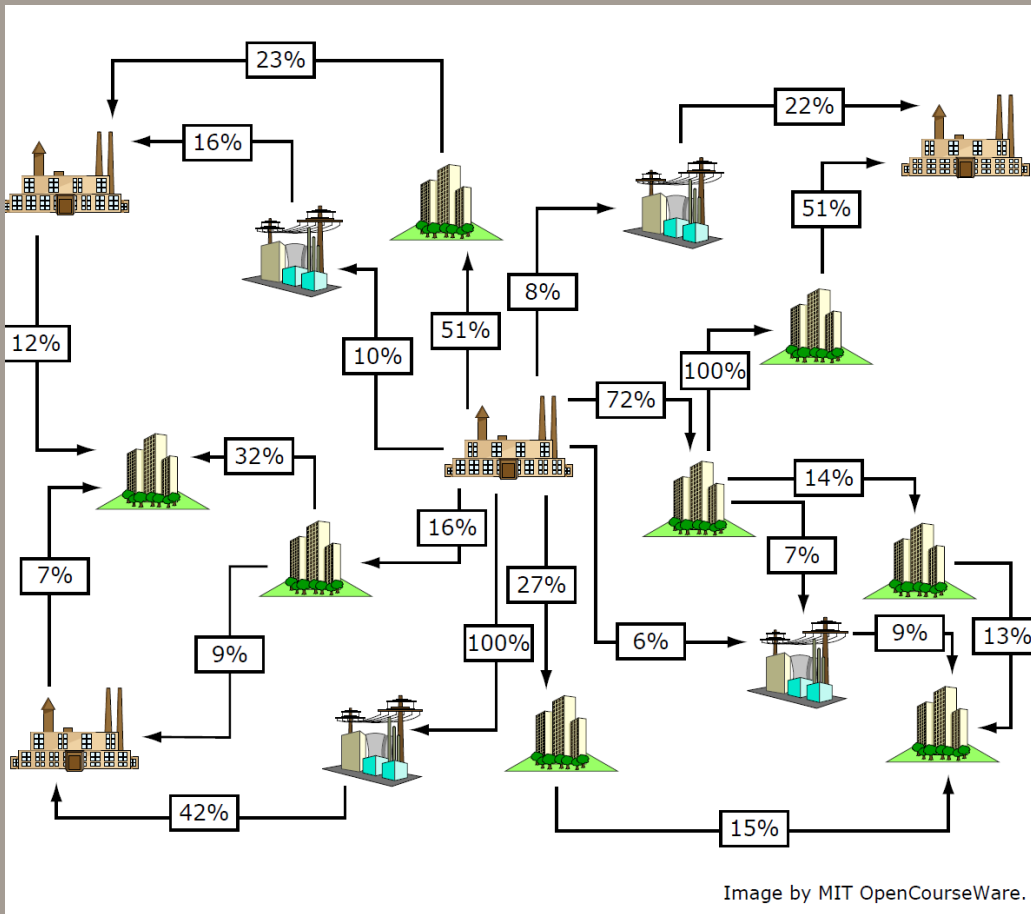
Network: definitions

- **Network**: collection of points linked through some type of association
- **Points** can represent object or subject
- **Links** can represent any relationship between them

Type of Tie	Firms as Entities
Similarities	Joint membership in trade association; colocated in Silicon valley
Relations	Joint ventures; alliances; distribution agreements; own shares in; regards as competitor
Interactions	Sells product to; makes competitive move in response to
Flows	Technology transfers; cash infusions such as stock offerings

Borgatti
and Li,
2009

- Illustration using lines, arcs and symbols



Putzke

Links/ties

- Owned by
- Purchases from, sells to
- Competes with, supports

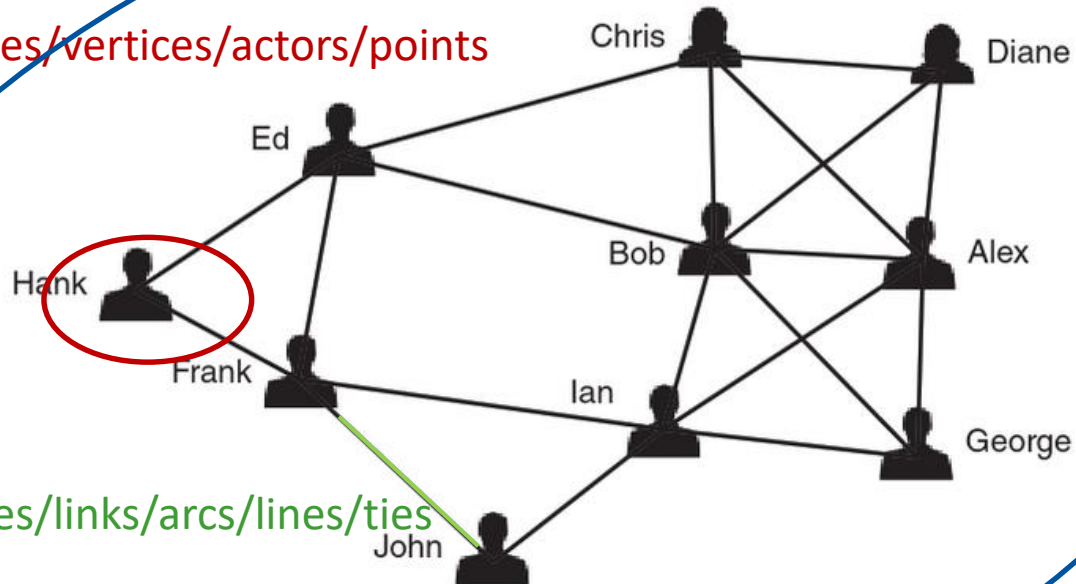
Through stakeholders

- Board interlocks
- Previously worked for

Network: notation I

Network

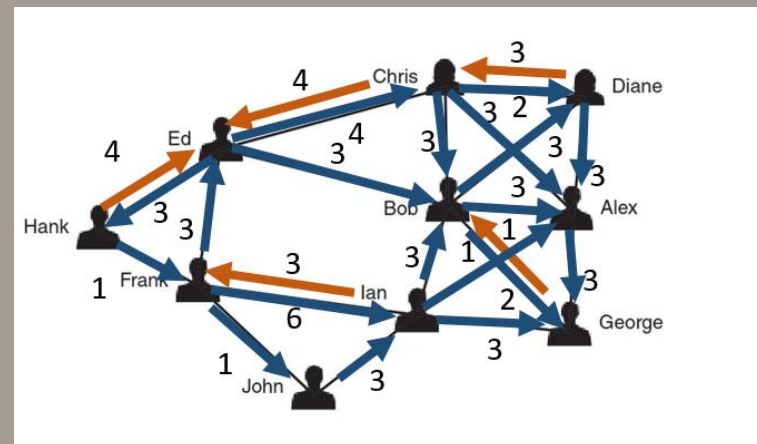
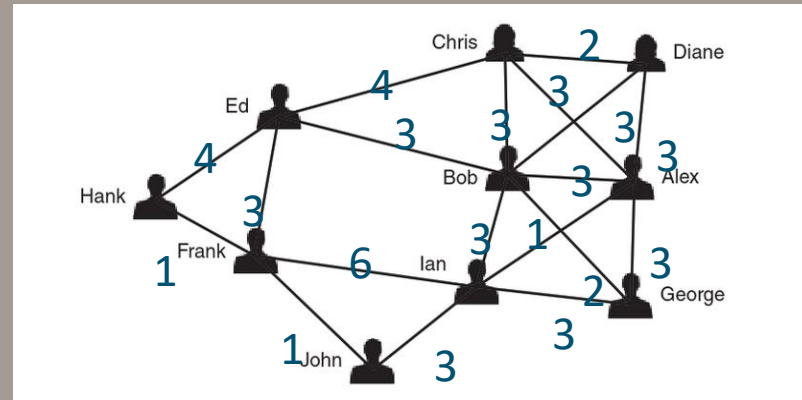
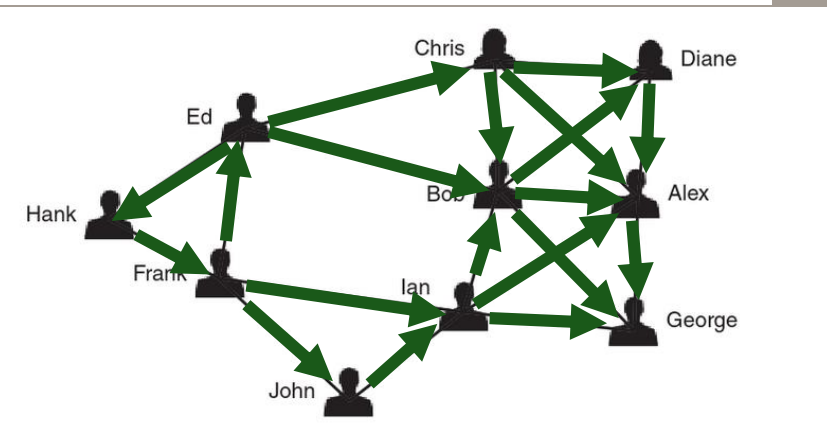
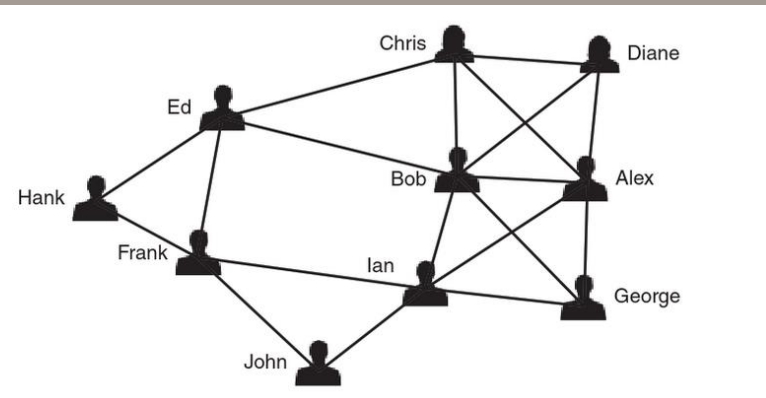
Nodes/vertices/actors/points



Edges/links/arcs/lines/ties

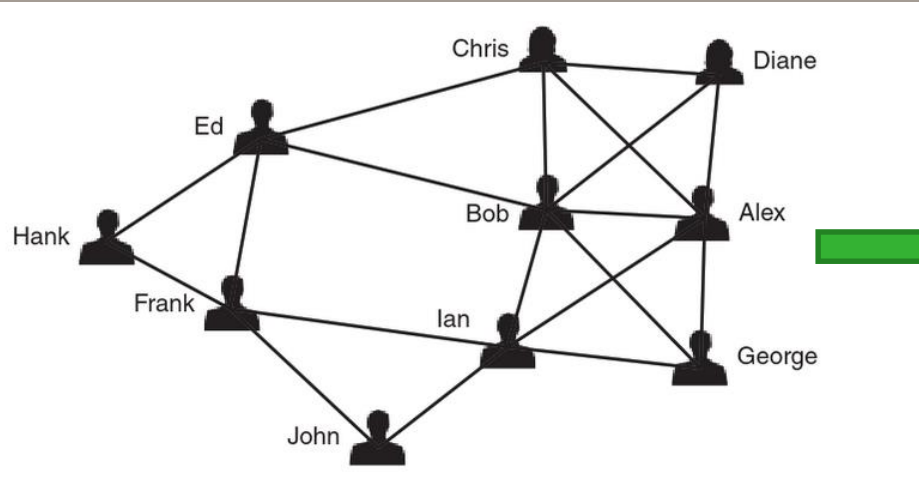
McCulloh et al.,
2013

Network: notation II



Own representation based on McCulloh et al., 2013

Network: notation III



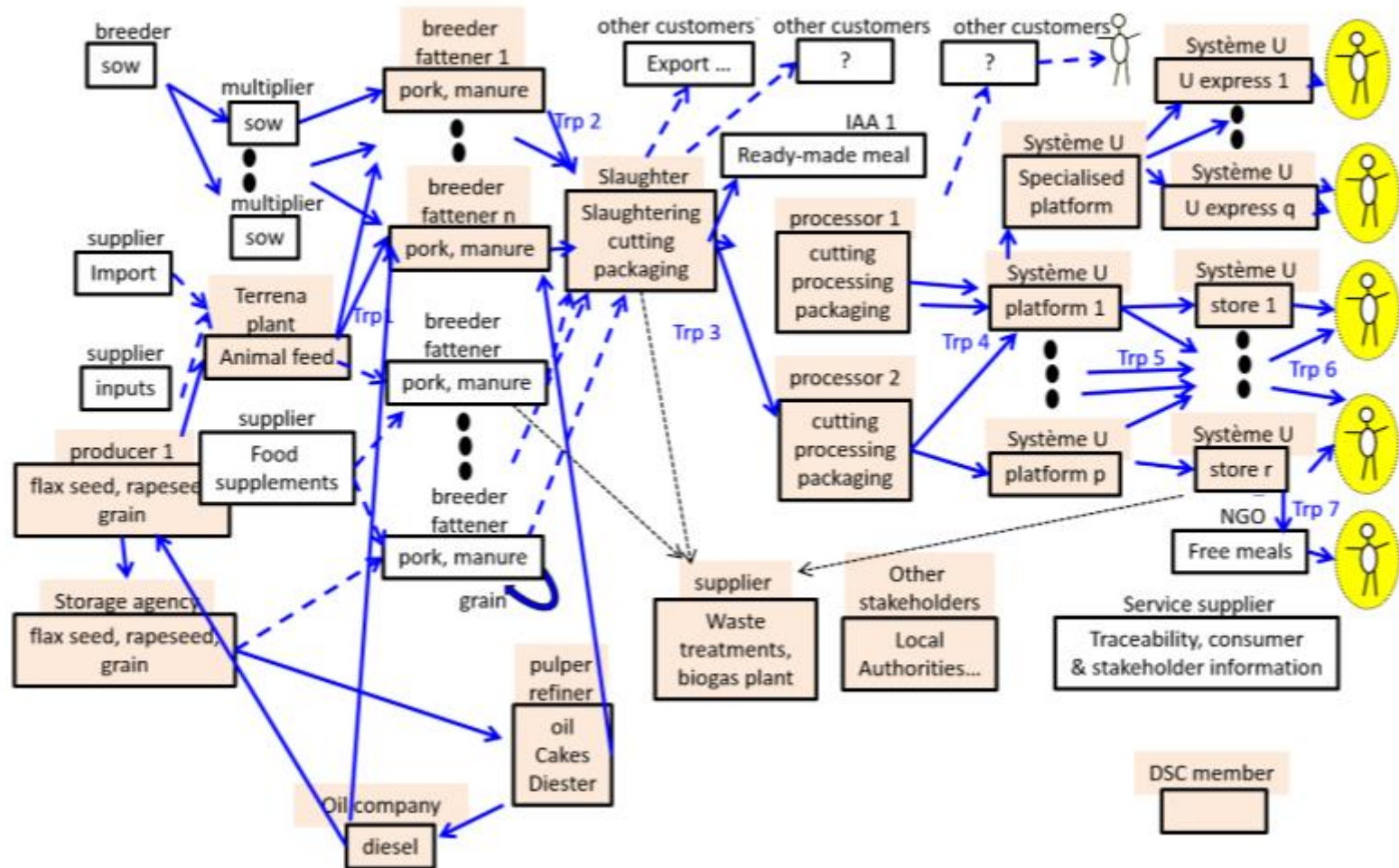
Adjacency matrix

	Alex	Bob	Chris	Diane	Ed	Frank	George	Hank	Ian	John
A										
Alex	0	1	1	1	0	0	1	0	1	0
Bob	1	0	1	1	1	0	1	0	1	0
Chris	1	1	0	1	1	0	0	0	0	0
Diane	1	1	1	0	0	0	0	0	0	0
Ed	0	1	1	0	0	1	0	1	0	0
Frank	0	0	0	0	1	0	0	1	1	1
George	1	1	0	0	0	0	0	0	1	0
Hank	0	0	0	0	1	1	0	0	0	0
Ian	1	1	0	0	0	1	1	0	0	1
John	0	0	0	0	0	1	0	0	1	0

McCulloh et al.,
2013

$$a_{ij} = \begin{cases} 1 & \text{if an edge exists between } n_i \text{ and } n_j \\ 0 & \text{if no edge is present between } n_i \text{ and } n_j \end{cases}$$

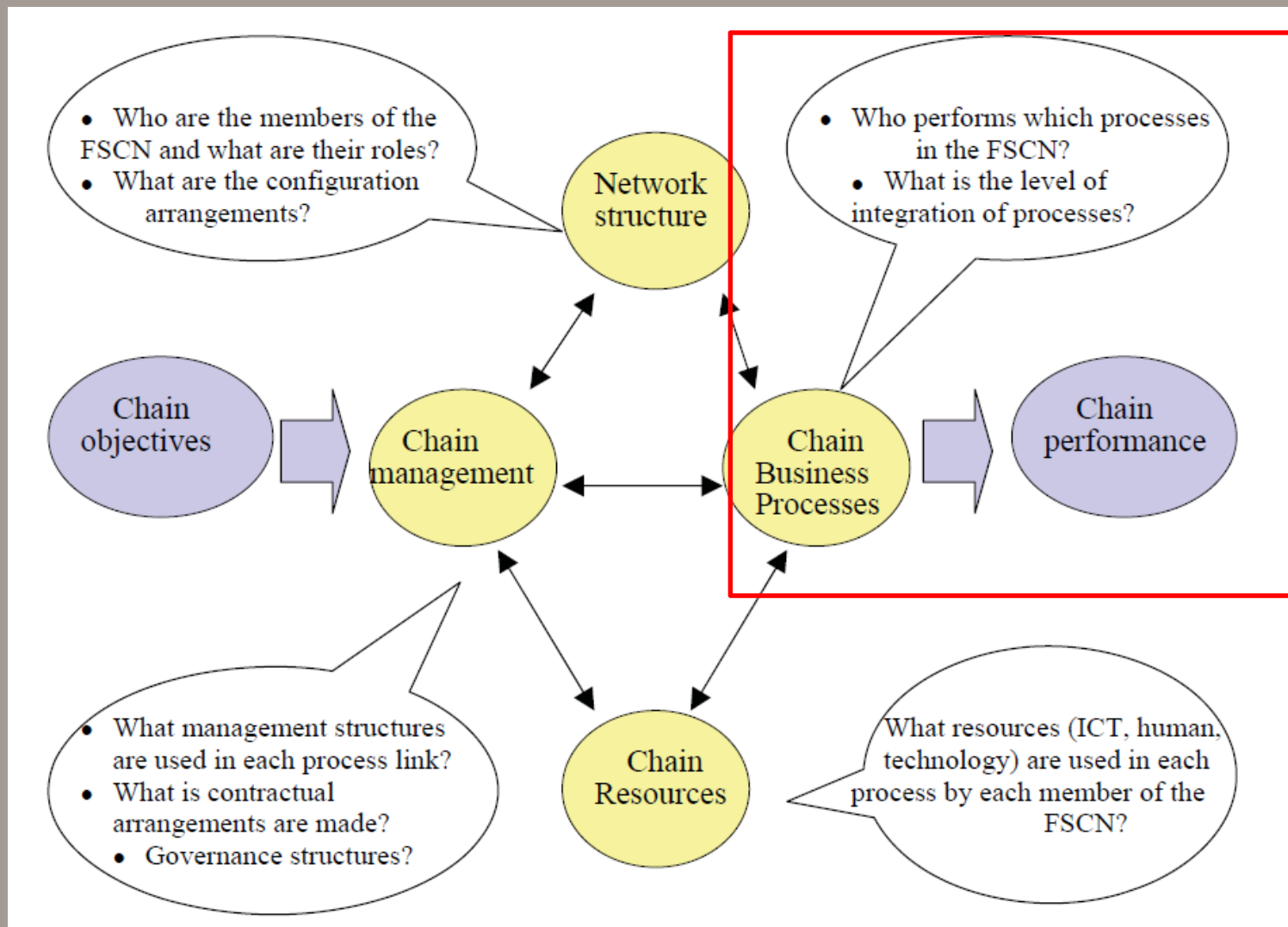
Agri-food value chain: example map



Filippi and Chapdaniel, 2020



Framework for chain mapping and analysis



Analysing agri-food value chains

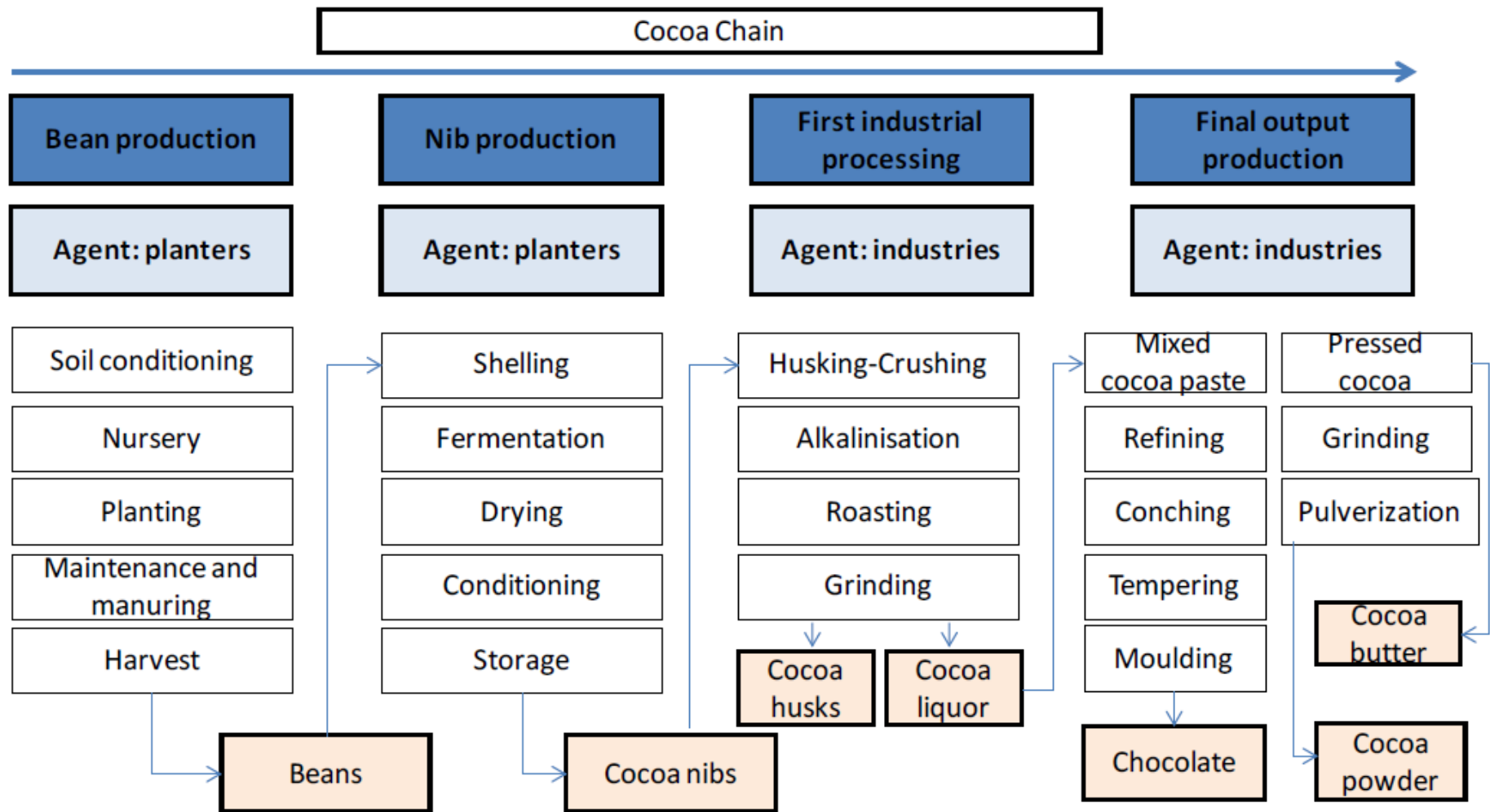


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Domains of value chain analysis (Bellù, 2013)

- Socio-economic context of the value chain
- Demand for value chain outputs
- Analysis of the institutional setup
- Analysis of input and output markets
- Functional analysis of the value chain
- Economic analysis of the value chain

Functional analysis (Bellù, 2013)

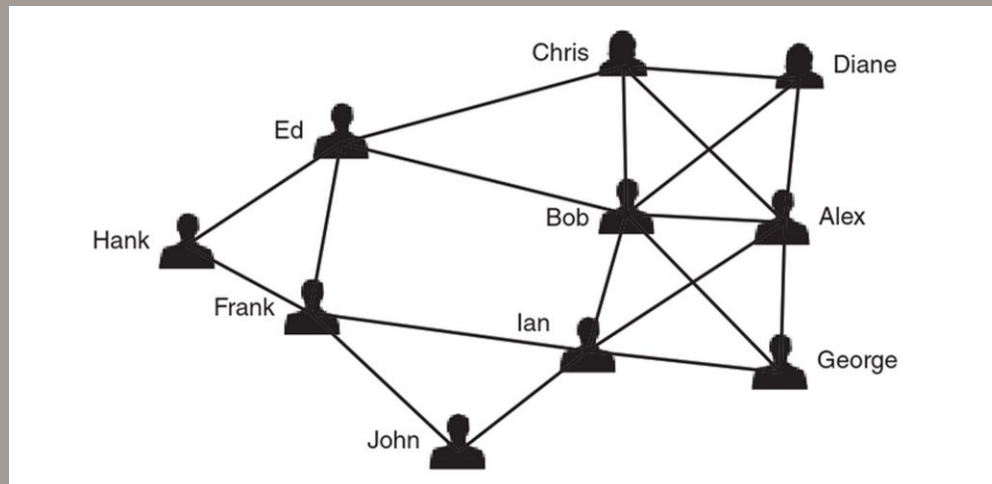


Source: elaborated on the basis of: About Cocoa. International Cocoa Organization (ICCO) <http://www.icco.org/>

Functional analysis at the network level

Centrality: structural importance or prominence of a node in the network

- *Who knows the most actors?*
- *Who has the shortest distance to the other actors?*
- *Who controls knowledge flows?*



Proof! Just six degrees of separation between us

After checking 30 billion electronic messages, Microsoft researchers say the theory stands up



▲ Just six degrees of separation or fewer between the Dalai Lama and everyone else. Photograph: Carl de Souza/AFP/Getty Images

The Guardian,
2008



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Eigenvector Centrality

Eigenvector centrality: connections to other nodes who are themselves well connected



Yahoo, 2019

Graph level measures I

- **Size:** Number of individuals participating in the network



Oxfam, 2013

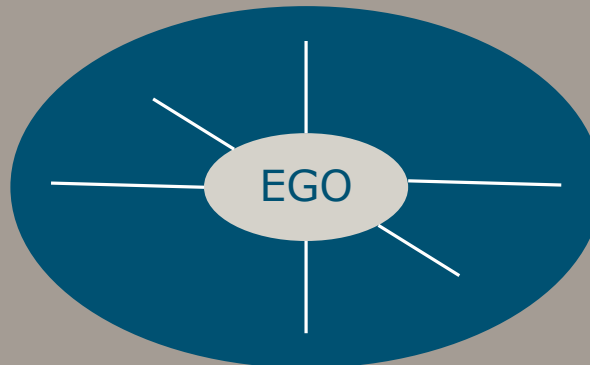
- **Density:** Ratio of the number of links present given the total number of links possible

Graph level measures II

Egonet quality

$$q_i = \sum_j x_{ji} a_j$$

- Sum of the attribute values for a given firm's alters
- Possible attributes: _____?



Economic analysis



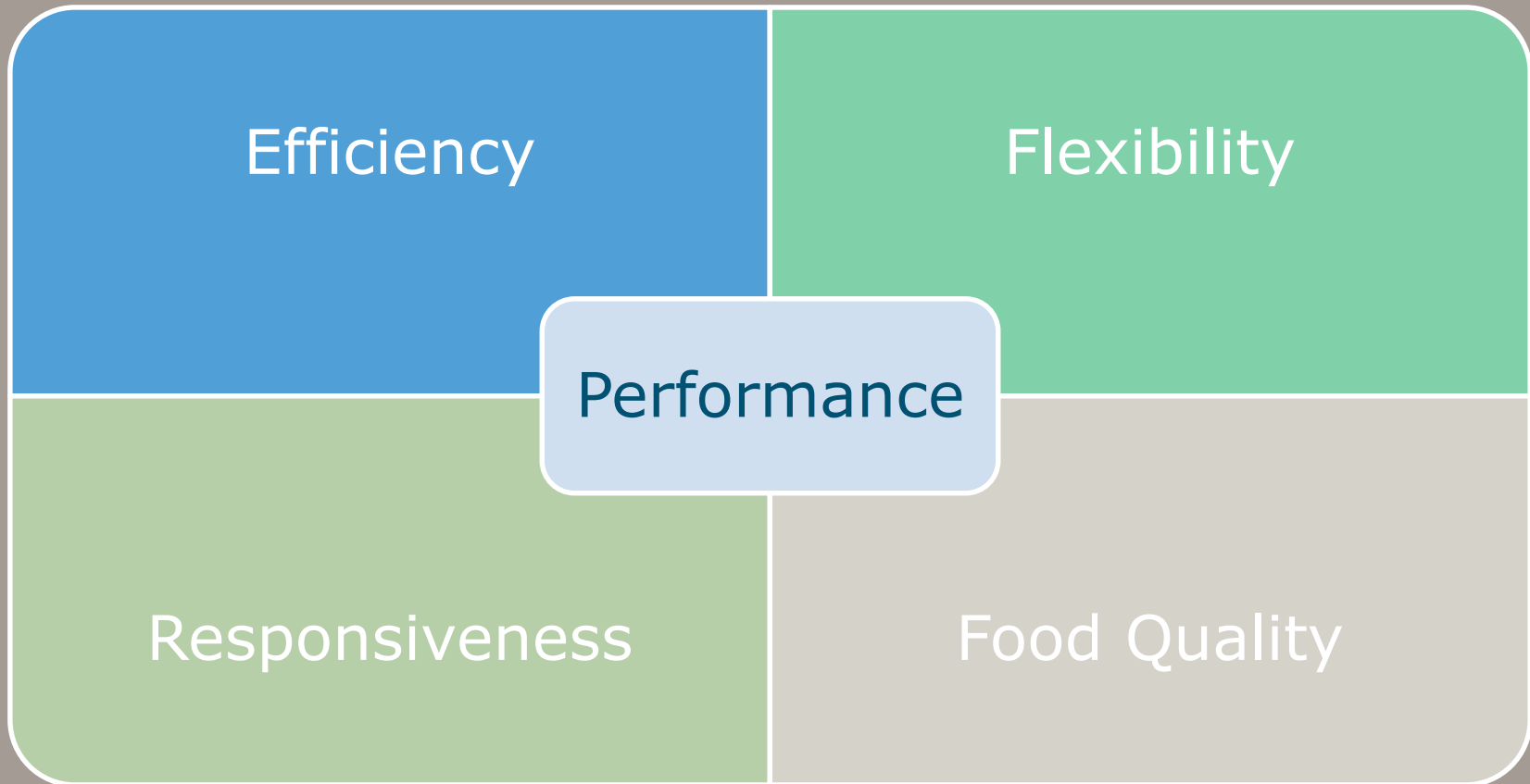
Economic analysis: value added

Production Account of a production process determines the Value Added (VA), as the balancing item of revenues minus the value of the inputs required to obtain that output

Income Account determines how the value added is distributed among the actors participating in the production process



Agri-food value chain performance



Aramyan et al., 2007

Transaction cost economics

- **Idea:** Transactions are costly
- Transaction costs (TC) are..
 - ...costs of defining and measuring resources or claims
 - ...costs of utilizing and enforcing the rights specified
- According to some estimates: $TC \sim 50-60\%$ of net national product

The concept of transaction

„A transaction occurs when a good or service is transferred across a technologically separable interface. One stage of activity terminates and another begins“

(Williamson, 1985)



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Characteristics of transactions

Transactions are characterized by

...uncertainty

...frequency with which they occur

...degree of transaction-specific investments

Transaction costs and value chains

Efficient form of organization = $f(\text{characteristics})$

Contract

Market



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Vertical integration



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Characteristics of transactions: uncertainty

- Uncertainty results from
 - Environment
 - Measurement
 - Behaviour
- Chain structures:

Market



Contract

Vertical integration



Characteristics of transactions: frequency

- Frequency with which a transaction occurs
 - One-time
 - Occasional
 - Recurrent
- Chain structures:

Market



Contract

Vertical integration



Characteristics of transactions: asset specificity

"...durable investments that are undertaken in support of particular transactions, the opportunity cost of which investments is much lower in best alternative uses [...]." (Williamson, 1985)

- Site specificity
- Physical asset specificity
- Human asset specificity
- Dedicated Assets

Transaction costs in Egyptian potato marketing

Table IX UK importers to Egyptian exporters

(1) <i>Contractual perspective</i>	From UK-based importers	To Egyptian exporters
Transaction objectives	To obtain regular timely supplies of high quality Egyptian potatoes	
(2) <i>Nature of transaction</i>		
Volume/number of transactions	High in season (although bulky loads)	
Political, social or economic risk	High – prices in particular; large and variable marketing margin	
Dedicated inputs	Moderate to high – handling and storage facilities at the ports of entry	
Limited judgement	Moderate	
Opportunistic self-interest	Moderate	
(3) <i>Governance</i>		
Implied contracting process	Relational contracting	
Expected governance structure	Bilateral or trilateral	
Actual governance structure	Mostly bilateral	
Implications and observations	Illustrates the advantages to both sides of the contract of the more unified governance structure	

Loader, 1997

Quiz

Go to menti.com and enter the code _____.

Consumers want to know about the content and safety of their food, but also how it is produced and what the environmental and social impacts are.

(KPMG, 2013)

Questions and Feedback



Contact

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