Value chain in pig production – a global perspective

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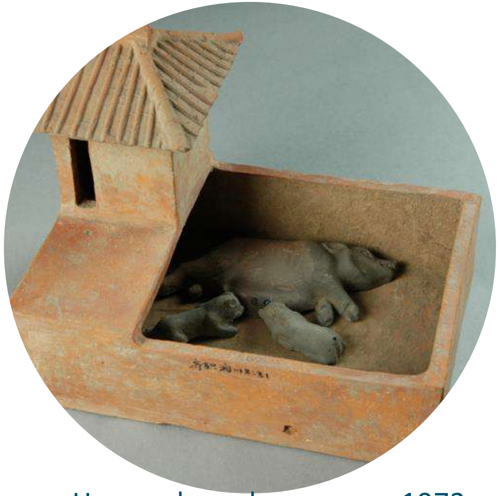

Henan sheng bowuguan, 1973

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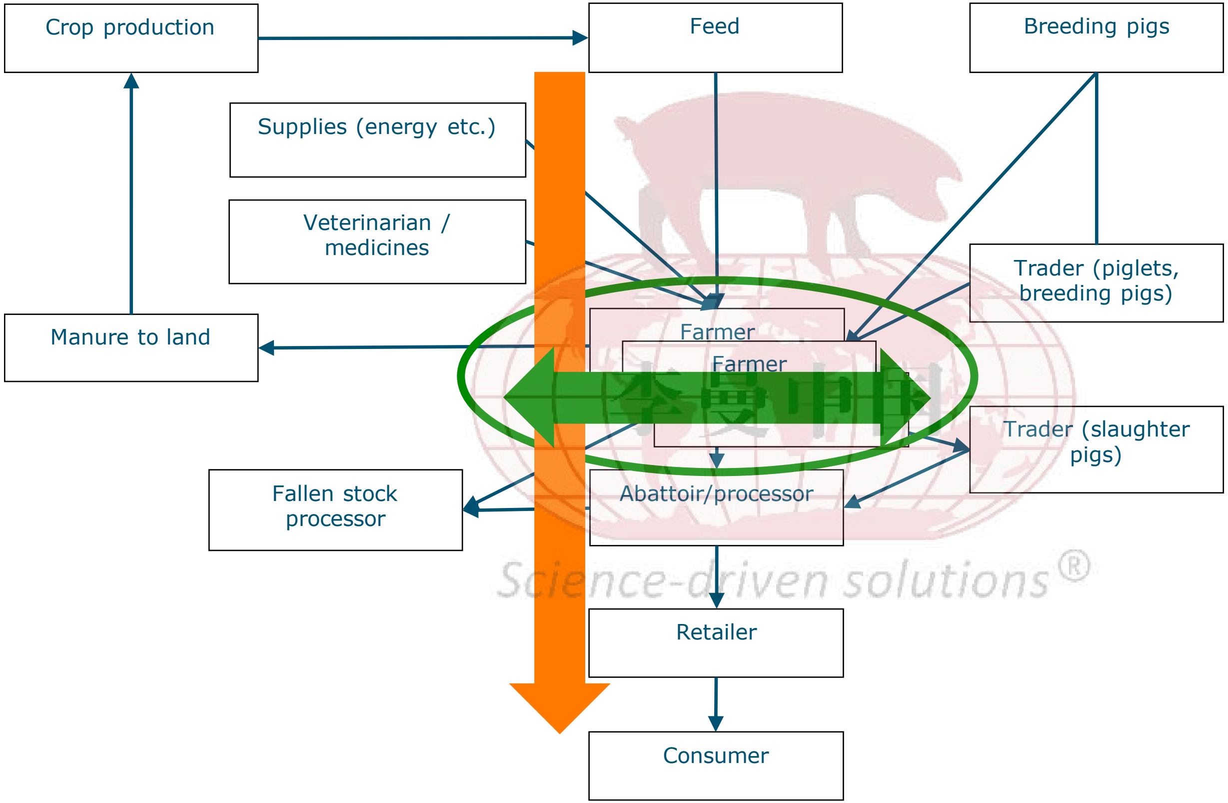
Supply chain (general overview)



Vertical organization of supply chains

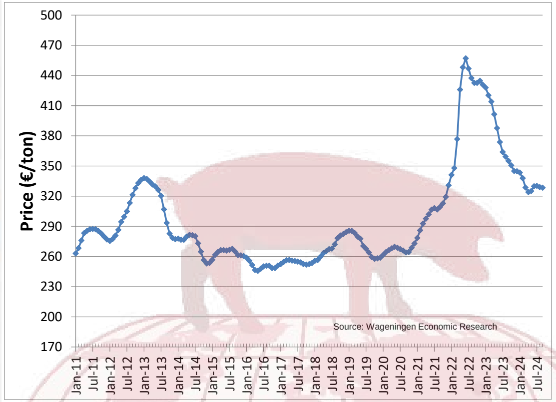
Day trade Spot market	Short term contracts	Long term contracts	Strategic alliances/ Partnership	Vertical integrations	Ownership

Weak — < Level of vertical control > — Strong

Source: Boston et al., 2004

Risks have increased

Source: pig333.com, based on MOA China



Source: Wageningen Economic Research

https://www.reuters.com/markets/companies/002714.SZ/

Risks have increased: animal diseases, feed prices, wars, border closures, financially

➔ Supply chain cooperation can support risk management

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Aspects of supply chain cooperation (Zhuo et al., 2020)

- Integration: Strategic collaboration within supply chain to achieve effective and efficient product flows (Flynn et al., 2010)
- Agility: ability to respond quickly to change (Charles et al., 2010)
- Robustness: ability to maintain production despite disruptions (Brandon-Jones et al. 2014)
- Resilience: adaptive capability to prepare, respond and recover from unexpected events (Ponomarov and Holcomb, 2009)

➔ Efficiency and risk management

Table 6 The relationship between supply chain coordination, agility, robustness, and resilience of four cases

	Integration	Agility	Robustness	Resilience
Jin'xin	L	L	L	L
Long'zhu and Chun'ran	M-L	M-L	M	M
Jin'zhong and its Jin'li	M	M-H	M-H	M-H
Mu'yuan	H	H	H	H

Increasing vertical integration in China

- Increasing integration over time
- Feed production highest, with forward integration

Source: Wang et al., 2023

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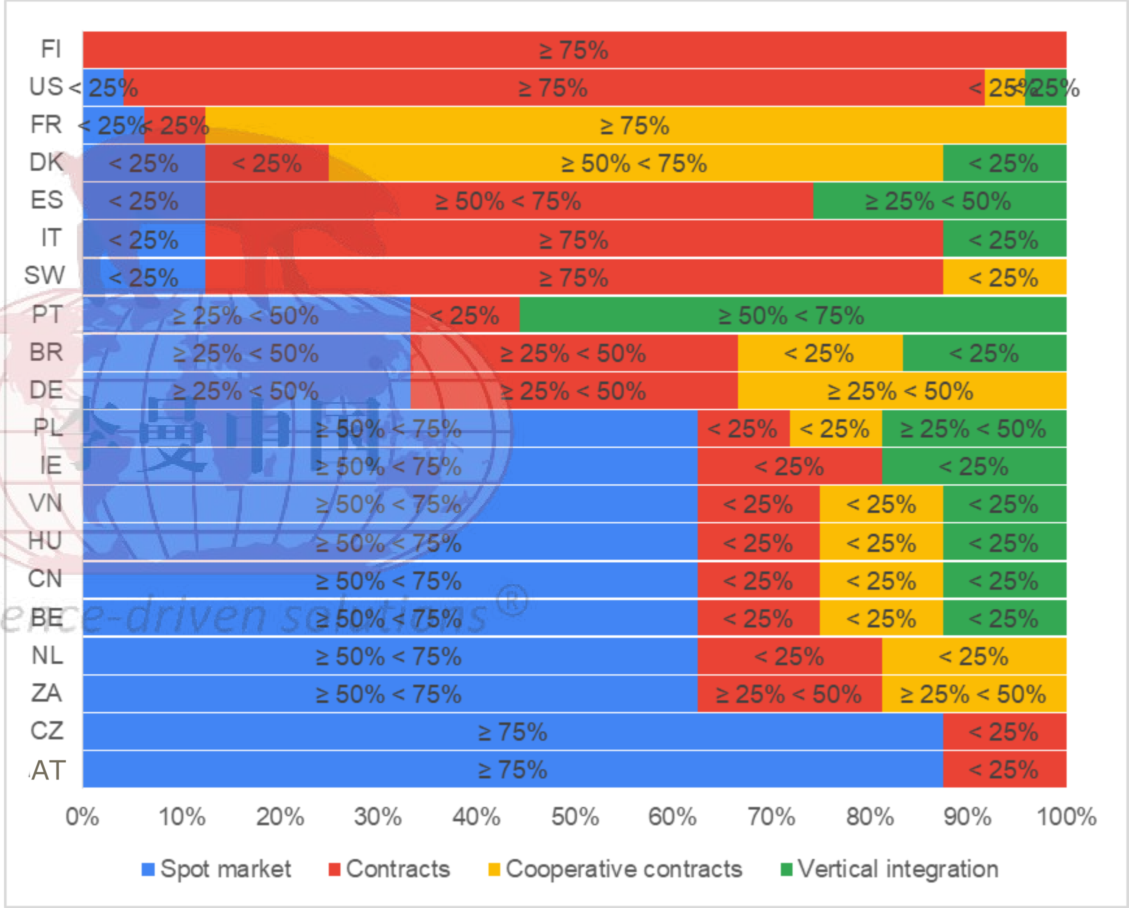
Why vertical integrations?

1. Sales security and/or supply security
2. Demand of developing retailers
3. Weak position of farmers, information asymmetry (Mirrlees, Vickrey and others)
4. Jointly bear/reduce/mitigate risks (e.g. Zhuo et al. 2020)
5. Different interest within supply chain – failure cost (e.g. Bondt et al., 2005)
6. Control of product quality
7. Joint value creation (McIntyre et al., 2023)
8. Swift reaction on fluctuating market circumstances (Charles et al., 2010)
9. Answer to survive in acute adverse market situation (Ponomarov and Holcomb, 2009)
10. Finance opportunities (Cox, pers.comm., 2024)

Supply chain models internationally compared

Draft outcomes!

- Survey among members of InterPIG and agribenchmark Pigs
- Definitions not always clear; e.g. 'spot market': for farmers or for processors?
- Source: InterPIG/Embrapa – report forthcoming



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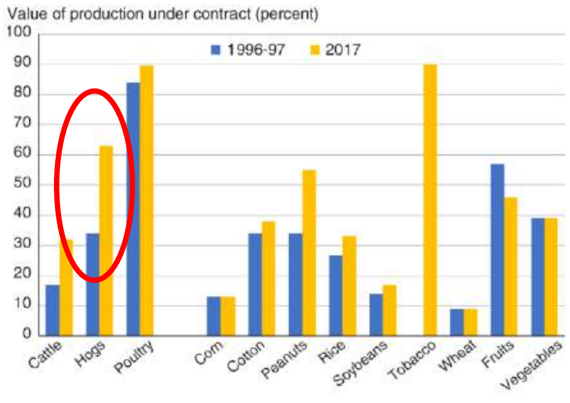
USA



Source: USDA Economic Research Service.

- >60% contract production
- Production- and marketing contracts
- Price: Daily price, Joint to average price, Value of carcass parts, futures
- E.g., Smithfield, ~0.8 mln. sows; owned & contract; meat industry
- E.g., Cactus, 35.000 sow owned, 100 contracted finisher farmers
- Payment ±40 dollar/finisher place/year - 12-year contract

Meyer and Goodwin (2021); Freese (2018)

USA – Iowa State

Picture: David Mark (Pixabay)

- Iowa – High density pig production area Corn belt
- Half of piglets imported from other States
- Integrators initiated by finisher farmers
- Finisher farmers co-owner processors
- Grain producers need pig manure
  - Invest in pig facilities
  - And provide labour (outside harvesting season)
- Integrator (coordinator) owns the pigs; provides feed and health services

Brazil

- Mainly integrations (Top-3: Brasil Foods, JBS, Aurora)
- Hardly space for independent producers
- Ractopamine-free production
- Production and marketing contracts
- Miele (2013): “The spot market is more speculative than the integrated production, without sales guarantee … The producer is risk taker, and profit margins fluctuate strongly.”

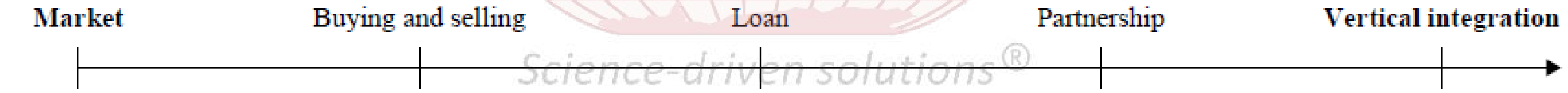


Figure 1. Contractual arrangements used in the Brazilian pork chain.

Source: Müller Martins et al., 2021

Ukraine - Dnipro-Hybrid

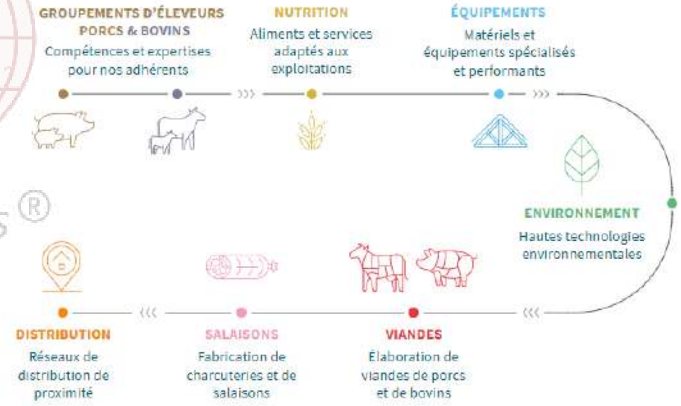
- Pig production
- 80.000 sows and progeny
- Own breeding
- Feed production
- Own slaughtering and processing
- Own shops for sales

Nonghyup, South Korea

- (Super)cooperative
- Genetics
- Subsidy portal
- Representative organization
- Advice
- Bank

France - Cooperl

- Producer association: pigs, feed, environmental technology, meat processing, transport
- Activities for farmers: manure processing technology, intact boars, antibiotic free, intensive data use
- Own price setting to farmers



Source: cooperl.com

Romania - Smithfield

- Own pig production and contracted finishing farming
- Meat processing, feed production
- Sales of fresh meat in large area (up to Mediterranean)
- Timisoara (west) – historic pig production area
    - American art
- CSF in 2007 and distrust of local communities
- General distrust against cooperatives

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Denmark – Danish Crown

- Cooperative
- Breeding
- Slaughter and processing
- Research

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Family farms in the Netherlands

Farm type	Sows	Slaughter pigs produced
Sow farms	900	
Finishing farms		8,500
Combined farms	550	10,200 (+ partial sales of piglets)

"My employees should jointly fit at the kitchen table"

Source: CBS, 2023

- Labour: Farm owner + 0.36 family member + 1.1 hired worker
  - Efficient: 300 sows/worker, or 15-25,000 pigs slaughtered/worker
- Solvency 71%; avg. loan 1.2 mln. Euro
  - Financial cost is partial expense, partially for own remuneration
- MSY 31 – strong zootechnical focus
- Hard to survive in volatile market – Solution in partnership

Source: Farm Accountancy Data Network, 2022

Netherlands – Beter Leven

- Netherlands: loosely coupled supply chain cooperation
- Beter Leven is NGO driven welfare program
- All NL supermarkets adhere, for all fresh pork
- Not always provided with logo
- Retailer orders processor, which in turn contracts pig farmers
- Some of the supply chain have pig producer groups (coops)
- Vertical integration in Netherlands not desired; partnerships!

Headaches

- Feed miller: Ingredients purchase and customer connection
- Farmer: health, prices: good price and security
- Processor: optimal valorization and capacity use
- Retailer: Need for adaptive suppliers

Hoste, 2024

Take-home messages

- Appropriate supply chain collaboration models depend on many factors
- Risk management and cost efficiency are important drivers
- Supply chain cooperation can support risk management
- Take care of different interest per chain link
- Vertical integration not always desired or necessary; family farm in partnership as alternative

Thank you for your attention

谢谢您的关注

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