Innovation, Regulation & Economic Performance: The Impact of ASYNCHRONICITY on the Chain

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Organization of this Presentation

- Introduction to “Knowledge Economy”
- The concept of Innovation
- Regulation and the Institutional Agrifood Value Chains
- Economic Performance
- Impact of Asynchronicity on the Chain
- Conclusions
- Implications

Knowledge Economy

- During the last decades we have been slowly "sliding" into the Knowledge Economy, driven by "Science and Innovation"
- Why Knowledge Economy?
- Knowledge is a very important source of Value Creation and Wealth, having a tremendous impact on the economic system.
- Characteristics of Knowledge:
  - ***Intangible***
  - ***Can be used simultaneously in different and various locations***
  - ***It's accumulative, not fungible and system generated***
  - ***Positive externalities and Spillovers***
  - ***Tacit (implicit) and Communicable (explicit)***
  - ***Patentable***
  - ***Non rival, non exclusive in consumption (Public Good)***
  - ***Becomes obsolete with time***
  - ***Continuous process***

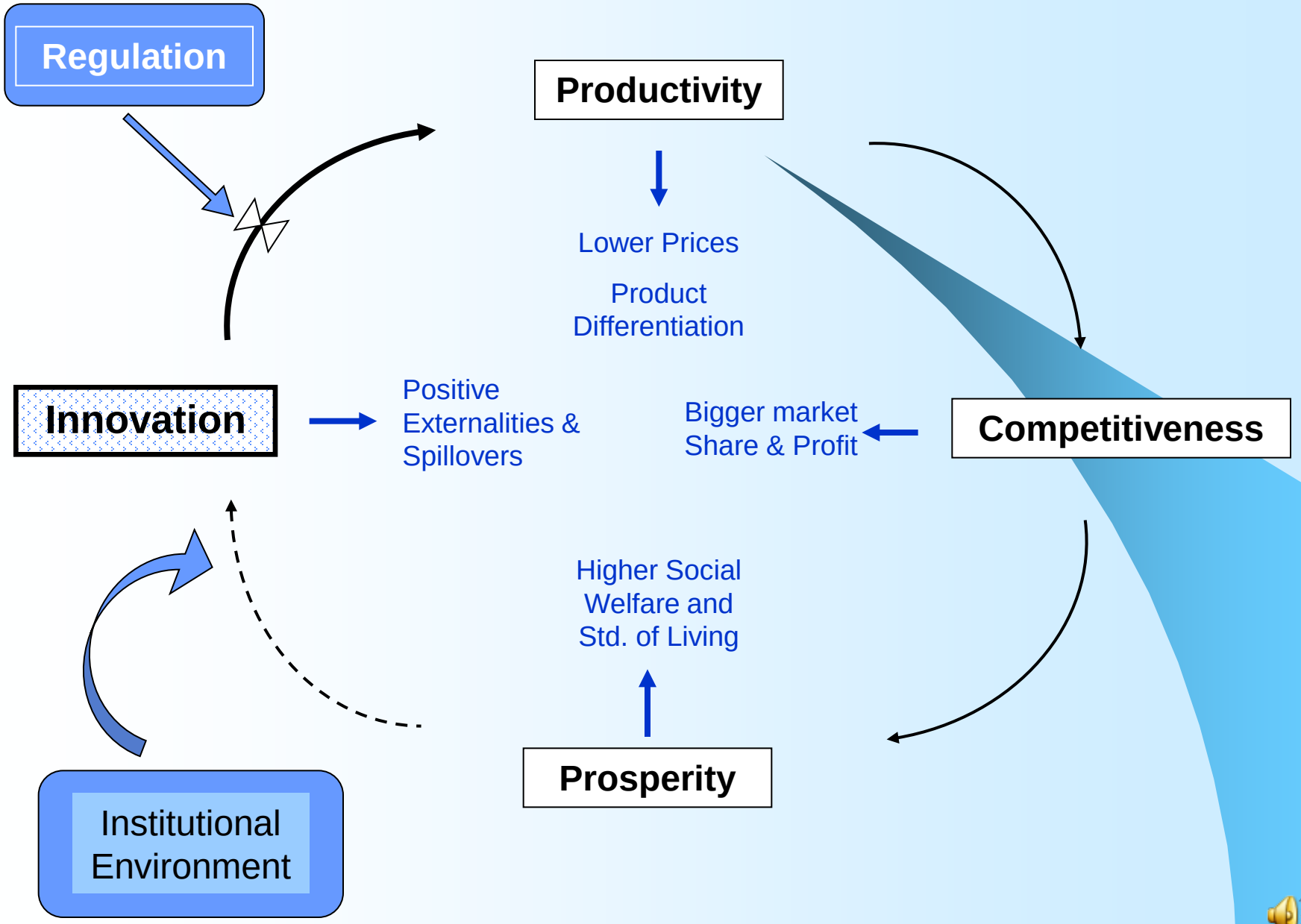
Biotechnology

- Agricultural BT, Agroceutics, Bioceutics, Nutraceutics, Bio Therapies are silently leading the process of knowledge creation; not only in "quantitative" terms, but in "qualitative"
- Biotechnology is a very important component of the Agrifood Value Chain, impacting on Productivity, Competitiveness and Prosperity
- Regulation is also an important element of the Chain, and therefore its "quality" affects not only the rate of knowledge creation, but the rate of its dissemination
- Innovation is the purpose and consequence of Biotechnology

Innovation

- ***"The implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in business practices, workplace organization or external relation" (Oslo Manual, OECD and Eurostat, 2005)***
- ***"…of a new or improved institutional instrument or practice"***
- It consists in the APPLICATION of knowledge to "create" value for consumers or individuals, and hence the creation of WEALTH
- Science and Research are essential components of the Innovation System, as "scientists and researchers"
- Rarely occurs in ISOLATION, it's a interactive and multidisciplinary process, where cooperation and trust play a significant role.
- Ultimately, INNOVATION is the application of Knowledge to satisfy, directly or indirectly the NEEDS of consumers

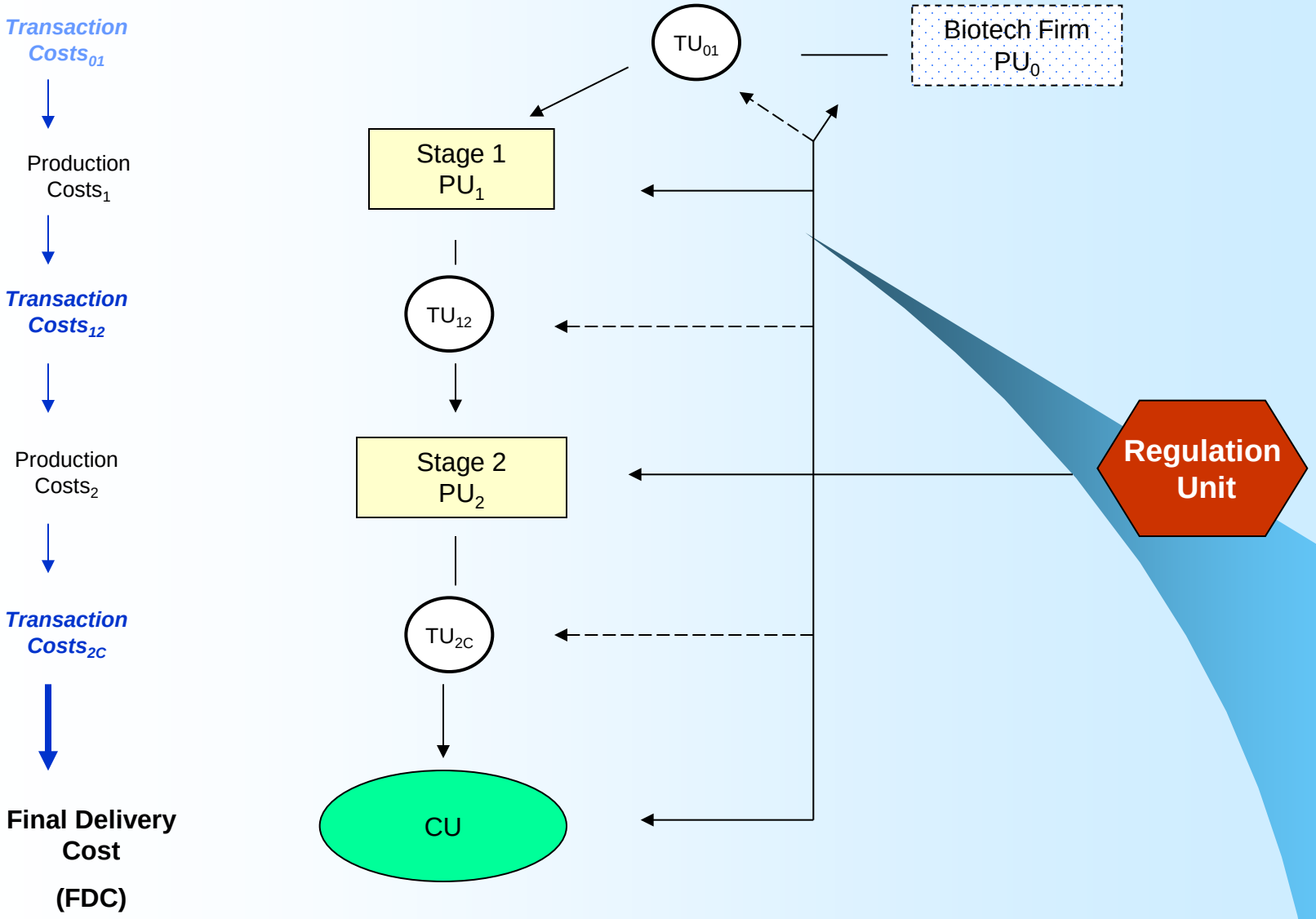
The Virtuous Cycle of Knowledge & Innovation
The KNOWLEDGE Paradigm


Regulation
Productivity
Lower Prices
Product Differentiation
Innovation
Positive Externalities & Spillovers
Bigger market Share & Profit
Competitiveness
Higher Social Welfare and Std. of Living
Prosperity
Institutional Environment

Regulation

- Is the activity, acts or instruments that constrain the conducts or behaviour of individual, firms, government agencies and organizations in a certain industry or socioeconomic system
- The purpose is to limit the available options, courses of action or alternatives for an individual or organization
- In this Workshop the Rules of the Game: Laws, Norms, Directives, Resolutions that apply to Animal Biotechnology.
- How REGULATION impacts the Chain?
- On and through Production and *Transaction Costs*
- Transaction Costs:
  - "The cost of Social or Human interaction" (North)
  - "The cost accrued to a Transaction Unit or the economic sacrifice to realize or perfect a Transaction, e.g. exploring prices, acquiring information, **REGULATION**, negotiating contracts, writing contracts, enforcing contracts, taxes, charges, corruption, **Risk/Uncertainty** and **Ceased Profits** (lucrum cessans) or the cost of the foregone opportunity
- Transaction Unit: the interface of two or more Stages of an Agrifood value Chain

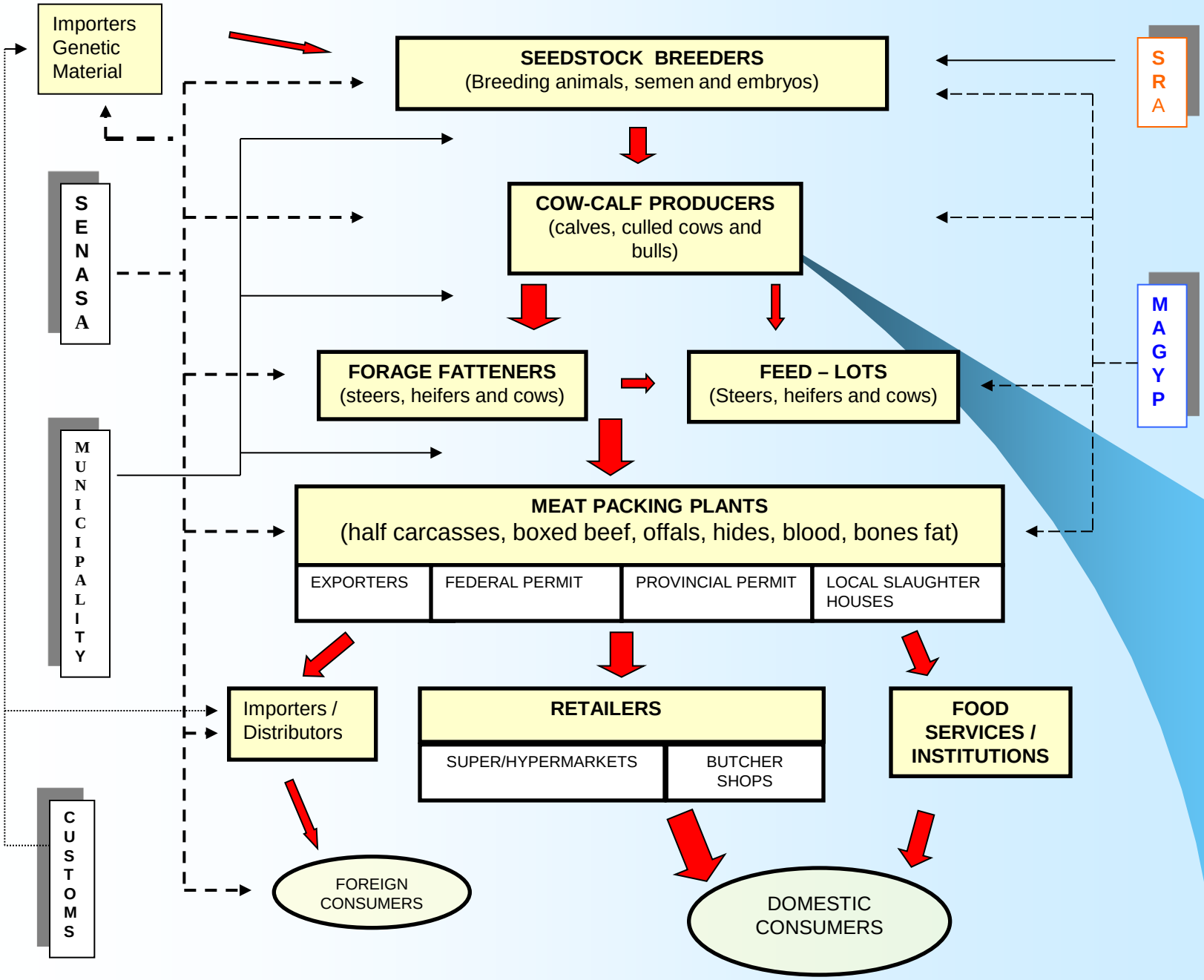
The Institutional Agrifood Value Chain

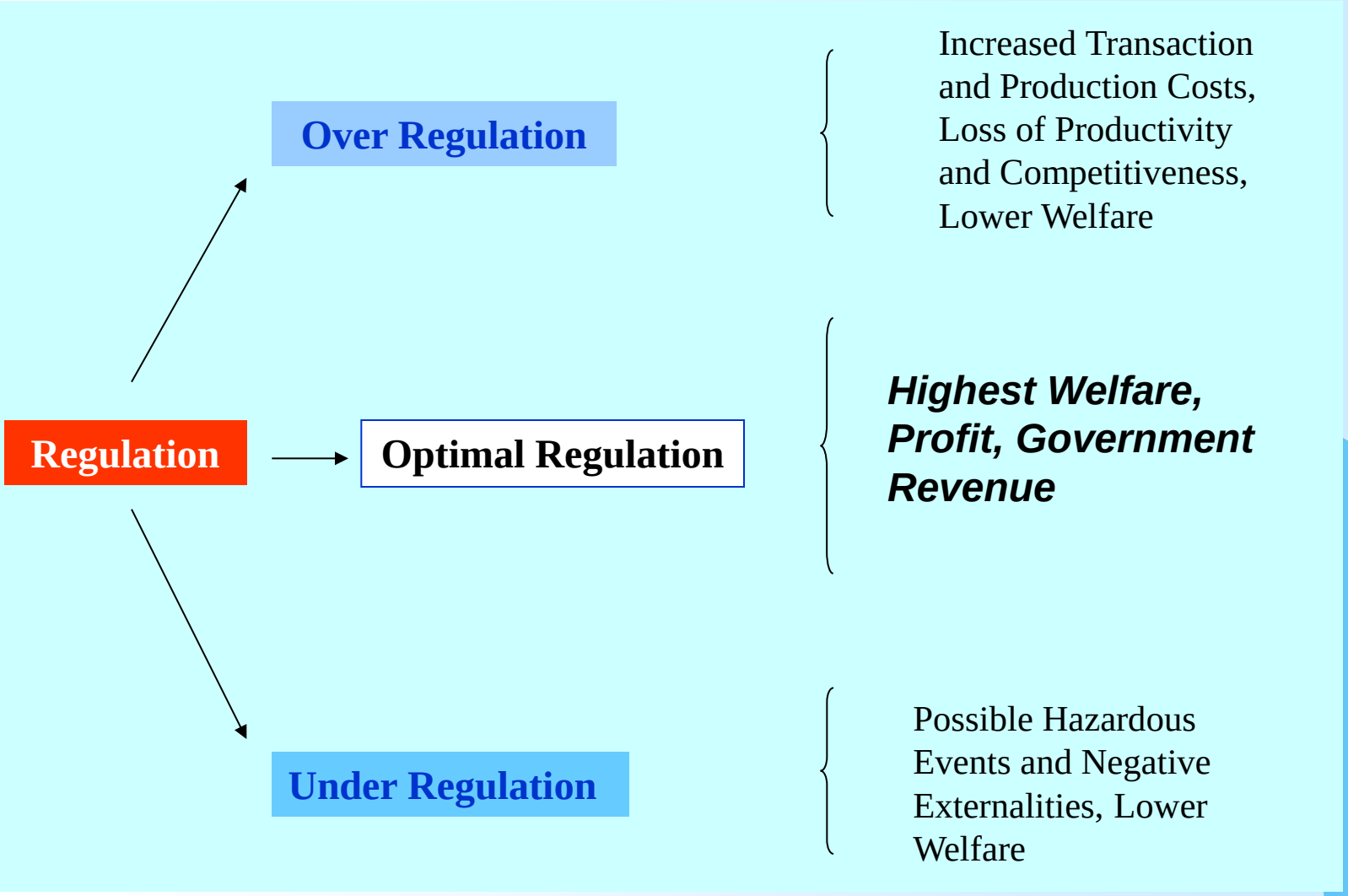


$$FDC = [\sum_{i=0}^{n} PCi + \sum_{j=1}^{m} TCj]$$

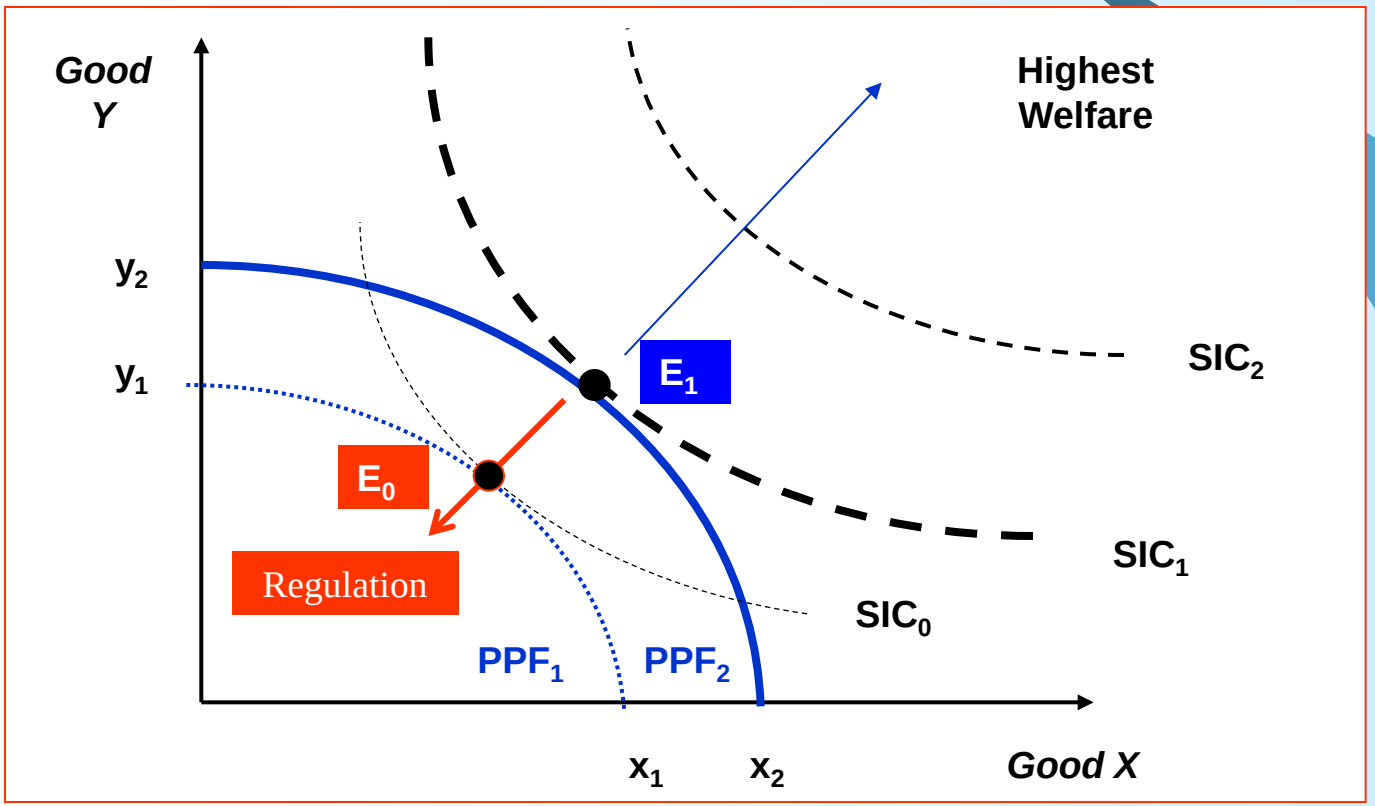
Profit of the Chain = P (End Price) - FDC

The Beef Cattle Chain in Argentina


Importers Genetic Material
SEEDSTOCK BREEDERS
(Breeding animals, semen and embryos)
SRA
SENASA
COW-CALF PRODUCERS
(calves, culled cows and bulls)
MAGYP
FORAGE FATTENERS
(steers, heifers and cows)
FEED – LOTS
(Steers, heifers and cows)
MUNICIPALITY
MEAT PACKING PLANTS
(half carcasses, boxed beef, offals, hides, blood, bones fat)
EXPORTERS
FEDERAL PERMIT
PROVINCIAL PERMIT
LOCAL SLAUGHTER HOUSES
Importers / Distributors
RETAILERS
SUPER/HYPERMARKETS
BUTCHER SHOPS
FOOD SERVICES / INSTITUTIONS
CUSTOMS
FOREIGN CONSUMERS
DOMESTIC CONSUMERS


Over Regulation
Increased Transaction and Production Costs, Loss of Productivity and Competitiveness, Lower Welfare
Regulation
Optimal Regulation
Highest Welfare, Profit, Government Revenue
Under Regulation
Possible Hazardous Events and Negative Externalities, Lower Welfare

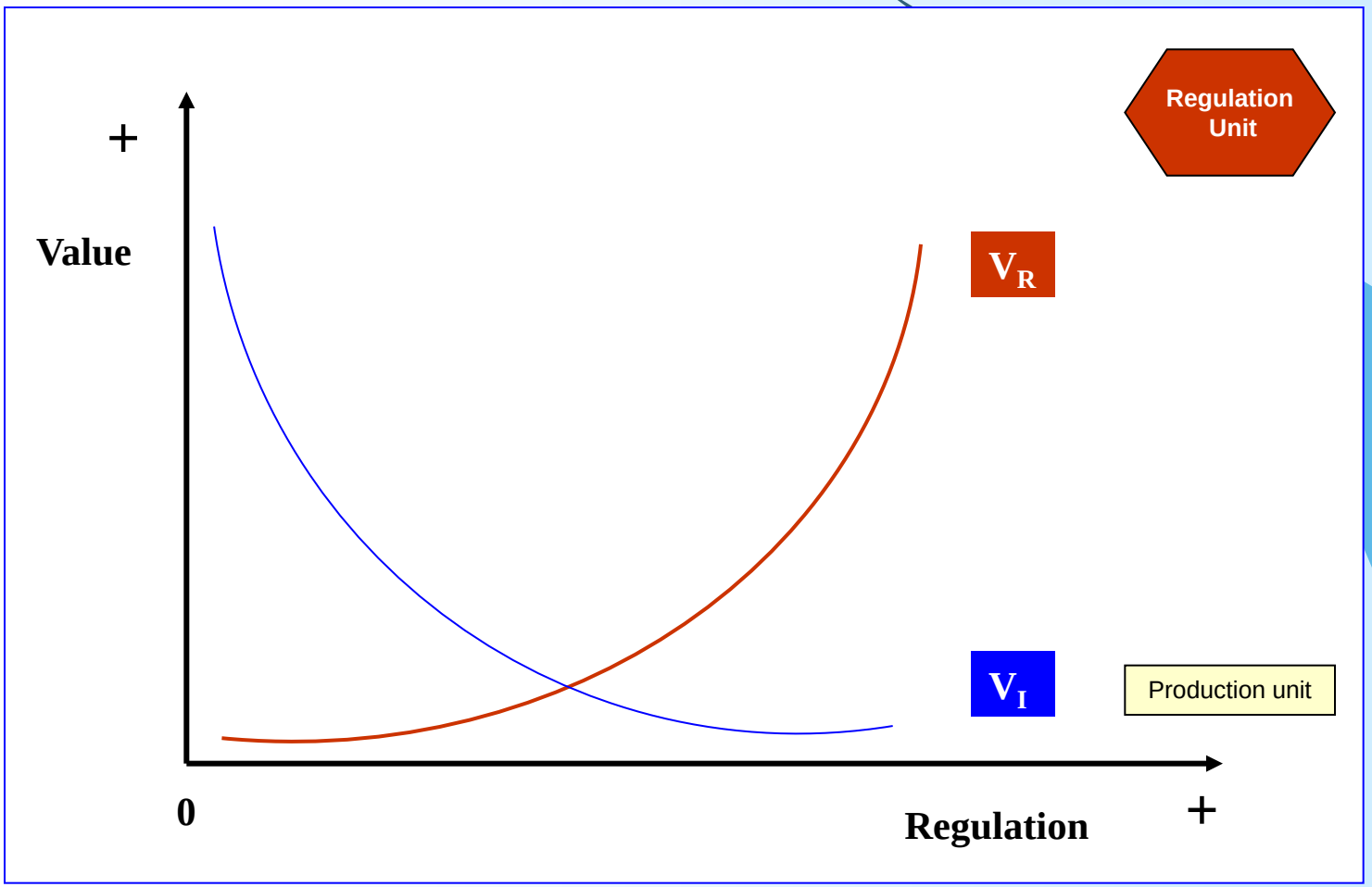
The Effect of Regulation on the Production Possibility Frontier and Social Indifference Curves



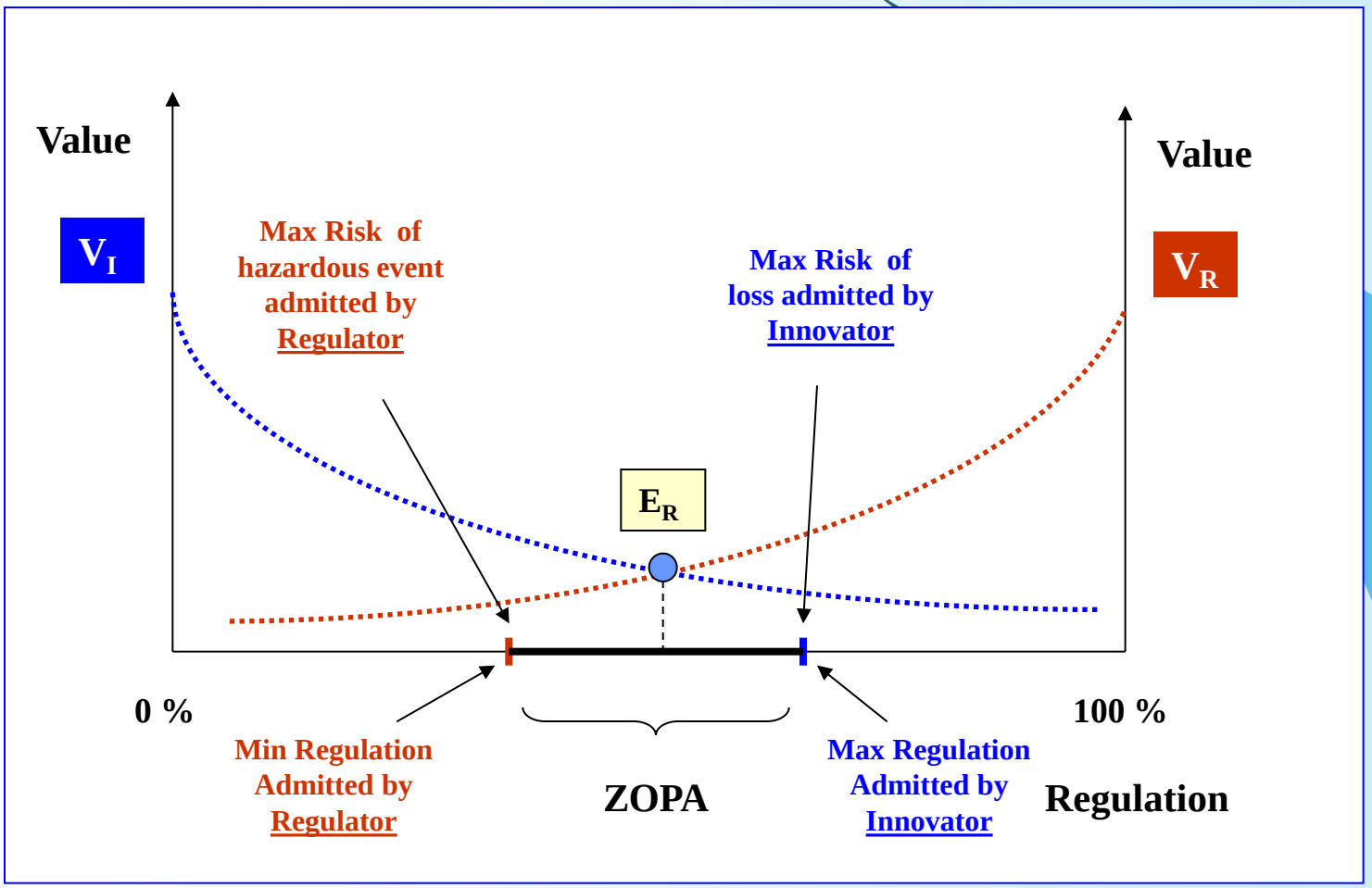
Economic Performance

- Historically "Economic Performance" has strongly been linked with the development of "Institutions and Organizations" that allowed the realization of the gains of technology, knowledge and trade, e.g. UK, the Netherlands (XVII C), USA (XIX/XX C)
- Institutions, Enforcement and Property Rights helped keeping "Transaction Costs" low.
- Co-evolution of Regulation, Property Rights, Enforcement and Technology
- Regulation could be a "constraint" to Technology and Innovation
- Innovators or "Technological Entrepreneurs" play a very important role in the process of Economic Performance, searching for opportunities that allow the satisfaction of consumers needs, with new products or services
- They connect "Knowledge, Science or Technology" with practical applications for society
- Regulations are the limits "Innovators" face in fulfilling these demands
- Value functions for Regulator and for Innovator, inverse behaviour

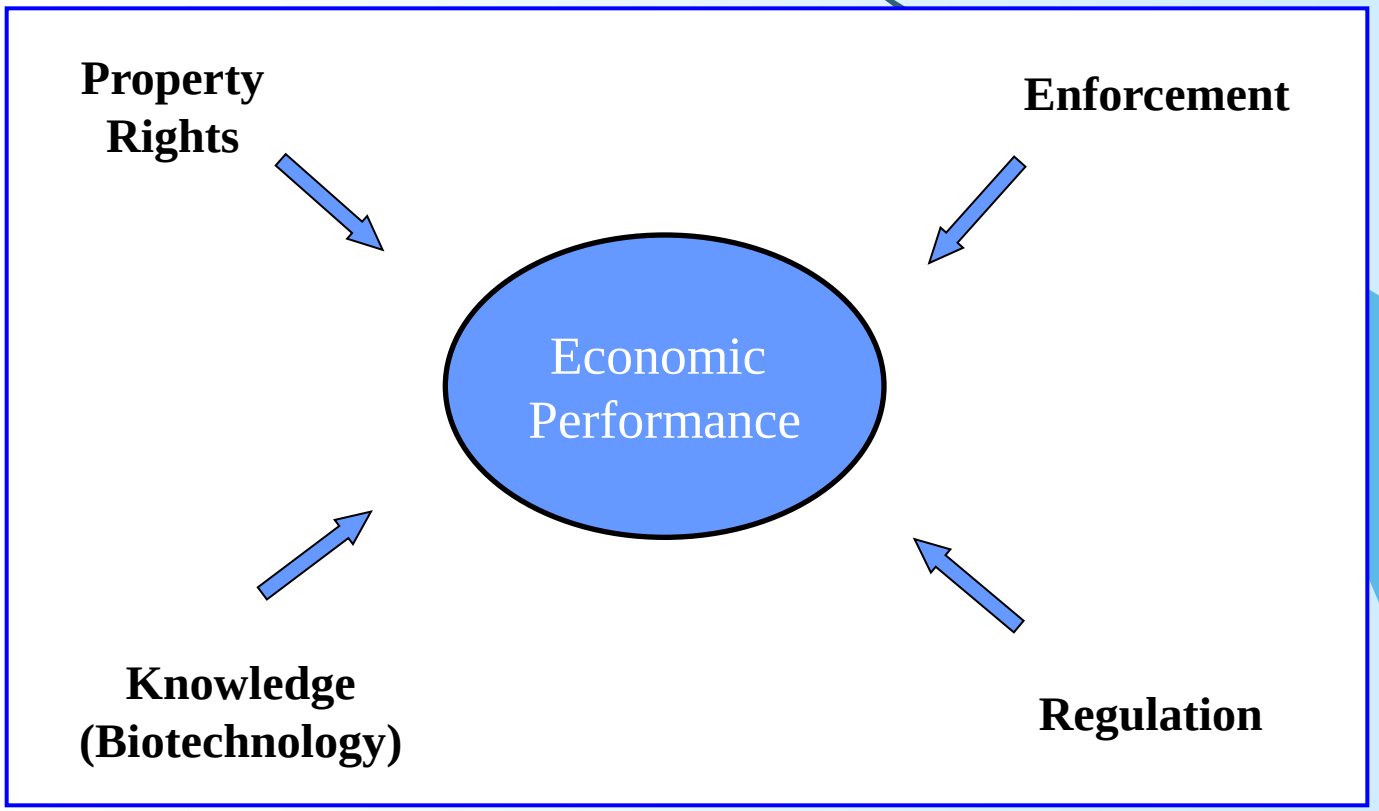
Value Functions for Regulators and Innovators



Set up of a Regulation Scheme



Institutional Factors Affecting Economic Performance of Agrifood Value Chains

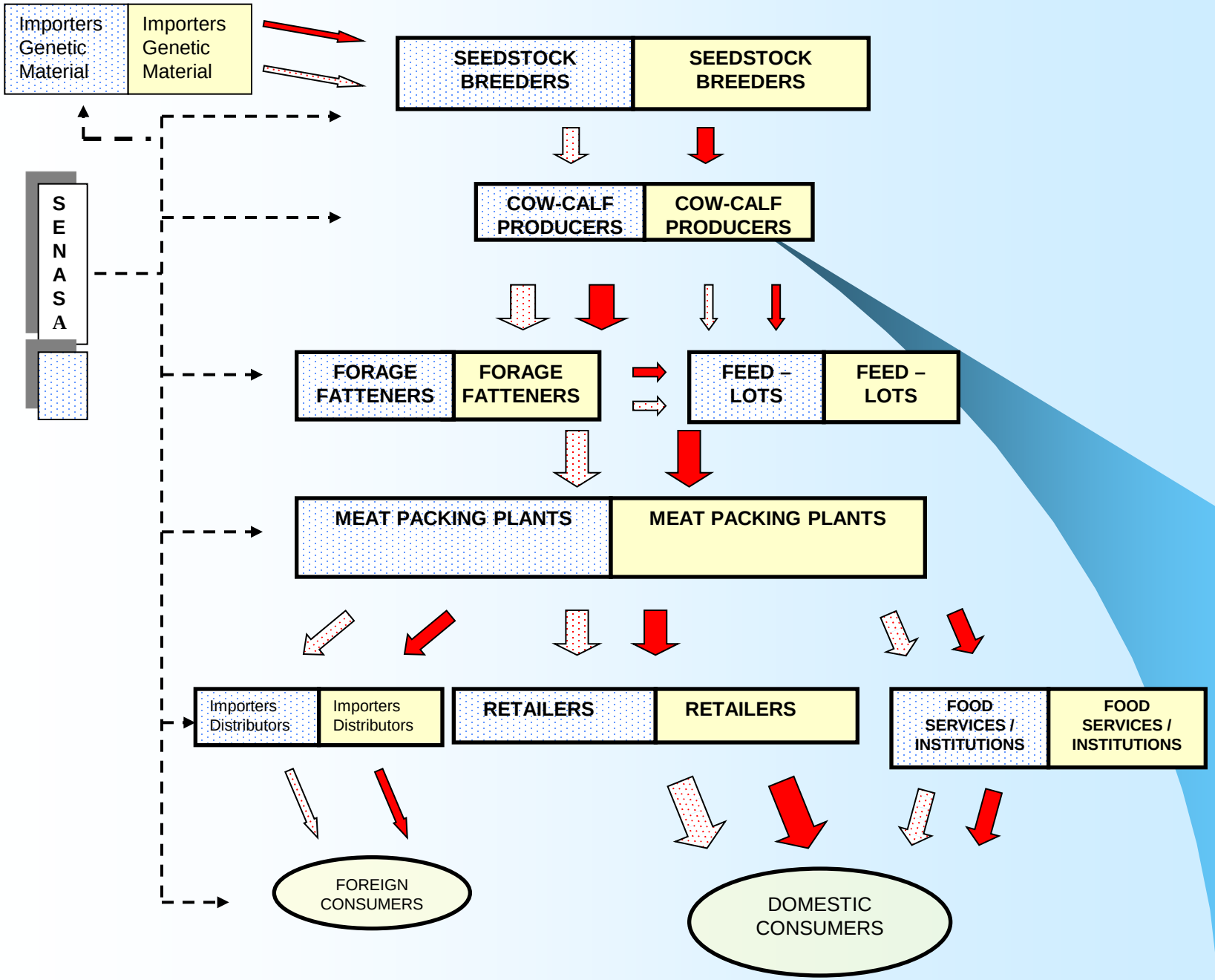


The Impact of Asynchronicity

i) Between Export / Import Countries
ii) Among competing countries

- Cost of segregating organisms, inputs, products, feeds, Practices, processes, medicines along the supply chain
- Differential productivity and competitiveness among chains and countries
- Opportunity cost (ceased profit) and reduced profit
- Uncertainty & Risk for supply chain having some stages under one standard and another stages under another standard
- Loss of potential Productivity & Competitiveness
- Higher prices and lower Gross Production Value (sales)
- Lower Social Welfare because of higher prices, smaller supply and smaller variety of goods
- Different production and commercial standards

Impact of Mandatory Labelling/Prohibition or ASYNCHRONICITY on a Beef Cattle Chain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FOOD SERVICES / INSTITUTIONS
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FOREIGN CONSUMERS
DOMESTIC CONSUMERS

Conclusions I

- Knowledge an important “source” of value creation, competitiveness and prosperity
- Innovators key agents to discover the needs of consumers and apply technology to satisfy them.
- Institutional, Organizational and Management Innovations required to realize gains from Biotechnology

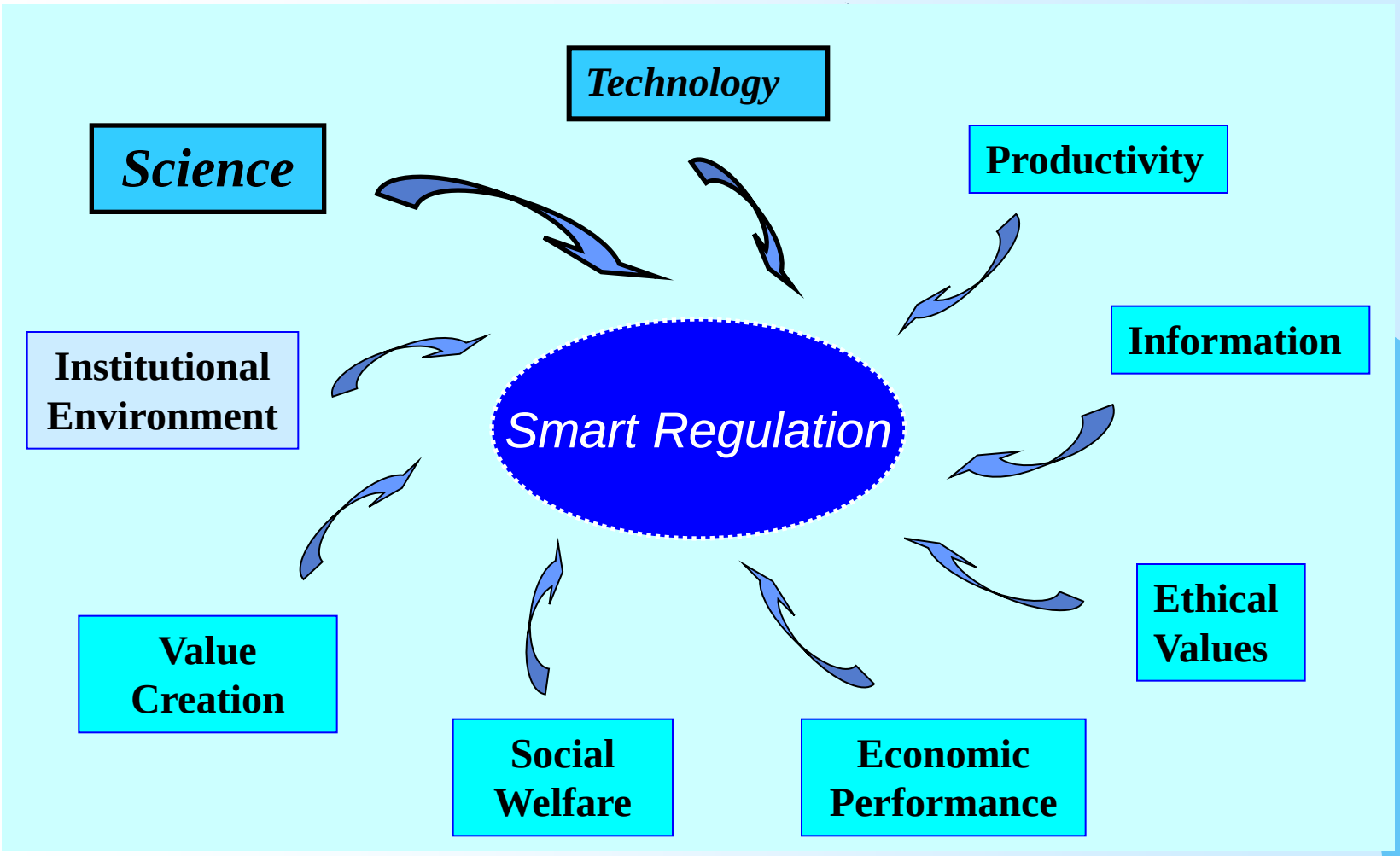
Conclusions II

- Regulation needs to "evolve" synchronically with Technology and Trade to promote Economic Performance
- Regulation: affects the rate of innovation within the chain – Accelerator and Brake of the System
- Importance of Patents and Intellectual Property Rights

Implications

- Biotechnology will re-locate some “manufacturing” processes from urban locations to rural ones, e.g. agroceutics, biofuels
- Biotechnological innovations will represent an important source of “revenue” for the agri-food industry, allowing lower prices for food
- Value adding follows value creation
- Plants, Animals and Microorganisms “manufacturing units” of food, medicines, medical inputs, raw materials and fuels

Proposal for a Regulatory Scheme



Thank You Very Much for Your Attention!

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