

Innovation in the Canadian Agri- Food Sector

David Sparling and Erna van Duren
Dept. of Agricultural Economics and Business
University of Guelph

Presentation made at the
2002 WCC-72 Meeting in Las Vegas

Overview

- Definitions, Dimensions and Process
- Innovation and Policy
- Case Study
- The Future

Innovation

“The introduction of something new”

“Something that deviates from established doctrine or practice... differs from existing forms”



Dimensions of Innovation

- Two main categories
 - Technological
 - » Product/Service
 - » Process
 - Organizational
- Dimensions not independent – varying combinations of all aspects
- Measured along a gradient

Dimensions – Technological Type & Degree of Change

Types of Innovation

Product

Product line extension

New Cancer Drugs

Genetically Engineered Crops

Branded organic products

Product/Process

Enterprise Software Systems Genomic Research

GM crops on farms

Process

Process modification

E-commerce applications

Reengineering

Incremental

Radical

Dimensions - Organizational Degree of Internalization and Timing

Organizational Change and Innovation

Network

Supply Chain Management

Co-developed technology platform

E-commerce applications
Biotechnology commercialization

Internal

Total Quality Management

Web based
New process technology

*Timing relative to
Product Process
Innovation:*

Precedes

Simultaneous

Follows

Managerial Innovation

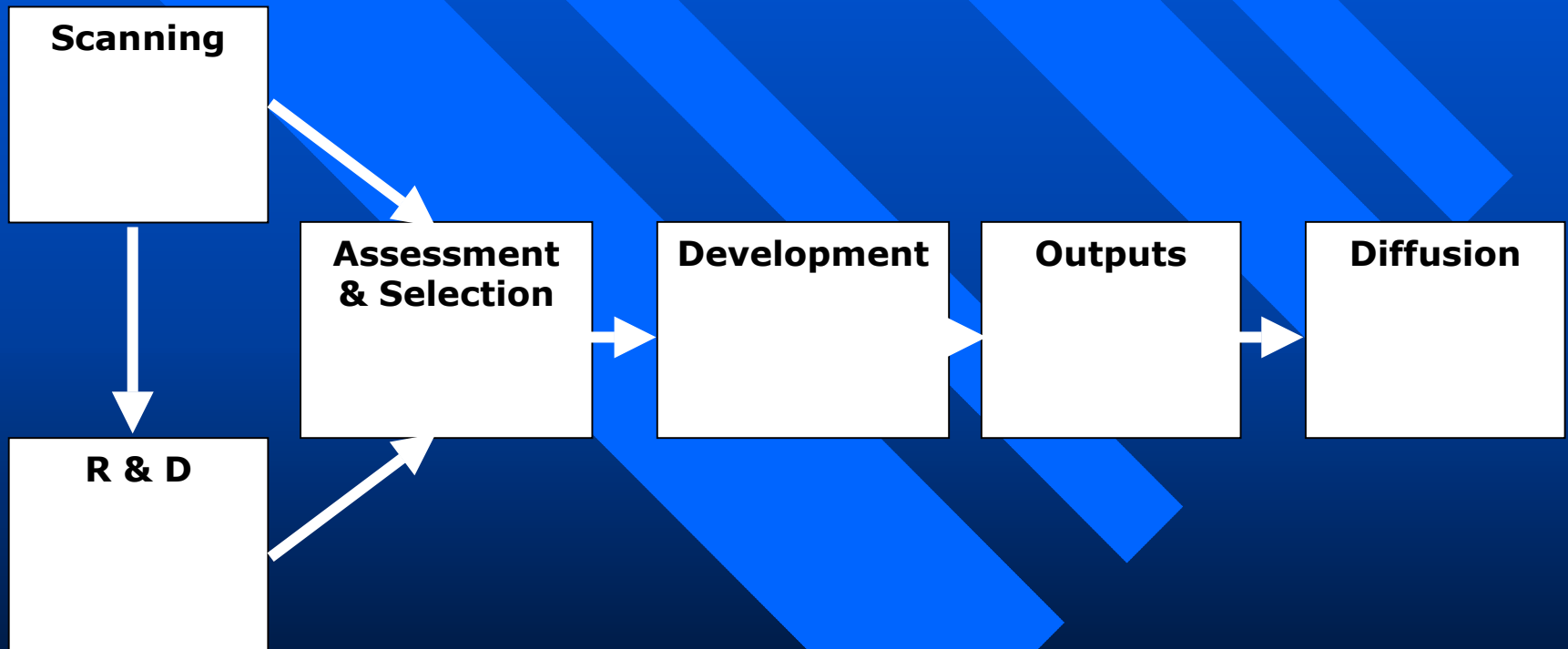
Managerial Adaptation

Innovation Process

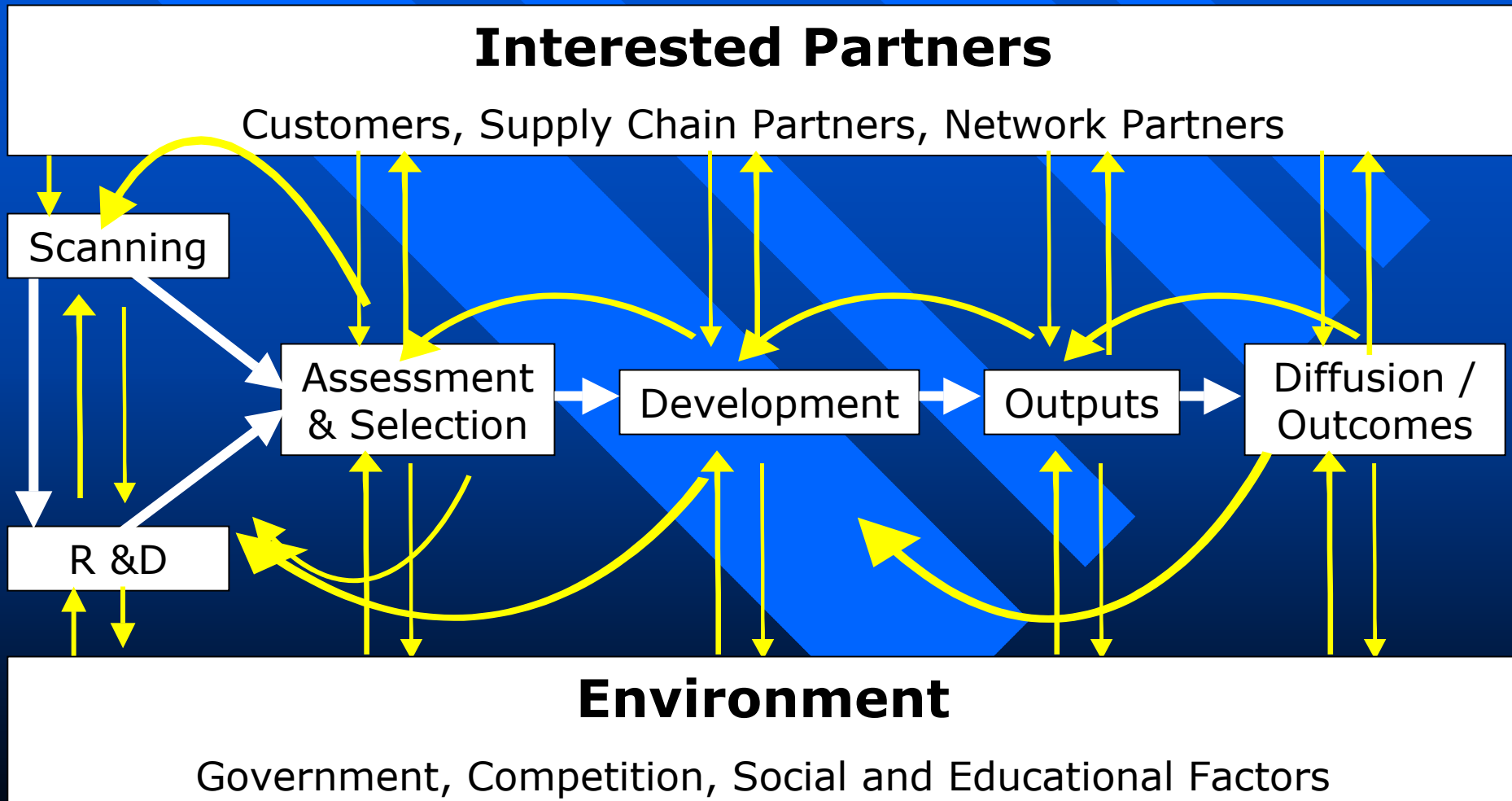
- Innovation models - evolved from linear, technology push models to more fluid, evolutionary models
 - Networks of innovation
 - Feedback loops between different activities
 - Market pull as well as technology push

The Innovation Process

Linear Development Model



Innovation Sphere of Influence



National Systems of Innovation

- Lundvall, 1992
- Includes institutions, organizations and policies which impact a nation's innovative activities and their ability to capture the benefits of those activities
- Evidence that even in a global environment, national policies matter

Innovation and Policy

- Objective - Improve well-being of citizens through economic and social policy
- Innovation is one contributor to economic performance
- Governments want to increase economic impact of innovation - not just innovation for innovation's sake.

Progression of Policy Emphasis

Fiscal & Monetary
Policy – 70-80's



Focus = National Economies
Create the national conditions
that enable industry and
organizational success

Competitiveness
Policy – 90's



Focus = Industries
Create the industry conditions
that enable organizational
success

Innovation Policy
– 00's



Focus = Organizations/Networks
Support internal/network
strategy processes to create
foundations for success

Canadian Incentives to Innovate

OECD 1999 7 Innovation Indicators for G7

Measure	1999 Standing	Growth
External patent applications	5	1
Human Capital Devoted to R&D	5	1
Business Funded Expenditure on R&D	6	1
R&D Intensity	6	1
Technology Balance of Payments	5	6
National Patent Applications	5	4
Government R&D Expenditure	7	3

Policies and Points of Impact

Interested Partners

Customers, Supply Chain Partners, Network Partners

Scanning

Technical/market
Evaluation

Cluster
Formation,
Funding

Technical Assistance,
Taxation on Capital
Spending

Assessment
& Selection

Development

Outputs

Diffusion/
Outcomes

R & D

Funding, Taxation,
Direct R&D

Education and
Training
Strategies

IP Strategies

Trade,
competition
policies

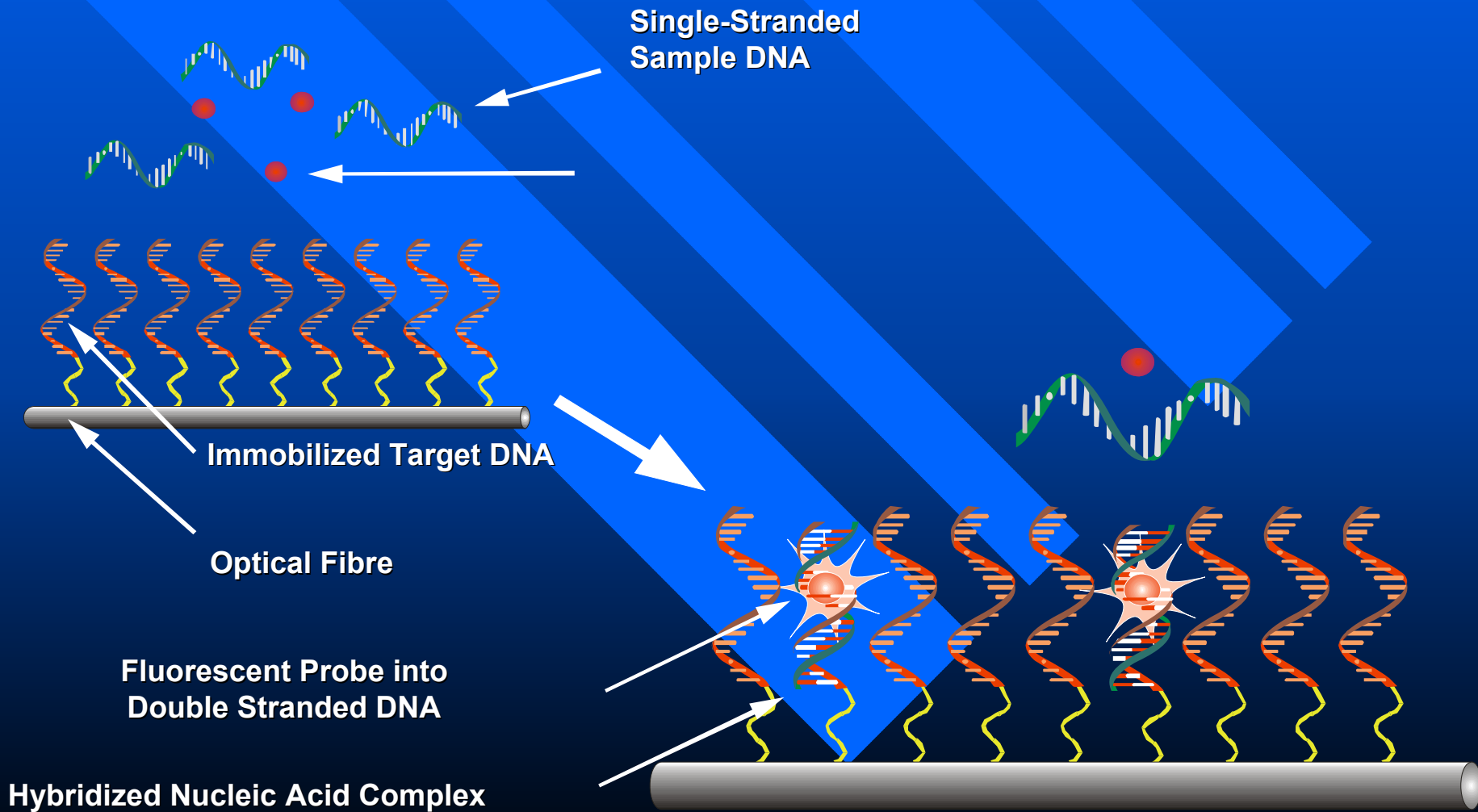
Environment

Government, Competition, Social and Educational Factors

Policy and Innovation Systems

- Policy decisions impact the general innovation system
 - IP, education, investment
- They can also target specific components or activities of the system
 - tend to be technology focused

Case Study – FONA DNA Identification Technology and Policy Impact



Policy Impacts on New Technology

- Idea Generation – R&D *mid- 1990's*
 - Created at U. of Toronto
 - Funded by National Science Research Council
- Transfer out of University
 - Encouraged by University policy
 - Licensed to small diagnostic firm
 - R&D funding by firm – refundable tax credit
- Patents initiated *1998*
- Search for partners through Agri-food Quality Cluster *1999*

Industry R&D

- FONA - Hiring supported by Industrial Research Fellowship *2000*
- FONA scientists located at U of T
- Development research supported by grants and R&D taxation support

- Funding secured from firm partners
- Application partners sought – partner in food and environment – both provided funding
- Canadian VC funding environment and technology crash eliminated access to venture capital

Sale to Technology Partner

- 2001 – FONA sold to instrumentation partner
 - Virtek Vision International Inc
 - Facilitated by taxation laws
- Virtek/FONA Development
 - Supported by R&D taxation laws
 - Continuing relationship with U. of T. research team
 - Reach forward to application partners – driven partially by funding opportunities
 - » Applications in environmental testing and genomics
 - » Separate funding initiatives, partners and applications - common core

Technology component	Innovation	Responsibility
<i>Fibers and Chemistry</i>	Radical, incremental dyes	FONA, U. of T.
<i>Laser Reader</i>	Incremental to ChipReader	Virtek, contract scientists
<i>Sample preparation</i>	Incremental to existing kits, Radical	FONA, Virtek, microfluidics partner & testing lab partners
<i>Application development</i>	Incremental in target selection	FONA/Virtek and testing partners
<i>Diffusion to testing labs</i>	Radical, organizational	Distribution partner, customers

Dimensions – Product/Process and Incremental/Radical

Type of Innovation

Product

Product/Process

Process

ChipReader

DNA Fibres

Dye Chemistries

Sample Prep.

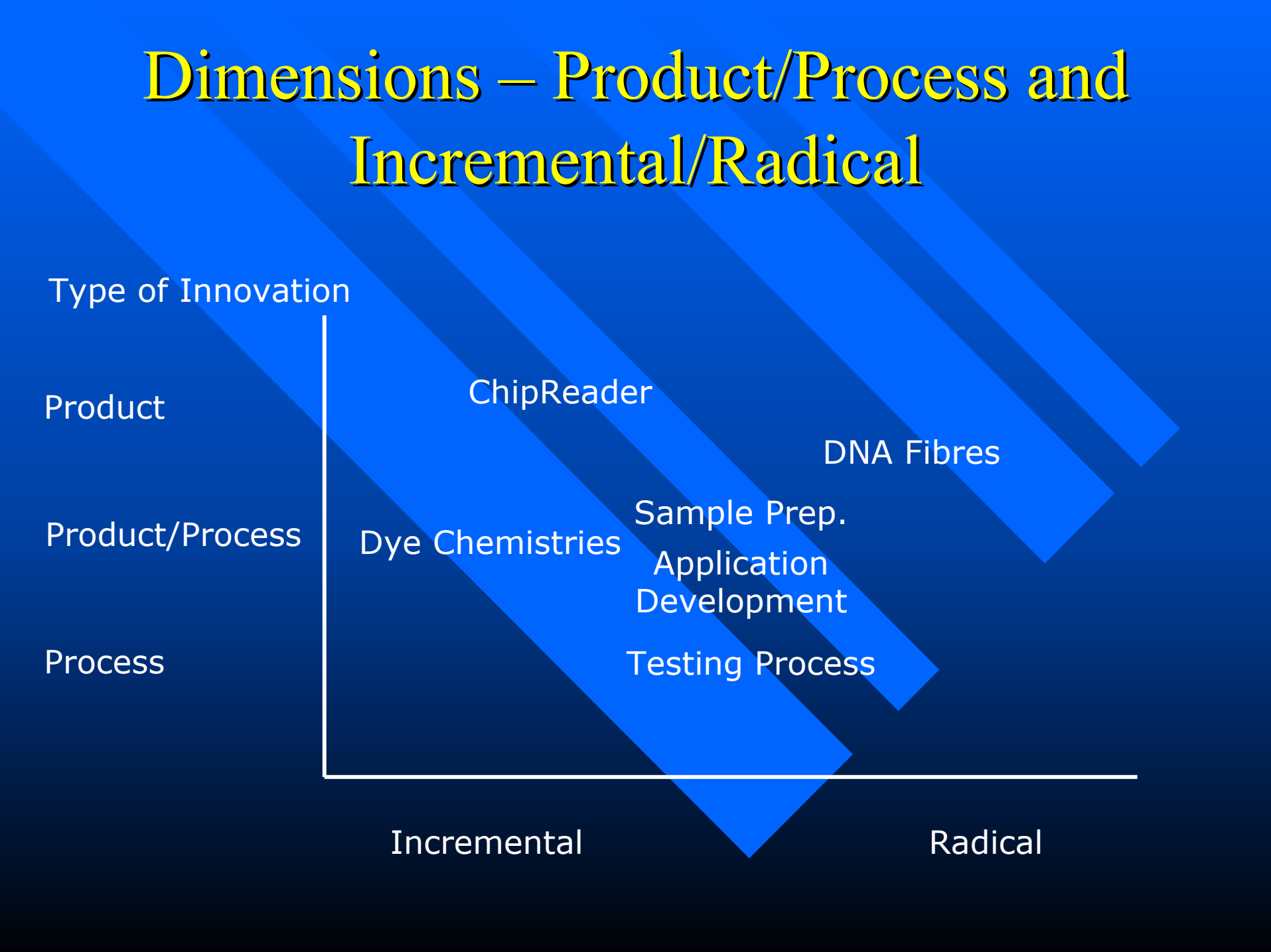
Application

Development

Testing Process

Incremental

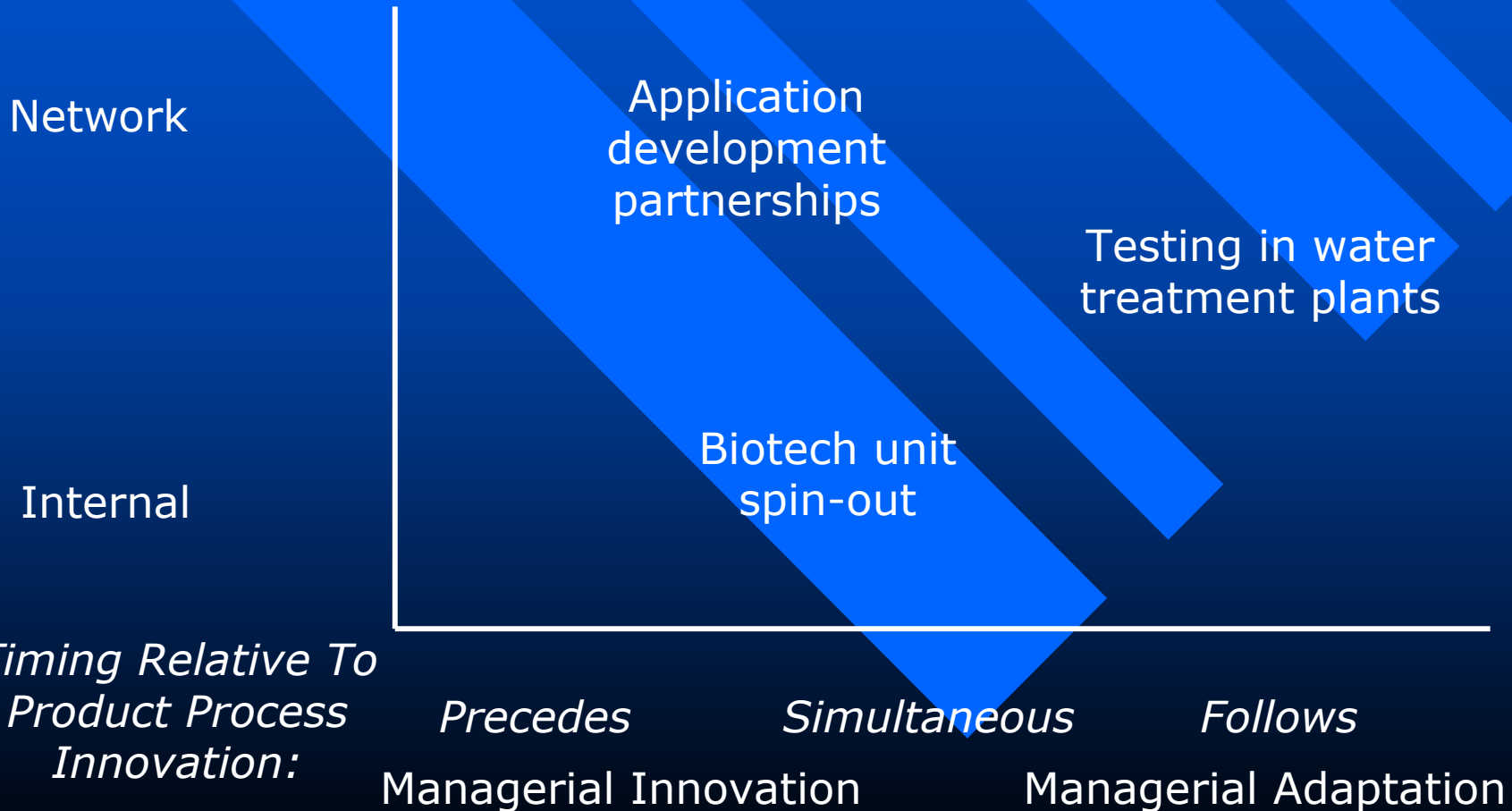
Radical



Innovation and Organizations

- Timing and Degree of Internalization

Organizational Change and Innovation



Conclusions

- Innovation is complex activity requiring internal and external resources
- Issues around managing knowledge transfer between organizations
- Support policies differ for
 - innovation leadership vs diffusion
 - organizational vs technological
 - different industry segments and levels of the supply chain
 - different competitive priorities
- Innovation process can be learned – how do we transfer what we learn

Future for Agri-Food Innovation Policy in Canada

- Canadian White Paper on Innovation
- National Forum on Innovation Management in Canada – Nov. 2002
- Agribusiness Input – Workshop in September
 - Identify priority areas
 - Identify special needs for agri-food
 - Set research agenda