
ABIC 2007 Conference

Session: Challenges for Success – Regulatory, Trade and Investment

***AgBiotech is About to Move to Center Stage
...Move Over Medical Biotech***

Sano Shimoda

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Calgary, Alberta, Canada
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The Power of BiInnovation

A Strategic Perspective

“We believe that we are on the brink of a technology-driven restructuring of agriculture, one that will lead to a reshaping of agriculture and agribusiness on a scope that is truly revolutionary. The driving force behind these changes is agricultural biotechnology...”

We expect to see a transformation in investors perceptions of agricultural biotechnology – from an industry of promises to a proprietary growth industry – as well as agriculture – from a mature industry to a new technology-based growth industry.”

Sano Shimoda

“Commentary on Agbiotech”

Bio/Technology, November 1994



Agriculture and Biotechnology – Limited Investor Opportunities

Agriculture and Biotechnology/Technological Innovation Have Been a Limited Investment Driver Over the Last 10 Years

- ❖ **Impact of the Successful Commercialization of AgBiotech Traits Has Largely Benefited Conventional Agriculture at the Farm Gate – Trait development/commercialization has largely been limited to input traits (focus - herbicide tolerance and insect resistance)**
- ❖ **Investors Have Focused on a Limited Number of Companies - Success in commercializing biotech traits over the last decade has been driven by a small number of agbiotech/seed companies, represented by a “who’s who” in the crop protection/seed business:**
 - o **BASF**
 - o **Bayer CropScience (Bayer)**
 - o **Dow AgroSciences (Dow Chemical)**
 - o **DuPont/Pioneer Hi-Bred**
 - o **Monsanto**
 - o **Syngenta**

(Excludes a small group of private agbio companies)



New Mega-Markets for Investors – A New Agriculture???

Investors Stand at the Edge of New Mega-Market Opportunities

Agriculture Combined with Biotechnology/Technological Innovation

- ❖ Edge of creating new technology-based, market-driven solutions to Four Global Strategic Challenges
- ❖ Ag-related business opportunities have the market potential to surpass Medical Biotech Markets, which have dominated both corporate and investors' mindsets

Biotechnology - “Integrated Innovation” Between Agriculture and Broad Industrial/Consumer Markets

Biotechnology - Drivers of Broad Integrated Mega-Value Creation

- ❖ Biotech/Genomics/Seed – Direct/Indirect application of AgBiotech
 - o Enhanced breeding - Molecular breeding
 - o Biotech traits - Yield, traits (input, output, agronomic)
 - o Plant engineering – Plant modification
- ❖ Biotech/Enzymes – Products produced from ag/plants



Investors' Mindset – Medical Biotech vs. Yesterday's Agriculture

Investors' Framework

HOW Investors Think About Investing in Medical Biotech

Lessons – Investor's Optimistic View of Medical Biotech

- ❖ **Large market potential – Example: cancer**
- ❖ **Visible growth - Driven by unmet priority-based human needs**
- ❖ **Technology-based products – Example: pharmaceuticals**
- ❖ **High profit margins – Patented technology-based products**
- ❖ **Visible value capture – Example: sale of a pharmaceutical product**

Wall Street Investors Like and Will Pay For (Valuation Premium)

- (1) Large visible market potential based on unmet demand-driven needs**
- (2) High growth potential**
- (3) Proprietary technology that creates above-average profit margins and value sustainability**

Medical Biotech Fits What Investors Like!



Investors' Mindset – Medical Biotech vs. Yesterday's Agriculture

Framework

HOW Investors Have Looked at Investing in Agriculture and Biotech

Investor's Historical View of Agriculture – Limited Overall Enthusiasm

- ❖ Markets – Large commodity markets, dominated by food production
- ❖ Growth – Limited growth, mature markets
- ❖ Technology-based products – AgBio traits have started to redefine growth, but investment vehicles have been limited
- ❖ Profit margins – Generally low-value commodity margins
- ❖ Value capture – Value visibility limited by variable commodity supply demand factors, seasonality, environmental impacts

Investors' enthusiasms for AgBiotech has largely focused on a small number of companies, of which Monsanto stands out, due to its success in building its global trait and seeds businesses

For Investors, Agriculture Has Largely Meant Food



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Framing New Investment Opportunities in Ag – A New Mindset

New Demand-Driven Ag/Biotech-Related Market Opportunities Will **STRATEGICALLY** Change **HOW** Investors Think About Agriculture

SO WHAT IS CHANGING FOR INVESTORS?

Investor's Focus - New World of **Integrated** Biotech-Driven Agriculture

- ❖ **Market potential** – Large global demand-driven mega-markets
- ❖ **Growth potential** – High growth driven by large global market needs
- ❖ **Technology-based products** – Developing biotechnology-based products and NEW integrated markets (derived from patented biotechnology and related technologies)
- ❖ **Profit margins** – High margins will be driven by INNOVATIVE INTEGRATED BUSINESS MODELS that link the farm gate to downstream industrial and consumer markets
- ❖ **Value capture** – Greater value capture visibility, based on patented, technology-based products and **integrated** business models

***AgBiotech is About to Move to Center Stage
as a Major Investment Driver***



The Key Challenge – Transforming Investors' Mindsets

**Critical to Understanding Future Business Opportunities
Created by a New World of Biotechnology-Driven Agriculture is
“Mindset”**

Mindset reflects:

- ❖ **HOW one THINKS about the world we live and the global strategic challenges and unmet market needs**
- ❖ **HOW one THINKS about how Agriculture, combined with technological innovation and biotechnology, can create mega-market business solutions to meet these challenges**
- ❖ **HOW one RETHINKS about how Agriculture and Industry must **STRATEGICALLY EVOLVE** to take advantage of the future**

***The Road to Investing in the Future of Agriculture
It's All About Mindset - A New Paradigm of Thinking***

**Broad Investment Opportunities Will Driven By “Integrated Innovation”,
Linking Agriculture to Developing Mega-Markets**



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The Challenge – Capitalizing On the Future

**The Strategic, Global Market Reach, and Economic Power of
Agriculture/Plants are Being Transformed NOW**

Future of Agriculture Has NEVER Been Greater

- ❖ ***New Growth Opportunities***
- ❖ ***Ability to Create New Mega-Markets***
- ❖ ***Potential to Redefine Ag-Derived Profitability***

**Future business/financial REWARDS will go to those
Companies and Investors that:**

***Challenge Their “Mindsets” to
Capitalize on Transformational Change***

**New Ag/Biotech-Related Mega-Market Opportunities
Could Surpass the Potential of Medical Biotech Markets**



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Catalysts of Change – Create Unrivaled Market Opportunities

Agriculture Stand at the Edge of a New World:

- (1) Create New Mega-Markets of Unrivaled Dimensions
- (2) Catalyze a Strategic Transformation of Agriculture and Linkages to New and Existing Large Markets

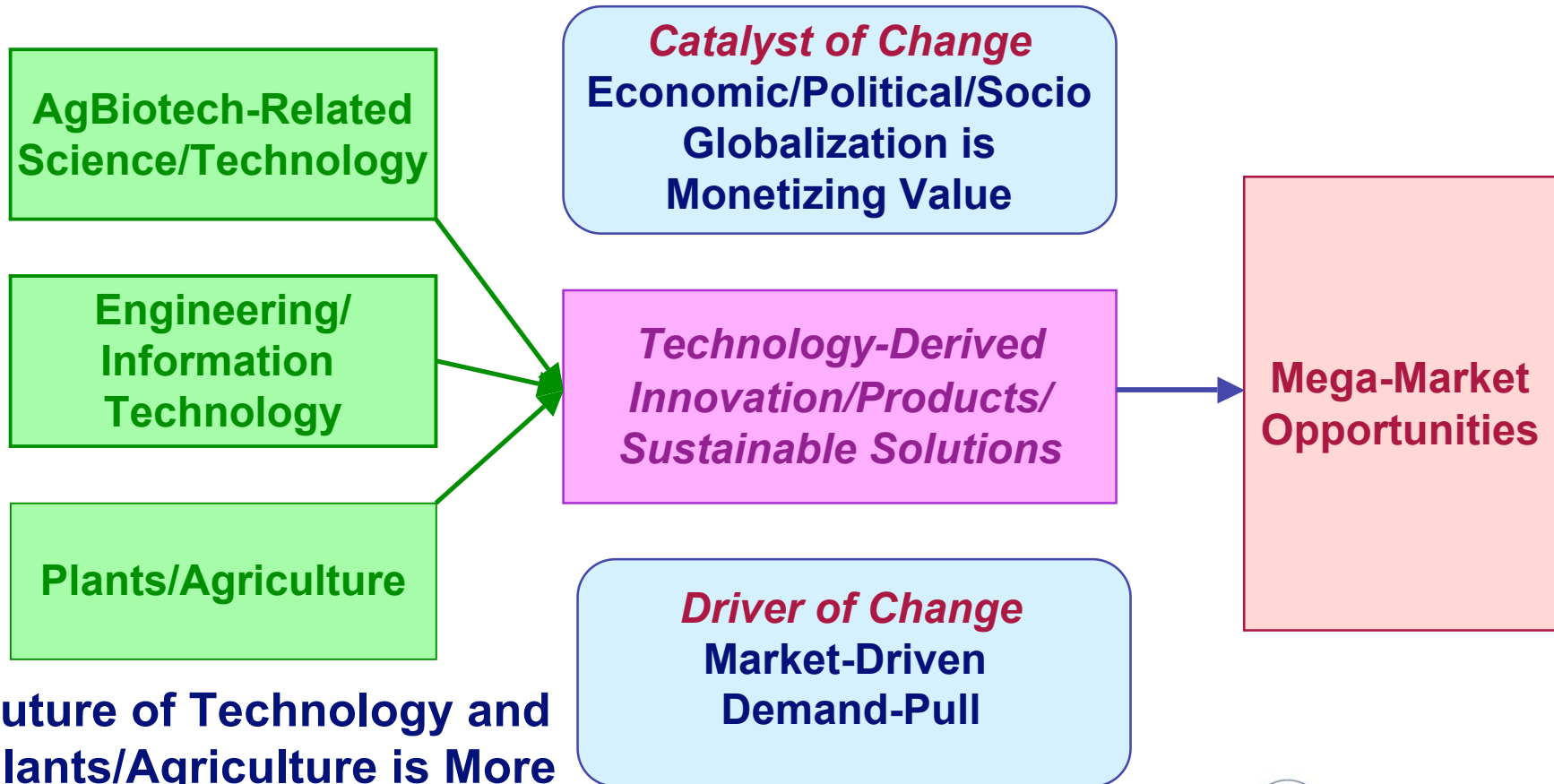
Catalysts of Change: _

- Global Strategic Opportunities - Demand-driven mega-market potential
- Sustainability – Need for new sustainable solutions
- Technology/Innovation – Dynamic new technology-based market-driven solutions
- Globalization – Redefining global economic/political/socio linkages are monetizing value
- Capital - Large technology-based, mega-market opportunities will be a magnet for global capital from inside/outside agribusiness



The Drivers - Global Market-Driven Socio-Economic Needs

Ag-Related Science/Technology and Plants/Agriculture are Creating New Market-Driven Solutions to Meet Strategic Global Challenges



Future of Technology and Plants/Agriculture is More Than Just Food Production



Today's Challenges Creates Tomorrow's Ag Opportunities

Ag-Related Technologies (Including Ag-Biotech) Have the Potential to Contribute Market-Driven Solutions to Four Global Strategic Challenges

BioEnergy

New renewable/sustainable non-oil based BioFuels

BioMaterials

New renewable/sustainable materials

BioEnvironment

Reduce the impact of global warming/GHG

BioHealth

Prescriptive "Wellness" focus on nutrition/health

"The Perfect Storm"

- New demand-driven mega-market opportunities
- Redefine value-creation
- Create new higher, more profitable growth dynamics
- Shift the drivers/dynamics of profit generation



Agriculture and Technology – Solutions to Strategic Challenges

Agriculture and Long-Term Biotechnology/Technology Development Have the Potential to Contribute Meaningful Solutions to the Four Strategic Challenges Facing the U.S, as well as the Rest of the World

BioEnergy – Create new renewable, low-cost, market-driven, sustainable, non-oil based energy sources, that could: (1) lower U.S. energy cost structure, (2) shift to low-carbon fuels; (3) enhance U.S. competitive position, and (4) strengthen U.S. security of supply

BioMaterials – Create new renewable, market-driven, sustainable materials with improved product price/value-added characteristics

BioEnvironment – Reduce the impact of global warming/greenhouse gases, shift to a low-carbon footprint, and offset the growing direct/indirect monetary cost penalties impacting industry and society

BioHealth – Reduce the rise in health care costs through a prescriptive focus on nutrition/health, reflecting a shift in emphasis in U.S. health care policy (including corporate/insurance incentives) towards “Wellness” and preventative health care

Framework - U.S. Perspective



BioEnergy – Ag/Plant-Based BioFuels Are a “Game Changer”

- Drivers:**
- (1) Key - “U.S. Energy Strategy”
 - (2) Goal - Create market-driven sustainability
 - (3) Redefine - U.S. energy cost structure
 - (4) Contribute - U.S. energy security

- Framework:**
- (1) U.S. BioFuels policy - Driven by “ag support/rural development policies”, not co-ordinated “energy policy”
 - (2) Priority - “Energy efficiency”, including a mega-increase in auto engine efficiency (CAFÉ* standards)
 - (3) Market-driven - Competitive with \$25-30/bbl oil (without LT subsidies) in a world of volatile oil prices - \$30-70+/bbl

- AgBio**
- (1) Ag-based/biomass-based ethanol (biobutanol?)/biorefinery
- Related:**
- (2) Integrated enzyme crops (e.g., Syngenta’s amylase corn)
 - (3) Plant modification to enhance biofuel production
 - (4) Cellulosic ethanol – Major engineering/technology hurdles

*CAFÉ – Corporate Average Fuel Economy

Framework - U.S. Perspective



BioMaterials – Opportunity to Create New Value-Added Growth

Drivers:

- (1) New products - Improve cost-price/performance/value-added**
- (2) Sustainability - Use of renewable materials**
- (3) New businesses – Large markets and growth**

Framework: Replace hydrocarbon based polymers/chemicals

AgBio

- (1) New renewable polymers/chemicals**

Related:

- (2) Modify plant substrates - Enhance cost/value benefits**
- (3) Plant integrated enzymes - Enhance fermentation economics**
- (4) Plant-based (corn) polymers:**
 - Operational – NatureWorks (Cargill) – PLA-based polymers**
 - Sorona (DuPont) – 3 GT-based fibers/polymers**
 - Under development (2008) – Telles (Metabolix/ADM) – PHA-based polymers**

Framework - U.S. Perspective



BioEnvironment – Opportunity for Ag to Monetize Value

Drivers: (1) Reduce - Escalating impact of global warming/GHG
(2) Offset - Growing direct/indirect socio-economic derived environmental cost penalties

Framework: (1) Environmental benefits - Sustainable/renewable materials
(2) Monetize value - Direct/indirect environmental benefits of agriculture-based products/production agriculture

AgBio Related: (1) Development of sustainable/renewable BioFuels/BioMaterials
(2) Plants/agriculture could play a major role in the global focus on “global warming” by reducing the growth in greenhouse gases, IF technology focuses on “low carbon footprint”

- o Carbon Sequestration – Ability of plants/crops to sequester carbon dioxide in the ground (carbon credit benefits?)
- o BioFuels – Replacement of conventional oil-based fuels with low-carbon footprint BioFuels
- o Carbon Tax/Carbon Credit System - Benefit from the creation of a market-driven system

Framework - U.S. Perspective



BioHealth – A Cornerstone to Solving the Health Care Crises

- Drivers:**
- (1) Reduce the rise in health care costs - Shift in U.S. healthcare policy towards “Wellness”, based on a “preventative” focus on nutrition/health**
 - (2) Leverage consumer awareness – Nutrition as a key element to personal health improvement**

Framework: Shift healthcare emphasis towards a “preventative” focus on nutrition-oriented “Wellness”, including “personalized nutrition”

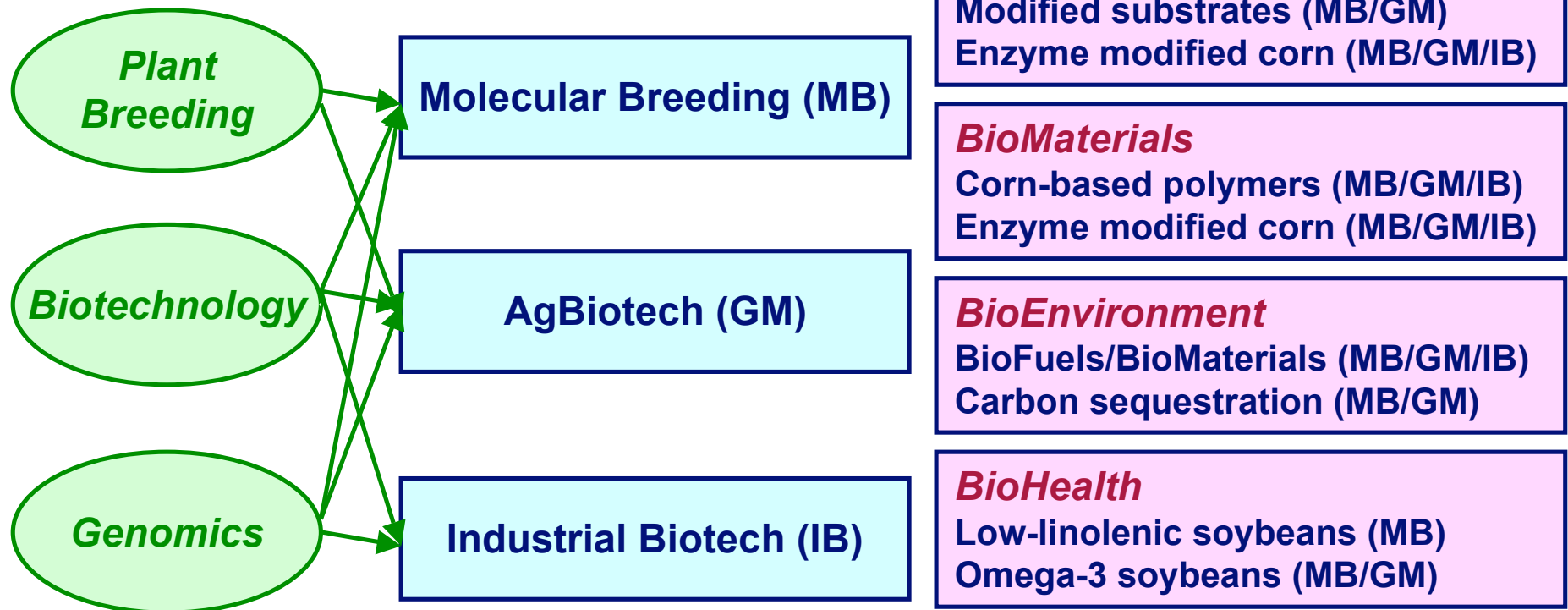
- AgBio Related:**
- (1) Potential to enhance nutrition/health-oriented nutritive compounds in food crops:**
 - o Enhanced plant breeding (Value of low-linolenic soybeans due to trans-fat issue)**
 - o Biotech traits, such as omega-3 precursors in major oilseed crops (DuPont and Monsanto in soybeans)**
 - (2) Potential to adjust nutritional compounds in foods to meet individual needs (nutrigenomics and “personalized nutrition”)**

Framework - U.S. Perspective



Biotechnology Creates a Multi-Dimensional Technology Platform

Broad Set of Complementary Biotech-Related Technologies -
Catalyzing the Market Reach of Plants/Agriculture to Capture
Mega-Market Opportunities



AgBiotech is More Than GM Traits



Example - Ethanol is Redefining Mindsets: Markets and Investors

BioFuels, especially Ethanol, are redefining the market's (farmers, companies, politicians, and Wall Street/Investors) mindset:

Growing Marketplace Realizations:

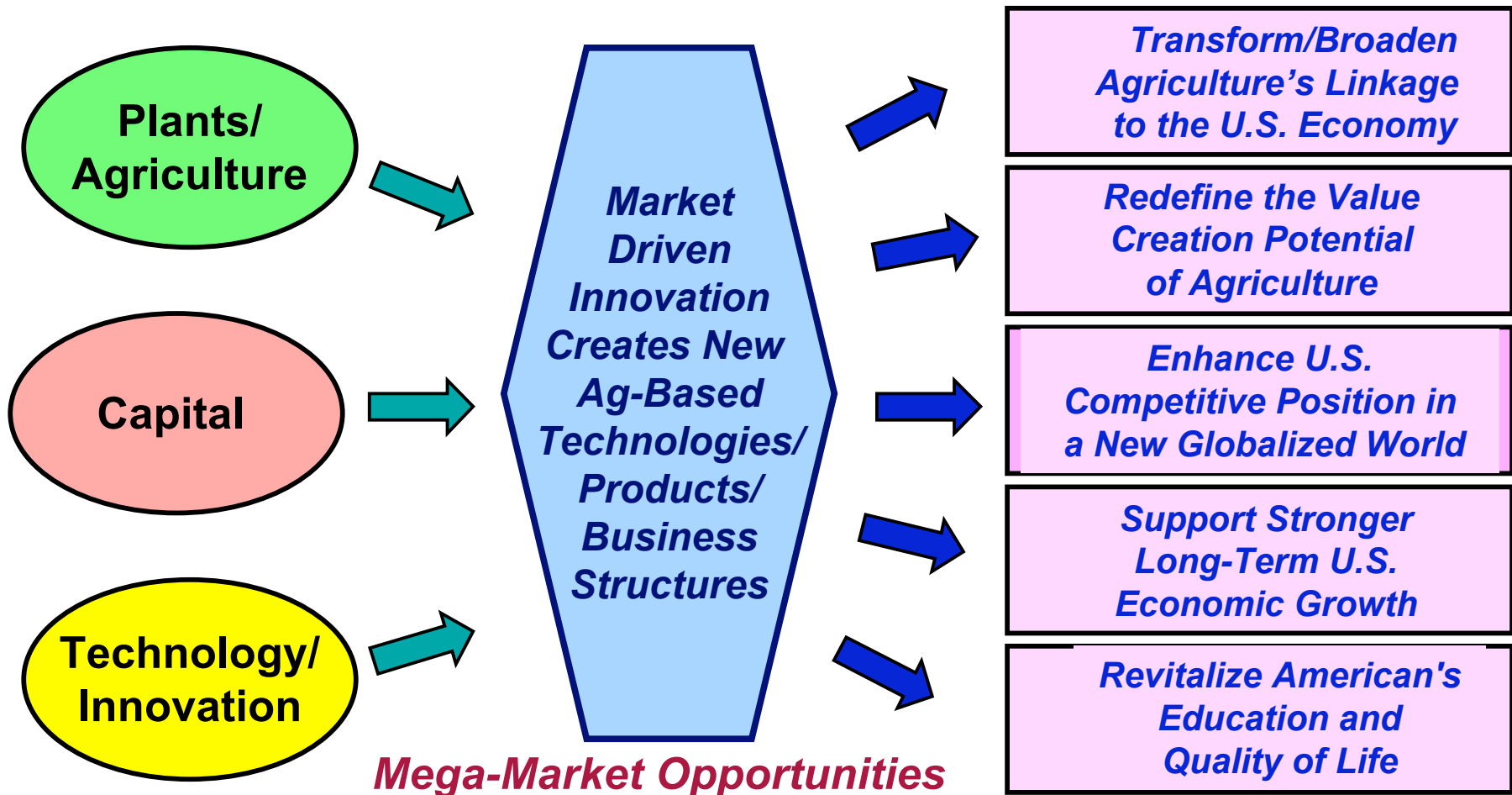
- ❖ **Ethanol's potential long-term value as a renewable fuel, as well as mitigating the growth of greenhouse gases/global warming**
- ❖ **Agriculture means more than just food**
- ❖ **Biotechnology at the industrial interface can redefine the market reach of agriculture to meet broad unmet market needs**
- ❖ **Agriculture and biotechnology will catalyze new demand-driven markets, created by "Integrated Innovation"**

Success in BioFuels/Ethanol will depend on a much bigger picture:

- ❖ **Strategic integration of biotechnology from the farm gate to downstream markets**
- ❖ **Market-driven sustainability, based on strategic low cost integration**
- ❖ **Integrated business models that drive downstream value creation**



Growth Dynamics of U.S. Agriculture – Redefine America's Future



Framework - U.S. Perspective



Investors Meet Transformational Change – It's All About Mindset

- ❖ **The impact of “Integrated Innovation” could create waves of transformational change, that will have broad impact:**

Global economy,

Corporations/Governments worldwide,

Citizens of the world,

Wall Street, financial markets, and investors

The Driver – The Power of “Integrated Innovation”

Market Driven Technological and Business Model Innovation

- ❖ **Investment opportunities will focus on new integrated business models that capitalize on agbiotech-derived innovation, as the enabler of new sustainable industries and companies**

The Opportunity – A Transformation of Investors' Mindset?

***Move Over Medical Biotech – Agriculture and Biotechnology
are About to Move to Center Stage***



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**Today, Agriculture and Biotechnology are at the Stage of Development
Similar to When the Wright Brothers Flew at Kitty Hawk in 1903
The Best is Yet to Come – A Man on the Moon and Beyond!**

***The World Belongs to the Optimists, and
Investors Who Have Vision and are Realists!***

Good Luck with Your Future!

Thank You....Questions?

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Background – Sano Shimoda, President and Founder

- **BioScience Securities is a strategic corporate advisory and investment banking firm that focuses on the application of BioBased technologies to plants/agriculture, as we move towards a BioEconomy**
- **BioScience Securities’ business model is framed around the concept of “Integrated Knowledge” centered on an understanding of the interface between agriculture, technology, markets, and financial - Wall Street**
- **The firm was founded in 1993 in Orinda, California (San Francisco Bay area) as an institutional research, corporate advisory/investment banking firm, to focus solely on the broad application of biotechnology to plants/agriculture**
- **Sano has over 30 years of Wall Street experience, including corporate advisory, investment banking, and equity analysis**
- **Sano is well known for his forward-looking views of the changing dynamics agricultural biotechnology will have on agriculture and the broad economy**
- **Education: M.B.A., University of California, Berkeley (1972), and B.S. in Business Administration (magna cum laude), Lehigh University (1968)**
- **Sano is a member of the Advisory Board to the Seed Science Center at Iowa State University**



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