

**PATHWAYS TO SUSTAINABLE
INDUSTRIAL TRANSFORMATIONS:
Co-optimizing Competitiveness,
Employment, and Environment**

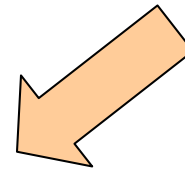
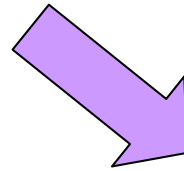
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Supply Side

Extraction industries
Manufacturing
Agriculture
Transportation
Energy
Services
Housing
ICT

Demand Side

Consumer Consumption
Commercial Consumption
Government Consumption



PROBLEMS

Inadequate Goods & Services

Toxic Pollution, Hazardous Operations

Climate Disruption

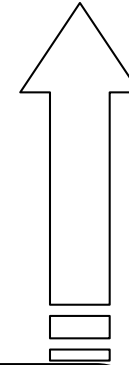
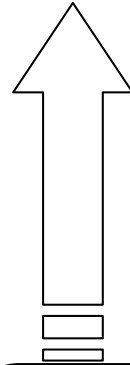
Resource Depletion

Biodiversity/Ecosystem Integrity

Environmental Injustice

Employment/Purchasing Power

Economic Inequity



SOLUTIONS

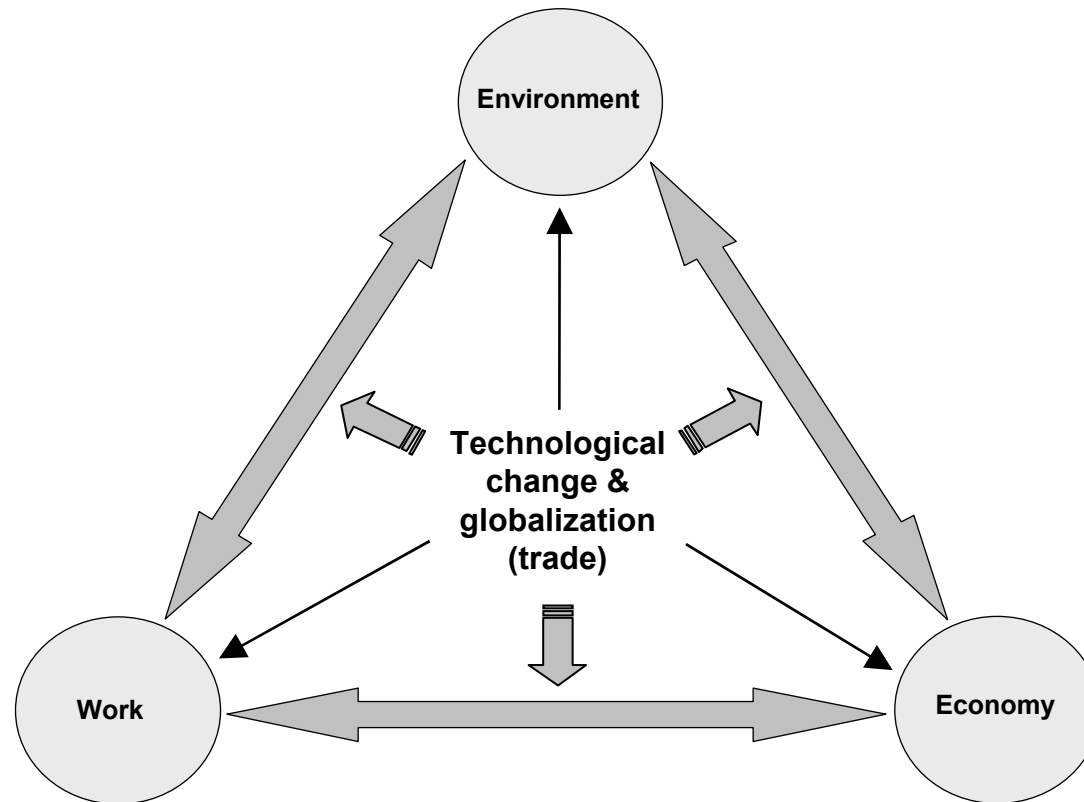
Education & Human Resource Development

Industry Initiatives

Government Intervention/Regulation

Stakeholder Involvement

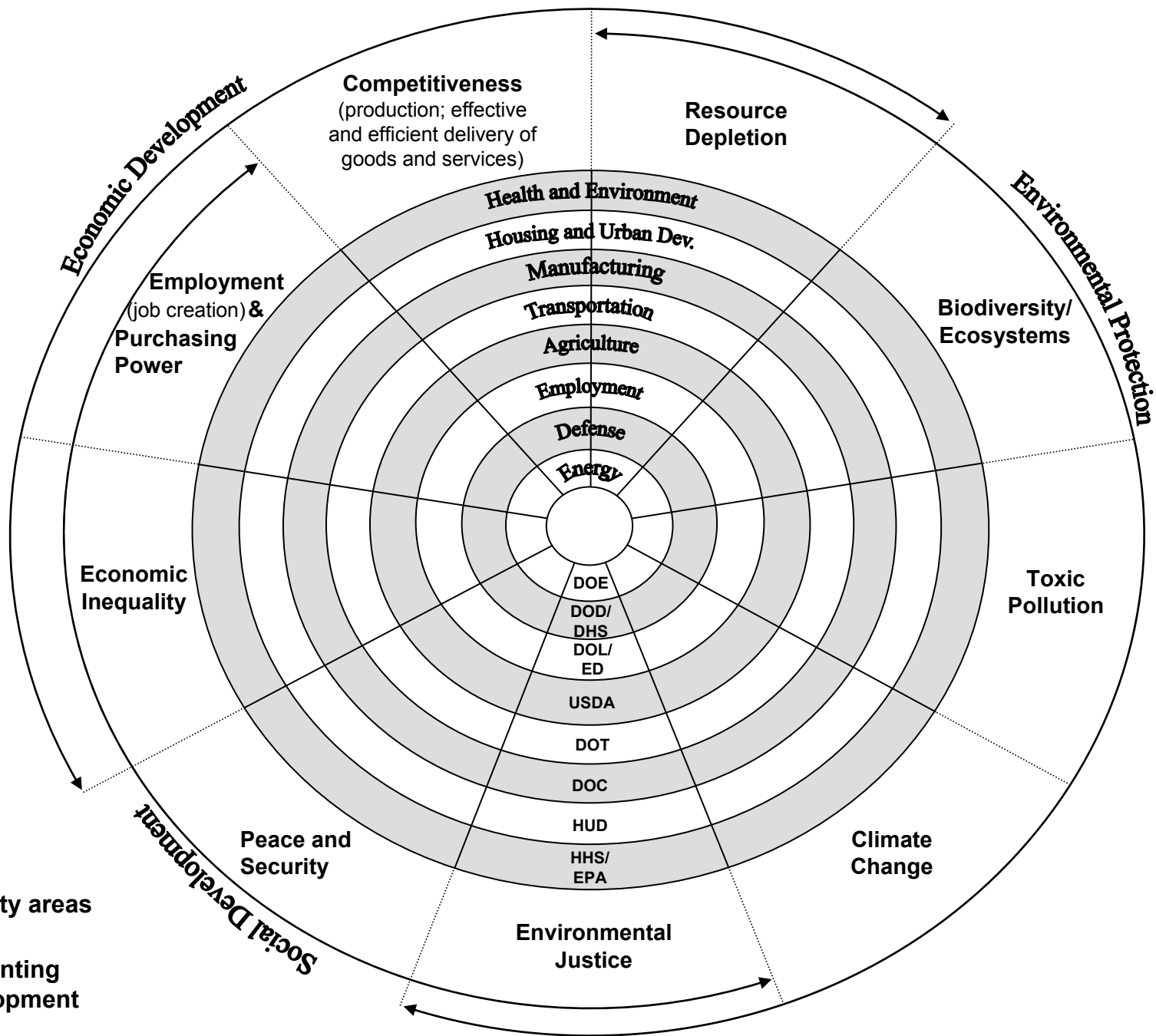
Financing Sustainable Development



Technological change and globalization (trade) as drivers of change within and between three operationally-important dimensions of sustainability

TRANSFORMATION PROCESSES

- Require transdisciplinary expertise
- Sustainable transformation processes go beyond the role and responsibility of just a single government department, e.g., environment or economic affairs.
- System changes cut across problem areas: competitiveness, environment, and employment -- and they therefore also cut across sectors and firm divisions, as well as government departments and missions.



Key:



Government activity areas



Challenges confronting sustainable development

Requisites for Technological Change

- Willingness
- Opportunity/Motivation
- Capacity

Determinants of Evolutionary Change

- Willingness

- Towards changes in production (flexibility)
- Influenced by an understanding of the problem
- Influenced by knowledge of options or solutions (diffusion)
- Influenced by the ability to evaluate alternatives

- Opportunity/Motivation

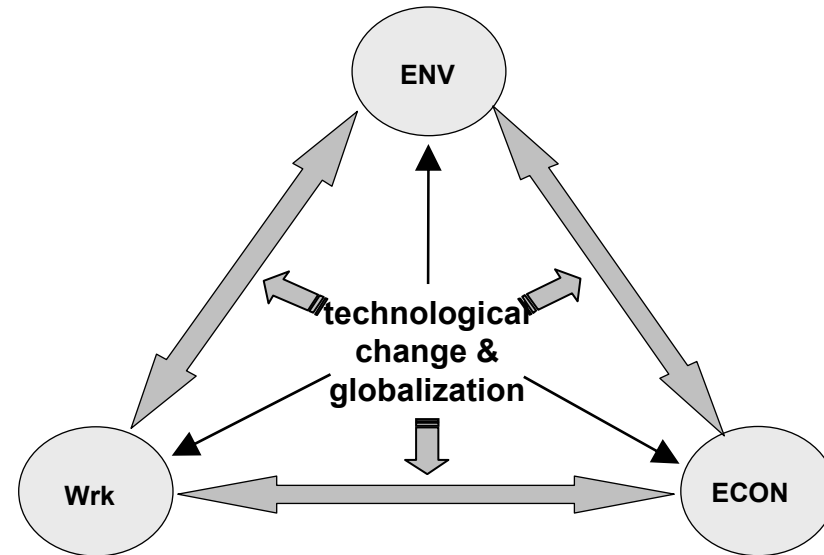
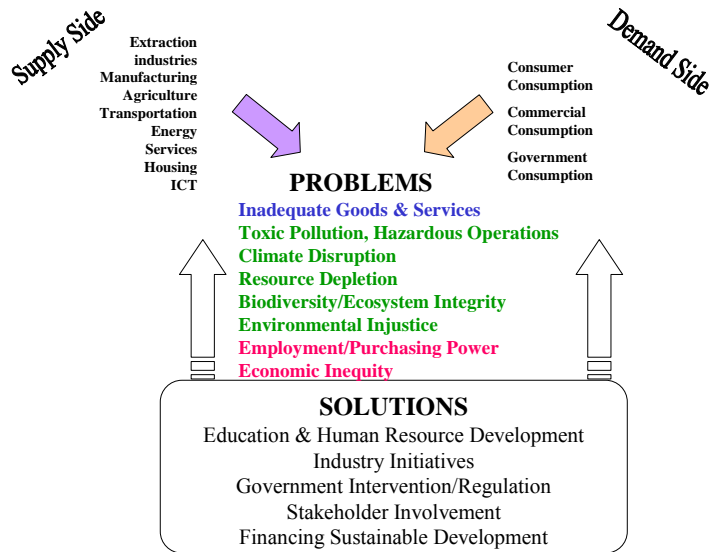
- Gaps in technological/scientific capability (existing markets)
- possibility of economic cost savings in existing markets or new/expanded market potential (industrial competitiveness)
- Regulatory requirements (making new markets)
- Consumer/worker/societal demand (making new markets)

- Capacity

- influenced by an understanding of the problem
- Influenced by knowledge of options (diffusion)
- influenced by the ability to evaluate alternatives
- Resident/available skills and capabilities (innovation)
- Role of outsiders (deviants?)

Determinants of Revolutionary Change

- Willingness
 - **Crises/Tipping points/Visionary leadership**
 - Towards changes in production (flexibility)
 - Influenced by an understanding of the problem
 - Influenced by knowledge of options or solutions (diffusion)
 - Influenced by the ability to evaluate alternatives
- Opportunity/Motivation
 - **Crises/Tipping points/Visionary leadership**
 - Gaps in technological/scientific capability (existing markets)
 - possibility of economic cost savings in existing markets or new/expanded market potential (industrial competitiveness)
 - Regulatory requirements (making new markets) ← **Changing the rules**
 - Consumer/worker/societal demand (making new markets)
- Capacity
 - influenced by an understanding of the problem
 - Influenced by knowledge of options (diffusion)
 - influenced by the ability to evaluate alternatives
 - Resident/available skills and capabilities (innovation) ← **Building New Capacity**
 - Role of outsiders ← **New actors, innovators, institutions, political agendas**



Address all dimensions of sustainability in all sectors, engaging and integrating the policies/programs/activities of all governance units of firms, government, and civil society.

Political/legal action to change:

- Willingness
- Motivation/opportunity
- Capacity