Managing & Communicating Knowledge in Three States

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New Knowledge exists in 3 States

- Scientific Research methodology ►

  Conceptual Discovery

- Engineering Development methodology ►

  Prototype Invention

- Industrial Production Methodology ►

  Market Innovation

Discovery State of Knowledge

Purpose: **Scientific Research** methods create new to the world knowledge.

Process: Empirical analysis reveals novel insights regarding key variables, precipitated by push of curiosity or pull of gap in field.

Output: **Conceptual Discovery** expressed as manuscript or presentation – the '*know what*.'

Legal IP Status: Copyright protection only.

Value: **Novelty** as first articulation of a new relationship/effect contributed to knowledge base.

Invention State of Knowledge

Purpose: **Engineering Development** methods combine/apply knowledge as functional artifacts.

Process: Trial and error experimentation/testing demonstrates proof-of-concept, initiated through opportunity supply or operational demand forces.

Output: **Prototype Invention** claimed and embodied as functional prototype - the '*know how*.'

Legal IP Status: Patent protection.

Value: **Feasibility** of tangible invention as a demonstration of the **Novelty** of concept.

Innovation State of Knowledge

Purpose: **Industrial Production** methods codify knowledge in products/components positioned as new/improved products/services in the marketplace.

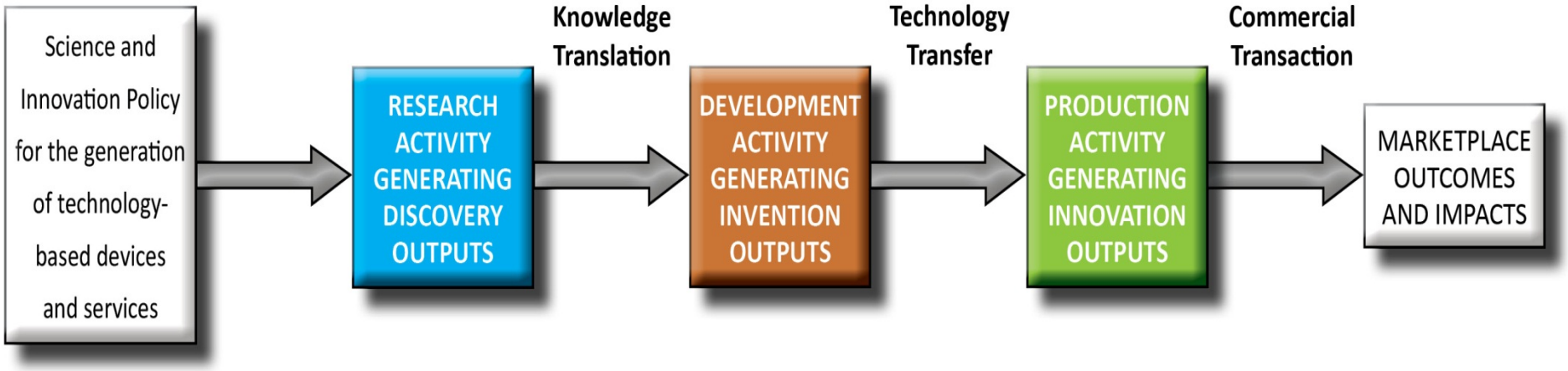
Process: Systematic specification of components and attributes yields final form.

Output: **Market Innovation** embodied as viable device/service in a defined context, initiated through a commercial market opportunity – '*know why*.'

Legal IP Status: Trademark protection.

Value: **Utility** defined as revenue to company and function to customers + **Novelty + Feasibility**

Knowledge Communication – 3 Strategies for 3 States



Why are these distinctions important?

- National policies and programs are increasingly focused on generating socio-economic benefits.
- These benefits are seen as chiefly arising from technological innovations.
- Dominant theories and practices are seriously flawed in most nations – *China's 2050 Plan is getting it right*.

Public Support for Knowledge Creation

- **Grant-based Scientific Research Programs** – Exploration to discover new knowledge about physical world (science/medicine).
  Grant-based Scholarship → Peer System → Publish for Tenure.

- **Contract R&D for Production Programs** – Application of S&E to deliver specified products with national value (defense/energy):
  Contract Production → Performance Specs → Sell for Profit.

- *These two Programs each work well because their respective systems and incentives are closely and properly aligned.*

- ***Sponsored "R&D" for "S&T" Innovation*** – Generate S&E outputs for commercial exploitation to generate beneficial socio-economic impacts.
  Scholarly outputs for tenure ≠ Corporate requirements for profit

- Hybrid Programs have many *problems because their systems and incentives are misaligned and incongruent!*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Implications for Managing Knowledge & Communicating Information:

- *Awareness of knowledge state:* Method of origin and attributes of output state dictate opportunity and constraints for knowledge application.
- *Avoid confusing jargon and metrics:* Academic 'impact factor' bears no relation to societal impact, nor can national innovation be measured as ((\$R + \$D) / GDP).
- *Apply proper strategies to transitions between Knowledge States:* Ensure that models, methods and metrics underlying Knowledge Management systems are congruent and designed to communicate information based on rigor and relevance, *not on rhetoric*.

Related Publications

- *Lane,JP, Godin, B.* (2013) *Methodology Trumps Mythology, Bridges, The Translatlantic STI Policy Quarterly from the Office of Science & Technology, Embassy of Austria, Washington, DC, 36, December 2012/OpEds & Commentaries.*

- *Lane, JP, Godin, B, (2012) Is America's Science, Technology, and Innovation Policy Open for Business? Science Progress, June 12, 2012, http://scienceprogress.org/2012/06/is-america%E2%80%99s-science-technology-and-innovation-policy-open-for-business/*

- Flagg, J, Lane, J., & Lockett M. (2013) "Need to Knowledge (NtK) Model: An Evidence-based Framework for Generating Technology-based Innovations." Implementation Science, 8, 21, http://www.implementationscience.com/content/8/1/21

- Stone, V. & Lane J (2012). "Modeling the Technology Innovation Process: How the implementation of science, engineering and industry methods combine to generate beneficial socio-economic impacts." *Implementation Science*, 7, 1, 44. http://www.implementationscience.com/content/7/1/44.

- Lane, JP (2012). The Need to Knowledge Model: An operational framework for knowledge translation and technology transfer. *Technology and Disability*, 24,187–192. http://iospress.metapress.com/content/f384n4gp042732gx/fulltext.html

- Lane, J & Flagg, J. (2010) "Translating 3 States of Knowledge: Discovery, Invention & Innovation." *Implementation Science*, 5, 1, 9. http://www.implementationscience.com/content/5/1/9

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