



Hellenic Society for Systemic Studies (HSSS)
20th National & International Conference
in collaboration with the
University of Ioannina, Lab. of New Technologies & Distance Learning

Systems Approach for Innovative Entrepreneurship

11-14 December 2024
Ioannina, Greece



Systems Approach for Coping with the Innovation Emergence

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Innovation can be defined as the development of new products, processes, services, or solutions by employing new or existing knowledge or technologies which introduce a level of novelty and become widely accepted by the people to whom they are addressed. Innovation is a complex phenomenon that drives technological advancement and market evolution.

It's important to understand that innovation is not solely driven by technology. The perception of people's needs, opportunities, and the market at large also plays a significant role in creating innovative products. The "Henderson-Clark Innovation Model" is a powerful tool that effectively captures and maps the relationship between market and technology in product innovation, enlightening us about the multifaceted nature of innovation.

The systems approach sees the world as systems. It considers a situation not as an isolated monolithic entity but as a system or a whole of sub-situations, and this system is part of a broader system of situations. Systems Theory in Management appeared as early as the 1950s and has since been one of the foundations on which the management of modern organizations is based.

A systems approach to innovation underscores the interconnectedness and interdependencies within the innovation ecosystem. This perspective is crucial for understanding the emergence and complexity inherent in innovation processes. Emergence refers to the phenomenon where complex systems and patterns arise out of relatively simple interactions. In the context of innovation, emergence can be seen in how new technologies and market trends evolve from the interactions of various stakeholders, including researchers, developers, consumers, and policymakers.

Systems thinking contributes significantly to innovation by providing a holistic framework for analyzing and managing the complexities of innovation processes. It encourages looking beyond linear cause-and-effect relationships and considering the broader system of interactions and feedback loops. This approach helps to identify leverage points where interventions can lead to significant improvements in innovation outcomes.

The "Innovation Butterfly" concept is a metaphor that captures the non-linear and often unpredictable nature of innovation. Similar to the butterfly effect in chaos theory, small changes or inputs in the innovation process can lead to disproportionately large impacts on outcomes. This concept highlights the importance of flexibility and adaptability in managing innovation, as well as the need for continuous monitoring and adjustment of strategies.

Innovation can be viewed as a complex system characterized by numerous interacting components and adaptive behaviours. This complexity requires a systems approach to effectively navigate and manage the innovation landscape. By recognizing the interdependencies and emergent properties of innovation systems, organizations can better cope with the uncertainties and challenges associated with innovation.

In conclusion, a systems approach to innovation provides a comprehensive framework for coping with the innovation process's emergence and complexity. It emphasizes the importance of considering the broader ecosystem of interactions and feedback loops and highlights the value of flexibility and adaptability in the face of uncertainty. By leveraging systems thinking and concepts, organizations can enhance their capacity to innovate and respond to the dynamic demands of technology and markets.



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HSSS 2024 :: Systems Approach for Coping with the Innovation Emergence

Presentation topics

- Innovation
- Systems Thinking
- Systemic aspects of innovation
- Unexpected behaviors in innovation systems
- Systems approach for innovation

Innovation :: the basics

Innovation:

The creation of **new products, processes, services or knowledge** by using **new or existing scientific or technological knowledge**, which provide a **degree of novelty** either to the developer, the industrial sector, the nation or the world and **succeed in the marketplace.** *

- **Novelty**
- **Value Creation**
- Customer-Centric
- Interdisciplinary Collaboration
- Implementation
- Risk-Taking

* Galanakis, K. (2006). Innovation process. Make sense using systems thinking.

Innovation :: Technology & Market

Innovation is the systematic practice of developing and marketing breakthrough products and services for adoption by customers.

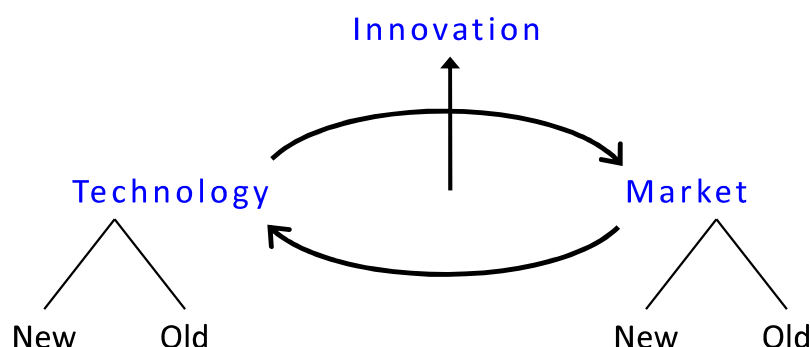
McKinsey & Company

www.mckinsey.com/featured-insights/mckinsey-explainers/what-is-innovation

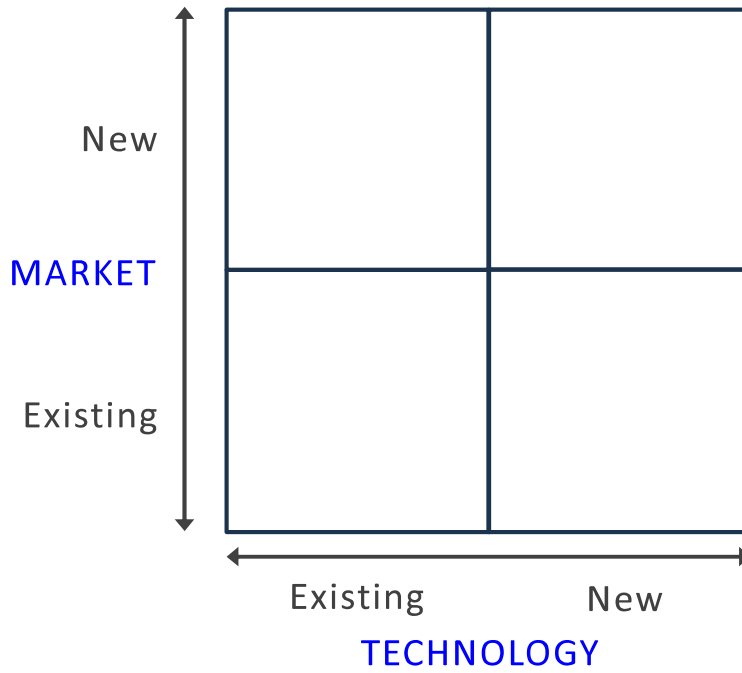
Innovation is a product, service, business model, or strategy that's both novel and useful.

Harvard Business School Online

<https://online.hbs.edu/blog/post/importance-of-innovation-in-business>

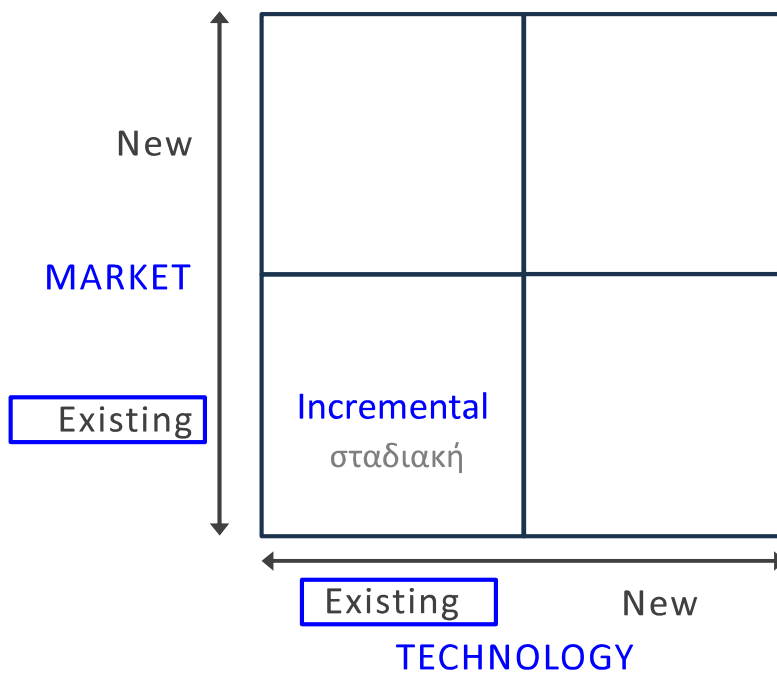


Types of Innovation :: Henderson-Clark Innovation Model



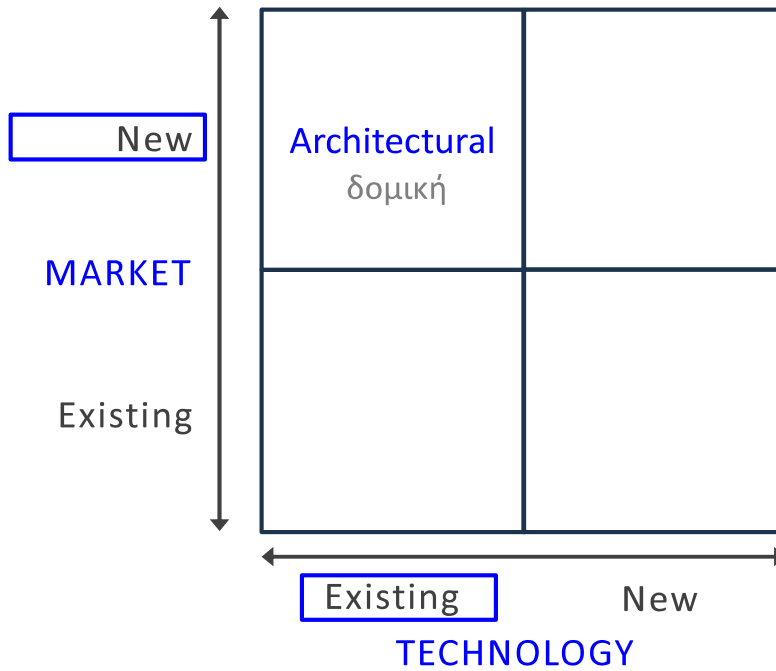
<https://www.futurize.studio/blog/4-types-of-innovation-and-examples>

Types of Innovation :: Henderson-Clark Innovation Model



Well-understood technology. Small improvements
Familiar markets
iPhones, Gillette blades, Coca-Cola, Cadbury, Car models variants and generations.

Types of Innovation :: Henderson-Clark Innovation Model

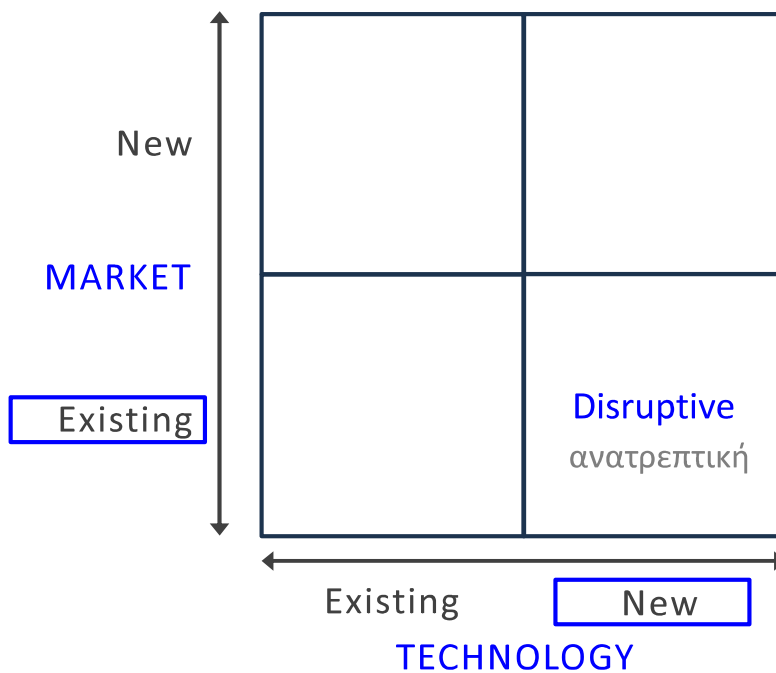


Existing technologies, whole product or parts reconfiguration

New markets, new application or uses

Desktop Photocopier, SONY Walkman, Laptops, GPS on Smartphones, Rolling Suitcase.

Types of Innovation :: Henderson-Clark Innovation Model

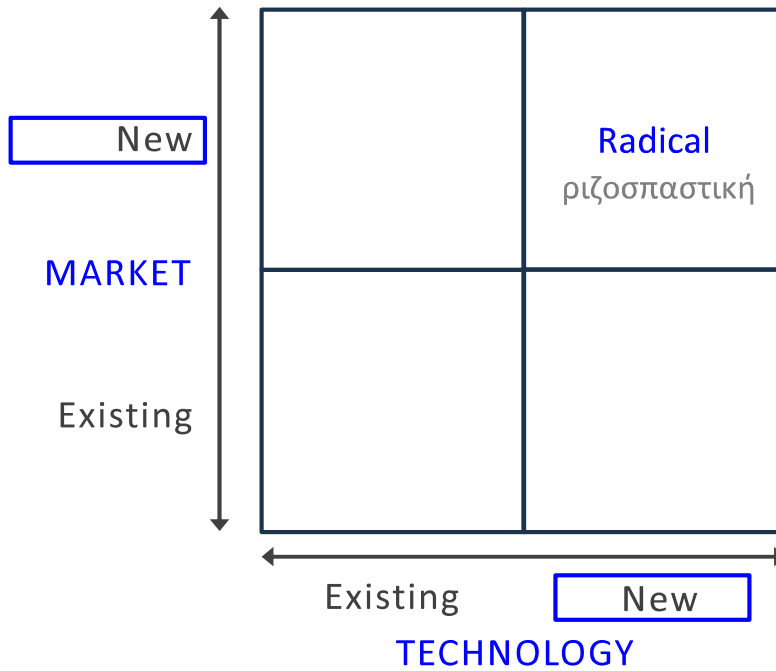


New technology, fresh value proposition

Existing market, potential to eventually surpass long-standing market leaders

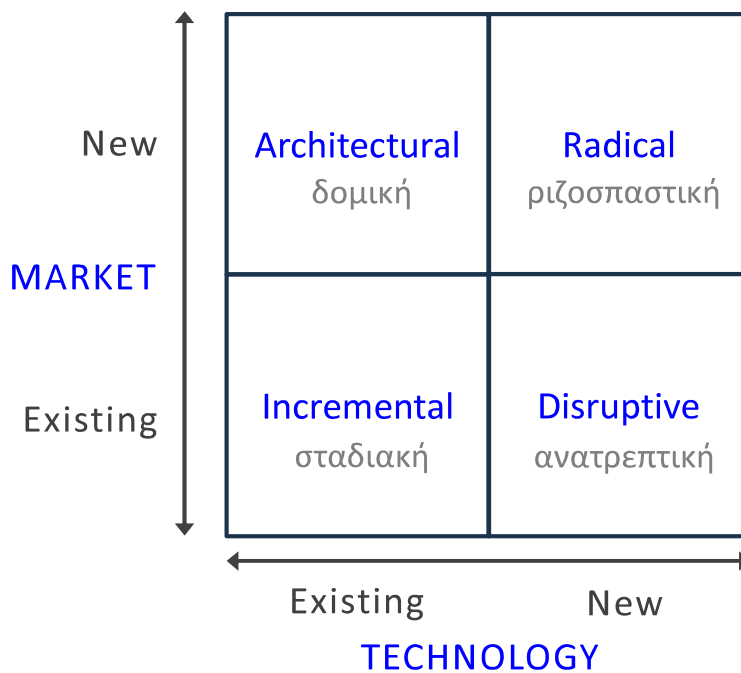
Netflix, Uber, Airbnb.

Types of Innovation :: Henderson-Clark Innovation Model

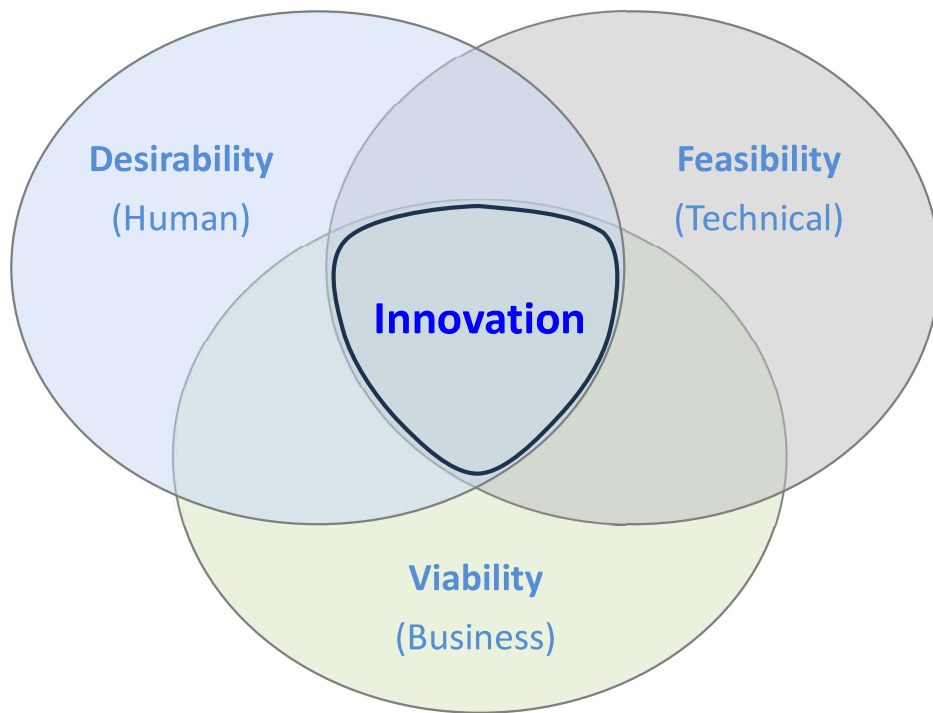


Breakthrough inventions, cutting-edge technologies
 New markets, possibly upending existing industries or spawning new ones
 Google, Blockchain Technology, 3D printing, SpaceX's reusable rockets.

Types of Innovation :: Henderson-Clark Innovation Model

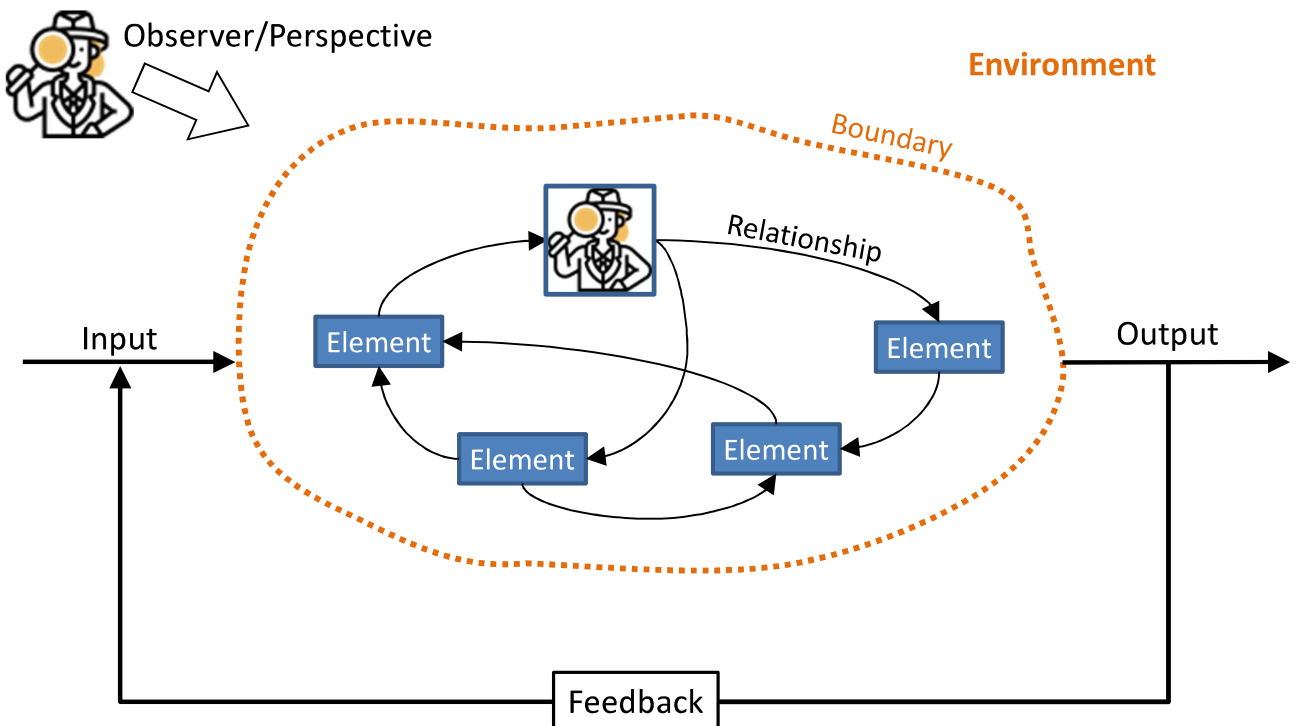


Innovation & Design Thinking :: 3 dimensions



SOURCE: Design Thinking by Tim Brown from IDEO.com

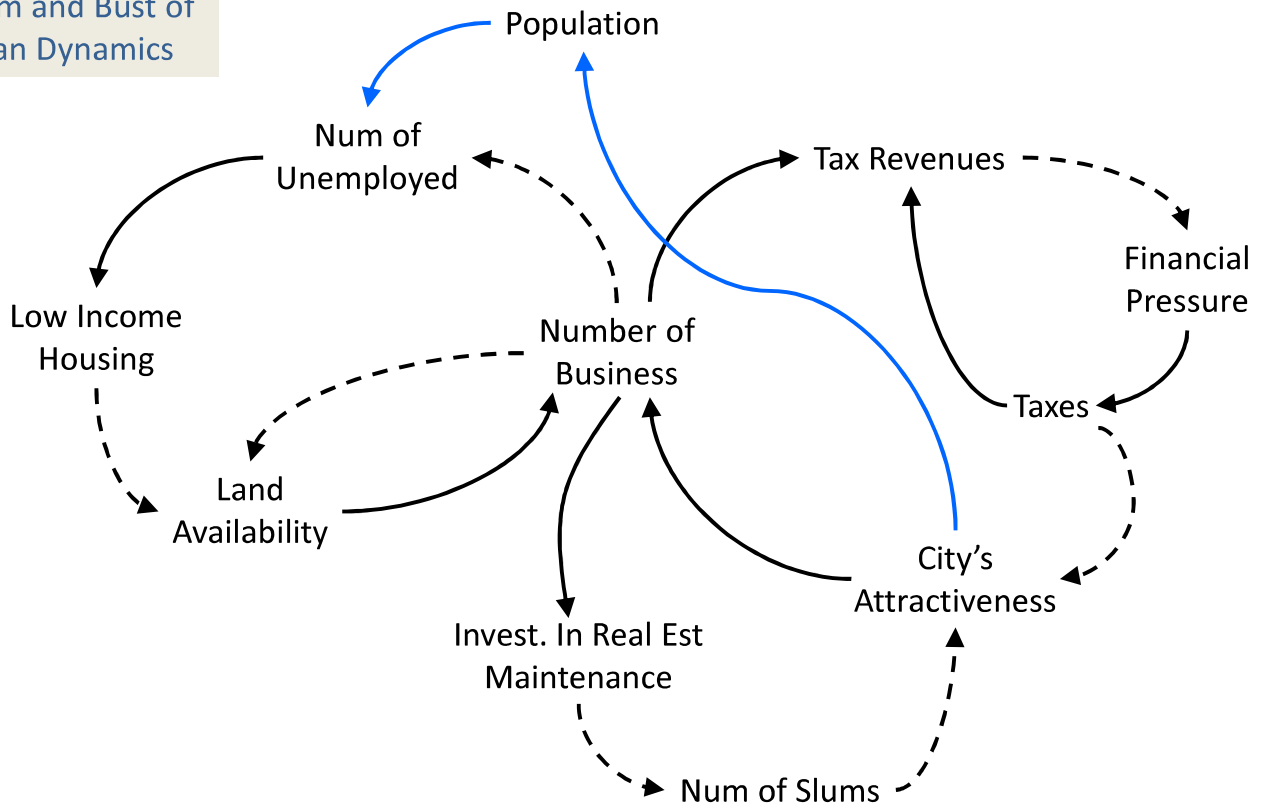
Systems Thinking :: A world of Systems - Non-Linear Causality



Observer icon source: Freepik.com

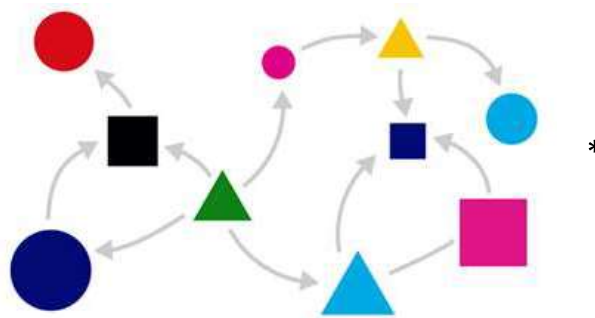
Systems Thinking :: A world of Systems - Non-Linear Causality

Boom and Bust of Urban Dynamics



Forrester, Jay W. Urban Dynamics. (Portland, OR: Productivity Press, 1969)
<https://thesystemsthinker.com/what-companies-can-learn-from-urban-dynamics/>

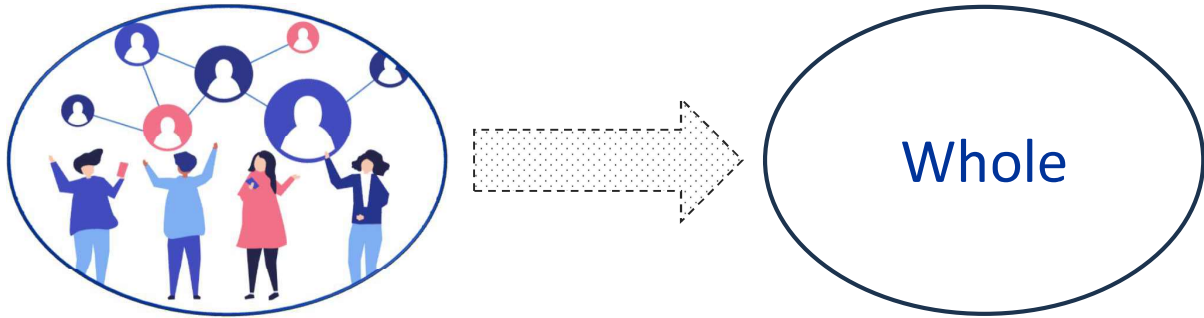
System Thinking :: Systems Approach



- See the world as systems
- A situation is not isolated but is part of a broader system of situations
- A situation is a system of sub-situations
- There are interactions and interdependences
- The causality is not linear and immediate: There are causal loops and delays
- The most sustainable intervention is at system's level

Organizational Systems :: Emergence and Complexity

From the **Behavior of the Parts** to the **Behavior of the Whole**



micro-behavior

macro-behavior

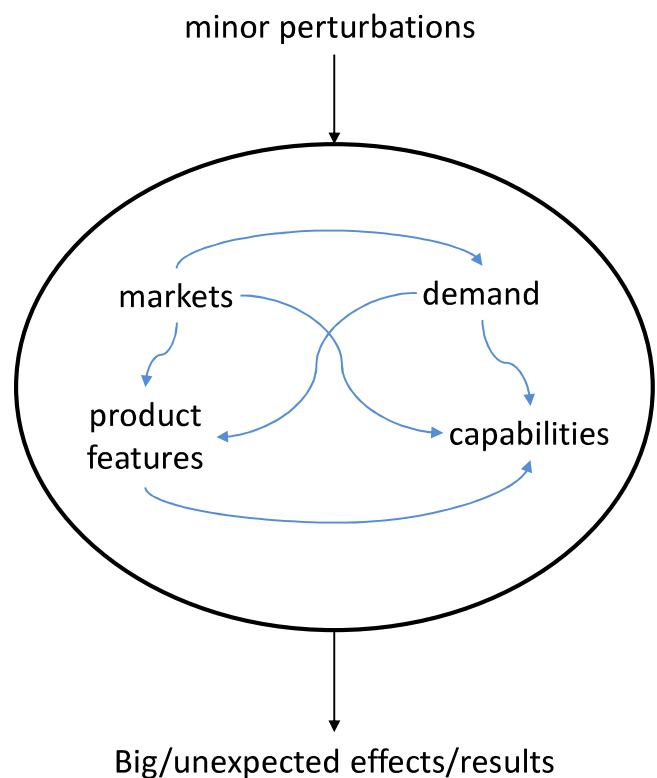
Emergence: Unexpected behavior of the whole, that cannot be explained by the behavior of the parts but by their interaction.

Complexity: Difficulty to express the behavior of the whole, even when given reasonably complete information about the behavior of the parts and their inter-relations

Emergency in Innovation :: The innovation butterfly



www.freepik.com



Innovation butterfly :: Product examples

Apple's iPhone



touchscreen instead of a physical keyboard

Airbnb



quality of photos for their listings

Tesla's Electric Vehicles



the Roadster

Netflix



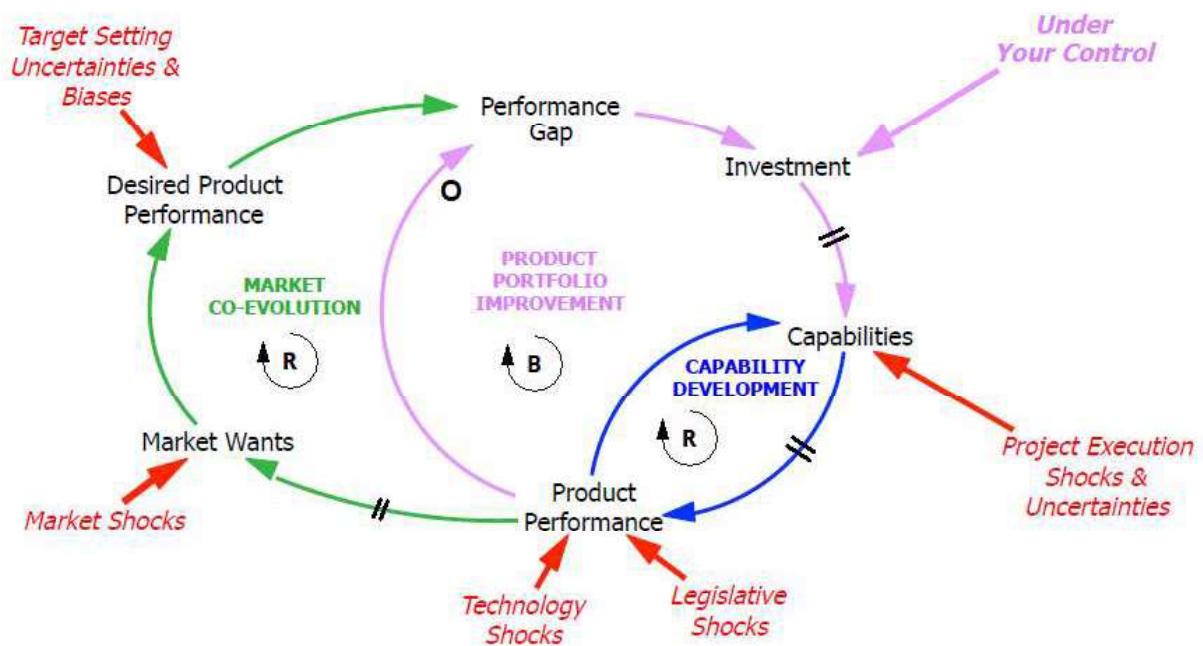
from DVD rentals to streaming services

LEGO



agreements for Star Wars and Harry Potter

Innovation butterfly :: A Complex System

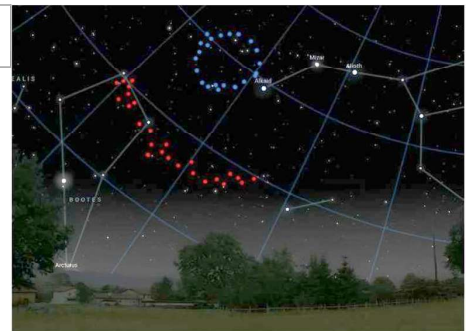


The Evolution of Management and the Systemic Approach

Classical Management Theories	Late 19th and early 20th centuries
Human Relations Movement	1930s and 1940s
Systems Theory	1950s and 1960s
Contingency Theory	1960s and 1970s
Modern Management Theories	From the 1980s onwards

Systems Thinking :: importance for Innovation

Encourages Big-picture Perspectives

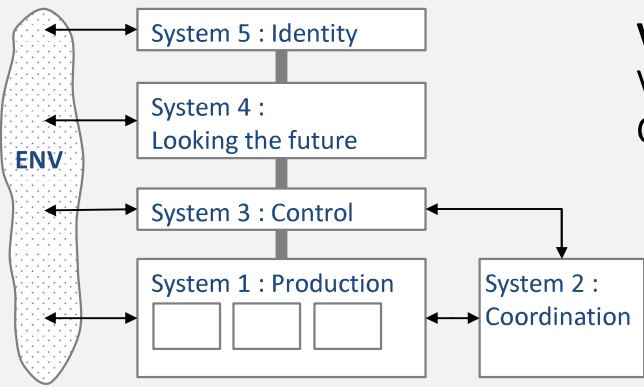


Sees Problems as Opportunities

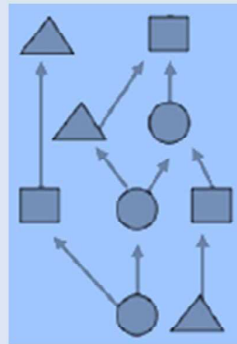
Enabling Rapid Adaptation



Systemic Methodologies for Innovation



VSM
 Viable System Model
 Organizational structure for innovation

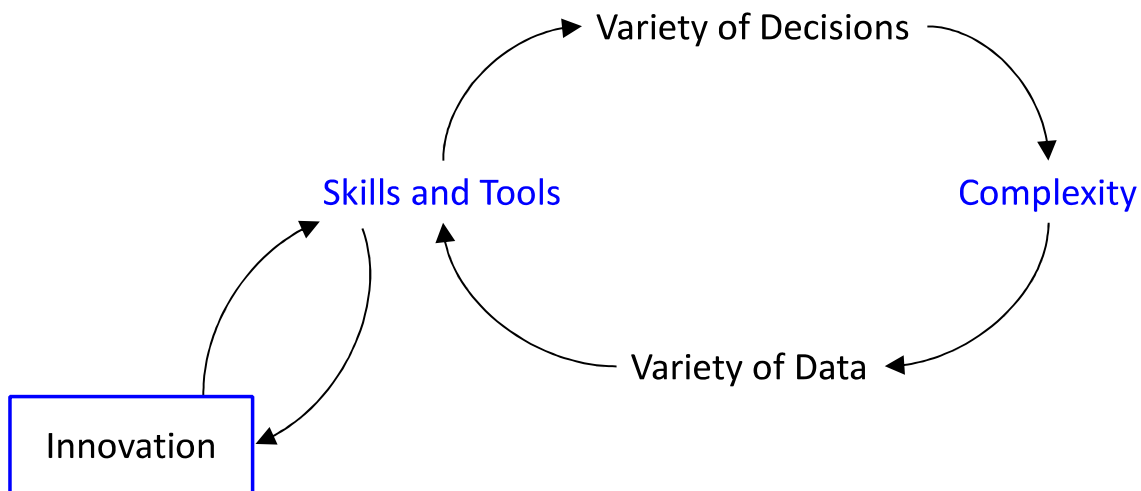


SDD
 Structured Dialogic Design
 Planning innovation
 New ideas generation

Systems Thinking :: Contribution to innovation

- | | | |
|------------------------------|---|------------------------|
| Identifying Interconnections | ➡ | Holistic View |
| Encouraging Collaboration | ➡ | Cross-Functional Teams |
| Enhancing Problem-Solving | ➡ | Systemic Interventions |
| Dynamic Systems | ➡ | Promoting Adaptability |
| Fostering Long-Term Thinking | ➡ | Sustainable Innovation |

Complexity as an opportunity for Innovation



Conclusions

- ◆ Innovation is a vital element for organizations
- ◆ Innovation is strongly related with emergency and complexity phenomena
- ◆ Systems approach provides a comprehensive framework for coping with the innovation process's emergence and complexity:
 - Holistic view
 - Managing innovation dynamics
 - Organizational structure for innovation
 - Collaboration for innovation

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