



Faculty of Design

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## Digital manufacturing and the future of innovation systems in Chicago

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# Digital Manufacturing and the Future of Innovation Systems in Chicago

Authors:

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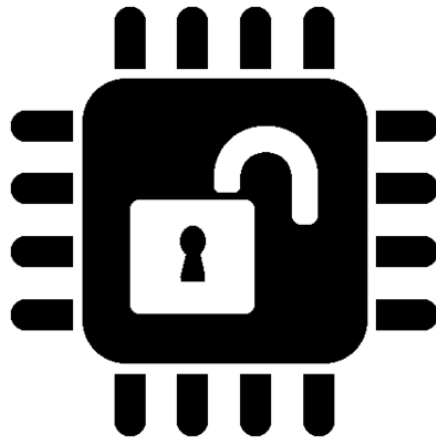
Laura Forlano, Assistant Professor, IIT Institute of Design.

# What makes this a system?

**U+ LABS**



**MHUB**



**DMDII**

# Complex Adaptive Systems

Composed of populations of adaptive agents whose interactions result in complex non-linear dynamics, the results of which are emergent system phenomena.

Adaptive agents

Non-linear dynamics

Emergent system

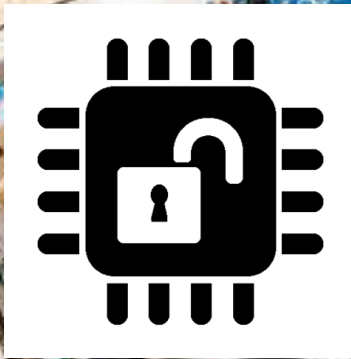
Source: Jason Brownlee, in Complex Adaptive Systems

# Infrastructure

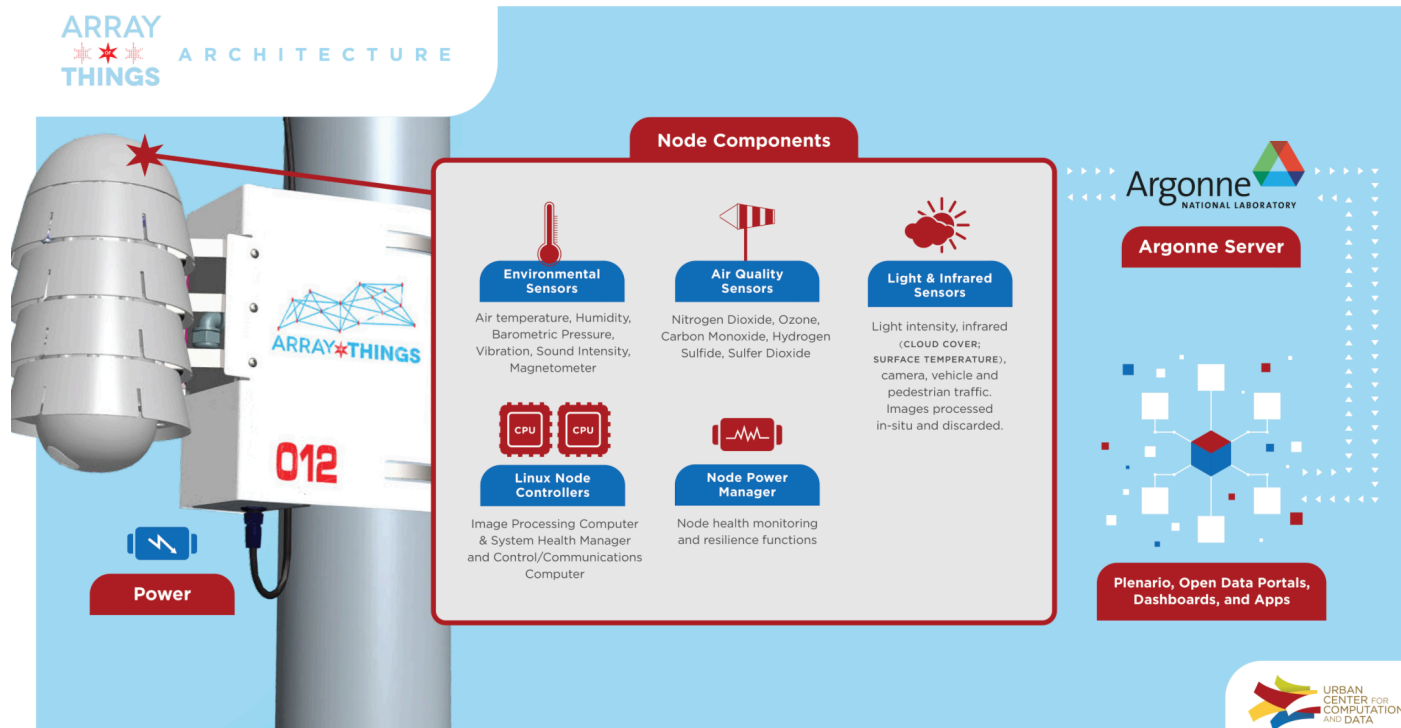
Open hardware

Digital fabrication

Robotics



# Array of Things



# UI Labs



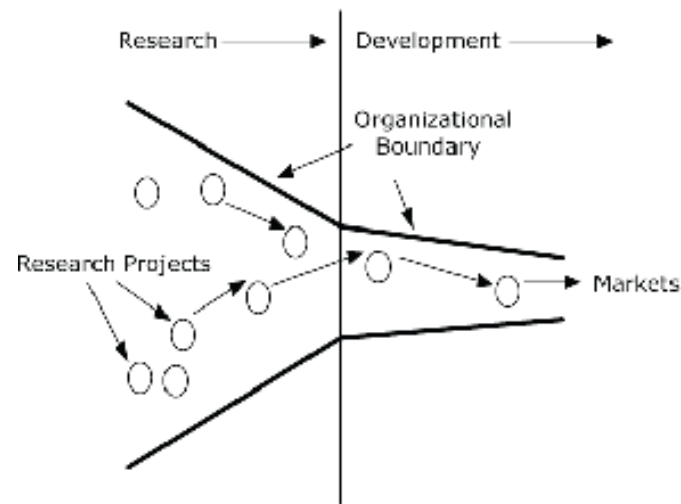
#RSD5

# mHUB

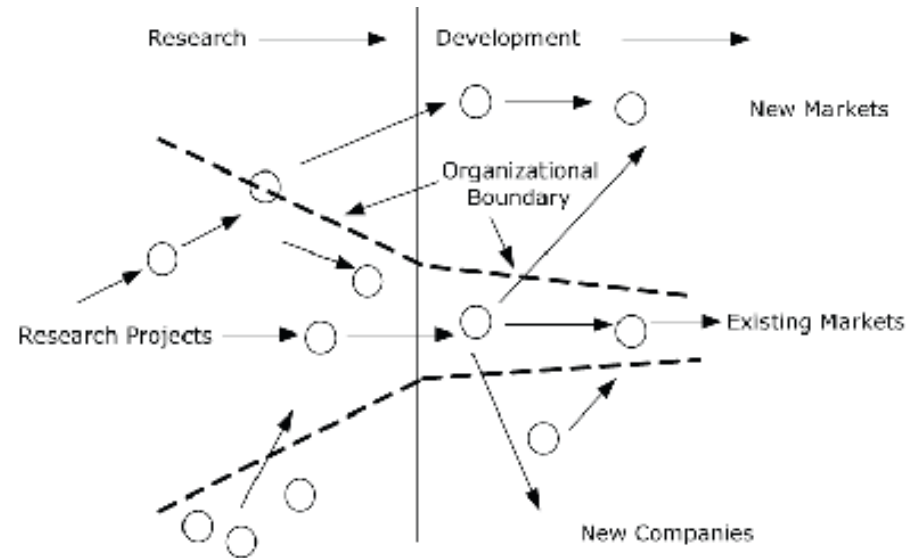


#RSD5

# From closed to open innovation



Closed Innovation



Open Innovation

Source: Henry Chesbrough

# Product Development Ecology in Chicago

Categories and players:

Investors

Incubators

Makers

Manufacturers

Consultants

Corporations

Start-ups

# Adaptive nonlinear networks

Dispersed interactions

No global controller

Crosscutting hierarchical interactions

Continual adaptations

Perpetual novelty

Out-of-equilibrium dynamics

Source: Jason Brownlee, in Complex Adaptive Systems  
A paraphrase of W. Brian Arthur's six aspects of adaptive nonlinear networks

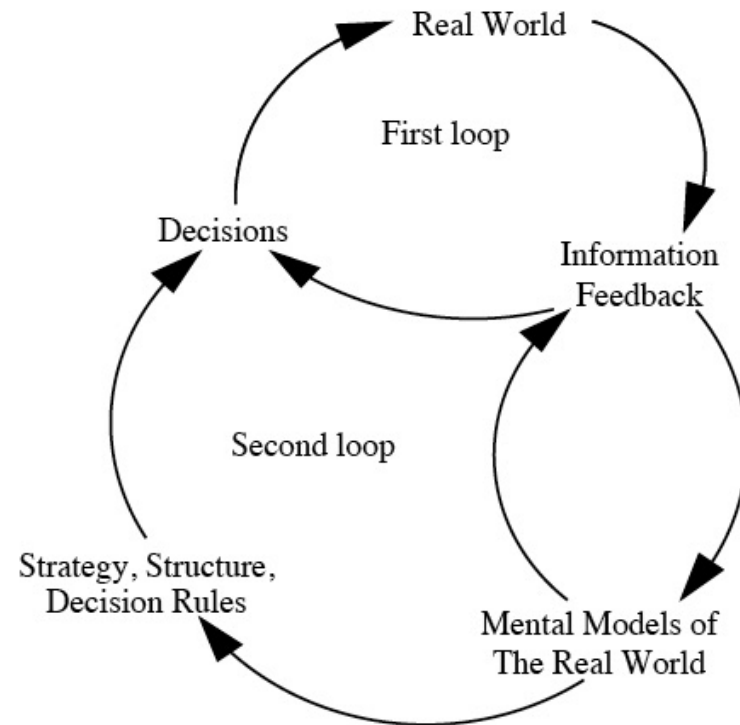
# Agile production system

Anticipation

Recombination

Instant feedback loops

Continual adaptation



P. Hjorth, A. Bagheri / Futures 38 (2006) 74–92

# References

Brownlee, J. (2007). *Complex Adaptive Systems* (Tech. No. 070302A).

Chesbrough, H. W. (2003). *Open Innovation: the new imperative for creating and profiting from technology*. Boston, MA: Harvard Business School Press.

Hjorth, P., & Bagheri, A. (2006). Navigating towards sustainable development: A system dynamics approach. *Futures*, 38(1), 74-92. doi:10.1016/j.futures.2005.04.005