



Research centres and knowledge: the good, the bad and the ugly

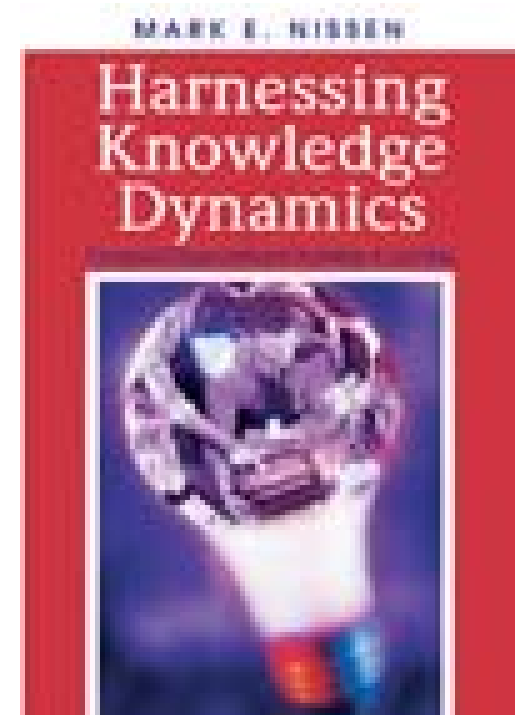
Monieson Centre Seminar
20 May 2009
Dr. Mark E. Nissen
Center for Edge Power
US Naval Postgraduate School

25 years' research & practice

2006 book

"Harnessing Knowledge Dynamics: Principled Organizational Knowing & Learning translates what is arcane and controversial today into managerial guidance that is sophisticated yet practical. It also complements the many existing management books on strategy, technology, knowledge and systems while addressing a well-recognized void."

"Harnessing Knowledge Dynamics: Principled Organizational Knowing & Learning draws from the emerging knowledge-flow theory to provide stable principles to build a practice of knowledge management. It also draws from diverse, real-world experience to provide operational applications of knowledge-flow principles in practice. This book builds upon theory but targets practice; it takes knowledge known only by a few researchers and shares it with many leaders and managers."



Motivation

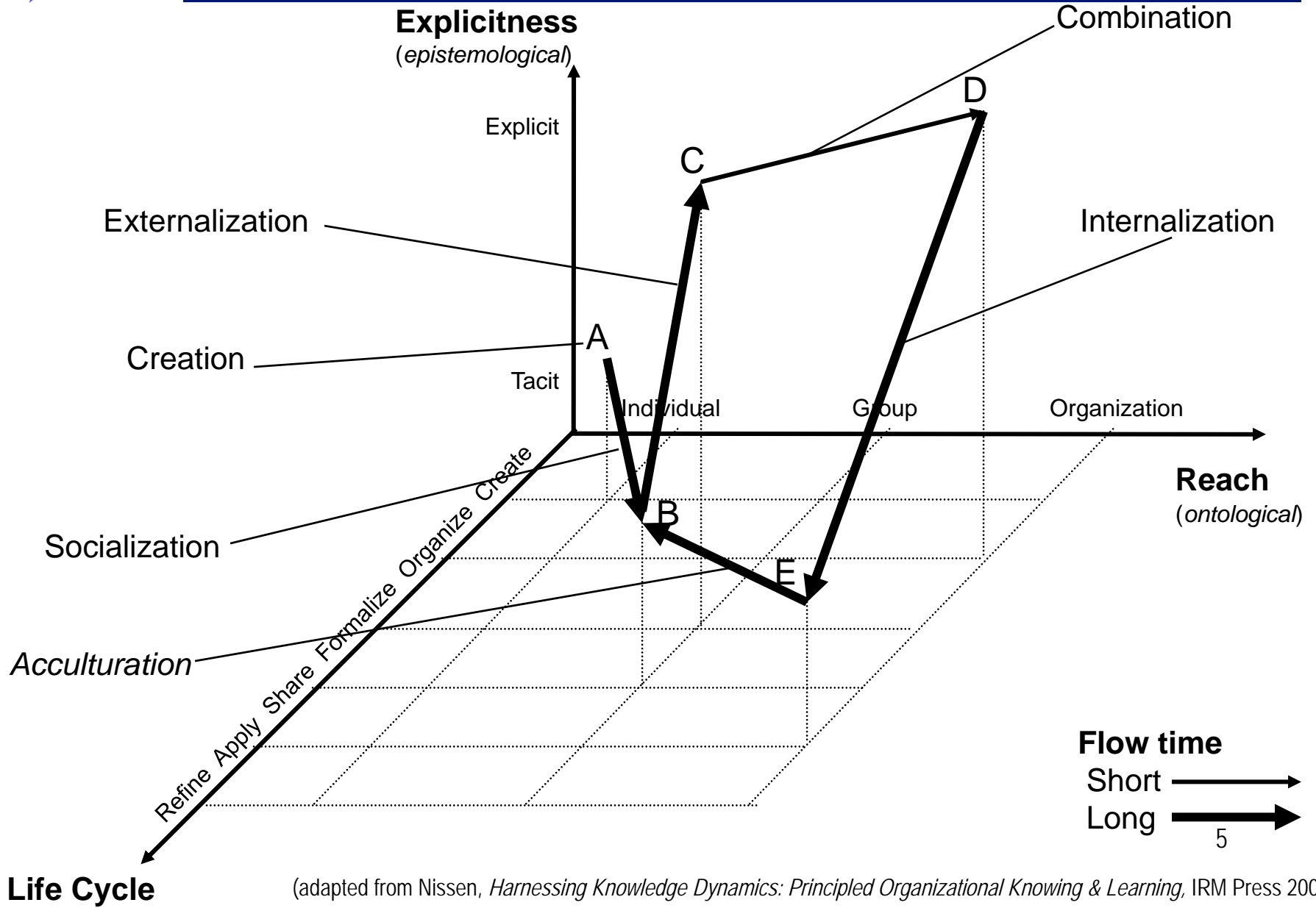
- Knowledge (K) critical but uneven
 - Tacit, experience, how-to, research K
 - Essence of University/R&D work
 - Clumps @ people, orgs, locations, times
- Research centers
 - Flow via multidisciplinary collaboration
 - Can dissolve or enlarge K clumps
 - Seminars & pubs: **tacit K flows?**
- App of Knowledge Flow Theory: Edge

Knowledge Flow Theory

- Multidisciplinary roots & methods:
 - AI, ISD, BPR, OL, TM & KM
 - Phenomenology, ethnography, COT
- Answers some key research questions:
 - How is knowledge distinct?
 - How does knowledge “move”?
 - What dynamic properties & behaviors?
 - How to viz, diagnose & treat K flows?
- Research, education, application

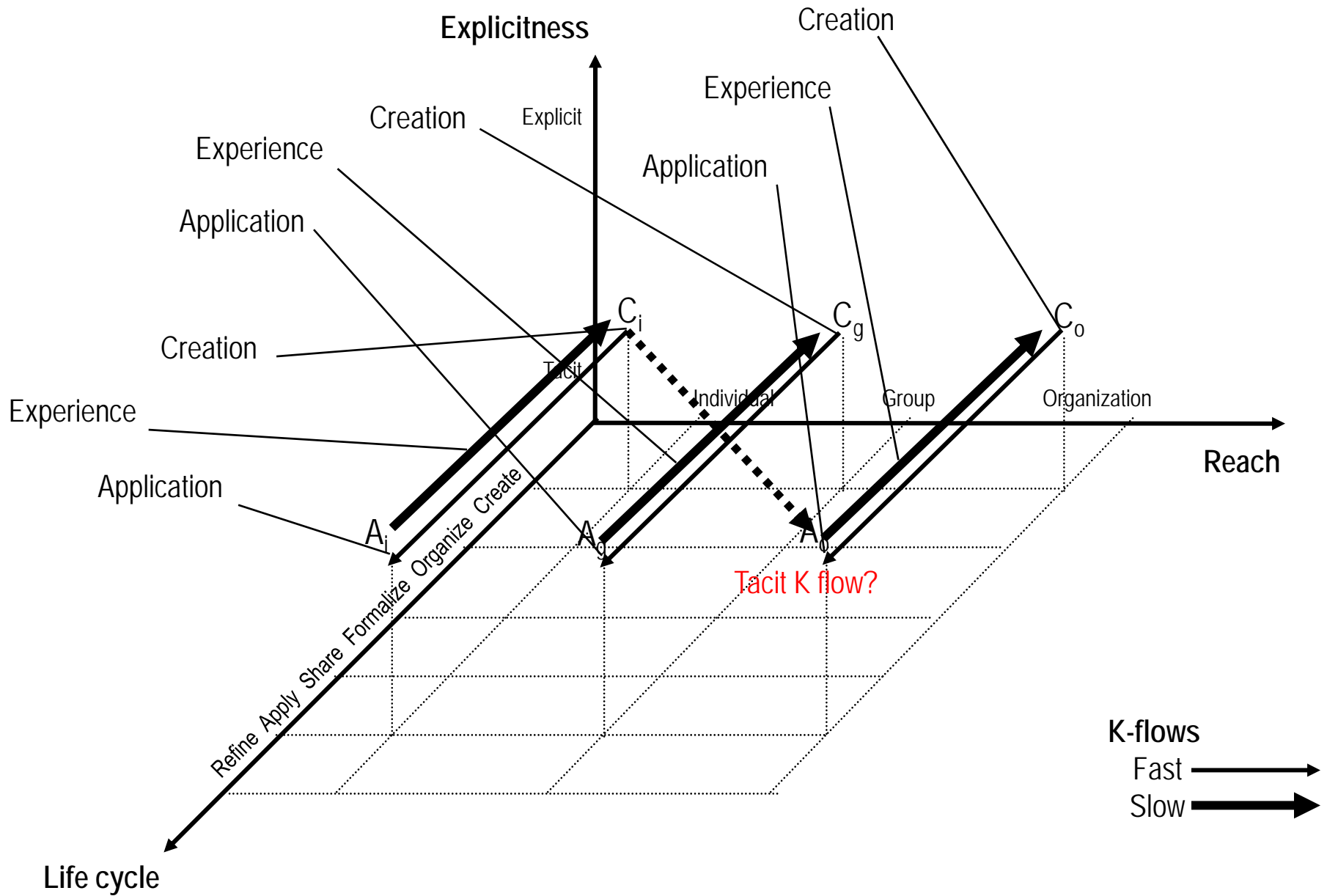


K-flow Viz - Spiral Model

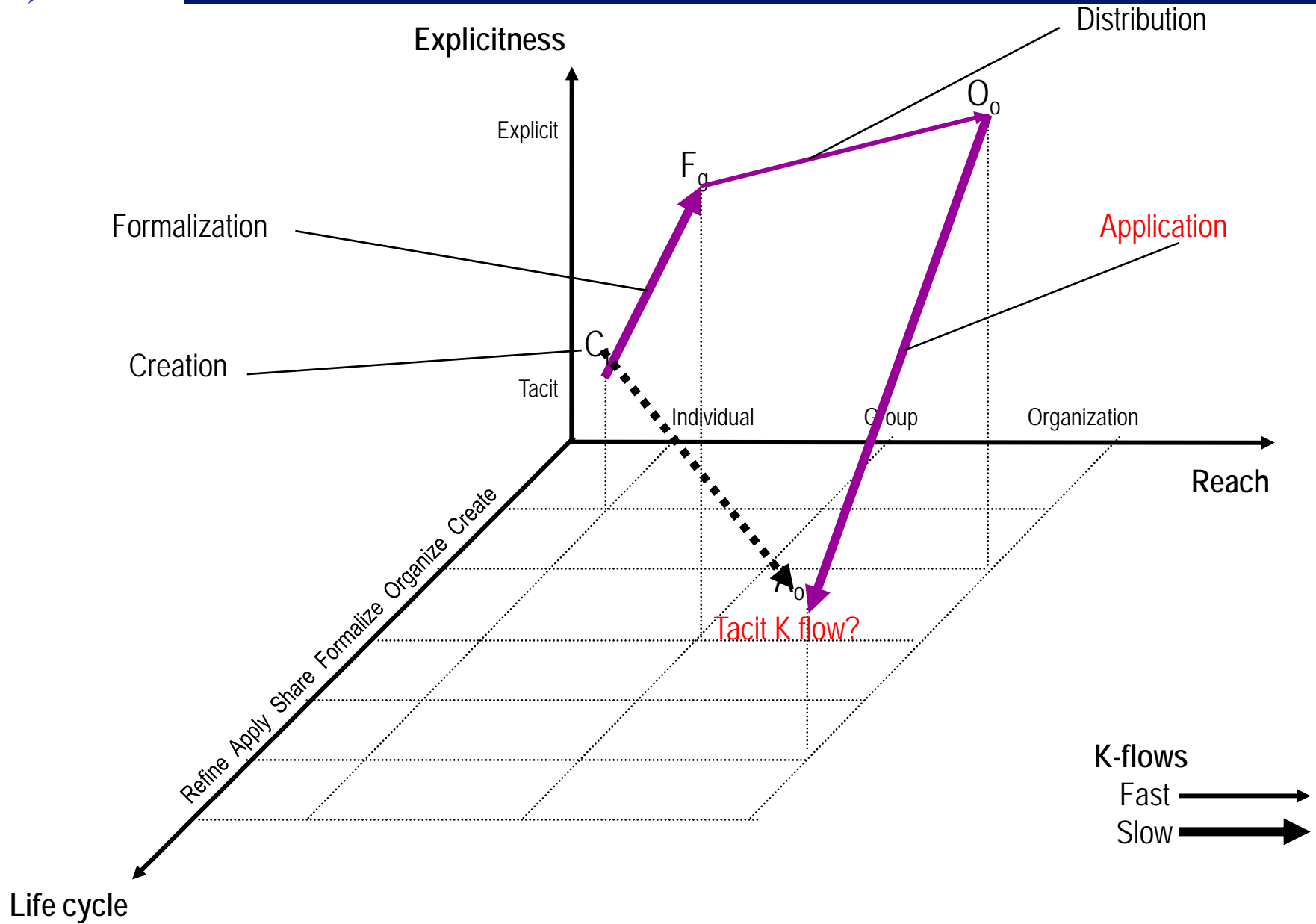


(adapted from Nissen, *Harnessing Knowledge Dynamics: Principled Organizational Knowing & Learning*, IRM Press 2006)

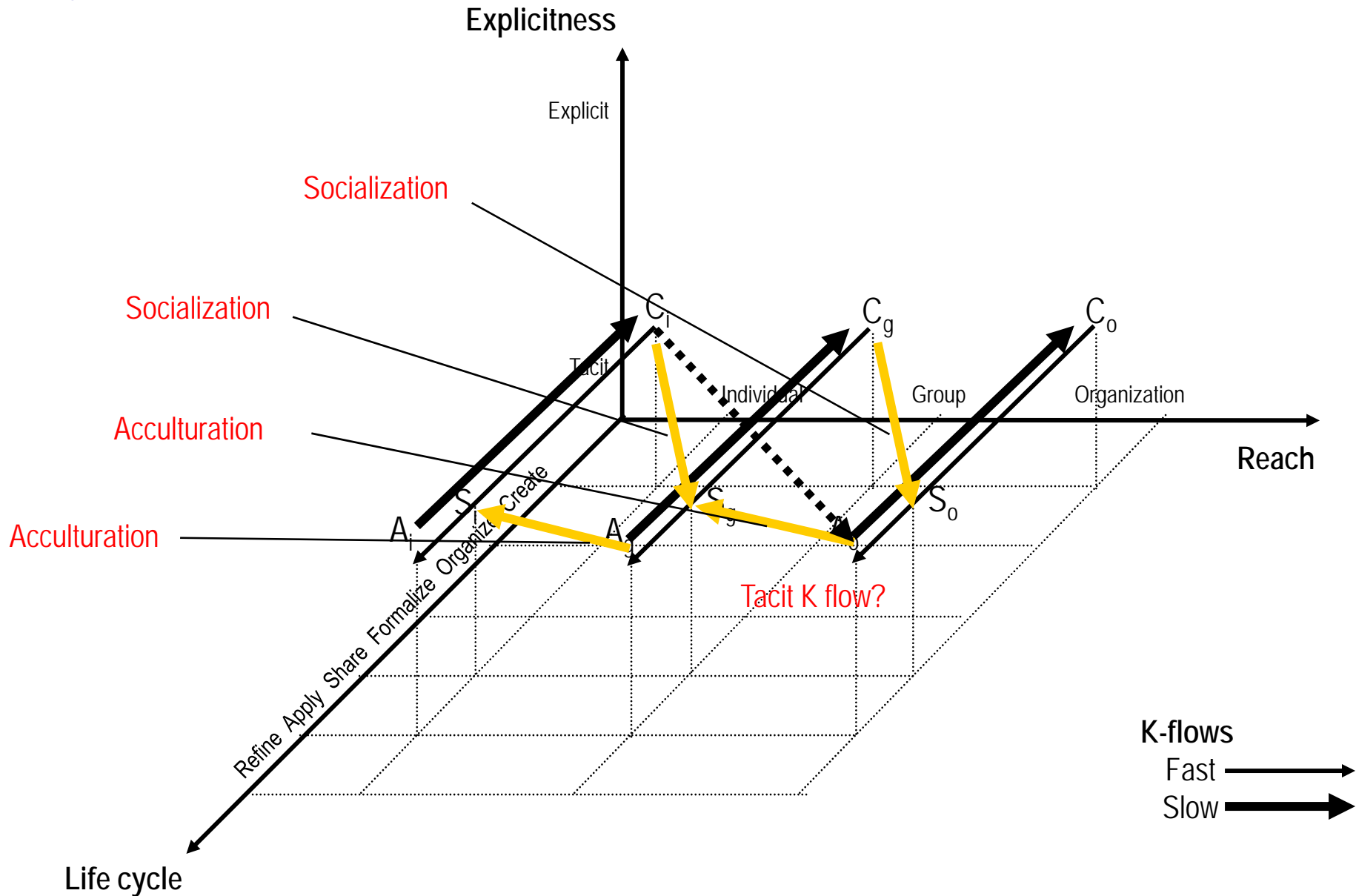
Experience Pattern



Formalization Pattern



Socialization Pattern



"Best"?

Explicitness

Explicit

O_0

F_g

C_i

C_g

C_o

Tacit

Individual

Group

Organization

Reach

A_i

A_g

S_o

Refine Apply Share Formalize Organize Create

Life cycle

K-flows

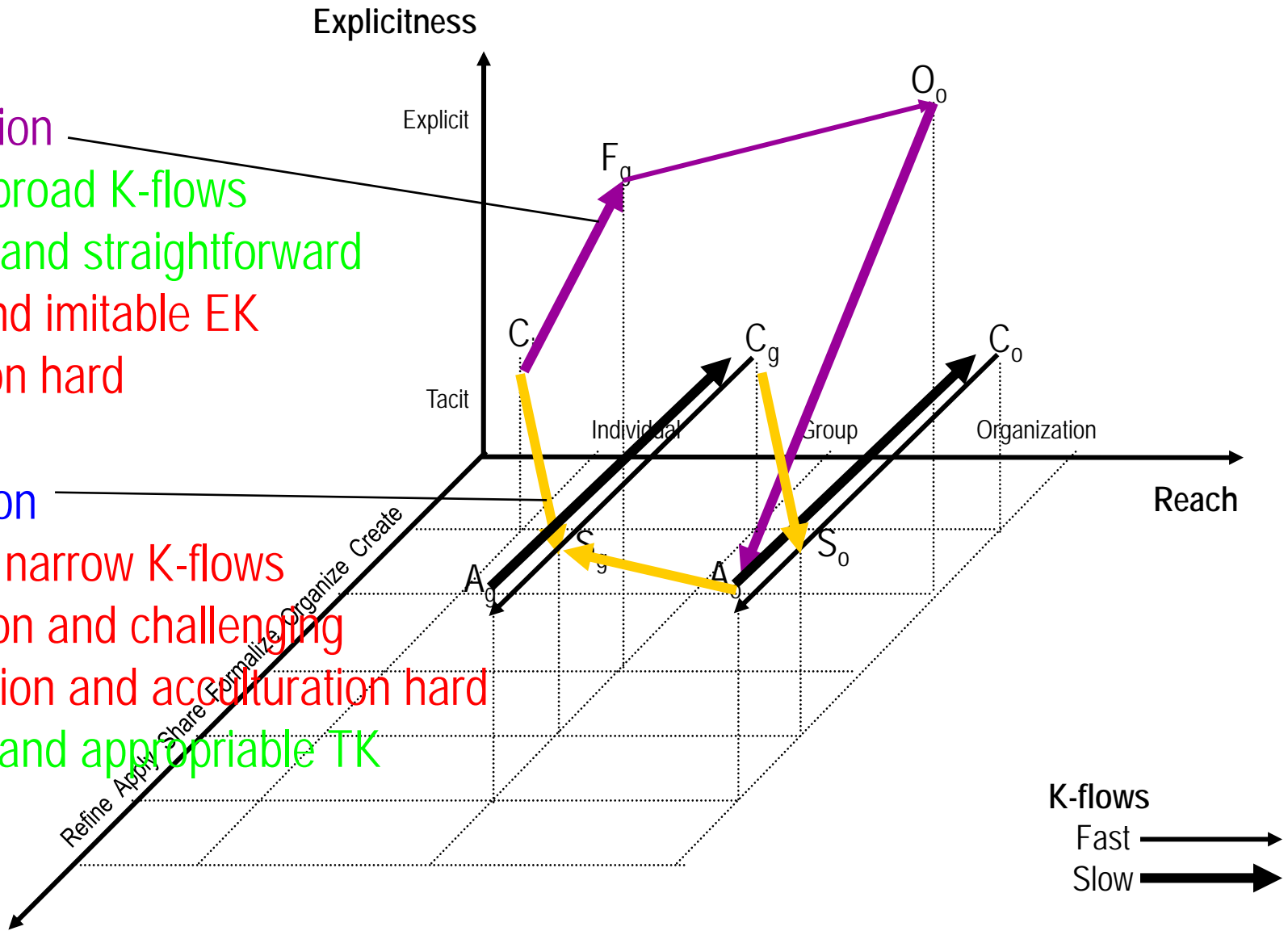
Fast \longrightarrow
Slow \longrightarrow

Formalization

- fast and broad K-flows
- common and straightforward
- diluted and imitable EK
- application hard

Socialization

- slow and narrow K-flows
- uncommon and challenging
- socialization and acculturation hard
- powerful and appropriable TK



Risks

Explicitness

Explicit

O_0

F_g

C_i

C_g

C_o

Tacit

Individual

Group

Organization

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A_i

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Refine Apply Share Formalize Organize Create

Life cycle

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Center for Edge Power - Welcome

The Center for Edge Power is sponsored by the Office of the Assistant Secretary of Defense for Networks and Information Integration (OASD-NII), through its Command and Control Research Program (CCRP; see <http://www.dodccrp.org/index.html>).

The Center activities are coordinated through the Naval Postgraduate School. [Professor Mark Nissen](#) serves as Director. Research associated with this Center is multidisciplinary, innovation-oriented, and reaches well beyond the NPS, involving a world-class team of faculty, postdocs and PhD students from multiple, top universities (e.g., Stanford, Southern Cal).

See additional information on this site pertaining to the Center's mission, participants, activities, work products, collaboration opportunities, and contacts.

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Mission of the Center for Edge Power

In FY04, the Department of Defense (DoD) Command and Control Research Program (CCRP; see <http://www.dodccrp.org/index.html>) launched a set of related initiatives designed to explore innovative behaviors, organizations, technologies and their implications for command and control (C2). One of these initiatives established the Virtual Edge Institute: a network of research centers located at colleges, universities and research organizations both within DoD and in the Private Sector. The first of these Centers—the Center for Edge Power—was established, through funding from the Office of the Assistant Secretary of Defense for Networks and Information Integration (OASD-NII), for innovative C2 research at the Naval Postgraduate School (NPS). Professor Mark Nissen serves as Director.

The Center for Edge Power fosters, coordinates and promotes multidisciplinary research on all elements of network-centric operations (e.g., including concepts, organization, command and control, management, doctrine, personnel, technology). The term *edge* derives from the recent book entitled [Power to the Edge](#) (Alberts and Hayes, 2003), which depicts new ways of organizing military forces and of enabling more powerful warfare by leveraging shared awareness and dynamic knowledge. The central premise is that power (i.e., the capability to accomplish intended actions) needs to flow from the "centers" of military organizations to their "edges." Using this metaphor, center refers principally to headquarters (e.g., where decision makers request information from the field), and edge refers principally to front lines (e.g., where combatants—at the pointy end of the metaphorical spear—fight wars). The concept clearly involves more than simply realigning organization charts and reallocating decision rights. People at the edges of organizations must: be aware of command intent; know how to accomplish tasks, activities and processes; and be able to self-organize and self-synchronize to achieve the desired effects.

Although the Center for Edge Power focuses on military organizations and problems, the edge concept applies well to business, government and other organizational domains also. For instance, the edge of a business organization is where customer interactions take place. Approaches to work, organization, management and technology other than the Edge will be conceived, investigated and refined as well. And a fluid flow of concepts and applications, both to and from public- and private-sector organizations, is envisioned to occur.

Participants in the Center for Edge Power

The Center activities are coordinated through the Naval Postgraduate School. Research associated with this Center is multidisciplinary, innovation-oriented, and reaches well beyond the NPS, involving a world-class team of faculty, postdocs and PhD students from multiple, top universities around the world. Key participants are listed below.

Naval Postgraduate School Participants

Push SOTA/P
"C2"/OMT

Participants

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Other University Participants

- **Academia Militar**
Fernando Freire, Colonel, Operational Research/Decision Management and Theory
Marco Manso, MSE, Edisoft Corporation
- **Hoover Institution**
Katya Drozdova, PhD, Research Associate
- **Johns Hopkins University**
Jay Liebowitz, PhD, Carey Business School
- **Parity Corporation**
Mary Ruddy, MSIS, ELICIT
- **Purdue University**
Hong Wan, PhD, School of Industrial Engineering
- **Referentia Corporation**
Adam Forsyth, PhD, Technical Staff
- **Stanford University**
Raymond Levitt, PhD, School of Civil & Environmental Engineering
Ryan Orr, PhD, Center for Research on Global Projects
Marc Ramsey, Center for Research on Global Projects
W. Richard Scott, PhD, Department of Sociology (Emeritus)
- **Universität der Bundeswehr München**
Petra Eggenhofer, PhD, Institute of Technology of Intelligent Systems
Reiner Huber, PhD, Institute of Technology of Intelligent Systems (Emeritus)
- **University of California at Irvine**
Walt Scacchi, PhD, Institute for Software Research
- **University of Kentucky**
Clyde Holsapple, PhD, School of Management
- **University of Southern California**
Clayton Morrison, PhD, Information Sciences Institute
Yan Jin, PhD, School of Engineering
- **University of Washington**
Kevin Desouza, PhD, School of Information
Sumit Roy, PhD, School of Engineering
- **US Office of the Secretary of Defense**
David Albers, PhD, Networks & Information Integration/Command & Control Research Program
Alenka Brown, PhD, Networks & Information Integration/Defense Threat Reduction Agency

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World-class
& worldwide

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Activities of the Center for Edge Power

The Center for Edge Power engages currently in three primary activities: 1) research, 2) outreach, and 3) Center development.

Research – this represents the focal task of the center. Five interrelated research projects are in work currently.

1. **Research Area A – Hypothesis Testing of Edge Organizations.** This project seeks to employ existing tools and methods of computational organization theory to test hypotheses pertaining to Edge organizations. Various conceptual models are evaluated and critiqued. These models are used in turn as a point of departure for conceptualization and operationalization of computational models. Performance metrics are developed and used to test computationally Edge Organization hypotheses. New knowledge about the contexts in which Edge organizations are suited relatively better and worse than other organizational forms is expected.
2. **Research Area B – Near-Optimizing Knowledge and Power Flows.** This project seeks to understand how flows of knowledge can enable and enhance flows of power to the edges of organizations. Theory-driven models of knowledge and power flows are used to complement models of workflows and information flows in both Edge and hierarchical military organizations. An experiment, conceived, designed, and conducted in accordance with the COBP for Experimentation and the COBP for Campaigns of Experimentation, is used to understand better how different organizational configurations and knowledge dynamics affect power and performance in Edge and other kinds of organizations. New knowledge about how to facilitate, enhance and measure knowledge flows and organizational power is expected.
3. **Research Area C – Infrastructure Enhancement.** This project seeks to develop appropriate tools to create virtual environments and/or explore flows of knowledge within distributed organizations and modeling trust relationships between actors, including those who come from differing organizational and/or cultural backgrounds
4. **Research Area D – Exploring and Exploiting Inter cultural Knowledge Flows and Organizational Forms.** This project seeks to understand how cultural differences affect Edge and other organizational forms where knowledge flows are important. The organizational studies literature is used to examine how various organizational forms accommodate and exacerbate cultural differences (e.g., across military services and coalition partners), and the project draws from emerging knowledge-flow theory to examine intercultural, inter-organizational knowledge work as a balance between exploration (i.e., knowledge flows associated with organizational learning) and exploitation (i.e., workflows associated with organizational doing). A demonstration experiment is used to illustrate how different organizational cultures and knowledge dynamics affect power and performance in Edge and other kinds of organizations. New knowledge about how to facilitate, enhance and measure knowledge flows across cultural barriers is expected.
5. **Research Area E – Emerging Research.** Research in this area seeks to promote emerging C2 research that may not be described well within the four areas above, and to catalyze innovation further beyond the innovative areas under investigation currently.

Outreach – this represents an important focus of the center. The goal is to reach out to top-tier academic institutions, with the idea of engaging top faculty and graduate students in research on Edge organizations, and to leaders and managers in military, government and commercial organizations, with the idea of informing them about Edge organizations. Two workshops are planned for each fiscal year, and the Center also solicits informed proposals for collaborative research.

Center Development – this represents the small infrastructural part of the center. A center identity, reflecting the multidisciplinary, multi-university, multi-year, virtual nature of the Center is established, developed and marketed.

Research
& outreach

14

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Work Products of the Center for Edge Power

Principal work products include research papers and presentations.

Research Papers - 2009:

Powley, E.H. Nissen, M.E. Powley, E.H. and Nissen, M.E., "[Responding to Counterterrorism Threats: Effects of Coalition Trust and Mistrust on Organizational Design](#)," NPS Technical Report NPS-GSBPP-09-001 (February 2009).

Research Papers - 2008:

Nissen, M.E. Leweling, T.A. Nissen, M.E. and Leweling, T.A., "[Conceptualizing Dynamic Organizational Fit in Multicontingency Contexts](#)," *Proceedings Academy of Management Conference*, Anaheim, CA (August 2008).

Barrett, F. Nissen, M. Barrett, F., Nissen, M., "[Self-Organization and Synchronization at the Edge: Situated Action, Identity and Improvisation](#)," *Proceedings International Command & Control Research & Technology Symposium*, Bellevue, WA (June 2008).

Desouza, K. C. Roy, S. Lin, Y. Desouza, K. C., Roy, S., Lin, Y., "[Performance Measures for Edge Organizations: A Preliminary Report](#)," *Proceedings International Command & Control Research & Technology Symposium*, Bellevue, WA (June 2008).

Holsapple, C.W. Li, X. Holsapple, C.W., Li, X., "[Understanding Organizational Agility: A Work-Design Perspective](#)," *Proceedings International Command & Control Research & Technology Symposium*, Bellevue, WA (June 2008).

Koons, J.L. Bekatoros, N. Nissen, M. Koons, J.L., Bekatoros, N., Nissen, M., "[C2 for Computer Networked Operations: Using Computational Experimentation to Identify Effects on Performance in Organizational Configurations within the Larger Network-Centric Environment](#)," *Proceedings International Command & Control Research & Technology Symposium*, Bellevue, WA (June 2008).

Liebowitz, J. Ivanov, E. Liebowitz, J., Ivanov, E., "[Extending Cross-Generational Knowledge Flow Research in Edge Organizations](#)," *Proceedings International Command & Control Research & Technology Symposium*, Bellevue, WA (June 2008); nominated for Best Student Paper Award.

Oh, R. Sanchez, S. M. Lucas, T. W. Wan, H. Oh, R., Sanchez, S. M., Lucas, T. W., Wan, H., "[Efficient Experimental Design Tools for Exploring Command and Control Organizational Structures](#)," *Proceedings International Command & Control Research & Technology Symposium*, Bellevue, WA (June 2008); nominated for Best Student Paper Award.

Ruddy, M. Nissen, M. Ruddy, M., Nissen, M., "[New Software Platform Capabilities and Experimentation Campaign for ELICIT](#)," *Proceedings International Command & Control Research & Technology Symposium*, Bellevue, WA (June 2008).

Scacchi, W. Jensen, C. Scacchi, W., Jensen, C., "[Governance in Open Source Software Development Projects Towards a Model for Network-Centric Edge Organizations](#)," *Proceedings International Command & Control Research & Technology Symposium*, Bellevue, WA (June 2008).

Research Papers - 2007:


Gateau, J.B. Gateau, J.B., Leweling, T.A., Looney, J.P. and Nissen, M.E., "[Hypothesis Testing](#)

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Journals & conferences

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NPS works with government laboratories, universities, industry, non-profits and other activities in the performance of its research mission.

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Contracts & Grants - Broad Agency Announcements (BAAs)

NPS's Long Range BAA

[Long Range Broad Agency Announcement \(BAA\) for Research and Education Initiatives at the Naval Postgraduate School](#)
(BAA 08-003 - Published on 1 April 2008)
Proposals will be accepted until 30 April 2009.

[Amendment 1](#)

Currently Active BAAs

Due	BAA #	BAA Title
Full Proposals due no later than 02/28/2010	NPS-BAA-09-001	Research on Edge Organizations in the Context of Network-Centric Operations
Full Proposals due no later than 06/30/2009	NPS-BAA-09-002	The Acquisition Research Program at the Naval Postgraduate School

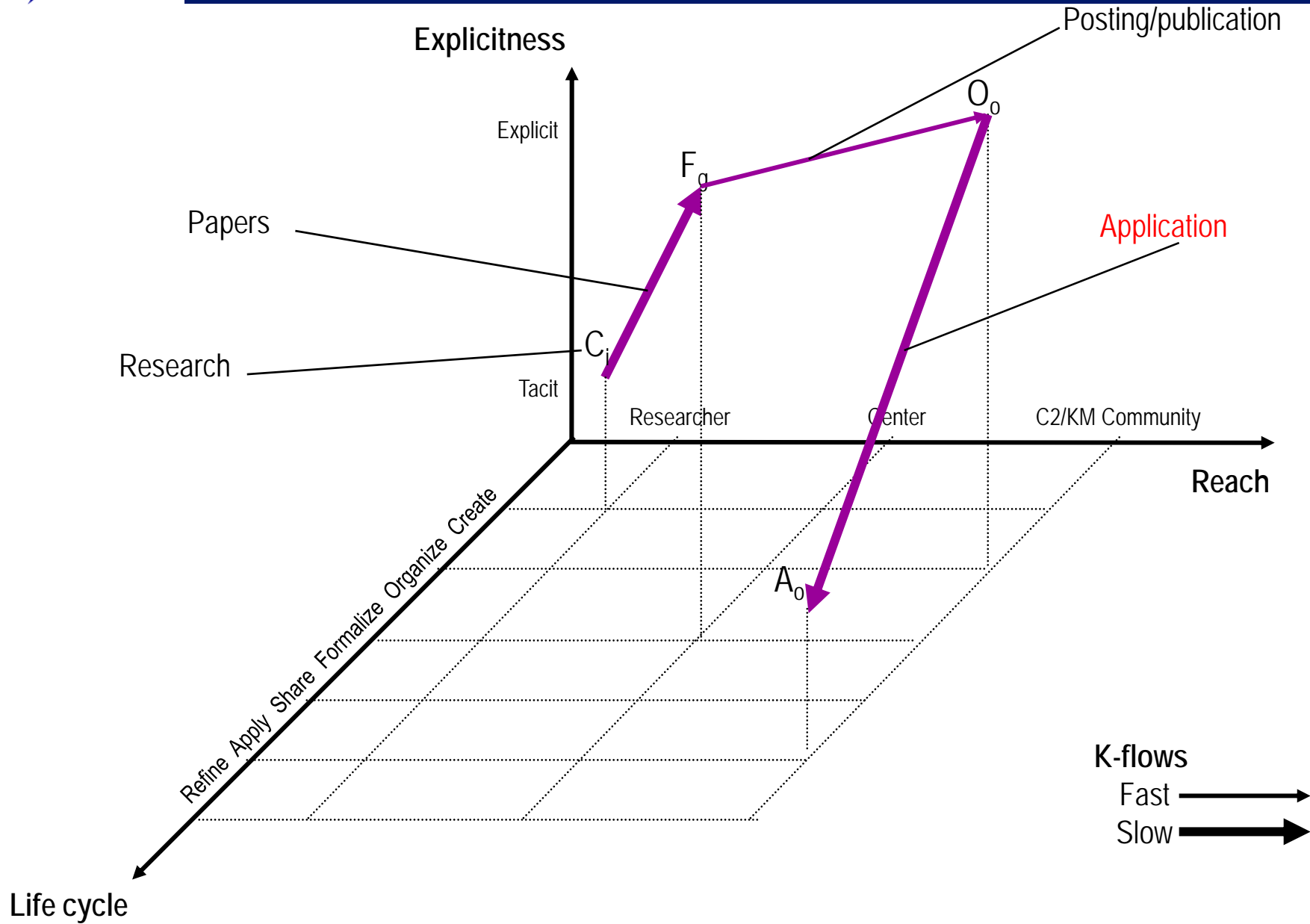
Expired NPS BAAs

- [NPS-BAA-07-001: Research on Edge Organizations in the Context of Network-Centric Operations](#)
- [NPS-BAA-07-002: Acquisition Research Program](#)
- [NPS-BAA-07-002: Acquisition Research Program Amendment 1](#)
- [NPS-BAA-07-002: Acquisition Research Program Amendment 2](#)
- [NPS-BAA-07-003: Research and Education Initiatives at the Naval Postgraduate School](#)
- [NPS-BAA-07-004: Science, Math, and Research for Transformation \(SMART\) Defence Education Program at NPS](#)
- [NPS-BAA-08-001: National Security Science and Engineering Faculty Fellowships \(NSSEFF\)](#)

Grant focus:
PhD students

- Research methods & tools
 - Grounded theory building → computational experimentation → laboratory experimentation → “field” experimentation → action research
 - nVivo, POWer, ELICIT, Trident Warrior, DoD/NATO/Coalition & SFBA/Sili Valley
- Domain expertise
 - C2/OMT: coalitions & social movements
 - K-flows: org diagnosis & design

Edge Center Pattern 1



Edge Center Pattern 2

Explicitness

Explicit

Workshops?
Common PhD students?
Cross-center collaboration?

Seminars/collaboration

Tacit

Researcher

Center

C2/KM Community

Reach

IS PhD program

A_i

Create

A_g

S_g

A_o

S_o

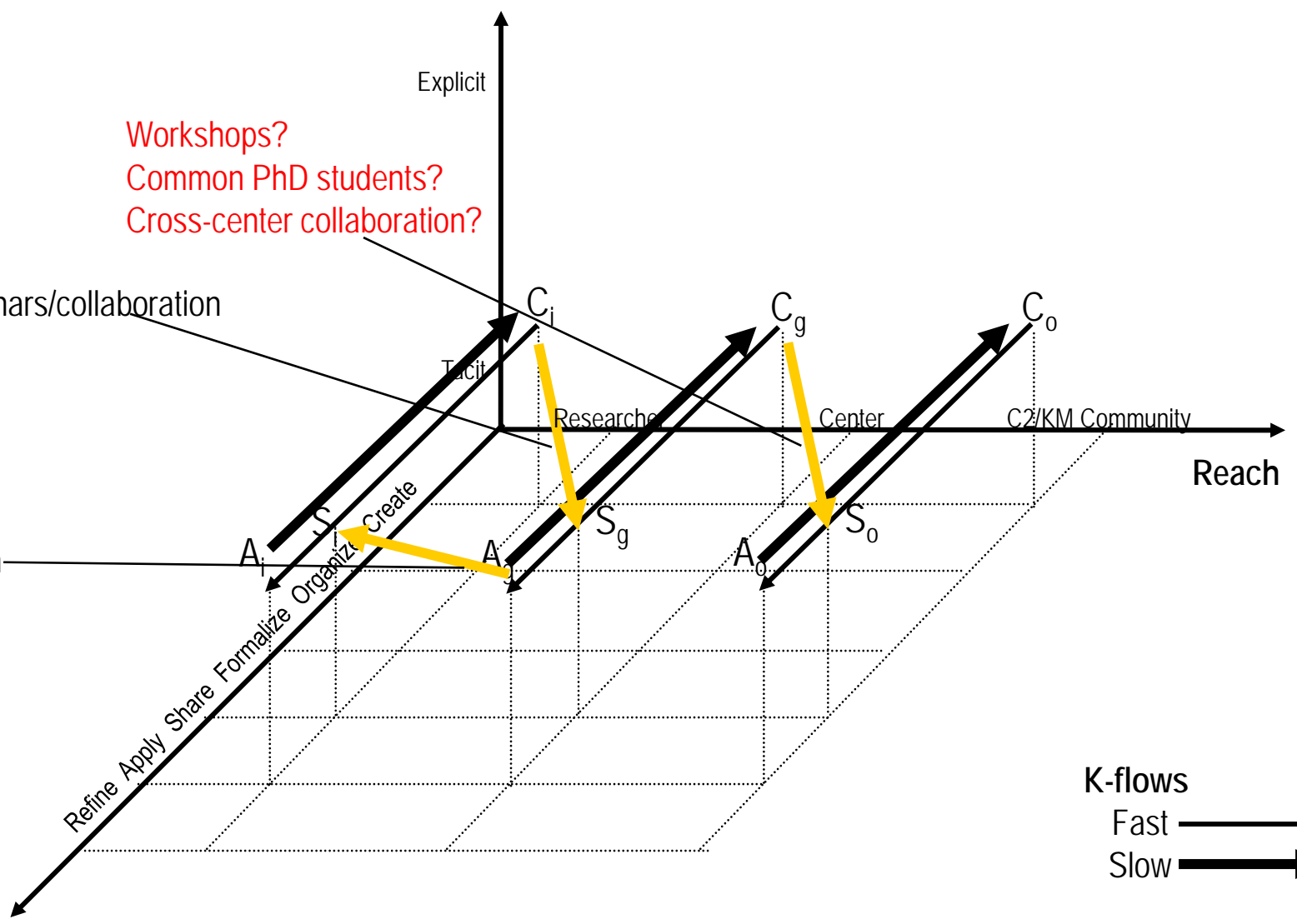
Refine Apply Share Formalize Organize

Life cycle

K-flows

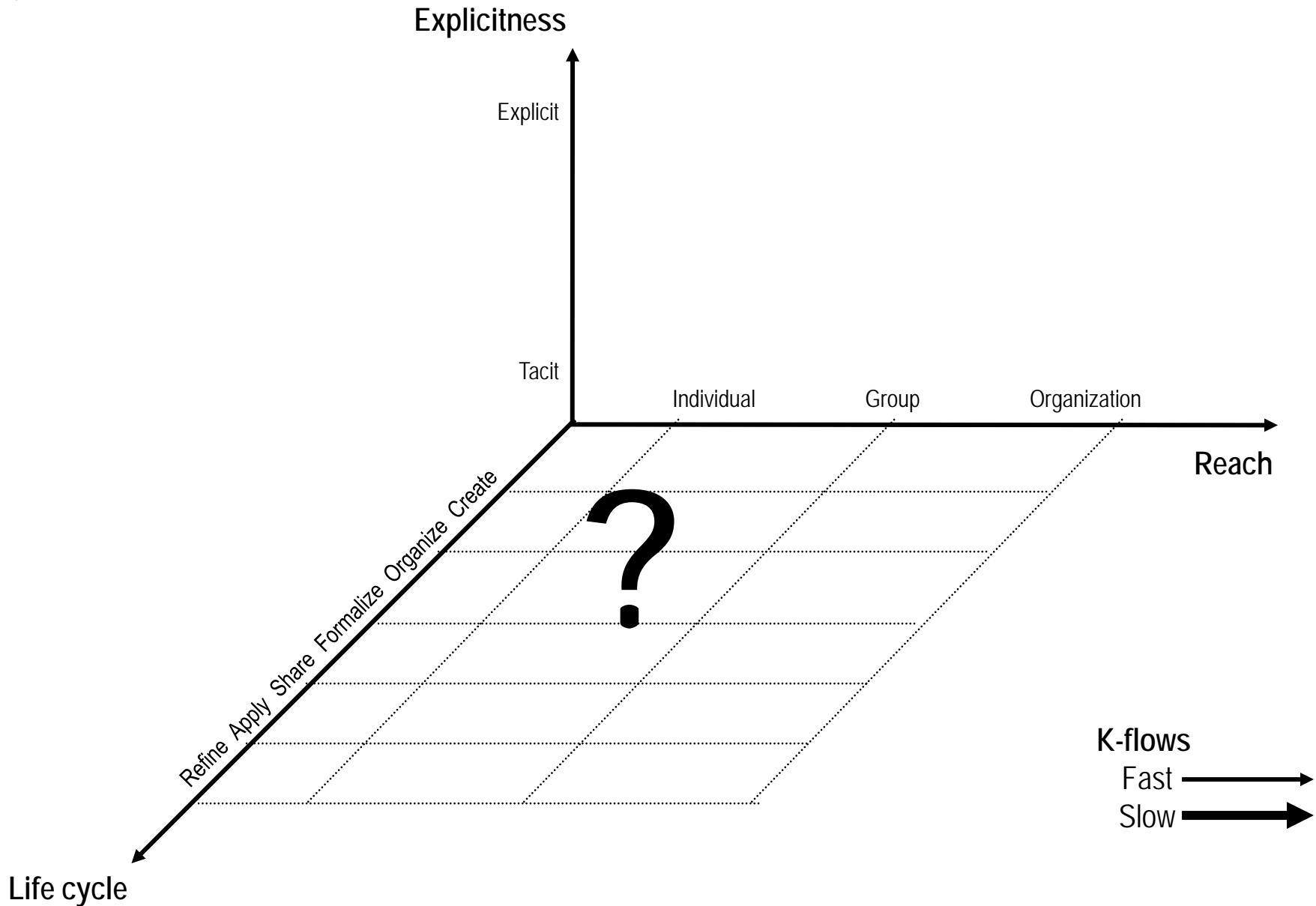
Fast 

Slow 





Monieson Center Pattern



Selected References

- Nissen, M.E., *Harnessing Knowledge Dynamics: Principled Organizational Knowing & Learning* Hershey, PA: IRM Press (2006).
- Nissen, M.E., "Dynamic Knowledge Patterns to Inform Design: A Field Study of Knowledge Stocks and Flows in an Extreme Organization," *Journal of Management Information Systems* 22:3 (2006), pp. 225-263.
- Nissen, M.E., Orr, R.J. & Levitt, R.E., "Streams of Shared Knowledge: Computational Expansion of Organization Theory," *Knowledge Management Research & Practice* 6:2 (2008), pp. 124-140.
- Nissen, M.E., "Keynote Paper: Enhancing Organisational Metacognition – Flow Visualisation to Make the Knowledge Network Explicit," *International Journal of Networking and Virtual Organisations* 4:4 (2007), pp. 331-350.
- Leweling, T.A. & Nissen, M.E., "Hypothesis Testing of Edge Organizations: Laboratory Experimentation using the ELICIT Multiplayer Intelligence Game," *Proceedings International Command & Control Research & Technology Symposium*, Newport, RI (June 2007); nominated for the Best Paper Award.
- Powley, E.H. & Nissen, M.E., "Trust-Mistrust as a Design Contingency: Laboratory Experimentation in a Counterterrorism Context," *Proceedings International Command & Control Research & Technology Symposium*, Washington, DC (June 2009).

Thank You

