

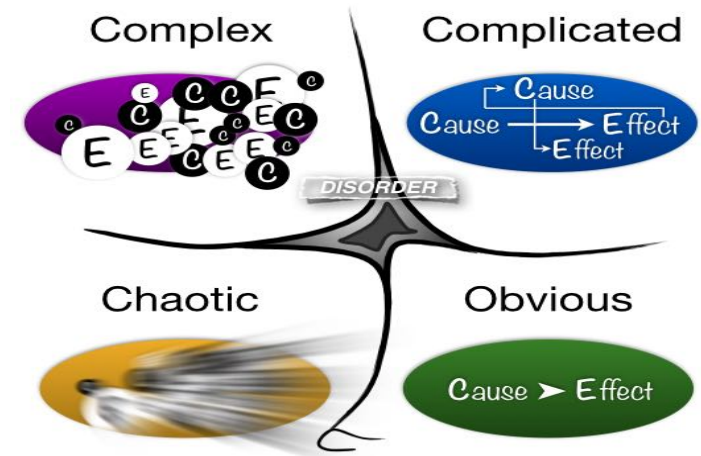


28th Annual **INCOSY**
international symposium

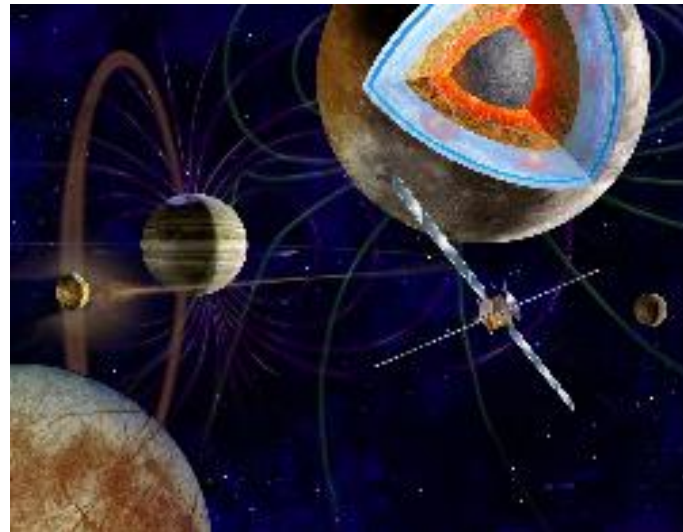
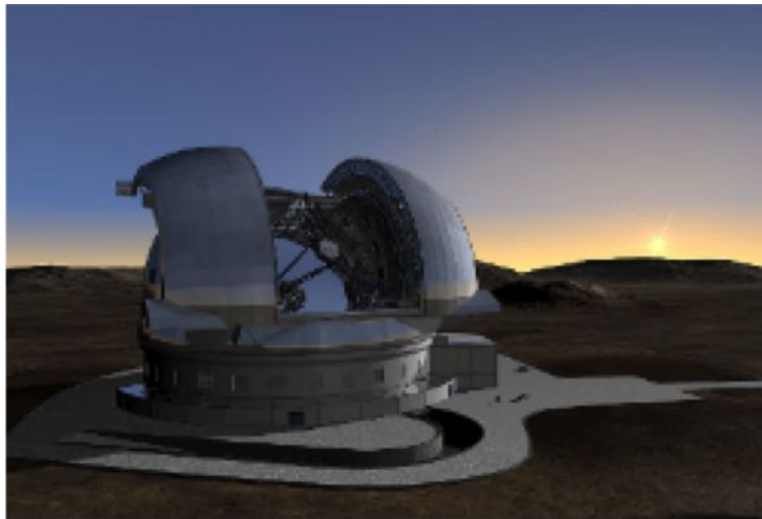
Washington, DC, USA
July 7 - 12, 2018

The Cynefin Framework and Technical Competencies. A New Guideline to Act in the Complexity

D. Fierro, L. Tirone



INAF – National Institute For Astrophysics



Project Life Cycle



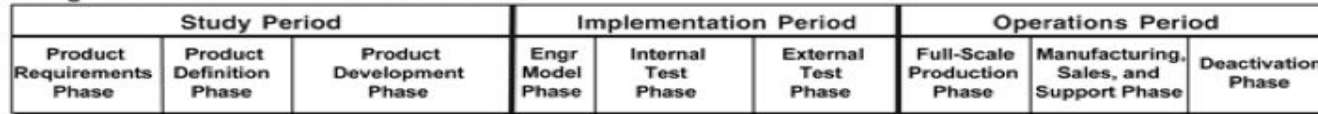
Generic Life Cycle (ISO 15288:2008)



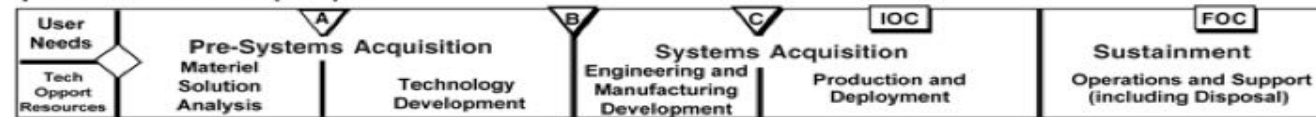
Typical High-Tech Commercial Systems Integrator



Typical High-Tech Commercial Manufacturer



US Department of Defense (DoD) 5000.2



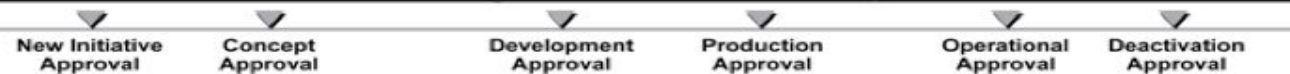
NASA



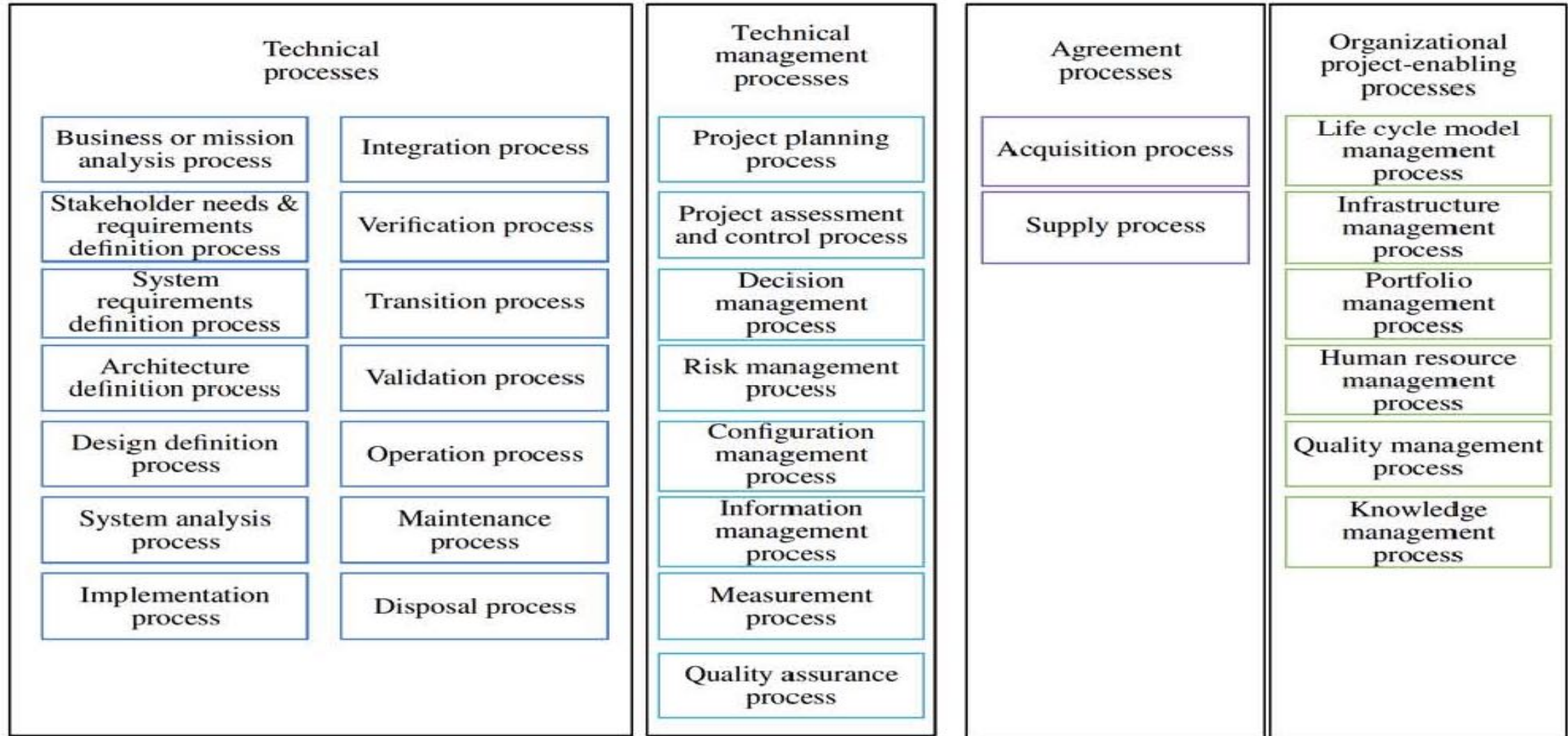
US Department of Energy (DoE)



Typical Decision Gates



Processes





Knowledge

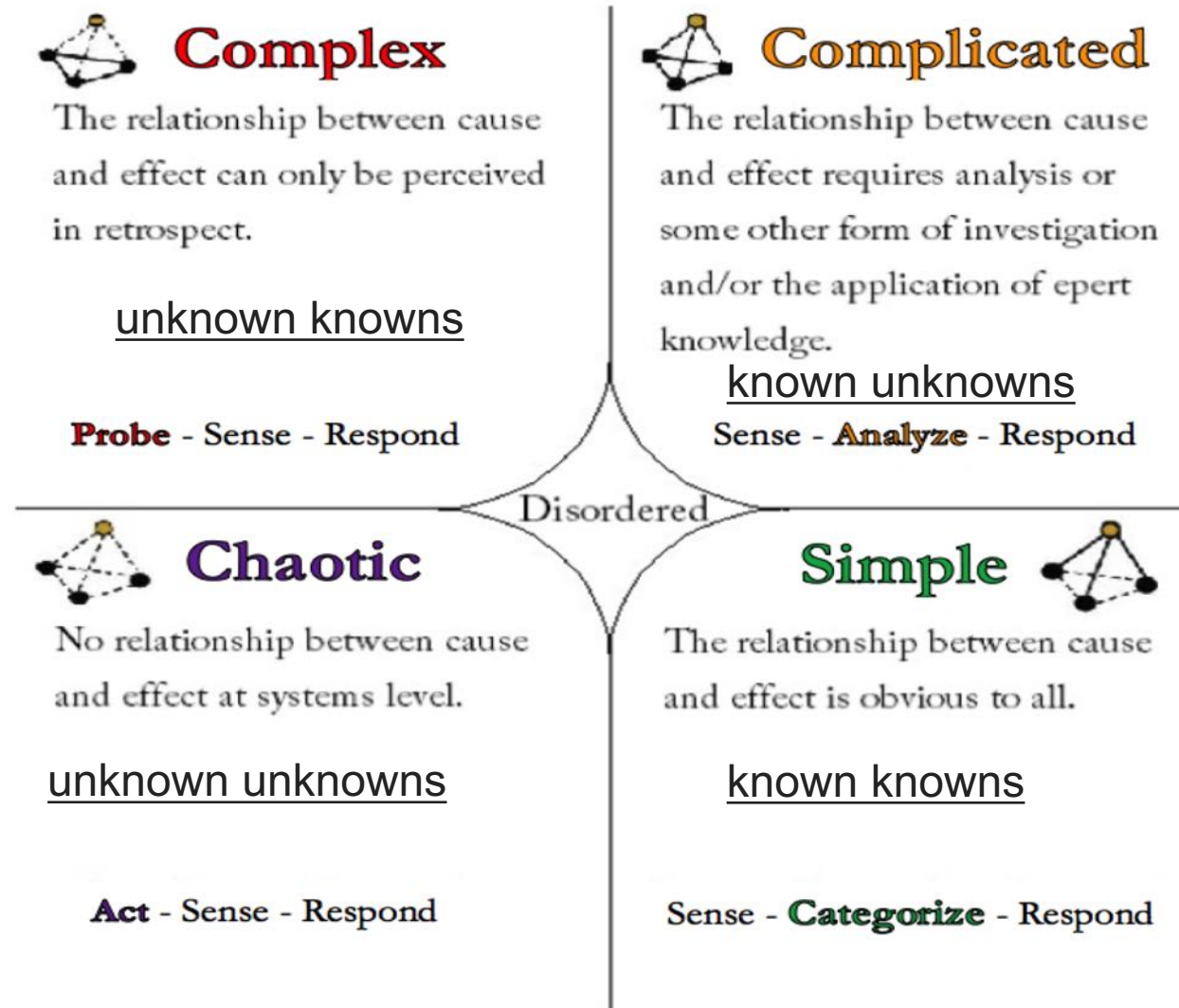
- Know-why Learning by studying
- Know-how Learning by doing
- Know-what Learning by using

Prof .John Dutton and Annie Thomas

Graduate School of Business Administration, New York University



Cynefin Framework



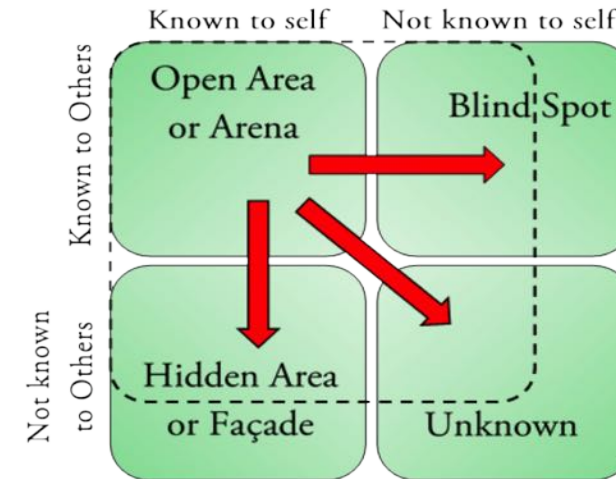
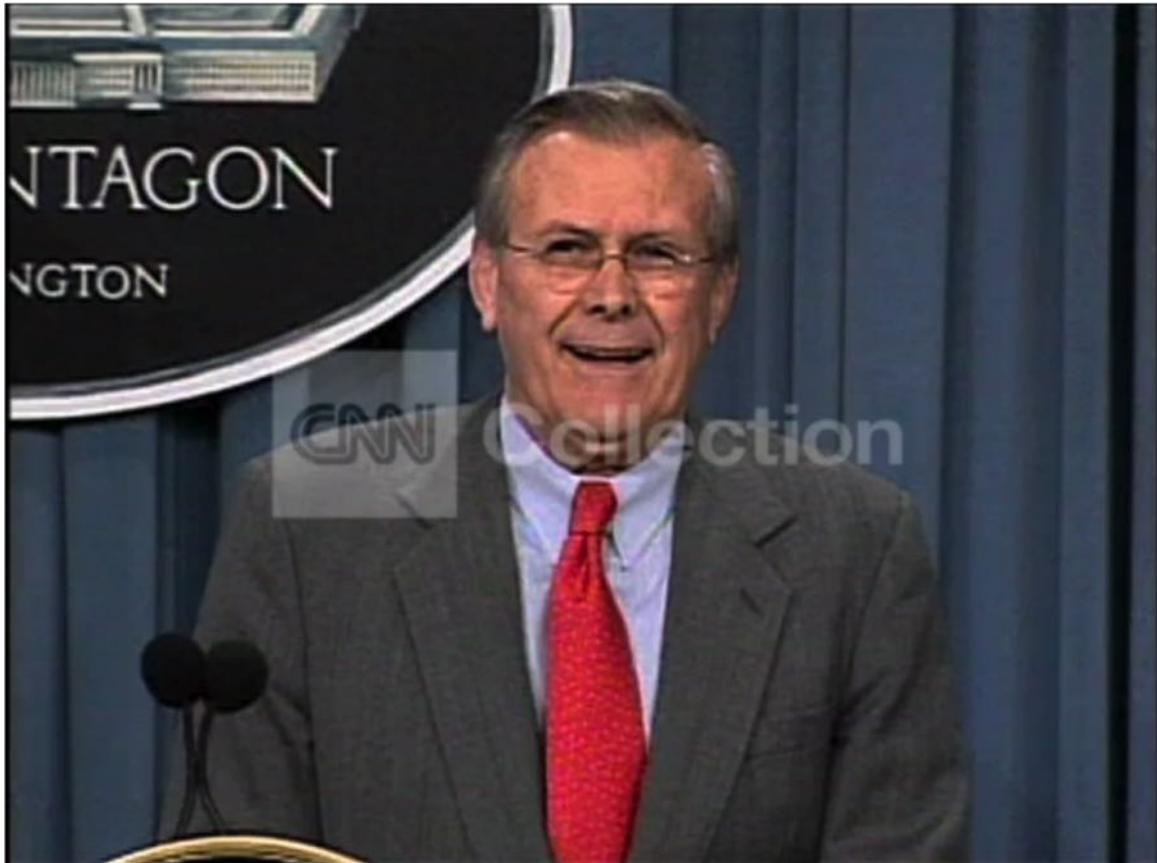
[Cynthia F. Kurtz](#), [David J. Snowden](#)

The new dynamics of strategy: sense-making in a complex and complicated world





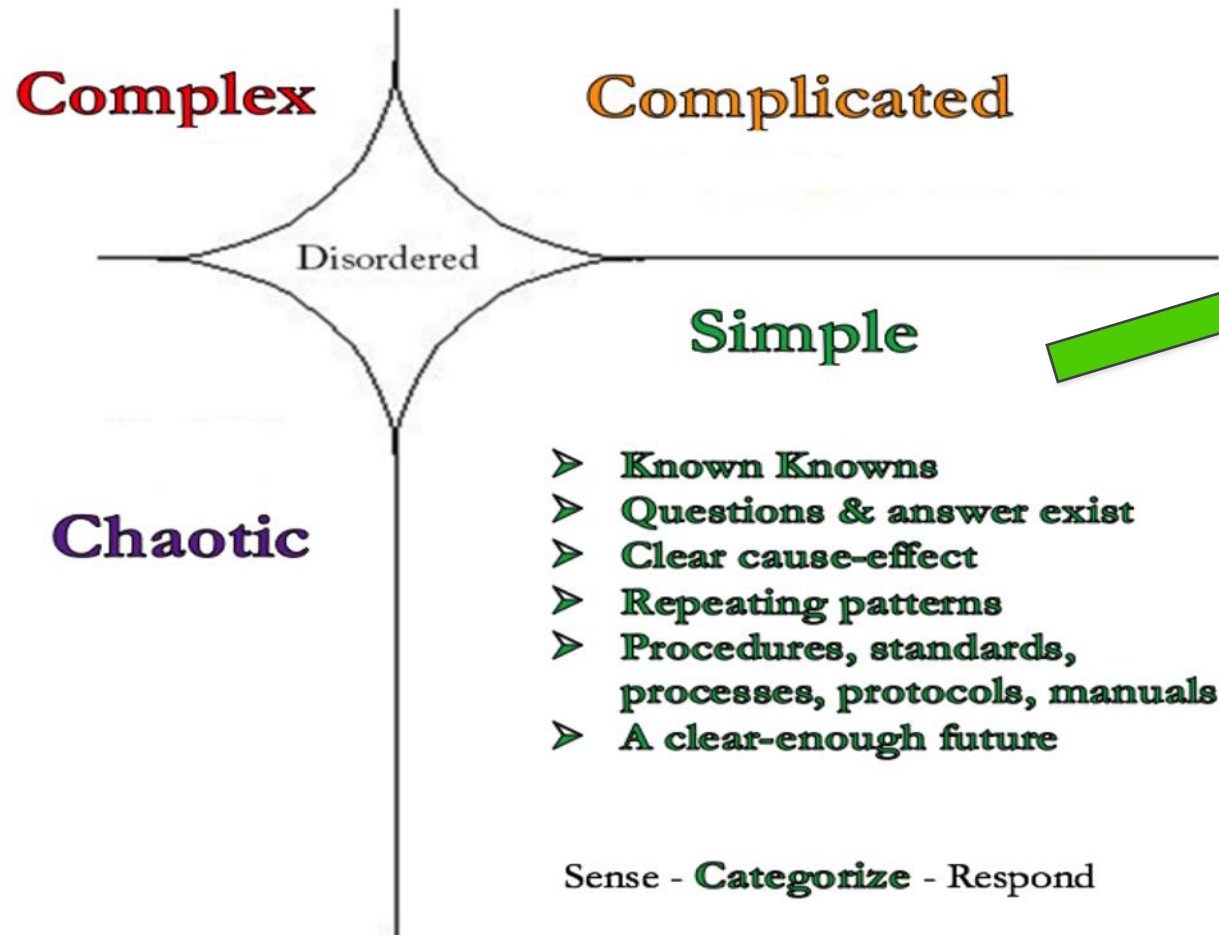
U.S. Department of Defense (DoD) on February 12, 2002



...something hasn't happened are always interesting to me, because as we know, there are known knowns; there are things we know we know. We also know there are known unknowns; that is to say we know there are some things we do not know. But there are also unknown unknowns – the ones we don't know we don't know.

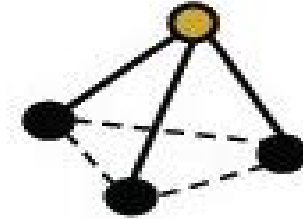


Simple



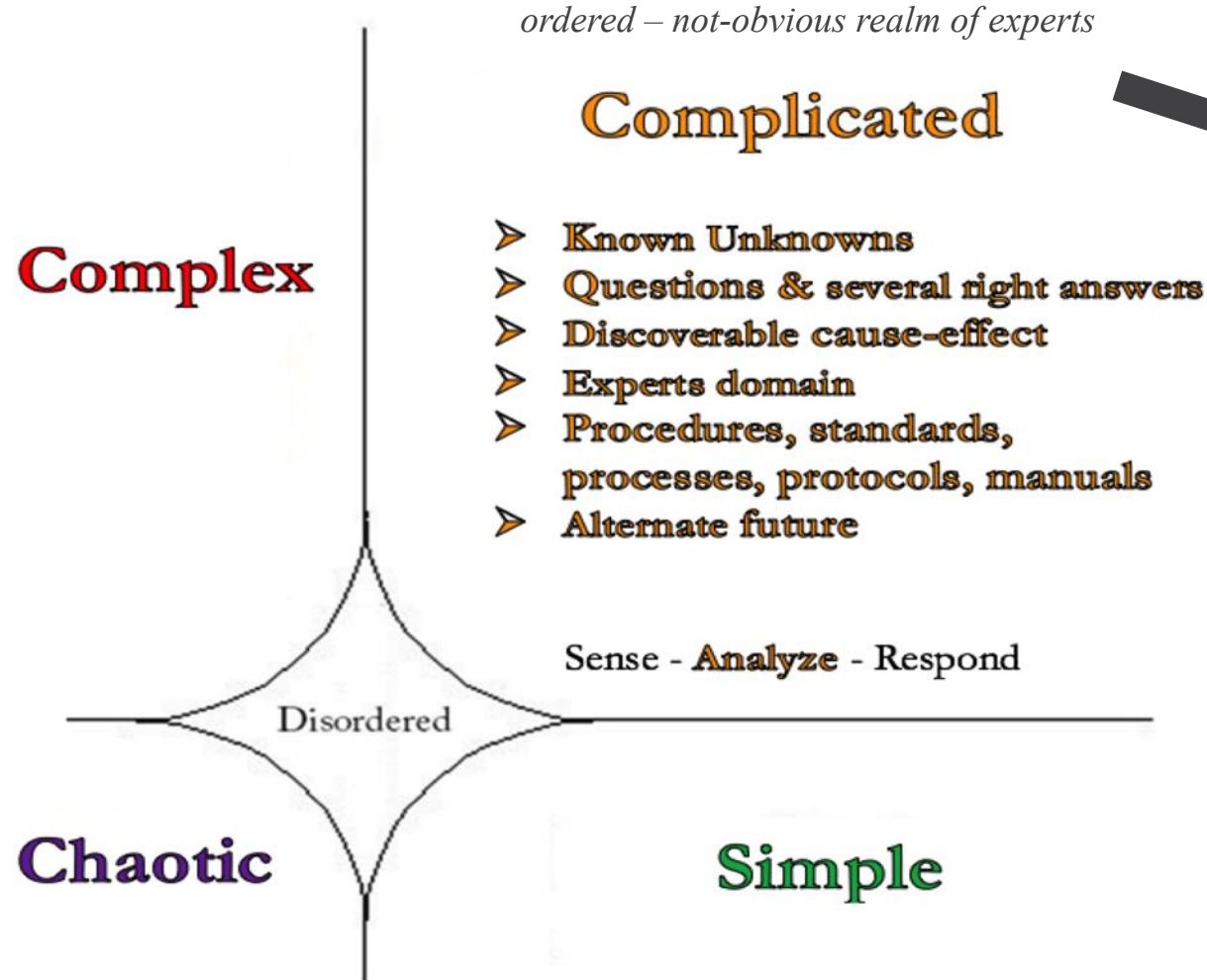
ordered and obvious

Management approach

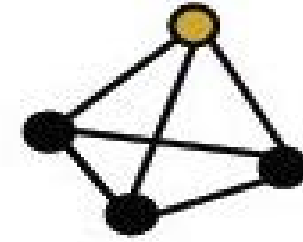


- Sense, categorize, respond
 - Fact Based Management
 - Best practices
 - Authority command and control
 - Instructions to collaborators
 - Correct language-no ambiguity
 - Waterfall model
- Risks**
- Mis-categorization-Wrong procedures
 - Entrenched thinking
 - Complacency & Resistance to change

Complicated



Management approach



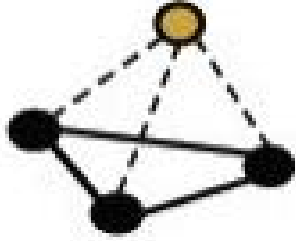
- Sense, analyse, respond
- Reductionism, system elements
- Oligarchic approach
- Fact Based Management, Good practices
- Flexible, open and analytical mindset to encourage and evaluate contributions
- Incremental

Risks

- Over-confidence, overlook-lost opportunities
- Over-analysis-paralysis
- Entrenched thinking

Complex

Management approach



Realm of unordered—obvious in hindsight

- Probe, sense, respond
- Investigate and do experiment before action
- Visionary, pioneer, researcher
- Creative, agile and innovative approach
- Holism, synthesis
- Pattern Based Management
- Ride emergent practices
- Fail fast & safe, learn fast, risk mitigation
- Evolutionary

Risks

- No learn, scarce tolerance to failure
- Impatience
- Revert to simple strategies
- Determinism, over-control

Complex

- **Unknown Knowns**
- **Unpredictability**
- **No questions & answers clear in hindsight**
- **Cause-effect clear in hindsight**
- **Emergent patterns**
- **Many competing ideas**

Probe - Sense - Respond

Chaotic

Complicated

Disordered

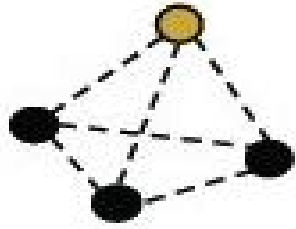
Simple





Chaotic

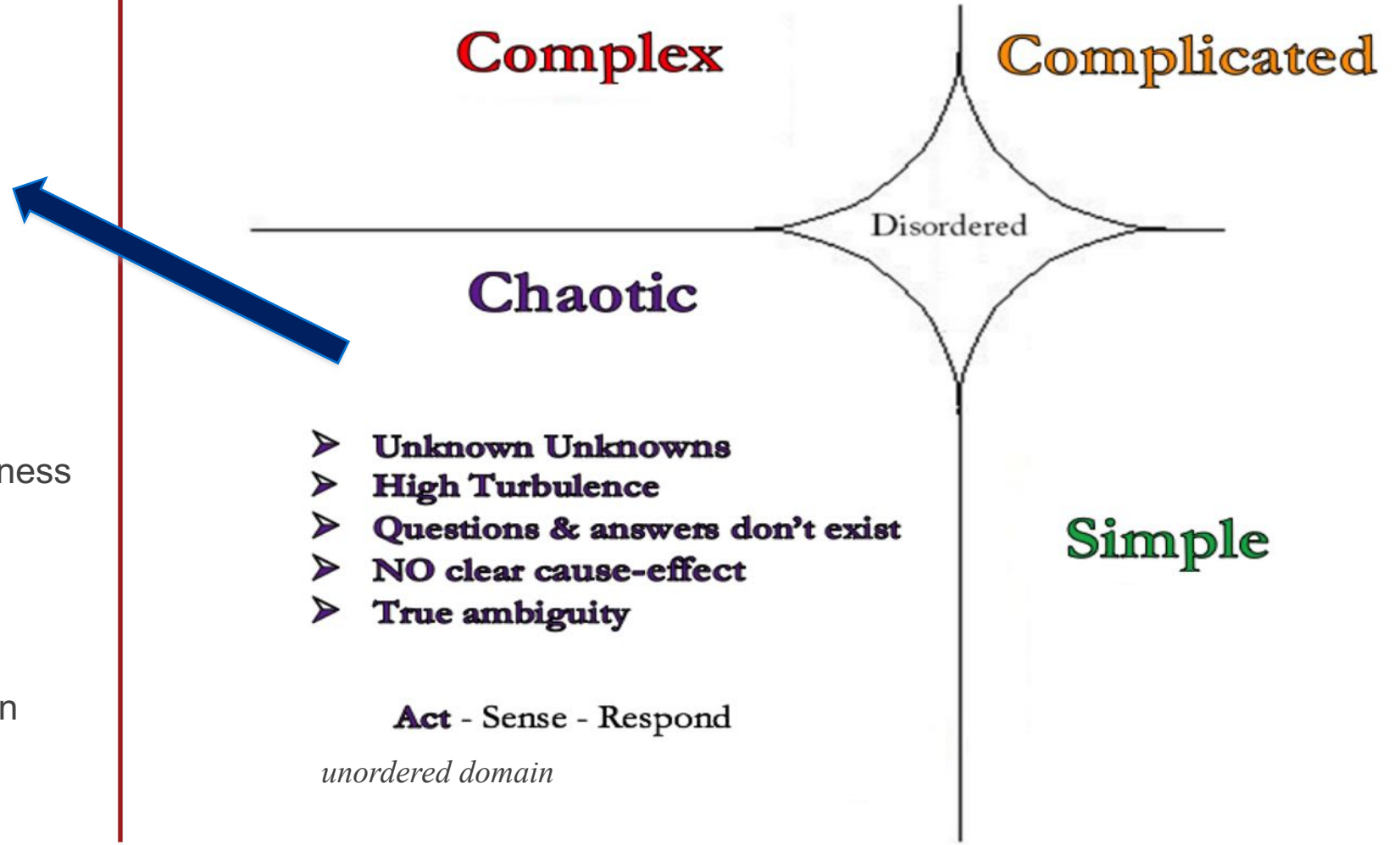
Management approach



- Act, Sense, Respond
- Act decisively to avoid collapse
- Entice the crowd to follow us
- Hero/Draconian approach
- Command and control
- Authority, charisma, authoritativeness
- Novel practices (bright, original)
- Many decision, no time

Risks

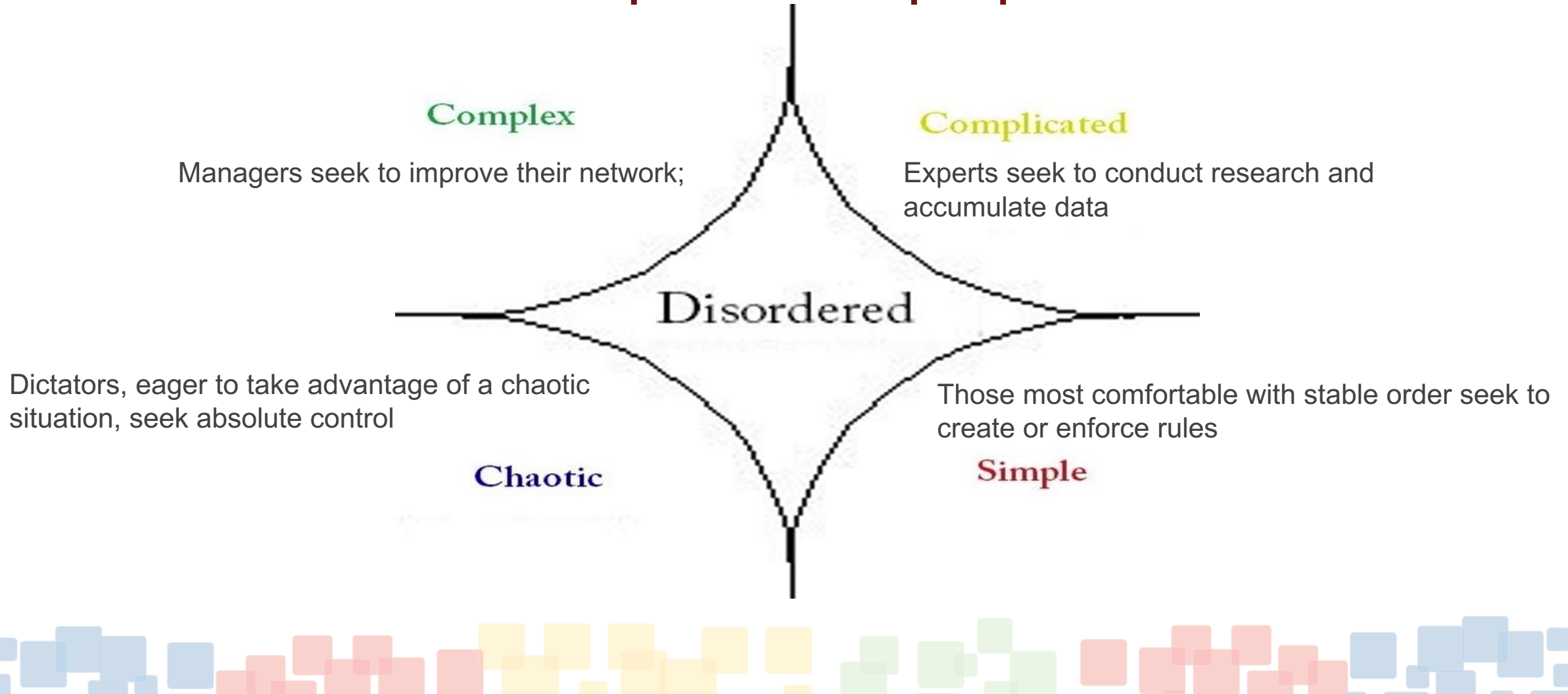
- Command and control longer than needed, enforcing chaos
- Missed opportunity



Disordered



In this scenario people try to move towards the one of the four contexts on the basis of their individual capabilities and perspectives.



Leadership Table



	Contest's characteristics	Leader's job	Danger signals	Response to danger signals
Simple	<p>Repeating patterns and consistent events</p> <p>Clear cause-and-effect relationships evident to everyone; right answer exists</p> <p>Known knowns</p> <p>Fact-based management</p> <p>Standard rules procedures, protocols or manuals</p>	<p>Sense, categorize, respond</p> <p>Ensure that proper processes are in place</p> <p>Delegate</p> <p>Best practices</p> <p>Communicate in clear, direct ways</p> <p>Understand that extensive interactive communication may not be necessary</p> <p>Clear line of authority</p> <p>No ambiguity</p> <p>Command – Control style</p> <p>Waterfall approach</p>	<p>Complacency and comfort</p> <p>Desire to make complex problems simple</p> <p>Entrained thinking</p> <p>No challenge of received wisdom</p> <p>Overreliance on best practice if context shifts</p> <p>Wrong categorization</p>	<p>Create communication channels to challenge orthodoxy</p> <p>Stay connected without micromanaging</p> <p>Don't assume things are simple</p> <p>Recognize both the value and the limitations of best practice</p> <p>Johari window</p> <p>ADKAR model</p>
Complicated	<p>Expert diagnosis required</p> <p>Cause-and-effect relationships discoverable but not immediately apparent to everyone; more than one right answer possible</p> <p>Known unknowns</p> <p>Fact-based management</p> <p>Standard rules procedures, protocols or manuals</p> <p>Methodology</p> <p>Reductionism</p>	<p>Oligarchic style</p> <p>Sense, analyze, respond</p> <p>Create panels of experts</p> <p>Listen to conflicting advice</p> <p>Good practice</p> <p>Iterative approach</p>	<p>Experts overconfident in their own solutions or in the efficacy of past solutions</p> <p>Over - analysis</p> <p>Expert panels</p> <p>Viewpoints of nonexperts excluded</p>	<p>Encourage external and internal stakeholders to challenge expert opinions to combat entrained thinking</p> <p>Use experiments and games to force people to think outside the familiar</p> <p>Johari window</p> <p>ADKAR model</p>

Leadership Table



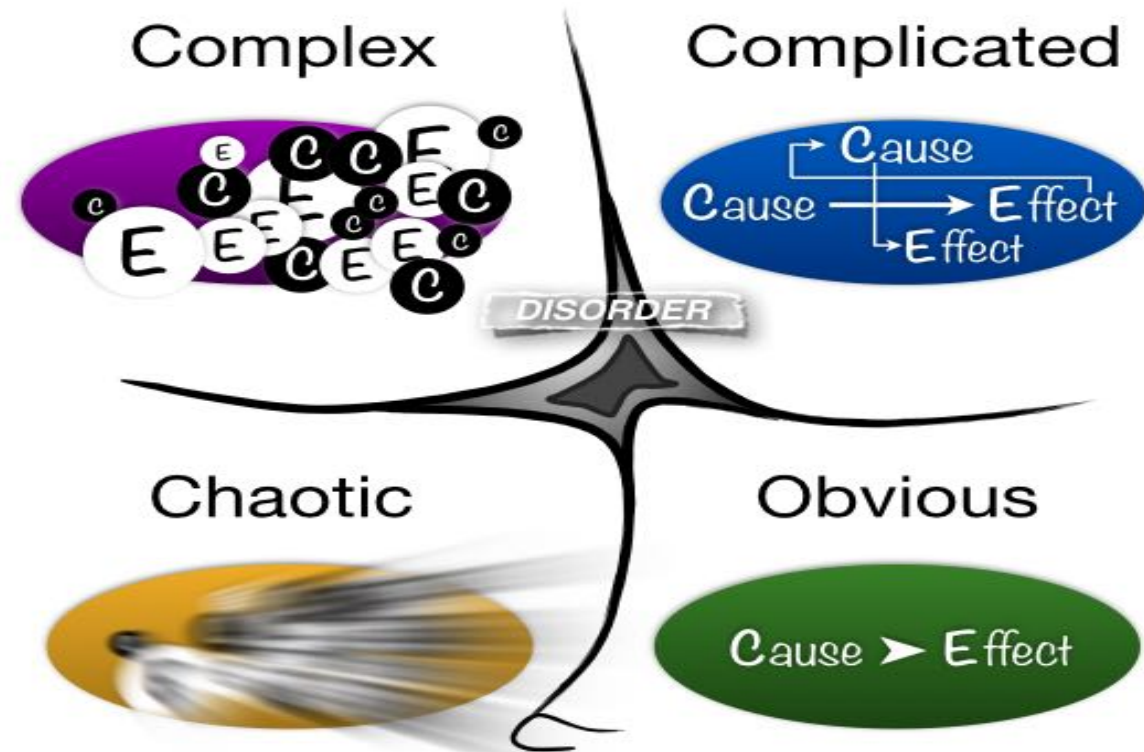
Complex	<p>Flux and unpredictability</p> <p>No right answers; emergent instructive patterns</p> <p>Unknown unknowns</p> <p>Many competing ideas</p> <p>A need for creative and innovative approaches</p> <p>Pattern-based leadership</p> <p>Know in hindsight</p> <p>Black swan theory</p> <p>Research</p>	<p>Probe, sense, respond</p> <p>Create environments and experiments that allow patterns to emerge</p> <p>Increase levels of interaction and communication</p> <p>Use methods that can help generate ideas: Open up discussion (as through large group methods); set barriers; stimulate attractors; encourage dissent and diversity; and manage starting conditions and monitor for emergence</p> <p>Emergent practice</p> <p>Fail fast, learn fast, fail safe</p> <p>Holistic and synthesis skills</p> <p>Agile, Evolutionary approach</p> <p>OODA loop</p>	<p>Temptation to fall back into habitual, command-and-control mode</p> <p>Temptation to look for facts rather than allowing patterns to emerge</p> <p>Desire for accelerated resolution of problems or exploitation of opportunities</p> <p>Failure to learn</p> <p>Impatience</p> <p>Over control</p>	<p>Be patient and allow time for reflection</p> <p>Use approaches that encourage interaction so patterns can emerge</p>
Chaotic	<p>High turbulence</p> <p>No clear cause-and-effect relationships, so no point in looking for right answers</p> <p>Unknowables</p> <p>Many decisions to make and no time to think</p> <p>High tension</p> <p>Pattern-based leadership</p>	<p>Act, sense, respond</p> <p>Look for what works instead of seeking right answers</p> <p>Take immediate action to reestablish order (command and control)</p> <p>Provide clear, direct Communication</p> <p>Super hero</p> <p>Draconian order imposition</p> <p>Dictatorial and charismatic</p> <p>Novel practice</p>	<p>Applying a command-and-control approach longer than needed</p> <p>"Cult of the leader"</p> <p>Missed opportunity for innovation</p> <p>Chaos unabated</p>	<p>Set up mechanisms (such as parallel teams) to take advantage of opportunities afforded by a chaotic environment</p> <p>Encourage advisers to challenge your point of view once the crisis has abated</p> <p>Work to shift the context from chaotic to complex</p>

Cynefin dynamics

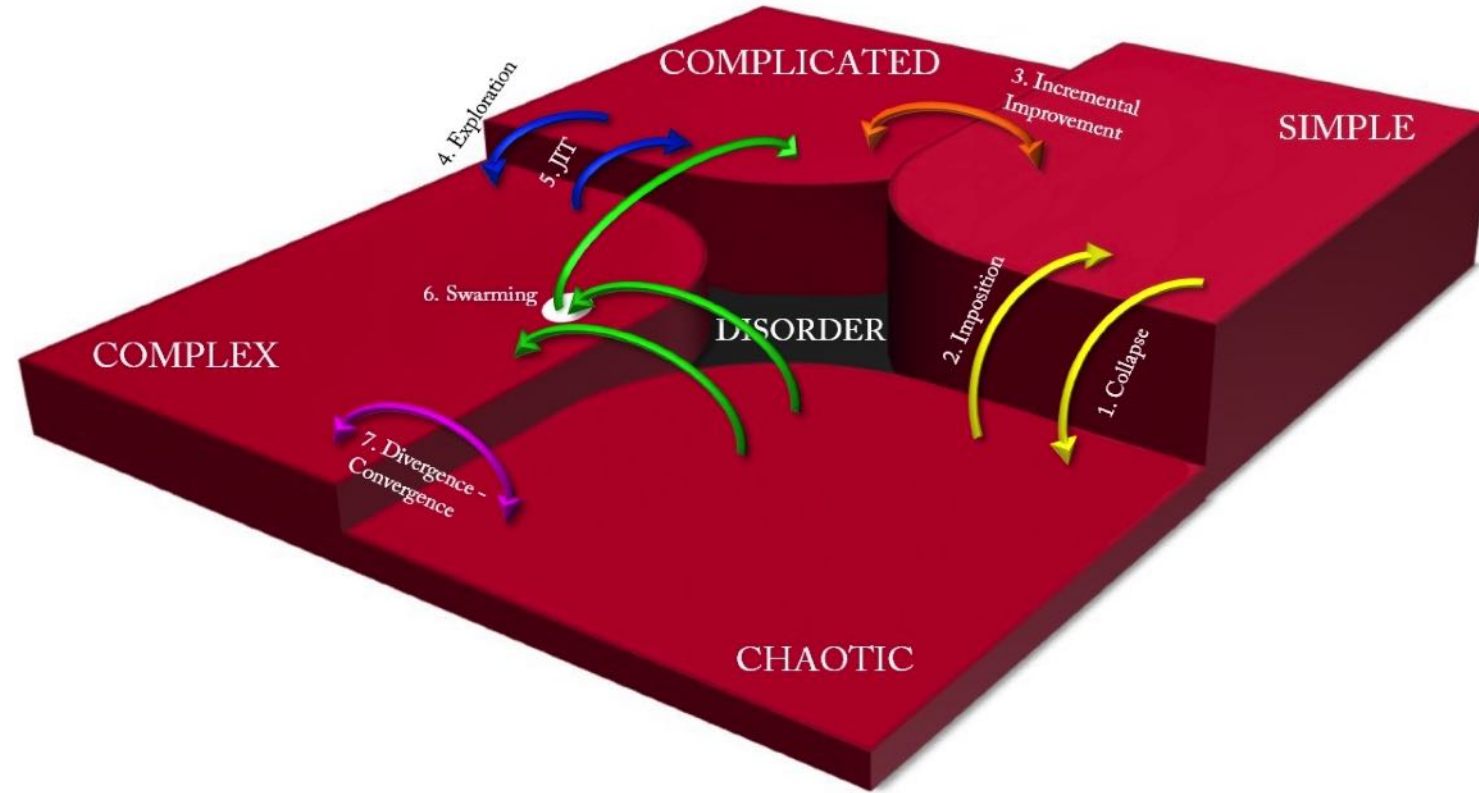


The moving paths between Cynefin domains are as important as the domain characteristics themselves;

A leader should take significant advantages moving across boundaries but this requires a shift to a different model of understanding as well as a different leadership style.



Cynefin dynamics

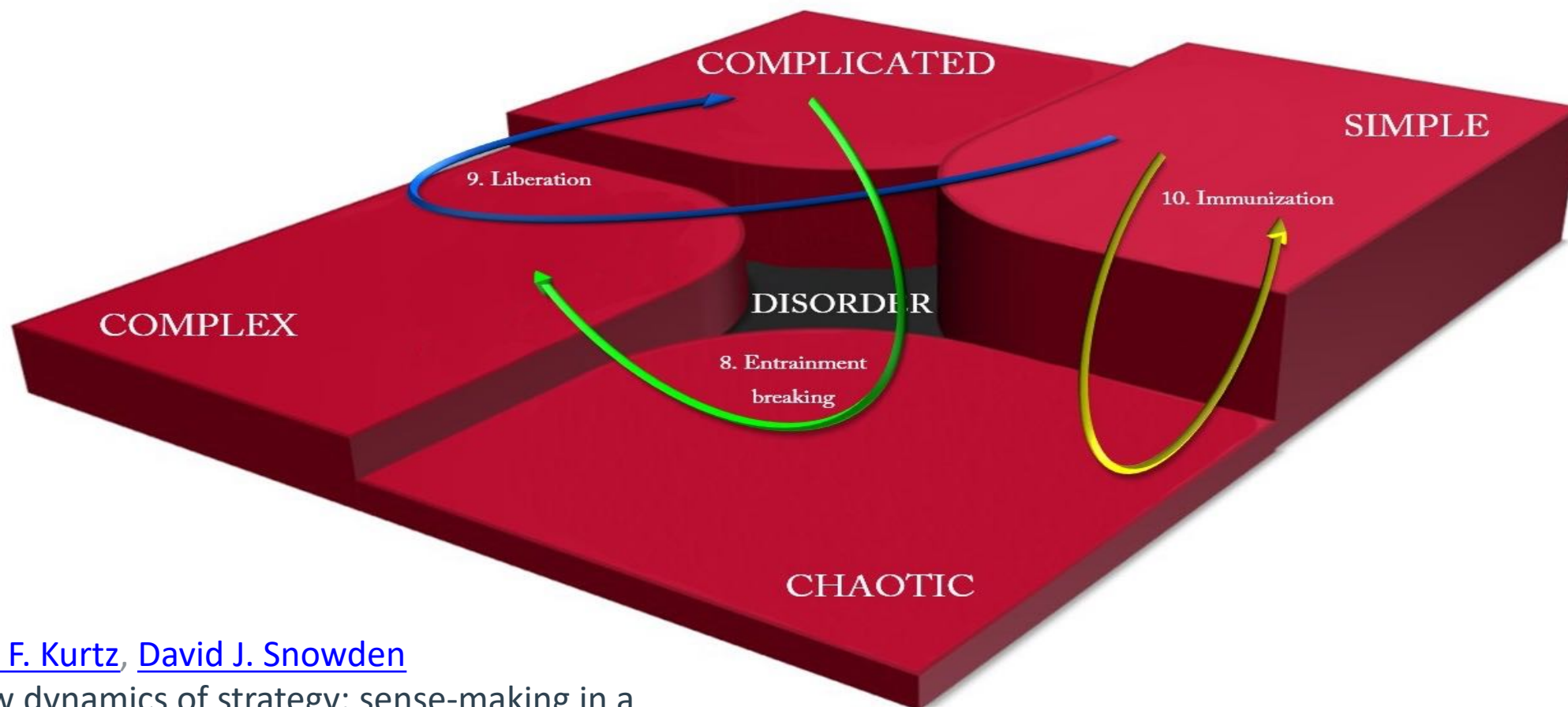


[Cynthia F. Kurtz](#), [David J. Snowden](#)

The new dynamics of strategy: sense-making in a complex and complicated world



Cynefin dynamics



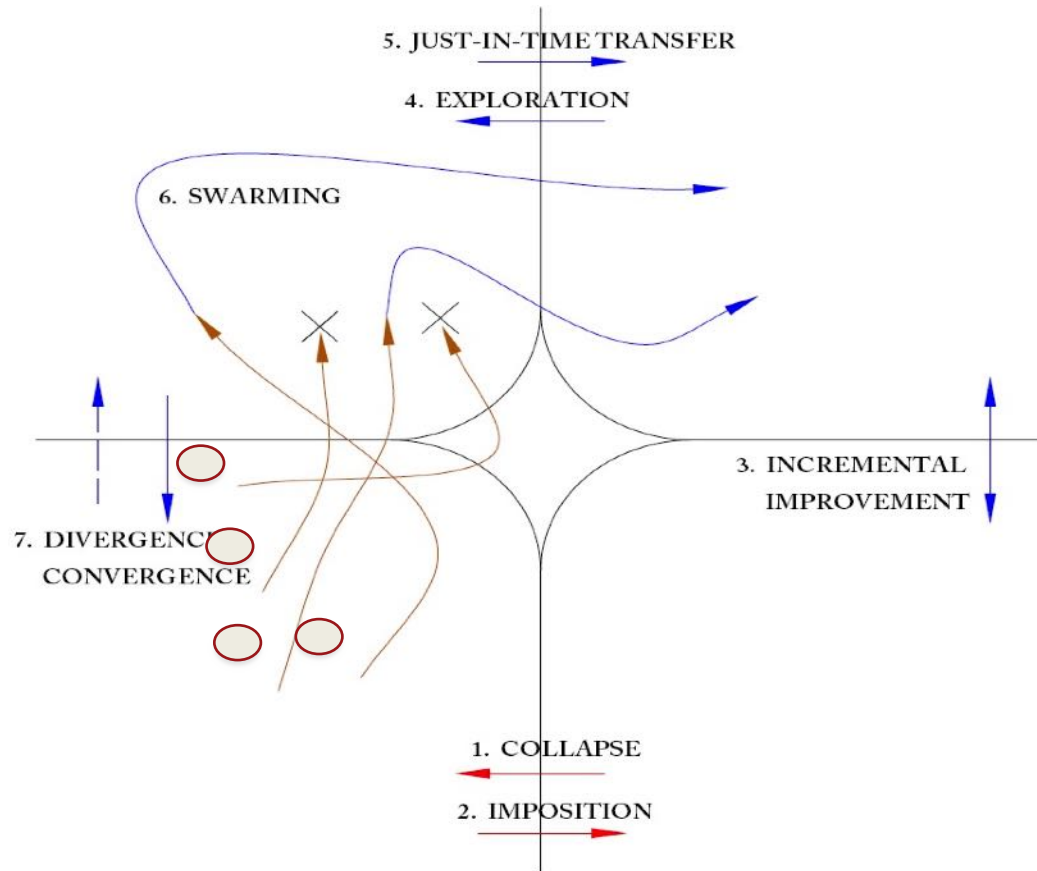
[Cynthia F. Kurtz](#), [David J. Snowden](#)

The new dynamics of strategy: sense-making in a complex and complicated world





Asymmetric collapse



1,2 Movements at the known-chaos boundary

Asymmetric collapse (Item 1) is

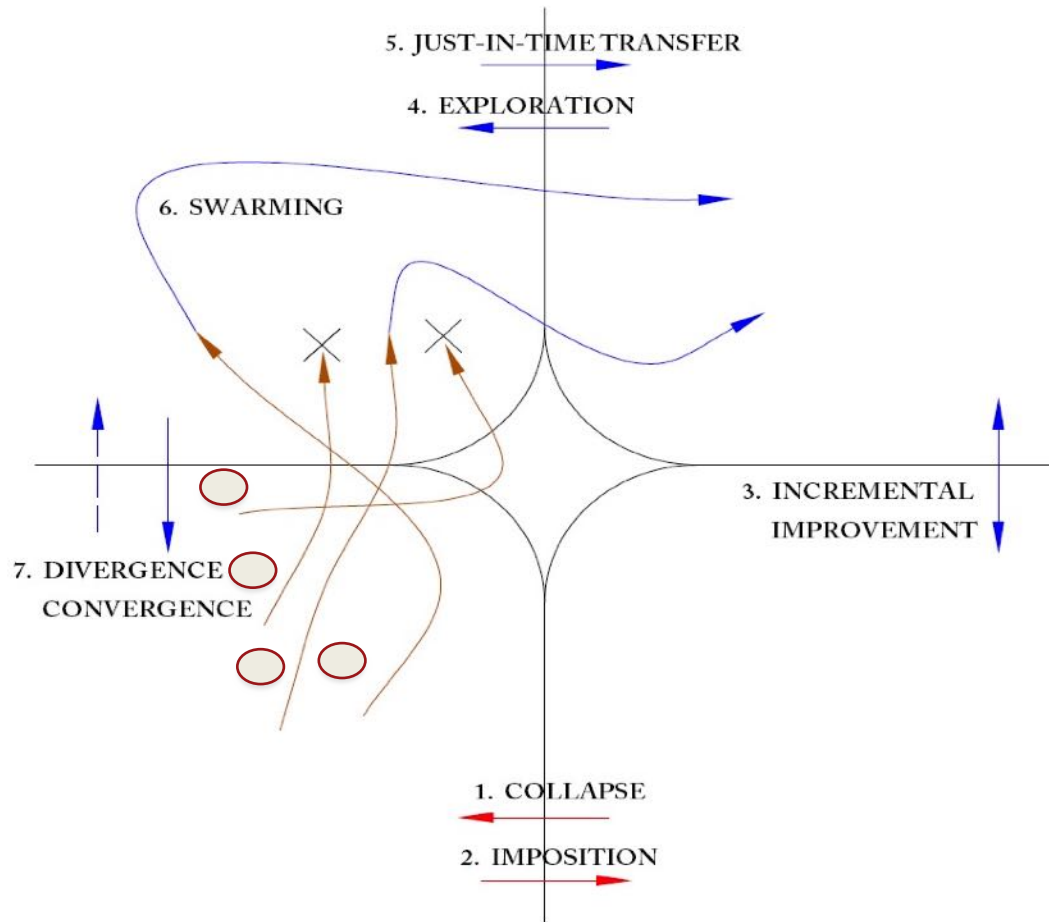
movement from simple to chaotic domain, disastrously.

The leader does not see what is going on outside border of his small horizon, and he continue not to see them until finally the system breaks and falls in chaos.

Chaos is also a space we can enter into consciously to brake the chain of entrenched thinking and create the conditions for new possibilities .



Imposition



1,2 Movements at the known-chaos boundary

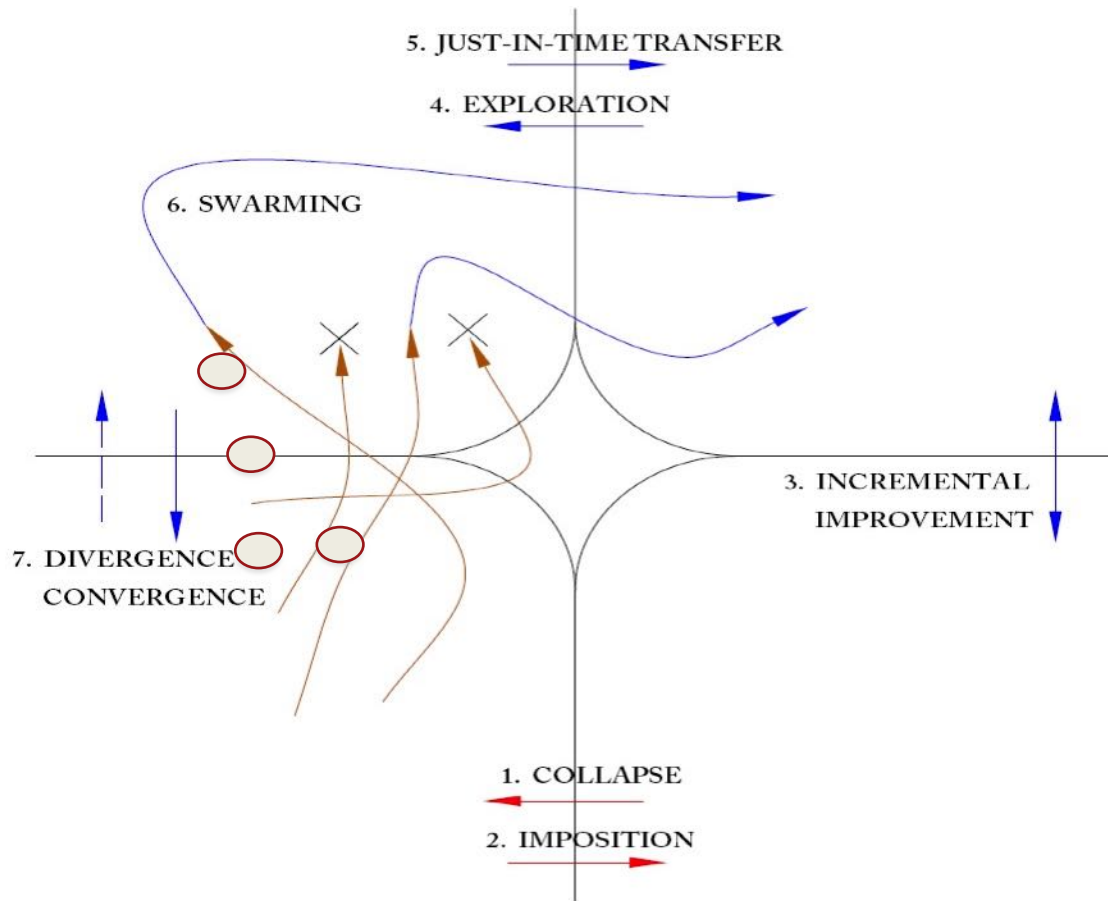
Imposition (Item 2) is the forceful movement from chaotic to simple domain. The consequence of collapse is chaos, and the consequence of chaos is frequently imposition of order. In catastrophic situations, as the price of order, are usually tolerated conditions that would has previously been unacceptable.





Incremental improvement

3 Movement at the known-knowable boundary



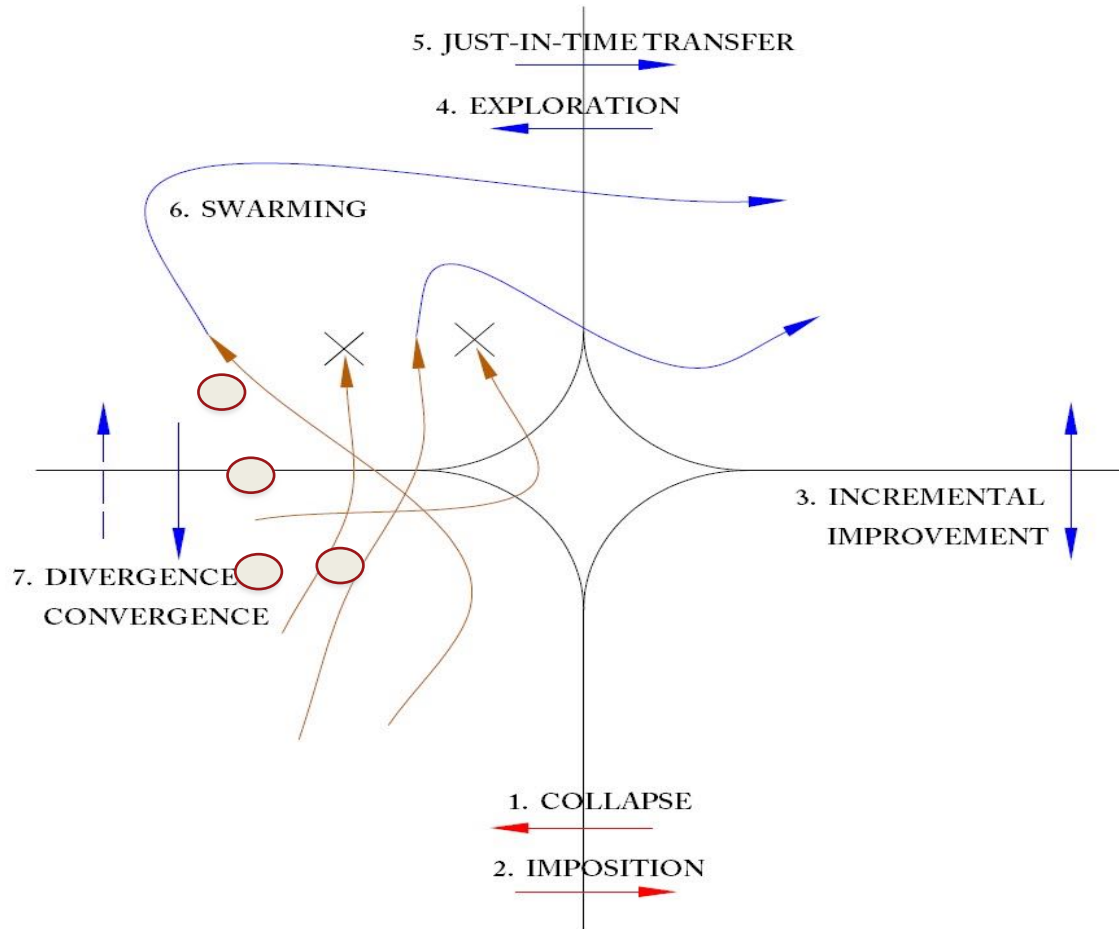
Incremental improvement (Item 3) is movement from simple to complicated domain and back to ask for experts supports. This is the engine of **technological growth**.



Exploration



4,5 Movements at the knowable-complex boundary



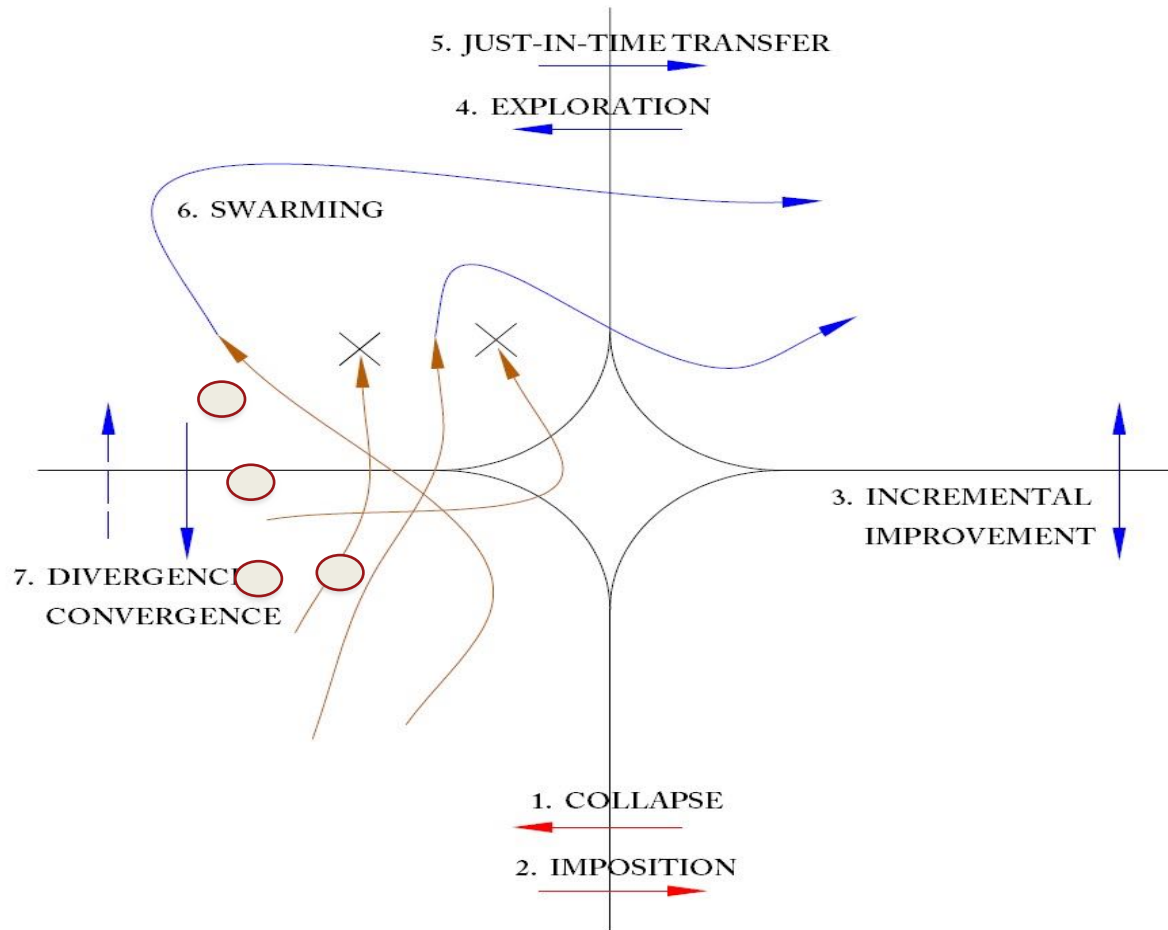
Exploration (Item 4) is movement from complicated to complex domain very useful to the growing of new ideas and opportunities, in other terms... **Innovation**





Just-in-time (JIT) transfer

4,5 Movements at the knowable-complex boundary



Just-in-time (JIT) transfer, exploitation (Item 5) is movement from complex to complicated domain to stabilize useful patterns in complex space when it is needed (just-in-time).



Case Study

Sardinia Radio Telescope



SRT Refurbishment dynamics



Tender for “competitive debate” for new innovative solutions

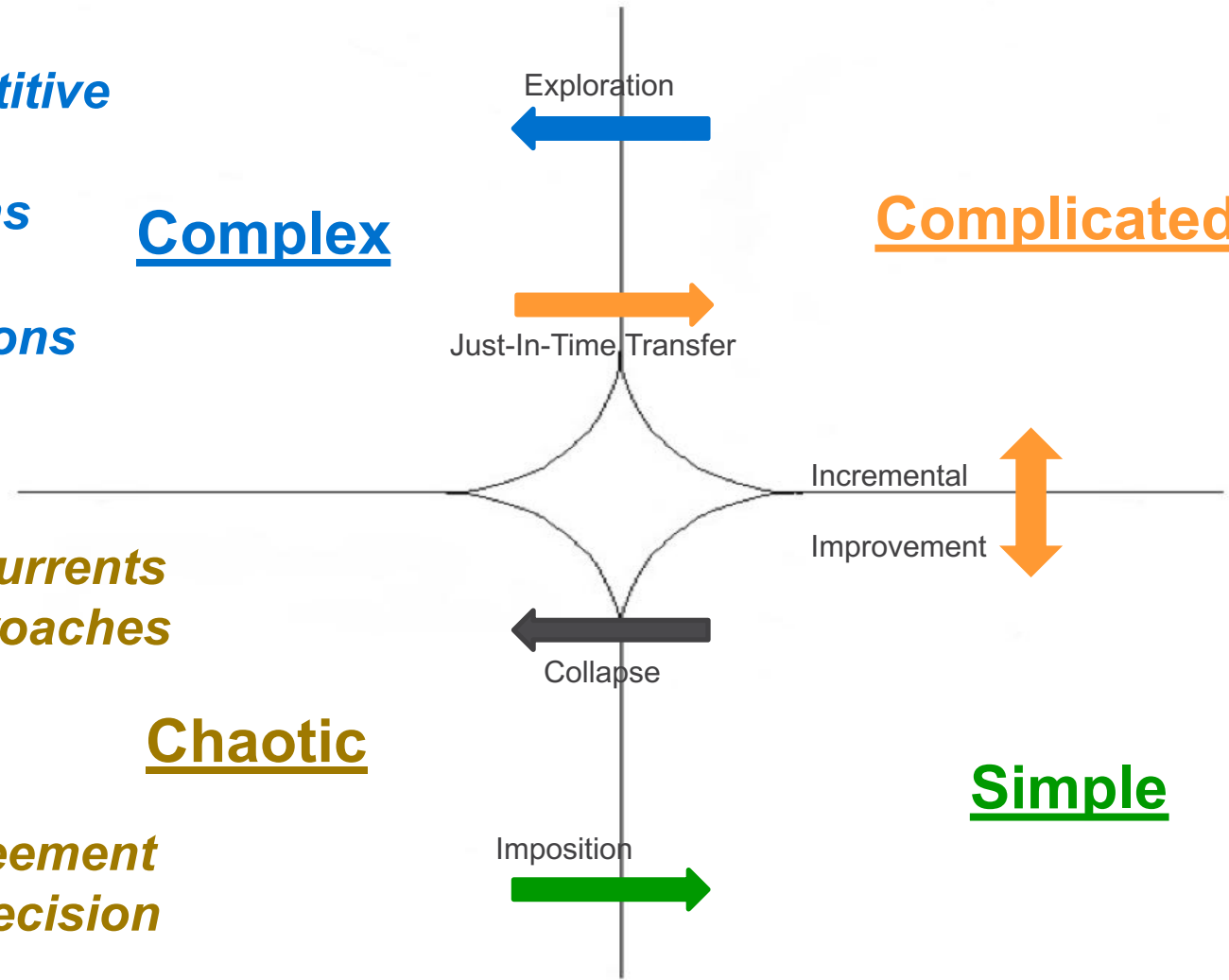
Complex

Set of viable solutions stabilized in....

Different thought currents and divergent approaches

Chaotic

*ASI-NASA-JPL agreement
INAF’s President Decision*



Experts working group

Technical specification of the new call for tender

Operation Phase

Accounting and administrative processes

Implementation Phase

SRT Radio Telescope was delivered ten days in advance with respect to the scheduled time.



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ASI - AGENZIA SPAZIALE ITALIANA

NEWS

Home > News > L'Italia entra nel Deep Space Network

[Archivio News](#)
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Mezzo secolo di missioni spaziali italiane.

La storia dello spazio in Italia dal 1964 ad oggi.

EVENTI



Gli eventi ASI
Convegni scientifici e istituzionali, i workshop tematici, le fiere e manifestazioni per il pubblico a cui partecipa l'ASI.

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Per conoscere le risorse informative, i servizi e lo stato di avanzamento di iniziative e progetti.
[Vai al sito della biblioteca](#)

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ACCORDO ASI-NASA

L'Italia entra nel Deep Space Network

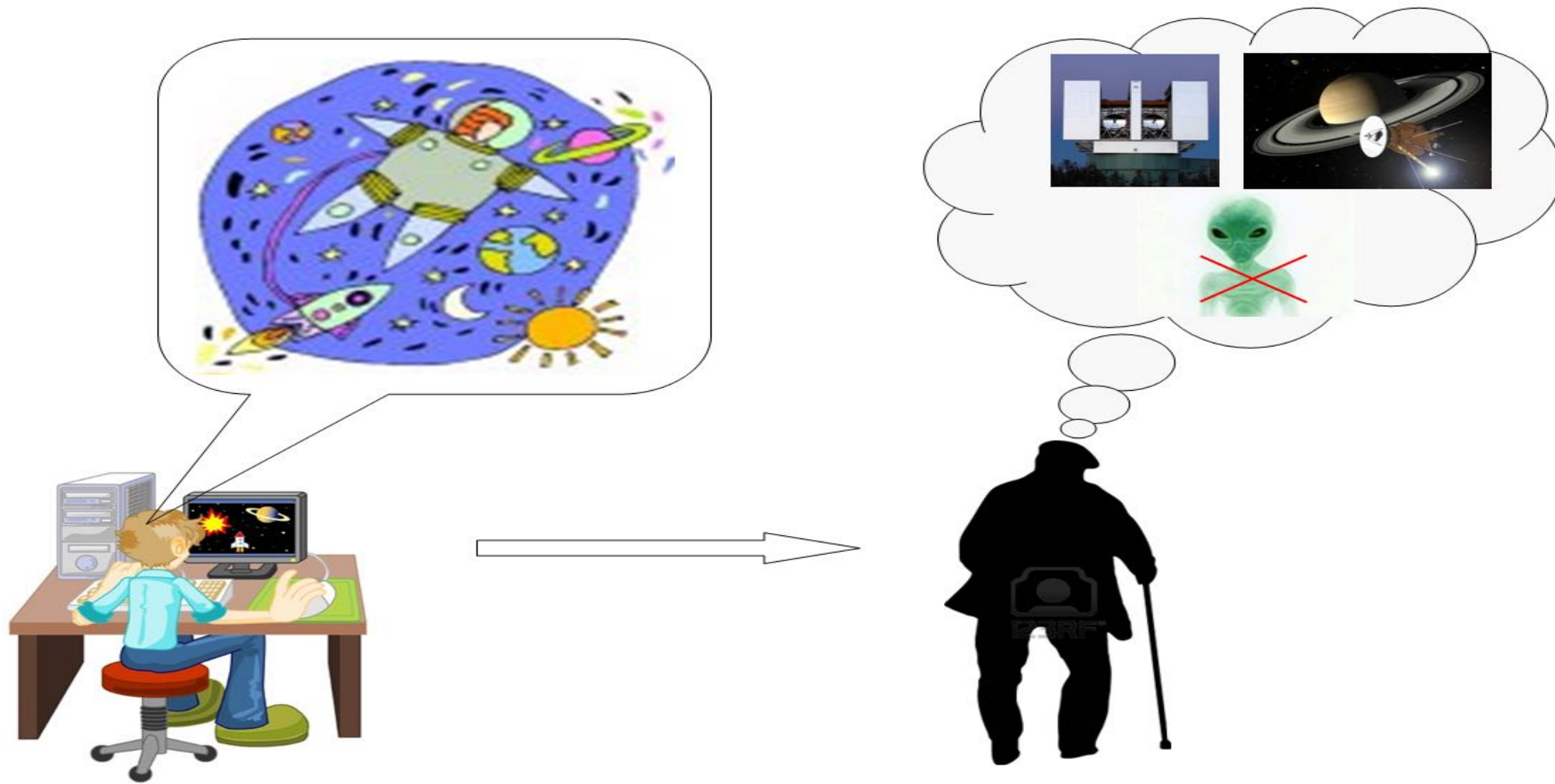
Entra in attività il nuovo centro dell'ASI SDSA (Sardinia Deep Space Antenna) che si avvale del Sardinia Radio Telescope dell'INAF per tracciare le sonde interplanetarie. Si comincia con Cassini e il Grand Finale

di Redazione Web [Follow @ASI_spazio](#) Venerdì 01 Settembre 2017



Prendono oggi il via dal **Sardinia Deep Space Antenna (SDSA)** le operazioni di "tracking" della sonda NASA-ESA-ASI **Cassini** che tra qualche giorno compirà l'ultimo atto della sua ventennale missione dedicata al sistema di Saturno. Il SDSA dell'**Agenzia Spaziale Italiana (ASI)** costituisce una nuova configurazione sviluppata l'impiego a supporto di **missioni interplanetarie**, equipaggiando in modo adeguato il **Sardinia Radio Telescope (SRT)** realizzato dall'INAF (Istituto Nazionale di Astrofisica) in collaborazione con l'Agenzia Spaziale Italiana, la Regione Sardegna e il Ministero dell'Istruzione, Università e Ricerca, e destinato allo studio dell'universo e dei suoi misteri.

Il **Sardinia Deep Space Antenna (SDSA)** a partire da gennaio diventerà ufficialmente operativo nell'ambito del **Deep Space Network** della NASA, ma fornirà **servizi di comunicazione e navigazione anche per le sonde interplanetarie europee**, specializzandosi in particolare per quelle marziane, in vista della Human Exploration del pianeta. Il SDSA nasce grazie ad accordi tra **ASI e l'INAF** ed a uno specifico accordo **ASI - NASA**, che ne assicura l'impiego per una molteplicità di missioni interplanetarie in collaborazione con il Jet Propulsion Laboratory - (JPL). Il suo debutto è legato alla fase cruciale **The Grand Finale** della missione di Cassini nel sistema di Saturno. Il SDSA seguirà gli ultimi giorni del lungo viaggio della sonda prima del suo tuffo finale sul pianeta fissato per il 15 settembre prossimo.





Thank you.....

fierro@inaf.it



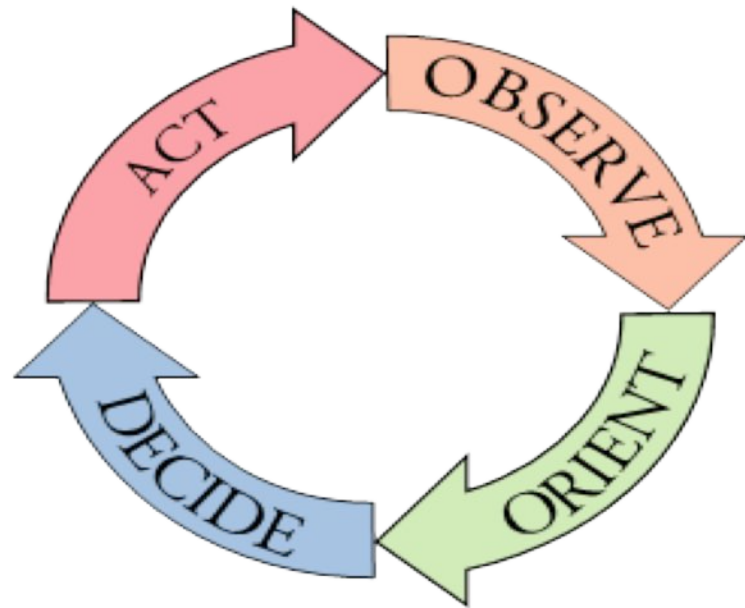


28th Annual **INCOSE**
international symposium

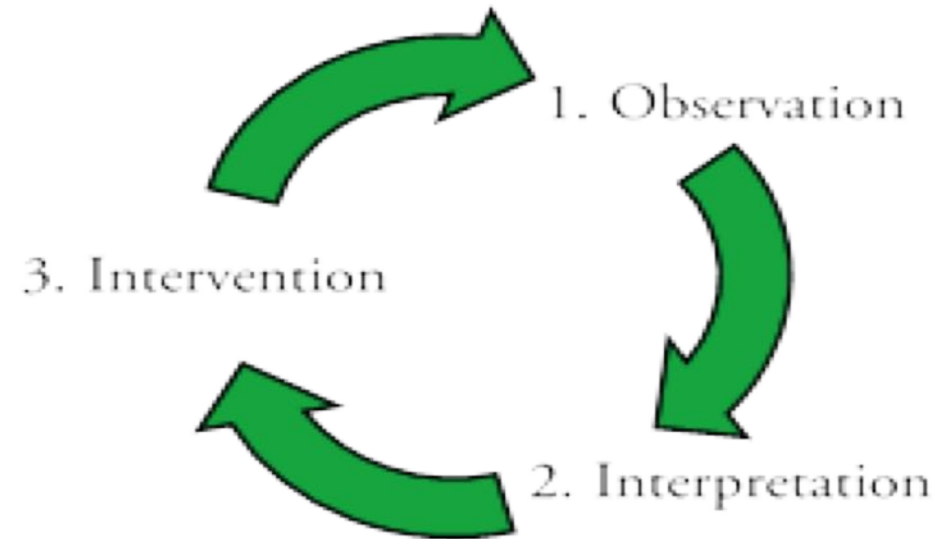
Washington, DC, USA
July 7 - 12, 2018

www.incose.org/symp2018

Adaptive Methodologies



OODA loop

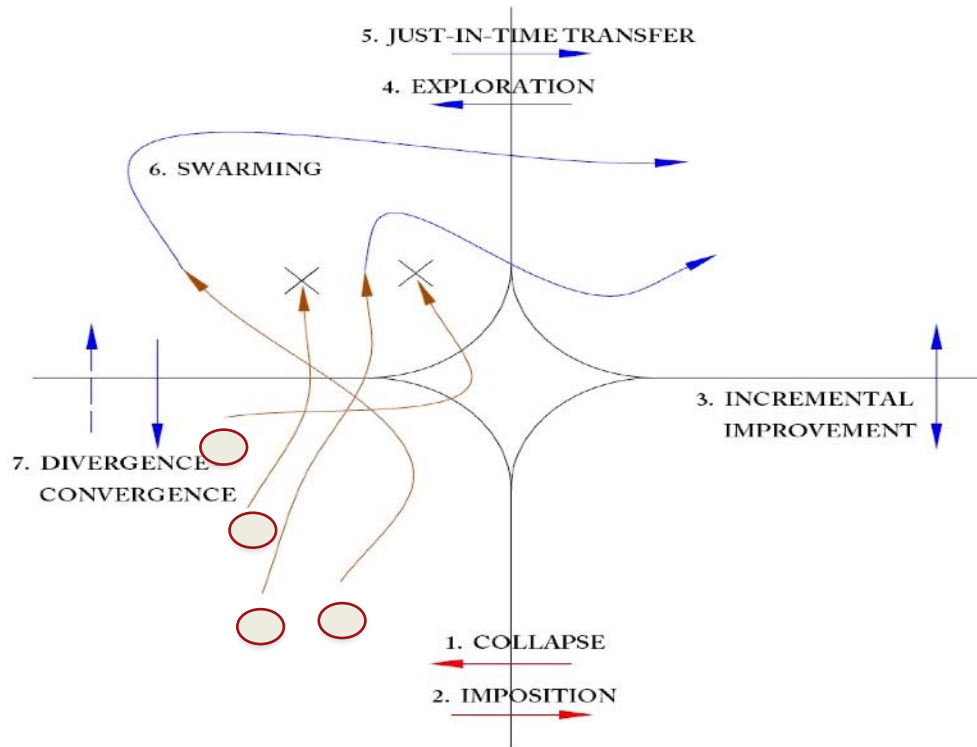


Adaptive leadership model



Swarming

6, 7 Movements at the complex-chaotic boundary



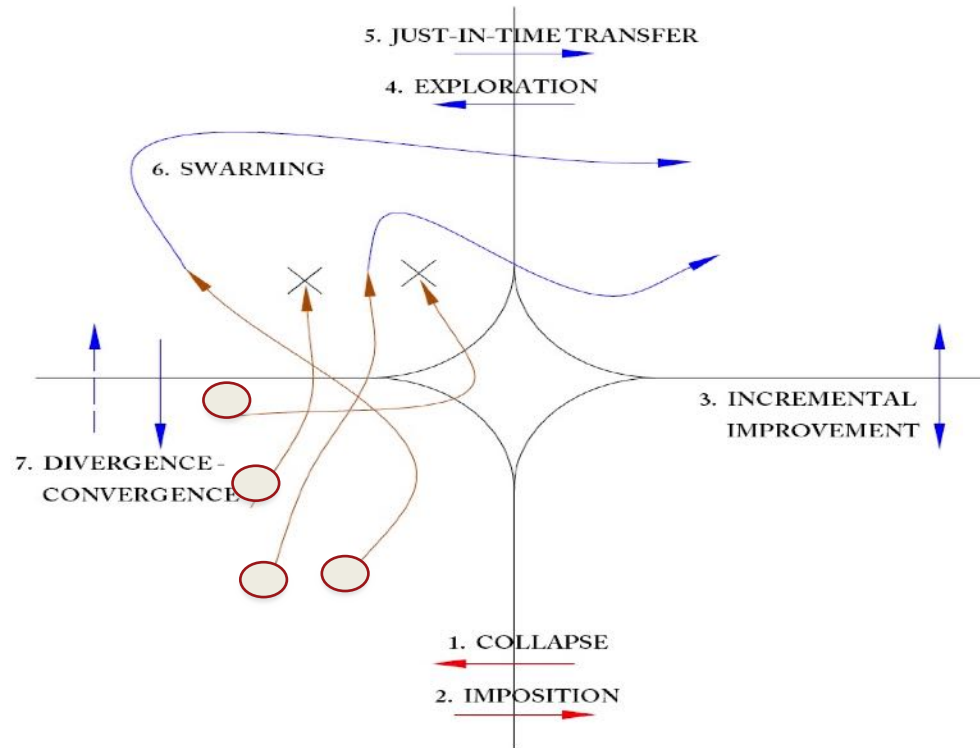
Swarming (Item 6) is movement from chaotic to complicated throughout the complex domain. The transition from chaotic to complex is carried out by creating multiple attractors, or swarming points, as seeds of future patterns, whereas a transition from chaotic to simple domain requires a single strong attractor. In the complex domain leader has the possibilities to see the growing of such patterns forming around the attractors; those he finds desirable he stabilizes in the complicated domain; the undesirable ones are destroyed.





Divergence-convergence

6, 7 Movements at the complex-chaotic boundary



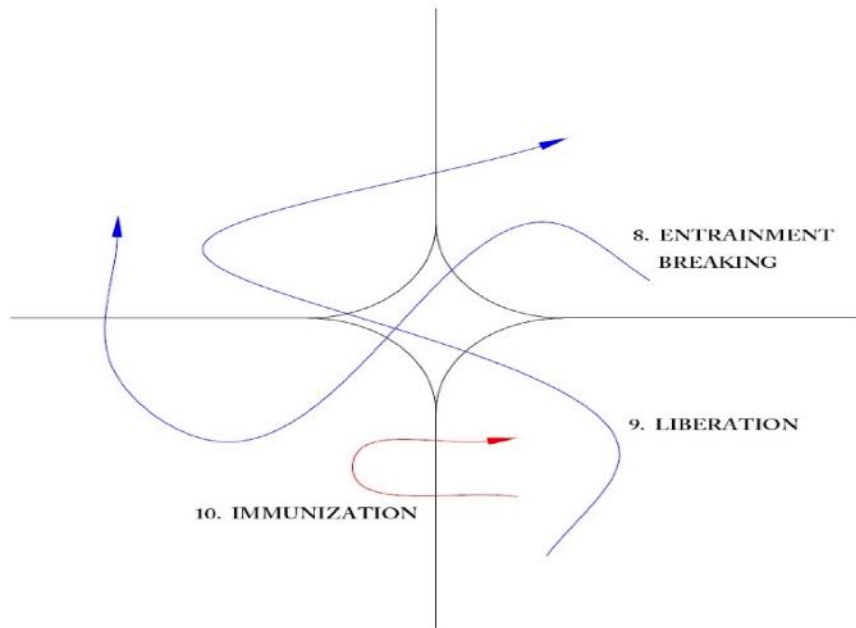
Divergence-convergence is the cyclic movement from complex to chaotic. This allow the generation of a rich variety of patterns to facilitate sense-making.



Entrainment breaking



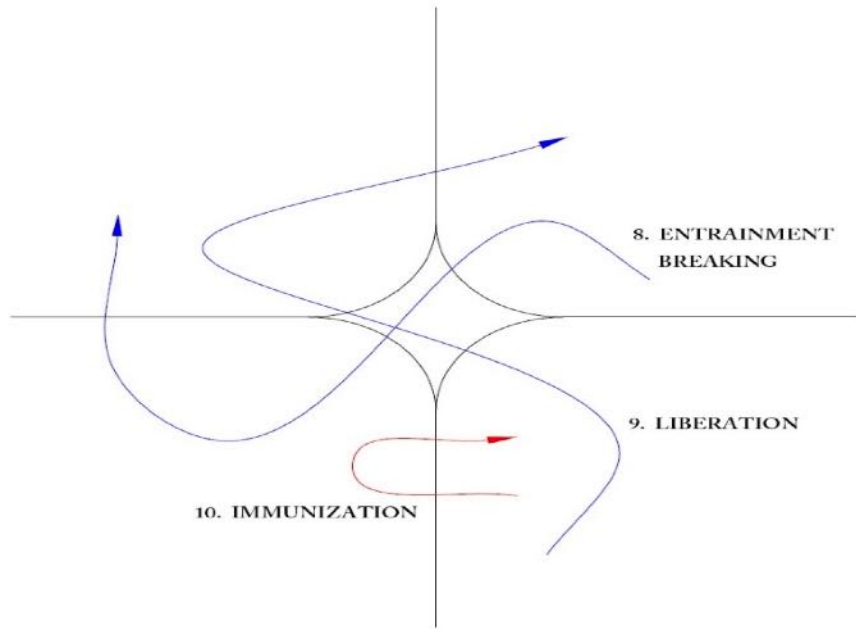
8, 9, 10 Movements through chaos



Entrainment breaking (Item 8) is the periodic movement from complicated to chaotic to complex domain. This is sometimes referred to as “creating a burning platform”. This is a common approach to disrupt the entrained thinking of experts by creating a more fertile space of interactions from which leaders can select stabilization points for the movement to the complicated domain. This method is used to create and validate new sources and structures for decision-making.



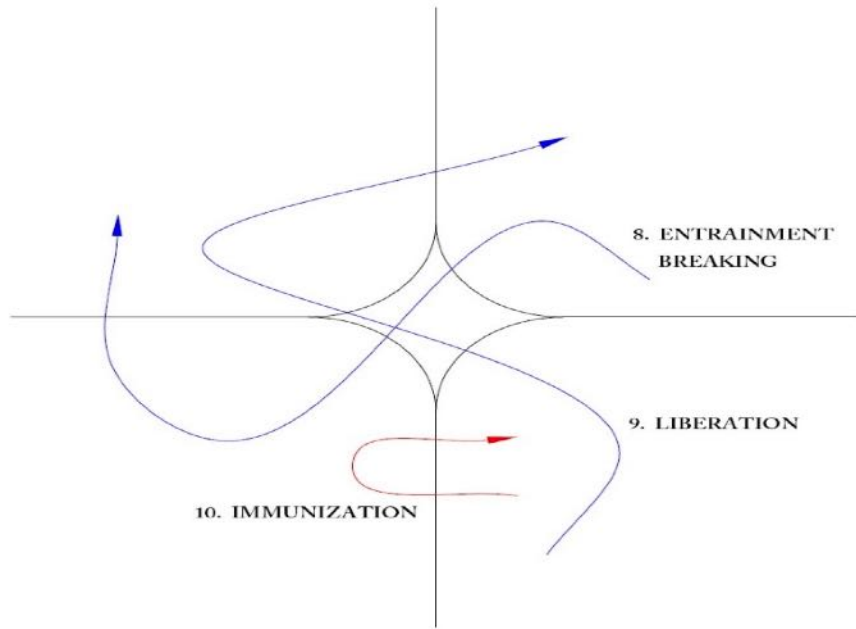
Liberation



Liberation (Item 9) is the periodic movement from simple to complex to complicated domain. Enterprises operating in simple domain often need to change the status quo in order to facilitate the creation of new emerging ideas and opportunities. They, so, have to move in the complex domain by, for example, recruiting external specialist staff or redistributing new responsibilities in the organization. Then, analytically and methodically, leaders can choose the most viable ones moving toward complicated domain.



Immunization



Immunization (Item 10) is the temporary movement from simple to chaotic domain not enough to destabilize the whole system. It serves mainly two purposes. First, it shows the devastating force of chaos preparing leaders to face those forces. Second, immunization brings new perspectives, which cause radical disruptions in stable patterns of thought and lead to changes and new complex patterns. This movement enable lateral thinking, prevent entrainment of attitudes destroying the glue of stagnant views.



Engineering Models

