



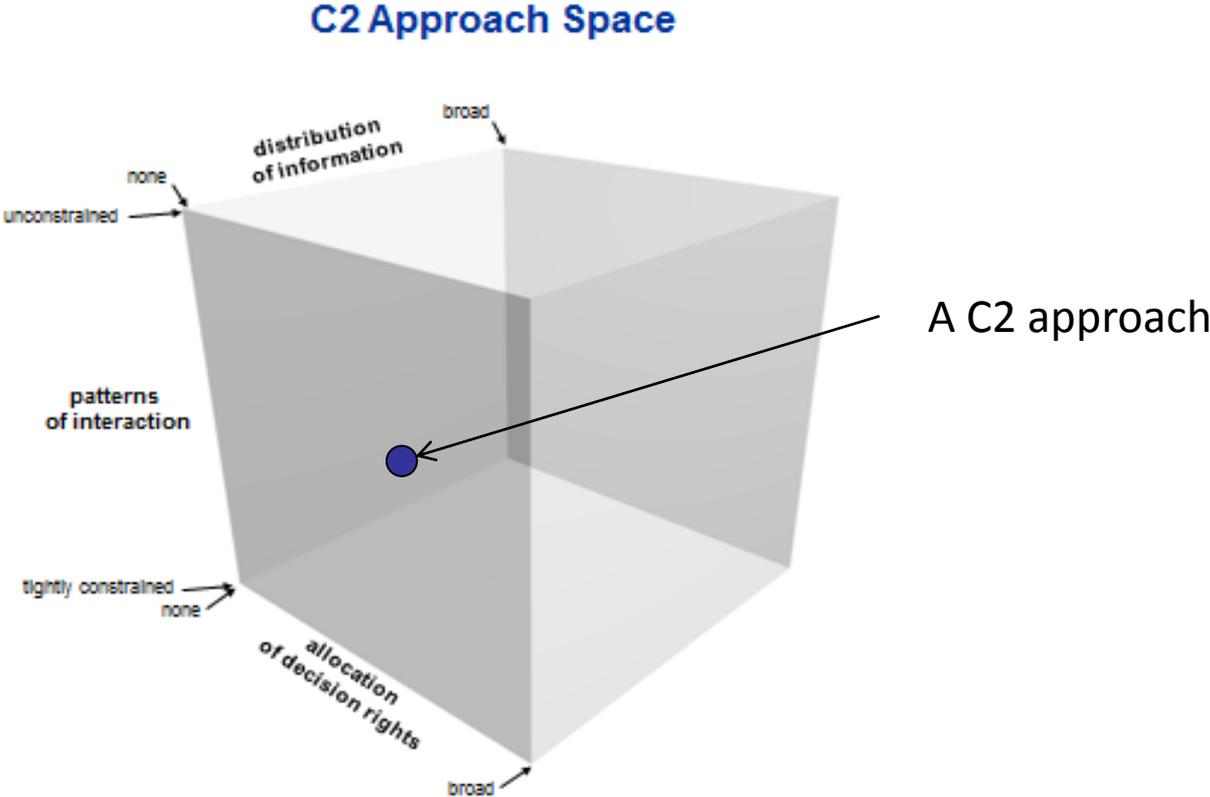
## C2 Approaches: Looking for the Sweet Spot

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# Outline

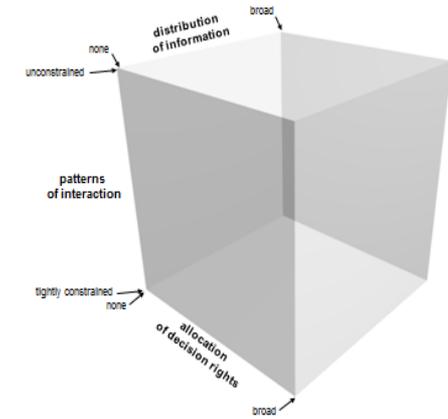
- Background
- C2 Approach Space and the “diagonal”
- Hypotheses
- Results of Experiment

# C2 Approach Space



# C2 Approach Space

- The C2 Approach Space, taken at face value, only provides a taxonomy that allows us to describe significant differences between and among different approaches to C2.
- It says nothing about the relative merits of the possible C2 Approaches contained within.
- However, the very existence of more than one approach can be interpreted to mean that C2 Approaches:
  - located in certain parts of this space are 'better' than those located in other parts of this space and/or,
  - located in different regions are more appropriate for different organizations, missions, and circumstances than others.



# Why a “diagonal”?

- There is a long-recognized need for co-evolution that is required to maintain an appropriate balance with respect to the three C2 Approach dimensions
- Thus, enabling those who have been delegated decision rights would seem to include a provision of an increased capability to interact as well as increased access to information
- Thus, C2 Approaches that differ in the degree to which decision rights are allocated should differ in all three dimensions.

# Hypotheses

- This paper specifically addresses the following position-related hypotheses:
  - The C2 Approach Space provides a useful way of characterizing and depicting the differences between and among C2 Approaches.
  - The actual positions of a set of C2 Approaches may differ from their intended positions.
  - For a given C2 Approach, those closest to the 'diagonal' are more effective.
  - The dimensions of the C2 Approach Space are positively correlated to agility.

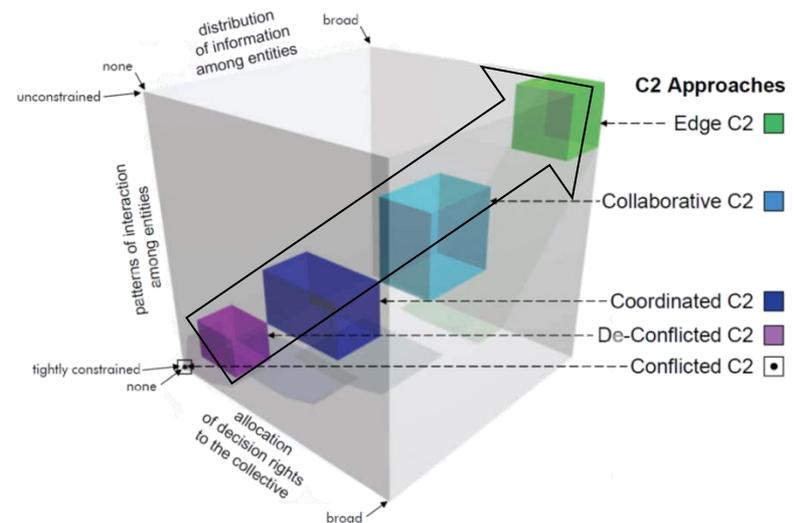
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  - For a given C2 Approach, those located closest to the 'diagonal' are more effective.
  - The dimensions of the C2 Approach Space are positively correlated to agility.

# Where is the “diagonal” located

- The diagonal implied by the NATO NEC C2 Maturity Model graphic is only notional
- This is because there are no scales specified for the dimensions
- There is no reason to believe that the diagonal is linear
- The location and shape of the diagonal depends upon
  - Scales used
  - Inter-dependencies between the dimensions

## C2 Approach Space



Source: NATO NEC C2 Maturity Model

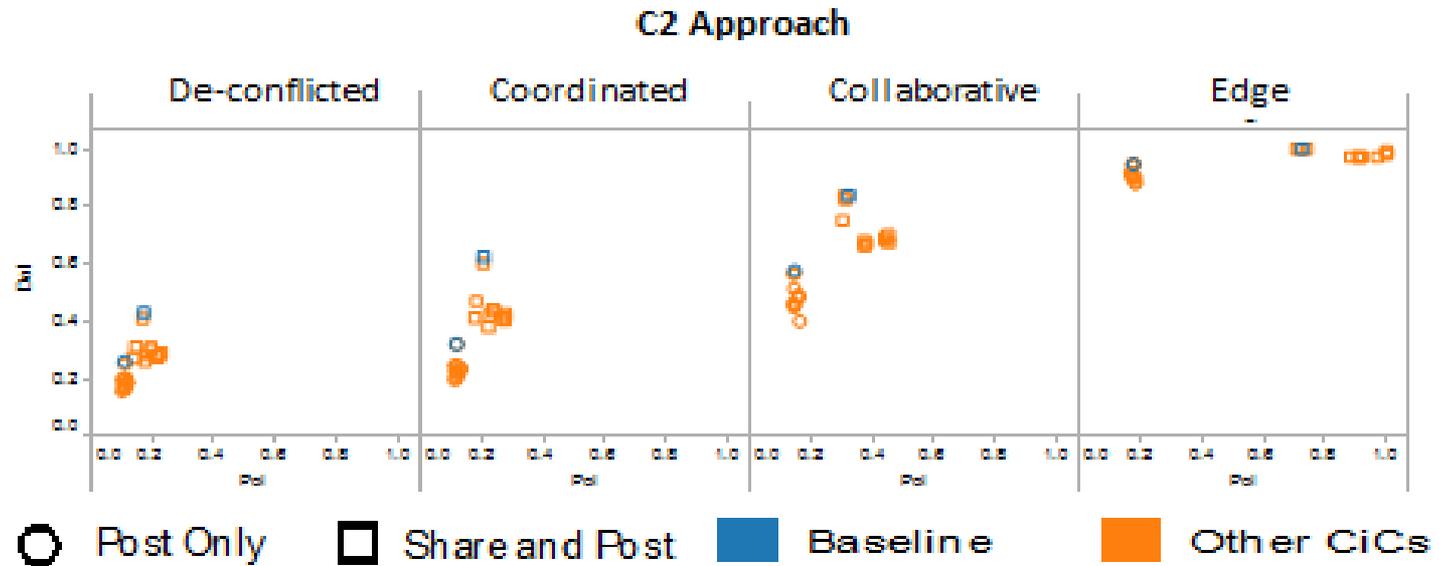
# Locating the “diagonal”

- SAS-085 Campaign of Experiments defined scales for each of the dimensions of the C2 approach Space
- SAS-085 measured the actual locations of the entity in the C2 Approach Space under every circumstance simulated
- The diagonal implied by the NATO NEC C2 Maturity Model graphic is only notional. This is because no scales were specified for these dimensions
- Thus, there is no reason to believe that the diagonal is linear. The location and shape of the diagonal will depend upon
  - Scales used
  - Inter-dependencies between and among the three dimensions

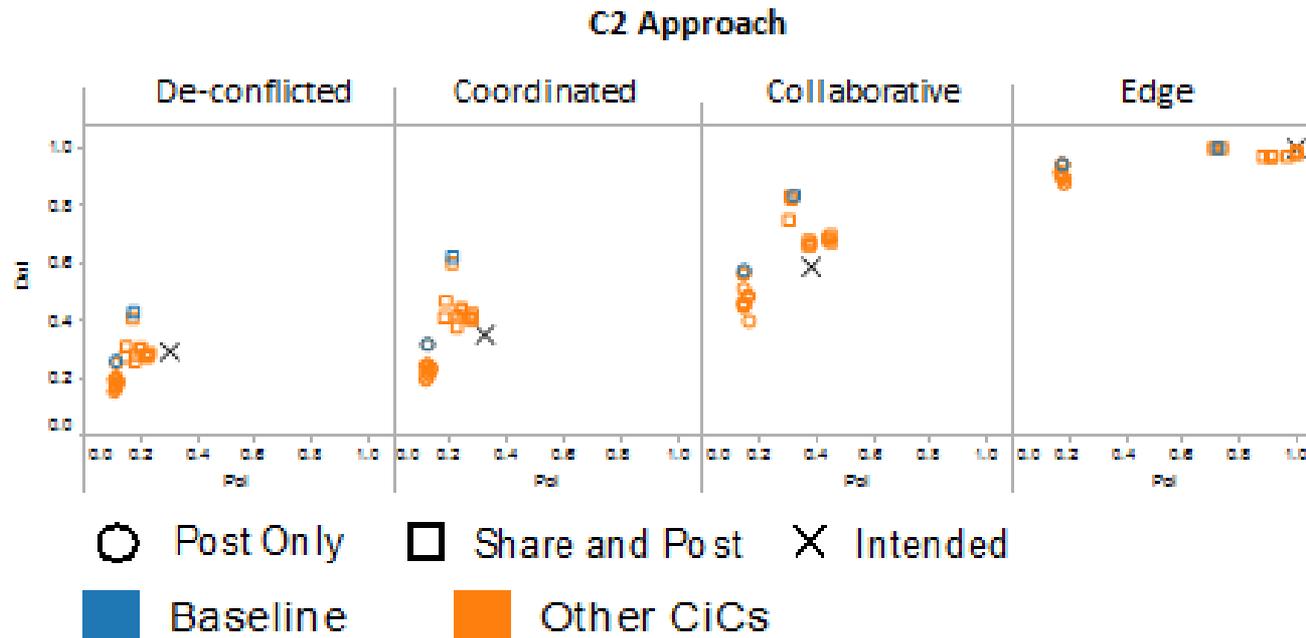
# The scales employed

C2 Approach Dimension	Nature of Measure	ELICIT Metric
<b>Allocation of Decision Rights (ADR)</b>	degree to which decision rights are distributed; a measure of participation in decision making	ratio of the number of individuals exercising decision rights to the total number of individuals
<b>Pattern of Interactions (PoI)</b>	density of interactions between and among individuals; a measure of quality, frequency, and reach	square root of the number of information-related transaction and scaling them between 0 and 1 based upon the maximum number of transactions observed
<b>Distribution of Information (DoI)</b>	degree to which individuals have access to available information	average percent of available factoids received by an individual

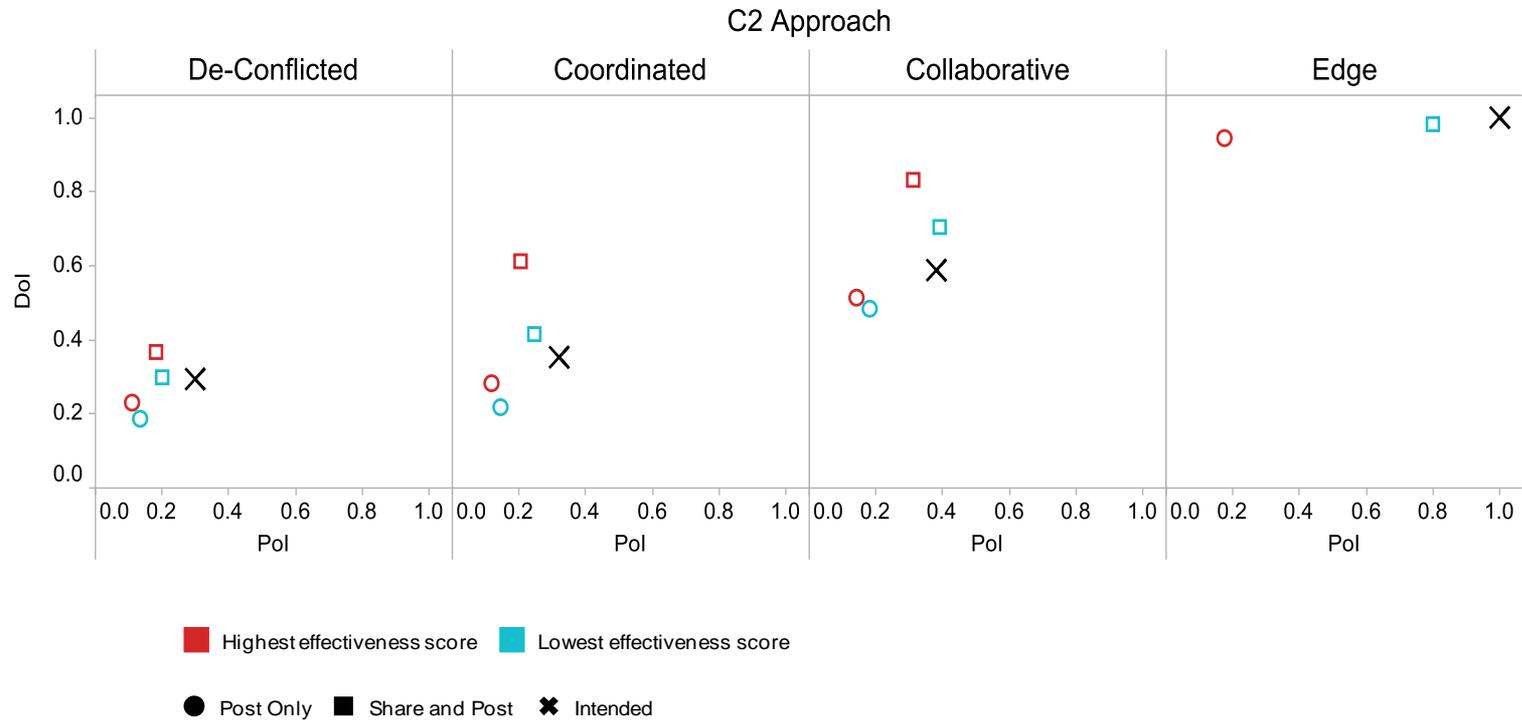
# C2 Approaches: actual positions



# C2 Approaches: intended v. actual positions



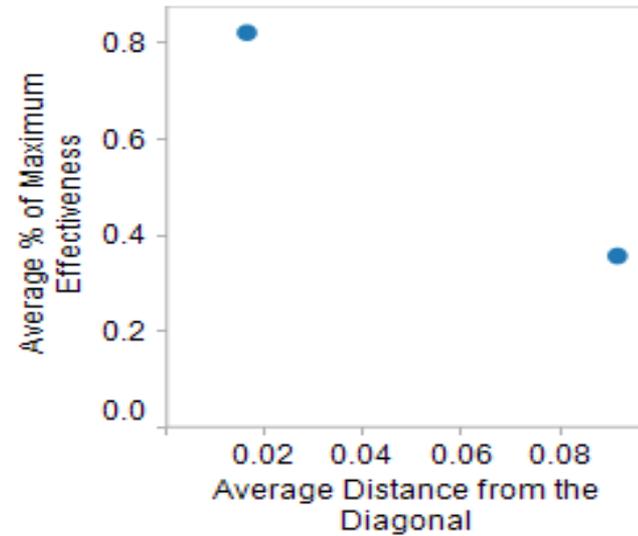
# C2 Approaches: positions where most / least effective



# Where is the diagonal located?

- Do we use the ‘intended’ positions of the C2 Approaches as points along the diagonal?
- Do we use the location for each C2 approach that is most effective given the circumstances simulated?
- We chose to use the most effective location for two reasons:
  - It was an observed position rather than an aspiration
  - If they understood the relationship between the location and effectiveness, we assumed that this would be their intended position

## C2 Approach Effectiveness: “on-diagonal” v. “off-diagonal”



# Findings

- Location is related to effectiveness
- Locations that differ significantly from a co-evolved or balanced position suffer a loss of effectiveness
- Thus, there is a “sweet spot” that can be identified for a given C2 approach with respect to a given Endeavor Space