Are Two Heads Better than One? A Formal Investigation into the Efficacy of Multi-authority Hierarchies in Coordinating Action in Complex Organizations. Dan Levinthal (Wharton) and Maciej Workiewicz (INSEAD)

**Background and motivation**
- As organizations grow larger, the task of coordinating distributed and interdependent action (or projects) becomes increasingly difficult. (Pfeffer, 1999; Burton, Odel, Defurne, 2011)
- Understanding the effects of an organizational structure on performance is one of the central concerns of theoretical and empirical work in strategic management and organizational theory. (Chandler, 1962; Lawrence, Lorsch 1967; Miller et al. 2009).
- There have been different approaches to the challenge of organizing:
  - Complexity is best answered with a simple organizational structures with small, autonomous units (Fram, Prohaska, 1996; Christensen, 1997)
  - Bounded rationality – a 100% perfect – academically perfect – but complex organization for only (α) 70% perfect organization that is simple and easy to understand.” former CEO of ABB (Galbraith, 2009)
  - Employ equally complex organizational structure, like the matrix form (Ashby 1956; Nadler, Tushman, 1997; Galbraith, 2009)
- Recent evidence suggests that multi-authority structures are becoming increasingly common among project-based and multinational companies. (Galbraith 2009; Guadalupe et al. 2013).
- The available research offers conflicting findings and more formal modelling is needed to capture the core drivers of performance of complex organizational structures (Ford, Randolph 1992; Roberts, Saloner, 2013; Puranam, Forthcoming).

**Summary of key points**
- Multi-authority structure is the best alternative when:
  - the lower level problems are hard (i.e. complex)
  - Balancing coordination and specialization is important for the overall performance of an organization (α)
- Bounded rationality, conflict resolution and motivation are all key in determining the relative efficacy of the three organizational structures, but impact their performance to different degrees

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**The task environment – hierarchical complex system**
- Executive Level
  - complex (design, manufacturing, financing, advertising)
- Unit Managers’ Level
  - simple

**Connecting the two levels – an example**
- Executive Level (vehicle type)
  - (SPORT) or (SUV)
- Managers’ Level
  - wheels
  - suspension
  - body

**Tuning the relative benefits of coordination and specialization**
\[
Ω_{\text{org}} = αΩ_{\text{LL}} + (1 - α)Ω_{\text{HL}}
\]

**Three canonical organizational structures**

**Results: steady state fitness levels for the three organizational structures**

**Robustness checks (higher and lower levels are hard)**
1. Bounded rationality
2. Conflict resolution
3. Motivation

**Key question**
What are the costs and benefits of a multi-authority hierarchy in coordinating complex projects?

**Approach**
An agent based model testing performance of three canonical organizational structures in projects of varying characteristics.