



## Ph.D. DISSERTATION DEFENSE

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**Date:** Tuesday, February 25<sup>th</sup>, 2025  
**Time/Location:** 10:30 a.m. / CCSE Lab (5<sup>th</sup> Floor, Babbio)  
**Title:** Unveiling Interpersonal Knowledge Networks in Organizations:  
Integrating Network Complexity and Trust

**Chairperson:** Professor Roshanak Nilchiani, Department of Systems and  
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## ABSTRACT

Modern organizations recognize that competitive advantage hinges not just on what employees know, but on who they know. Despite efforts to manage talent networks, many leaders, particularly in large organizations that depend on strong internal labor markets, continue to rely on heuristic approaches, leaving them vulnerable to disruptive shocks. While social network techniques, organizational science, and interpersonal trust research have advanced significantly, no scalable, non-intrusive, and complete method has emerged to elicit and govern these interpersonal knowledge networks. This study addresses the need for a holistic, data-driven framework to understand, manage, and shape the interpersonal knowledge networks that underlie organizational performance. It integrates and extends research on trust formation, network weighting, cognitive capacity, resilience modeling, and agent-based policy simulation into a single coherent approach.

The work begins by examining how trust emerges in dyadic relationships, an essential yet often overlooked driver of high-quality knowledge exchange. Next, it introduces nuanced weighting methods for network elicitation, harnessing commonly available administrative data rather than time consuming surveys or intrusive digital monitoring. A capacity-based pruning technique follows, acknowledging that only a fraction of possible connections can be actively maintained, thereby refining networks to reflect meaningful, enduring ties. These foundational steps address the challenge of scaling network elicitation without sacrificing dynamic insights.

This research turns to network management, revealing the roles of resilience and strategic interventions. A new informed percolation model shows how typical random-removal analyses can misrepresent organizational resilience, underscoring the value of attribute-driven approaches in detecting genuine vulnerabilities. Small, targeted enhancements - adding edges among mid-range nodes, for example - substantially reduce reliance on influential hubs and increase overall robustness. Finally, an agent-based simulation demonstrates how human resource policies, such as longer rotation cycles, affect both local team cohesion and broader connectivity, ensuring decision-makers can balance costs, stability, and network-wide knowledge flows.



By merging these previously disparate research areas into an integrated framework, the study offers both theoretical innovations and practical decision-support tools. The findings enable organizational leaders to make more informed choices about trust-building, resource allocation, workforce policy, and structural augmentation, ultimately strengthening the resilience and adaptability of their interpersonal knowledge networks.