



U.S. ARMY  
**RDECOM**

Trust, Influence and the Enhanced Human Performance of Multi-genre Crowd Networks

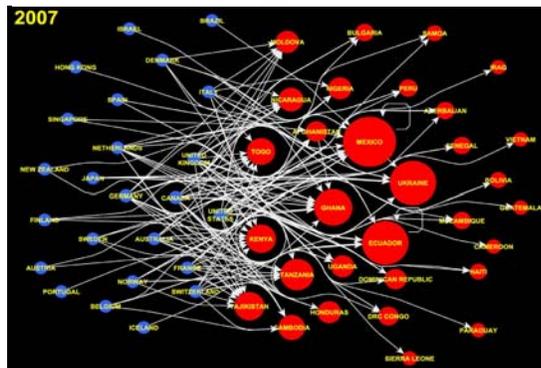
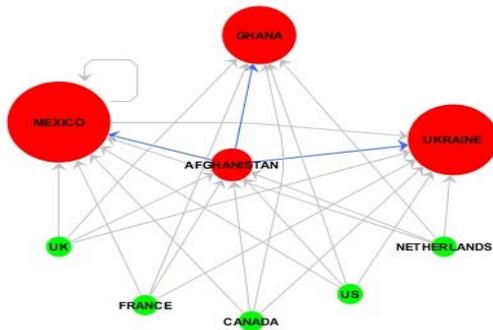


**S&T Campaign: Information Sciences**  
*System Intelligence and Intelligent Systems*

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**Research Objective**

- Does network and node information drive trust in crowds?
- Do network dynamics predict crowd formation?
- Current research on human performance examines small tightly-knit teams or networked communities. In contrast, crowdsourcing teams are fluid and large suggesting differences in scale and collaborative technologies are spawning new patterns of influence driven by collective wisdom and connectivity



Afghanistan crowdfunding network: Lender (green), borrower (red)  
Crowdfunding network: Global lender (blue), borrower (red)

**Challenges**

- Crowds are multi-genre networks but are unlike traditional networks in many ways, for example, crowds often interact anonymously online rather than face-to-face; crowds churn people and leadership rather than have stationary membership
- Crowds efficaciously solve complex decision-making problems but the understanding of their mechanisms is nascent
- Investigations are needed to identify factors that contribute to trust and influence in crowd networks to leverage the power of crowds for humanitarian and operational purposes

**ARL Facilities and Capabilities Available to Support Collaborative Research**

- Utilize large-scale crowdfunding datasets: (1) Kiva.com, international, 1.8M borrowers in 80 nations, 1.2M lenders in 200 nations, 490M loaned (2) Prosper.com, US, 129K borrowers, 65K lenders in 50 states, 318M loaned
- Operationalize trust as a concrete outcome as repayment of quantifiable resources
- Studies planned: (1) National corruption and crowdfunding growth (2) Signals of collective intelligence in crowds (3) Peer-to-peer networks, the effects of online consumer sentiment and information sharing on crowdfunding growth (4) Geographic predictors of crowdfunding diffusion
- Preliminary results on Study 1: Roy & Kase (2015). *The relation between microfinancing and corruption by country: An analysis of an open source dataset. Proceedings of the 2015 IEEE Intelligence Security Informatics (ISI) Conference*

Summary of Multiple Regression Analysis			
	B	SE B	$\beta$
Intercept	32.848	1.624	
Average Loan Size in Dollars / Months on Kiva	0.635	0.067	0.361
Average Loan Size per GDP / Months on Kiva	-10.544	2.405	0.228
Delinquency Rate / Months on Kiva	23.031	8.235	0.207
Average Time to Fund Loans in Days / Months on Kiva	-26.870	10.433	0.204

Multiple regression analysis performed using Automatic Linear Modeling (ALM) to determine the best model to predict the Corruption Perceptions Index (CPI) from 11 microfinancing variables

**Complementary Expertise/ Facilities/ Capabilities Sought in Collaboration**

- Path forward on Study 1: test model with entire Kiva dataset to confirm results and explore World Systems Theory applicability to crowdsourcing networks
- Initiate Studies 2 – 4 with academic collaborators at Northwestern University, Rensselaer Polytechnic Institute, and BBN