

Composition and Antecedents of Emergency Management Information Networks on Twitter



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Research Interests

Interlocal Cooperation



Antecedents of inter-municipal partnerships

Public Safety & Emergency Mgmt



Management of shared risk across jurisdictions

Information Technology



How to facilitate a common operating picture



Collaborative Governance



How to facilitate via social media

Coproduction & Participation



How to facilitate via social media

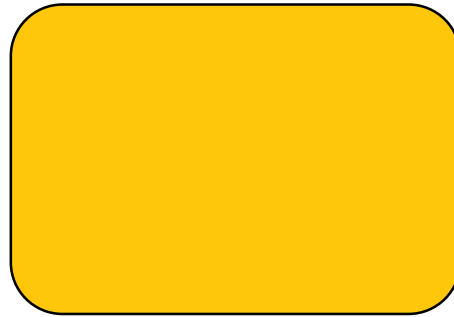
Digital Govt & Social Media



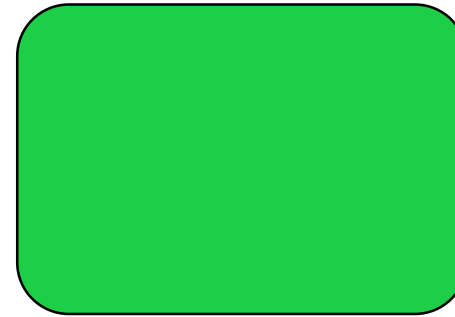
Potential to link government, nonprofits, and the public

Theory - Message Typologies

Messages providing the public with information about what their government is doing



Transparency



Collaboration

Messages promoting and/or facilitating cooperation, coordination, and collaboration with other organizations

Messages eliciting people's concerns, ideas, and expertise to improve administrative decision making



Participation



Coproduction

Messages encouraging the public to produce goods and services (e.g., public safety and resilience), often independent of additional government coordination

Research Questions

- What types of actors participate in emergency management information networks on Twitter...
 - in terms of social sector, level of jurisdiction, and geographic location?
- What factors influence tie formation...
 - i.e. what leads one actor to share information with another?

Information Sharing Patterns in Emergency Management

- Bridging vs. Bonding Hypotheses
 - Bonding Behavior
 - Share information with similar actors
 - Pool resources/Reinforce group norms
 - Consistent with homophily theory (McPherson, Smith-Lovin, & Cook, 2001)
 - Bridging Behavior
 - Share information with dissimilar actors
 - Facilitate access to resources and information across a diverse set of actors (Andrew & Carr, 2013; Aldrich, 2012)
- Resource dependency theory (Pfeffer & Salancik, 1978)

Methodology

- Case - FEMA Region VII
- Identified seed list - 1,086 accounts
 - Represent core set of emergency management actors deemed relevant by state agencies
- Manually assigned attributes
 - Geographic Location | Social Sector | Mission | Jurisdiction
- Used NodeXL to...
 - Collect latest 200 tweets
 - Identify links between accounts (e.g., mentions and replies)
- Used UCINET and R for analysis
 - Homophily Analysis | Exponential Random Graph Model (ERGM)



Network Composition

Who's In?

Account Types by State (Location)

	Iowa		Kansas		Missouri		Nebraska		Outside		Total	
<i>Type</i>	<i>N</i>	<i>%</i>	<i>N</i>	<i>%</i>	<i>N</i>	<i>%</i>	<i>N</i>	<i>%</i>	<i>N</i>	<i>%</i>	<i>N</i>	<i>%</i>
Commercial	2	1.3	2	1.9	2	1.1	-	-	26	6.8	32	2.9
Government	107	67.7	63	58.3	104	57.1	122	47.7	198	51.8	594	54.7
Media	33	20.9	32	29.6	31	17	83	32.4	85	22.3	264	24.3
Nonprofit	15	9.5	5	4.6	41	22.5	18	7	46	12	125	11.5
Private Citizen	1	0.6	6	5.6	4	2.2	33	12.9	27	7.1	71	6.5
Total	158	14.5	108	9.9	182	16.8	256	23.6	382	35.2	1086	100

Organizational Missions - Government

- Agriculture
- Corrections
- Earth Sciences
- Economic Development
- Education
- Elected Officials
- Emergency Management
- Environmental
- Fire
- General
- Homeland Security
- Housing
- IT
- Meteorology
- Military
- Other
- Parks & Land Mgmt.
- Police
- Public Health
- Public Works
- Regulatory
- Transportation
- Utilities

Network Antecedents

What factors account for information sharing?

Homophily – Geographic Proximity (State)

	Iowa		Kansas		Missouri		Nebraska		Outside	
	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%
Iowa	264	85.2	1	0.4	5	1.1	20	2.3	80	14.4
Kansas	3	1	206	79.2	26	5.7	16	1.8	61	11
Missouri	4	1.3	24	9.2	386	84.6	19	2.1	111	19.9
Nebraska	17	5.5	7	2.7	8	1.8	773	87.4	147	26.4
Outside	22	7.1	22	8.5	31	6.8	56	6.3	158	28.4
<i>Total</i>	310	-	260	-	456	-	884	-	557	-

Homophily – Jurisdiction (Geographic Scale)

	International		National		State		Regional		County		Municipal	
	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%
International	19	11.3	63	5.2	11	1.2	10	1.2	1	1	0	0
National	58	34.5	490	40.8	175	18.8	67	7.9	17	17.3	12	5.4
State	29	17.3	329	27.4	415	44.6	214	25.2	20	20.4	29	13.1
Regional	49	29.2	211	17.6	225	24.2	375	44.2	31	31.6	83	37.4
County	11	6.5	62	5.2	43	4.6	66	7.8	14	14.3	24	10.8
Municipal	2	1.2	46	3.8	61	6.6	116	13.7	15	15.3	74	33.3
<i>Total</i>	168	-	1201	-	930	-	848	-	98	-	222	-

Homophily – Account Type (Social Sector)

	Citizens		Commercial		Government		Nonprofit		Media	
	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%
Citizens	16	19.3	4	7.0	112	5.5	12	4.4	91	8.9
Commercial	3	3.6	4	7.0	33	1.6	6	2.2	25	2.5
Government	42	50.6	28	49.1	1349	65.6	145	53.5	434	42.6
Nonprofit	6	7.2	9	15.8	315	15.3	76	28.0	135	13.2
Media	16	19.3	12	21.1	246	12	32	11.8	334	32.8
<i>Total</i>	83	-	57	-	2055	-	271	-	1019	-

Discussion/Conclusion

- Composition
 - Diverse network
- Network formation
 - Geographic proximity matters
 - Level of jurisdiction remains relevant
 - Although information flows between all levels
 - Tendency toward centralization
 - Focus on government agencies
- Next steps
 - Explore 1) content of tweets and 2) role of central actors
 - Specific Question: What impact do these message have?

Key Accounts

In-degree & Out-degree Centrality

Account	Type	Indeg
fema	Government	72
youtube	Media	54
redcross	Nonprofit	53
nws	Government	52
omahapolice	Government	39
readygov	Government	37
govricketts	Government	32
ketv	Media	32
prepareathon	Government	32
dhsgov	Government	30

Account	Type	outdeg
emap_us	Nonprofit	58
eqconsortium	Nonprofit	36
centus_shakeout	Nonprofit	31
nationaleas	Government	29
emweeklyrpt	Media	28
leslilu1	Nonprofit	26
mtobiasne	PrivateCitizen	25
sternjd	Government	25
craigatfema	Government	24
fredprepdog	Government	23

Organizational Missions - Nonprofit

- Animal rescue
- Economic dev
- Education
- Emergency mgmt
- Fire
- Hospital
- Lobby
- Military
- Other
- Public health

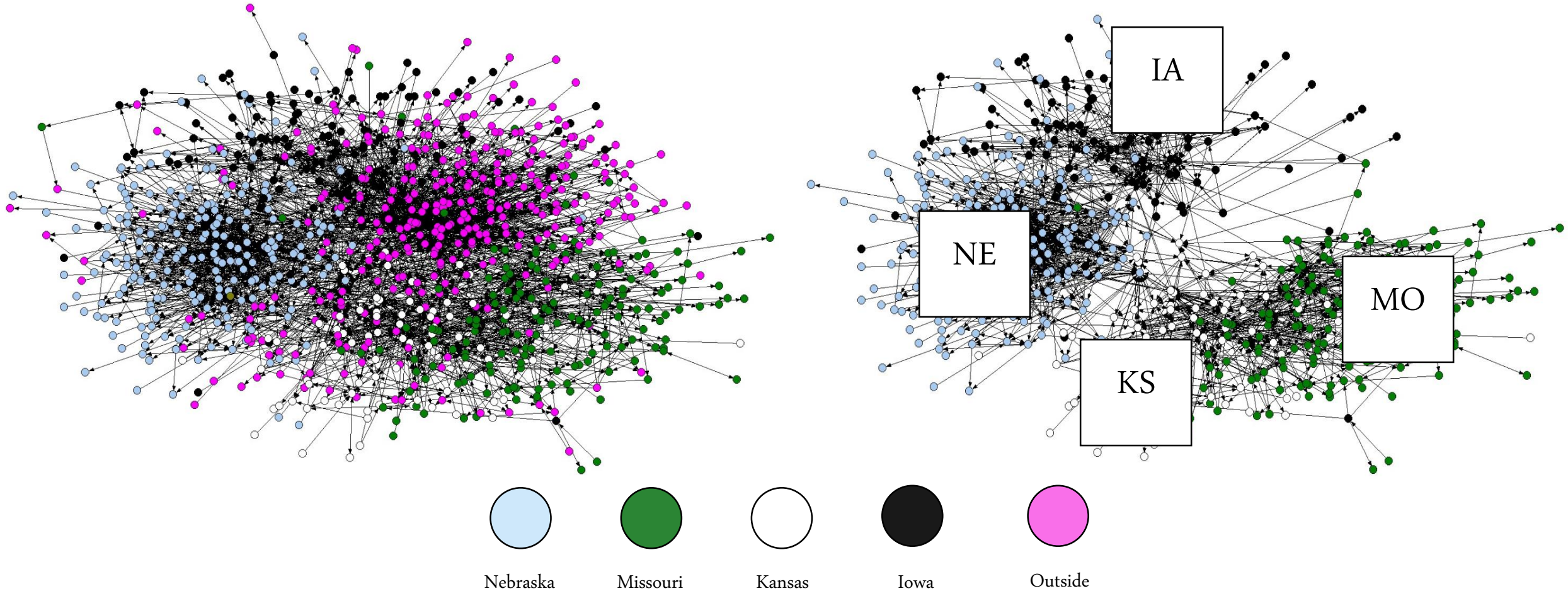
Organizational Missions - Media

- Blog
- Documentary film
- Magazine
- Newspaper
- Radio
- Social media
- TV
- Website

Organizational Missions - Commercial

- EM
- Fire
- Insurance
- IT
- Marketing
- Sports
- Utilities
- Other

Twitter Reply & Mention Network (w/ & w/out Outside Accounts)



Future Research: Working Papers



Social Media
Monitoring



Information Networks on
Social Media: Participants
& Structure

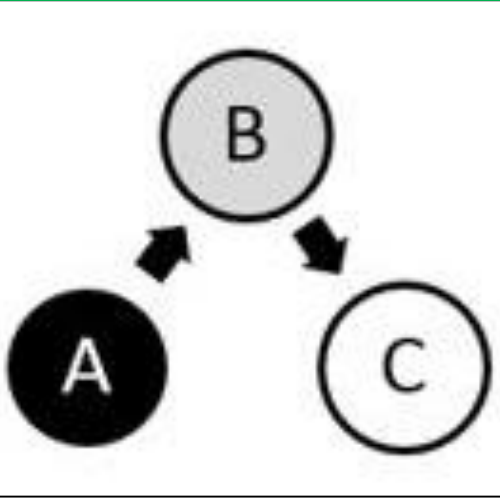


Ohio EMA

Disaster Preparedness



Social Media and
Collaborative Governance



Information Networks on
Social Media: Messages as
Network Antecedents