

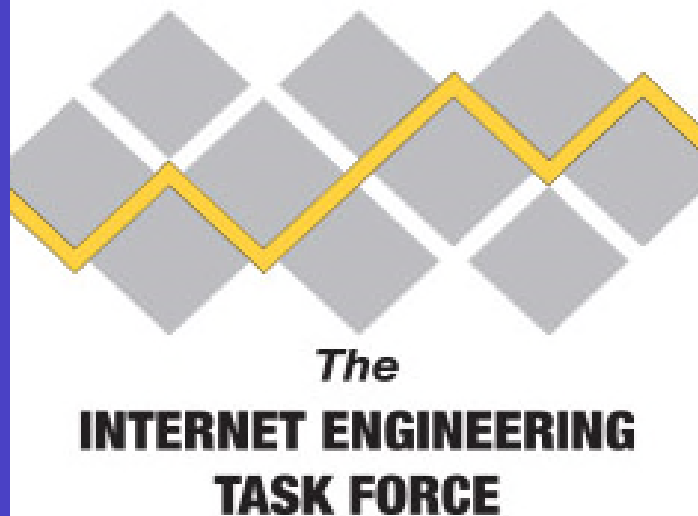
Consensus Decision- Making in IETF Standards

**Dr. Susan Hares,
Regent University**



Agenda

Consensus Decision-Making in Internet Standards (Dr. Susan Hares)



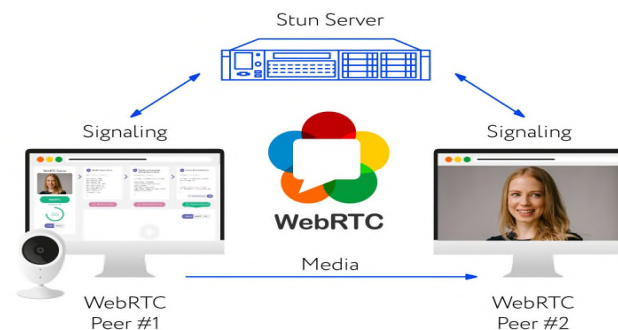
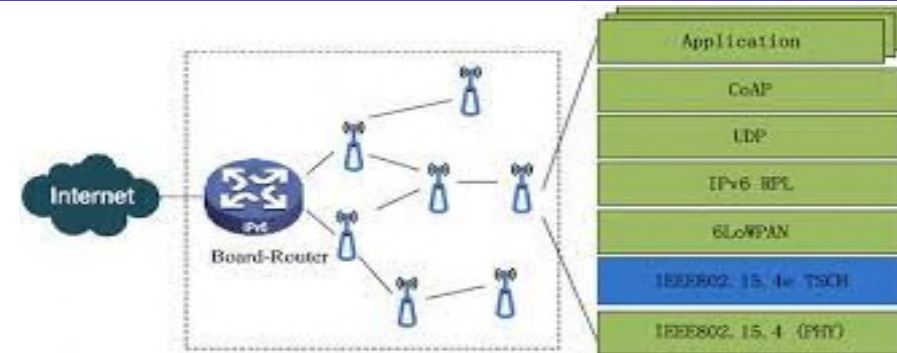
**IETF's Goal:
Make the Internet work better**

- Consensus Decision-Making in TMT in IETF
- 3 Phase Mixed-Mode Study
- Limits to Study

Public Leadership in Open Standards for the Internet



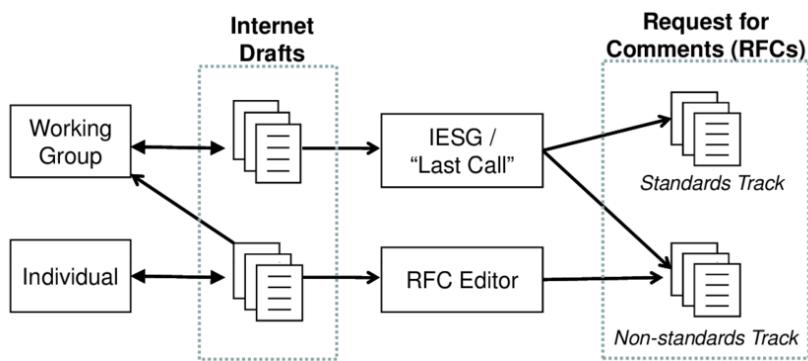
Internet of Things
(IEEE-IETF)



Video in your
Web browser
(W3C-IETF)

IETF Mission – guided by IESG (TMT)

IETF Drafts



Simcoe, Waguespack, Smith, & Rotman (2009)

RFC 3935: Mission of IETF

*"Its mission is to produce high quality, relevant **technical and engineering documents** that influence the way people design, use, and manage the Internet in such a way as to make the Internet work better. These documents include protocol standards, best current practices, and informational documents of various kinds."*

All Decisions made by "rough consensus"

Rough consensus and running code We make standards based on the combined engineering judgment of our participants and our real-world experience in implementing and deploying our specifications.

RASP and RFC2026

RFC 2026 - WG track

- Internet-Draft (I-D) developed in WG
- WG requests the IESG publish I-D
- IESG reviews
 - IETF LC
 - IESG review
 - IESG Approves
- RFC editor publishes

Reality prior to RFC handoff

- Individual I-D (draft) published
 - WG Adoption call on mail list
 - WG discussion + implementations
 - Early IETF Directorate review
 - WG LC (May happen 1-2 times) on mail list
 - WG Shepherds help authors refine draft
 - Pre-IESG Directorate review
 - WG shepherd/Chairs request IESG that publish I-D
 - AD review - prior to IETF LC
 - Directorate Reviews
 - IETF LC
 - AD write-up of IETF LC
 - IESG review (ballot and IESG formal telechat)
 - Resolution of comments at IESG review
 - Formal hand-off to RFC Editor
- Mail list research**
- Reviewer choices**
- Datatracker + Reviewer choices**
- IESG Review + Reviewers**
- Mail list research**
- IESG Consensus**

Consensus Decision-Making in IESG TMT in IETF

Did Leaders in the IETF make it successful?



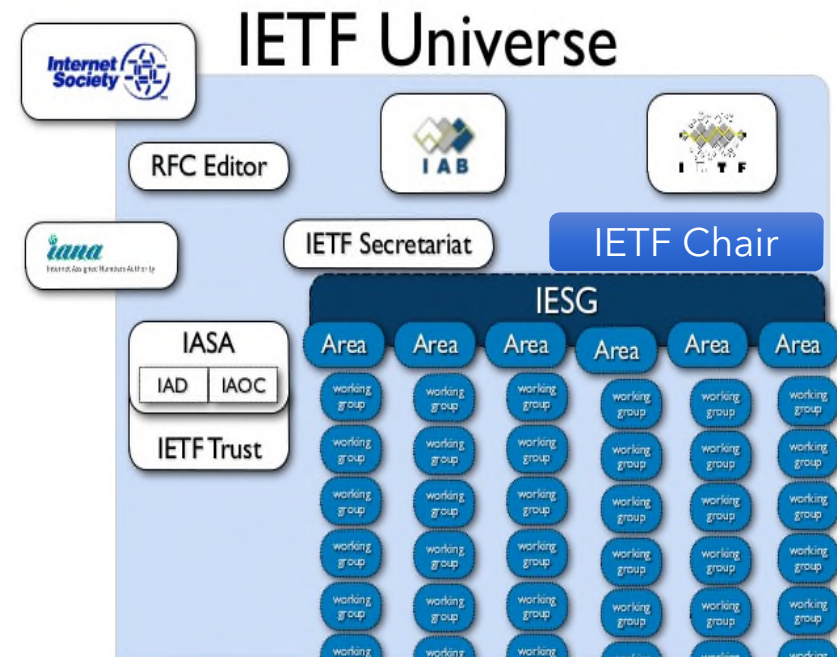
IETF
Chair 7



IETF
Chair 8



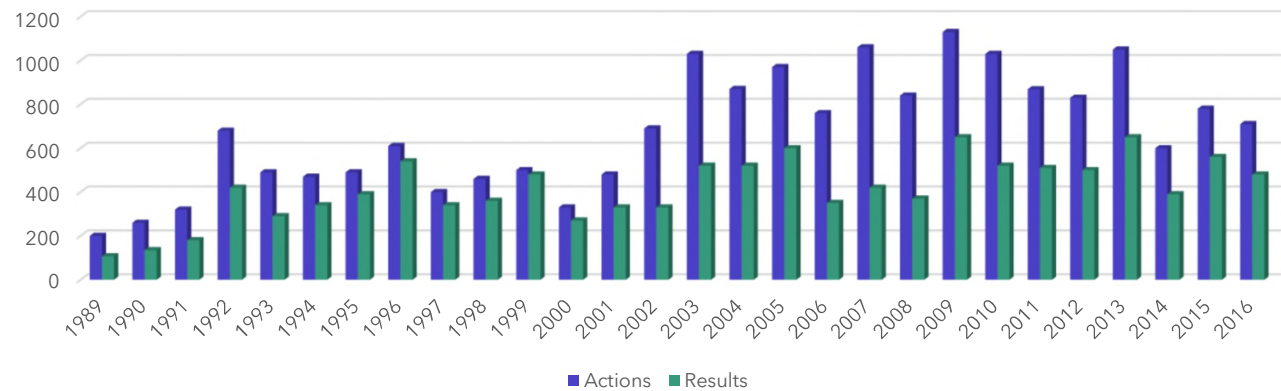
IETF
Chair 9



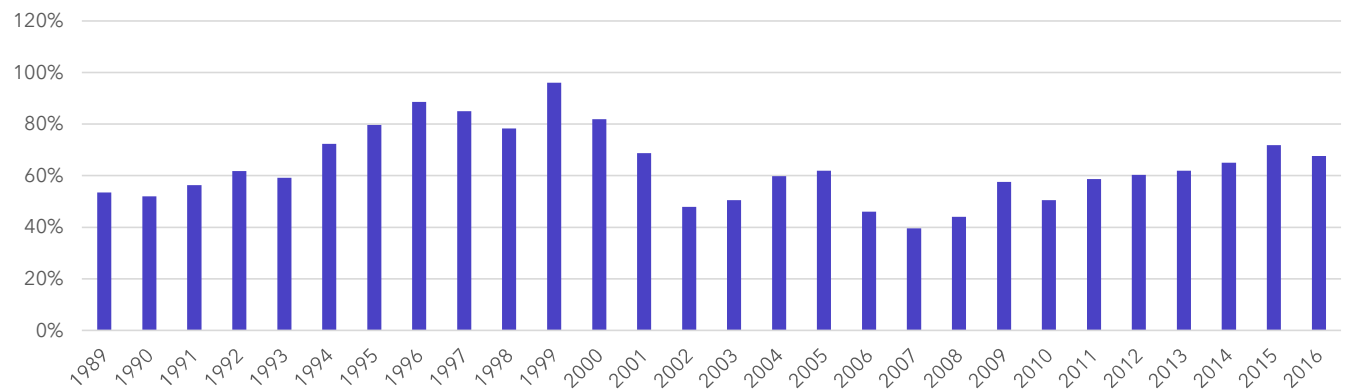
IESG Decisions Discussed vs Results

Consensus Decision-Making in Internet
Standards (Dr. Susan Hares)

IESG - Decisions versus Results
Raw Count (based on 10% analysis)



% IESG Decision causing Results

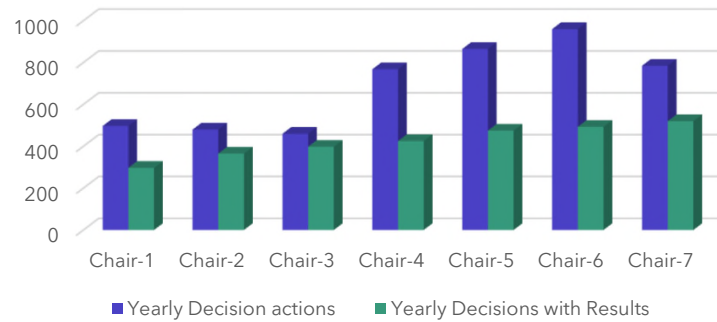


11/5/2023

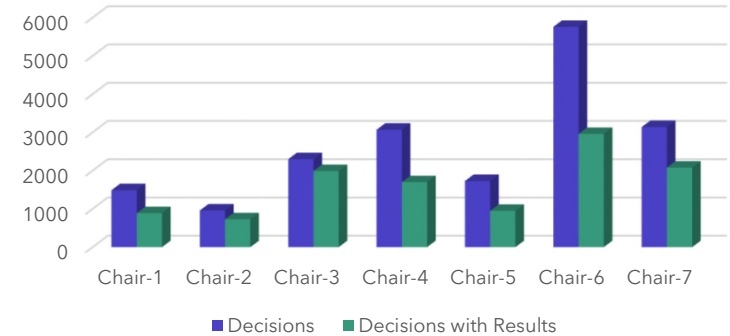
IESG Decisions Discussed vs Results - Per IETF chair

Consensus Decision-Making in Internet
Standards (Dr. Susan Hares)

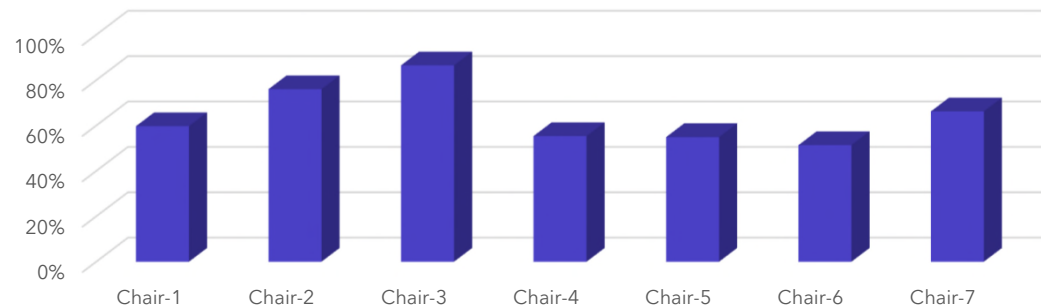
Average Yearly
Decision versus Decisions with Results



Results versus Decisions
for all IESG led by IETF Chair



IETF Chair tenure
% Decision causing Results



3 Phase Mixed Mode Study

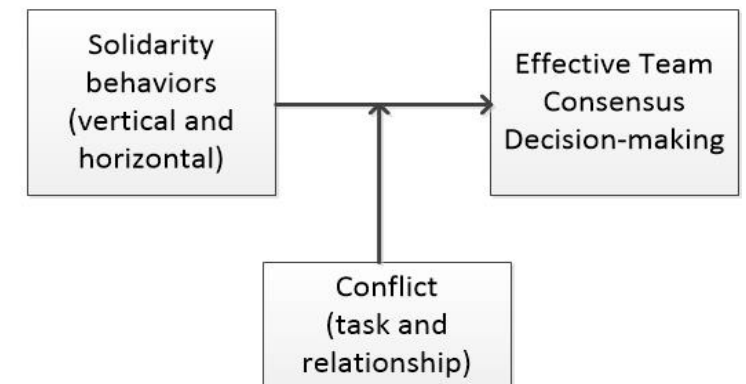
Phase 1



Phase 2



Phase 3



What Predicts Effective Decision-making

Leadership theories for antecedents

- **Collaborative and reciprocal leadership:** “more adaptable” when “no one person has the solution to a multi-faceted problem” (Allen and co-authors (2010))
- **Solidarity** – An individual who contributes more effort toward a group or person has greater solidarity (Hetcher (1987)).
- **OCB** – “discretionary” efforts outside of their normal roles indirectly “or explicitly recognized by the formal reward system, that in the aggregate, promote organizational goals”. (Organ, 1997)
- **Conflict** – task and relationship ((Jenn, 1995, 1997), (Jehn and Chatman, 2000))
- **Task interdependence** – the extent to which members rely on others to complete their jobs

Research on IETF Processes

- **ICT impact:**
 - Gençer, 2012 - Most actors in software and hardware embrace open standards” so delays in standards result in delays in new ICT products.
 - McQuistin et al. (2021) - Deployment of RFCs
- **WG mail list review** -
 - Protocol Adoption - Nikkhah, Mangal, Dovrolis, and Guérin (2017)
 - Activities on Mail list + Social Media - Niedermayer, et al. (2017)
 - Collaboration on QUIC (Web) Protocols for [20 years) Welzl, et al. (2021)
- **Standard publication process:**
 - Simcoe (2007, 2013) Individual “draft” document to published standard
 - Impact of IPR, who participates
 - IESG review in this process is “**fixed value**”

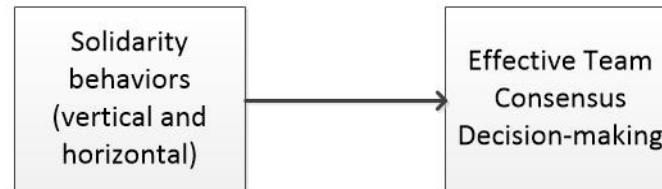
Models

Phase 1



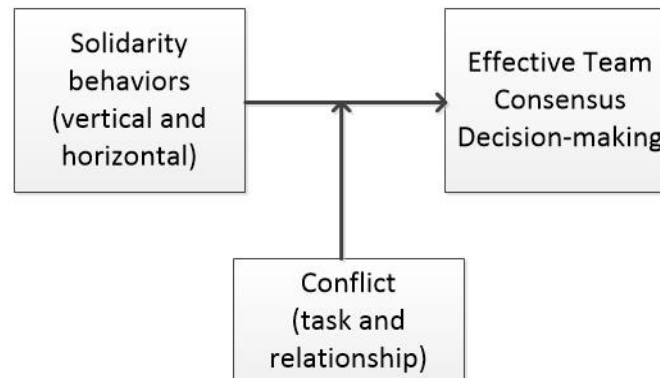
H1: An increase in multiple person discussions will increase the effectiveness of consensus decision made in team consensus decision-making

Phase 2



H1: An increase in solidarity will increase the effectiveness of consensus decisions made in team consensus decision-making

Phase 3



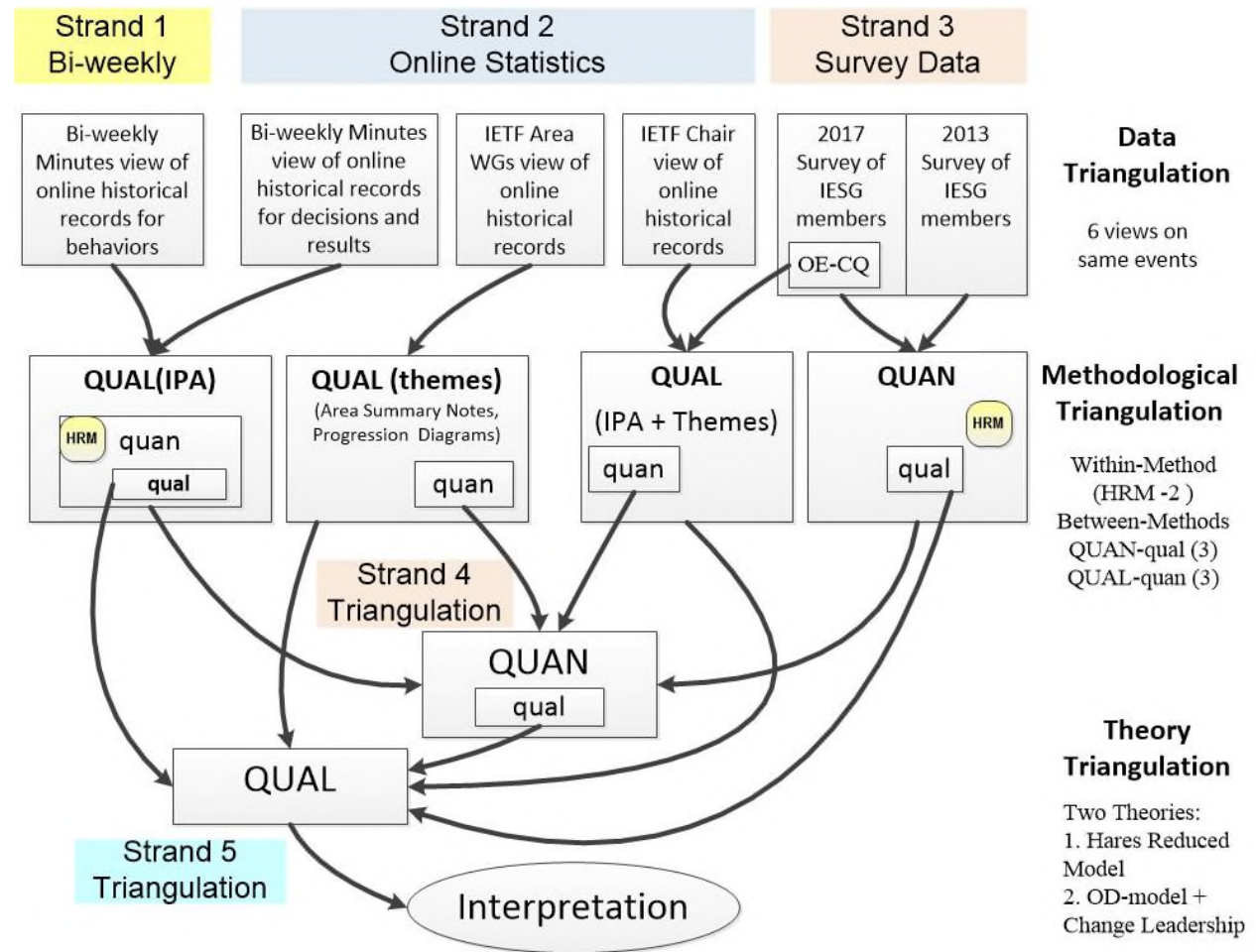
H1: An increase in solidarity will increase the effectiveness of consensus decision made in team consensus decision-making

H2: Controlling for task interdependence an increase in solidarity moderated by conflict will increase the effectiveness of consensus decisions made in team consensus decision-making

Three Phases

	Phase 1 (2012)	Phase 2 (2013)	Phase 3 ('17-'21)
Strands	Exploratory (QUAL→ quan)	Explanatory (QUAN→ qual)	Concurrent triangulation
Theory	Allen & co-authors: Collaborative and reciprocal leaders	Hares Model Solidarity Control: TI	Hares Model Solidarity, Conflict Control: TI
Alternate Theory	Fielder's LPC (Least Preferred Coworker)	Hares Model with OCB replaces solidarity	Hares Model with OCB replaces solidarity
Data	IPA analysis of IESG formal minutes: 5 per year 2003, 2006, 2011	Survey with solidarity, OCB, TI, and self-reported Effectiveness	IESG Minutes 10% 1991-2016 Online WG, Online Chair 2 Surveys ('13, '17)
Analysis	Quantitative: Theme counts totals behavior (multiple person, dyad) , decisions	HRM with IETF totals + perceived totals per year	HRM (cohort mean) Solidarity predicts Better than OCB
Interviews	Post-analysis 3 chairs	Post Analysis 8 IESG members	Dissertation online for IESG members prior to publication

Phase 3 - historio- metric



Survey Instrument [Themes for IPA]

Behavior Instrument	Reliability (Cronbach Alpha)		
	Previous Research	2013 Survey	2017 Survey
Survey responses [2013: 28 questions behaviors + 5 effective decision-making [2017: added 6 conflict behaviors + 2 open-ended conflict]	100s	41 IESG (46%) 94 slots (41%) 25 years	25 IESG (26%) 88 slots (26%) 28 years
Solidarity instrument from Koster and Sanders (2006) (10 horizontal, 10 vertical)	HS: 0.85-0.95 VS: 0.78-0.89	0.90	0.91
OCB from Wayne & Cordeiro (2003) Generalized Compliance (3) Altruism (2)	0.70 0.70	0.70 0.76	0.80
TI from Van Der Vegt et al. (1998) (3 questions)	0.81	0.85	0.89
Jehn's (1995) Intragroup Conflict scale (task (3), relationship (3))	0.72 - 0.91	Not on Survey	0.88
Self-Reported Effectiveness		2013 survey	2017 survey
IESG Perceived Effectiveness (PR) (Documents (2), WG (1), Admin (1))	no history	0.85	0.79

Correlation and HRM results

10% Minutes 1991-2016	100% Minutes 2015-2016	2013 Survey Cohort mean	2017 Survey Cohort mean	2017 Survey All Responses
Correlations: S-OCB: 0.902 S-Results: 0.845 C-Results: 0.409 TI-Results: 0.738 OCB-Results: 0.784 HRM: Solidarity predicts 62-73% of results OCB predicts 61%	Correlations: S-OCB: 0.919 S-Results: 0.804 C-Results: 0.545 TI-Results: 0.798 OCB-Results: 0.855 HRM: Solidarity predicts 65% ('15), 44% ('16) OCB predicts 73% ('15), 71% ('16)	Correlations: S-Results: 0.517 PR-Results: 0.451 S-PR: 0.531 HRM: Solidarity predicts 22-26%	Correlations: S-OCB: 0.637 S-PR: 0.713 C-PR: -0.479 OCB and S did not correlate to results HRM: Solidarity predicts 51-58% of perceived results	Correlations: S-OCB: 0.637 S-PR: 0.706 C-PR: -0.509 OCB and S did not correlate to results HRM: Solidarity predicts 51-58% of perceived results

3 Conclusions

1. Quantity of quality data matters
2. Triangulation is critical
3. Solidarity appears to be better than OCB for IESG

Still in the mountains of data
Going from 10% to 100%



My goal
Help make the IESG more effective

So the IETF can
Make the Internet work better

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Dissertation:
Solidarity as an Antecedent
of Consensus Decision-
Making: A Mixed Mode Study
(**PhD Organizational
Leadership**)

LinkedIn: Sue Hares

Thank you

Dr. Corné Bekker – dissertation chair
and committee (Dr. Cabanda and
Dr. Gomez) for their guidance

And you ... for your feedback!



IETF's Goal:
Make the Internet work better

Historical data collected in Phase 3

	IESG Minutes	WG information	IETF Chairs
Minutes	Formal Minutes Narrative Minutes	Online IETF WG information	Online IETF proceedings
Files	599 formal ('91-'16) 246 Narrative ('05-'16) 78 BOF	768 WG 281 BOFS [1049 Pages]	95 meetings ('89-'17) 110 meetings ('89-'21) (IESG 1989-2020)
Sample	Formal: 78 (26 years) (52 meetings + 12 BOF) Narrative: 35 (2005-2016) (23 meetings + 12 BOFs)	100% WG pages read	100% of Plenary presentations with IETF chair presentations
Decisions	10% - 1853 100%: 1605 (2015: 820, 2016: 785)	Content Analysis Per Area standards progression	IETF chairs were surveyed 2013: 4 chairs (16 yrs) 2017: 4 chairs (17 yrs)
IBA -	10% - 21643 100%: 17543 (2015: 8816, 2016: 8721) [39 questions]	WG looked at the progression of documents	Look at Chair's environment via SWOT, Goals versus Accomplishments, Conflict

Total IPA analysis = IBA * 39 questions = 1.5 million items

References (1)

Amason, A.C. (1996). "Distinguishing the effects of functional and dysfunctional conflict on strategic decision-making: Resolving a paradox for top management teams. *Academy of Management Journal* (1996), 39(1), 123-148.

Dess, G. & Origer, N. (1987). Environment, structure, and consensus in strategy formation: A conceptual integration. *The Academy of Management Review*, 12, 637-647.

Gençer, M. (2012). The evolution of IETF standards and their production. *International Journal of IT Standards and Standardization Research*, 10(1), 17–33. doi:10.4018/jitsr.2012010102

Hechter, M. (1987). *Principles of Group Solidarity*. Berkely: University of California Press.

Internet Engineering Task Force. (2021, November 20). *Mission and principles*. Retrieved from <https://www.ietf.org/about/mission/>

Jehn, K.A. (1995). "A multimethod examination of benefits and detriments of intragroup conflict", *Administrative Science Quarterly*, 40(20), 256-282.

References (2)

- Jehn, K.A. & Chatman, J.A. (2000), “The influence of proportional and perceptual conflict composition on team performance”, *The International Journal of Conflict Management*, 11(1)
- Koster, F. & Sanders, K. (2006). Organizational citizens or reciprocal relationships? An empirical comparison. *Personnel Review*, 35(5), 519-537
- Kotlyar, I., Karakowsky, L., & Ng, P. (2011). Leader Behaviors, conflict, and member commitment to team-generated decisions. *The Leadership Quarterly*, 22, 666-679.
- Ligon, T.S, Harris, D.J. & Hunter, S.T. (2012). Quantifying Leaders’ Lives: What historiometric approaches can tell us. *The Leadership Quarterly*, 23, 1104-1133.
- MacKenzie, S., Podsakoff, P., & Fetter, R. (1991). Organizational citizenship behavior and objective productivity as determinants of managerial evaluations of salespersons performance. *Organizational Behavior and Human Decision Processes*, 50, 123-50.
- McQuistin, S., Karan, M., Khare, P., Perkins, C., Tyson, G., Purver, M., Healy, P., Iqbal, W., Qadir, J. & Castro, I. (2021, November). “Characterising the IETF through the lens of RFC deployment”. In *Proceedings of the 21st ACM Internet Measurement Conference* (pp. 137-149).

References (3)

Niedermayer, H., Raumer, D., Schwellnus, N., Cordeiro, E., & Carle, G. (2016). “An analysis of IETF activities using mailing lists and social media”, . In *Internet Science: Third International Conference, INSCI 2016, Florence, Italy, September 12-14, 2016, Proceedings 3* (pp. 218-230). Springer International Publishing.

Nikkhah, M., Mangal, A., Dovrolis, C. and Guérin, R., 2017. “A statistical exploration of protocol adoption”, *IEEE/ACM Transactions on Networking*, 25(5), pp.2858-2871.

Organ, D. W. (1997). “Organizational citizen behavior: It's construct clean-up time”, *Human Performance*, 10, 85–97

Parry, K., Mumford, M.D., Bower, I. & Watts, L.L. (2014). Qualitative and historiometric methods in leadership research: A review of the first 25 years of The Leadership Quarterly. *The Leadership Quarterly*, 25(1), 132-151.

References (4)

Sanders, K. & Schyns, B. (2006). Leadership and solidarity behavior: Consensus in perception of employees within teams. *Personnel Review*, 3, 538-556.

Simcoe, T. S. (2007). Delays and de jure Standardization: Exploring the slowdown in Internet standards development. In S. Greenstein, & V. Stango (Eds.), *Standards and public policy* (pp. 260–295). New York, NY: Cambridge University Press.

Simcoe, T. S. (2012). Standard setting committees: Consensus governance for shared technology platforms. *American Economic Review*, 102(1), 305-336.

Simcoe, T. & Waguespack, D., Smith, R. & Rotman, J. (2009). What's in a (Missing) Name? Status, Quality and Attention in Open Standards Development.

(https://www.researchgate.net/publication/228785726_What's_in_a_Missing_Name_Status_Quality_and_Attention_in_Open_Standards_Development)

References (5)

Stewart, G. L., Manz, C. C., & Sims, H. P. (1999). *Teamwork and group dynamics*. New York, NY: Wiley & Sons.

Welzl, M., Oepen, S., Jaskula, C., Griwodz, C., & Islam, S. (2021). Collaboration in the IETF: an initial analysis of two decades in email discussions. *ACM SIGCOMM Computer Communication Review*, 51(3), 29-32.