Adoption Metrics for Proximity Technologies

A presentation to NIST Workshop entitled:

Challenges for Digital Proximity Detection in Pandemics: Privacy, Accuracy, and Impact

(Primarily responsive to “commercialization” and “test beds” prompt)

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By

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The Need:

We need metrics to help promote and steer adoption of Exponential, Socio-Technical Systems (ESTS)

(such as proximity technologies)

Exponential Socio-Technical Systems (defined)

- Proximity Systems ARE Exponential Systems (ES)
  - Power from higher-order effects of Moore's Law (exponential growth)
  - Value depends on achieving "network effects" in deployment
- Proximity Systems ARE Exponential *Socio-Technical* Systems – (ESTS)
  - ESTS have all characteristics of ES
  - Plus
  - Include humans/institutions as users AND as "calibrated system elements"
    - Humans/institutions supply input data flows (for training/calibration, for processing)
    - Humans/institutions administer/animate nodes in system (formally and informally)
- ALL networked information technologies are ESTS

Our Approach – Develop Adoption Metrics for ESTS

- IRRI programs and materials support distributed testbeds (testing ”ecosystems”)
- Test “Technically Feasible” systems for “BOLTS reasonableness”
- BOLTS Metrics are drawn from domains of:
  - Business
  - Operating
  - Legal
  - Technical
  - Social
- Failure of any one of the BOLTS performance criteria potentially vetoes adoption. Period.
- “BOLTS Engineering” brings together requirements for adopted technology
  - Collect and curate B-O-L-T-S patterns of practice directly from stakeholders
  - Present additional and alternative B-O-L-T-S practices for stakeholder consideration
  - Curate multi-stakeholder process of solution discovery among BOLTS practices
    - enables compensating controls within and across BOLTS categories
- Commercialization depends on presence of BOLTS risk metrics to evaluate adoption pathways and market potential.
  - Insufficient BOLTS risk evidence blocks adoption, including commercial adoption

Benefits of "BOLTS" Engineering Metrics Testing Ecosystem

- Better Design and Development:
  - Feedback to technical design and development teams saves time and cost
- Better Performance:
  - Real-world performance stress test tech before deployment
- Socio-Technical Interoperability:
  - Capture BOLTS (aka "policy") considerations as engineering requirements
- Scale:
  - Patterns and Practices approach incorporates BOLTS elements "localized" for stakeholders
  - Isolated adoption/commercialization pathways are brought into contact to solve stubborn problems
- High Resilience:
  - Anti-fragile because of cross-BOLTS interdependencies
- Sustainability:
  - Built on stakeholder self interest to "de-risk" in ways that each cannot do alone

Align current isolated pathways from tech lab to adoption/markets

- IYBITWC (“if you build it, they will come”)
  - Too naive
- Academic Tech-Transfer
  - Patent focused, Theoretical
- Corporate market research
  - Product driven, Competition driven
- Government Sponsored Research
  - National agenda focused, Too jurisdictionally bound for global legal/social interoperability
- Entrepreneur Startups
  - Too under-resourced
- Trade associations
  - Too insular, Too operations-focused
- Statutory pathways
  - Anachronistic/lagging tech, IP focused

Applications of BOLTS to Exponential Socio-Technical Systems

- Technical Standards Setting Generally
  - "Necessary Claims" language references "technically feasible" vs. "commercially reasonable"
- Identity Systems
  - Trust Frameworks (NIST, GSA, NISTIC, OIX, OpenID, PCI-DSS)
- Financial Markets
  - Integrated BOLTS Risk Models (IIF, SWIFT, WEF)
- Food System Security
  - Information Network Risk Maps (KSS, DARPA, NASA, Columbia University)
- Data Security and Data Ethics
  - Standards/Policy Framings/Curriculum (Accenture, Atlantic Council, WEF, NSA, IEEE)
- Data Sharing Standards
  - DSA Questionnaire Tool (UN SDSN, WEF, NYU Gov Lab)
- Contact Tracing
  - Ethical/Privacy requirements (IEEE), Distributed Testbed (DHS)
- AI/ML
  - Policies, white papers, governance documents (WEF, IEEE)
- Government 2.0
  - Tech policies/Legislative language (Wyoming, EU, OECD, UK, WEF, NYU GovLab)
- Information Security for Complex Systems
  - Atlas of Risk Maps

Let’s work together

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