

## Research Agenda for digital HKS

A new research fellow investigates federal open source software\*

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### Open Source Software (OSS) and the Federal Government

The federal government began using open source software in the 1940s. [Grace Hopper's](#) work at the [Harvard Computational Laboratory](#) supported by the U.S. Navy in collaboration with other academic institutions facilitated a cooperative arrangement to create and share code. Notably, this collaboration led to the creation of a compiler and later to the programming language [COBOL](#). My research begins with a narrative of the history of computing from the 1940s to the present and examines the practices of the federal government in developing, consuming, and publishing software.



Photo courtesy of [YaleNews](#).

### Organizational Culture Affecting OSS Publication

"Organizations have cultural properties, they breed meanings, values and beliefs, they nurture legends, myths and stories, and are festooned with rites, rituals, and ceremonies" ([Allaire & Firsitou, 1984](#)).

#### *Beliefs*

OSS, as a distinctive technology, is intertwined with beliefs, which are critical to OSS publication, as they reflect the [Hacker's Ethos](#), a "silently agreed upon" notion of access to computers and information that create art and are used to change one's life for the better. Beliefs are supported by values and norms that drive behavior. My research examines how organizational beliefs are facilitating and hindering federal organizations' ability to publish software publicly<sup>†</sup>.

#### *Public Engagement*

Integral to OSS publishing is the need for a software development community fostered by an organization's efforts with public engagement. [Weber](#) suggests software communities positively support cooperative relationships by empowering individuals to help themselves through "experimentation" maintained by a "group and in public." My research examines aspect of community for software development by investigating federal agencies' public engagement processes and mechanisms<sup>†</sup>.

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\* Each theme and sub-theme of research should result in one or more of the following: 1. Publication on Medium; 2. Input into digital HKS reports; 3. Discussion in seminars and classes; and, 4. Inform activities with Code.gov.

<sup>†</sup> This research includes primary data collection with federal IT project/program managers in software development organizations. It extends my dissertation research, [An Organizational Analysis of Publishing the People's Code](#).

## Organizational Structure Affecting OSS Publication

“Most analysts have conceived of organizations as social structures created by individuals to support the collaborative pursuit of specified goals” ([Scott & Davis, 2007](#)).



Joan Woodward. Photo courtesy of [Management Pocketbooks](#).

### *Structural Dimensions*

One way to examine organizational structure is to analyze structure in context. Technology-structure theory suggests as organizations experience technological uncertainty, they will adjust structures through variations of rules, skills, decision-making, and communication. Exemplified by [Woodward](#) with factories in England in the 1950s, when work routine is high and technical complexity is moderate, assembly workers are optimal for mass production; however, engineers operate best when routineness of work with continuous processing of products is low and the complexity of technology is high. My research examines technology-structure phenomenon and how it affects an organization's ability to publish OSS<sup>‡</sup>.

### *Structural Situation*

An aspect of structure affecting the publication of OSS is how the unit is positioned within a larger organization. Units embedded in larger organizations may be encouraged, permitted, discouraged, or prohibited from publishing OSS. Organization design includes structural situation with organization forms (e.g., bureaucratic, matrix, adhocracy) and rationale of why a form works in a particular situation. My research examines structural situation with an analysis of organizational forms supporting and prohibiting software publication<sup>‡</sup>.

### **By the Numbers: Current Performance with OSS<sup>§</sup>**

- Data from open source platforms – Analysis of code repositories and engagement.
- Federal IT budget spend – Analysis of total by agency, % spend on software, % spend on OSS.
- Analysis of federal IT major investment reports and 2016 IT Modernization responses.

### **Position Papers**

- Thoughts about the next iteration of the Federal Source Code Policy (FSCP).
- Responses to writings within digital HKS and open source software.
- Quality of OSS; Value of OSS reuse.
- How to Open Source: Technical steps to move from closed to open source.

### **Stories**

- Notes from the Field – Events, roundtables, conferences, speaking engagements, etc.
- Agency Case Studies – Including code development, publication, and reuse.

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<sup>§</sup> Analysis of public data sources (e.g., [Federal IT Dashboard](#), [GitHub.com](#)) with Qualitative Data Analysis tools.