The Adaption of Agile Methods and Principles in Public Administrations around the World

Discussion of Academic Paper

The key academic paper for my project is the journal article *"Agile Innovation Management in Government: A Research Agenda"* by Ines Mergel, Yiwei Gong, and John Bertot (2018). Its goal is to provide a (brief) overview of agile software development, analyse and synthesise existing literature on agility in government, and provide a series of future research questions. I have selected the paper since it is the most recent literature review on the substantive part of my topic, providing a comprehensive introduction into the research field.

After motivating the need for agile governance based on the apparent change in citizens' expectations towards government services as well as the increased necessity to manage complex IT innovations (potentially involving AI, Big Data etc.), the authors state that agile government practices originate from the private sector software engineering domain and intend to "transform organizational culture and methods of collaboration to achieve higher level of adaptiveness" (Mergel et al., 2018, p. 292). In order to further illustrate the agile approach, the authors provide the 12 principles of agile software development as laid down in the foundational work of the Agile Manifesto (2001).

Next, the authors explain their systematic literature review approach which they base on the PRISMA method developed by Moher et al. (2009): Initially they searched the Web of Science and Google Scholar databases from 1988 to 2018 using the following pre-defined keywords: adapt* AND government, flex* AND government, agil* AND government. Getting over 100,000 hits, the authors then used an inclusion criteria-set to sort out the relevant articles, which ultimately left them with 33 articles for their analysis.

Analysing the content of the respective papers, the authors find that the existing agile government studies are mainly empirical research and focus on the applications and practice of agile government approaches in various contexts. They identify the floowing four research streams:

1. Agile software development: Focusing mainly on the particularities, benefits, and challenges of applying agile methods in IT related government projects, research from this stream finds that agile methods improve organisations' internal collaboration, communication, and speed. Moreover, agile approaches have been found to increase users' loyalty and satisfaction as well as the organizations' responsiveness to changing requirements in their environment.

2. Agile acquisition: This research stream focuses on the necessary interplay of agile development approaches with new forms of acquisition and vendor management as well as the therewith connected difficulties. It finds that "agile contracting and acquisition practices help governments avoid vendor lock-in, and move away from proprietary applications and single-vendor contracts" (Mergel et al., 2018, p. 296). This in turn is said to enable governments to be more flexible, and better leverage the internal and external capacities.

3. Agile project management: This stream focuses on applying agile methods in all aspects of government project management and assess the thereby involved drivers and barriers. It finds that agile methods improve gov-

ernments ability to streamline projects and increase flexibility in delivery but tend to conflict with traditional leadership and management approaches in the public sector.

4. <u>Agile evaluation</u>: Finally, a largely underexplored research area is the evaluation of agile approaches. Here, researchers try to apply measurement and assessment methods from other areas like the private sector or engineering to measure agility and its impact in government. Authors find that through early validation and the evaluation of alternatives, agile methods tend to reduce costs and risks of public administration projects.

The authors of the paper summarize the findings from their literature review concerning gains and challenges in applying agile methods in the public sector as follows: "On the one hand, governments and the citizens whom they serve benefit from greater efficiencies, better designed and implemented applications, and cost savings. On the other hand, agile deployments require capacity, skills, culture, policy structures, and leadership that governments may not possess"(Mergel et al., 2018, p. 298).

From these findings they derive possible future research questions like the following: What are the prerequisites for governments to engage in agile efforts, e.g., skills, capacity, policies, leadership? How can bureaucracies adapt or how can agile approaches be aligned with the needs of bureaucracies and their regulations? What is the required legal and regulatory environment to foster and promote agile efforts? How to measure and evaluate agility and its impact on government organizations? And finally, how do government structures and characteristics – centralized, size, engagement with public-private partnerships, innovation efforts, technology maturity, and others – impact the ability of governments to engage in agile methods?

Further relevant references from the paper are:

- Torgeir Dingsøyr, Sridhar Nerur, Venugopal Balijepally, and Nils Brede Moe (2012) "A decade of agile methodologies: Towards explaining agile software development"

- Yvonne Dittrich, Jan Pries-Heje, and Kristian Hjort-Madsen (2005) "How to make government agile to cope with organizational change"

- Darrell K. Rigby, Jeff Sutherland, Hirotaka Takeuchi (2016) "Embracing agile"

- Janette Scott, Robyn Johnson, Michael McCullough (2008) "Executing agile in a structured organization: Government"

Motivation

In today's fast-paced world a high level of responsiveness and adaptability to changing user needs has become the key-skill of any organisation, be it private or public. Furthermore, citizens' expectations of well-integrated and seamless government service experiences are constantly rising, with the bar being set higher and higher by extremely user-centred private sector companies every day. Lastly, the integration of advancements in digital and AI technologies demands for new, more flexible public governance structures. Hence, the adoption of agile methods in the public sector has become one of today's mantras in public management practice and literature (Mergel et al., 2018; Vacari and Prikladnicki, 2015). However, although the number of scholars investigating agile governance has constantly risen over the last years, academia still lacks a clear understanding of the actual spread and application of agile governance in public administrations around the world (Mergel et al., 2018). In my master thesis I aim to

close this research gap by answering the following research question: *What is the spread and application of agile governance methods and principles in the public sector around the world?*

Task

In my thesis I will employ theory-informed, exploratory natural language processing based on web-scraped data to investigate the spread and application of agile methods in public administrations from around the world. In particular I will

1. identify websites of federal government organisations from a particular selection of countries chosen based on theory that mention keywords related to agile methods;

2. download the content and meta data of the respective websites;

3. generate a corpus database of the crawled text data;

4. analyse the database with respect to the quantity and quality of the mentioned keywords and their context (word frequencies, topic models, sentiment analysis, word vectors etc.); and finally,

5. draw conclusions based on the findings from the exploratory analysis in regard to similarities and differences between countries and/or ministries.

Data

To gather the data for my analysis I am setting up an own online data collection system to crawl and scrape data (specific agile governance related keywords and their context) from government websites.

Methods

I plan to employ the following methods:

- Web-crawling / -scraping to get the data (R packages: Rcrawler, hrvest etc.)

- Natural language processing to construct the corpus and analyse topics, word representations, sentiments etc. (R packages: quanteda, spacyr, translateR, stm, text2vec, tidytext etc.)

Baseline

I am not aware of any existing paper that could serve as a baseline for this novel approach. However, as an "internal baseline" I see a version that only focuses on Germany and Austria. The "full approach" would cover as many other relevant and comparable countries as possible.

Project Outcome

This project will advance research by providing insights about the quantitative spread of agile methods amongst the ministries in the selected countries based on the occurrence of relevant keywords on their websites. Furthermore, it will help carve out qualitative differences between ministries and/or countries concerning the context of the respective keywords.

Timeline

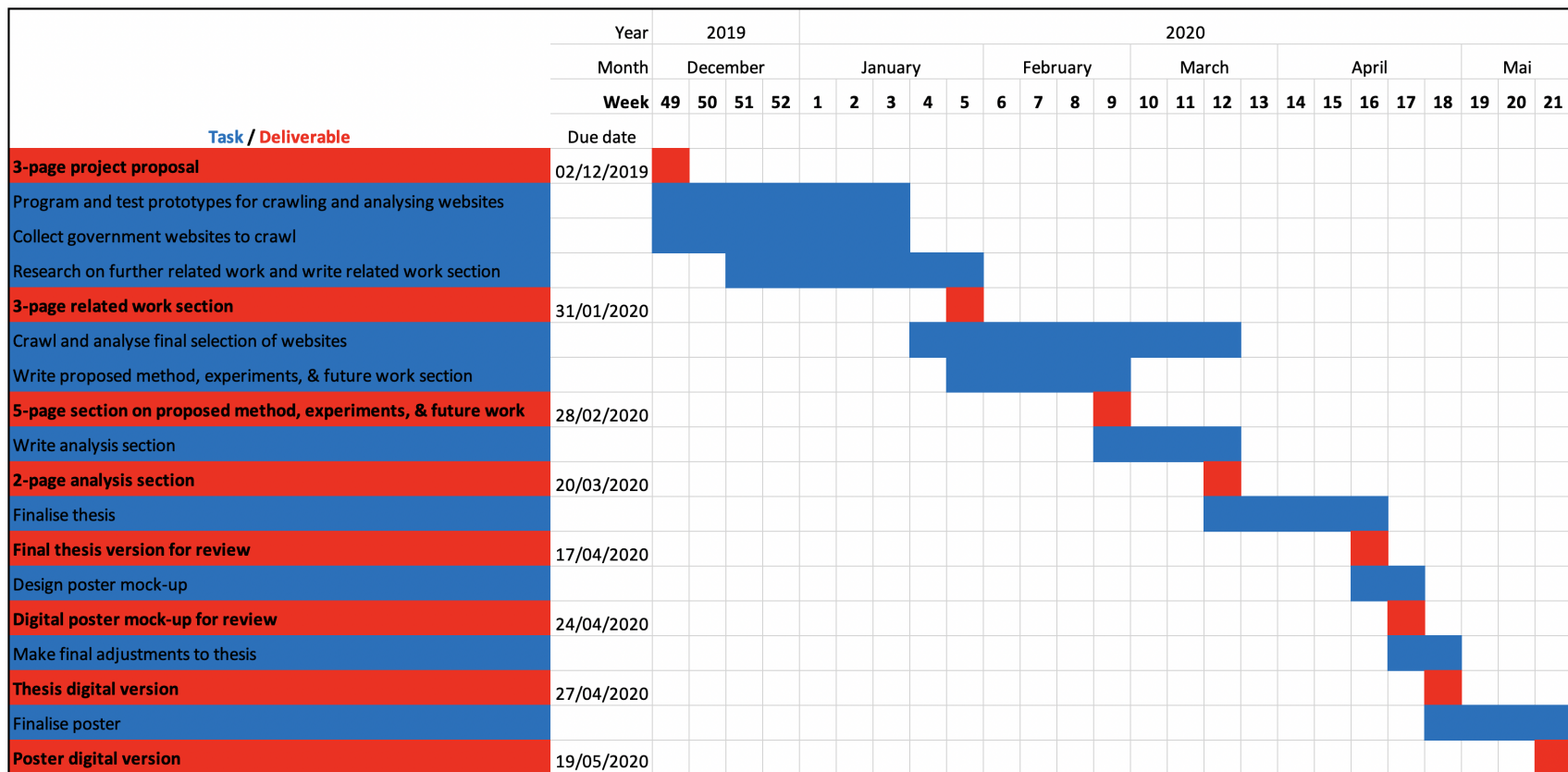Figure 1 illustrates the important tasks and deliverables over the project timeline.

Task / Deliverable	Due date	49	50	51	52	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Year: 2019 (49–52), 2020 (1–21)																										
Month: December (49–52), January (1–5), February (6–9), March (10–13), April (14–18), Mai (19–21)																										
3-page project proposal	02/12/2019																									
Program and test prototypes for crawling and analysing websites																										
Collect government websites to crawl																										
Research on further related work and write related work section																										
3-page related work section	31/01/2020																									
Crawl and analyse final selection of websites																										
Write proposed method, experiments, & future work section																										
5-page section on proposed method, experiments, & future work	28/02/2020																									
Write analysis section																										
2-page analysis section	20/03/2020																									
Finalise thesis																										
Final thesis version for review	17/04/2020																									
Design poster mock-up																										
Digital poster mock-up for review	24/04/2020																									
Make final adjustments to thesis																										
Thesis digital version	27/04/2020																									
Finalise poster																										
Poster digital version	19/05/2020																									

Figure 1: Gantt chart depicting the project timeline

References

Agile Manifesto. (2001). Manifesto for Agile Software Development. Retrieved from http://agilemanifesto.org/

Dingsøyr, T., Nerur, S., Balijepally, V. & Moe, N. B. (2012). A decade of agile methodologies: Towards explaining agile software development. *Journal of Systems and Software*, *85*(6), 1213–1221. doi:10.1016/j.jss.2012.02.033

Dittrich, Y., Pries-Heje, J. & Hjort-Madsen, K. (2005). How to make government agile to cope with organizational change. In *Ifip advances in information and communication technology*. doi:10.1007/0-387-25590-7{_}21

Mergel, I., Gong, Y. & Bertot, J. (2018). Agile government: Systematic literature review and future research. *Government Information Quarterly*, *35*(2), 291–298. doi:10.1016/j.giq.2018.04.003

Moher, D., Liberati, A., Tetzlaff, J., Altman, D. G., Altman, D., Antes, G., . . . Tugwell, P. (2009). Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. doi:10.1371/journal.pmed.1000097

Rigby, D. K., Sutherland, J. & Takeuchi, H. (2016). Embracing agile. *Harvard Business Review.*

Scott, J., Johnson, R. & McCullough, M. (2008). Executing agile in a structured organization: Government. In *Proceedings - agile 2008 conference*. doi:10.1109/Agile.2008.40

Vacari, I. & Prikladnicki, R. (2015). Adopting agile methods in the public sector: A systematic literature review. *Proceedings of the International Conference on Software Engineering and Knowledge Engineering, SEKE*, *2015-Janua*, 709–714.