**Research Summary**

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On January 20, 2021, the very day President Joe Biden took office, he issued the "Exective Order on Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis". In addition to six broad policy decisions, the order also revoked TransCanada’s construction permit for Keystone XL. The *Keystone XL* pipeline was supposed to be TransCanada’s follow-up project to the *Keystone* pipeline which transports diluted bitumen from Alberta, Canada to Texas. On the surface, the revocation of TransCanada’s permit looks like a late victory for the environment. After an extensive discourse, the concern for the environment has come to dominate and America finally came around. For the oil and gas industry the defeat of Keystone XL can be seen as a highly symbolic defeat signaling the end of the U.S. oil infrastructure (Freitas, Adams-Heard, and Gilmer 2021). As with DDT (Maguire and Hardy 2009), the defeat represents an important step toward the deinstitutionalization.

Yet how robust is the new status quo? My dissertation examines support for the pipeline industry in the context of the cultural war being fought between environmentalists and proponents of the oil & gas industry. The cultural war has been a war of words, but with a physical dimension. Sustainability scholarship conventionally focuses on learning that leads to a cleaner future, following either from "enlightened" individuals inside organizations (e.g., Howard-Grenville et al. 2017), or from economic motives (e.g., Flammer 2015). Yet the oil & gas industry holds an antithetical vision, where progress follows from economic development, and resource extraction is an economic necessity. These questions of a sustainable future are a battle over the institutional future that go to the heart of organizational theory (Davis 2015; Ergene, Banerjee, and Hoffman 2020).

## Studies

My dissertation consists of three essays exploring the frail progress on the deinstitutionalization of oil and gas illustrated by the revocation of the permit for Keystone XL. The studies draw on institutional theory and organizational learning. Institutional theory is useful for explaining the stability of the current structure, and the challenges around substantial (as opposed to symbolic) change (Meyer and Rowan 1977; Hoffman and Jennings 2015). Organizational learning on the other hand emphasizes the potential for adaption, knowledge sharing, and vicarious observation, while keeping one eye on obstacles (Madsen and Desai 2010, 2018; Rerup and Zbaracki 2021). Underlying all three studies is the polarization of the discourse on oil and gas that has not been overcome by the defeat of Keystone XL. Instead, the institutional developments are characterized by twists and turns suggest that we should treat pipeline projects such as Keystone XL as potential precursor of the deinstitutionalization–or resurrection!– of oil and gas. We need to be ready to "expect the unexpected".

The *first study* focuses on the industry side of the discourse. The operation and construction of pipelines requires a social license. The US experiences over 100 significant pipeline spills every year. Pipeline operators routinely refer to technology–both clean-up technology, and pipeline safety technology–in their statements on recent pipeline spills. Since both the quality of implementation and effectiveness of these new safety technologies is highly opaque for external audiences, the risk of decoupling and symbolic adaption is high (Wijen 2014). In other words, pipeline operators can use symbolic references to technology in conjunction with selective disclosure of information on spill causes as a means of greenwashing (Lyon and Montgomery 2015). Study one explores the potential of technology as a device for greenwashing, using a mix of quantitative data on pipeline networks and spills, and qualitative descriptions of spill causes and responses.

Yet the theoretical focus on greenwashing limits the analysis to only one side of a richer discourse. The *second study* opens up the blinds to provide the complete picture of this multivocal environment. Five communities have participated in the discourse on Keystone XL: pipeline operators, environmental activists, political decision makers, local residents, and the scientific community. Participants meet in public forums across multiple years (Latour 2005) and produce their own texts before and after, allowing us to repeatedly observe their beliefs, information exchange, and strategizing over time. Maguire and Hardy (2009) describe deinstitutionalization as a process of discourse and collective change to institutions. In the case of Keystone XL, we observe only a partial reconfiguration of knowledge networks, which leads to a frail deinstitutionalization of large oil and gas infrastructure projects (cf. Latour 1984). Study two studies focuses on the different communities that participate in the discourse on Keystone XL (Aronczyk and Espinoza 2019; Knorr Cetina 1999), and how their participation on the Keystone XL discourse affects their understanding of the environmental risks and impacts related to pipelines and fossil fuels.

The *third study* applies the insights from studies one and two to the theory on organizational and collective learning. The literature distinguishes between two dimensions–reliability and validity (March, Sproull, and Tamuz 1991). Reliability describes how widely shared a model of the world has become. Validity describes how useful the model is for prediction and control (Rerup and Zbaracki 2021). Sustainability presumes that new valid understandings of the environment will become widely accepted and thus reliable. Yet as the greenwashing literature shows, pipeline operators can maintain their public license whether the knowledge that they share is valid or not. Contrary to our intuition, models that are suboptimal in terms of validity can become widely shared in the world (Levitt and March 1988). The regulatory process depends on these social dimensions of learning (Madsen and Desai 2018), so my third chapter is dedicated to how reliability and validity contribute to learning how to build a more sustainable future.

## Data on the pipeline industry

The studies are informed by three datasets on the pipeline industry that I have collected in preparation of the dissertation research. One data set draws from the Pipeline and Hazardous Materials Safety Administration (PHMSA), the preeminent source of quantitative data on the pipeline industry in the US, which provides data on pipeline miles and the volume of oil transported (in gallon-miles) by operator every year. PHMSA also maintains a repository on every pipeline spill in the US. This repository includes the data to carry out study one–the location, volume, cause, and narrative for every one of the over 100 significant spills that occur in the US every year.

A second data set draws on the National Transportation Safety Board (NTSB), which provides in-depth narratives of a small number of noteworthy pipeline incidents over an extended period of time. The NTSB uses its own resources to investigates these incidents and provides in-depth reports of usually 10-70 pages as well as shorter briefs. Since 1996, the NTSB has completed 53 investigations on pipeline incidents. These incidents provide an understanding of both the organizational and technological causes of pipeline spills (cf. Perrow 1984).

A third data set shows the discourse on Keystone XL as it unfolded over time amongst multiple relevant actors over an extended period of time. To build this data set, I began with a timeline of events (c.f. Maguire and Hardy 2009). The basis for that timeline are newspaper articles from the sampling period of 2008-2021. These articles were obtained from five major American national news outlets through Factiva by searching for the Keywords "Keystone XL", and "KXL". Further, articles on Keystone XL over the sampling period were collected from the Oil & Gas Journal.

The timeline on Keystone XL includes multiple public forums (Latour 2005). These public forums serve two functions in this study. (1) They allow for the identification of relevant participants in the discourse. 12 types of participants participate in the forums, 6 of which are specific organizations that participate repeatedly. (2) The public forums are a compressed version of the discourse itself, where actors lay out their understanding of the permit application process, of Keystone XL, and of its environmental impact. The actors also respond to competing claims in this forum, laying bare the extent to which they have engaged with each others’ arguments. For example, a rebuttal testimony begins with a summary of the other side’s position, which offers a useful gauge of engagement and comprehension.

The final step toward creating a sample of texts is to gather the communication of the actors on Keystone XL over the time of the discourse. Most of the communities have formed and organize themselves through websites. Documents on TransCanada, Keystone XL, and the Sierra Club are also published online. The documents are downloaded by hand, or automatically through web scraping where appropriate. In some cases, the texts are automatically filtered to retain only those that discuss Keystone XL, using the keywords "Keystone XL" and "KXL". The filtered texts, and the texts from step two constitute the final sample that is imported into ATLAS.ti for the data analysis.

## Methods

The purpose of this study is to extract the meaning of words and phrases from text (Parker 1992). We identify the main themes of the discourse by reviewing and coding the public forums. To decode their meaning, we first reference the timeline of events that was compiled in the first step in the section (Maguire and Hardy 2009). We then turn to the texts that the community has produced ahead of the forum. Connecting themes from the forums with texts that were produced ahead of the forum, allows us to more accurately decode their meanings. Texts that are specific to the forum sometimes reveal a community’s strategy for the forum.

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