Understanding the Failures of Albemarle County's Stormwater Initiatives

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On my honor as a University Student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments

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Introduction

Stormwater management in Albemarle County, Virginia is not up to the standards of a modern and prosperous American municipality. From the familiar grounds of the University of Virginia to the country roads and farms spreading out radially from Charlottesville, flooding, runoff, erosion, and standing water are common occurrences. New technologies and systems created to solve these issues have been suggested, only to fail in their implementation. This is due to a historical lack of agreement between the local government and the private sector, specifically landowners who control a majority of the impermeable surfaces and private water management systems in the region. A combined framework will be used to study this problem. Social Construction of Technology is a socio-technical analysis framework ideal for studying the influence of actors on technological development. Transition Science is a related field that describes stages of technological development and the paths it can follow to acceptance or rejection (Madsen et al., 2017). This paper will explore the recent failure of a stormwater utility fee in Albemarle County to explain the social and governmental impasse preventing stormwater development through critical discourse analysis. The Social Construction of Technology framework will be combined with Transition Science to analyze the failure of this recent stormwater initiative by tracking the progress of technology and stabilization among relevant social groups.

Literature Review

Stormwater management is a global issue with solutions varying by location. Understanding the stormwater infrastructure stagnation in Charlottesville requires comparative analysis to stormwater projects in other large communities. The primary literature source for this study, by Madsen et al. (2017), applied a combination of Social Construction of Technology (SCOT) and Transition Science to quantify stormwater development progress in Melbourne, Australia, and Copenhagen, Denmark. SCOT studies the ways in which new technologies and systems are influenced by society and how these influences

manifest in their eventual design (Madsen et al., 2017). Relevant social groups, which are stakeholders in the development, apply different meanings to the technology based on their values and perception. Stabilization is the process through which the technology changes to meet the desires of the relevant social groups, reaching closure when all disagreements between groups are resolved (Pinch and Bijker, 1948). This does not always result in the implementation of the new technology, however. If an agreement cannot be reached, stabilization decreases, and the change is rejected. In order to understand the paths new technology can travel, Transition Science is introduced. Transition Science studies the possible effects new technologies can have on existing socio-technical regimes (Madsen et al., 2017). This is best exemplified by the S-curve graph seen in Figure 1. Effective implementation of a new technological system means surviving the two critical areas of low stability marked on the curve. This correlates with large disagreements between relevant social groups as seen in the SCOT framework. Madsen et al. (2017) combined these two approaches into a novel conceptual framework for analyzing stabilization processes, defined by four main stages of development: New Technology, Testing, Opportunity, and Agreement.

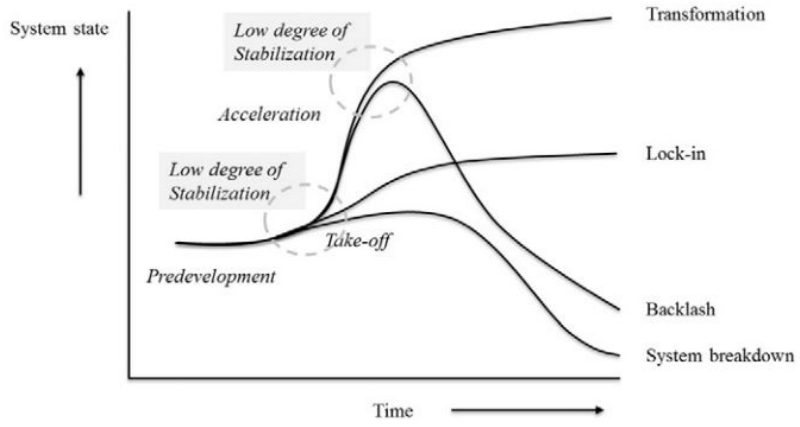

Fig 1: S-Curve Illustrating Transition Science System Development, Madsen et al., 2017

New Technology, the first stage, is born from an issue with the existing system. It is concerned with a small number of emerging technologies and includes government, citizens, industry, and researchers as actors. Stability increases through the Testing phase, when industry forerunners and researchers become the main actors and the technology develops outside of the public sphere. Issues with the current state of the technology lead to lower stabilization and the third phase, Opportunity. Actors are reintroduced that bring new meanings to the technology, requiring the system to adapt or be rejected. Finally, Agreement coincides with closure as arguments are settled and the new system is accepted (Madsen et al., 2017). When predicting the success or failure of the technology, the Opportunity phase is critical; if the values of every relevant group are not considered when the technology is being developed the system will fall down the paths of backlash or breakdown.

A major concern in the battle for effective water management is the spread of impermeable land, which increases runoff and propagates water issues onto other properties. "Land development for houses, roads, and shopping malls increases the amount of impermeable surface. This in turn increases the amount of precipitation that becomes surface runoff, and can exacerbate flood problems downstream. In the language of economics, land development upstream creates a negative *externality* on people downstream" (Thompson, 1999). This is a driving issue for the continued debate over effective stormwater systems in Albemarle (Baars, 2018). Stormwater issues tend to develop on privately owned land before spreading to other properties, including public land: "...water's materially connects individual bodies to the collective body politic; for example, by transporting vectors of disease and pollution. For this reason, the regulation and control of water-borne bodily wastes, the disposal of which has become an intensely private activity under modernity, is thus an inescapably collective act, and is essential to the health of the population, as well as the individual" (Baker, 2012). This conflict of meaning between landowners and local government is responsible for system destabilization, as the system has failed to optimize to meet the desires of the landowners.

Understanding the recent history of Albemarle's stagnant stormwater development requires identifying technology and technological system failures as failures of *innovation*. Kiparsky et al. (2013) defines innovation as "the development, application, diffusion, and utilization of new knowledge"; this includes new technologies as well as new management systems and rate structures. The success of innovations is dependent on *institutions*, the "...rules, norms, and practices that govern decision-making." These institutions are not simply driven by logical or legal arguments but by a myriad of personal and impersonal factors. "Most importantly, these factors can often outweigh analytical metrics, such as physical or financial efficiency, in actual decision-making. Even where technology with demonstrated potential for improving urban water management is available, institutions may stand in the way of technological diffusion and utilization" (Kiparski et al., 2013). The meanings applied by different social groups to innovations are governed by their institutions and can be difficult to quantify without proper understanding of said rules, norms, and principles.

Analysis & Discussion

In 2013, the city of Charlottesville passed a stormwater utility fee, charging property owners relative to the amount of impermeable land they owned. At the same time, Albemarle County was beginning to develop their own stormwater fee (Baars, 2018). In September 2016, the county government voted in favor of creating and implementing a stormwater utility fee, however the initial hearing date in January 2018 was delayed due to protests from Albemarle residents (Wrabel, 2018). These protests, and the ensuing discussion, led to the rejection of the proposed fee. In April 2018, the Albemarle Board of Supervisors voted against the utility fee and any future stormwater fee development (Albemarle County, 2018). Resistance was led by farmers in Albemarle, who routinely referred to the fee as a "Rain Tax" (Baars, 2018). In addition, during the discussion a group called "No Rain Tax Albemarle" emerged through a website that organized against the fee (Baars, 2018). The website cited "unnecessary" costs,

"burdensome" administrative needs, and inequitable taxation as primary concerns (No Rain Tax Albemarle, 2020). As of now, Albemarle's stormwater management remains funded by the county's general fund (Albemarle County, 2018).

The lifespan of Albemarle's stormwater utility fee, from conception to eventual death, can be mapped through Madsen et al.'s combination of SCOT and Transition Science. Development of the new technological system began when the Virginia Department of Environmental Quality mandated an improvement to the county's runoff control and drainage systems (Baars, 2018). An issue with the existing system had been identified, and the local government and researchers became the key actors. In 2014, a committee of stakeholder representatives was appointed to advise the county board (Albemarle County, 2018). The committee members were chosen to represent a wide range of actors and stakeholders, and was assisted by county staff and a stormwater finance consultant (WRFAC, 2015). While the Testing phase is defined by system development outside of the public sphere, the stormwater committee made community input its priority. In this way the distinction between Testing and Opportunity begins to blur as community acceptance becomes a major consideration in the policy design. "Although the Committee engaged in a relatively considerable public outreach and engagement process, the Committee did not have the resources necessary to gauge overall community sentiment with any degree of statistical precision – such as through a formal survey. Nonetheless, the Committee received abundant and varying feedback from the community through online surveys, emails, letters, and verbal comments at community events" (WRFAC, 2015). While county residents remained a relevant social group, the lack of resources that prevented proper feedback analysis indicated that the system was still in the Testing phase. The feedback gained from the community was shown to have insufficiently impacted the development of the fee, a scenario expected of the Testing phase but crucial to avoid during Opportunity.

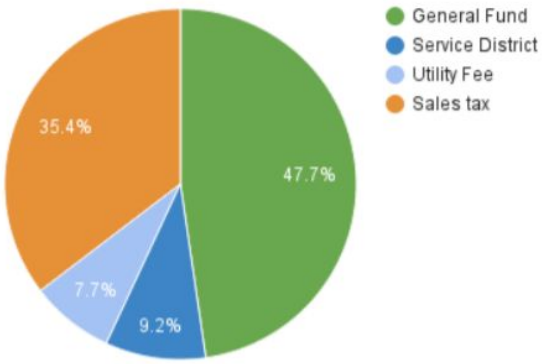

Fig 2: Albemarle community preference for stormwater funding source, WRFAC, 2015

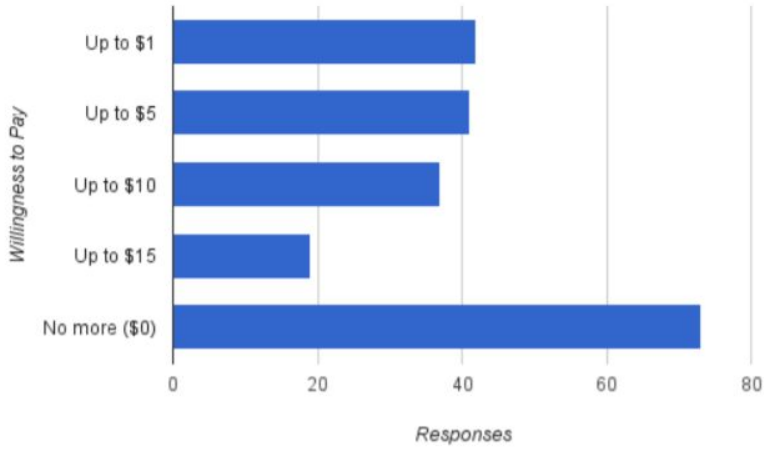

Fig 3: Albemarle community responses to increased cost/month for stormwater, WRFAC, 2015

As seen in Figures 2 and 3, local residents were already resistant to a change in stormwater policy. The committee failed to acknowledge the meanings the community applied to the stormwater fee, identifying "environmental protection", "planning for long-term benefits", and complying with state mandates as the primary *community considerations*. The community had indicated different meanings through the surveys, prioritizing low tax rates and administrative restraint (WRFAC, 2018). A key part of the Opportunity phase is adapting the technological system to stabilize it as new meanings are introduced. As the proposal developed, some community feedback was taken into account: "[T]he fee will be based

on impervious area but will not necessarily be charged equally for the total amount of impervious area on properties; the advisory panel recognized that a straight charge would unfairly burden owners of large properties having long driveways..." (Albemarle County, 2018). Adjustments to the plan intended to reduce costs for residents show that the committee attempted to adapt the proposal to increase stability, albeit ineffectively.

The Opportunity phase also birthed the "Rain Tax" designation, created by the fee's opponents. The name appeals to a deeper political meaning driven by a desire for small government and lower taxes; In short, libertarianism (Baars, 2018). The No Rain Tax Albemarle website summarized the fears echoed throughout the opposition: "Albemarle County's Rain Tax proposal will include a HUGE, expensive government bureaucracy that will never go away and will only grow over time" (No Rain Tax Albemarle, 2018). Anti-taxation and anti-bureaucracy language drove the debate, and as stability continued to decrease the effect of said language on the other relevant social groups. Ann Malek, Albemarle's supervisor at the time, was initially in favor of the utility fee. After a resident protest in March of 2018, she exclaimed: "If the process is so complicated that I can't explain it to people and tell them how much it's going to help, then I'm making a mistake by pursuing it" (Baars, 2018). Local politicians represent an additional relevant social group that had not been served by the system. The fee was difficult to sell; unable to be explained in a convincing way by those who had not created it. These meanings applied by the politicians had not been sufficiently integrated into the fee. The developing system had not been adapted to the needs of the two key groups necessary to implement it, inhibiting effective discourse between the relevant groups and causing the system to collapse. The committee could not consolidate its goals with the local government; the local government could not communicate its meaning with the county residents preventing discussion that could have led to stabilization. Albemarle's stormwater utility fee never reached the final phase of Agreement as backlash took hold. That the county

decided to abandon any future utility fee consideration indicates how complete the rejection of the system was.

Conclusion

The case study of Albemarle's stormwater utility fee encapsulates the challenges of stabilizing new technological systems identified through SCOT and Transition Science. A failure of the government and researchers to adapt the system to the political climate of the community was the primary cause for destabilization. The discourse surrounding the stormwater fee was indicative of an inability of innovators to appeal to the meanings openly expressed by the relevant social groups. If Albemarle desires to improve stormwater management, a different approach is needed. Support from relevant social groups can only be achieved if the meanings of the community, specifically low cost, minimal bureaucracy, and simplicity are understood and effectively applied to the stormwater system. An avenue for further research would be the research of new technologies that increase performance within the existing budget. A more critical analysis of the alternative propositions for raising money for stormwater infrastructure would provide insights into future plans that could be successfully stabilized. Stormwater management is a global issue that has found success in communities similar to Albemarle. Studying effective system implementation through SCOT and Transition Science in these areas could introduce novel solutions for future plans.

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