

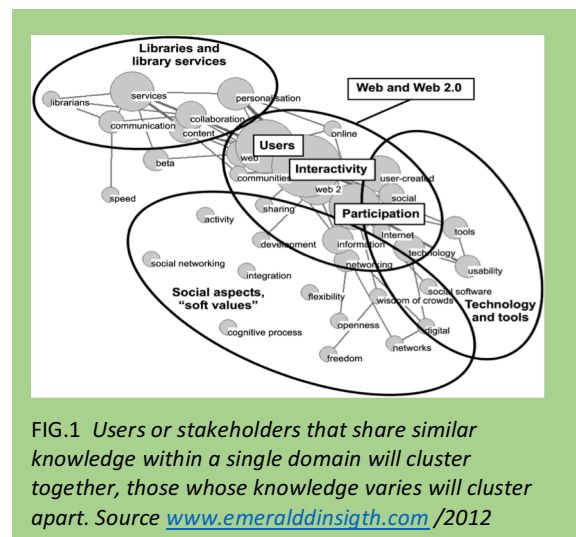
Decision-maker Barriers to Extreme Weather Climate Change Adaptation for Seaports: A Cultural Consensus Model for Medium and High-Use Ports in the North Atlantic

Heavy rains, storms, sea level rise (SLR), and extreme heat cause damage to critical coastal infrastructure upon which coastal communities depend [1]. Seaport planners and managers need to plan and implement extreme weather adaptations and infrastructure protection plans to safeguard and enhance the resilience of their ports [2]. However, recent climate change investigations stress decision-making barriers slow the development and implementation of needed adaptation strategies[3, 4]. As long reactive mitigation remains the dominant extreme weather adaptation strategy, coastal communities will remain at risk.

To assist state organizations, the Department of Homeland Security and other decision makers, to understand and prepare for extreme weather events and increase the port community's resilience, we propose an assessment of the decision-makers' barriers to extreme weather events adaptation by surveying port directors/managers, safety officers and environmental risk officers in 23 medium and high-use ports of the USACE North Atlantic Division. The survey will use a quantitative and qualitative approach, conducting a cultural consensus analysis on the perceptions experts have regarding barriers that hamper the implementation of actions to protect their ports from these impacts.

This is a second phase of the study whose goal is to identify barriers to adaptation to extreme weather impacts. Barriers, defined here as factors and conditions that impede, prevent or delay processes for the development and implementation of extreme weather adaptation strategies [4], can be overcome through planning, efforts, creative thinking and the prioritizations of resources [3]. Kretsch (2016), for example, explained the lack of pro-active action for adaptation in the Port of Providence was due, in part, to limited understanding of the risk to storms and an absence of leadership [5]. Moser and Ekstrom (2010) describe barriers related to: conflicting timescales, lack of financial resources or training, uncertainty of societal costs and future benefits and fragmentation between and within scales of governance [4].

Social scientists can use the Cultural Consensus Model (CCM) to link distribution of a group's cultural shared knowledge to models of behavioral change. This project poses the question, "is there consensus on the barriers to adapt seaports to extreme weather?" and the perceptions stakeholders have on the concepts of vulnerability. Through a mathematical model, the CCM derives estimates of experts competence and an estimate of the cultural shared knowledge [6]. It distinguishes patterns of socially transmitted knowledge that people use to interpret the world and to make decisions [6]. As an example, a study on "cultural cognition of risk" identified where members of the public disagree about science facts surrounding risks of climate change and nuclear energy, on which expert scientists largely agree [7]. CCM adds local relevance value to the extreme weather adaptation process.



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We extend lessons learned during Phase I in Rhode Island to the larger North Atlantic region by identifying barriers to adaptation to extreme weather impacts as perceived by 60-65 port authority decision makers in 23 medium and high use ports in the North Atlantic. It will define trends and gaps that can local port authorities and policy makers can address to facilitate resilience planning and climate change adaptation strategies for these ports. For example, the CCM might reveal barriers such as: a lack of funding, not enough information about the risks to ports, or a perception that other entities are better positioned to take the lead. In addition, through active engagement of these port stakeholders, the process of creating a CCM and dissemination of results can lead to increased levels of trust among the participants [8]. By applying a CCM, we will contextualize and cluster perceptions (Fig. 1) and identify “cultural shared knowledge” about the barriers and make recommendations for constructive interventions.

This is second phase to the study of “Overcoming Barriers to Motivate Community Action to Enhance Resilience” by the DHS Coastal Resilience Center on the ability of communities to adapt to climate change. In addition, it builds on the USACE funded project “Measuring risks to inform resilience: Pilot study for North Atlantic Medium and High Use Maritime Freight Nodes”. It directly responds to the call of increasing resilience and protection of national critical infrastructure [9] by increasing our understanding of barriers to extreme weather adaptation. Understanding experts’ perceptions on barriers to , and their cultural knowledge surrounding the obstacles and opportunities is a step forward towards the planning, development and implementation of strategies that will make our coastal communities resilient to storm and extreme weather events.

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