Proposal introduction & rationale

Homework #3

FISH 521 - Proposal Writing and Professional Development

30 January 2023

Background

Your assignment this week is to draft the introduction and rationale for a research proposal based on your area of research. As we discussed in class, this is an important part of every proposal because it sets the stage by providing background information and justification for the proposed research (ie, “Why is this topic important?”).

Instructions

Write a draft consisting of 3 paragraphs with the following general structure:

1. What is the problem/question and why is it important?
2. What do we know and what is lacking in our understanding?
3. What are the 2-3 objectives and specific hypotheses/questions?

Make sure to cite all relevant references and include them in a section labeled “References”. If you are so inclined, and you think it would help communicate the ideas in your proposal, feel free to also include a figure or schematic (this is not required, though).

Submission

Please submit in the respect homework directory in your GitHub Repository. Please confirm it is pushed to GitHub and not only on your local computer.

Draft Introduction

This project proposes to create a digital platform for coastal stakeholders that will enable the aggregation of dilute supply of and demand for environmental information; as well as enable the collection, management, and exchange of this information and the contracts associated with it. The creation of this digital platform is deemed to be a worthwhile endeavor as it has the potential to help solve systemic problems present within current economic structures found all over the world, but especially within developing coastal economies.

The world’s coasts currently generate 68% of global GDP, and are home to 40% of Earth’s population. Seafood alone provides 20% of protein intake globally, over 70% for some communities[[1]](#endnote-1). Yet, our coasts face increasingly numerous and severe threats. Worldwide, 30% of seafood goes unreported; two-thirds of fisheries are overfished[[2]](#endnote-2); over $1 billion[[3]](#footnote-1) is lost to harmful algal blooms (HABs) each year; damages from flooding, severe weather, and tropical cyclones totaled $3.1 trillion from 2010 to 2019[[4]](#endnote-3); and projected ocean acidification damages will reach $1 trillion by the end of the century[[5]](#endnote-4). The spatial and temporal resolution of ocean information[[6]](#footnote-2) needs to increase (existing in-water observatories only cover 9–15% of global ocean surface). But accessibility and usability improvements are essential, too. Whether autonomous or manual, generating, processing, and analyzing information continues to require too much money, time, or technical expertise to reach scale, especially for developing nations [[7]](#footnote-3), [[8]](#footnote-4), [[9]](#endnote-5). Coastal areas already spend over $26 billion annually on data analytics. But due to detrimental competition and persistent silos, only a fraction of these funds actually end up being used to analyze coastal threats. 45% of data scientists’ time is spent on data gathering and preparation[[10]](#endnote-6), 80% of business leaders view poor systems/applications integration as a top problem[[11]](#endnote-7), system administrators face daunting IT security standards, and developers are burdened by the re-coding requirements involved in production6.

In recognition of the vital role of this blue economy and the ever-increasing threats it faces, several initiatives have sprung up. However, each of these initiatives focuses on a specific subset of these problems (i.e. sea level rise, traceable seafood supply chains, environmentally-friendly shipping fuel, sustainable fisheries management, community-based livelihoods, coral restoration, ecotourism, aquatic monitoring, etc.) and are rarely (if ever) coordinated. Consequently, the scaling-up of these initiatives is limited by the very structure of the blue economy. This structure also continues to decouple economic activity from the environment upon which the blue economy ultimately depends. Thus, inefficient, short-sighted, misinformed decision-making is occurring within governments, private business, and individual citizens. This inefficiency results in massive waste of public and private capital, and thus huge losses in potential revenue.

This is a case of multiple market failures; the structure of the system itself needs to be reimagined so as to encourage collaboration; and integrated, holistic, long-term solutions. There are several reasons this flawed system has continued to persist. First of all, our collective understanding of the intricacies of the blue economy is ever evolving. So too, have our technologies. Many of the technological advances necessary to address this system problem have only just been invented within the past 10-20 years. There is also the reality that the incentives in our blue economy are arranged such that it is highly unlikely for any single, already-established entity to profit from tackling this systemic problem. Inherent in any systemic issue are externalities which thus lead to free-ridership; why would Government/Company A bother to spend time and money on issue Z when it could just let Government/Company B fix it while still reaping the benefits? Plus, existing institutions that attempt to address our blue economy’s problems are quite limited in their scope, even acting as obstacles to addressing these concerns (i.e., rent-seeking and self-preservation behavior). Furthermore, the incentive structure in our blue economy is arranged such that investment in valuable environmental information, the systems necessary for gathering this information, and the activities dependent upon it, does not occur because the return on investment (ROI) is too low. In other words, the marginal gain to single entity that results from incorporating environmental information into a business/management decision is frequently dwarfed by the investment of time, effort, and/or money required to produce this environmental information. However, there are countless situations where the collective gain is exponentially greater than this investment.

Enter this project. We seek to address this systemic problem by creating a platform upon which our global economy can transact in a revolutionarily new way. The platform would consist of a network whose nodes are composed of the members of our blue economy, connected to each other via digital pipes through which information and compensation can flow. The openings of these pipes are governed by codified contracts, customized to the needs of each member, and the dynamic arrangement of these pipes is contingent upon the ever-changing aggregate supply and demand for these needs within the network. In this way, we make it possible for transactions to occur between groups, rather than individuals, on a case-by-case basis. Plus, due to the codification of contracts, transactions and terms and conditions enforcement can be automated. And all of this activity will be recorded in an accessible, immutable, traceable, and transparent ledger; thus ensuring members and their transactional activities are trustworthy.

Specifically, this project plans to build the minimal viable product for this platform; try out this platform in a lab-based scenario; and test a revised version in a real setting in collaboration with several blue economy stakeholders in a coastal community; analyze the results; and then iteratively build upon and test the platform as it expands to new regions and never-ending use-cases. We expect to identify optimal digital technologies to use for this platform, as well as transaction mechanisms and price-setting approaches. We also fully plan to receive large amounts of constructive feedback from lab testers, as well as community testers, and to incorporate this feedback into analysis and revision.

1. “What Does the World Eat?” *Sustainable Fisheries UW.* Accessed November 13, 2020. <https://sustainablefisheries-uw.org/seafood-101/what-does-the-world-eat/>. [↑](#endnote-ref-1)
2. Rowland, Michael Pellman. “Two-Thirds Of The World's Seafood Is Over-Fished -- Here's How You Can Help.” *Forbes, Forbes Magazine*, 25 July 2017, www.forbes.com/sites/michaelpellmanrowland/2017/07/24/seafood-sustainability-facts/#3c1a89934bbf. [↑](#endnote-ref-2)
3. Converted to the value of USD in 2020. [↑](#footnote-ref-1)
4. Podlaha, Adam, et al. “Weather, Climate & Catastrophe Insight.” *AON*, 2019, thoughtleadership.aonbenfield.com/Documents/20190122-ab-if-annual-weather-climate-report-2018.pdf. [↑](#endnote-ref-3)
5. Huizen, Jennifer. “Oceans Could Lose $1 Trillion in Value Due to Acidification.” *Scientific American*, 21 Oct. 2014, www.scientificamerican.com/article/oceans-could-lose-1-trillion-in-value-due-to-acidification/. [↑](#endnote-ref-4)
6. Note: in this document the phrase “ocean information” is used broadly to refer to any raw, processed, and/or analyzed data that is relevant to coastal communities, oceanic activities, and/or the seafood industry. [↑](#footnote-ref-2)
7. For example, a single oceanic pH sensor can cost between $ 5,000-50,000 depending on the exact use-case. [↑](#footnote-ref-3)
8. For example, the government coral reef monitoring budget in Malaysia is just $20 per hectare, and less than 1¢ per hectare in Indonesia. For perspective, adequate reef patrols are estimated to cost over $4,500 per hectare per year. [↑](#footnote-ref-4)
9. From numerous personal interviews with coastal government and academic researchers, NGOs, and companies. [↑](#endnote-ref-5)
10. “Anaconda | State of Data Science 2020.” *Anaconda.* Accessed November 13, 2020. https://www.anaconda.com/state-of-data-science-2020. [↑](#endnote-ref-6)
11. Wilder-James, Edd. “Breaking Down Data Silos.” *Harvard Business Review*, 22 Feb. 2017, hbr.org/2016/12/breaking-down-data-silos. [↑](#endnote-ref-7)