A feasibility study to assess the potential for dramatically increasing the efficiency of maintenance dredging at the port of Beira in Mozambique

In March 2020, the Knowledge Transfer Network (KTN) recruited design mentors to work on a programme for The Global Challenges Research Fund (GCRF). The GCRF was a £1.5 billion fund to support innovative research which addresses the problems faced by developing countries.

Victoria Milne. CEO of Tenshi and technical expert of ISO, was selected from a pool of specialists to become a Design Mentor and work with a small number of companies who were deploying human-centred design within their projects, for the first time. One of those companies she worked with was Marlan Maritime Technologies Ltd.

Marlan Maritime Technologies Ltd

Marlan Maritime Technologies is a UK based SME, who provide situational awareness solutions for maritime and marine-related industries. Their high performance, cost-effective vessel traffic monitoring and management systems are designed to help those responsible for ports and harbours, coastal surveillance and offshore asset protection to achieve the safety, security and efficiency they need.

The challenge

Climate change is wreaking havoc on the planet and having a particular devastating effect on coastal populations, who are being impacted by increasing sea levels, tidal ranges and extreme weather events. Low-lying developing countries, such as Mozambique, have a lack of monitoring systems in place to support planning and mitigation when such events arise. This was exemplified by the arrival of Tropical Cyclone Idai in March 2019, which caused widespread devastation, particularly in the Southern region around Beira - Mozambique's second largest international seaport.

The solution

Tenshi supported Marlan Maritime Technologies in carrying out a 26-week feasibility project, that would demonstrate the application of a suite of innovative remote sensing solutions. These solutions work to alleviate operational and strategic issues relating to coastal erosion, flood risk, and navigation channel maintenance dredging at the Port of Beira.

Traditional solutions are incredibly expensive and carbon-intensive, involving daily dredging of the berths and sections of channel. This study sought to find a way of reducing costs and carbon emissions associated with frequent maintenance dredging, plus enable a more data-driven and evidence-based framework for coastal management.

The benefits associated with turning the study into a real-life project

1. Economic benefits including:
   - increased trade volume
   - better vessel turnaround time
   - less spend on dredging
   - less spend on traditional survey techniques by focusing on sustainably due to using remote sensing techniques proposed.
2. Positive environmental impacts including:
   - increased resilience of coastal systems in Mozambique due to better, evidence-based development.

- reduction in regular survey and dredging should contribute to reduced air pollution at the coast, less CO2 equivalent usage and less benthic habitat disturbance from dredging.
3. The proposed system will have positive impacts on the working conditions of the INAHINA and port authorities.
4. The sense of a common goal and shared purpose within the consortium will increase staff morale.
5. Great potential to benefit the resilience of infrastructure and services to coastal flooding and cyclone-driven erosion.
6. High quality datasets can be used by students of educational institutions to further research the morphology of their coastline.
7. There is potential for greater social inclusion by promoting the principles of citizen science to the local authorities and population.

Get in touch

If you are, looking for support in applying human-centred design to your upcoming project, please contact us and we'd be happy to have a chat about how Tenshi can help you.