* 1. **Background**

When one thinks water transport, they only see a novel concept, move one item from point A to point B over a body of water for example a lake or ocean. But that would be merely scratching the surface. Since time immemorial, water transport has served as the backbone of various communities and empires, undergoing very many significant steps in its evolution process to what it is today. Water transport is a never-ending constant for as long as there exists a body of water and vessels that are in a position to navigate them. But in recent times we have experienced an increase in instances of organizations suffering losses due to losing or damaging of cargo during transportation from one place to another using water transport. Another issue is the loss of life due to overloading of vessels used in water transport.

“There are different ways in which manufacturers and suppliers can suffer from cargo damage during transit. First, damaged items are typically returned for replacement or full refund which not only incurs additional costs but can have a negative impact on both the carrier’s and the seller’s reputation. Second, the components, parts, and equipment that are damaged often result in wasted time. This is why, carriers need to ensure that tools, equipment, and other cargo are protected from damage, taking into account factors such as handling, humidity, temperature, contamination, vibration, impact, and static charges.”

(International Forwarding Association, 2022)

In the last few years there has been a steady rise in instances of injuries occurring in water transport due to a variety of reasons and in some instances death.

“For people between the ages of five and forty-four years, injuries are one of the top three causes of death worldwide, killing 4.5 million people globally in 2017. Even when injuries do not result in death, they can inflict serious disability and lifelong misery on survivors and impose heavy costs on health care systems, families, and individuals. The economic, social, and health consequences are disproportionately borne by the low-income countries that can least afford them. Deaths from injuries have been declining in every region except in sub-Saharan Africa, where they have been increasing as share of the deaths in the region since 2010.”

(Bollyky, 2019)

Based on this research, there appears to be a steady decrease in guaranteed safety of both goods and passengers in the sector of water transport. In spite of the strides made to enhance safety, there seems to be a number of unresolved issues that are starting to rear their collective ugly heads and if not dealt with can lead to further damages with very dire consequences.

“Importers, manufacturers, shippers, and freight forwarders should take measures to minimize the risk of damage and associated operational and financial losses. To restrict movement and protect cargo, it is important to use the proper dunnage material and lashings. Also, frozen cargo should be inspected for flavor and color changes, black spots, odor, fluid migration, desiccation, and dehydration.

“Carriers need to ensure proper temperature controls and a valid inspection certificate when shipping reefer containers. The distribution of weight and stowage of cargo in containers should be well planned. Lastly, when transporting goods that are susceptible to water damage, it is important that carriers choose the correct route and seal all doors of the containers.”

(International Forwarding Association, 2022)

All in all, the safety of cargo as well as passengers is very paramount not only for individuals and businesses but for the sake of international relations and safety of marine life as well. Our system looks to close gaps and ensure that vessels transport cargo as well as passengers safely by ensuring overloading does not take place.

* 1. **Problem Statement**

In recent times there has been a rapid increase in the frequency of accidents as well as businesses realizing losses due to the use of water transport. The various factors contributing to this include overloading of passengers on ferries, transportation companies packaging cargo to the wrong locations, cargo being misplaced or in some instances lost in transit.

“As a result of the ship sitting on water for a long period of time the cargo is unlikely to be checked for the period of time it is in these adverse and potentially humid conditions. As such, this can lead to the movement of cargo within a container, potential water leakage and even bad odours if the goods are not packaged correctly, which ultimately leads to damage.” (Barrington Freight, 2018)

These are problems are encountered in the sense that cargo that is unaccounted cargo can lead to organizations realizing losses and passengers becoming injured or perishing which will expose the transporters to the risk of facing lawsuits and in most if not all instances paying some form of compensation to the affected parties. The gap in this sector is that most companies will lose credibility and authenticity as a result of losing or misplacing of cargo or overloading passengers.

“The greater the weight it is supporting, the lower the vessel sits in the water and the more likely it is that water will come over the side or into the hull. Once there is water ingress, the vessel is likely to become unstable and can be easily swamped or capsized.” (Maritime Safety Victoria, 2017)

**1.3 General Objectives**

The aim of the project is to create a water transport system to enable SMEs as well as large scale organizations track their cargo during transportation and track the number of people using the ferry per day.

**1.4 Specific Objectives**

1. To review the existing water transport system in Kenya.
2. To establish challenges faced in water transport and identify the gaps present.
3. To design a system to solve the challenges faced in water transport and develop a system that will be used by passengers and SMEs or organizations to transport their cargo and to monitor it in transit.
4. To test the proposed system.

**Research Questions**

1. What is the current system used to manage water transport?
2. What are the challenges faced in water transport?
3. How does the existing system function?
4. What is the best way to test the system?

**1.5 Justification**

The reason for the project is to increase the favorability of people using water transport and providing an opportunity to all types of SMEs and organizations to access ferry services. We want to make people feel that water transport can be easily accessible as inland transport and is also reliable especially with the factor of overpopulation being a major demerit of inland transport. The benefit of this system is that passengers will be able to book their trip depending on the availability of ferries, they will be able to be updated on the progress of their journey if there were those who would want to alight on the next stop, they will also be able to log in and cancel their trips incase of any mistakes they would have done. For SMEs and organizations, they will be able to log in, book a spot on the ferry for their cargo and be able to monitor it during transit.

The difference that we aim to bring to the current water transport system has made people lose confidence in using it, they would prefer using inland transport and incur the high costs in long distance transportation. For passengers this will many affect the less privileged members of society where they may need to go somewhere but due to the lack of proper capital the ought to forfeit and for SMEs and organizations their only option is cut off their vision of expanding to a global level and withholding their products to the area they are located. Our systems intend to provide a bridge to all to access ferry services that will be at fair prices and enable its users to express their satisfaction with their trip, which will be a light to win back the confidence of in water transport.

**1.6 Scope**

The proposed study focuses on creating a web-based system that will be accessed with at least 4GB internet access speeds and will allow a user to choose what services they want to access between passenger and cargo from the system. On the passenger side, they can book their trip on the ferry, choose a stop they would like to alight from the listed options, they will be able to see the location they had chosen to as their stop and they will also be able to delete their booked trip if by any chance they had a change of plans. The cargo side will have almost the same features as the passenger side, but its payment rates will be determined by the weight of the cargo and there will be prompt sent to the cargo owners based on the estimated time taken to get from one point to another. This system will attempt to simulate payment processes that will be used by SMEs and individuals in Kenya, however, the system will only be deal with passengers without vehicles when booking.

**Limitations**

As we engage in this project, we anticipate facing some limitations such as weather conditions, internet speeds required to access the system, time taken to load cargo onto the ferry. Interventions that we will employ to tackle these limitations will include setting up a function that will enable the user to retain their progress in booking in case of internet downtime to ensure a smooth time operating the system in place of unstable internet. Cargo loading will be set to start some time before the allocated departure time of the ferry to avoid delay. For the weather conditions there will be an alert to the users that a delay will be experienced.