Passenger Ferry Service Level

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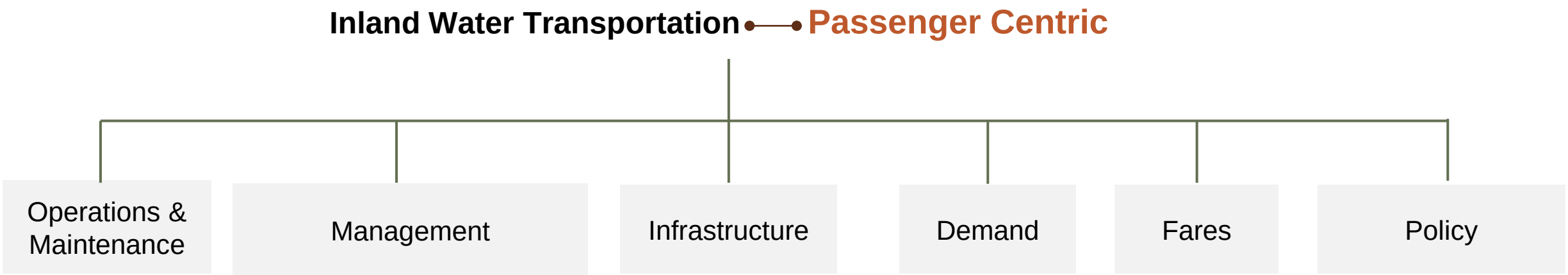


- National Waterways Act & Inland Waterways Authority of India

Evaluation techniques - Level Of Service concept for Indian cities?

Case city - Mumbai

02 SELECTED PARAMETERS

To understand the current scenario:

1. Individual preferences of daily and non-daily users

   Increase ferry usage

2. Connectivity to Public Transport

   Reduce travel time, improve efficiency, optimize services, and encourage PT usage if need be.

3. Ferry Patronage

   Ferry demand

4. Climate

   Safety, Mode Choice, Operational Efficiency, and Implications on Financial Mechanism

5. Management of ferry services

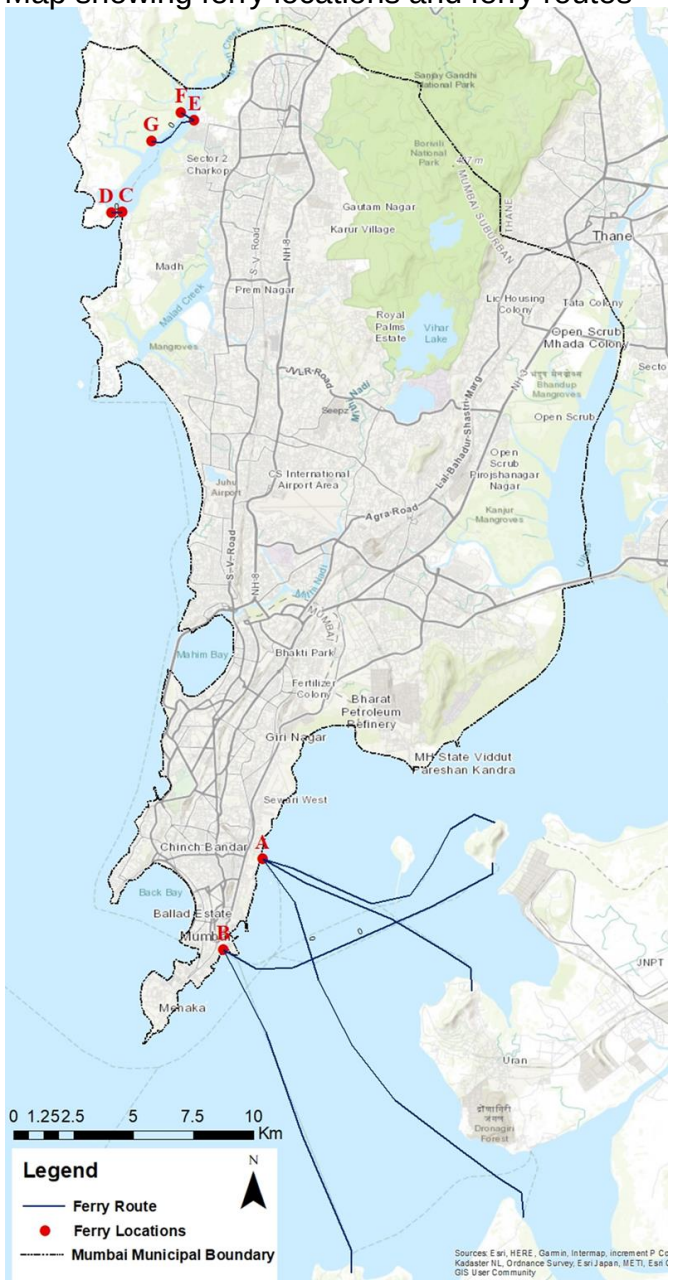
   Ferry business, financial condition.

To assess LOS:

Parameters	Reasons
Accessibility *(To board the ferry)*	• Infrastructure • Service rate of ferry.
Travel time	• **Ferry time in relation to time using alternate mode.** • **Retain the captive users.**
Frequency	• **User satisfaction with current frequency.**
Public Information	• Universal legible • Service quality
Reliability	• Sailings cancelled and delayed.
Cost = Ticket Fare	• **Fare structure – Willingness of users to pay the fare for the service offered.** • **Opinion on cost.** • **Passenger fare versus automobile operating cost.**
Passenger Comfort	• **Comfort level of users while travelling.**
Delay	• The delay incurred to users in overall journey.
Vessel Capacity	• **Crowdedness** • **New vessels required.**

INTRODUCTION - Location and Survey conducted

Map showing ferry locations and ferry routes



Ferry locations
A – Ferry Wharf
B - Gateway of India
C - Marve jetty
D - Manori jetty
E- Borivali jetty
F- Gorai jetty
G - Essel world jetty.

Operations

- MSRDC – (Maharashtra State Road Development Corporation Ltd.)
- MSRDC has 20 Ferry routes in Mumbai with 25 Ferry stations.
- **Sublet to private operators.**

Infrastructure

- MMB –Maharashtra Maritime Board

Survey locations and samples collected

Primary survey collected – User survey - Questionnaire based
- Operators survey – Informal interview type

Location A – Ferry Wharf	**36**
Location B – Gateway of India	**25**
Location C – Marve Jetty	**53**
Location F – Gorai Jetty	**43**

Total Samples Surveyed = **157**

04 DATA ANALYSIS – OPERATOR PERSPECTIVE

Types of Users				
	Ferry Wharf	Gateway of India	Marve Jetty	Gorai Jetty
Daily	61.11%	72.00%	75.47%	67.44%
Non-Daily	22.22%	4.00%	5.66%	13.95%
Tourists	16.67%	24.00%	18.87%	18.60%

Types of Purpose				
Work	58.33%	64.00%	60.38%	53.49%
Education	5.56%	8.00%	15.09%	13.95%
Recreation	13.89%	24.00%	18.87%	18.60%
Shopping	8.83%	4.00%	5.66%	13.95%

Data obtained from operator	Ferry Wharf		Gateway of India	Marve Jetty	Gorai Jetty
	Route 1 (Mora)	Route 2 (Rewas)	Route 1 (Mandwa)	Route 1 (Manori)	Route 1 (Borivali)
Total operators providing service	8		3	1	1
Total launch available	20		25	5	5
Vessel Capacity – (Seating + Deck)	65 + Standing	65 + Standing	250 + Standing (Deck)	40 + 8 = 2W	60 + 15 = 2W
			350 + Standing (Deck)	120 + 30 (2W)	
Services provided per day	17	6	15	50	50
Employees working in launch (Seamen, Driver, Engine driver)	5 (3,1,1)	5 (3,1,1)	5 (3,1,1)	2 (1-Engine Driver, 1-Driver)	
Fare (One side)	**80**	**100**	**180 and 215 (Deck**	**15**	**15**
Ridership (Per day)	**500**	**400**	**20,405**	**4,500**	**7,500**
Frequency (In Mins)	**60**	**90**	**15 – 30**	**15**	**25**

Seasonal variation

Financial Mechanism

- Fuel cost
- Salaries
- Maintenance charges

} **Constants**

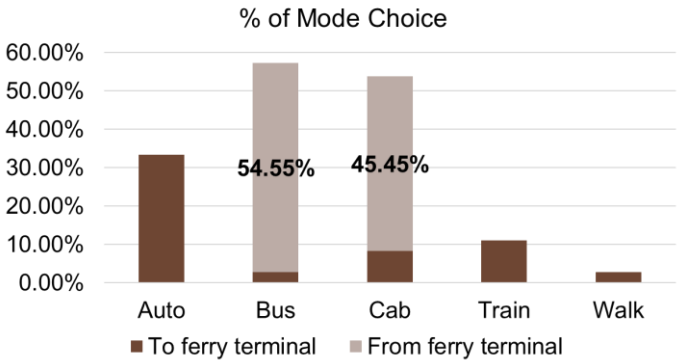
Daily Ticket sold	Ticket Fare (₹)	Tax levy (MMB) (₹)	Daily fuel cost (₹)	Daily fuel consumption
300	100	10	95 / litre	35 litre/day

- Tax levy to Maharashtra Maritime Board = Rs.10 per ticket = 300 X 100 = Rs. 30,000
  Rs. 30,000 – (300 X 10) = 30,000 – 3000 = **Rs. 27,000**
- Daily fuel consumption = 35 litres/day = 35 X Rs.95 = Rs. 3,325
- Daily Cost = 27,000 – 3,325 = **Rs. 23,675**
- **Profit *(From operator)* = Rs.30,000 monthly**
  30,000 / 30 = Rs. 1000 /day
- Rs. 23,675 - 1000 = **Rs. 22,675 Daily Balance**

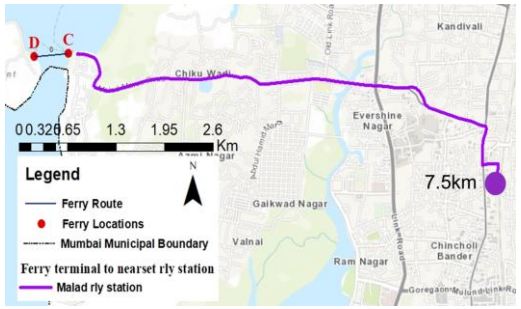
Monthly (No. of days) = (A)	Monthly Balance (B) = A X 22,675	Monthly Salary (C) = 30 X 20,000	Balance – B - C
30	₹ 6,80,250	₹ 6,00,000	**₹ 80,250**

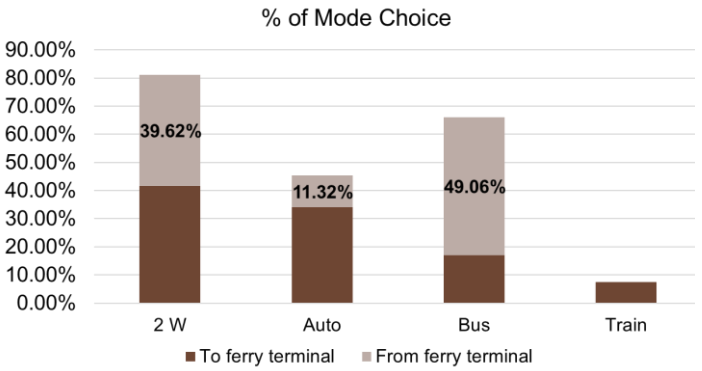
Connectivity to nearest Public Transport

Ferry Wharf

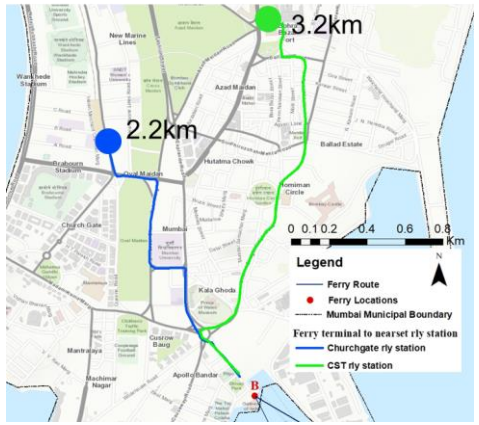


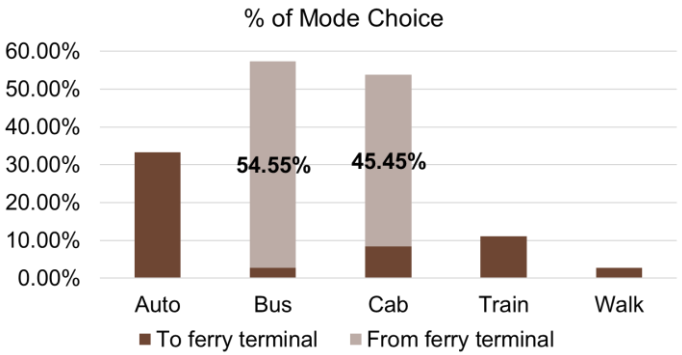
Marve Jetty



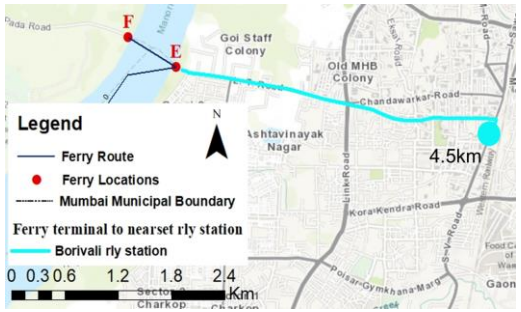


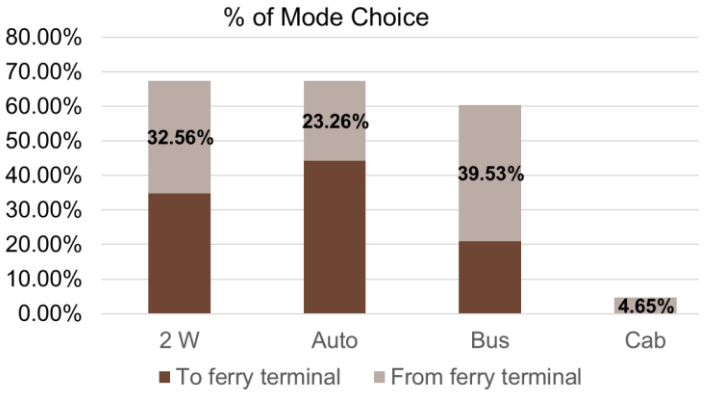
Gateway of India





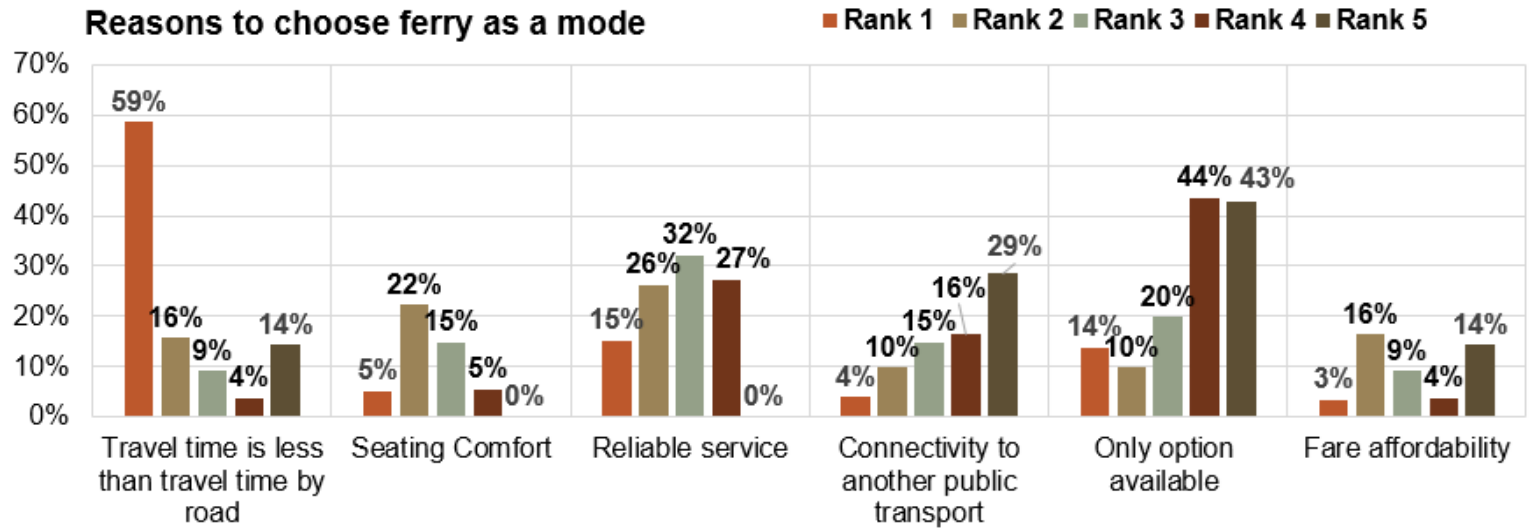
Gorai Jetty



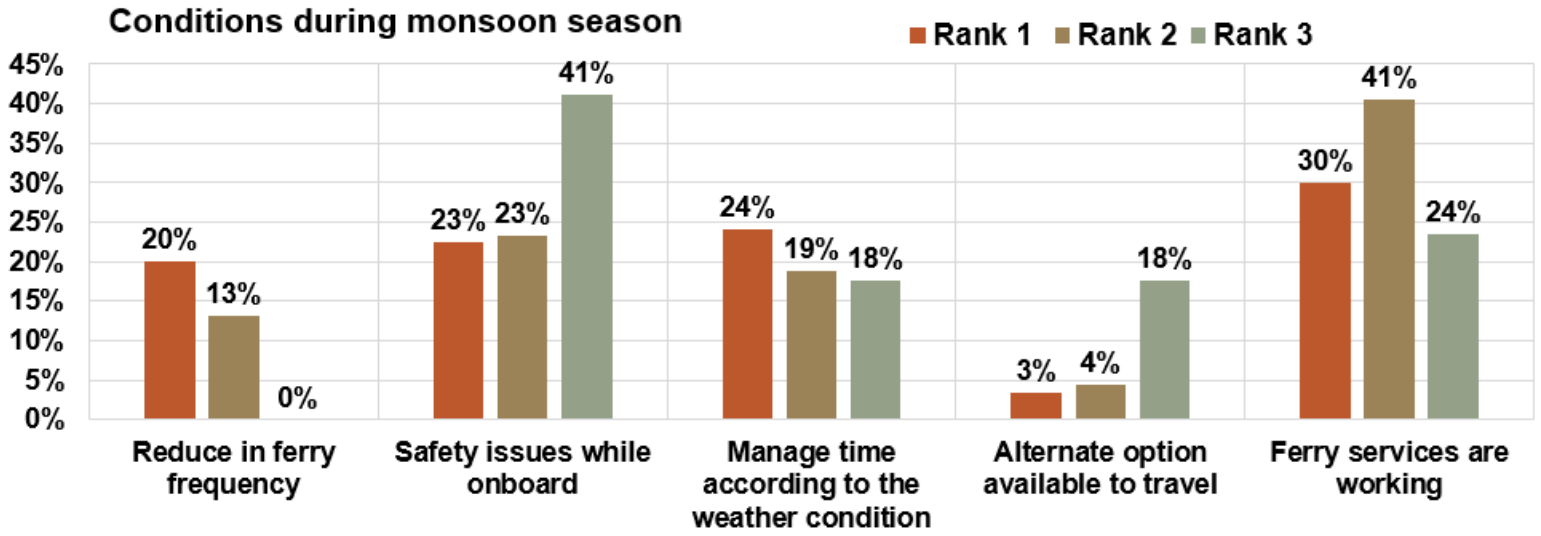


- Use of PT and IPT mode to reach their destination due to minimum fare charges to be paid and available at a shorter distance from terminal.

Individual Preferences of daily and non-daily users



- Travel time
- Only option available
- Reliable service



- Ferry services work during monsoon season at two locations due to newly constructed jetties or else services provided are reduced.

LEVEL OF SERVICE PARAMETERS MEASURES

1. Frequency

(No. of samples – 126 – Excluding tourists)

Satisfaction levels – Percent of riders satisfied with current frequency provided.

LOS Category	Percent of riders satisfied
A	100%
B	80% and above
C	60% and above
D	40% and above
E	20% and above
F	0% and above

2. Travel Time (TT)

(No. of samples – 126 – Excluding tourists)

Variables assessed – Travel time to reach till ferry (Origin to ferry terminal) + Waiting time + Ferry travel time + Travel time to reach their destination

(Ferry TT / Automobile TT)

LOS Category	Index	Comparison with automobile
A	< 0.20	Ferry TT < 20% of automobile TT
B	0.20 - 0.40	Ferry TT is 20 to 40% of automobile TT
C	0.40 - 0.60	Ferry TT is 40 to 60% of automobile TT
D	0.60 - 0.80	Ferry TT is 60 to 80% of automobile TT
E	0.80 - 1.00	Ferry TT is 80 to 100% of automobile TT
F	> 1.00	Ferry TT > 100% of automobile TT

3. Ticket Fare

(No. of samples – 126 – Excluding tourists)

PF – Passenger Fare OC – Operating Cost

LOS Category	Comparison with automobile
A	PF < 20% of automobile OC
B	PF in between 20 to 40% of automobile OC
C	PF in between 40 to 60% of automobile OC
D	PF in between 60 to 80% of automobile OC
E	PF in between 80 to 100% of automobile OC
F	PF > 100% of automobile OC

4. Passenger Comfort

(No. of samples – 126 – Excluding tourists)

Satisfaction level based on – Cleanliness in Ferry, Cleanliness around the pier, Seating comfort, Operators' behavior, Crowdedness in ferry.

LOS Category	Percent of Passenger Comfort
A	100%
B	80% and above
C	60% and above
D	40% and above
E	20% and above
F	0% and above

5. Vessel Capacity *(No. of samples – 126 – Excluding tourists)*

Percent capacity = (Passenger + Vessel) / Full capacity X 100

LOS Category	Category	Percent of capacity
A	Least capacity	< 20%
B	Low capacity	20% - 40%
C	Medium capacity	40% - 60%
D	High capacity	60% - 80%
E	Full capacity	80% - 100%
F	More than full capacity	> 100%

Ranking LOS – Analytical Hierarchy Process

AHP – Multi Criteria Decision Making Process

Expert opinion survey data for Frequency, Travel time, Ticket fare, Passenger comfort and Vessel capacity

↓

Scale of relative importance

↓

Matrix of data collected using mode value

	Frequency	Travel Time	Ticket Fare	Passenger Comfort	Vessel Capacity
Frequency	1	9	9	5	2
Travel Time	0.11	1	8	8	2
Ticket Fare	0.11	0.13	1	9	7
Passenger Comfort	0.2	0.13	0.11	1	9
Vessel Capacity	0.50	0.50	0.14	0.11	1
Sum	**1.92**	**10.75**	**18.25**	**23.11**	**21**

↓

Normalised pair-wise matrix

↓

Calculate criteria weights

↓

Calculating consistency – *To ensure whether collected data is correct or not.*

Rank	Parameters	%
1	Frequency	43%
2	Travel Time	21%
3	Ticket Fare	17%
4	Passenger Comfort	12%
5	Vessel Capacity	7%

10 RECOMMENDATIONS

Ferry service

- Privately operated

Charter Services

- Working at the Gateway of India ferry terminal, can be incorporated at other locations too.

Advertisement & Sponsorship

- Utilize the ferry space and terminal.
- Advertisement revenue.

Tours & Excursions

- Collaboration with local tourism organizations.
- Attracting additional customers.

Administration - Formation of specific administrative departments to overlook ferry transportation of that city.

Evaluation Framework steps to be followed

STEP 1	STEP 2	STEP 3	STEP 4	STEP 5	STEP 6
Decide Parameter Measures	Data Source/ Collection	Set LOS Categories	LOS Ranking	Financial Mechanism	Improvements

Passenger Perspective		Operators Perspective
Based on existing scenario.	As adopted in this study	Existing financial mechanism

- Additions/Subtractions of parameter measures as per city and desired outcome.
- Update survey questionnaire as per the parameters fixed.
- Quarterly data (season wise), government funding if provided any, miscellaneous revenues.

THANK YOU