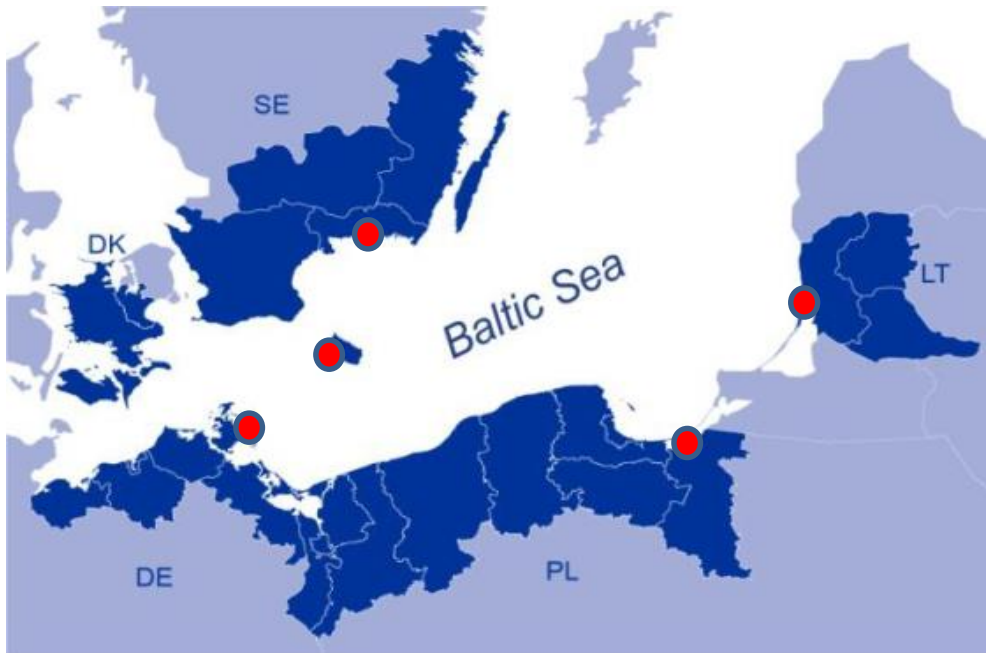


# South Baltic Transport Loops Smart Multi-modal Transport Solutions for medium-sized Ports

## *CARGO FLOWS IN SBSR PORTS FORECAST*



NPPE Klaipeda Shipping Research Centre

Habil. Dr., Prof. Vytautas Paulauskas

## CARGO FLOWS IN SBSR PORTS FORECAST

### ■ Forecast need

- For the planning operations
- For the developments

### ■ Forecast corrections (updating)

## CARGO FLOWS IN SBSR PORTS FORECAST

- **In general, transportation forecasting is the process of estimating the total number of vehicles, transport goods or travelers, etc. that will use a specific transportation facility in the future.**
- **Traffic forecasts are used for several key purposes in transportation policy, planning and engineering:**
  - **to calculate the capacity of infrastructure, e.g., how many terminals a port should have;**
  - **to estimate the financial and social viability of projects, e.g., using cost-benefit-analysis and social impact analysis;**
  - **to calculate environmental impacts, e.g., air pollution, noise, etc.**

## FORECAST SYSTEMS (METHODS)

- **Time series methods**
  - Moving Average
  - Exponential smoothing
  - Exploration
  - **Linear Prediction**
  - **Multi-criteria**
  - Trend Estimation
  - Growth Curve
- **Causal / econometric methods**
- **Judgmental methods**
- **Computer Simulation, etc.**

## MULTI-CRITERIA FORECAST METHOD

### Main dependence

- $M$  – Multi-criteria forecasting coefficient
- $f_i$  – factors weight coefficients;
- $N_i$  – factors;
- $\eta_k$  – correlation coefficient.
- $Q_0$  – flow in last statistical point;
- $B$  – coefficient on basis statistical or other data;
- $T$  – forecasting period.

$$Q_i \approx (Q_0 + BT) \cdot M$$

$$M \approx \frac{1}{\eta_k} \sum f_i \cdot N_i$$

## MULTI-CRITERIA METHOD (FACTORS)

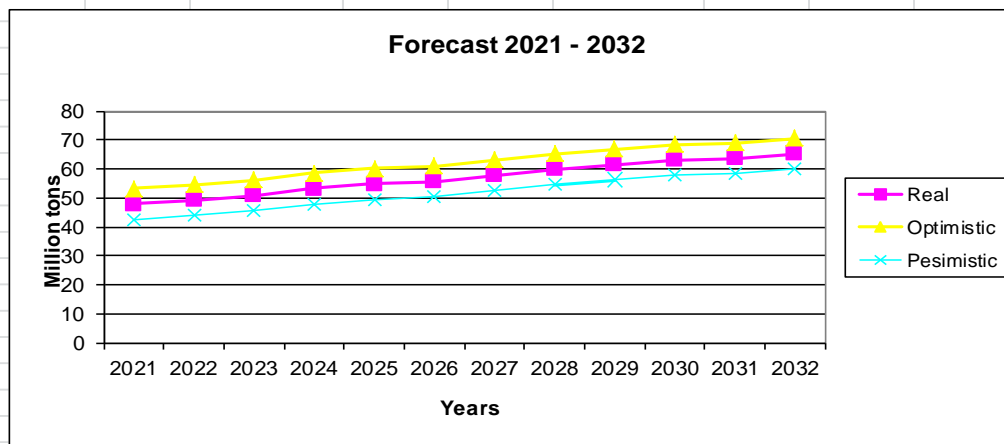
- **World economic situation**
- **Regional economic situation**
- **Port development programs**
- **Competitors development programs**
- **East Countries limitations influence**
- **Influence of the logistics platforms**
- **HUB influence**
- **Other influence**

## MULTI-CRITERIA FACTORS WEIGHT COEFFICIENTS FOR THE LITHUANIA PORT (FOR THE FREIGHT AS EXAMPLE)

Passengers (Flow)	Bulk	General	Liquid	Containers	Ro-Ro	Other
World economic situation	0,10	0,20	0,10	0,20	0,25	0,15
Regional economic situation	0,10	0,20	0,10	0,20	0,25	0,20
Port development programs	0,25	0,10	0,10	0,10	0,10	0,10
Competitors development programs	0,20	0,10	0,25	0,10	0,05	0,10
East Countries limitations influence	0,10	0,10	0,25	0,10	0,20	0,10
Influence of the logistics platforms	0,00	0,10	0,00	0,10	0,05	0,10
HUB influence	0,20	0,10	0,00	0,15	0,05	0,05
Other influence	0,05	0,10	0,20	0,05	0,05	0,20

## TOTAL TURNOVER FORECAST FOR THE KLAIPEDA PORT FOR YEARS 2021 – 2032.

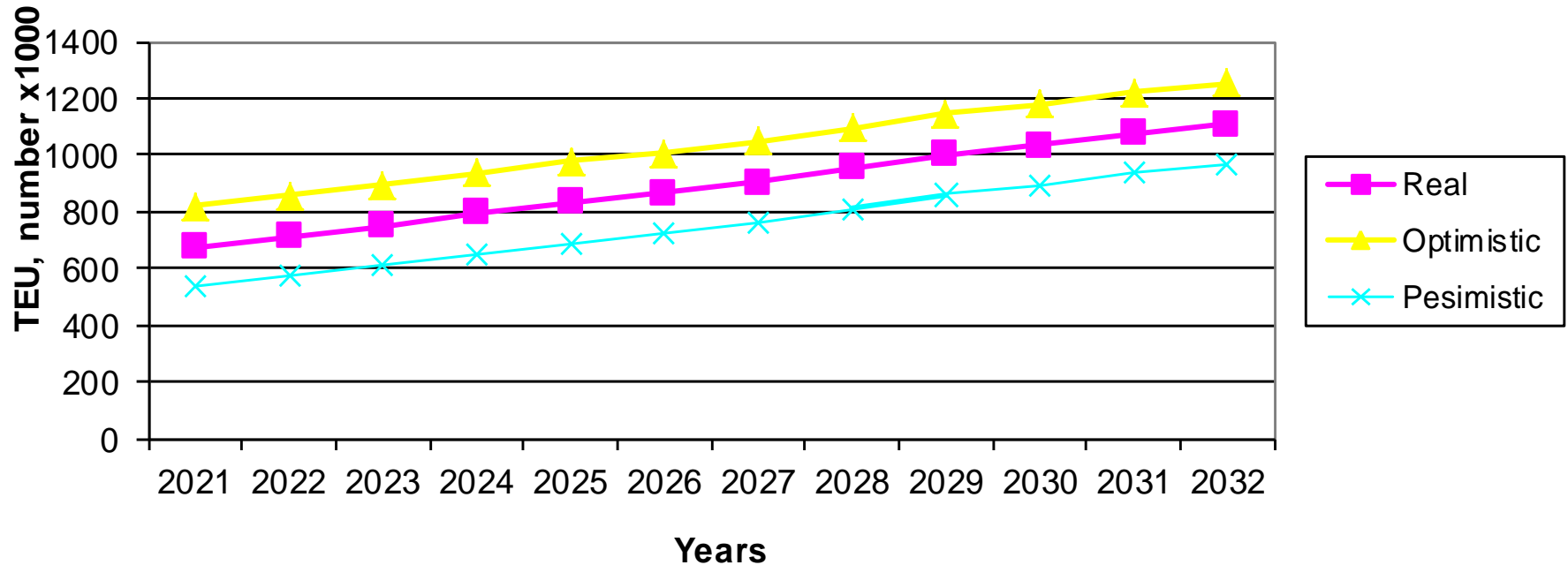
Years	Data	Bi	B	Forecast Period	LINER	M	F YEAR	QMK	OPT	PES
2012	35.24		0.962379	2021	48.75238	0.98	2021	47.77733	53.11605	42.43861
2013	33.42	-1.82		2022	49.71476	0.99	2022	49.21761	54.55633	43.87889
2014	36.41	0.585		2023	50.67714	1	2023	50.67714	56.01586	45.33842
2015	39	1.09		2024	51.63952	1.03	2024	53.1887	58.52742	47.84998
2016	40.14	1.225		2025	52.6019	1.04	2025	54.70597	60.04469	49.36725
2017	43.17	1.586		2026	53.56428	1.04	2026	55.70685	61.04557	50.36813
2018	47	1.89		2027	54.52666	1.06	2027	57.79826	63.13698	52.45954
2019	46.26	1.574286		2028	55.48904	1.08	2028	59.92816	65.26688	54.58944
2020	47.79	1.56875		2029	56.45142	1.09	2029	61.53204	66.87076	56.19332
				2030	57.41379	1.1	2030	63.15517	68.49389	57.81645
				2031	58.37617	1.09	2031	63.63003	68.96875	58.29131
				2032	59.33855	1.1	2032	65.27241	70.61113	59.93369
				My	40.83556 e**		28.50192778 e		5.33872	



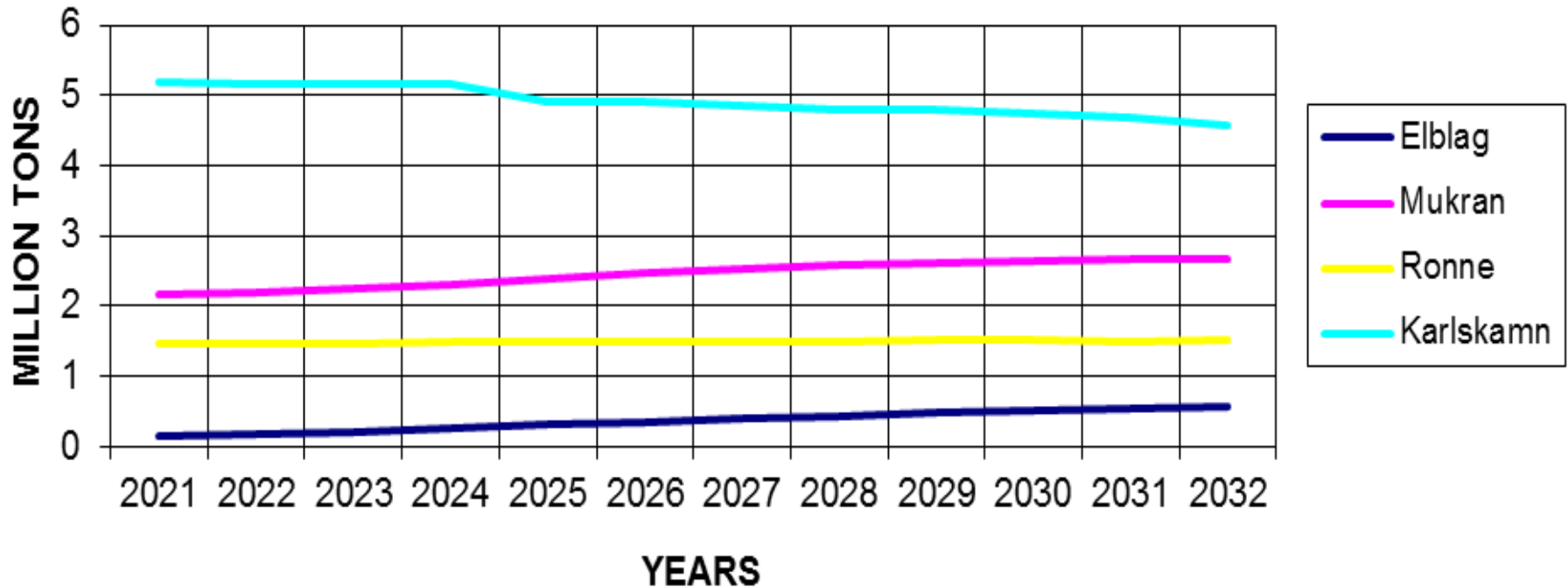


## KLAIPEDA PORT CONTAINER HANDLING FORECAST ACCURACY (PROBABILITY 63 – 68 % BAND)

Forecast 2021 - 2032



## SOME SOUTH BALTIC PORTS TOTAL CARGO HANDLING FORECAST



## CONCLUSIONS

- **The South Baltic Sea region develops very rapidly and it is very important as correct as possible passengers and cargo flows forecast**
- **Multi-criteria forecast methods could be used for the practical tasks to take right decisions regarding main transport corridors ports in all, terminals and other transport elements**
- **Methodology clarified and checked for the SBSR some ports could be used for the transport corridors, hub and other ports evaluation and recommendations for the European Transport system, including Sea transportation optimization in SBSR**

# THANKS FOR YOUR ATTENTION

