



Shipping KPI

Shipping KPI Project

Past, present and future

MARINTEK


InterManager
International Ship Management Association

 Norges forskningsråd

Today's topic

- **Shipping KPI Project Goals**
- **Shipping KPI Project Methodology**
- **Shipping KPI Project Achievements**



Current industry situation

- Too many different indicators (KPIs)
- Comparison of performance between companies is difficult due to lack of standardization
- Difficult to mobilize organizational focus on quality improvement
- Additional manpower required to present the same information in many different ways (onboard, in office and to externals)
- Emerging new reporting requirements (On environmental performance & Corporate Social Responsibility (CSR))



The KPI Project objectives

Develop tools to measure company and vessel performance and get these recognized as “the Standard of the Industry”

In order to:

- boost performance improvements internally
- provide an efficient communication platform about ship operation performance information to internal and external stakeholders through increased transparency



The project

Norwegian Research Council

**Project Responsible
Wilh. Wilhelmsen ASA**

**Project Partner
MARINTEK**

**Project Partner
InterManager**

Stakeholders

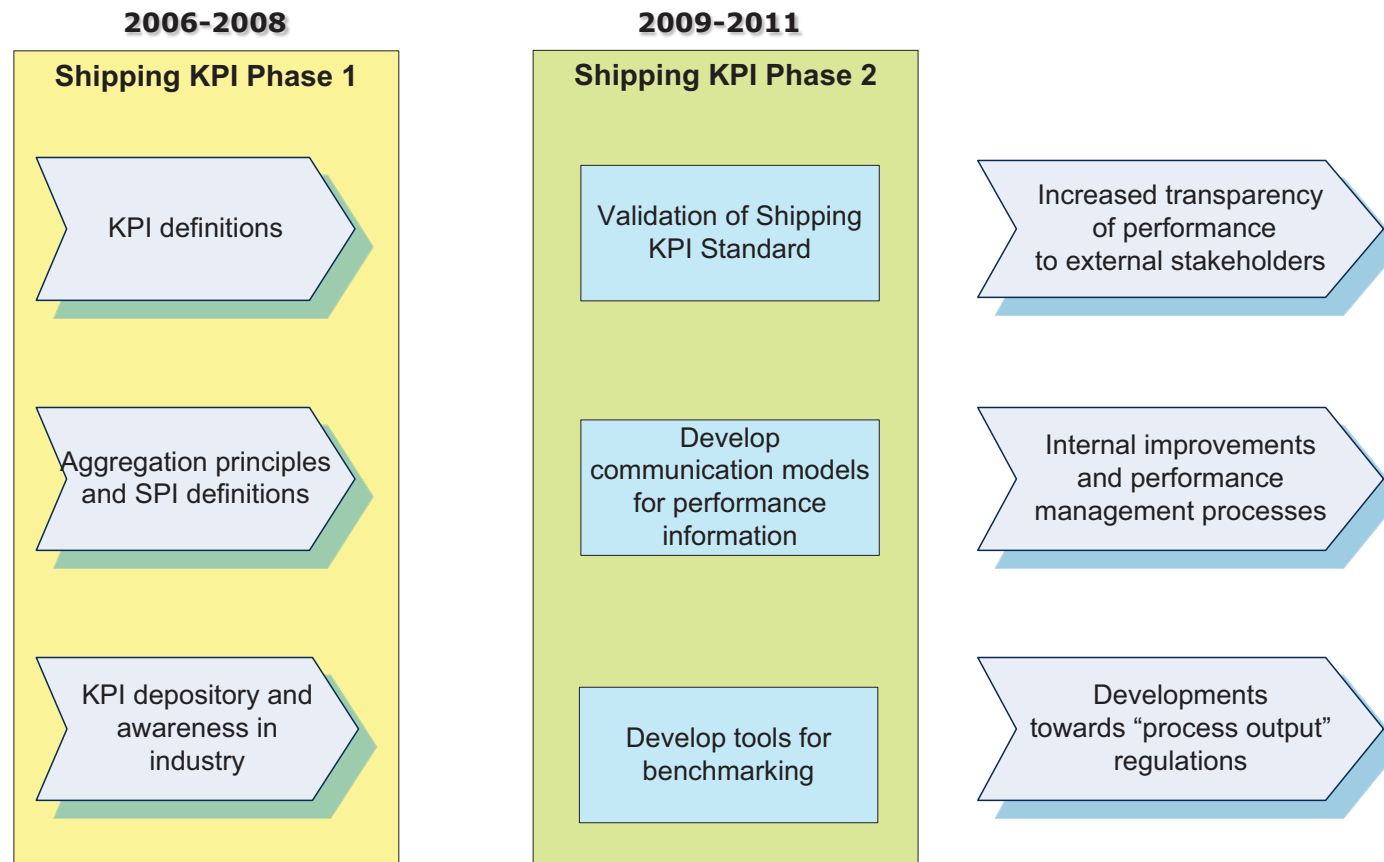
Shipping Companies

InterManager members

**Trade Organisation
Regulators e.g. IMO
EU DG-TREN
Labour Organisations
Insurance
and many more**



Shipping KPI Phase 1 & 2 - Content



Shipping KPI Phase 2 WG Participants

Bernhard Schulte Shipmanagement	Bill Lunn	Group Director - Loss prevention, safety & quality
Columbia Shipmanagement	Dietrich Wulff	Q.A. Manager
ConsultISM	David McFarlane	Project Manager
EMS Ship Management	Ranjith Cheerath	Marine, Safety & Quality Director
Epic Asia	Sanjay Mittal	Assistant General Manager, DPA
Epic Europe/Meridian Marine	David Turner	Manager Risk, Safety and Security
Hoegh Fleet Services	Alv Johan Erikstad	Controller, Fleet Management
Maersk Ship Management	Terry Cornick	Managing Director
Marfin Management S.A.M.	Alexandre Albertini	Director
NovoShip	Alexey O. Khaydukov	Quality Assurance Director
NYK Shipmanagement Singapore	Hemant Pathania	Managing Director & COO
Seaspan Ship Management	Peter Curtis	Vice President
Thome Ship Management Singapore	Bjorn Hojgaard	Managing Director
V.Group	Simon Pressly	Chief Information Officer
Wilhelmsen Ship Management	John-Christen Jensen	Vice President Shipmanagement
NewsLink	George Hoyt	Founder
Tsakos Shipping Hellas	A. Rozakis	General Manager
Interorient	Steve Hardy	Manager HSEQ
MMS Japan	T. Ajay	Managing Director

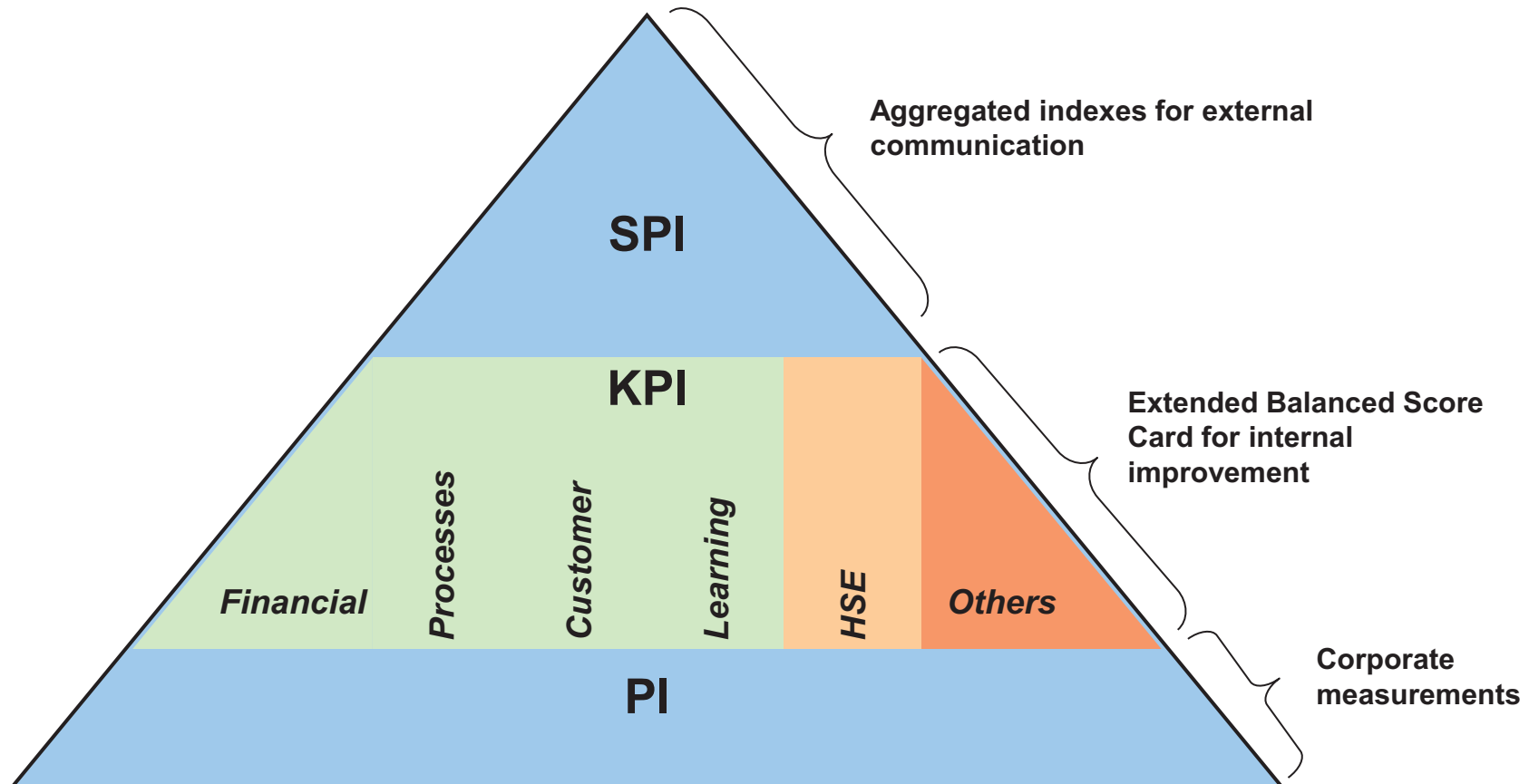


Requirements for Shipping KPIs

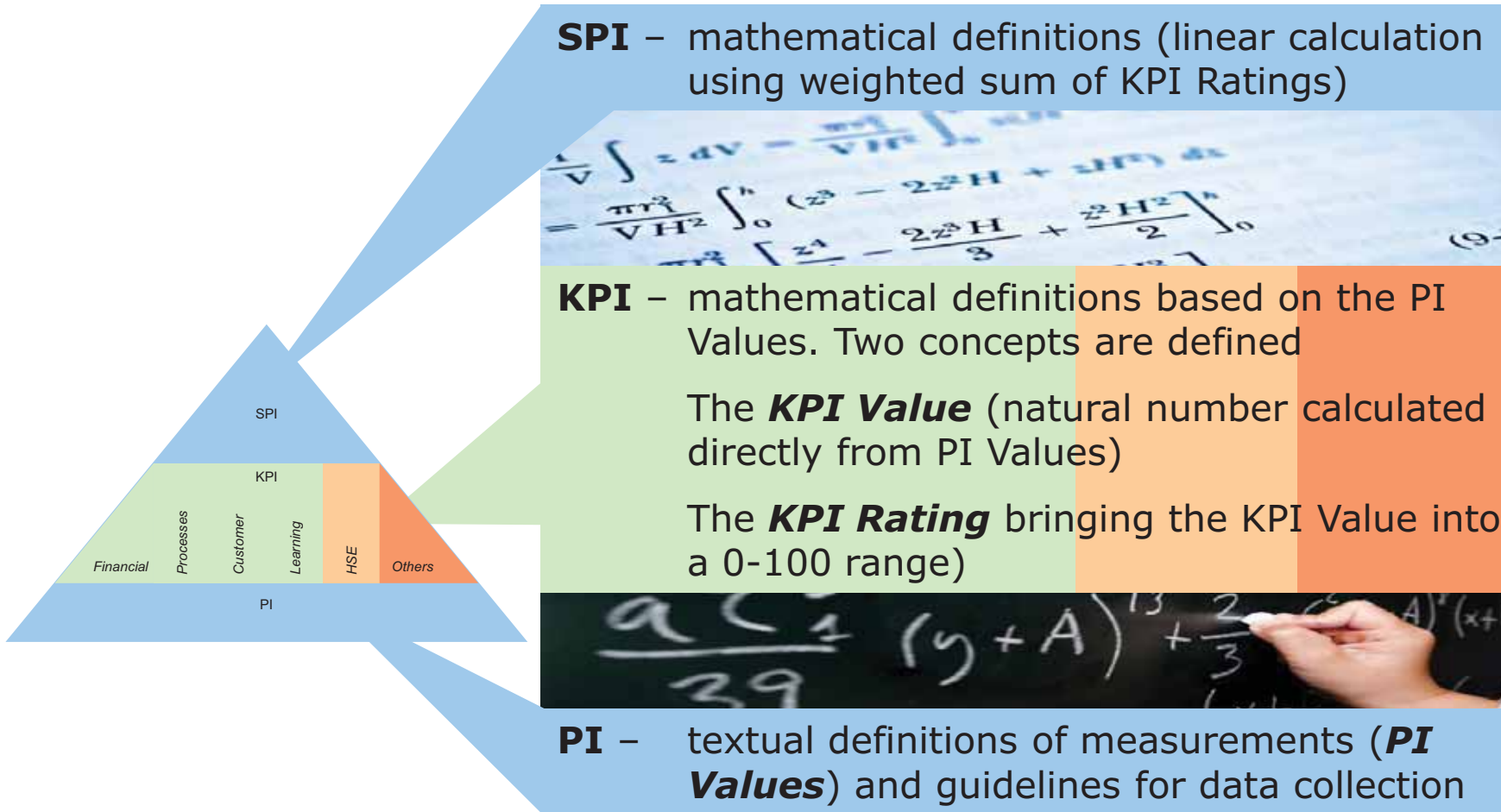
- **KPI accepted as part of the Shipping KPI performance hierarchy must be:**
 - **Observable and quantifiable**
 - Mathematical formula on basis of unambiguous, observable measurements
 - **Valid indicator of performance**
 - Express performance within an area which the Ship Manager needs to perform well as well as having complete control of the factors affecting the performance
 - **Robust against manipulation**
 - To a large extent related to unambiguous descriptions of the needed measurements
 - No room for “favourable interpretations”
 - **Sensitive to change**
 - Will actual changes in the Ship Manager’s performance be reflected well (by increase/decrease) in the KPI Value over time?
 - **Transparent and easy to understand**
 - Would all of the “users” of the KPI interpret the KPI in the same manner
 - If the KPI can be said to be context-dependent, a high KPI Rating for one Ship Manager is not necessarily a positive thing while for another Ship Manager a high KPI Rating on the same KPI is to be interpreted as very positive indeed
 - **Compatible**
 - Is the KPI harmonized with the rest of the performance hierarchy?
 - The KPI must be compatible with other KPIs to prevent the decision-makers receiving contradictory control signals



The Shipping KPI Standard - Concept



The Concept of the Shipping KPI Standard



The Shipping KPI Standard - SPIs

- Environmental performance
- HR performance
- Safety performance
- Security performance
- Technical Performance
- Navigation Performance
- Operational Performance



Shipping KPIs in the BSC perspectives

PROCESS (*internal*)

- Cargo damage ratio
- Condition of class
- Drydocking planning performance
- Environmental deficiencies
- Failure of critical equipment and systems
- Flawless port state control performance
- HR deficiencies
- Navigational deficiencies
- Navigational Incidents
- Operational cargo incidents
- Operational deficiencies
- Port state control deficiency ratio
- Port state control detention
- Safety deficiencies
- Security deficiencies
- CUSTOMER** (*customer*)
- Budget performance
- Vessel availability

HR (*innovation and learning*)

- Crew disciplinary frequency
- Crew planning
- Officers experience rate
- Officer retention rate
- Training days per officer
- Cadets per vessel

HSE (*new*)

- Accidental releases of substances as def by MARPOL
- Ballast water discharge violations
- CO2 efficiency
- Contained spills
- Fire and Explosions
- Lost Time Injury Frequency
- Lost Time Sickness Frequency
- No of violations of MARPOL Annex 1-6
- NOx efficiency
- Passenger injury ratio
- SOx efficiency



(text in italic refer to Kaplan Norton perspectives, HARVARD BUSINESS REVIEW Jan-Feb -92)

For an updated list of KPIs please visit www.shipping-kpi.com

Shipping **KPI**

The Shipping KPI Standard - PIs

Actual drydocking costs
Actual drydocking duration
Actual off-hire
Agreed drydocking costs
Agreed drydocking duration
Average number of officers employed
Emitted Mass of CO2
Emitted Mass of NOx
Emitted Mass of SOx
Last year's AAE (Additional Authorized Expense)
Last year's actual running costs and accruals
Last year's running cost budget
Number of absconded crew
Number of accidental releases of substances covered by MARPOL, to the environment
Number of allisions
Number of ballast water discharge violations
Number of beneficial officer terminations
Number of cadets under training with the ship manager
Number of cargo operations
Number of cargo units transported
Number of cases where a crew member is sick for more than 24 hours
Number of charges of criminal offences
Number of contained spills of bulk liquid

Number of collisions
Number of conditions of class
Number of crew not relieved on time
Number of damaged or lost cargo units during cargo operations
Number of damaged or lost cargo units during voyage
Number of dismissed crew
Number of environmental related deficiencies
Number of explosion incidents
Number of failures of critical equipment and systems
Number of fatalities due to injuries
Number of fatalities due to sickness
Number of fire incidents
Number of groundings
Number of HR related deficiencies
Number of logged warnings
Number of Lost Workday Cases
Number of navigational related deficiencies
Number of officers onboard
Number of officer months onboard
Number of officers onboard all vessel under technical management (DOC)
Number of officer terminations from whatever cause
Number of officer trainee man days

Number of operational related deficiencies
Number of passengers injured
Number of passengers transported
Number of Permanent Partial Disabilities
Number of Permanent Total Disabilities
Number of PSC inspections resulting in zero deficiencies
Number of PSC deficiencies
Number of PSC inspections
Number of PSC inspections resulting in a detention
Number of recorded external inspections
Number of safety related deficiencies
Number of security related deficiencies
Number of severe spills of bulk liquid
Number of cases where drugs or alcohol is abused
Number of unavoidable officer terminations
Number of vessels under technical management (DOC)
Number of violations of MARPOL Annex 1-6
Number of violations of rest hours
Planned unavailability
Total Exposure Hours
Transport Work

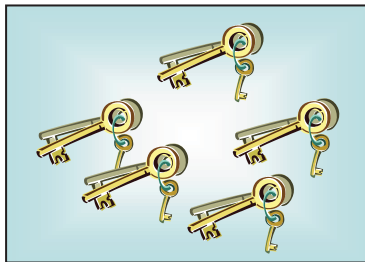


For an updated list of PIs please visit www.shipping-kpi.com

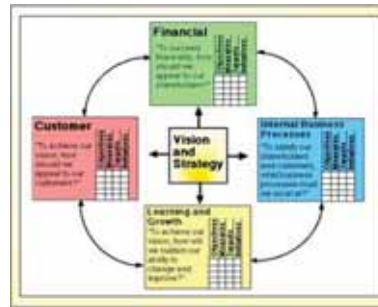
Shipping KPI

Application of theory to develop the Shipping KPI Model

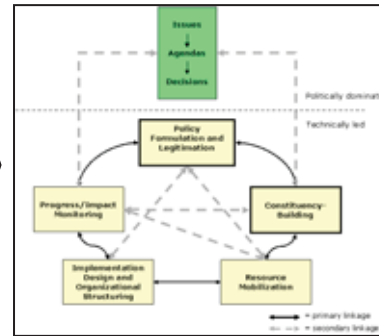
+Industry KPIs
+KPI Definitions



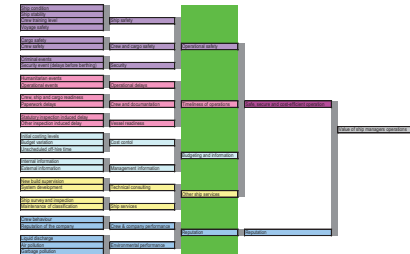
Validating and
balancing the
indicators



Identifying
Stakeholder needs

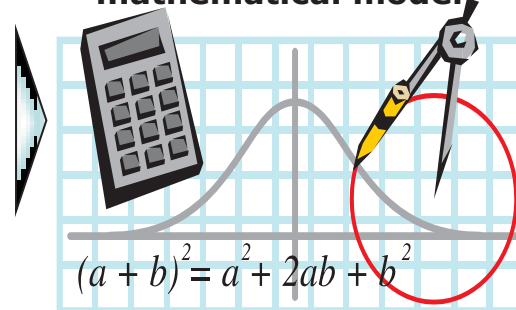


Creating a
aggregation
hierarchy



Applying theory

Creating the
mathematical model



Publishing the
Shipping KPI Standard



Own development



KPI: Cargo damage ratio

DESCRIPTION:

The KPI expresses the ship manager's ability to run a reliable operation in regards to delivering the cargo undamaged at the port of discharge.

RATIONAL FOR THE KPI:

One of the main objectives for any ship manager is to ensure that the vessel arrives at the port of discharge with the cargo in the same shape as when loaded at the port of loading. The issue of timeliness is more under the responsibility of the commercial operator and no such KPI therefore exists in the Shipping KPI performance hierarchy.

EXTERNAL REFERENCE:

No external reference is made in this KPI.

*For updated version refer to
www.shipping-kpi.com*

DEFINITION:

This KPI represents a ratio between the total quantity of damaged or lost cargo (during the actual sea voyage) relative to the total quantity of cargo transported. By defining the KPI as a ratio, benchmarking is feasible even between different vessel sizes.

BACKGROUND:

Due to the different nature of different vessel types, this KPI is not suitable for comparison across vessel types. A contaminated tank on a VLCC will result in a much bigger contaminated cargo volume as opposed to a damaged single container on a container carrier. Even though both incidents are single incidents, the VLCC's performance will come off much worse on this KPI than the container carrier.

During the definition phase of this KPI we contemplated about only counting the number of incidents instead of registering the actual volume/quantity of damaged cargo but it was decided that we would lose valuable information if only the number of incidents were counted.



KPI: Cargo damage ratio

MEASUREMENT PERIOD:

Expressed on a quarterly basis (2009/Q1 = 2009.01.01 - 2009.03.31).

Expressed per vessel for internal improvement and benchmarking as well as external communication

PIs USED FOR CALCULATION:

- Total number of damaged or lost cargo units during voyage
- Total number of cargo units transported

For updated version refer to
www.shipping-kpi.com

KPI Value Formula=

$$\frac{\text{Total number of damaged or lost cargo units during voyage}}{\text{Total number of cargo units transported}}$$

KPI Rating Formula=

$$KPI_{Rating} = 50 * \left(1 - \frac{KPI_{Value} - KPI_{Average}}{2\sigma}\right)$$

KPIaverage is the average KPIvalue of the vessels in the data base

σ is the standard deviation for the KPIvalue of the vessels in the database



The history of the KPI Rating (0-100)

- The linear z- scaling

$$KPI_{Rating} = 100 * (1 - Z * KPI_{Value})$$

Insensitive and sensitive to ships particulars

- The statistical approach

$$KPI_{Rating} = 50 * \left(1 - \frac{KPI_{Value} - KPI_{Average}}{2\sigma}\right)$$

Distributions not normal distributed, sensitive to ships particulars

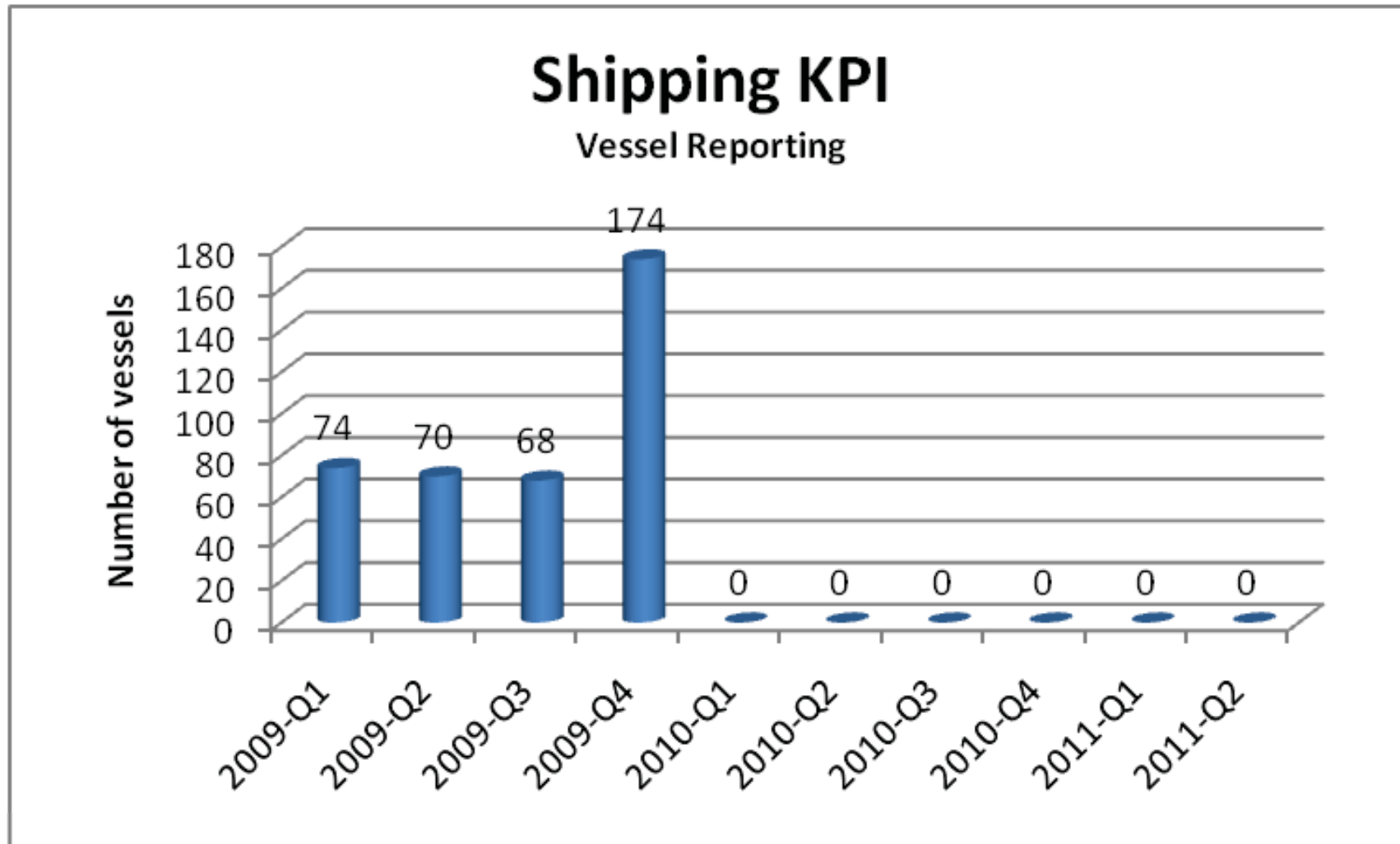
- An hybrid approach

$$KPI_{Rating} = 100 * \left(\frac{KPI_{Value} - KPI_{MinRequirement}}{KPI_{Target} - KPI_{MinRequirement}}\right)$$

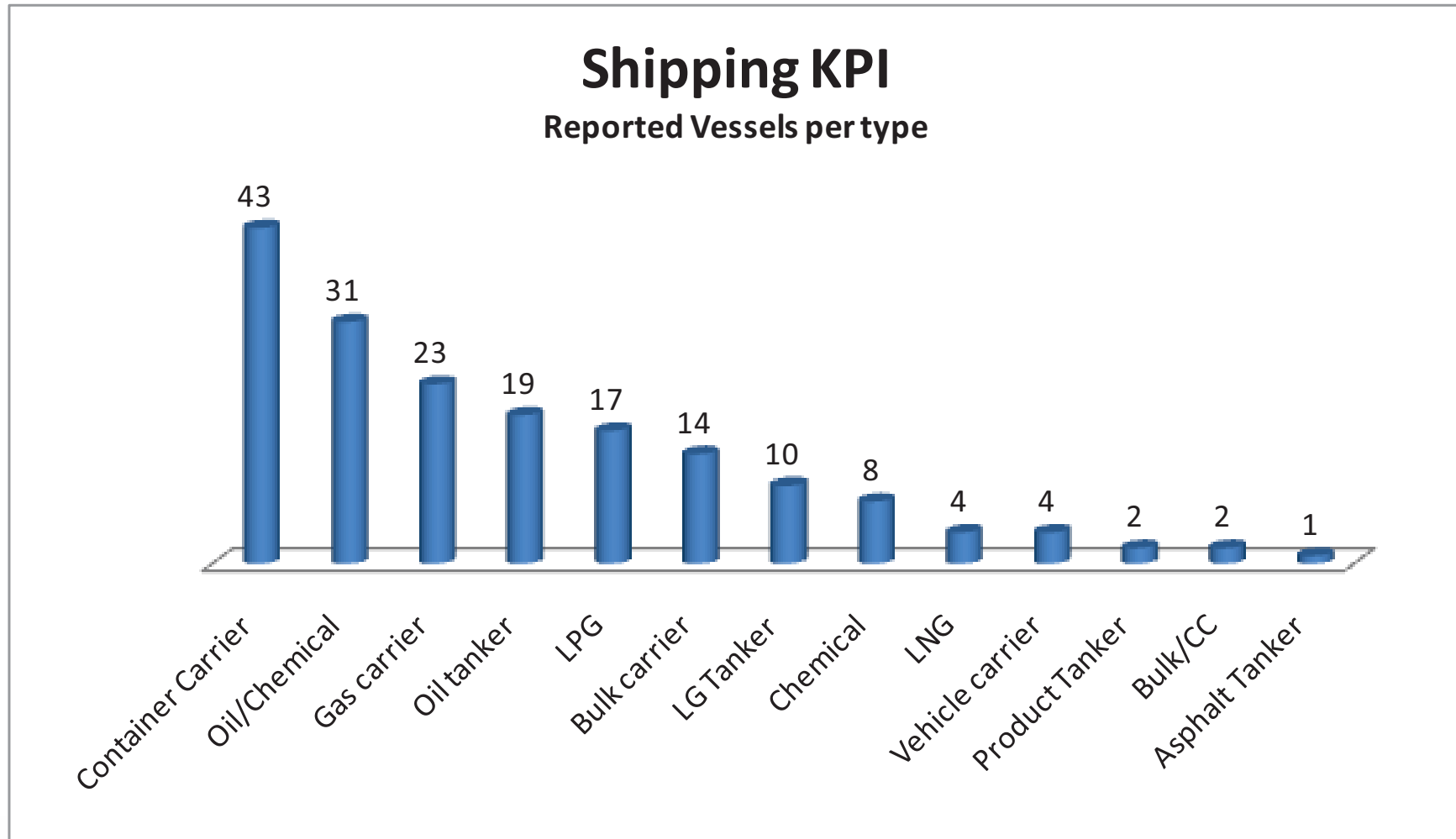
Requires Target and MinReq set per ship cluster



Validation of standard (number of vessels)



Validation of standard (type of vessels)





User Haraldsl connected to Shipping KPI Raga3 using Windows XP Version 5.1

Explorer

Hierarchy Edit

Security | Technical | Navigational | Operational | System

Environment | HR | Safety

Status W A Count Type

Fleet

- MS Olivia
 - Accidental releases of substances as def by MARPOL
 - Ballast water discharge violations
 - CO2 emission
 - Cargo incidents during cargo operations
 - Cargo incidents during voyage
 - Contained spills
 - Crew management
 - Crew planning
 - Environmental deficiencies
 - Failure of critical equipment and systems
 - Flawless port state control performance
 - NOx emission
 - Navigational incidents
 - No of violations of MARPOL Annex 1-6
 - Port state control detention
 - SOx emission

Expanded MS Olivia

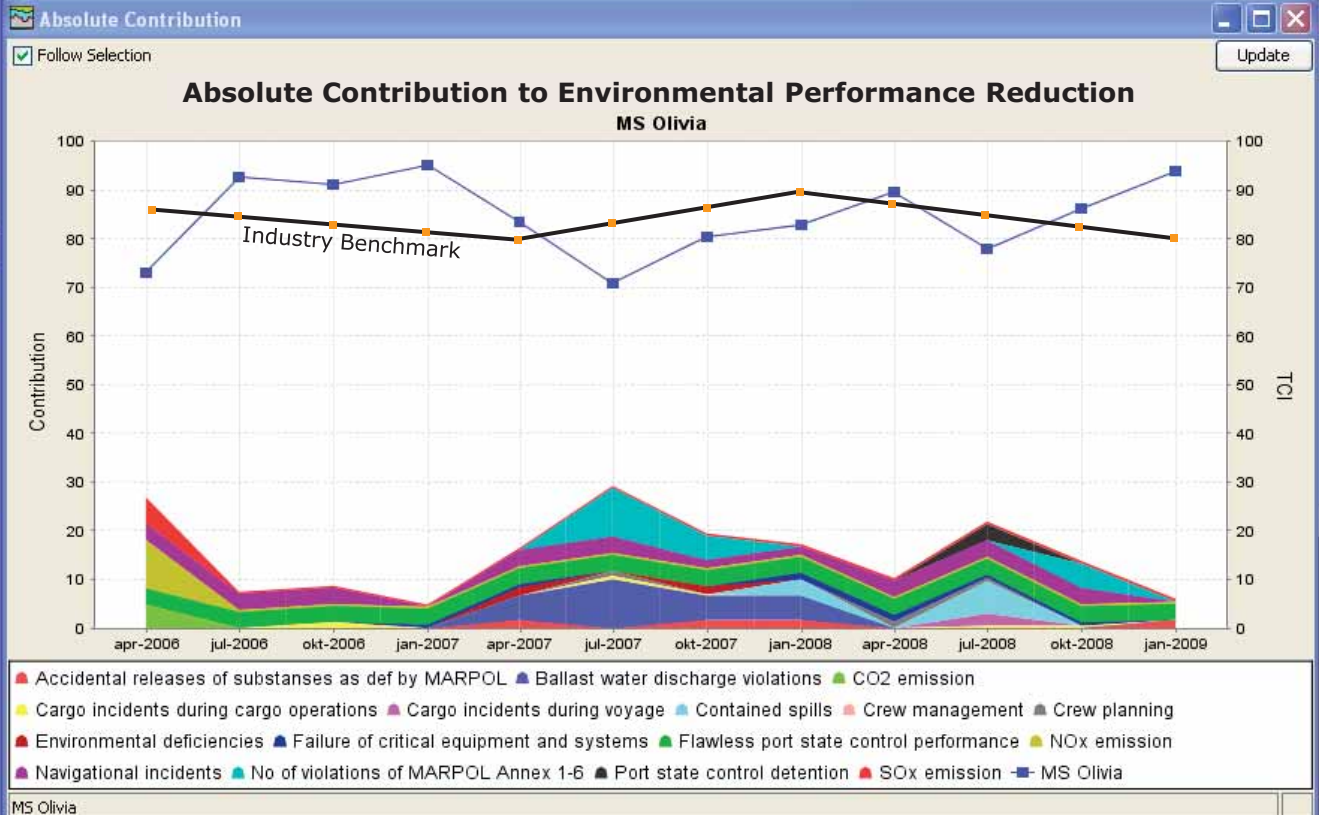
Annotation Inspector | TCI Inspector | UF Inspector

Follow Selection

Date | Title

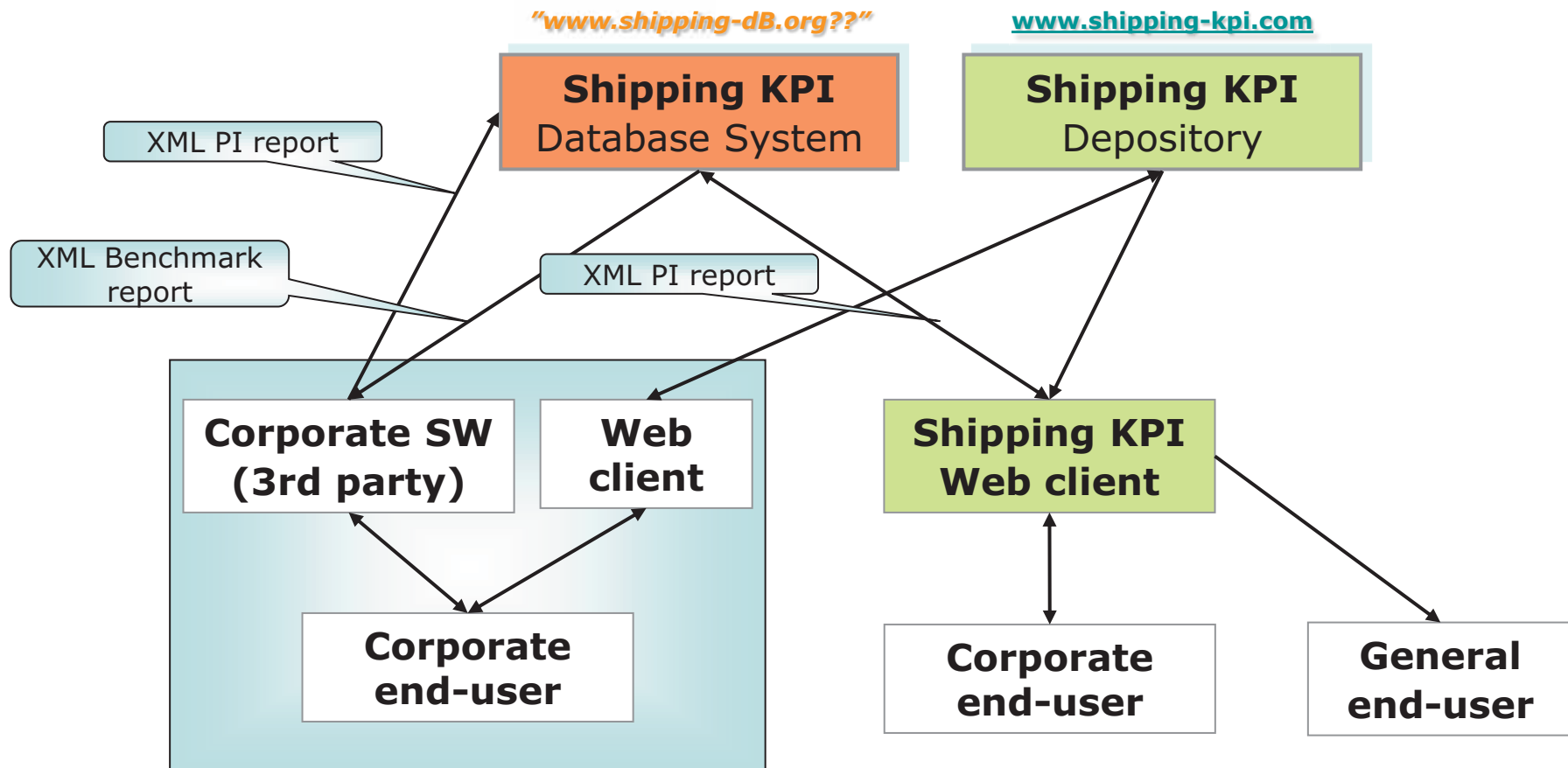
Text

MS Olivia



A benchmarking prototype application is developed

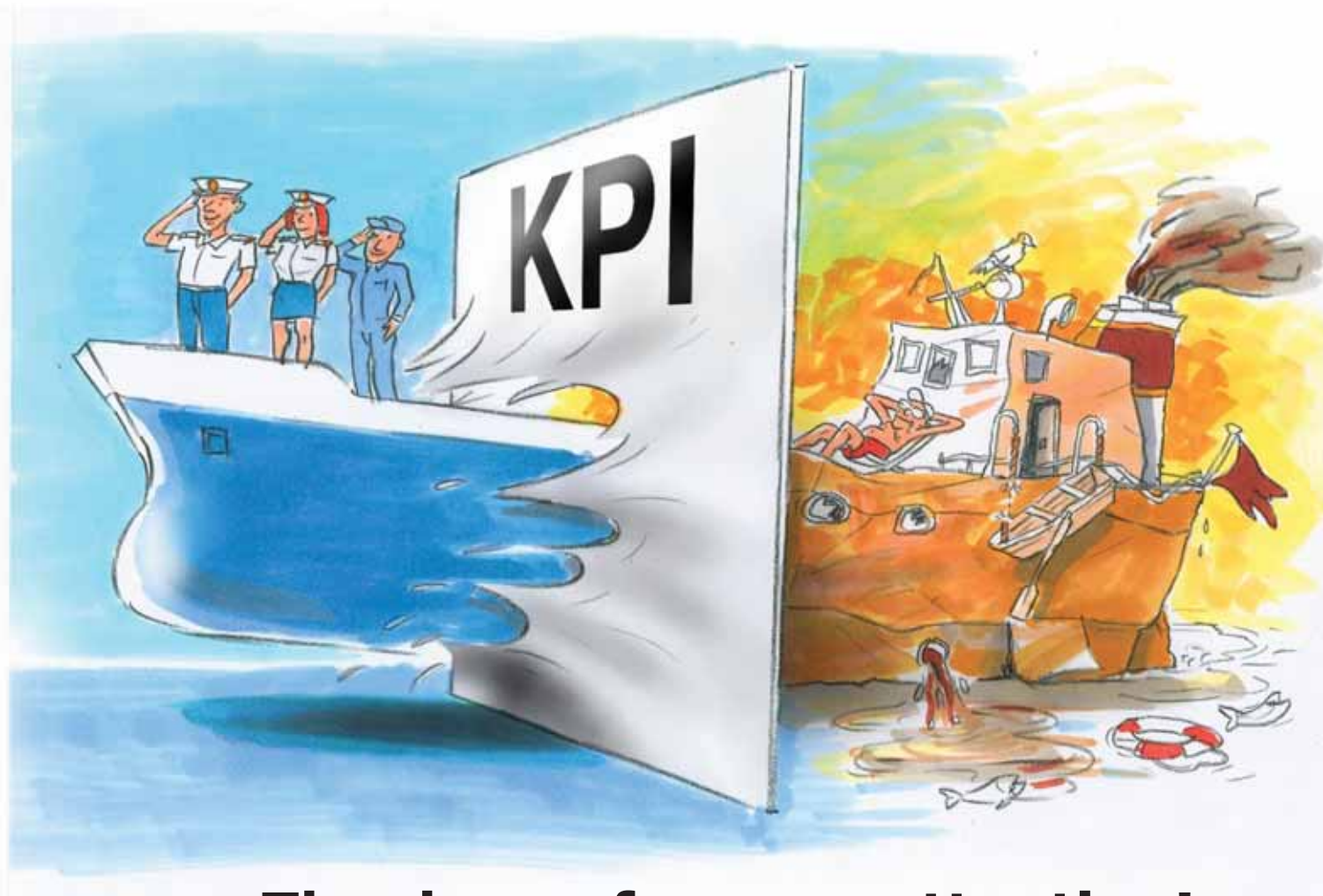
A conceptual model for the Shipping KPI System Interfaces



Utilisation of the Shipping KPI Standard

- A voluntary industry initiative
- Proactive relative to regulators
- Meeting future transparency requirements
- Used in relation to TMSA - evidence tracking
- Informing the public opinion
- Provide consistent external performance communication
- Indicating policy and regulatory implementation effects
- Internal improvement
- Fleet/industry benchmarking
- Performance based contracting





Thank you for your attention!

