D 5.3.1 Key Performance Indicators

Activity A. 5.3 – Assessment and evaluation

July 2021 – Final

Partner: Pp5, Pp2, Pp4
Authors: Ogrizovic, Castelli, Cocciarini
Email: dario@uniri.hr

Project Acronym	E-CHAIN
Project ID Number	10048282
Project Title	Enhanced Connectivity and Harmonization of data for the Adriatic Intermodal Network
Priority Axis	4 - Maritime Transport
Specific objective	4.1 - Improve the quality, safety and environmental sustainability of marine and coastal transport services and nodes by promoting multimodality in the programme area
Work Package Number	5
Work Package Title	Services and Transport Vehicle Integration
Activity Number	5.3
Activity Title	Assessment and evaluation
Partner in Charge	PP5 - University of Rijeka, Faculty of Maritime Studies Rijeka
Partners involved	LP - Municipality of Ancona PP1 - Amatori Interestate SRL PP2 - Brusutti S.R.L. PP3 - G.M.T. S.P.A. PP4 - University of Trieste PP6 – Prosoft d.o.o. PP7 - Jadrolinija PP8 - City of Split PP9 - Rathmann d.o.o.
Status	Final
Distribution	Public

Date	Version	Prepared by	Responsible	Approved by	Revision	Comment
Jun'21	draft	Ogrizovic, Castelli, Cocciarini				draft
Jul'21	final	Ogrizovic, Castelli, Cocciarini		All Pps		final

European Regional Development Fund

ACRONYMS / ABBREVIATIONS

ACRONYM	DEFINITION
PP	Project partners
PT	Project Team
TC	Technical task coordinator
WP	Work package
IT	Information Technologies

CONTENTS

1. Introduction

The E-CHAIN Key Performance Indicators (KPIs) document is part of Work Package 5 - Services and Transport Vehicle Integration of the E-CHAIN project, co-financed from the EU and the 2014 – 2020 Interreg V-A Italy -Croatia CBC Programme, inside the priority axis Maritime transport, responding at the specific objective n. 4.1: "Improve the quality, safety and environmental sustainability of marine and coastal transport services and nodes by promoting multimodality in the Programme area".

The E-CHAIN Key Performance Indicators (KPIs) document defines appropriated Key Performance Indicators (KPIs) and structures preliminary templates for questionnaires.

The Key Performance Indicators (KPIs) document is prepared by the University of Rijeka (PP5) and University of Trieste (PP4), the project partner responsible of WP5 - Services and Transport Vehicle Integration, and discussed and approved by the whole partnership.

2. Performance measures

A Performance measurement system is supposed to include the data to collect, analyse, report and use to make sound business decisions.

Performance indicators are tools to understand, manage and improve the activities of organizations.[1] Effective performance indicators allow us to understand:

• How well we are doing;

• If we are meeting our goals;

• If our customers are satisfied;

• If our processes are in control;

• If and where process improvements are necessary.

The result of a performance measurement is a performance indicator, which is generally expressed by a number and a unit of measurement. The number gives a magnitude (how much) and the unit gives a meaning (what). Indicators are always associated with corresponding representation targets.

---

[1] Eccles, R. (1991). The performance measurement manifesto. Harvard Business Review, 69(1), 131–137.

3. Key performance indicators (KPIs)

Key performance indicators (KPIs) are indicators that focus on the aspects of organizational performance that are the most critical for the current and future success of the organization. Key performance indicators (KPIs) are quantifiable measures that define and evaluate the success of an organisation in meeting its strategic goals over a specified time.[2] KPIs are quantitative and qualitative measures used to review an organisation progress against its goals. KPIs provide a measurement tool which measure performance by showing trends to demonstrate that improvements are being made over time.

KPIs should be closely attached to the business or project strategy to identify the most important things and to give the answers to most relevant questions in order to provide relevant information to employees and management. KPIs are good indicators to define and measure business goals and are commonly used in business.

KPIs are usually developed following the well-known SMART criteria[3]. SMART (Figure 1) is an acronym that stands for Specific, Measurable, Assignable, Realistic and Time-related.
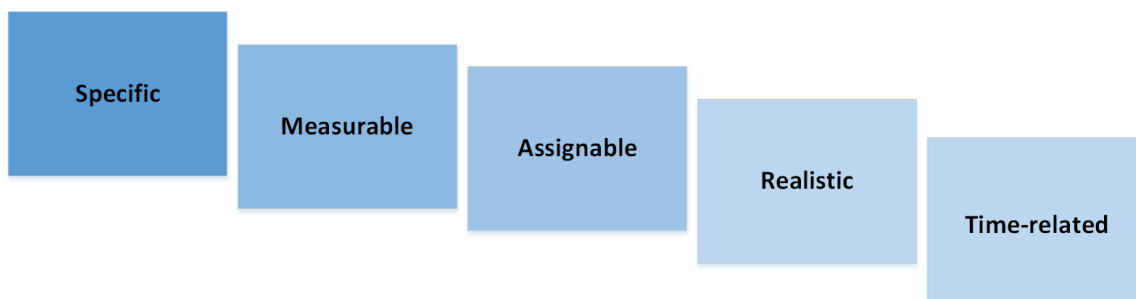

Figure 1. SMART criteria

Specific - specification of area for improvement.

Measurable - specification of indicators of progress.

Assignable - specification of person or team who will do the job.

Realistic - specification of results which can be realistically achieved.

---

[2] Parmenter, D. (2015). Key performance indicators: developing, implementing, and using winning KPIs. John Wiley & Sons.

[3] Doran, G. T. (1981). There's a S.M.A.R.T. Way to Write Management's Goals and Objectives. Management Review, 70, 35-36.

Time-related - specification of time frame in which results can be achieved.

Each of these criteria can help set strategic goals and improve business performance.

KPIs Characteristics

Main KPIs characteristics are:

1. Relevant to and consistent with the specific organization's vision, strategy and objectives.

2. Focused on organization wide strategic value rather than non-critical local business outcomes.

3. Representative – appropriate to the organization together with its operational performance.

4. Realistic – fits into the organization 's constraints and cost effective.

5. Specific – clear and focused to avoid misinterpretation or ambiguity.

6. Attainable – requires targets to be set that are observable, achievable, reasonable and credible under expected conditions as well as independently validated.

7. Measurable – can be quantified/measured and may be either quantitative or qualitative.

8. Timely – achievable within the given timeframe.

9. Understood – individuals and groups know how their behaviours and activities contribute to overall agency goals.

10. Agreed – all contributors agree and share responsibility within the agency.

11. Reported – regular reports are made available to all stakeholders and contributors.

12. Governed – accountability and responsibility is defined and understood.

13. Resourced – the program is cost effective and adequately resourced throughout its lifetime.

14. Assessed – regular assessment to ensure that they remain relevant.

Main types of KPIs are:

- Process KPIs - measure the efficiency or productivity of a business process.
- Input KPIs - measure assets and resources.
- Output KPIs - measure the financial and nonfinancial results of business activities.
- Leading KPIs - measure activities that have a significant effect on future performance.
- Lagging KPIs - measure the success or failure after an event has been consumed. Such as most financial KPIs, measure the output of past activity.
- Outcome KPIs - measure benefits of performance as overall results or impact of the business activity in terms of generated benefits.
- Qualitative KPIs - A descriptive measure, an opinion, a property or a trait.
- Quantitative KPIs - A measurable characteristic, resulted by counting, adding, or averaging numbers, uses average's, ratio's, percentages, etc. Most common and frequently used type of data in measurement in most of KPIs.

Figure 2 shows main types of KPIs with their examples.

Process KPIs	e.g. - Days to deliver an order, time to complete customer order, etc.
Input KPIs	e.g. - Funding for training, dollars spent on research, etc.
Output KPIs	e.g. - Revenues, net profit, new customers, etc.
Leading KPIs	e.g. - Number of new patents, number of high performers, etc.
Lagging KPIs	e.g. - Total customer contacts, total incidents, most financial KPIs, etc.
Outcome KPIs	e.g. - Customer retention, brand awareness, etc.
Qualitative KPIs	e.g. - Employee / customer satisfaction rate, etc.
Quantitative KPIs	e.g. - Measurements of time, currency, weight, revenue per employee, etc.

Figure 2. Main types of KPIs with their examples

Designing effective KPIs

Designing effective KPIs starts with a strategy and the plan that captures most important strategic objectives, project mission (purpose) and vision (ambition) statements.

For each strategic objective, KPIs need to be defined in order to monitor and measure success with clear targets that define what success looks like.

Creation of an action plan sets out how defined targets will be achieved.

Monitoring, reviewing and adjusting KPIs and targets at regular intervals or whenever there's an important change in the project.

Well-designed KPIs should:

- Establish baseline information.
- Set performance standards and targets to motivate continuous improvement.
- Measure and report improvements over time.
- Compare performance across geographic locations.
- Benchmark performance against regional and international peers or norms.

4. KPIs reporting

Reporting and communicating performance findings is a critical component of any effective performance management strategy. KPIs as a performance management tool that provides evidence that allows enough information to support timely decision making. Disseminating the right information, in the right format to the right people is therefore extremely important to understand the implications of the KPIs that are monitored.

KPI reports need to include:

1. Strategy map at the start of the report with the connection between the subsequent data and the stated strategy.

2. Frame the report with a key performance question (KPQ) to remind the reader which of their unanswered question(s) the data is seeking to answer. Again, this helps to put the KPIs in even greater context, increase the relevance and turn 'interesting' into 'valuable' and therefore engaging the target audience.

3. Visual representation of the data with appropriate and meaningful graphs and charts.

4. Explanation of the data in words to add depth to the story and contextualise the graphics with key points, observations and detail explanations.

5. Designing of report to capture the main points and key insights to give a reader the information very quickly.

Visualising KPIs

The ultimate aim of a KPI report is to disseminate valuable information in an engaging and visually appealing way that is easy to understand and use. Using graphs and charts is the most common visual display tools for reporting purposes.

There are many different types of graphs and charts with a different purpose and effectiveness:

- Bar graphs, also known as bar charts, display rectangular bars of varying lengths representing different values. The bars are positioned either vertically or horizontally, with one axis showing the specific category being compared and the other representing the discrete value each bar

represents. Because the information is displayed side by side, this type of graph makes comparison between adjacent values particularly easy.

- Line graphs are ideal for displaying time-related data, such as variations in share price over time or sales made over a certain time period. What a line graph does well is illustrate trends, fluctuations, cycles, rates of change, and the comparison of two data sets over time.
- Pie charts display various segments that represent the data as a percentage of the total data. Pie charts are best when there are fewer than six segments to illustrate, otherwise it can become too difficult to distinguish between the values.
- Scatter charts, also known as scatter plots, are particularly useful for showing or indicating the correlation between two sets of data and illustrating the strength and direction of that relationship.
- Speedometer dials or gauges have been designed to represent a dashboard to provide a view of performance at a particular point in time, although KPIs tend to be much more static and don't move up or down all the time. Speedometer dials are also not very space efficient and can be difficult to compare to a target and they can't show trends.
- The bullet graph is better version of a speedometer dial and is more space efficient, making it easier to read and compare across a number of graphs. It only displays a single measure in relation to target performance.

Helping decision makers to read, understand and use the data from KPIs report is just as important as providing the data in the first place. Graphs, charts, images and diagrams get the important facts across to the reader very quickly and can make it easier to understand and give a deeper and broader insight into the findings. Graphics to visualise data need to be simple, relevant and to deliver important information.

Software reporting applications

There is a huge range of software applications that can upgrade KPIs reporting. Some of the software solutions are:

- Tableau, https://www.tableau.com/

- Targit, https://www.targit.com/

- Dundas BI, https://www.dundas.com/

- QlikView, https://www.qlik.com/

- Board, https://www.board.com/

- IBM Cognos BI, https://www.ibm.com/products/cognos-analytics

- SAP Crystal reports, https://www.crystalreports.com/

5. E-CHAIN Key Performance Indicators (KPIs)

KPIs are based on document D 3.4.1 – E-CHAIN platform design and high level architecture.

Function A: travel preparation (a responsive web portal)

Main KPIs are:

- Number of web portal users
- Number of customer clicks to supplier booking engine
- Carbon impact (percentages of reduced CO_2 and how many users have chosen to reduce it compared to the fastest/cheapest trip)
- Number of requests from customers to be kept informed during the trip
- Number of customers who don't want to be informed during the trip (receive sms/email)
- Number of the non-transport services (managed with the DMS) detected

Booking (suppliers):

Trenitalia - API GTFS

Jadrolinija - API GTFS

Conerobus ticket - API GTFS

Function B: assistance during the journey (aimed at facilitating the relationship between customer and supplier)

Main KPIs are:

- Number of customers who accessed dedicated links and started the editorial communication plans
- Number of sms / e-mail to customers from E-chain web platform
- Number of the editorial communication plans created
- Number of non-transport services
- Number of non-transport services booked
- Number of special communications from port authority or other territorial body

Function C: data analysis after the trip (analysis of flows and improvement of transport performance in the port area)

Main KPIs are:

- Number of route requests on the E-chain web platform
- Number of geolocation of users who have joined the service in real time during the navigation within port area
- Number of passenger bookings with special needs (families with children's, people in wheelchairs, motor homes)
- Average modal split-passengers (analysis of customer travel modes and routes)

6. Questionnaire

After the use of the E-CHAIN service each customer will get a message to fill out a customer satisfaction questionnaire.

Where do you currently live? _____

What is your age group?

12-24	25-39	40-54	55+

Which modes of transportation do you use?
- Car
- Bus
- Train
- Ferry
- Other (please write) _____

How often do you use public transport?
- Daily
- Weekly
- Monthly
- Once a year or less
- Never (please specify, why not?) _____

How easily can you find information about the lines and the timetables of your public transport service?

Very easily	Kind of easily	Okay	Not very easily	Very hard

How do you pay for the public transportation?

- With cash on spot
- Online in advance
- Another way (please specify) _____

Do you travel cross-borders and combine different modes of public transport on your route?
(If yes, please select which modes you combine)

No, I don't travel cross-borders by using public transport

Bus	Bus	Bus
Train	Train	Train
Ferry	Ferry	Ferry
Other (please write)	Other (please write)	Other (please write)

What do you think about the E-CHAIN web portal (travel preparation)?

Respondents can score their reply on a 1–5 scale (1 = not good, 5 = excellent).

	1	2	3	4	5
Search on the E-Chain web portal with Google Maps					
Notification of the CO2 of the various routes					
Possibility to book a ticket					
Availability of the non-transport services					
Weather information					

What do you think about the E-CHAIN "keep me informed" service, during your travel?

Respondents can score their reply on a 1–5 scale (1 = not good, 5 = excellent).

	1	2	3	4	5
Date and time of departure					
Place of check-in and how long before you must be there before boarding					
Supplier (bus, train and ferry) contacts and assistance contacts					

Tourist Board events with date, time and place					
Weather information					
Special communications (Port authority or other territorial body)					

How likely are you to return to the E-CHAIN service web portal?
Respondents can score their reply on a 1–5 scale (1 = not at all likely, 3 = neutral, 5 = extremely likely).

How likely would you be to recommend the E-CHAIN service web portal to a friend?
Respondents can score their reply on a 1–5 scale (1 = not at all likely, 3 = neutral, 5 = extremely likely).

Eccles, R. (1991). The performance measurement manifesto. Harvard Business Review, 69(1), 131–137.

Doran, G. T. (1981). There's a S.M.A.R.T. Way to Write Management's Goals and Objectives. Management Review, 70, 35-36.

Gladen W. (2005). Performance measurement, 3rd edn. Wiesbaden, Verlag TUV Rheinland, Koln.

Marr, B. (2015). Key Performance Indicators for Dummies. Wiley.

Mettanen P. (2005). Design and implementation of a performance measurement system for a research organization. Prod Plan Control 16(2):178–188.

Meyer M.W. (2002). Rethinking performance measurement – beyond the balanced scorecard. Cambridge University Press, Cambridge.

Parmenter, D. (2015). Key performance indicators: developing, implementing, and using winning KPIs. John Wiley & Sons.

Samsonowa T., Buxmann P., Gerteis W. (2009). Defining KPI sets for industrial research organizations - a performance measurement approach. Int J Innovat Manage 13(3):157–176.

Samsonowa T. (2012). Industrial Research Performance Management - Key Performance Indicators in the ICT Industry. Springer-Verlag GmbH Berlin Heidelberg.