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LOCALIENCE

DELIVERABLE D.1.2.1

Appraisal System to measure effectiveness of local level collaboration of professional and civic/public actors in Disaster Risk Reduction

Version 1

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1. Introduction

Sendai framework[1] contains in its core documents its own sets of indicators[2] for measuring, reporting and evaluating the efforts of participating States in disaster risk reduction (DRR). However, most of these indicators or key performance indicators (KPI´s) were initially not directly applicable for appraisal the degree of cooperation between professional actors and civilian actors in the process and efforts to reduce the risks of different types of disasters (floods, extreme weather events including heat waves and prolonged drought, industrial accidents triggered by natural disasters (NaTech´s), etc.) at the city and municipal level.

Hereafter proposed appraisal system was developed to evaluate the effectiveness of local level cooperation between professional and civil/public actors in the prevention, preparedness and management of extreme weather hazards. This methodology could serve as a structured framework aimed at assessing the extent to which collaboration contributes to enhancing a community's resilience and ability to respond adequately. The definition of resilience that will be used is in line with the UNDRR Sendai Framework strategies.

Appraisal system consists of several key components. First, it emphasizes a clear definition of the objectives of the assessment, prioritizing the measurement of outcomes and impacts resulting from collaborative efforts to mitigate extreme weather risks and strengthen local resilience.

In addition, the methodology includes the establishment of specific criteria for evaluating the effectiveness of cooperation. These criteria include various aspects such as the effectiveness of communication, the efficiency of coordination, the dynamics of resource sharing and the level of stakeholder involvement (the list is not exhaustive). They provide the basis for the selection of relevant Key Performance Indicators (KPIs).

The appraisal system (methodology) will propose a set of key performance indicators that meet the established criteria. These KPIs are designed to offer both quantitative and qualitative measures of the effectiveness of the cooperation. They allow stakeholders to systematically monitor status and progress, identify areas for improvement and track performance trends over time.

[1] Sendai Framework for Disaster Risk Reduction 2015-2030, adopted at the 3rd World Conference on Disaster Risk Reduction, Japan, 2015. Available on-line: https://www.undrr.org/publication/sendai-framework-disaster-risk-reduction-2015-2030

[2] Basic DRR sets of indicators and terminology by Open-ended Intergovernmental Expert Working Group on Indicators and Terminology (OIEWG). Available on-line: https://www.preventionweb.net/terminology/open-ended-working-group, https://www.preventionweb.net/files/50683_oiewgreportenglish.pdf

2. Appraisal System Proposal

Performance Appraisal System to measure effectiveness of local level collaboration of professional and civic/public actors in DRR (including a new set of better applicable indicators and KPI´s) has been widely discussed and derived, as a part of ongoing LOCALIENCE project[3] aims and objectives.

Hereby proposed Appraisal System is based on 5 main pillars:

- Inputs and recommendations from interconnected project deliverables, literature research, disaster risk reduction good practice and emergency management practice.
- Typology of possibly involved stakeholders and survey participants.
- Newly derived list of 29 indicators and 9 aggregated Key Performance Indicators (KPI´s) with questions, typology and classification.
- Online Google Form for presenting and testing of all 29 performance indicators, including basic statistical evaluation.
- Recommendation for final aggregation of 29 performance indicators into 9 Key Performance Indicators, done by project partner (OSU) and / or external company.

2.1. Inputs and recommendations

This performance appraisal system was developed as a result of work package D.1.2.1, finetuned within work package D. 1.2.2, building on Extreme Weather Catalogue (D. 1.1.3, EWC) and pilot action (D.3.2.1) data, with indicators and aggregated KPI´s applicable to all project regions, measuring the effectiveness of local level collaboration of professional and civil/public actors in preparation for and management of extreme weather threats.

During discussions, there was indicated overall needs:

- to develop or select both qualitative and quantitative types of performance indicators,
- there should be quite a lot of specific indicators available,
- it should be possible to check or to answer only some of indicators, regarding available data and information.

From previous Deliverable D.1.2.1 Preliminary Performance Appraisal (PPA) methodology, also valuable inputs were given, regarding evaluation of local level collaboration for extreme weather readiness (file: 10. Introducing the preliminary performance appraisal system-1.pdf, from April 4th, 2024):

PPA methodology was considered within that deliverable as “structured framework aimed at assessing the extent to which collaboration contributes to bolstering community resilience and response capabilities”. It´s objective shall be: “to evaluate the effectiveness of local level collaboration between professional and

[3] Basic information on the project LOCALIANCE available on-line: https://www.interreg-central.eu/projects/localience/

civil/public actors in readiness for and management of extreme weather threats" or "to measure outcomes and impact of collaborative efforts".

OBJECTIVES & CRITERIA FOR EVALUATION / Core Components of PPA (as considered within D.1.2.1):

Criteria: Communication efficiency, coordination effectiveness, resource sharing, and stakeholder engagement.

- Communication Efficiency
- Coordination Effectiveness: The level of harmonization in planning
- Resource Sharing Dynamics information, tools, and manpower
- Stakeholder Engagement

IMPLEMENTATION & IMPACT / Tracking Success with KPI´s:

Criteria: Communication efficiency, coordination effectiveness, resource sharing, and stakeholder engagement.

- Quantitative Measures
  - the number of joint training sessions conducted,
  - resources allocated,
  - or emergency responses effectively executed.
- Qualitative Measures
  - the quality of stakeholder interactions,
  - satisfaction levels,
  - and the effectiveness of communication channels.

PPA methodology - qualitative indicators (as considered within D.1.2.1):

- Frequency of Interagency Communication
  - Talking Often and Well How often and well do groups talk and coordinate for weather emergencies?
- Level of Collaboration Engagement
  - Working Together How involved are everyone in planning and acting together?
- Resource Utilization Efficiency
  - Are resources like money, people, and materials used well, especially during extreme weather?
- Community Resilience Capacity
  - How prepared and united is the community to face and bounce back from challenges?
- Impact on Vulnerable Populations

- Are efforts effectively supporting those most vulnerable to weather impacts?

- Response Time and Effectiveness

  How fast and well do groups respond to weather emergencies and help the community to recover?

PPA methodology - quantitative indicators (as considered within D.1.2.1):

- Who did we reach actively?
  - number of organisations, stakeholders, participants reached who took part in the planned activity
- Who did we reach passively
  - number of organisations, stakeholders, participants made aware of the initiative
- How many partnerships formed?
  - number of interacting organisations
- Whose resilience improved to extreme weather events?
  - all participants (and local citizens (by default).

Furthermore, team know-how regarding disasters risk reduction and emergency management has been continuously used, implemented and properly referred during the solution process.

For example, derived basic performance indicators are classified into 4 (respectively 3) main phases commonly used by integrated rescue services (IRS) worldwide during Disaster Management Cycle (DMC)[4] and Emergency Planning:

1. Prevention (including risk understanding and characterisation, anticipation and preparation),
2. Preparedness (preparation),
3. Response (including absorption and ability to endure).
4. Recovery (including ability and resources to react, adapt, learn and to transform).

Where response and recovery phase has been aggregated into one phase 3. Response, because of practically applied rescue services approach. There is also category "0. Generally applicable", because some of indicators fits into all three predefined phases of Disaster Management Cycle.

Into these three main phases of DMC fits five generally recognized phases of resilience of municipality system as a group of subsystems:

1. Risk understanding and characterisation,
2. Anticipation and preparation,
3. Absorption and ability to endure,

[4] D. E. Alexander. Principles of Emergency Planning and Management. Terra and Oxford University Press, 2002. Disaster Management Cycle scheme is cited and use in many following topics, for example in: Erdelj, Milan & Król, Michał & Natalizio, Enrico. (2017). Wireless Sensor Networks and Multi-UAV Systems for Natural Disaster Management. Computer Networks. 124. 10.1016/j.comnet.2017.05.021

4. Response and recovery,
5. Adaptation, learning and transformation.

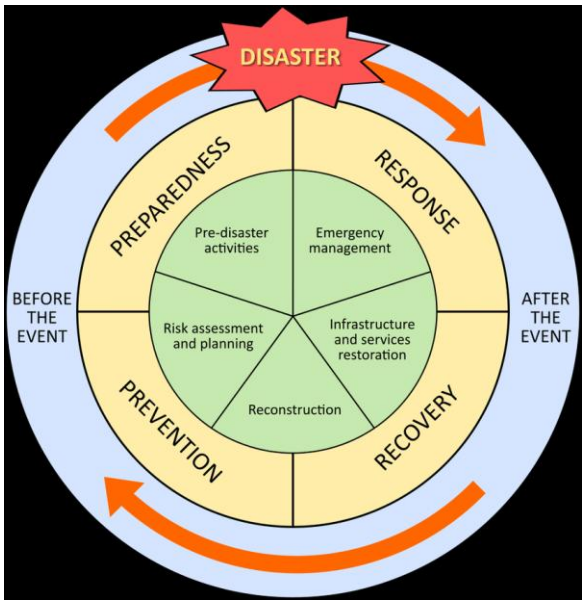


Figure 1 Disaster Management Cycle[5]

2.2. Stakeholders which can be involved in Appraisal System

Disaster risk reduction (DRR) involves a wide range of stakeholders working together to minimize the impact of disasters.

Here are some key stakeholders typically involved (click on the hyperlinks to get more information on-line from referred sources e.g. UNDRR[6] with information about:

1. Government Agencies

- National and local governments.
- Urban planning and infrastructure departments.
- Health and social services.

2. Non-Governmental Organizations (NGOs) and Civil Society

- FEMA - **Community-Based Organizations**: Engage in local preparedness and response activities
- Local and international NGOs focused on disaster response and community resilience.
- **International NGOs**: Provide expertise, resources, and support for large-scale disaster management.

3. Private Sector

[5] Al-Abdulla, O., & Kallström, A. (2022). *Public Health in a Chaotic World*. Figure 5: Disaster management cycle. Retrieved from https://www.researchgate.net/figure/Disaster-management-cycle_fig3_365996108

[6] www.undrr.org

- **Insurance Companies**: Play a role in risk assessment and financial recovery.
- Construction and engineering firms.
- Technology companies providing solutions for DRR.

4. Academic and Research Institutions

- Experts in disaster management, environmental science, and related fields.
- Institutions conducting risk assessments and developing new DRR methodologies.
- **Think Tanks**: Provide policy recommendations and strategic insights.

5. Media

- **News organizations and journalists** : Disseminate information and raise public awareness about risks and preparedness measures.
- **Social Media Platforms, influencers**: Facilitate real-time communication and information sharing.
- Public relations and communication firms.

6. Local Communities and Volunteers

- **Citizens**: Participate in preparedness activities and provide immediate response during disasters.
- **Volunteer Organizations**: Mobilize volunteers for various disaster management tasks[2].

7. International Organizations

- **United Nations Agencies**: Support global DRR initiatives and provide frameworks like the Sendai Framework for Disaster Risk Reduction.
- **Multilateral Organizations**: Offer funding and technical assistance for DRR projects.

8. Educational Institutions

- **Schools and Universities**: Educate students and communities about disaster risks and preparedness.
- **Training Centers**: Provide specialized training for disaster management professionals. Example in Czechia: Central School of Volunteer Firemen, Bílé Poličany

9. Health Sector

- Emergency medical services (private, volunteers…)
- **Hospitals and Clinics**: Provide medical care and support during and after disasters.
- **Public Health Agencies**: Monitor and manage health risks associated with disasters.

10. Environmental Organizations

- **Conservation Groups**: Work on ecosystem-based approaches to reduce disaster risks.
- **Climate Change Advocates**: Address the links between climate change and disaster risks.

2.3. Lists of performance indicators and key performance indicators (KPI´s)

Newly derived tabular list of 29 basic performance indicators and 9 aggregated Key Performance Indicators with questions, typology and classification is presented in this subchapter and in the Annex I. (*.XLSX) of this deliverable).

A new set of 29 basic performance indicators has been developed within mutual discussions of several working groups and project packages (for example during Ljubljana workshop, April 2024).

Another valuable source for the selection and evaluation of indicators was the UNDRR[7] document.

Those cooperation processes could represent also potential problems/issues within communication and cooperation activities considered between professional and civil/public actors.

2.3.1. Detailed list of 29 basic performance indicators

The 29 basic performance indicators formulated also as questions are both:

- qualitative (gradable by scale of subjective beliefs on possible cooperation level between professional actors (PROs) and civic actors (CIVICs), from mark "0" up to maximum mark "3"); **summa: 20 qualitative indicators,**
- and quantitative (the answer must include an estimate of the specific number of jointly implemented activities in specific municipality); **summa: 9 quantitative indicators**.

In that way indicators can serve as measure of the effectiveness of cooperation between both actors.

Resilience Phase: All (cross-cutting, general resilience)

A.1 Existence and frequency of interagency or other communication (and cooperation): assess the frequency and effectiveness of communication channels established between professional and civilian/public actors to share critical information and coordinate response efforts.

- Qualitative indicator. Gradable by scale 0,1,2,3.

A.2 Level of engagement in collaboration: An assessment of the level of active participation and engagement demonstrated by stakeholders in collaborative initiatives, including their involvement in strategic planning, decision-making processes, and implementation activities. Functions of the platforms and their effectiveness.

- Qualitative indicator. Gradable by scale 0,1,2,3.

A.3 Resource efficiency: Assessment of the efficiency of resource allocation and use among the cooperating actors, including financial, human and material resources, especially in response to extreme weather events.

- Qualitative indicator. Gradable by scale 0,1,2,3.

[7] United Office for Disaster Risk Reduction (UNDRR). Disaster resilience scorecard for cities. 2017. 52 p. Available on-line: https://mcr2030.undrr.org/disaster-resilience-scorecard-cities. Another information available also here: https://mcr2030.undrr.org

A.4 Community Resilience Capacity: Identifying the resilience capacity of communities by examining indicators such as response preparedness, adaptive capacity and social cohesion that are affected by collaborative resilience building efforts.

- Qualitative indicator. Gradable by scale 0,1,2,3.

A.5 Impact on vulnerable populations: assessing the effectiveness of collective action in addressing the unique needs and vulnerabilities of marginalized or at-risk populations, ensuring inclusivity and equity in resilience-building efforts.

- Qualitative indicator. Gradable by scale 0,1,2,3.

A.6 Response Time and Effectiveness: Assessing the timeliness and effectiveness of response actions taken by cooperating entities in addressing various extreme weather hazards, including the effectiveness of evacuation procedures, emergency services deployment, and subsequent recovery efforts.

- Qualitative indicator. Gradable by scale 0,1,2,3.

A.7 How often we actively approached / asked / informed? (how many/how much organisations, stakeholders, participants approached who took part in the planned activity)

- Quantitative indicator. Number / integer.

A.8 How many/how much we reach or informed passively? (number of organizations, stakeholders, participants who learned about the initiative)

- Quantitative indicator. Number / integer.

A.9 How many partnerships were formed? (number of organisations working together)

- Quantitative indicator. Number / integer.

A.10 Whose resilience to extreme weather events has increased? (All participants /by active approach/ and local citizens /by default/).

- Qualitative indicator. Text description.

<u>Resilience Phase: Prevention</u>

B.1 Is the systematic support of the basic principles of DRR across stakeholders (both professional and civil actors) such as sharing, support and mutual presentation of civil and professional actors regarding indigenous knowledge being used?

- Qualitative indicator. Gradable by scale 0,1,2,3.

B.2 Is the systematic support of the basic principles of DRR across stakeholders (both professional and civilian actors), such as sharing, support and mutual presentation of civilian and professional actors regarding the application of best practice being used?

- Qualitative indicator. Gradable by scale 0,1,2,3.

B.3 Is the systematic support of the basic principles of DRR across stakeholders (both professional and civilian actors), such as sharing, support and mutual presentation of civil and professional actors regarding the application of the Build Back Better principle being used?

- Qualitative indicator. Gradable by scale 0,1,2,3.

B.4 Are investments in the prevention and mitigation of risks related to the impacts of extreme weather sufficiently discussed/promoted across stakeholders?

- Qualitative indicator. Gradable by scale 0,1,2,3.

B.5 How many PPP actions (Public-Private Partnership) related to the prevention and mitigation of risks related to the effects of extreme weather have been implemented?

- Quantitative indicator. Number / integer.

B.6 What is the amount of investment in the prevention and mitigation of risks related to extreme weather sufficiently discussed/promoted across stakeholders (both professional and civil actors)?

- Quantitative indicator. Number / integer.

- (Also possible to set up within another form as Qualitative indicator. Gradable by scale 0,1,2,3.)

Resilience Phase: Preparedness

C.1 Was cooperation used in the preparation or implementation of specific measures in connection with the undesirable effects (consequences) of extreme weather? Alternatively, how would you rate the cooperation?

- Qualitative indicator. Gradable by scale 0,1,2,3.

C.2 How many times has practical adoption of recommended procedures or regular implementation of exercises involving wider groups of stakeholders (professional and civil actors) been implemented (as part of preparation for emergencies related to the effects of extreme weather)?

- Quantitative indicator. Number / integer.

C.3 Have mistakes or lessons learned from mistakes during the preparation or resolution of emergencies related to the effects of extreme weather been presented to a sufficient extent across stakeholders (both professional and civil actors)?

- Qualitative indicator. Gradable by scale 0,1,2,3.

C.4 How many times was the presentation of errors or lessons learned from errors during the preparation or resolution of emergencies related to the effects of extreme weather implemented to a sufficient extent across stakeholders (both professional and civil actors)?

- Quantitative indicator. Number / integer.

C.5 How would you rate the coordination of joint activities related to emergency preparedness related to the effects of extreme weather?

- Qualitative indicator. Gradable by scale 0,1,2,3.

C.6 Are data being used on the monitoring of phenomena related to weather extremes sufficiently shared across cooperating parties (professional and civic)?

- Qualitative indicator. Gradable by scale 0,1,2,3.

C.7 Is a controlled awareness raising (or expansion of the knowledge base) being used across actors regarding phenomena and events related to emergencies linked to weather extremes?

- Qualitative indicator. Gradable by scale 0,1,2,3.

C.8 As part of the preparation for emergencies related to the effects of extreme weather, is a practical adoption of recommended procedures or regular implementation of exercises in the form of involvement of wider groups of stakeholders (professional and civil actors) being used?

- Qualitative indicator. Gradable by scale 0,1,2,3.

Resilience Phase: Response

D.1 To what extent are civil and professional actors informed in a controlled manner about the details of planning documentation for mitigation of the impact of emergencies resulting from the effects of extreme weather?

- Qualitative indicator. Gradable by scale 0,1,2,3.

D.2 How often is the "control center" used (i.e. the space used for managing procedures) by the representation of all interested parties (civilian and professional actors) for cooperating (possibly planned for use within the framework of cooperation) in the solution/exercise for emergencies related to the impact of extreme weather)?

- Quantitative indicator. Number / integer.

D.3 Is it possible, within the framework of cooperation between civil and professional actors, to use financial reserves for the needs of risk mitigation solutions (response solutions) related to the effects of extreme weather? If not, try to express their amount (semi-quant. in % of the municipal budget).

- Qualitative indicator. Text description. (Candidate for better formula of indicator).

D.4 Does the mobilization of professional and civilian capacities take place in a sufficiently redundant degree (slightly overestimated degree in the case of multi-hazard) in case of solving an emergency related to weather extremes?

- Qualitative indicator. Gradable by scale 0,1,2,3.

D.5 Is sufficient coordination of resources across levels of management/agencies/entities (both professional and civilian actors) being used to support timely decision-making, communication and response to an emergency affected by the impacts of extreme weather?

- Qualitative indicator. Gradable by scale 0,1,2,3.

2.3.2. Nine main aggregated KPI´s

Nine main aggregated Key Performance Indicators are considered as such:

I. General Resilience,
II. Impact on Resilience,
III. Disaster Risk Reduction,
IV. Investment / Financing,
V. General Cooperation,
VI. Knowledge Base,
VII. Performance Coordination,
VIII. Exercise and Training,
IX. Resources Management.

3. Testing of Appraisal System

Simplified proposed appraisal system for evaluation of cooperation level between various professional actors (PROs) and civil actors (CIVICs) on the municipality level during disaster risk reduction process, has been created online, using Google Forms. It is going to be tested by project partners, filling the form answers, and will be potentially further updated according to further identified needs.

Every expert participating on the appraisal process can get to his / her answers later, to correct them or to revise them after some time (for example in period of 1 year).

Basic idea of appraisal process using basically 4 stage classification for qualitative / semi-qualitative indicators / questions and using number of cooperation actions for several quantitative indicators).

Four stages or levels of KPI´s evaluation stands same as using UNDRR itself within scorecard:

0 – none level of activity or cooperation (frequency: approximately 0/year),

1 - low level of activity or cooperation (frequency: approximately 1/year),

2 - medium level of collaboration (approximately 1/month),

3 - high level of cooperation (approximately 1/week or higher - 1/day).

In order, to easily fill out the prepared form, the following “step by step” algorithm was developed:

Explanation of the algorithm steps:

1) Start: Begin the process by accessing the Google Form through the provided link.
2) Read Introduction: Understand the purpose of the form.
3) Go to the 1st question and try to answer it. Answer each question as it appears.
    a) Multiple Choice Questions: Click on the circle next to your preferred answer.
    b) Text Response: Click on the text box and type in your answer. Make sure your input is clear and accurate.
    c) Dropdown Menus: Click on the dropdown arrow to select an option from the list.
4) Is the question required (is question marked by an asterisk (*))? YES /NO.
5) If YES -> Answer required question. Ensure that all required questions (marked with *) are answered before moving on. If you attempt to proceed without answering a required question, the form will highlight the question and prompt you to complete it.
6) If NO -> Questions not marked with *) are voluntary, but they are the core of the Appraisal Form. Take your time. Please answer as much questions as you can.
7) If you do not know the answer on the voluntary question or you are not sure, just leave the answer blank. You can return to the form later through the link in your e-mail and fill it / correct it later, after you will find and verify data.
8) Move to next question and try to answer it, till the end of the form.
9) Review Answers. Before submitting, review your responses. If you need to make changes, go back to the relevant section and update your answers. If you think that most of them are wrong, you can click the "Erase" button and start over.

10) Submit the form by click the "Send" button. A copy of your answers will be sent to the address provided, with a link to the possibility of later correction. Look for a confirmation message and results in your e-mail.

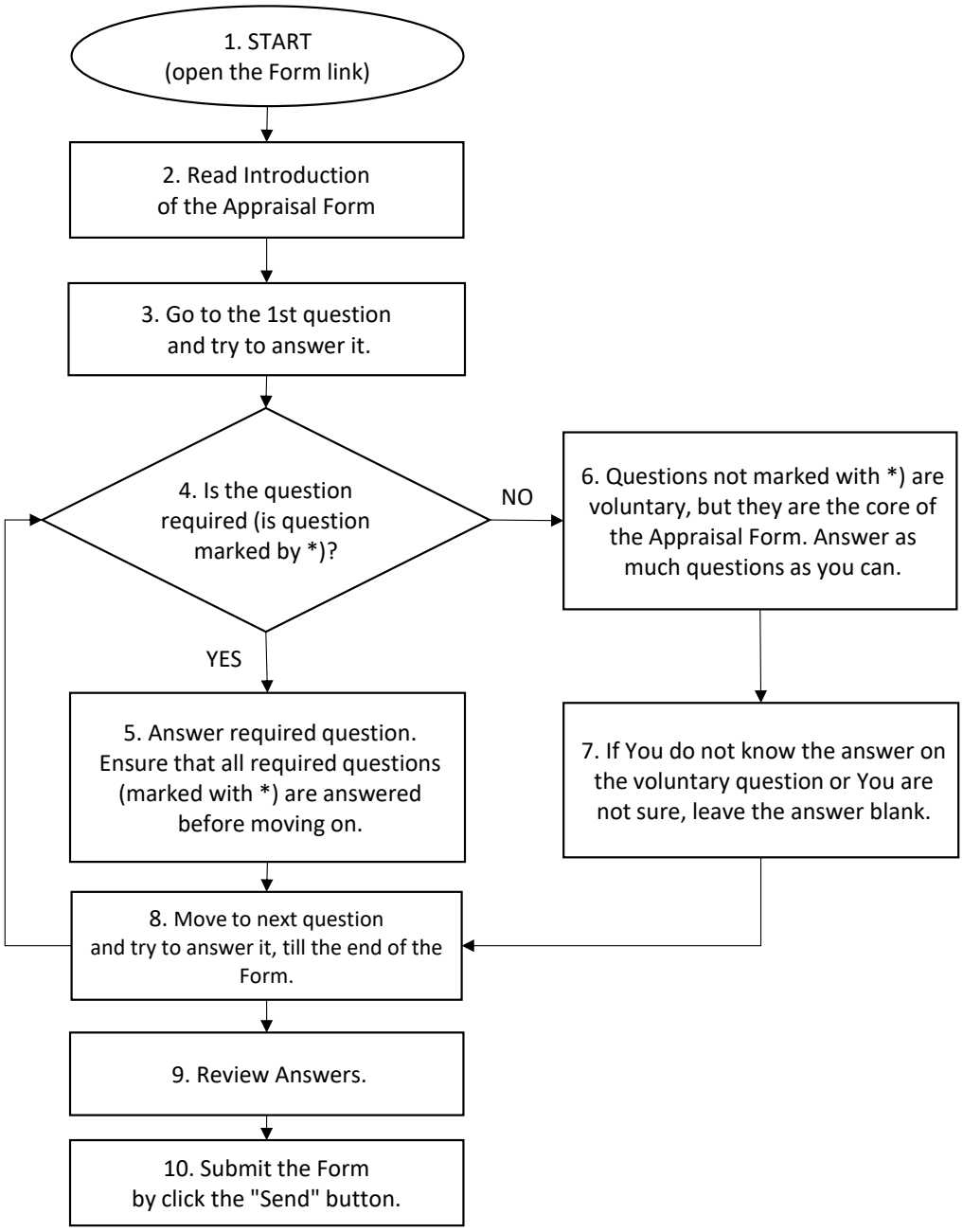
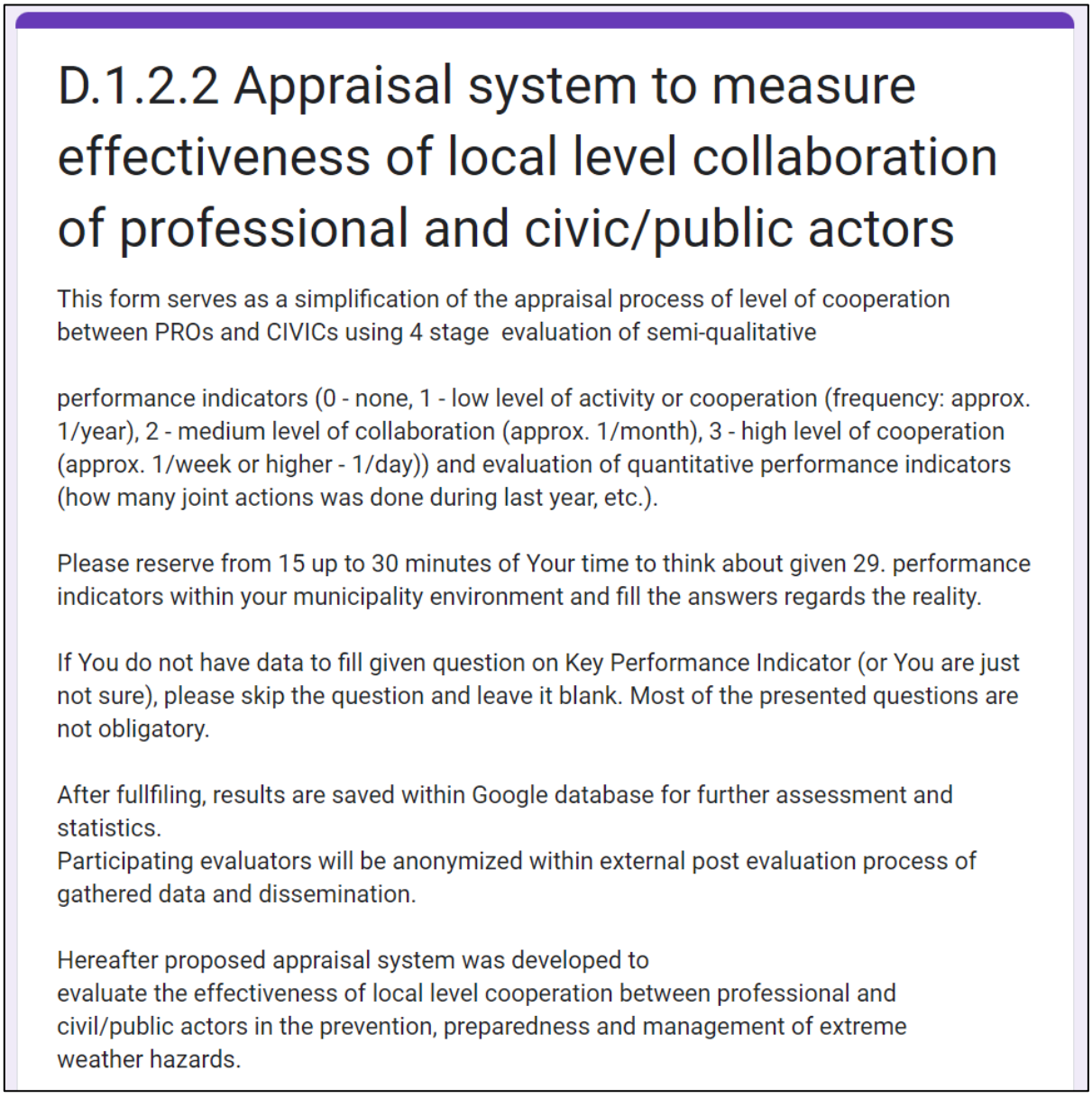


Figure 2 „Step by step" algorithm for Appraisal Google Form

Evaluation form for testing and application of the appraisal process is available through the link: https://docs.google.com/forms/d/e/1FAIpQLSdA4CBlDGSjrN2XJ-ntzl-5YN62X5Y59dyx7LJ0HWSSlC6zlA/viewform?usp=sf_link

or its shortened URL: https://forms.gle/khmSXoDiKsWJxJJ69

Reminder: If you, as participating project partner, external expert or any other process stakeholder, do not have data to fill given question on Key Performance Indicator (or you are just not sure), please skip the question and leave it blank. You will get the opportunity to correct your answer or fill them again, through the link in your e-mail later.



D.1.2.2 Appraisal system to measure effectiveness of local level collaboration of professional and civic/public actors

This form serves as a simplification of the appraisal process of level of cooperation between PROs and CIVICs using 4 stage evaluation of semi-qualitative

performance indicators (0 - none, 1 - low level of activity or cooperation (frequency: approx. 1/year), 2 - medium level of collaboration (approx. 1/month), 3 - high level of cooperation (approx. 1/week or higher - 1/day)) and evaluation of quantitative performance indicators (how many joint actions was done during last year, etc.).

Please reserve from 15 up to 30 minutes of Your time to think about given 29. performance indicators within your municipality environment and fill the answers regards the reality.

If You do not have data to fill given question on Key Performance Indicator (or You are just not sure), please skip the question and leave it blank. Most of the presented questions are not obligatory.

After fullfiling, results are saved within Google database for further assessment and statistics.
Participating evaluators will be anonymized within external post evaluation process of gathered data and dissemination.

Hereafter proposed appraisal system was developed to
evaluate the effectiveness of local level cooperation between professional and civil/public actors in the prevention, preparedness and management of extreme weather hazards.

Figure 3 View of prepped Google Form for Appraisal system testing (1) - start

A.5 Impact on Vulnerable Populations: This evaluates how well collective action meets the specific needs of marginalized or at-risk groups. It focuses on ensuring inclusivity and fairness in efforts to build resilience.

	0	1	2	3	
Without visible impact of collective actions on vulnerable groups of population.	○	○	○	○	With high impact.

A.6 Response Time and Effectiveness: Evaluating how quickly and effectively different groups respond to extreme weather events. This includes how well evacuation plans work, how emergency services are deployed, and how recovery efforts are carried out.

	0	1	2	3	
None. There are none or poor response actions.	○	○	○	○	Very fast and adequate response actions observed / experienced.

A.7 Number of Approaches/Contacts: Estimate how many organizations, stakeholders, or participants were actively approached, informed, or involved in the planned activity. This is a quantitative measure, so provide an exact number.

Your answer

Figure 4 View of prepped Google Form for Appraisal system testing (2) - examples of questions

4. Evaluation of Appraisal System results

You can see the rating statistics in different cities on an ongoing basis within given Google Form yourself, right after filling the form.

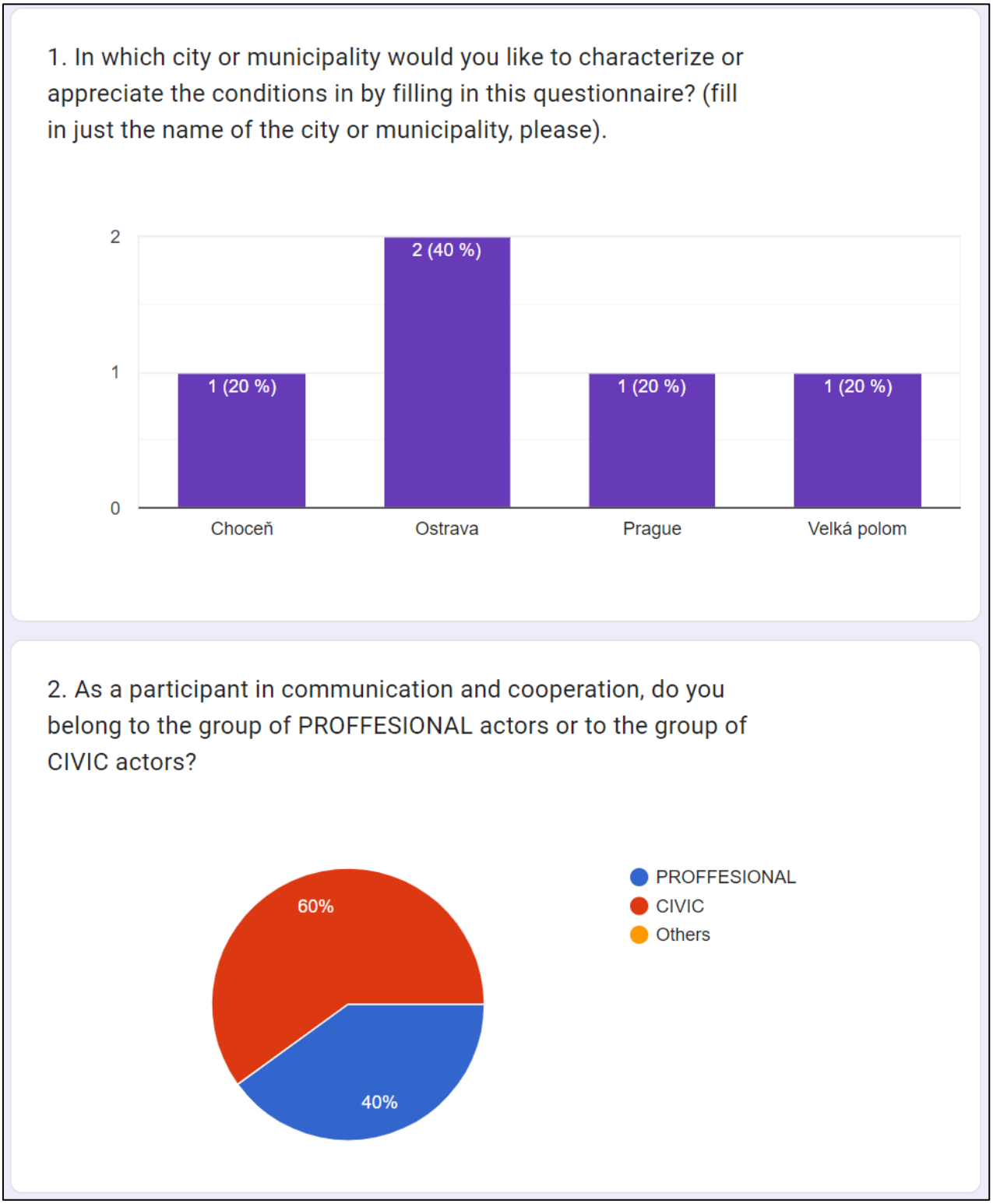


Figure 5 View of prepped Google Form for Appraisal system testing (3) – examples of preliminary results

Other data from the evaluation of the main Key Performance Indicators will be processed and disseminated by project partner - Ostrava University (OSU, Czech Republic) in the cooperation with an external company or subsequently, at the end of the project or during its sustainability phase.

After filling the form is done by an expert, results are saved within Google database for further assessment and statistics. Participating evaluators will be anonymized within external post evaluation process of gathered data and dissemination. Outsourced services can do further statistics and deliver other aspects of evaluation, based on expert´s answers.

4.1. Recomendation for evaluation of appraisal form results

This evaluation of results, obtained in table form (Annex I. Example of appraisal results, *.XLSX, *.*) for example from upper proposed questionnaire made in Google Forms environment, could be done either by project partner, or by outsourced company later.

Recommendation is not for common stakeholder which just answered the questionnaire, because he or she probably don't need it and won´t do it.

Completion of all sub-indicators (in Arabic numerals) is the basis for the output of the cooperation appraisal (evaluation) process.

The output of the evaluation is the level of fulfilment of the main indicators (KPI), which are 9 in number and are marked with Roman numerals:

- I. General Resilience;
- II. Resilience Impact;
- III. Disaster Risk Reduction;
- IV. Investment/Financing;
- V. General Cooperation;
- VI. Knowledge Base;
- VII. Performance Coordination;
- VIII. Exercise and Training;
- IX. Resources Management.

Note:

The numbering of sub-indicators is not linked to the numbering of main indicators, so called Key Performance Indicators (KPI´s). The reason is the fact that the sub-indicators in the questionnaire form are sorted logically for the user of the form. Whereas the resulting KPIs are sorted logically for the analyst and for the purpose of easier representation of the results. The connection between the sub- and key performance indicators is only taken into account during the calculation in the background, and the common user of the form does not have the opportunity to intervene in the calculation. For that reason, for example, indicator A.1 is not related to the KPI marked I. General Resilience.

Calculation of KPI: I. General Resilience

Sub-indicators A.4, A.5 and A.6 are related to the KPI marked I. General Resilience. In all cases, these are semi-quantitative partial indicators. The output will also be a semi-quantitative KPI as an average value.

Calculation of KPI: II. Resilience Impact

With KPI marked II. Resilience Impact is related to sub-indicators A.7, A.8, A.9 and A.10. In three cases, these are quantitative sub-indicators and in one case a qualitative sub-indicator. The output will therefore be a KPI consisting of two parts: a quantitative KPI as an enumeration of partial indicators of A.7 to A.9 and a description of the text results of indicator A.10.

Calculation of KPI: III. Disaster Risk Reduction

With KPI marked III. Disaster Risk Reduction is related to sub-indicators B.1, B.2, B.3 and B.5. In three cases, these are semi-quantitative sub-indicators and in one case, a quantitative sub-indicator. The output will therefore be a KPI consisting of two parts: a semi-quantitative KPI as an average value of B.1 to B.3 and further records of the result value of indicator B.5.

Calculation of KPI: IV. Investment/Financing

With the KPI marked IV. Sub-indicators B.4, B.6 and D.3 are related to Investment/Financing. In two cases, these are qualitative partial indicators and in one case a semi-quantitative partial indicator. The output will therefore be a KPI composed of two parts: a qualitative KPI as an enumeration of partial indicators of B.6 and D.3, and a semi-quantitative output value of indicator B.4. The desired record of indicator D.3 is a number.

Calculation of KPI: V. General Cooperation

Sub-indicators A.1, A.2 and C.1 are related to the KPI marked V. General Cooperation. In all three cases, these are semi-quantitative partial indicators. The output will therefore be a semi-quantitative KPI as an average value of all sub-indicators.

Calculation of KPI: VI. Knowledge Base

With the KPI labelled VI. Knowledge Base related sub-indicators C.3, C.6 and C.7. In all three cases, these are semi-quantitative partial indicators. The output will therefore be a semi-quantitative KPI as an average value of all sub-indicators.

Calculation of KPI: VII. Performance Coordination

With KPI marked VII. Performance Coordination is related to sub-indicators C.5, D.1 and D.2. In two cases, these are semi-quantitative partial indicators. The output will therefore be a KPI composed of two parts: a semi-quantitative KPI as an average value of sub-indicators C.5 and D.1 as the first part. Furthermore, in

one case it is a quantitative indicator as a result value of sub-indicator D2. The desired entry in the indicator is a number.

Calculation of KPI: VIII. Exercise and Training

With KPI marked VIII. Exercise and Training are related to sub-indicators C.2, C.4 and C.8. In two cases, these are quantitative partial indicators. The output will therefore be a KPI composed of two parts: a quantitative KPI as an average value of sub-indicators C.2 and C.4 as the first part. Furthermore, in one case it is a semi-quantitative indicator. The output will then be the second part of the KPI as a semi-qualitative indicator of recording the value of sub-indicator C.8.

Calculation of KPIs: IX. Resources Management

With KPI marked IX. Resources Management is related to sub-indicators A.3, D.4 and D.5. In all three cases, these are semi-quantitative partial indicators. The output will therefore be a semi-quantitative KPI as an average value of all sub-indicators.

Note for all KPI:

Value of all semi-quantitative KPIs is displayed by the colour based on colour range. When the KPI final value is low (0) the colour is red and when the final value is high (3) the colour is green (through the orange colour for median).

Overall cooperation coefficient (CC)

Value of final coefficient is calculated as the sum of the values of all sub-indicators expressed as a scale: A.1, A.2, A.3, A.4, A.5, A.6, B.1, B.2, B.3, B.4, C.1, C.3, C.5, C.6, C.7, C.8, D.1, D.4, D.5 (19 sub-indicators in total). Potentially maximal value for CC is counted as a maximal value of each indicator (3) multiplied by the quantity of the semi-quantitative indicators (19).

Final value of cooperation coefficient (CC) is tinted by colour corresponding to the scale:

- for values between 0 and 19 (including) is filled by the red colour.
- For values between 19 and 38 (including) is filled by the yellow colour.
- For values 38 and 57 (including) is filled by the green colour.

One final value (filled one line) of cooperation coefficient had to be seen as an expression of subjective opinion of 1 actor / expert, which filled the questionnaire in Google Form.

Note:

Blank values are not considered in the calculations.

Note:

During the testing and application of proposed questionnaire, in different cities or municipalities, there could arise new needs for different statistical calculation, to gather new kind of information. Partners could use just proposed sets of indicators, and do not use upper prepped Google Form.

5. Conclusion

Hereafter proposed appraisal system was developed to evaluate the effectiveness of local level cooperation between professional and civil/public actors in the prevention, preparedness and management of extreme weather hazards.

In addition, the methodology includes the establishment of specific criteria for evaluating the effectiveness of cooperation. These criteria include various aspects such as the effectiveness of communication, the efficiency of coordination, the dynamics of resource sharing and the level of stakeholder involvement (the list is not exhaustive). They provide the basis for the selection of relevant Key Performance Indicators (KPI´s).