Valuation of ecosystem services – introduction to non-economists

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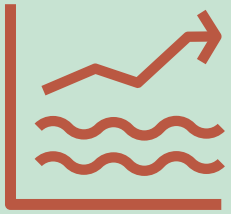
GDP



Ecosystem and Biodiversity

Natural Resources

CAPITALISM

Economics

Future Generation

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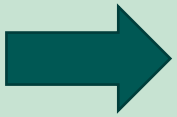
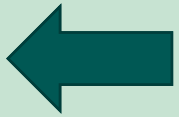
Valuation of ecosystem services

Ecology
Environmental sciences





Economics

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Measuring marine recreational service value and their linkage to ecosystem condition with a PGIS survey

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PTT: Kimmo Mäkilä, Juuso Heinämäki, Minna Virkkunen, Matti Valonen, Maurizio Sajeva, Kirsi Noro, Laura Aalto, Olli Korhonen

MAREA

Interreg Central Baltic

EUROPEAN UNION European Regional Development Fund

PTT Pellervo Economic Research

Tartu Ülikool 1632 Universitas Tartuensis

BEF Latvia

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PGIS marine recreational survey

How environmental condition influence recreational services (in both physical and monetary terms) (Lankia et al., 2019, Bertram et al., 2020)

Traditional **travel cost methods:**

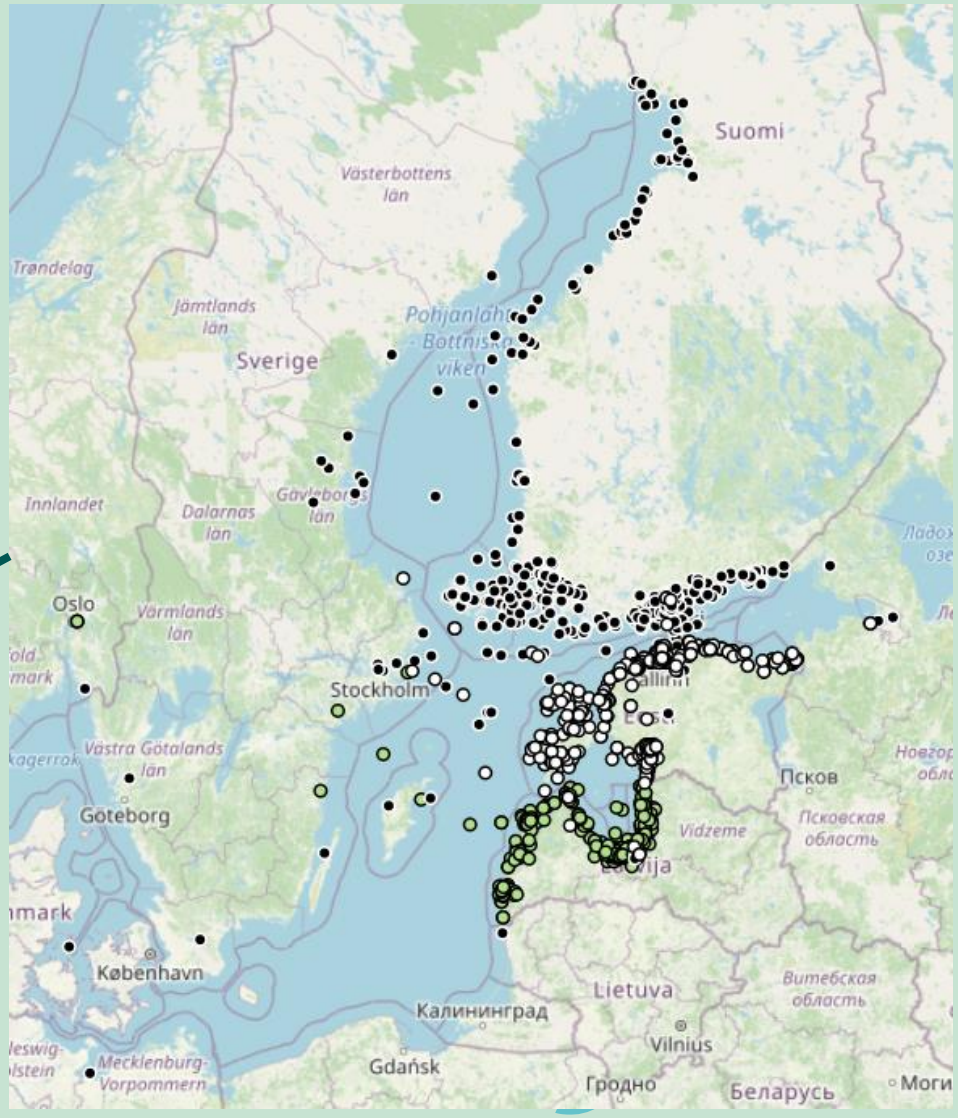
- Number of visits to the site(s) (in the past 1 or 3 years)
- Travel cost/time to the site (s)
- Social-demographic questions

- Perceived environmental condition of the site (amount of algae, water transparency, litter amount at the coast, common reed patterns, biodiversity, landscape)

Difference cultural services (recreational activities + other cultural ES (e.g., Enjoying scenery, smell, sounds, reminiscing about life events and people, learning about the marine environment))

Link/compared to modelling or monitoring environmental condition

Marked the most visited leisure site at the Baltic Sea or its coast (in the past 1 or 3 years)



Survey summary (Finland)

Average number of visits per person per year (SD)+/	11.7 (40.4)
Average stated travel cost (TC) per visit (SD) in EUR*+	38.1 (89.5)
% of respondents that visits the coast or marine of Baltic Sea in the past 3 years	67.3%
Estimated total visits for the adult population (18-85) of the country per year+	34.35 million
Estimated TC for the adult population of the countries*+	1308 million

*Not the estimated TC we used in the travel cost model, which included opportunity cost of travelling time and estimated based on distances and different travel modes

+ Overestimated from a national accounting scope as the visiting and the cost to the places outside the national sea have not excluded

/underestimated as only the visits to the most visited sites are included

The preliminary test of the travel cost model showed that some of the environmental conditions e.g., water quality, reed patterns, are significant to number of visits

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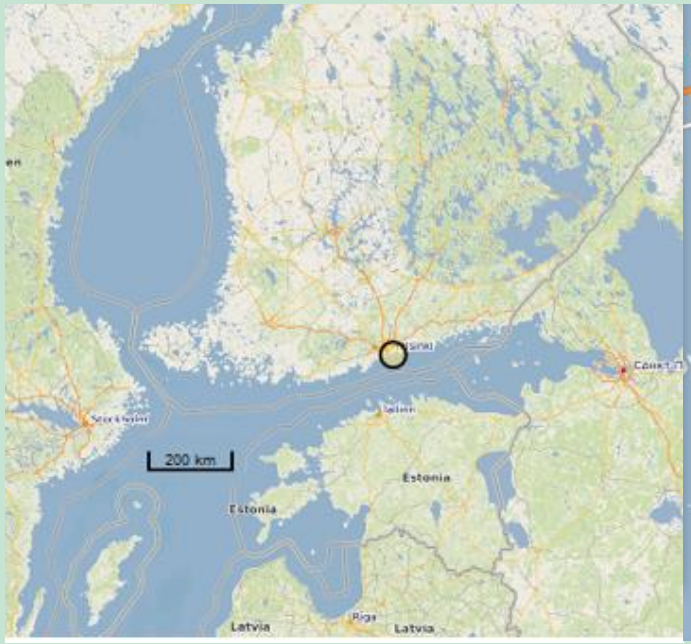
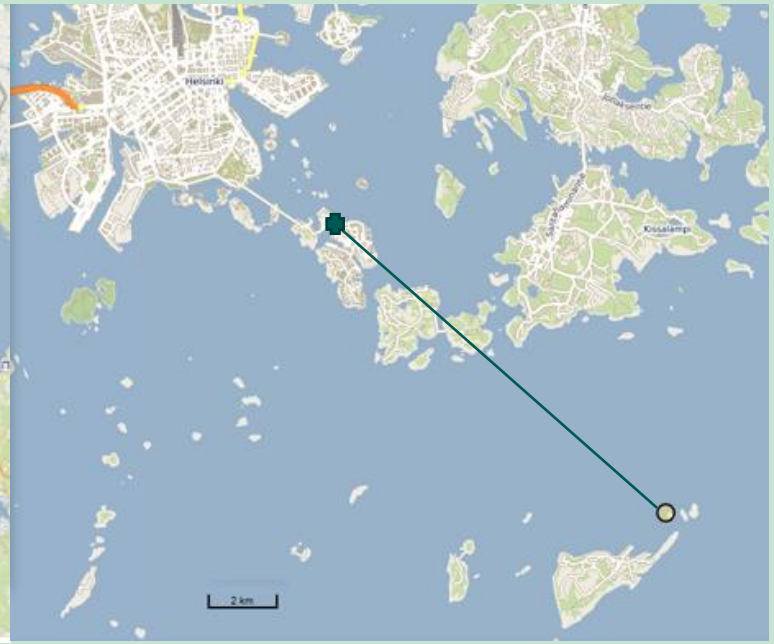
Challenges: Perceived environmental condition → modelling or monitoring environmental condition

- Accuracy of mark positions that can reflect the actual locations of visited sites is influenced by how close the map was zoomed in the and the understanding of the questions





Lesson learn:

(1) Using the platform that easy to operate and provide the information of zoomed-in degree

(2) Link to modelling or monitoring environmental data in a larger/regional scale

By Liisa Saikkonen

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Valuation of blue carbon

- Experiences from projects **MEREIAVAIN** and **MAREA**
- Tin-Yu Lai, Liisa Saikkonen, Leena Laamanen, Fiia Haavisto, Tytti Turkia, Louise Forsblom, Jonne Kotta, Francisco Rafael Barboza

Price of carbon → Blue carbon value (partial)

Habitat extent map, based on probability of occurrence of *Fucus spp.* and common eelgrass

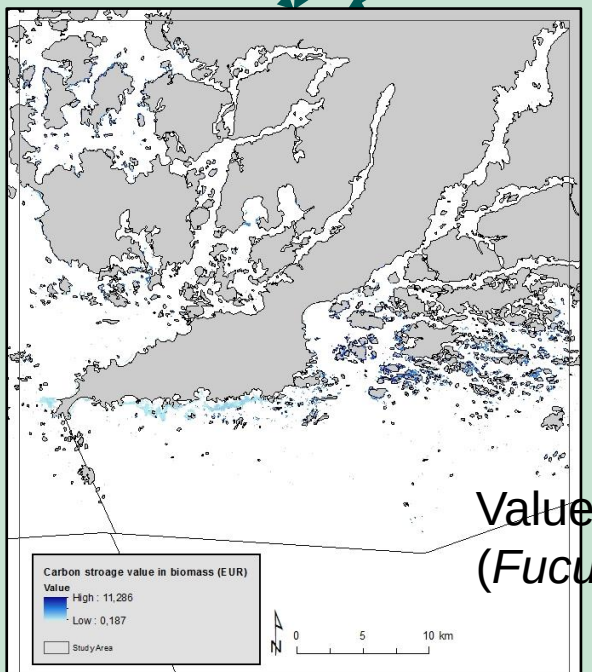
carbon storage in living biomass (literature)

CO_2 price from European Union emission trading system (EU-ETS) → **Carbon price (e.g., 69.3-110.3 EUR/t C in 2019)**

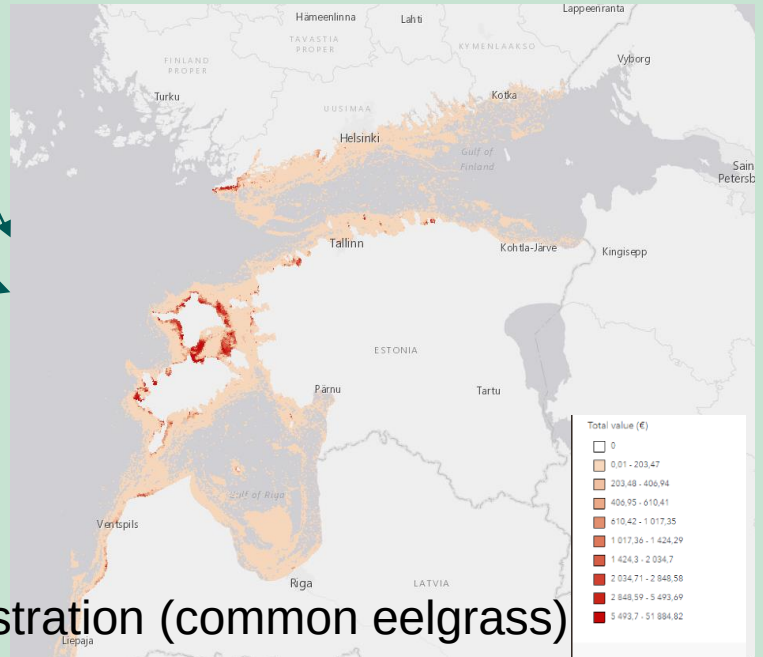
species distribution models

Unit is not match

Carbon sequestration rate from geoportal from UTARTU



Value carbon storage in living biomass (*Fucus spp.* and common eelgrass)



Value carbon sequestration (common eelgrass)

Different valuation methods/results for a same ecosystem service

Carbon price

- Market price (from CO_2 emission trading system)
- Avoided damage cost method (avoid social cost of carbon)
- Contingent valuation methods (e.g., ask how much people willingness to pay for the value of carbon)
- Replacement cost method (cost from carbon abatement technology)
- Hedonic pricing method (price change in accommodation, due to built dike nearby)

Value for recreation (from same travel cost model)

- Travel expenditure
- Consumer surplus (the differences between traveler willingness to pay and actual payment)
- Simulated exchange value

Ecosystem accounting, which link to the accounting system used to estimate economic performance (e.g., GDP)

Other climate change studies

Cost-benefit analysis, total economic value

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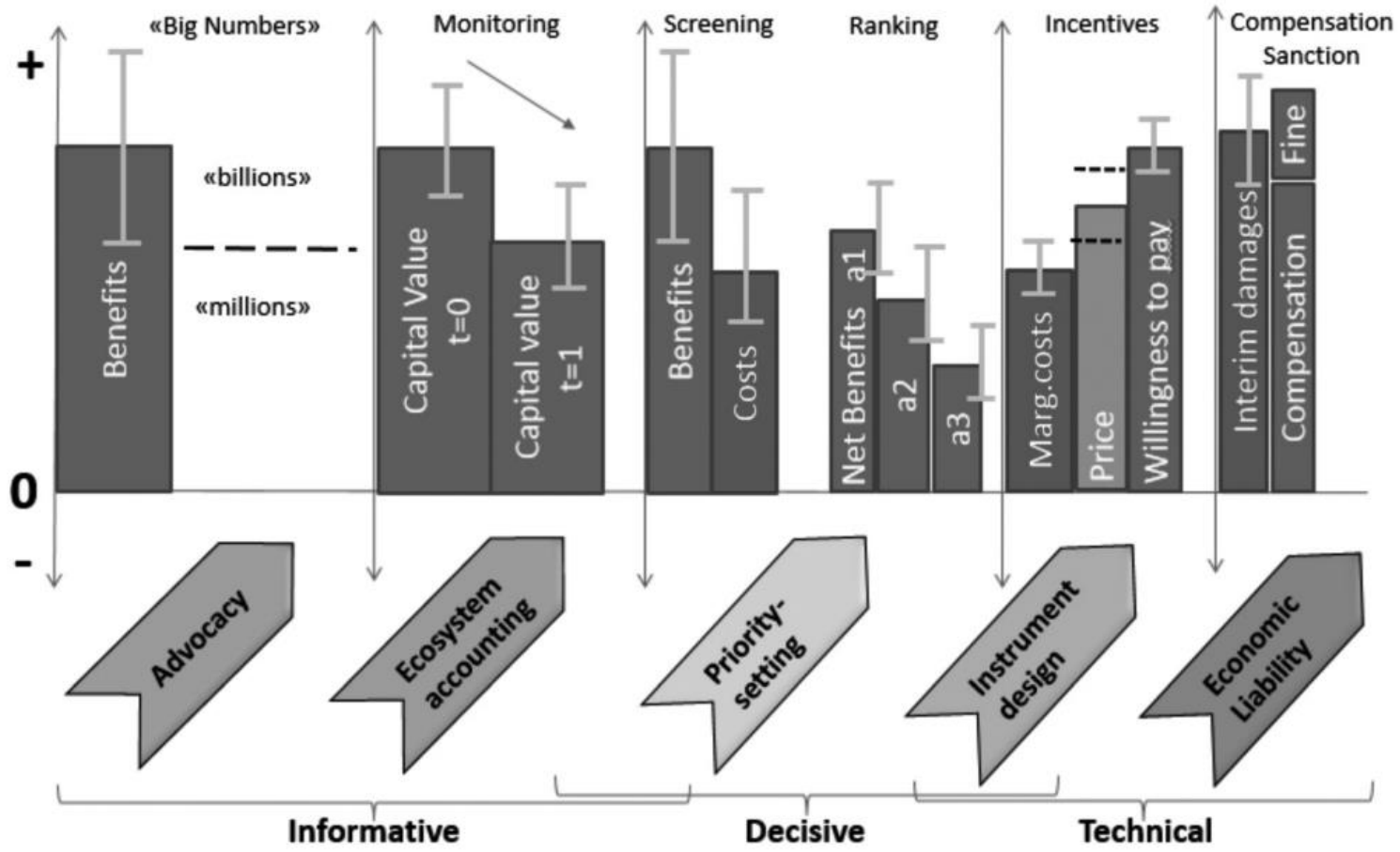
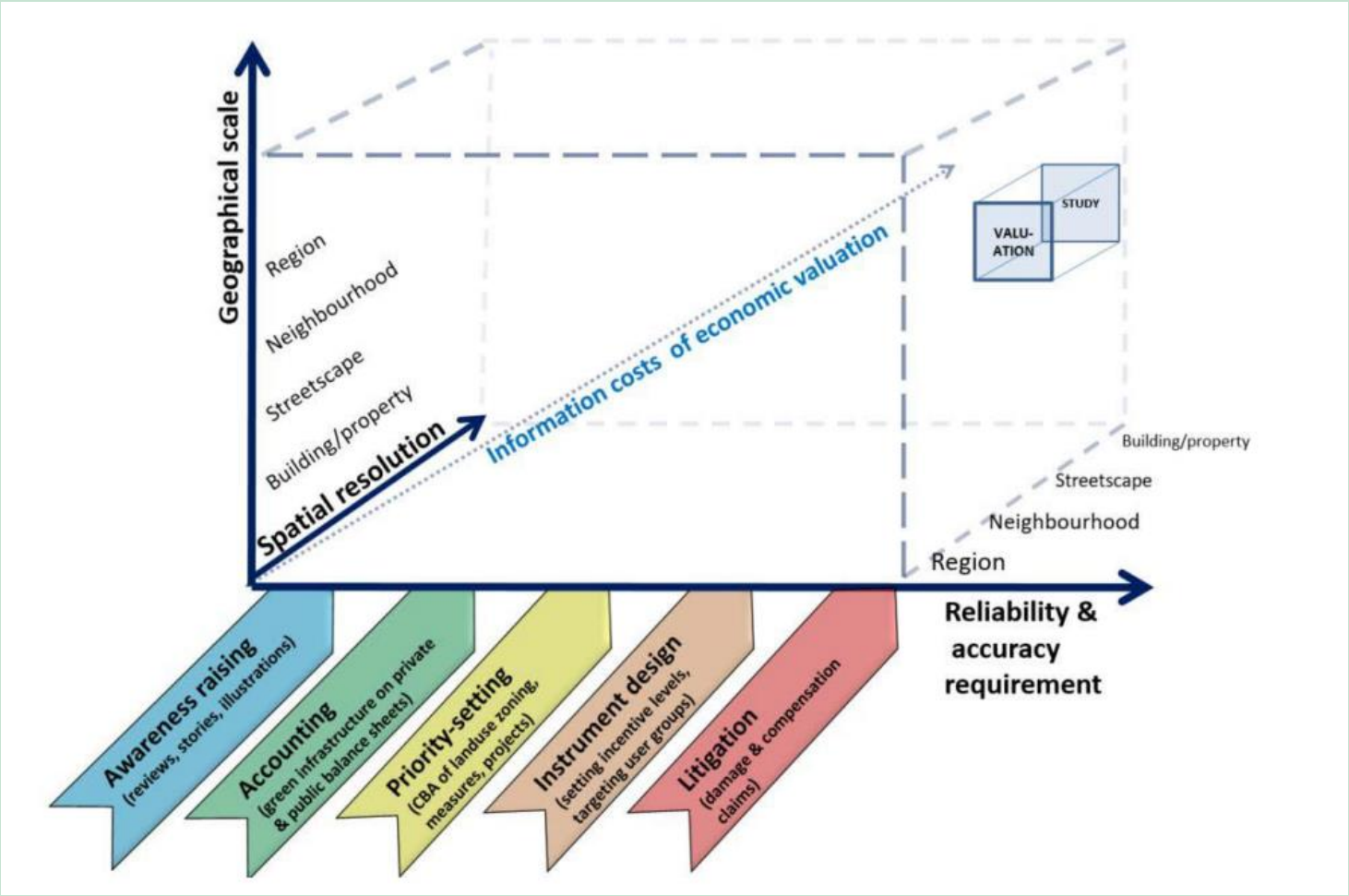
Decision contexts for economic valuation of ecosystem services

Figure 8. Increasing demands for accuracy of monetary valuation in different decision-support contexts.



Source: Barton 2015



Source: Barton et al. (2018).

The challenges from economics in ecosystem service valuation is not lack of approaches but lack of data

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Take home message

1. Approaches to value natural resource/environment/ecosystem services have been developed in Economics for a long time.
   - Need to adjusting the approaches to make the valuation appropriately link to the ecological monitored or modelled data that reflect the environmental degradation in the real word
   - Need to devote time and money to collect economic data

2. (From our experiences), mis match between ecological data and economic approaches/data in unit and scope is an issues
   - Communication between ecologist and economist at an early stages is necessary
   - Work together to explore the approaches to transform the data into compatible unit

3. Which valuation approaches to use and how accuracy of the valuation results is needed depends on the purpose

“we – and our economies – are ‘embedded’ within Nature, not external to it”

-Partha Dasgupta,

The Economics of Biodiversity: The Dasgupta Review- Headline Messages

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Thank you for your attention

If you have any quesitons, feel free to contact: tin-yu.lai@syke.fi

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Figure source

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- https://www.flaticon.com/free-icon/distribution_7479854