

NANORIGO

DELIVERABLE No.	D1.1
DELIVERABLE TITLE	Instructions on data reuse (retrieval)
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D1.1 Instructions on data reuse (retrieval)

The main purpose of D1.1 is to provide instructions and guidelines on data reuse (retrieval). Data reuse has been defined by the National Institutes of Health (NIH) as: “...a concept that involves using research data for a research activity or purpose other than that for which it was originally intended” (<https://nnlm.gov/data/thesaurus/data-reuse>). Data may be retrieved for the purposes of data reuse from data repositories and discovery portals, grey literature (e.g., literature that cites data from another study and project websites), research publications, and from colleagues and peers. In order to facilitate data reuse, data may be deposited into databases or data catalogs for simplified retrieval and/or standardized or defined for greater comprehensibility. However, quality must be maintained, and can be done so by taking into account the trustworthiness of the source, the appropriateness of the sample characteristics, time of collection, and response rate (if relevant), the acceptability of the data collection methods used, consistency of the data collection, appropriateness of any data coding or modifications made, sufficiency of the original study documentation, and whether enough information exists to cite the original source (<https://www.andis.org.au/working-with-data/publishing-and-reusing-data/data-reuse>). In this deliverable, existing data, models, and knowledge were gathered and presented in a form relevant for decision-making as part of the nano risk governance process. The focus was directed on past EU-funded efforts and projects, in particular, within the NSC and other international organisations, and the 2 projects funded by the NMBP-14-2018 Call.

The contribution of WP1 task 1.1 is in

- a) using a hierarchical organisation of relevant data (based on the DIKW model) to accelerate its usefulness for decision making or problem solving (Figure 1).
- b) using toxicological databases as a reference for how human or environmental safety databases are structured to support decision making (last part of the report).

Relevant data, information and knowledge will be organized according to the data pyramid principle (DIKW) which is made up of data (the D), information (I), and knowledge (K), up to wisdom (W). The DIKW model expresses a logical consequence of steps and stages subsequently taken for information management to arrive at a contextualized ‘progression’ of data as it gets more meaning (data mining). Knowledge can refer to the understanding of a subject while wisdom has understanding and is actionable (Fig.1).

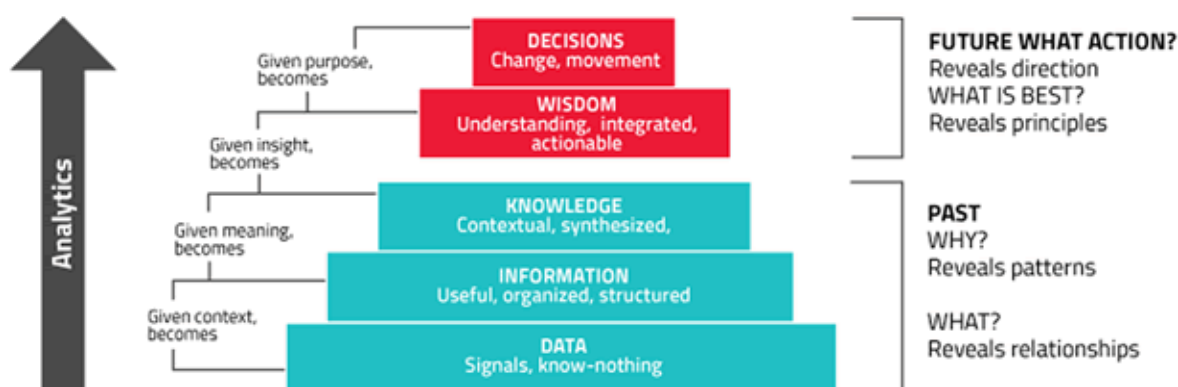


Fig. 1. Hierarchical organisation of data, information, knowledge and wisdom in a data pyramid (DIKWpyramid) taken from [Russel L. Ackoff](#), entitled 'From data to wisdom' (1999).

The aim of hierarchical organisation of data is its usefulness when making a decision or solving a problem (Table 1). In this process, it is important to make use of all forms of data (data, information, knowledge, and wisdom), and not to rely on just one or two forms (Intezari, Ali; Pauleen, David, J.; Taskin, Nazim. (2016). The DIKW Hierarchy and Management Decision-Making. 49th Hawaii International Conference on System Sciences (HICSS) DOI: 10.1109/HICSS.2016.520). Furthermore, the decision-maker should progress from the bottom of the DIKW hierarchy (starting with data) to the top (wisdom) and avoid "informational overload" in which too many forms of data are ultimately used to make the decision or solve the problem at hand (which can occur when data substitutes information, or information substitutes knowledge, etc.) (Nurulin, Yury; Skvortskova, Inga; Tukkel, Iosif; Torkkeli, Marko. (2019). Role of Knowledge in Management of Innovation. Resources 8(2), 87 <https://doi.org/10.3390/resources8020087>). Ultimately, we are gathering, capturing, understanding, leveraging, storing and analysing data, information and knowledge in order to make decisions regarding actions in business and customer outcomes and to create value in an informed way. The data useful for decision making or problem solving are 'actionable data' and 'actionable information'. We need 'actionable data' and 'actionable information' for getting knowledge to support nano-risk governance.

With this first deliverable, we provide strategies and information on data reuse (retrieval) that support the upcoming tasks in WP1 by starting to evaluate (i.e., ensure high quality) and organize data (i.e., hierarchical data organization with the DIKW framework and cataloging of nanomaterial and nanotechnology databases and toxicological databases). The foundation of

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high-quality, structured data developed in WP1 supports the feasible development of risk governance tools (WP2) and a risk governance framework (WP3), as well as the establishment of a European nanorisk governance council or council-like entity (WP4). In turn, the demonstration of sustainable solutions with case studies in WP5 will help to integrate and strengthen the contributions of WP2, WP3, and WP4, while also validating and further supporting the underlying data foundation developed in WP1.

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This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement n°814530 This document reflects only the author's view and the Commission is not responsible for any use that may be made of the information it