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Location Data Interoperability Skills for SMEs

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Abstract. In the dynamic digital transformation landscape, data interoperability emerges as a fundamental driver of operational efficiency, innovation, and collaborative efforts. This work focuses on location data interoperability challenges that companies must address to remain competitive in the international market. Data interoperability facilitates efficient information exchange, collaboration, and sharing across platforms and organizational boundaries, promoting communication and utilization. Specifically, the study references the European Interoperability Framework (EIF) [1], encompassing the four (legal, organizational, semantic, and technical) interoperability layers, and analyses distinct challenges and solutions associated with each of them. [17]. While data interoperability is pertinent across various sectors, it holds particular significance within the digital transformation framework and notably in all location-related business operations. By location data, we refer to "any piece of information that has a direct or indirect reference to a specific location or geographical area". This term can be interchanged with spatial, geospatial, place, or geographic information"
The proposed work details research within the European DIS4SME1 (Data Interoperability Skills for SMEs) project, launched in January 2023 under the Digital Europe Programme, aimed at enhancing SMEs' digital skills through tailored training in location data interoperability. Implemented by a consortium from five European countries, DIS4SME aims at upskilling and reskilling SME owners, managers, and employees through a structured curriculum featuring diverse training materials and delivery methods including online courses, workshops, and seminars.
DIS4SME curriculum includes diverse training materials with introductory and specialized content focused on specific Business Case Studies. The training material is organised in a three-level hierarchy. The basic units are brief lectures, which can be combined into courses. At the highest level are training actions, comprising comprehensive modules that integrate courses about interconnected domains. Tailored training material caters to SME managers, enhancing decision-making and addressing business challenges, while technicians gain proficiency in GIS software and relevant technical tools.

[1] https://www.dis4sme.eu/

Employing a bottom-up approach, the curriculum design is cantered on Business Case Studies (BCSs) addressing real-world challenges, ensuring relevance to SME needs. Identified BCSs include Mobile Food Marketplace, Digital Agriculture, Social Monitoring of road conditions, and Digital Twins for Spatial and Urban Planning.
A significant achievement of DIS4SME has been the identification of a set of Learning Outcomes (LOs) for each user profile (manager and technician): LOs are categorized into Horizontal Learning Outcomes (HLOs), covering general topics applicable across industries, and BCS-related Learning Outcomes (BCS-LOs), addressing specific demands from real business case studies. All these LOs have been developed using Bloom's Taxonomy, facilitating their categorization into cognitive levels indicative of the depth of understanding or skills to be achieved.

The HLOs refer to the following issues:

- Essential concepts for individuals involved in interoperability, including understanding EIF principles, data spaces, and location frameworks.
- EU data policies (e.g., INSPIRE, EU Data Strategy and EU Common Data Spaces, High Value Datasets Regulation), semantic interoperability (e.g., as standards for data models, vocabularies, and metadata encoding like GeoDCAT), and technical interoperability (e.g., OGC API, geoweb services, communication protocols).
- Cross-cutting HLOs are related to transversal topics like Open Data and the FAIR principles.

The BCS-LOs target specific business case studies needs. For example, in Digital Agriculture, they address EU cultivation guidelines and policies, the employment of emerging technologies (e.g. Remote Sensing, IoT, and Artificial Intelligence) and the related data management challenges.
The courses have been designed by clustering the LOs. Currently, the curriculum offers 10 courses, starting with foundational training and progressing to specialized tracks aligned with BCSs. Fundamental to this structure are two introductory courses (defined by the HLOs) that are mandatory for all participants and provide essential baseline knowledge in data interoperability. These foundational courses pave the way for subsequent specialized training aligned with specific BCSs. Each BCS is supported by two courses, tailored to the distinct roles of managers and technicians.
The DIS4SME courses are aligned with key European learning frameworks: ESCO, ECVET, EQAVET, DigComp, and the European approach to micro-credentials. This alignment ensures high standards, facilitating harmonization, mobility, and lifelong learning within the EU.
The implementation phase is ongoing, with courses scheduled to be provided and testing initiated by year-end, involving active participation from SMEs.

References

1. European Commission. Directorate General for Informatics.: New European interoperability framework: promoting seamless services and data flows for European public administrations. Publications Office, LU (2017), https://data.europa.eu/doi/10.2799/78681