

L-BEST: Adding Legal and Ethical Services to Manage Digital Innovation Hubs Portfolios in the Artificial Intelligence Domain

Silvia Razzetti¹, Sergio Gusmeroli¹, Sergio Terzi¹ and Claudio Sassanelli^{1,2}

¹ Department of Management, Economics and Industrial Engineering, Politecnico di Milano, Piazza Leonardo da Vinci, 32, 20133 Milan, Italy

² Department of Mechanics, Mathematics and Management, Politecnico di Bari, Via Orabona 4, 70125, Bari, Italy

Abstract

The increasing adoption of AI solutions as a key enabler to guarantee the competitiveness of companies and to improve processes has brought the European Commission and Policy Makers to introduce new regulations to guarantee trustworthiness and reliability of Artificial Intelligence solutions. The adoption of new regulations adds a level of complexity to AI providers and users, that very often are not aware of them and/or need additional support, to guarantee the compliancy and respect of laws and ethical principles. To address these requirements, a critical role is played by Digital Innovation Hubs (DIHs), that have been already identified as key players for enterprises' digital transformation and that are expected to help customers also from the legal and ethical perspective. To his regard, the DIH4AI project has switched the taxonomy of the Data-driven Business-Ecosystem-Skills-Technology (D-BEST) reference model, useful for DIHs service portfolio configuration, into the L-BEST, including also the "Legal and Ethical" class. The objective is to provide to DIHs a framework of services to be implemented in short-term and to be offered to SMEs to support the adoption of AI, respecting legal and ethical values.

Keywords

Digital innovation hub, legal and ethical services, artificial intelligence

1. Introduction

During last years, Artificial Intelligence (AI) has been identified as one of the key enablers to achieve a successful Twin Transition [1, 2] in Europe, that is, Green and Digital [3, 4]. A number of companies are adopting AI in their productive processes, developing new solutions (technology providers) or adopting AI tools and techniques to increase their performance and improve the production (end users enterprises). In this digital transition, Digital Innovation Hubs (DIHs) specialised in AI are playing a fundamental role, supporting both end-users and providers, offering technological, educational, financial services, with a specific focus on AI development.

However, despite the indisputable advantages deriving from its adoption (as support in decision making, monitoring and control processes, in collaborative tasks, etc), AI may hide some legal and ethical risks [5–8]. For instance, it is well known that AI models make a large use of data, including sensitive and personal information, so it is fundamental to ensure transparency and privacy in respect to the European GDPR [9]. Furthermore, AI models may leverage on data affected by biases, driving to decisions not ethically correct with the risk of discriminating people. Finally, in case AI machines act in the same environment of human beings and perform actions that could impact their security (for instance, designing Autonomous Guided Vehicles or implementing Industry 5.0 paradigm), further

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EMAIL: silvia.razzetti@polimi.it (S. Razzetti); sergio.gusmeroli@polimi.it (S. Gusmeroli); sergio.terzi@polimi.it (S. Terzi); claudio.sassanelli@polimi.it (C. Sassanelli).

ORCID: 0000-0003-0108-2274 (S. Razzetti); 0000-0003-4171-3632 (S. Gusmeroli); 0000-0003-0438-6185 (S. Terzi); 0000-0003-3603-9735 (C. Sassanelli)



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risks can emerge and responsibility issues must be regulated. The European Commission has developed an AI strategy [10], proposing among the others, some policy options for AI regulation. To this regard, in April 2021, the EC has published the “Coordinated Plan on Artificial Intelligence” [11] including a regulatory framework to ensure that “AI systems respect the EU fundamental rights and values”, “to ensure legal certainty” and to “facilitate the development of a single market for lawful, safe and trustworthy AI applications”. The new AI Regulation guarantees trustworthy and reliable AI solutions, but it adds a further complexity, besides the technical and computational ones. While implementing any AI model, it is necessary to consider possible legal and ethical issues and to this regards DIHs working in the field of AI are invited to extend their offerings with specific support services related to AI ethics.

Building on this first attempt presented in this paper, the DIH4AI project [12] defined and gathered all the possible services that could be provided to support SMEs in the AI domain. DIHs supporting AI adoption should include this set of services in the future offering to their networks to tackle legal and ethical issues connected with the development and adoption of such technologies. This set of services has been grouped in a macro-class of services (named “L” which stands for “Legal and Ethical”) to be included in the D-BEST reference model [13, 14], traditionally used by DIHs to configure their service portfolios according to a structured taxonomy. The resulting framework is called L-BEST, where “L” stands for “Legal and Ethics”, and Data and Technology classes were merged under “T”. So, the objective of the paper is to introducing the L class in the D-BEST reference model to make the DIHs aware of the new areas of competences and fields to be explored to better answer to incoming requirements from customers and stakeholders.

The paper is structured as follows. Section 2 presents the L-BEST reference model and Section 3 discusses them and concludes the paper.

2. The L-BEST taxonomy

The DIH4AI project has inherited from several projects results (the last is AI REGIO [15]) the (D) BEST taxonomy [13, 14, 16] for describing DIHs services, identifying four macro-classes of services (where D is integrated with T): Business, Ecosystem, Skills and Technology (&Data). As a response to the increasing need of regulating AI, to prevent possible legal and ethical issues and/or to mitigate related risks, DIH4AI has defined an additional macro-class of services: the “L” of “Legal and Ethics”. Differently from the other ones spread among DIHs, this macro-class is still in an embryonic stage, with few organisations specialised in it.

2.1. The BEST service portfolio

To manage in a structured way the set of services provided by DIHs, the BEST taxonomy (Figure 1) is proposed to DIHs to configure their service portfolio. Services are classified in 4 main top-level macro-classes according to a three-levels taxonomy. Three-levels taxonomy means that for each class, level 2 and level 3 are defined to better detail and classify the type of activity. The BEST catalogue (where D is integrated with T) contains in total 56 different services: 14 Business, 12 Ecosystem, 9 Skill, and 21 Technological and Data. Business services are related to the business activities, including planning and business model definition, funds resources, and project development. Ecosystem services are related to the creation and management of an ecosystem. Skills services are related to training and competences assessments and are addressed mainly to students and workers. Technology services are related to data management and data spaces and are also provided as “test-before-invest” (to guarantee the robustness before investing large amount of money). A DIH may provide an end-to-end support during the entire data lifecycle or during development of a technological solution. Dealing with AI DIHs, the services are expected to be AI-driven (e.g., training and assessments dealing with AI, technological support specialised in the AI solutions development, ecosystem made by stakeholders interested in AI tools or AI experts, projects/funded opportunities dealing with AI).



Figure 1: The BEST taxonomy – Levels 1 and 2

2.2. Legal and ethical services

The “Legal and Ethical” class of services has been shaped along the line of the other classes of the BEST catalogue, based on a three-levels taxonomy, where the “L” of Legal represents the level 1, while levels 2 and 3 are defined to describe the offering required to assist SMEs into their journey towards a more trustworthy AI adoption. 13 “Legal and Ethical” services have been identified, gathered in three different Types; the so called L-BEST taxonomy counts a total of 69 services (Table 1).

Table 1 The "Legal and Ethical" taxonomy

Service Class - Level 1	Service Type – Level 2	Service – Level 3
Legal and Ethical Services	Legal and IPR Assistance	Legal advice and support
		IPR assistance & management
		Model agreements & assistance
		Regulatory Sandboxes
	Ethical AI organisational support	Support the definition of internal Code of Conduct for AI
		Ethics-related organizational measures
		Training on Ethical & Legal AI services
		Ethics Expert on-demand
	Ethical AI life cycle assistance & assessment services	Ethical AI Committee as a service
		Ethical risk assessment
		Support in the development of ethically-aware AI solutions
		Conformity assessment / certification of AI solutions
		AI solution independent audit

Legal and IPR (intellectual property rights) Assistance. Services are conceived to support AI users in ensuring the legal compliance in the design, deployment and/or use of the artificial intelligence solutions and in properly tackling the relevant legal aspects and implications. It includes Legal advice and support, to ensure to AI developers compliancy with AI policies and regulations; advice and support concerning Intellectual Property Rights (IPR), guaranteeing the respect of existing IPRs as well as the application of specific patent. DIHs can provide to the SMEs templates of the most common agreements/legal document useful to support collaboration and, to reduce the regulatory burden that affect technology users/providers, realising AI regulatory sandboxes.

Ethical AI organisational support. Services aim at supporting AI users in the reshape process of their business, adopting the required organizational changes to ensure a more trustworthy AI. The support provided by DIHs includes the definition of a Code of Conduct for AI that aligns the internal ethical principles with national, international and sectorial practices; the review of current internal

processes to ensure that ethical principles are respected when an AI solution is developed; the definition of roles and responsibilities concerning ethical AI and support in the setup of an Ethical AI Board. To guarantee ethical compliancy at organisational level, DIHs may provide training and specific sessions on legal and ethical issues related to Artificial Intelligence and/or on demand support to identify and implement specific key ethical requirements into the organisation.

Ethical AI life cycle assistance & assessment. Services are provided to AI users without acting directly on the company internal organisation but focussing on specific AI-based solution. At company level, to support those enterprises that cannot afford a proprietary one, DIHs could establish an AI Ethical Committee with members of the local DIH network, community and experts. At AI-based solution level, DIHs may support SMEs to assess the potential risks and impacts of the AI solution to understand the corresponding risk level, as a preliminary activity before defining or adjusting specific ethical requirements. Once the AI solution has been assessed and assigned to a risk level, DIH could assist SMEs along the AI development process to ensure compliance with ethical requirements, in accordance with existing standards and best practices, by certifying it before the deployment. Finally, ex-post and independent audit of the AI solution is an additional tool that DIHs may provide to guarantee that the respect of the legal and ethical standards.

3. Discussion and conclusions

The definition of “Legal and Ethical” class of services took into account recent trends in the AI research and business ecosystem, considering also related initiatives and policy guidelines and it has been validated together with the DIH4AI ecosystem of DIHs, to verify that it is in line with their expectations. The provision of these services requires advanced and very specific legal-ethical skills and capabilities, that are still rare on the market and DIHs themselves often lack a full set of tools and resources to offer such a rich proposition. To get prepared to future AI challenges expected in next years, it’s fundamental to stimulate the discussion and raise awareness on this topic, to make DIHs conscious of future trends and requirements. So far, in DIH4AI Network, DIHs are more often end-users rather than providers of legal and ethical services: especially hubs with a strong technological profile (specialised in the development/implementation of new solutions) require an external legal support. The future prospective for DIHs is to extend their offerings with specific AI-related support services and to incorporate an ethical AI component also in their governance model, establishing a dedicated legal and/or intellectual property (IP) department. To offer these services, the DIHs need to leverage specific skills, internally and by accessing competences available in their network.

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5. References

- [1] DIGITALEUROPE, Uniting the twin transitions: There is no Green Deal without digital, 2021. URL: <https://www.digitaleurope.org/events/digital-the-green-deal/>.
- [2] European Commission, The European Green Deal: Striving to be the first climate-neutral continent, 2022. URL: https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en.
- [3] P. Rosa, C. Sassanelli, A. Urbinati, D. Chiaroni, S. Terzi, Assessing relations between Circular Economy and Industry 4.0: a systematic literature review, *International Journal of Production Research* 58 (2020) 1662–1687. doi: 10.1080/00207543.2019.1680896.
- [4] C. Sassanelli, P. Rosa, S. Terzi, Supporting disassembly processes through simulation tools: A systematic literature review with a focus on printed circuit boards, *Journal of Manufacturing Systems* 60 (2021) 429-448. doi: 10.1016/J.JMSY.2021.07.009.

- [5] D. Ivanov, A. Dolgui, B. Sokolov, M. Ivanova, Intellectualization of control: Cyber-physical supply chain risk analytics, *IFAC-PapersOnLine* 52 (2019) 355-360. doi: 10.1016/j.ifacol.2019.11.146.
- [6] C. J. Chiappetta Jabbour, P. D. C. Fiorini, N. O. Ndubisi, M. M. Queiroz, É. L. Piato, Digitally-enabled sustainable supply chains in the 21st century: A review and a research agenda, *Science of the Total Environment* 725 (2020) 138177. doi: 10.1016/j.scitotenv.2020.138177.
- [7] M. Xu, J. M. David, S. H. Kim, The fourth industrial revolution: Opportunities and challenges, *International Journal of Financial Research* 9 (2018) 90–95. doi: 10.5430/ijfr.v9n2p90.
- [8] S. Sun, X. Zheng, J. Villalba-Díez, J. Ordieres-Meré, Data Handling in Industry 4.0: Interoperability Based on Distributed Ledger Technology, *Sensors* 20 (2020) 3046. doi: 10.3390/s20113046.
- [9] GDPR.EU, Complete guide to GDPR Compliance Guidelines, 2022. URL: <https://gdpr.eu/>.
- [10] European Commission, Artificial Intelligence for Europe COM (2018) 237, 2018. URL: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2018%3A237%3AFIN>.
- [11] European Commission, Laying Down Harmonised Rules on Artificial Intelligence (Artificial Intelligence Act) and Amending Certain Union Legislative Acts, 2021. URL: <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52021PC0206&from=EN>.
- [12] DIH4AI, AI in-demand platform for a regional interoperable DIHs network, 2021. URL: <https://dih4ai-portal.eu/>.
- [13] C. Sassanelli, S. Gusmeroli, S. Terzi, The D-BEST based Digital Innovation Hub customer journeys analysis method: a pilot case, in: 22nd IFIP WG 5.5 Working Conference on Virtual Enterprises, PRO-VE 2021, Saint-Etienne, 2021. doi: 10.1007/978-3-030-85969-5_43.
- [14] C. Sassanelli, H. Panetto, W. Guedria, S. Terzi, G. Doumeingts, Towards a reference model for configuring services portfolio of Digital innovation hubs: the ETBSD model, *IFIP AICT* 598 (2020) 597–607, doi: 10.1007/978-3-030-62412-5_49.
- [15] AI REGIO, Our Vision, 2021. URL: <https://www.airegio-project.eu/>.
- [16] C. Sassanelli, S. Terzi, H. Panetto, G. Doumeingts, Digital Innovation Hubs supporting SMEs digital transformation, in: 27th ICE/IEEE International Technology Management Conference, IEEE, New York, 2021, pp. 1–8, doi: 10.1109/ICE/ITMC52061.2021.9570273.