Enhancing Collaboration and Innovation through DIGIPASS CSA and VIPCOAT Open Innovation Platform

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1. Introduction

In the era of digitalisation and Industry 5.0, the innovation paradigm has evolved to embrace collaborative frameworks that transcend traditional boundaries [1]. By showcasing VIPCOAT's developments towards Industry 5.0 through Quadruple Helix Open Innovation [2,3], this presentation aims to inspire and inform industry stakeholders, policymakers, researchers, and practitioners on the potential of collaborative ecosystems to drive technological advancement and sustainable development in the protective coatings industry and materials modelling and design more broadly.

2. Ontology-driven Open Innovation: Collaborative Pathways in Materials Science and Manufacturing

Ontologies serve as structured representations of knowledge, facilitating interoperability and semantic understanding among diverse stakeholders [4]. Incorporating ontological constructs into open innovation processes, this approach aims to streamline knowledge sharing, enhance data interoperability, and catalyse cross-disciplinary collaboration [5]. Significant advancements have been made in developing ontologies across diverse domains encompassing coating, physical entities and processes, business-related data, translation processes, and workflows. Key achievements include: i) the development of ontology tools facilitating ontology generation and updates, ii) the representation of physical entities and processes through knowledge graphs, and iii) the integration of business-related data into a Materials-based Business Case Ontology. Notable contributions include the harmonising the BPMN ontology with the EMMO, yielding a more comprehensive framework for workflows modelling, and the of a Translation ontology tailored to address intricate relationships within B2B2B environments. [6].

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3. Ontology-Based Translation and Decision-Making in the VIPCOAT Open Innovation Platform

The VIPCOAT architecture and platform facilitate group decision-making techniques and improve translation procedures in a business-to-business (B2B2B) setting. VIPCOAT simplifies commercial decision-making, translation procedures, and open innovation by fusing BPMN standards with ontology-based workflows and serious gaming principles.

4. Collaboration and Innovation through the VIPCOAT Open Innovation Platform.

VIPCOAT draws from open innovation, interoperability principles, and an open simulation platform, providing a structured approach that facilitates seamless integration and communication among disparate systems, enabling more efficient and effective collaboration. A critical component of the OIP is the integration of Business Process Model Notation (BPMN) workflows, powered by the Camunda engine, to support the innovation process from idea generation to project execution. This integration enhances transparency, efficiency, and collaboration across diverse stakeholders by providing standardised processes accessible to all users. Moreover, the event-driven workflow execution system, coupled with publish-subscribe patterns, ensures flexibility and scalability in managing complex workflows. By incorporating the Quadruple Helix Model, roles for stakeholders from different sectors are defined, optimising teamwork, and identifying potential bottlenecks in the innovation process proactively. Implementing custom BPMN and DMN editors, along with execution procedures, empowers users to create and deploy their applications seamlessly. Additionally, efforts have been made to ensure data interoperability through metadata standardisation and mapping to ontological concepts. This facilitates semantic interoperability, enabling meaningful data exchange and integration across different platforms and domains [7].

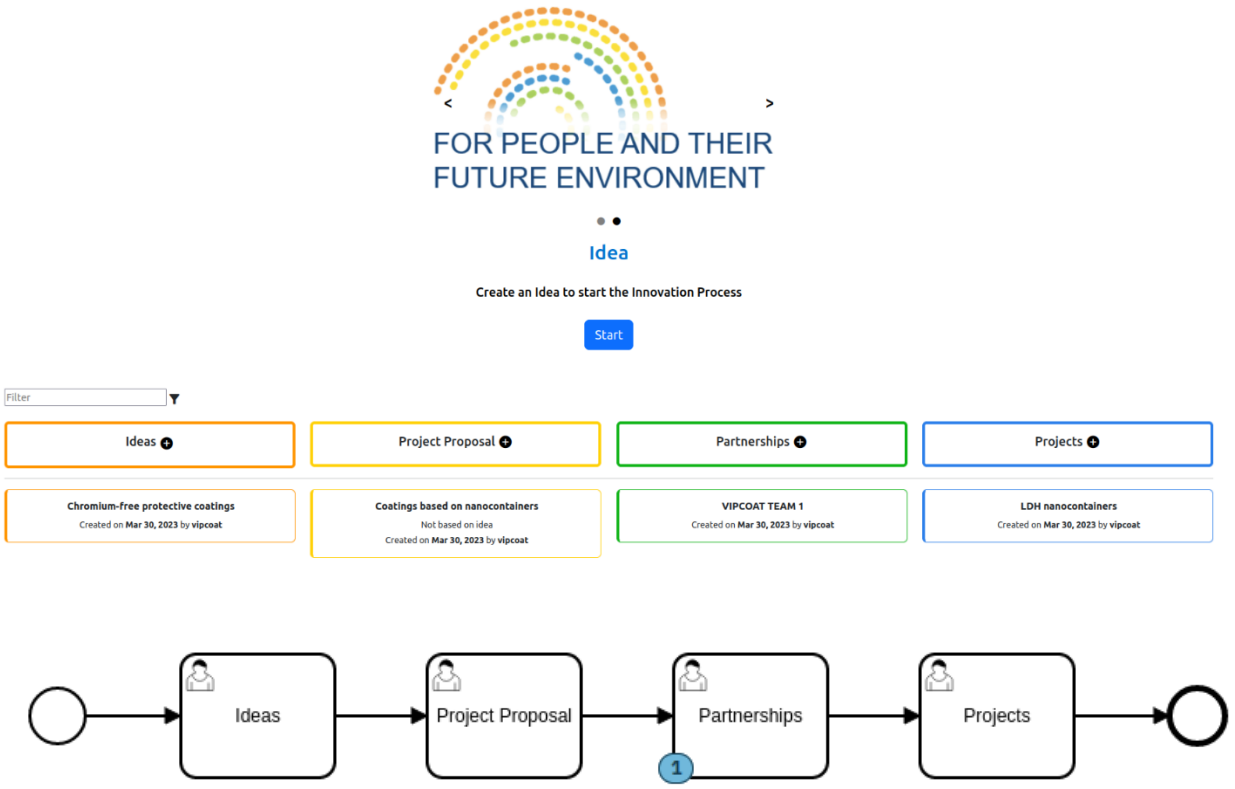

Figure 1: Web-page summarizing collaboration contributions and Simple BPMN workflow behind the process of project creation.

5. Conclusions

In conclusion, the emergence of collaborative frameworks in the era of digitalisation and Industry 5.0, exemplified by VIPCOAT's OIP, highlights the transformative power of Quadruple Helix Open Innovation. Through the integration of ontology-driven approaches, significant strides have been made towards enhancing knowledge sharing, interoperability, and collaborative decision-making in the protective coatings industry and beyond.

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