



PRACTICE ABSTRACT

Digitalisation: Needs and Impacts

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INNO'VIN USING DIGITAL FOR AGRO-ECOLOGICAL TRANSITION AND COMPTITIVENESS

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Inno'vin is the wine cluster of New-Aquitaine Region in the South–West of France which now brings together nearly 180 industry players in the wine ecosystem.

The focal question refers to the wine sector's digitalisation and aims to understand the stakes of digitalisation throughout the wine value chain, as well as its impacts: After a current state of the level of digitalisation within the wine sector value chain, *how can these technologies help achieve the agro-ecological transition of the wine sector while strengthening its competitiveness?* It is divided into two sub-questions concerning the upstream and downstream value chain because the agro-ecological transition leads to the improved competitiveness of wine on the markets.

The upstream of the wine value chain is characterised by the focus on agro-ecological transition with concentration of vineyards which has led to an increase in size. **The downstream of the wine value chain involves** actors focused on competitiveness.

Inno'Vin Socio-Cyber-Physical system shows digital technologies being used to move towards a more virtuous form of viticulture ('precision viticulture', thanks to the data collected by sensors) while meeting both legislative requirements and consumer expectations alike. The characterization of purchasing behaviors allows to adapt the different modes of production, marketing and sale of products accordingly.

Digital technologies, far from being a simple bundle of innovations, constitute a real transformation of the entire winegrowing system, one which redefines the interactions between its entities. Digitalisation helps improve winegrowing practices and the techniques for moving toward more sustainability in response to regulations and consumer expectations, reconnecting both up- and down-stream of the wine value chain. But digitalisation also intensifies inequality between bigger and smaller vineyards (size and/or value). This poses certain difficulties for improving value enhancement and data sharing in order to develop knowledge over the entire wine value chain.

Living Lab

New Aquitaine, France

Key Digital Technologies

Smart Transition, sensor, robot,

Keywords

Digital Agriculture, Smart Transition, sensor, robot, whole value chain

More info: <https://innovin.fr/en/>
<https://desira2020.eu/new-aquitaine-france/>



Context and main needs related to the Living Lab's focal question

INNO'VIN supports companies in their innovation projects (more than 100 projects successfully supported since 2010). It contributes to meeting the challenges of the sector through innovation by helping to germinate solutions: promotes the competitiveness of companies in the wine industry and contributes to maintaining its leadership position. Based on SWOT analysis, the following needs are identified in relation to the Living Lab's focal question.

The main digitalization challenges of INNO'VIN are related to (1) **Digital conditions**: Lack of connectivity of some territories, lack of cooperation between actors on interoperability and data exchange issues and the cost of certain digital tools that remains high and constitutes too substantial an investment for small vineyards (in volume or value), and (2) **Sector conditions**: wine sector is a particularly atomised and complex niche market, where the creation and adaption of specific digital tools for each farm implies greater costs. However, the competitiveness with the poor valorisation of winegrowing or distribution data prevents both improvement in digital practices and better characterisation of stakeholder purchasing behaviour. Finally, the existence of a plethora of solution providers reduces the visibility of the tools available on the market, making it difficult for users to identify which one would best meet their needs

Consequently, the main digitalisation needs of INNO'VIN whole value chain

- Developing practical, user-friendly and adaptable tools
- Developing marketing strategies using digital tools and diversifying distribution channels
- Strengthening the role of the collective to support producer organization and innovation
- Ensuring the emergence of forms of support to help develop skills and enhance job value
- Promoting stakeholder collaboration to ensure data sharing and develop an inclusive business model
- Solving connectivity problems in order to enhance digital solutions

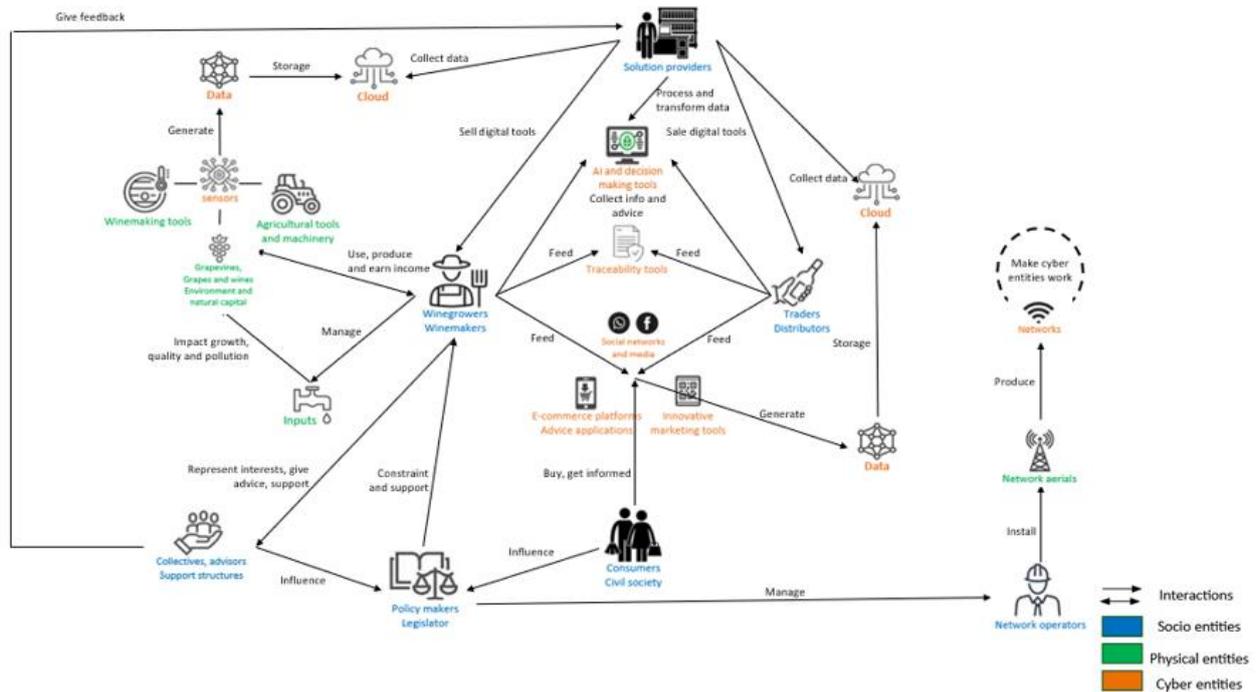
Main Strengths

- Arrival of a new generation familiar with both digital technologies and new marketing strategies or sales methods
- Prospects offered by technological progress such as robotics, AI and augmented reality + improvements to existing tools
- The mobilization of Inter-professional collective organizations and advisory services to support the digital transition projects of various sectorial actors
- The rapid spread of basic digital technologies within the wine sector is a first step towards digitalisation



The Socio-Cyber-Physical (SCP) system of INNO'VIN

The diagram below provides a representation of the INNO'VIN cluster and illustrates the interactions between the SCP entities and especially how digital technologies impact them translated into a system. Social entities (in blue) correspond to types of actors and other elements of the social field (e.g. regulations). Physical entities (in green) are the tangible elements used by social entities in the course of their activities. Cyber entities (in orange) refer to digital technologies.



Winegrowers and winemakers are using connected tools, DMT and AI in vineyards and cellars to achieve more virtuous viticulture and wine fabrication by managing inputs more efficiently. They are also using traceability tools to record all their interventions. These tools can be categorized according to their uses (Ex. Meteorology and pest risk management with weather stations being often associated with a DMT, to optimize the choice of treatment period; Proxi-detection for disease detection; drones and tractor; ...).

Consumers' purchasing behaviour and civil society expectations simultaneously influence wine-growing and wine-making practices (winegrowers and winemakers), marketing strategy and ways of selling wine (traders, distributors), legislation (legislator). Policy makers and the legislator constrain winegrowing practices but also support winegrowers in the sector's evolutions via financial support, training, infrastructures, etc.

Solution providers sell digital tools to winegrowers, winemakers, traders and distributors. They also capture the data collected through the connected object they provide, and process these data to transform them into information or knowledge thanks to artificial intelligence to resell them through services to other actors of the wine value chain (e.g. DMT cartography, etc.). Collectives, advisors and support structures furnish feedback to solution providers about the needs in the field to enable them to adapt their tools and services. Most of the time, the data are captured by solution providers, who process them as services for resale. This is why cooperatives and support structures are important social-entities for supporting the digital transition.



Impacts of digitalisation

What has been digitalised?	Main impacts (i.e. effects/consequences)		Sustainable Development Goals
Producing grapevine: IOT and AI technology; Captors Data collected by AI via decision support tools Agricultural connected tools and machinery winemaking connected tools	Direct	• Data are captured by solution providers, so that winegrowers are deprived of the potential benefits	SDG 1: No Poverty SDG 3: Good Health and Well-being SDG 6: Clean Water and Sanitation SDG 7: Affordable and Clean Energy SDG 13: Climate Action
		• Improved knowledge about grapevine and wine production	
	Indirect	• The use of output is reduced, thereby lessening environmental pollution and sanitary risks	
		• Digital tools are expensive, so farms have to incur debt. This increases the risk of inequality and the loss of competitiveness for small farms, which cannot invest in digital technologies	
Marketing and selling wine: e-commerce platforms traceability tools Innovative marketing tools Social networks and media Data on purchasing behaviour	Direct	• Seizing new market opportunities and capturing new consumers	SDG 9: Industry, Innovation and Infrastructure SDG 8: Decent Work and Economic Growth SDG 10: Reduced Inequality SDG 12: Responsible Consumption and Production
		• Valorised products, ways of production and reinforced competitiveness	
		• Data are captured by solution providers with, farmers being deprived of the potential benefits	
		• Better characterised purchasing behavior and consumer needs	
	Indirect	• Producers who are not selling their wine online or not using social networks to promote their product risk losing market share and competitiveness	
		• Producers are developing new skills, thereby making their profession more diversified and attractive	

. The identified positive and negative impacts brought by digitalisation can be explained by:

- **Design of digital technologies:** precision and adaptability of digital tools improve 'precision viticulture' in diverse vineyards and cellars; materials used to manufacture digital tools, their functionalities and performance determine their price; non-adoption can increase exclusion risk.
- **Access to digitalisation:** use digital tools to promote, sell or buy products; crise covid-19 accelerates changes; no connectivity = no digital tools or at a more expensive price)
- **System complexity:** determinant Tool facility for adoption; greater the skills required in using it. System complexity can increase their price and needs training for both producers and traders

Main conclusions and recommendations

The changes brought about by digital technology can become either opportunities or obstacles to development for the actors in the sector.

Main impacts generated by digitalisation in the Inno'Vin focal question:

The use of digital technology in viticulture is driven by the preservation of resources (precision agriculture, biocontrol), the traceability of practices, but also the search for competitiveness of the sector throughout the value chain. Issues and risks have been identified with some of them being of paramount importance:

- Data is a source of value that is still insufficiently exploited, because the wine growers and wine distributors who own the data do not know what to do with them.
- The plethora of solution providers makes it difficult for users to navigate and know how to find the solution that will best meet their needs.
- The digital challenge could allow the links with consumers to be recreated, whether by (1) ensuring traceability over the entire value chain so as to have direct contact with the consumer; (2) to seize digitalisation as a means of "reinventing the wine product" and "reinventing itself" as a company: in other words, finding new sources of value.

Analysis of the digitization of the value chain highlights that:

- The two-speed viticulture that has been observed constitutes a source of brakes on digital adoption, and even presents significant risks of exclusion.
- Support for change, the development of professions for both winegrowers, advisers and supervisors (management, marketing) are essential issues for developing inclusive digitalisation, allowing both the agro-ecological transition and the improvement of value chain competitiveness.

System complexity, technology design, and access role:

The sector reveals different levels of maturity. Wine sector heterogeneity explains the obstacles to the implementation of a collective strategy. The digitization of the cluster is characterised by the weakness of any comprehensive digitization strategy within the sector. The development of strategic governance of the entire value chain would seem to be an achievable objective.

Main recommendations are:

Accelerating agro-ecological and digital transitions, training and support for changes are crucial. This requires converging the strategic framework and the digital tools that are deployed at the various links in the value chain, from upstream to the consumer, in order to try to build a real collective strategy.

Promoting interoperability by sharing a common language, education and developing trusted third parties across the entire value chain to pool data, associating producers and digital players for creating and sharing value in the whole system, for the benefit of actors.

Co-building public policy measures to promote digital tool use, reducing the costs of individual equipment (at the operational level) and at a collective level (equipment, network connections,...), developing new supports for adoption (e.g. securing the business model of sharing and improving data) and modifying regulations to legislate on data sharing.

