



Smart SME's

Co-financed by the European Parliament through the Alpine
Region Preparatory Action Fund (ARPAF)

Smart SME's

WP 4 Action plan for digitalization of value chains

SYNTHESIS REPORT

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1 Introduction

This document individuates an action plan to boost the digitalization of bio-based value chains. The plan is intended to be a starting point for future projects tackling this issue.

Pre-requisites for the implementation of the action plan are the availability of funding at regional or macro-regional level and the involvement of a consortium of engaged entities.

The plan can be implemented as a whole project or some of the proposed actions experimented as a pilot.

The validity of the plan is transversal for different value chains with traditional approach, like the natural fibres one, so it can be adapted to different sectors according to regional specificity and priority, in order to reach a higher return on investment.

The information in this action plan derives from the work done in WP2 and WP3, the WP4 report "BEST PRACTICE FOR THE DIGITALIZATION OF THE WOOD AND AGRIFOOD SUPPLY CHAINS OF SMES - FINAL REPORT" and desk research. The authors prepared and shared a short questionnaire for project partners in order to agree upon main priorities and preliminary actions.

1.1 Scope

Increase the digital maturity index of the natural fibre, wood, agri-food and textile value chains in the ALPINE SPACE.

1.1.1 Objectives

- Tackle the main obstacles for value chains digitalization
- Engage relevant stakeholders in the process
- Create a favourable environment and measurable framework for the digitalization of the value chains
- Spread the knowledge and awareness about the opportunities and advantages of the digitalization process

1.1.2 Timeframe

This action plan has a timeframe of three years with the ambition to see the first effects on the digital maturity index in 5 years.

1.1.3 Target groups

EUSALP AG2 and AG5 members, RTOs, public authorities, umbrella organizations, innovation hubs, clusters



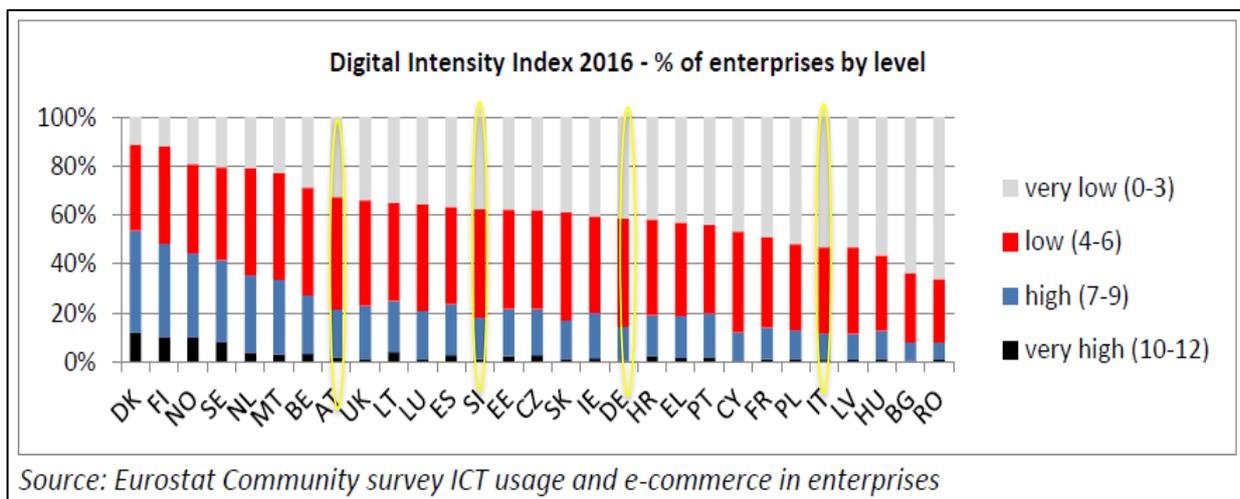
1.1.4 Beneficiaries

Alpine SMEs involved in bio-based sectors, clusters, umbrella organizations

2 Background

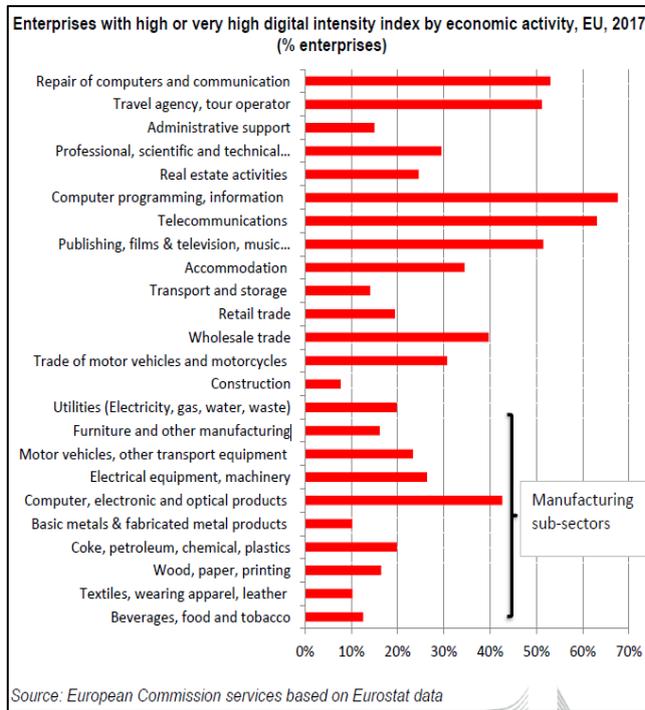
Findings in WP2¹ showed that traditional SMEs such as those operating in the natural fibres sector are at different levels touched by digitalization. Different methods to assess the digitalization level of single companies have been developed over time and there are several tools and practices that companies, government and research organizations are exploring to facilitate and exploit the full potential of the transformation (WP3).

Despite that, the digital intensity remains low in several countries where enterprises have not yet heavily invested in digitalization. The 2016 digital intensity index measure the pervasiveness of digital technologies in enterprise all around Europe. The Digital Intensity Index (DII)² measures the availability at firm level of 12 different digital technologies



¹ <https://www.alpine-region.eu/publications/smart-sme%E2%80%99s-mapping-actual-state-play-and-needs-synthesis-report>

² European Commission. Europe's Digital Progress Report 2017



Moreover, the digitalization rate is of different economic sectors is proceeding at different speeds, with the more traditional value chains (construction, wood, agri-food, textile) lagging behind (7-15% of enterprise with very high or high digital intensity).

These graphs include enterprises of all size, but the gap is more evident when dealing with SMEs, that usually have less resource to commit and often lack in knowledge and digital skills.

WP2 and WP3 explored the reasons and possible indications and strategies to accompany the small and medium

enterprises in the transformation process.

WP3 also proposed a list of indicators to assess the digital maturity of SMEs for the natural fibre value chains starting from existing tools and the specific needs emerged while interviewing companies in the project framework.³

With this action plan we wanted to expand the scope of previous activities addressing the hurdles and drivers to foster digitalization of the whole value chain rather than focusing on the single SME. We also investigated the transferability of the results of previous WPs to other value chains, related to the natural fibres ones, namely wood, agri-food and textile. Details about these value chains and relevant digitalization examples can be found in the report on best practices for the digitization on the wood and agri-food supply chains of SMEs.⁴

³ <https://www.alpine-region.eu/publications/smart-sme%E2%80%99s-collection-good-practices-and-existing-tools>

⁴ <https://www.alpine-region.eu/publications/report-best-practice-digitization-wood-and-agrifood-supply-chains-smes>



2.1 Digitalization of value chains

2.1.1 Opportunities

Digitalization of the whole value chain puts the whole process a step forward, pushing systemic transformation and allowing SMEs to benefit of a fairer, more transparent and dynamic environment where to make business and grow.

The use of technologies to connect and manage value chains cannot be postponed any more due to the increasing complexity of value chains in terms of network, processes, products, demands and organization capacity.

It offers several advantages making the whole value chains making it:

- Faster
- More flexible
- More customized
- More accurate
- More efficient

Figure 2 below well represents the "Vision" described.

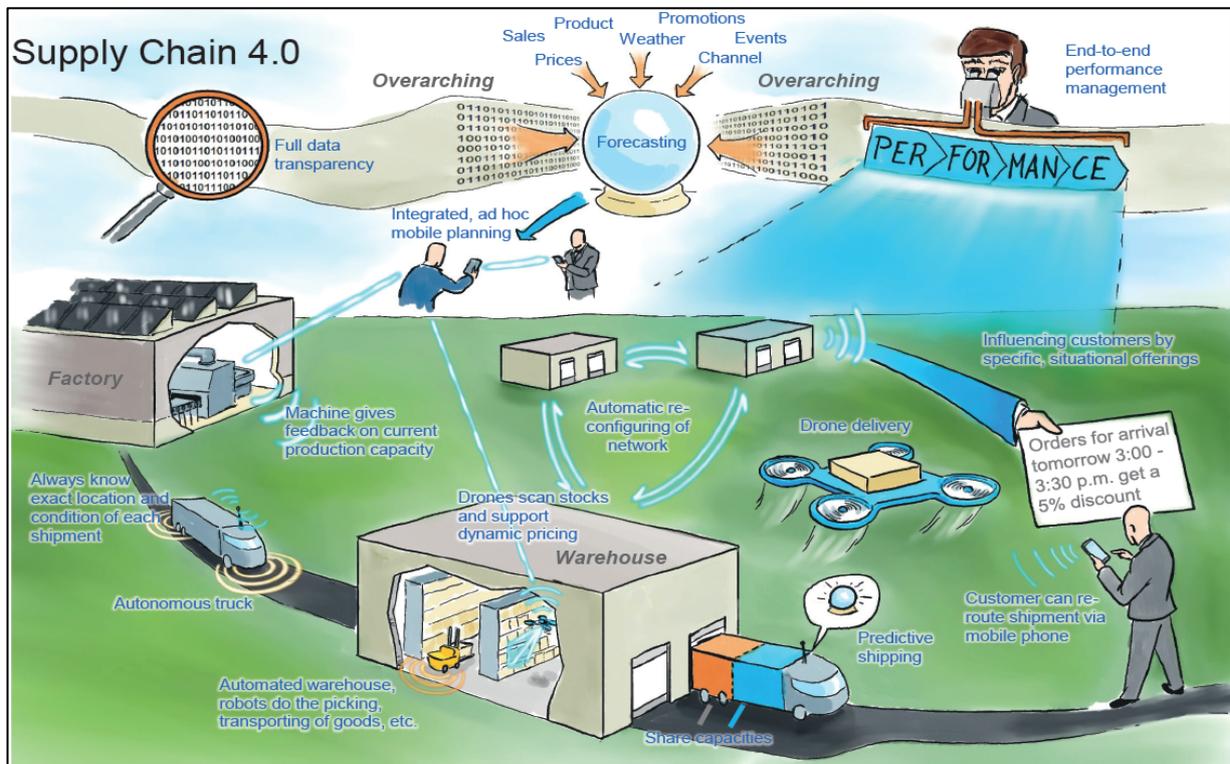


Figure 1: The Vision of the Supply Chain 4.0

Source: <https://www.mckinsey.com/business-functions/operations/our-insights/supply-chain-40--the-next-generation-digital-supply-chain#>



2.1.2 Main barriers

Some critical obstacles standing in the way to Supply Chain 4.0 transformation are summarized as follows:

- Many new technologies are used or starting to be used. However, the level of implementation in Europe is still shallow compared to other regions in the world, such as the US, mainly due to the lack of workforce digital skills⁵.
- Primary requirements to enable most of the new technologies, broadband coverage, and good internet connection are not evenly distributed within Europe, especially in remote rural areas⁶.
- Small and medium sized enterprises seek cost-effectiveness and reliability on new technologies⁷. Resistance to change and to the introduction of new technologies in wood and agri-food might be due to the knowledge gap by new technologies providers. Independently of age or sectors, wood and agri-food stakeholders appear equally sensitive to technologies and their implementation. Their main objective is to gain benefits and reduce costs of labour without disrupting the way they work and negatively impacting their priorities.
- Small and medium sized have difficulties with investment capabilities⁸. Investments in new technologies are expensive and it is difficult for SMEs to follow all the technological trends. Insurance schemes are also not sufficient at this stage to protect and cover the risks of technological investments. Funding through the private-public partnership is therefore developed to address this challenge.
- Proper governance for 'fair' distribution of information is one of the key challenges for digitalizing food-chains⁹. It is more likely that upstream players in the food-chain adopt new technologies faster and more effectively. Food-chain partners recognize new

⁵ Cedefop (2018). Insights into skill shortages and skill mismatch: learning from Cedefop's European skills and jobs survey. Luxembourg: Publications Office. Cedefop reference series; No 106. https://www.cedefop.europa.eu/files/3075_en.pdf

⁶ European Commission. DESI 2020 Thematic Chapters-Connectivity

⁷ <https://www.alphabrown.com/product-page/agriculture-iot-solutions-market-potential>

⁸ FAO. 2016. Public-private partnerships for agribusiness development – A review of international experiences, by Rankin, M., Gálvez Nogales, E., Santacoloma, P., Mhlanga, N. & Rizzo, C. Rome, Italy

⁹ FAO. 2020. Realizing the potential of digitalization to improve the agri-food system: Proposing a new International Digital Council for Food and Agriculture. A concept note. Rome



opportunities for better alignment of supply and demand, improving food quality, reducing food waste, utilizing efficient logistics, etc. However, this could become a challenge if information asymmetry is created because some players in the value chain have broader access to valuable data and can strengthen their (market) position at the cost of other, less informed, parties.

- In general, the process of digitalization is accompanied by uncertainty of the return and fear by employees, and sometimes by employer too. Although benefits of digitalization for a company are clear, sometimes they are not correctly presented to individual employees and teams: this often results in fear in those being impacted (job changes / losses, being faced with learning new skills, new technology or new ways of working). This may be particularly critical for SMEs involved in SCM, which have not the financial resources to cope with the inertia in involving staff in change: this in fact means not only digital training, or better, training on digital matters, but implementation of change paths that are recognized as opportunities by employees.

3 Stakeholder mapping

The Value chain is a complex system encompassing several processes and actors starting from the procurement of the raw material from the manufacturer/producer and ending with the delivery of the end-product to the consumer

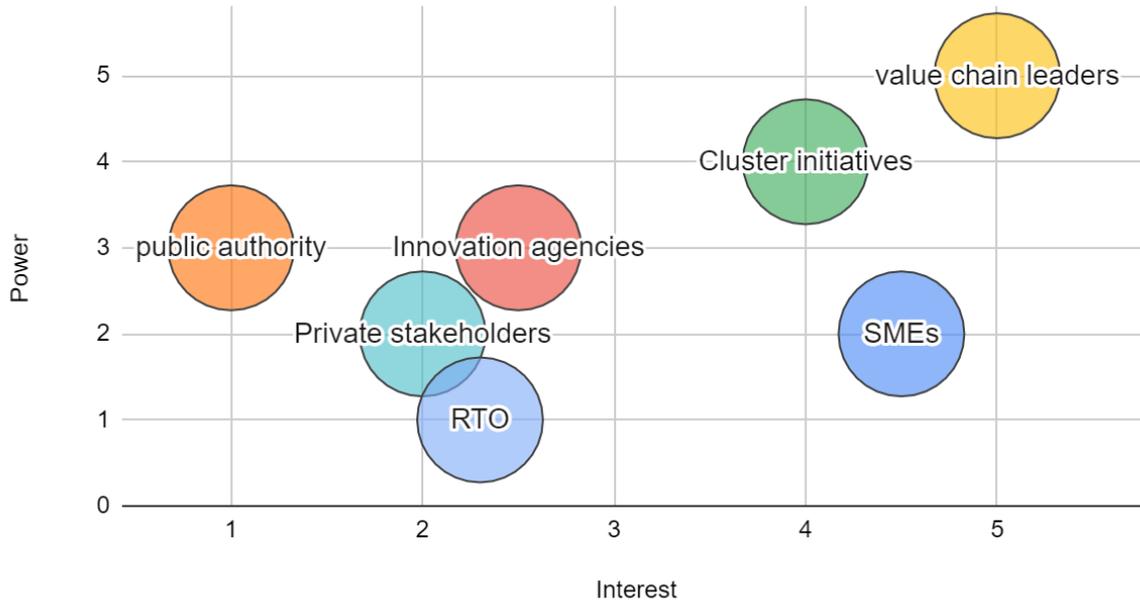
The digitalization of the whole value chain cannot be a bottom up process, but it needs to be guided and supported by different stakeholders.

Here a list of main stakeholders mapped according to their power and interest in the matter.

This preliminary map is based on authors consideration and literature study and needs to be validated in a dedicated action.



Stakeholders map



| Stakeholder | Interest (1-5) | Power (1-5) | Description |
|----------------------|----------------|-------------|---|
| SMEs | 4.5 | 2 | SMEs would be interested parties if correctly educated and supported in the process. Nevertheless, their power is limited due to dimension and limited resources |
| Innovation agencies | 2 | 3 | Innovation agencies can have a big role to increase the capacity for innovation and support technology transfer |
| Value chain leaders | 5 | 5 | Value chain leader companies are capable of exerting greater influence over other supply chain organizations. They have the right attitude and the interest to drive the digitalization of the whole value chain and force the transformation on single companies in the supply chain |
| Cluster initiatives | 4 | 4 | Cluster initiatives and umbrella organizations have the interest to help their affiliate to grow and compete. They can have high power to facilitate the transitions offering dedicated services and provide the right framework. |
| Public authority | 1 | 3 | Public authorities can affect the digitalization process by providing incentives, regulations and funding. Moreover, they can assure the right ecosystems for transformation |
| RTOs | 2 | 1 | RTOs can provide new technologies and knowledge to accelerate the change. |
| Private stakeholders | 2 | 2 | Private stakeholders including Forests and land owners can benefit from the digitalization of the supply |

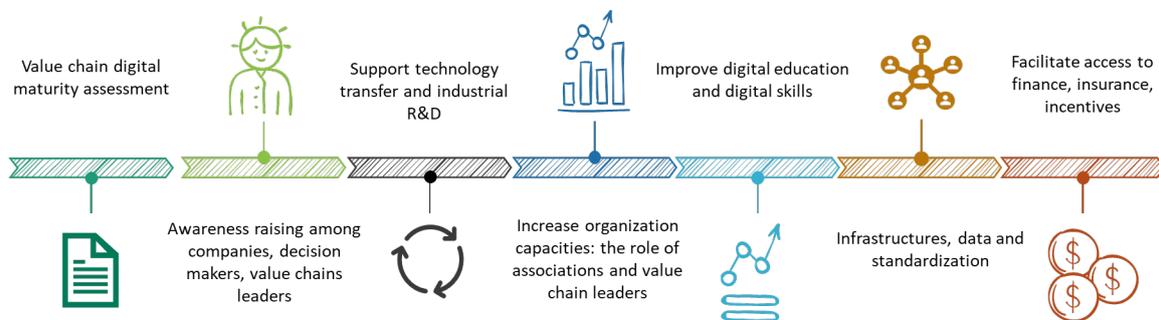


chain in terms of resource management and work organization. Their willingness to be involved in the whole transformation is important to cover the whole supply chain.

4 Intervention fields

In order to boost the digitalization of the value chains, the following intervention fields have been identified:

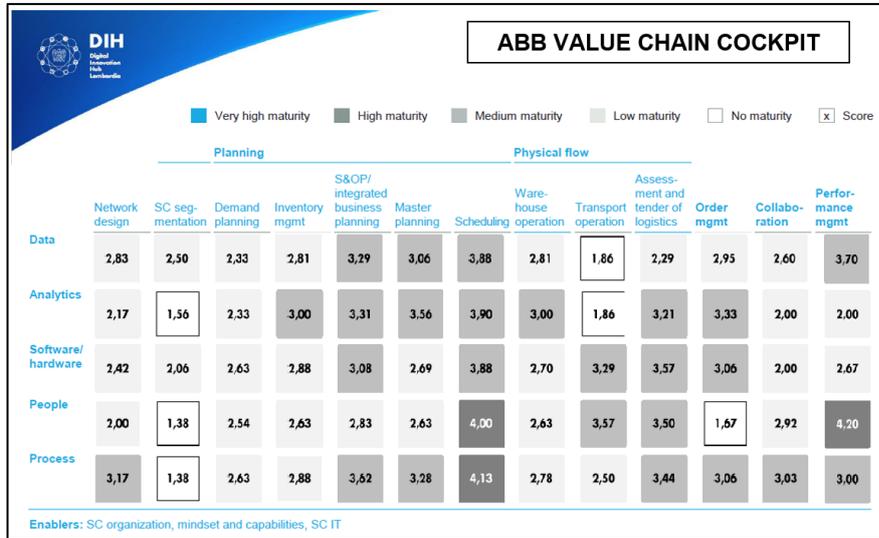
- Value chain digital maturity assessment
- Awareness raising among companies, decision makers, value chains leaders
- Support technology transfer and industrial R&D
- Increase organization capacities
- Improve digital education and digital skills
- Infrastructure, data, standardization and digital trust
- Facilitate access to finance for SMEs



4.1 Value chain digital assessment

Digital maturity of wood, agri-food and textile value chains has not been fully assessed so far. The assessment can provide a baseline for further improvement and allow the identification of major gaps and innovation opportunities.

Only few tools for the assessment of the digital maturity of values chains are currently in use. One relevant example is the cockpit realized by Confindustria Lombardia.



Digital Maturity Index (DMI) provides SMEs with an assessment of their digital maturity by analysing their business processes (R&D, Production, Quality, Maintenance, Marketing, Logistics, Supply Chain, and Human Resources). The stated processes are evaluated with respect to four dimensions of analysis, such as Monitoring and Control, Technologies, Execution and Organization, across the main company processes.

4.1.1 Objectives

- Identify, among the existing ones, the right assessment tool and customize it to be aligned with the requirements of the selected value chains.
- Assess the digital maturity level of wood, agri-food and textile value chains in the Alpine regions.

4.1.2 Actions

| Action | Description | Now (2021) | In 3 years | >3 years |
|---|---|------------|------------|----------|
| Definition of the tool | Selection of the best tool and tuning of the indicators for the wood, agri-food and textile value chains | x | | |
| Integration of the tool with existing practices | Analysis of existing tools and practices and integration activities. Identification of an assessment strategy | | x | |
| Assessment of selected value chains | Implementation of the assessment for the wood, agri-food and textile value chains in Alpine Space | | x | x |



4.2 Awareness raising and organization engagement

One of the main limitations for the adoption of digital tools in business is the lack of awareness of advantages and opportunities related to digitalization at different levels. Often, SMEs' CEOs need to be convinced (with examples, simplified practices, incentives, etc.) of the benefit that the introduction of new technologies can introduce in their business, without disrupting it, before affording the costs of it. The costs are not only in terms of money, but also human resources, time, mentality shift. Wood, agri-food and textile sectors are mainly composed of fragmented, small or micro enterprises with limited resources and low propension to innovation planning, that need to be informed, guided and supported in the transformation process. Moreover, mostly in the agri-food sectors there is a sense of mistrust towards new technologies that can be seen as enemy of tradition and cultural heritage. In this context, associations (e.g. districts, consortiums or cooperatives) and umbrella organizations can have an important role of innovation drivers, if provided with the right information and tools. Other key actors for the digitalization of the whole value chain, are the sector big players (see the example of IKEA) that can have the power of changing the rule of the supply chain and force the transformation process. In this case recommendation should be given to ensure the fairness in the information flow and balance.

Public bodies can be very supportive by providing guidelines, incentives and funding and by setting the right framework for innovation.

All these target groups and topics should be addressed with the right tools for awareness raising and engagement.

| Action | Description | Now (2021) | In 3 years | >3 years |
|---|--|------------|------------|----------|
| Individuate target and strategies for awareness raising | Stakeholder identification and engagement processes will be used to individuate target groups and needs. Target groups should be identified and mapped according to their role, beholding institutions, weight in decision making, sectors. | x | | |
| Prepare and deploy innovative awareness plans and tools | These would include event organizations, recommendations, graphic materials, etc. It would be interesting also to explore synergies with other disciplines like arts. Peer testimonial and success stories have proved to have great impact on SMEs perception. To this purpose actions may include: - Organization of matchmaking and best practices sharing events | | x | x |



| | | | | |
|---|--|--|---|--|
| | <ul style="list-style-type: none"> - Creation of recommendations series for clusters manager, umbrella organizations, associations and public bodies - Creation and sharing tools to increase the visibility of the whole value chains | | | |
| Engage with existing initiatives including (E)DIH and EEN | In order to match current policies and strategies and catch the best value from these, it is important to engage with existing initiatives and networks including DIH and EDIH, EEN, Vanguard Initiative, running projects. | | x | |

4.3 Technology transfer

Research and ICT are moving much faster than the absorption capacity of recipients, and this is much evident in the case of SMEs. The good thing is that the SMEs have a plethora of technologies and solutions to be adopted to their own needs, if guided by proper technology transfer processes.

Focusing on the value chain related dimensions, digital innovation can bring several advantages in terms of end to end visibility, new customer experience, supply chain synchronization, improved logistics and storage management. Data collection and analytics can create new opportunities for data driven services and business models.



The technology transfer approach should encompass the double driver:

- Technology push, starting from key enabling technologies to drive the creation of new products and solutions, opening new markets and opportunities



- Market pull, assessing companies needs and expectations and individuating the right technologies (if available) or strategies to address them.

Open innovation initiatives, that may include innovation challenges, collaboration with startups, co-creation and living labs, have the potentiality to accelerate ideation, implementation and adoption phases when dealing with innovation.

Tech transfer organization and innovation agencies can play a big role in this process.

Considering the complexity of the topic and emerging challenges including Digital IP management, the fair use and exploitation of data, it would be useful to foresee dedicated capacity building actions for innovation agencies.

| Action | Description | Now (2021) | In 3 years | >3 years |
|---|--|------------|------------|----------|
| Individuate companies' and farmers needs and expectations | This can be done with direct contact with SMEs and their representative associations. The digital assessments can be used to individuate innovation needs and match with existing technologies and knowledge | x | | |
| Identify trends, KETs and providers. | A structured mapping of KETs and technology providers can facilitate the matching with technology and demand offer. Several platforms and databases collecting this information already exist at regional at European level and they should serve as a starting point for the mapping without starting from scratch. | x | x | |
| Facilitate collaboration among industry and research. | Examples of actions to facilitate the collaboration include: <ul style="list-style-type: none"> - Ad hoc call for funding issued by University (e.g. Proof of Concept) - Organization of thematic Workshops - Open innovation events | | x | |
| Increase capacity of innovation agencies | Peer learning and capacity building activities among innovation and tech transfer agencies will increase the competences to provide support to SMEs and researchers in harsh topics such as Digital IPs protection and exploitation, fair and safe use of data, digital skills | | x | |
| | | | | |



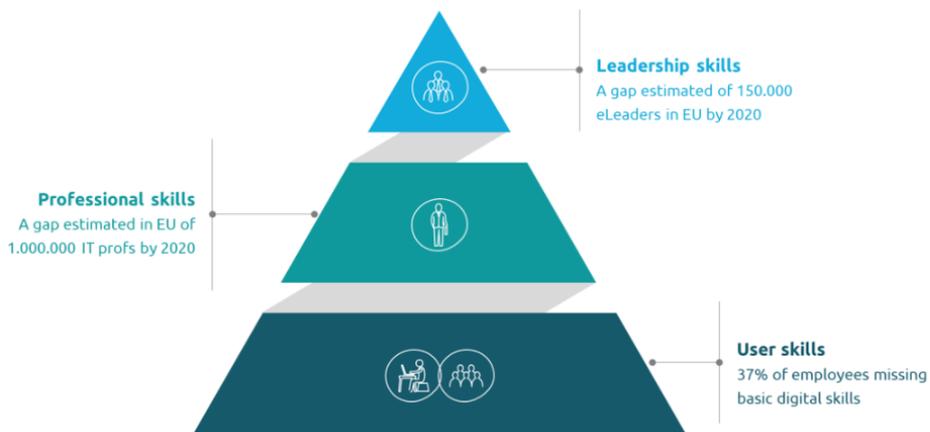
4.4 Improve competences

Lack of digital skills and competences is perceived as one of the main obstacles for the digitalization of companies and value chains

A recent report¹⁰ from European Commission analyses this gap, estimating a lack of about 1 million of ICT specialists in 2020 and this figure could grow to 2 million by 2030¹¹.

In order to increase digital autonomy of the SMEs, education and training programs should be addressed at different layers, including transversal competences to manage the transformation.

Figure 2 Skills gaps related to roles in a SME⁷



According to the roadmap individuated in the cited report this intervention field should be structured in three layers:

- Individuation of target needs
- Definition of tailored and innovative education and training, also starting with existing materials and platform.
- Strong commitment of public sector to invest in new initiatives and incentivize the participations of workers in the training modules

Targets are obviously SMEs at different levels, but also intermediaries that will increase their skills and competence and provide tailored support.

¹⁰ The Commission has identified IoT, big data and cybersecurity as areas where European SMEs would benefit from an increase in the skills level.

¹¹ DG CO NNECT, VICTORY (Vacancies for ICT-Online Repository: Data Collection)



| Action | Description | Now (2021) | In 3 years | >3 years |
|---|---|------------|------------|----------|
| Individuate targets and needs | Targets may include SME c-levels and workers, intermediaries' employers, public administrators, citizens. Each of these target groups has its own needs and expectations that should be correctly assessed using the right tools. | x | | |
| Create education and training programmes at different level | An interdisciplinary approach is needed to better catch target requirements and create ad-hoc education and training programs. Innovative solutions for education, including ed-tech approach should be included | x | x | |
| Merge with existing education programs | It would be important to merge the training activities with education programs already existing at regional level, involving relevant institution such as professional school, development agencies, federations and associations | | x | |

4.5 Infrastructures and digital trust

Regarding the adoption of digital technologies, there are two main aspects that impact on the digitalization of the value chains: fast and reliable internet coverage and the digital trust.

Governments, also supported by structural funds, are investing in the broadband coverage, but disparities still exist among regions and between urban and remote areas. The new broadband technologies including 5G will allow the development of new services bringing progress, welfare and jobs and new opportunities for business but also for citizens.¹² Extensive adoption of these technologies starts from government willingness and investments, but needs to be supported by transversal actions including awareness and training programs.

Technologies used for digital transformation can also be leveraged to increase trust—when they're used to enhance transparency, reinforce ethical practices, boost data privacy, and harden security.

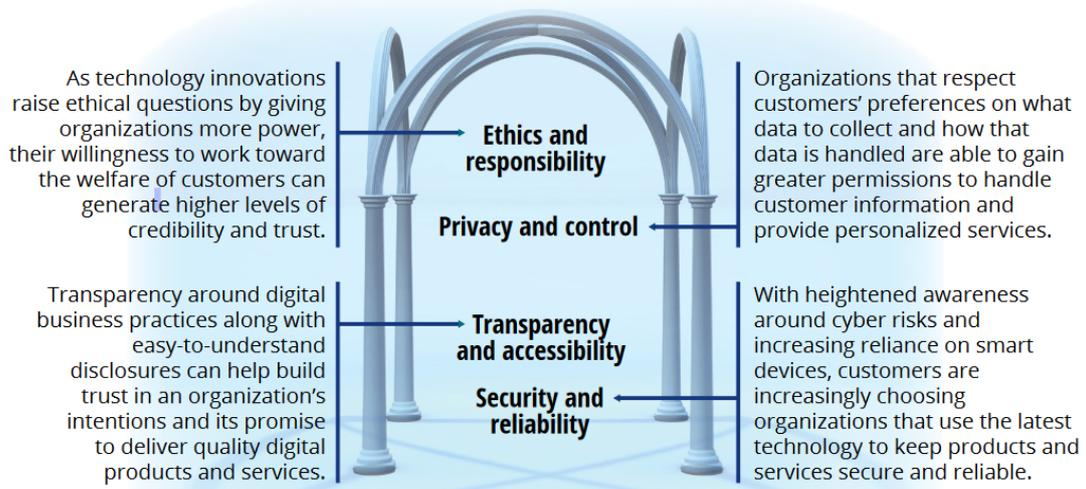
¹² <http://digitalexperiencenter.it/sites/default/files/osservatorio/allegati/ICOM-Thinking-Future-European-Industry.pdf>



Actions to increase digital trust in business and citizens can really change the perception towards digitalization and boost transformation. A strategy for this should be developed and tailored on regions priorities and regulations. It would be important to include a particular attention on strategies to increase transparency along the value chain and ensure fair access and distribution of data and information, particularly in the agri-food sector, where it can happen that few players in the value chain have broader access to valuable data and can strengthen their (market) position at the cost of other, less informed, parties.

Another element to push is the need to share digital platforms and infrastructures and the standardization of business processes to facilitate the better matching of supply and demand between chain members and to create an excellent backdrop for embarking on integration with external partners in the supply chain.

The four pillars of trust



Source: Deloitte analysis.

| Action | Description | Now (2021) | In 3 years | >3 years |
|---|--|------------|------------|----------|
| Support government investments in infrastructure for digitalization | Create and deploy plans for improving the capacity of government to invest and rely on digital infrastructures (broadband, 5G, IoT, cloud). These may include: <ul style="list-style-type: none"> Awareness raising actions | x | x | |



| | | | | |
|--|--|---|---|--|
| | <ul style="list-style-type: none"> • Support in the definition of new forms of Public private partnerships and innovation procurement • Push on standardization and interoperability | | | |
| Create and deploy programs to increase digital trust | <ul style="list-style-type: none"> • Promote fair access to information and data along the VC • Improve transparency and accessibility along the value chains • Stress the link between digitalization and sustainability | x | x | |

4.6 Access to finance

SMEs struggle to find the resources needed for digitalization. Funding mechanisms dedicated to this topic exist in all regions, but often they are not easy for SMEs to access. Sometimes rules and application are complicated or pose too many conditions for small enterprises, or it can happen that SMEs have difficulties to orient among different offers. Moreover, usually rules and eligibility varies among regions and also among programs. There is a need to rationalize and simplify access to finance for small and medium enterprises and create a one-stop-shop offer for information and guidance.

Sharing best practices among regions can be a starting point. Financing schemes should be harmonized also at transregional level, whenever possible in order to facilitate collaboration and the creation of new cross-border value chains.

Private investors, financing bodies and insurance companies can become important actors for risk sharing and financial support to digital transformation, so it is important to engage them in the revision and individuation of new funding schemes.

| Action | Description | Now (2021) | In 3 years | >3 years |
|--|--|------------|------------|----------|
| Rationalize the existing funding opportunities and simplify procedures | Individuate a single entry point collecting all the funding opportunities for digital innovation at regional, national at European level (e.g. (E)DIH). Help funding institutions to simplify procedures for grant assignment and evaluation, according to SMEs requirements | x | x | |



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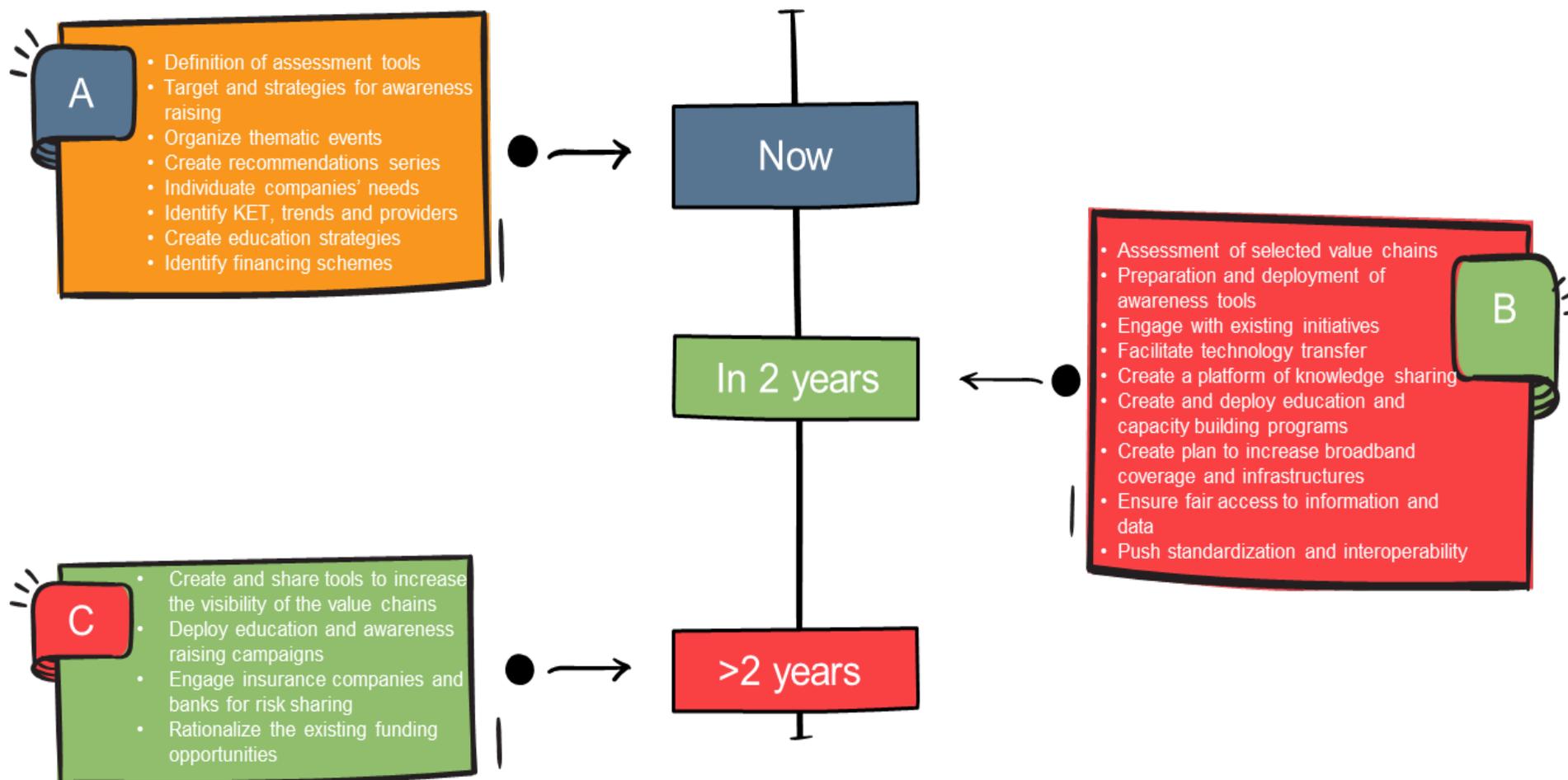
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| | | | | |
|---|---|---|---|--|
| Engage insurance companies and banks for risk sharing and finance support | Private investors, financing bodies and insurance companies can become important actors for risk sharing and financial support to digital transformation, so it is important to engage them in the revision and individuation of new funding schemes. | x | x | |
| Identify financing schemes to directly support companies | E.g. Innovation voucher, proof of concept, incentives and favourable loan | x | | |
| Support transregional collaboration | Digitalization of value chains can benefit from trans-regional collaboration among SMEs and/or service and knowledge providers. It would be useful to identify funding framework to support this kind of collaboration, based on S3 and exploiting regional funds and/or private investments. | | x | |



5 Action plan

The list of intervention fields and actions presented above is extensive but still general and needs to be structured in operative project(s). The dimension and scope of the projects strictly depends on the commitment of involved partners, region priorities and available resources.





6 Risk assessment

A first list of risks for the implementation of the action plan has been produced by the authors. The risks are categorized by the impact level and probability to happen. A contingency plan is drafted for each risk.

| Risk | Impact (1-5) | Probability (1-5) | Contingency plan |
|---|-------------------------|------------------------------|---|
| <i>Not enough available funding</i> | 3 | 3 | Different opportunities will be sought at regional and interregional scale. The projects will be aligned as much as possible with regional and macroregional priorities, in order to increase the interest of possible investors. |
| <i>Difficulty to engage relevant stakeholders</i> | 3 | 2 | A systemic approach should be used while implementing actions to be sure to involve all the relevant stakeholders and identify their needs and create a real value. |
| <i>Changes in regional and national priorities due to changed economic conditions</i> | 1 | 2 | Digitalization is a driver for innovation and growth of SMEs that are the engine of the Alpine regions. |
| <i>High complexity of the action plan</i> | 2 | 1 | The plan should be used as inspiration source for implementing actions with different geographic coverage and ambitions. |
| <i>Duplication of existing efforts and initiative</i> | 1 | 2 | A careful recognition of existing projects and initiative should be made at project planning phase and collaborations should be initiated whenever possible. |
| <i>Low interest of SMEs and related stakeholders</i> | 3 | 2 | All the projects and actions should be centred on SMEs and relevant stakeholders needs and expectations to increase their commitment and accelerate impact |



7 Conclusions and future opportunities

This report includes an action plan for the digitalization of bio-based value chains. What emerged is a list of possible intervention fields and actions to tackle the transformation.

According to available money, funding body expectation and involved parties willingness, it would be possible to get inspiration from this plan to develop one big or more small projects.

Projects can cover just one of the intervention fields or encompass more dimensions, focus on different target groups and sectors, aim at different level of implementation.

As an example, a possible Alpine Space project can focus on the creation of a framework to increase capabilities on high impact areas such as technology transfer, digital skills and access to finance, with the aim of increasing the digital maturity of selected value chains of a certain percentage (to be defined) in a defined timeframe (to be defined). It would be useful to tailor the actions according to the dimensions of SMEs (e.g. small enterprises with 25-70 workers are readier to act than smaller ones, while still needing stronger support than bigger ones) and careful select target sectors in order to maximise the impact int terms of employability and increased competitiveness. Or it would possible to select specific actions to implement pilots at regional or cross-borders scale.

As a further case, education on digital skills activities, specific pilot actions on digitalization, data integration and sharing can be part of a project funded under the Digital Europe Program. Access to finance, infrastructure and digital trust, engagement of relevant organizations fields can be topics to be further developed in Horizon Europe Pillar CSA under cluster 4 or in the European Innovation Ecosystem framework.