LEARNING 4.0 Ambition Guide

A common ambition for Smart Learning Communities, enabling skills, environments and capacities and joint action

M. A. Nogueira; E. Nunes; R. P. Henriques; E. Vishniakova; P. Peiró

Brussels, December, 2021

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ISG Business & Economics School

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Background and general objectives

This guide focuses on providing smart communities (cities, towns, villages, valleys and their regions) with a road map to navigate the digitally enabling / digitally enabled loop in the process of acquiring, developing and sharing critical skills, capacities and resources to face the digital transformation challenges.

This ambition guide roadmaps the smart learning communities' process to foster cooperation, co-creation and co-development under a "learning4.0" approach so providing the innovation boosting environment to ensure the flow of knowledge-based initiative needed to sustain smart communities.

This ambition guide suggests a digitally enabled and ai-enhanced approach, so called learning 4.0, to be developed by smart learning communities, under the context of developing smart communities, with particular interest in / for communities located in emerging regions, lower density regions, demographic regions, peripherical regions or rural regions. Also valid for cities, dense of metropolitan regions, the concept of smart learning communities reaches critical relevance as part of those communities' capacity strength building.

The smart learning communities' learning4.0 process is boosted by a digital environment of active interoperability, enhanced security and data transparency. Local and regional context provides smart communities with the critical mass of cooperation to achieve the continuous generation of innovation opportunities and the continuous sustained flow of new skills and competencies. This, and the digital and AI capabilities, create the perfect context for learning 4.0 establishment.

The partnerships, networks and platforms that regionally sustain, develop and establish smart communities generate the scale and the size needed to achieve market and public relevance. Innovation, competitiveness, entrepreneurship, advanced skills and emerging competencies create an attractive digitally and AI enable market which permits to roll out and expand the learning as service business model. This closes the loop of providing smart communities with continued access to innovation, stable attractiveness and resources generation to ensure their sustainable, resilient and just development.

A creative momentum emerges from combining the cross-cutting demands from smart communities. Persisting barriers between conventional training and unconventional needs is bottlenecking

that positive momentum and limiting access to vital competencies and continuous skills acquisition. The societal challenges, the environmental pressures and the entrepreneurial mindset around smart communities create the needed environment for learning 4.0 approach to overcome those barriers.

Let alone other areas of interest, the fact that smart communities create the fostering environment for learning4.0 makes them instrumental on achieving wider targets, objectives and goals for outcomes of a fair, just, open, balanced and secure digital transformation.

With learning 4.0 process, smart communities become instrumental for achieving the following widely shared objectives:

- to set of cross-sectoral activities preparing the future of knowledge development in Europe;
- to prioritize digital skills under the double approach of building personal capabilities adapted to the labour needs, and pave the way for smart communities so balancing proximity – critical for reinforcing urban, local and regional communities – with digital globality;
- to focus on blue, green and circular skills able to serve the professional and competence needs of the sustainable, climate-friendly, nature-caring economy, including cross-cutting changes from curricula to pedagogical methods including enhanced cooperation with the peri-academic sectors;

> ***"A creative momentum emerges from combining the cross-cutting demands from smart communities."***

- to favour, facilitate and enhance transregional cooperation between local and regional clusters, in particular smart communities, especially by supporting common projects, agendas and innovation environment that make new skills, entrepreneurship mind-set and proximity dimension common assets to be combined for reaching critical continental or global critical mass;
- to foster innovation in educational sphere and emperorship enabling the skills, competencies and knowledge needed for transition to a circular economy, climate change mitigation, society digitalisation, artificial intelligence development through social innovation.

Ambition Guide

Alignment with European critical strategies

The goal is to build a human-centric, sustainable society of the prosperous future for all the citizens, the European union has been adopting visions for digital transformation of Europe by 2030. This ambition guide's section outlines the broader landscape of European initiatives that orient projects[1] at any level in planning and implementing a coherent roadmap for a successful smart transformation. Thus, projects implementing this ambition guide may also align with the following strategies, visions and platforms.

1 Here and further in the text, the «project» mostly refers to possible projects of interested parties led by this guide. Anyone can use the Guide as a handbook to their project.

/ **Living-in eu.** Focuses on tackling community challenges through co-creation with citizens, bringing financial and social benefits of digital modification to all district communities and introducing an inclusive digital Europe with strong digital offerings, technologies, infrastructure and capabilities. This strategy focuses on the need for the necessary municipal and personal investments in digital offerings, technologies, infrastructure and capabilities to achieve this goal. The signatories of this initiative are committed to the development of sustainable measures in financial, technical, legal, educational areas and monitoring of benefits to the citizens. By building on and finding complementariness with this movement, the European interoperability principle for smart cities and communities (eif4scc) was developed, aiming to create a principle that would contribute towards the smart communities. The eif4scc includes three concepts (interoperability, smart city or community, eif4scc), five principles drawing on the living-in.eu declaration (union, p. O. Of the e. 2021).

/ European digital decade. The eu's digital decade results around four cardinal pillars: skills, government, infrastructures and business. t focuses also on promoting rights and principles of the europeans and international projects: to reach the objectives set by the digital transition. It is planned that the European Commission will facilitate development of international projects, building on the EU funding. The EU stands by a human-centred digital agenda worldwide and by promoting alignment with EU laws and standards within the international partnerships. Perspective partnership spheres: 6G, quantum, fighting climate change and environmental challenges.

/ **European skills agenda.** This is a five-year project aimed at helping individuals and firms develop more and more abilities and use them in practice by consolidating sustainable competitiveness, as taken into account in the European Green Deal; ensuring public loyalty, implementing the first principle of the Euro pillar of public rights: access to education, vocational training and lifelong learning for everyone and everywhere in the EU; increasing resilience to decline based on lessons learned during the covid-19 pandemic. It is also connected with: the European digital strategy, the strategy of industries, the intention of recovery for Europe and the strengthening of youth employment assistance. The European program for the formation of abilities connects 12 events sanctioned by 4 building blocks: the slogan to combine efforts in collective actions; the impact of ensuring that people have the necessary abilities to work; tools and initiatives to help people on their path of learning in the direction of a lifetime; a principle that allows you to unlock investments in abilities.

/ **Long term vision for rural areas.** Digital infrastructure is an essential for rural areas. This long-term vision aims to focuse in tasks on the emerging opportunities abilities of the green and digital transformations balancing territorial formation and stimulating economic recovery of rural areas after the covid 19 pandemic.

/ **European green deal.** It is focused on ensuring that Europe remains competitive and able to respond to the increasing needs for mobility of people and resources. Paying special attention to climate-appropriate agriculture,

organic farming, food security and conclusions for smart agriculture. Residents are digital "consumers" capable of not only consuming but also manufacturing, thanks to access to the learning 4.0 opportunities. Sustainable energy sources, integration of distributed energy resources, smart housing is crucial for smart communities.

/ **European health union.** Focusing on the strengthening of existing structures and mechanisms for better EU level protection, prevention, preparedness and response against human health hazards. The principles and specific safeguards laid down by the EU data protection principle allow for effective and comprehensive protection of personal data, including data concerning health, which is directly connected to the smart solutions regarding health, data and security.

/ **New European bauhaus.** The task is to apply the process of general creativity by the method of exploring thoughts, identifying more pressing needs and tasks. Within the framework of the connected cities initiative, it aims at smart decitions in the field of mobility, highlighting sustainable housing construction with the support of smart energy and the protection of biodiversity with the support of smart agriculture.

/ **Covenant of mayors (com)**, as an initiative running ever since 2008, has brought a bottom-up approach to the climate and energy targets of the eu. Com has gathered local governments and regional authorities, reaching its targets through effective cooperation. In the practices of the com so far it has been witnessed that cities with a more mature sustainable energy policy use the covenant differently than those with a less developed policy. Internally, covenant membership can help overcome hindrances to pursuing and updating local policies. The official commitment creates lock-in and, to a certain extent, secures the political decision once made, for example after municipal elections. Externally, covenant membership can be used as an audit: it endorses long-standing municipal policies and provides a benchmark for their achievements.

The EU policies contribute to give a principle for succeeding at the green and digital transformation. However, those are challenges that cannot be tackled by policies alone. They need a strategic

roadmap level that enhances changes in socio-digital systems, including advances in technologies, behaviours, legislation, markets. To achieve that, there is the need for an integrated, long-term approach to planning and implementation based on interdisciplinary and multisectoral synergies at the regional community levels.

The smart communities paradigm, which underlies the proposed ambition guide approach, basis itself on well-established

Ambition Guide

Ethical principles

ethical principles.

This makes the ambition guide's regard on ethics as a transparent subject. That's a topic to be followed, oversee and developed along with the possible projects or pilot's development. This regard aligns and adopts the emerging ethical aspects related to smart communities as the common principles to be adopted, included and integrated into the actions emerging from this ambition guide.

It might be expected, most likely, that in future communities and cities will become "smart". Thus, the universality of evolution towards smarter communities raises ethical issues that are transversal to society. Smart communities of the future will be concerned with nature, people and peace ethical issues, and so do the proposed ambition guide approach.

For the matter of this ambition guide, smart communities baseline for ethical principles relates to the following aspects:

- **Respect**. Respect for the dignity, honour, equality, diversity and privacy of all people.
- **Awareness, transparency and confidentiality**. Data transparency on the current state of affairs, actions taken and results.
- **Integrity**. Communicate and conduct ethically and act in fairness and honesty.
- **Accountability**. To take on the responsibility to people and the environment around them for their own impacts, conclusions and their results.
- **Independence**. Act in the sole interest of smart communities ethics, and ensure that personal and general actions, views and beliefs, do not interfere with the ethical principles of smart communities.
- **Involvement & cooperation**. Implementation of compatibility and openness, where people and institutions are involved in the decision-making process.
- **Balance**. An acceptable balance between measures taken and projects being implemented, security and confidentiality.

- **Commitment to professional commitment**. Commitment to smart communities, its missions and sustainable development goals.
- **Safety, reliability and resiliency**. Operational and financial sustainability implementation.

These are the ambition guide principles adopted as framework for smart communities' activities, agendas and partnership. In practice, the implementation of those principles requires continued observation on how smart communities ethics is successful and the principles are implemented to the emerging smart communities. The following questions illustrate the practical management of ethical principles implementation:

- is there engagement with stakeholders? How have the people and institutions reasonable expectations and interests been taken into account?
- is there credibility and completeness implementation? Is there an opportunity for interested and involved parties to take part and evaluate the results of the ethics realization for the period (one year for example)?
- is there comparability implementation? Is the information according to people, environment and peace allows people to analyse changes in the ethics performance of smart communities?
- is there reliability, clarity & timeliness implementation? Is the information about people, environment and peace collected, analysed and disclosed in an understandable and accessible manner to people and institutions? Information is available on time? Smart communities can correctly understand their progress and make informed decisions?
- does people cooperate to reach the dignity, honour, equality, and privacy of all people? Diversity is respected and valued?

In the smart community, there is citizen-oriented development, ensuring free individual development and innovation (new tools and services). Citizens' digital footprint is ethically used, citizens have high institutional confidence. This directly relates to the organisation of regionally-based clusters, the smart communities.

A well-organized innovation system is a key to the sustainable development of smart communities.

Concerning respect, protection and preservation of nature, environment and climate, the technological process itself does not pursue sustainable goals. Rapid response to changes that are not balanced may lead to additionally warming climate, natural disasters and environmental degradation. Effective data-driven decisions (decision support systems and predictive analytics). The huge role of standards in promoting cooperation and mutually beneficial/shared use of alternative resources and energy, while protecting nature, biodiversity and environment as whole.

As for peace, equity, inclusion and social impact are ensured. Civil society and the private sector interact to address urban challenges (the needs of cities and citizens are balanced with the support of industry groups). There is preventive targeted social assistance (elderly people, unemployed, etc.). Guaranteeing decisions that truly take into account specific opinions.

Enabling ethical, community-centred and sustainable regulation and business environment is then a critical outcome of ethically

driven innovation. This relates to the digital, institutional and business environment favoured by smart communities. That namely, among others on the following aspects:

Eco materials are using in smart communities processes and activities;

- Energy-saving technologies related to energy, water, wastes;
- Enrichment and maintenance of the local biodiversity;
- Emissions of pollutants and greenhouse gases meet international standards;
- Gas treatment facilities/events/actions have been provided with measures to reduce emissions of both polluting substances and greenhouse gases;
- Discharges and waste compliant with international standards and regulations;
- Products and services compliant with international project certification;
- Transport aimed at almost complete or complete reduction of co2 emissions;
- Health and safety ensured;
- Training and education to reach knowledge, skills;
- Everyone has access to equal opportunities/equality guaranteed;
- Freedom to form associations and communities ensured;
- Security practices evolving, including cybersecurity;
- Human rights respected;
- Anti-corruption;
- No child labour along the value-chain;
- Targeted social assistance for people' groups such as elderly people, unemployed, etc.;
- Presented sustainable products, technologies and solutions for a people-oriented community.

In a world, where communities permanently face ethical challenges, the nature, impact and purpose of cooperation play a critical role. Smart communities functioning principles are central for what partnership may achieve to face societal challenges. Setting together the ethical principles on which a resilient environment and society will be built is then vital and could never be absent once addressing innovation, training and education issues, as ambition guide does.

The proposed ethical management and its implementation ensure that a fair and secure innovation environment offers opportunities for all. Everyone is empowered to benefit from ethical solutions to live, explore and fulfil one's ambitions. That's why in ambition guide action ethics play a central role.

Ambition Guide

Gender-balance aspects

Equality is taken as an integral part of the ambition guide quality strategy. Those it is managed and evaluated accordingly. Gender equality and balance may be measured along projects emerging from this ambition guide. Objectives, targets and gaols may consider both the gender-balance related aspects of both the activities to be developed and the impacts to be generated.

Traditionally, science and technology have been considered a male domain. Still, recent studies have shown that gender and sex analysis can influence research results and offer a lot of potentials, even in areas that may seem gender-neutral like transport and climate change, improving the scientific quality and societal relevance of the results. Ambition guide aims to do both, promote gender equality in its team, and supporting women entrepreneurial potential, inspire women to pursue a career in stem (science, technology, engineering, math) fields, invest in rural innovation and – mostly – implement the sensitive design of new services.

This ambition guide includes gender sensitiveness over three main aspects to identity, understand, and describe gender differences and the relevance of gender roles and power dynamics in the social context. Why differences based on gender exist in living the public sphere and trying to find ways to eliminate inequalities? Highlight the connections between gender relations and the development challenge to be solved, indicating the impact of smart communities related solutions – for example, mobility services – and promoting alternative courses of action.

> ***“Gender equality and balance may be measured along projects emerging from this ambition guide”***

Besides analysing behaviours and attitudes to climate change disaggregating data simply by sex. This ambition guide compares groups of women and men based on additional, notably regional and socio-economic factors. The ambition guide recognises the divergent experiences across regions and incorporates them within planning practices guarantying gender-sensitive public rural realm.

The ambition guide integrates the concept of “learning as a service” (continued from childhood to later ages and across gender) into its analysis and plans design, revaluing the focus on learning and recognising the gender differences that operate as a barrier between conventional teaching (education and vocational) and learning, on a digitally and ai-enhanced learning 4.0 paradigm. This business model is expected to favour gender-balance and equality as whole. That’s indeed central to the ambitions underlying this guide.

Ambition Guide

Needs, demand & ambitions

The advanced technologies shaping innovation and skills landscape

The epidemic has affected the introduction of advanced technologies. This led to a slowdown in the pace of take-off, and companies could not focus on more initiatives related to sudden urgent business life circumstances. However, the consequences of the pandemic have prepared companies for a comeback, making the business as a whole more resilient to the future variability of the scenarios.

A separate group of technologies is characterized by a remarkable horizontal spread in all sectors of the economy, demonstrate a niche or industry orientation, and represent a technological group that is significant (but insufficient) for digital transformation It is assumed, in fact, that 5G technologies, the transfer of important network infrastructure and the inclusion of voice, data, global information tools and other related proposals will be even more necessary in the coming years. In this context, the development of artificial intelligence and cybersecurity will be needed more than ever as a fundamental asset to overcome today's decline and prepare for the future. Big data/analytic is a decisive role in the collection, exchange and analysis of data in real time, providing an effective method for identifying and quantifying failures.

Industries demonstrate some similar technological models among the most well-known technologies, with minor differences in various sectors of the economy. IoT and AI are increasingly showing a rise in the field of transport and healthcare, and the b2b industrial digital platform is gaining ground in manufacturing and agriculture. Healthcare shows tempting investments advanced technologies and materials by comparison with other branches of the industry. On the other hand, some technologies are slowing down: industrial biotechnology is increasingly being used in manufacturing, but its use is slowing down in utilities. Covid-19 demolished the retail section (online stores, convenience stores, also small and large retailers). Possibility to complete their own purchases with the support of their own devices, remains a value for retailers and a successful strategy during the pandemic decline of covid-19. Innovative technologies will continue to play a major role in logistics, because loads can be simplified by introducing a common environment in which people coexist with robots, while the latter take on monotonous and labor-intensive tasks. Advanced technologies find fascinating use in the fight against climate change challenges (such as the loss of arable land and the rise of urbanization). Industrial biotechnology still shows the

possibilities of obtaining alternative healthy, luxurious protein and nutritious balanced preparations of food raw materials in response to the increasing public and increasing demand for food.

> *The answer to mass challenges (...) will be achieved through the introduction of modern technologies.*

The answer to mass challenges or the ambitions of intellectual communities will be achieved through the introduction of modern technologies. These technologies, like robotics, artificial intelligence, iot, blockchain and advanced computing, are considered to support productivity and production processes with a minimum of social contact and have become a strategic base for the future development of companies. Digital platforms "business for business" are considered to promote closer cooperation. Artificial intelligence, giant data and blockchain are considered among the most promising technologies that make it possible to automate internal operations, improve customer service and increase cyber security.

The need to attract and retain buyers in the financial sector is considered a leading business goal that encourages investment in advanced technologies. This directs the industry to provide fresh offers. AI, blockchain, big data are considered among the more promising technologies and innovations, because they make it possible to automate internal operations, make better customer service and increase cyber security.

Robotics, mainly in the form of automation of mechanized processes (rpa), replaces the ways of doing business by banking and economic companies in order to keep up with the risks of information security. Robotics and blockchain increase the quality of data, improve customer service, provide permeability and efficiency, and more importantly reduce operating costs.

Thanks to the introduction of technology in education, **AI conclusions will support people with the next level of speed, properties and personalization, while at the same time providing remote management of work power.** Governments are moving to unchanged remote work; the bulk of offices will never return to their previous workload. Therefore, educational institutions in Europe are investing in mobile solutions, online platforms and applications for e-learning. It is assumed, in fact, that the plans of the "smart city", combining mobile solutions, IoT and big data analysis solutions, will contribute to investments in technology, especially for kybersecurity purposes and optimization of social vehicles. As a result, the security of digital offers is considered a key value, since they make it possible to verify the reliability of these offers when processing secret data. Another feature of the postcovid society is represented by disclosed data portals aimed at increasing transparency by sharing available data with citizens.

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Cross-sector deployment

For the progress of smart communities, the crucial moment is the intersectoral formation and implementation of innovative solutions and processes.

For instanse, quantum computing will cover all spheres, starting with the healthcare section, up to methods of machine learning with quantum improvement for the development of a road traffic management system and accurate plan of the urban movement that suits either personal or public vehicles.

Biometrics and sensory computing will be used by AI to create substantial results. Biometrics technologies will ensure the security for finance data and conclusions for the defence of their own data.

Countless applications are rapidly replacing daily work in some sectors of the economy, such as the insurance branch, where unmanned aerial vehicles (drones) are used to inspect warped assets, and in the agricultural sector.

Industrial wearable devices are devices that the user puts on or exactly (for example, as an accessory), or as a proportion of other materials (for example, clothing) that are connected to other devices and do a large number of various functions by data exchange between the network and the device.

Some technologies are considered industry-specific, and their use is limited to one or several sections. In this guide to ambitions, this group connects: 4d printing, which allows you to make especial materials.

Blockchain is used in the leading economic sector, where it is used for payments and cybersecurity, as well as accelerate transactions, increase transparency and verifiability of transactions, and almost everything else.

This shows why the conservation of next-generation opportunities makes crucial sense for providing smart communities with the appropriate abilities and possibilities to service their businesses at the level of competencies important for the successful competitiveness tasks.

Ambition Guide

Technology application

Some technologies formed a group that facilitated interaction between people or between people and machines.

The 2nd group of technologies, which is considered process activators, includes those technologies that have a leading impact on increasing the productivity of business processes and the efficiency of operations.

Digital accelerators, the 3rd group, are technologies that accelerate and complement certain digital scenarios by combination of different technologies. This group includes these technologies, such as fake intelligence, public cloud (which provides a base for progressive infrastructure and an accelerator of all kinds of technologies) and quantum computing, which provide a fresh degree of computational probabilities in all kinds of developments.

This explains why, before all this, the instruction on ambitions gives priority to caring for communities as the main vector of innovations in the learning process, in fact, which makes crucial sense for all 3 groups of technological applications considered.

Ambition Guide

Europe for growth

The challenges of global competitiveness are critical for Europe and as it is the success of smart communities entrepreneurial dimension.

Europe is leading in energy, industry and healthcare, but the EU still needs to stimulate next generation innovations and focus on advanced technologies. Smart communities use innovations in teaching artificial intelligence and digital probabilities of communities, in fact, which guarantees both stability and competitiveness.

Talent & skills initiatives are critical for European cities and regions to be full part of the growth process and benefit from the opportunities of the future. Creating and promoting the development of the necessary skills and knowledge that are urgently needed in the eu. The ambition guide approach fits this perspective.

An exceptionally vibrant ecosystem of startups and technology providers with personal investments and public markets are shaping the next generation of technologies and businesses in the European technology landscape. This explains the focus on entrepreneurial smart communities. Digitally enable, skilled, competent and innovative, they will be able to provide their cities and regions with the needed baseline of sustainability and competitiveness, and so access the opportunities of growth at European scale.

The public-private partnerships that may function as aggregators and scale-up facilitators will create next-generation advanced technologies. The proposed business model of learning as a service fits these demographics and the European paradigm of cooperation and fairness. All these elements considered, the European union offers the needed to scale advanced technologies enabling commitment to keep and develop advanced skills.

As leverage for better succeeding the digital decade, and all the European targets in general, the smart communities, with appropriate advanced skills, offer perfect mechanism to bring local small-scale projects and venture into coordinated actions, bigger in size, in scope, in ambition and so in complexity and impact.

Realising the ambition

Realising the ambition

Ambition 1. Education and training integration into learning

Regional innovation valleys are the strategic scale for success. At local level, development of regional ecosystems allows transfer of direct added-value to the economy and the expected integration of workplace learning for all stakeholders. At European level it populates a single space of cooperation, co-development and co-creation of global competitiveness value.

For integration of learning in the activity profile of regional innovation valleys, partnerships based on strategic and sustainable collaboration between educational bodies and enterprises working together offer the potential of adding value to the local economies and enhance the global competitiveness profile of emerging sectors. This approach significantly strengths the synergy between both fields of education and training fostering European-level opportunities and their impact on society and visibility, effectiveness and impact of European approach to innovation on the international community.

It is expected that convergence of action, objectives and agendas between he, vet and enterprises will contribute to the development of regional ecosystems and generate a direct valuable contribution to the economy by integrating learning in the workplace, in local innovation chains, in emerging sectors, in social ventures and in enhanced business environments.

Realising the ambition

Ambition 2. Dynamic large-scale cross-community cooperation

The regionally-based partnerships, smart-valleys, local innovation alliances meet the demand for wider, more functional and larger-scale cooperation. On a broader scale, partnerships are expected to target social and economic concerns, in both education and employment, and address key areas such as innovation, digitalization and artificial intelligence. On a more local-scale they provide the innovation environment starting venture need to progress and thrive.

Local alliances may also benefit from cooperation with large enterprises. Smart leaning communities for innovation, education and digital learning focus on the needs of citizens, the labour market and society and accelerate the demand for modernization of he and vet. In addition, they can solve social and economic problems, both in the field of education and in the field of employment.

Larger-scale collaboration, involving multiple regional partnerships and pluri-sectorial integration, allows increasing the outreach, rising the profile and systemic impact of new ventures through the dissemination among collaborative channels and the use of activities following the results in different organizations, value-chains and markets. Such cooperation will allow interested parties to develop the potential of their organizations, exchange best practices in European countries, look for partnerships or increase the effectiveness of educational projects at European and international levels.

Realising the ambition

Ambition 3. Consistency & continuity

Focus on sustainability and continuity in the form of institutionalization and formal commitment from all stakeholders.

Skills not only form the basis for the implementation of innovative activities but also for the dissemination and use of smart communities as a paradigm for enhanced regional innovation value, better regionally-based response to societal and environment challenges to the need balance innovation of economies.

Smart communities are expected to have long-term impacts on stakeholders at the individual, organizational and system levels. Expanding opportunities beyond formal education and prioritizing lifelong learning and intergenerational exchange and integration of learning and innovation process align with the smart communities paradigm and strengths their impact. Smart communities outputs and deliveries may be supported by linked and integrated learning so creating an adequate innovation environment for entrepreneurial ventures, investments schemes, social projects, environmental platforms, social businesses and regional governance.

Continuity of learning is critical for innovation, success of smart communities paradigm and capability of regionally-based innovation alliances and their entrepreneurial environment. Learning is permanent. Smart learning communities are the process to make it succeed and serve.

Realising the ambition

Ambition 4. Innovation potential

Smart communities related projects may a positive impact on innovation potential and the integration of new knowledge if accompanied with co-creation environments, new communication channels and new management platforms digitally enabled and AI enhanced. This applies to better digitally ready regions and more vulnerable ones as well. The provision of digital services and the establishing of innovation environments in less-served areas is commonly related to the full integration with existing infrastructures, processes, resources and abilities (rather that insertion of simple insertion of innovative offers in more densely prepared regions). This integration (opposed to insertion approach) empowers regional communities, networks and business by providing the means to coordinate offer and demand, support community driven initiative and ensure scale and sustainability of innovative endeavours under a shared development approach.

Several examples may illustrate shared development. Combining consumption with production and offering multi-sectorial integrated services, process efficiency, asset maintenance and demand management in public services such as health and wellness, are interesting examples. All these require a single channel of communication and a governance platform that can be shared by multiple sectors and serving the overall smart community, implementing shared development vision.

Constant improvements of sources and platforms will lead, firstly, to the development of tools and services to manage transactions for local markets, as well as decentralized supply and demand management of services and, as a consequence, integrated management of utilities that can be provided by members of the community. It is using a multidimensional and commodity approach energy, mobility, health or education services, agriculture or livestock among many others. Therefore, scale for sustainability of innovation and competitiveness and capability for cooperation with other regional innovation platforms may be reached.

The close collaboration and activities integration within smart communities networks makes it possible to bring to possible projects the critical mass of capabilities, resources and tools (namely digital) that make it possible to deliver a breakthrough and realise the expected innovation potential.

Realising the ambition

Ambition 5. Innovation and business creation

Along with social impact, the impact of business on less-well areas is related to the importance of large-scale creation of goods and services that cannot be measured in monetary terms alone. A digital environment that facilitates the exchange of goods and services creates an ecosystem that enables entrepreneurs to develop projects and ideas. Examples are local telecommunications services, logistics services for the distribution of goods, health care or mobility services, all demand-driven.

Entrepreneurs can take advantage of the offerings of a growing local economy to create products or services that improve the well-being of communities, such as local employment and wealth generation opportunities by increasing the access of goods and services that each community needs. What's more, entrepreneurs who once pushed local markets forward can also forge relationships with external markets, fuelling economic growth.

The success of new business approaches will create a cascading effect. For example, rural stakeholders with stable income will invest and spend on local goods and services, creating additional opportunities for suppliers, retailers, warehouse infrastructure or logistics services. Possible projects approach contributes to the development of innovation ecosystems by providing ict analysis tools and services to identify innovations (diversification) and business opportunities (complementarities) based on the assessment of transactions (supply and demand) of goods and services in smart communities, opening opportunities and markets for their entrepreneurial projects.

Realising the ambition

Ambition 6. Impact on society

To foster sustainable development, both new and old generations must acquire certain competencies that will guarantee adaptiveness to digitalization, acceptance of rapid development of artificial intelligence and benefiting from evolving digital environments. To achieve it local and regional communities, stakeholders and ecosystems are engaged with developing, sharing and enhancing digital competence in society by providing the skills, knowledge and attitudes to confidently, creatively and critically use technology and systems. Then and therefore, benefits may be extracted from the smart communities paradigm, which may then fully develop.

Historically, towns and cities have grown around local markets, representing a kind of community centre for the community. The contribution of farms and landscapes to social growth goes far beyond being major food sources and - near or far - urban environments. However, a strong food supply based on strong agriculture and livestock production is the key to securing goods to meet the needs of the local, regional and international market. Thriving communities can also bring additional benefits such as better living conditions, healthier diets, caring for the environment, improved wildlife care and biodiversity. This is the historic shift brought by the smart cities and communities.

To respond to the innovation needs of that shift, possible projects will create an ecosystem by promoting social performance markets, understood as ict commodity instruments and services creating an environment that provides infrastructure, knowledge and incentives for stakeholders and organizations. This makes it possible to provide smart communities with the critical skills and capabilities they so hardly need to fully realise the impact of that historic shift.

Realising the ambition

Ambition 7. Climate change mitigation and environmental impact, and trans-regional integration

To face the future, smart communities rely on collaborative approach, cooperative arrangements and shared development.

Smart villages, towns, cities operating as part of regional smart communities can play a critical role in enabling learning communities to make a just transition to a greener Europe in line with the new European green deal. Notably, rural areas have a natural "green" advantage due to lower environmental pressures and lime pollution.

Circular economy principles for re-using water for agriculture, online advertising for local products, clean energy, biomass, eco-tourism and the use of natural and cultural heritage are some of the new solutions already being applied to combat environmental pressures and rural population decline. It is therefore natural to argue that a European green deal requires a serious response from rural sectors and their smart villages.

Smart community paradigm is responding to the green deal imperative by integrating best practices in supporting emission reductions, biodiversity restoration and pollution reduction. Moreover, smart villages, towns or cities, communities at large should focus on inclusive development striving to not leaving anyone behind, despite rapid transformations, namely in digital environments.

Realising the ambition

Ambition 8. New teaching and learning methods

A new generation of young – of all ages – leaders is emerging. People around the world must be able to build a sustainable future. This is a model which is a source of hope to face global and societal challenges.

Smart learning communities, are part of that model. Complex problems may be tackled through the collaboration of learners, teachers and practitioners as part of those learning communities. Powerful tools for creativity, collaboration, and problem-solving that, among other things, encourage students to develop a sense of curiosity and critical thinking skills keep the smart learning communities developing and thriving.

Those tools form the basis for large-scale industry partnerships for skills development. Opportunities for teaching, product innovation, digital learning create a smart classroom with advanced technology; integration at large-scale participation and open (free) internet access; collaboration platforms for videos, presentations and forums from different sources in different formats. Continuing education programs and activities with and within enterprises will address social issues and related strategies and policies, organizational structures and processes, services and their delivery systems.

Virtual and augmented reality combines the best of face-to-face and online learning in an immersive experience. It is a very realistic and transparent way to visit unthinkable scenarios. In these learning tools, gamification and modelling will help develop student motivation and engagement by incorporating elements of game design into the learning environment.

Artificial intelligence, makes possible the access to multiple involvements, to virtual anticipation and to risk prevention. Thus, digitally enabled, ai-enhanced smart learning communities are effective models for regionally based partnerships to approach complex projects and challenging cooperation requirements. The resulting opportunities deliver advanced digital environments to smart communities.

Ai-enhanced learning needs to experiment. Smart learning communities may benefit from the learning 4.0 paradigm of integration, interoperability and individualization once the shift from discrete education and training towards permanent and continued learning are realised.

Realising the ambition

Ambition 9. Approach: disruptive and open education

Open education will allow everyone to take advantage of the new opportunities and communities to evolve, reinforce and design a more sustainable future. With new curricula or new teaching and learning methods opportunities may be shared with all community members as a result of open partnerships involving trans-sectorial and cross-level cooperation. These partnerships can organize mobility and community-centred learning activities beyond the traditional educational structure, opening the context under which students, faculty, researchers and staff may be part of partnership activities and value-adding cooperation and community centred learning.

Cross-sectoral, open, approach is critical for adapting the learning process to the development of future competences, knowledge, digital skills, green resilience capacities in communities across eu. New learning methods and teaching tools include applying cross-cutting skills responding to integrating cross-sectorial contexts. This open approach enhances synergies between different levels of the innovation ladder from education to entrepreneurship.

Fostering innovation, enabling new skills is critical to developing open community-centred approaches to address, face and respond to challenges of the future. Enhanced internships, apprenticeship and fieldwork in enterprises, institutions and networks once fully incorporated into the curriculum, recognized and credited contribute to teaching and learning processes to evolve in the direction of responding to those challenges. Enlarging exchange measures from the scope of students, researchers, faculty and staff of enterprises to other members of communities, even if for a limited period, stimulates the involvement of community members in the innovation chains, the engagement of employees of enterprise goals, the rise of levels of knowledge, science and technologies in the economic fabric, in training and research, in use and analysis of data.

Realising the ambition

Ambition 10. Project interoperability

High quality and inclusive intellectual education that respects the privacy and ethical standards should be a strategic goal for the community-centre development of skills, competences and capabilities. The concept of hyper-personalization is possible digitally enhanced learning processes. Interoperability allows individualized projects to be part of multi-layer communities, from physical proximity to thematic communities of interests.

This exostructure build over multi-interoperability, allows enhancing the ability of communities to leverage integration of projects, initiatives, ventures and innovations. This is valid to allow the integration of different services, tools and partnerships and they use on open campus and smart learning communities. Inclusive and connected he, vet are essential part of those communities and critical to develop enterprise systems that may reach critical scale based on multi-interoperability of decentralised activities, processes and value-chains.

Integration, possible under a multi-operable environment, requires mutual trust – physical and digital. In particular, as result of multi-interoperability enabled partnerships for skills sharing, namely as part of smart learning communities, enabling digital environments may be used as the basis for large-scale cross-sectoral skills partnerships. Outcome's relate to innovative businesses, schemes, projects, platforms, businesses, and in general reinforcement of smart communities for addressing and facing upcoming societal and global challenges.

Realising the ambition

Ambition 11. Emerging economy

Community-centred digital learning process shifts the paradigm from “teaching” to “learning”. This development turns students from passive recipients of information to active participants in their discovery process and opens the concept of “student” to all emerging economy participants. These “meta-students” develop their educational programs, choose what they will study, how they will learn, and what digital tools they will use. Individualized learning content that develops along with the student learning process using learning analytics to focus on actual integration of meta-students into innovation chains responding to challenges and opportunities of emerging economy. Implementing adaptive learning through the integration of learning experiences across multiple dimensions, including formal and informal learning contexts, individual and social learning, and the physical world and cyberspace. Provide a holistic learning experience, including skills to support employment and career development, as well as key life skills such as communication and collaboration.

Design and implementation of international cross-sector studying curricula in the workplace. This shift the learning process from systemic education to integrated learning, namely as part of emerging economy dimensions.

Realising the ambition

Ambition 12. Intellectual education and skills development

Intelligent education is the need to equip all students with advanced teaching methodologies, digital tools and advanced digital skills and competencies to live, work, study and thrive in an increasingly digitally driven world. Possible projects will foster excellence and innovation in the digital education ecosystem, providing students and educators with the best disruptive learning experiences.

Identifying the skills needed in the public domain to tackle social issues (e.g., climate change, health) and promote resilience and collaboration between authorities and the private sector contributes to the development and implementation of smart specialization strategies in the regions. These are the skills needed to live, study and work in a digital society.

Conventional educational paradigms can only move forward if new digital tools, namely AI enhanced, are developed together with new digital education/training open, interoperable and community-centric methodologies. Emerging projects may support possible projects with skill mismatches for both sustainability and market needs.

Learners require the necessary digital and interpersonal skills to take advantage of the new opportunities they are expected to face. For example, digital skills are required not only in the ict sector but across all sectors. Knowledge in cybersecurity, data analysis and machine learning, for example, is required in areas as diverse as banking and manufacturing, agriculture and healthcare. An advanced digital skilled education is both vital to maintain Europe's global competitiveness in a rapidly changing world and locally indispensable to better prepare communities for the challenges of the future.

The possible projects will provide high-quality digital tools to help modernize the European education system and adapt students to the digital age while respecting privacy and ethical standards. These tools can be digital competency courses: information and media literacy; digital communication and collaboration; responsible use; ethics, sustainability and security as key aspects of digital competence; initiative and entrepreneurial spirit; digital sustainability.

Realising the ambition

Ambition 13. Sustainability of the new education system

Society 4.0 needs a new education system. Without action, the next generation will be unprepared for the needs of the future, posing risks to both productivity and social cohesion. It became imperative for educational institutions to move towards a new revolution: a new European intellectual education system.

Obstacles to education (e.g., cost, geography, location, time, admission requirements, etc.) Need to be removed and the full digitalization of the European system supported, transforming the coming European digital decade into a giant leap forward in innovative education. This gives people the flexibility to upgrade their qualifications or retrain and leads to an open European education system.

Smart education at digitally enhanced entrepreneurship valleys is an unprecedented breakthrough in education, always preserving the values and cultural heritage of the European education system. A strong European education system built on a digital economy, citizens with digital skills, is vital to innovation, growth, jobs and European competitiveness. Moreover, smart education will enable truly sustainable development for the entire planet.

Realising the ambition

Ambition 14. Common dialogue

The problem lies in the broken communication between universities and employers. The former is often out of touch with the rapidly changing conditions in the labour market, while the latter cannot correctly formulate their request. Companies often speak a language that the university does not understand: they cannot articulate competencies and cannot describe them.

The interpretation of the accumulated data can not only contribute to the individualization of education, and, as a result, the training of specialists in demand, but also become the basis for research projects in the field of evidence-based education.

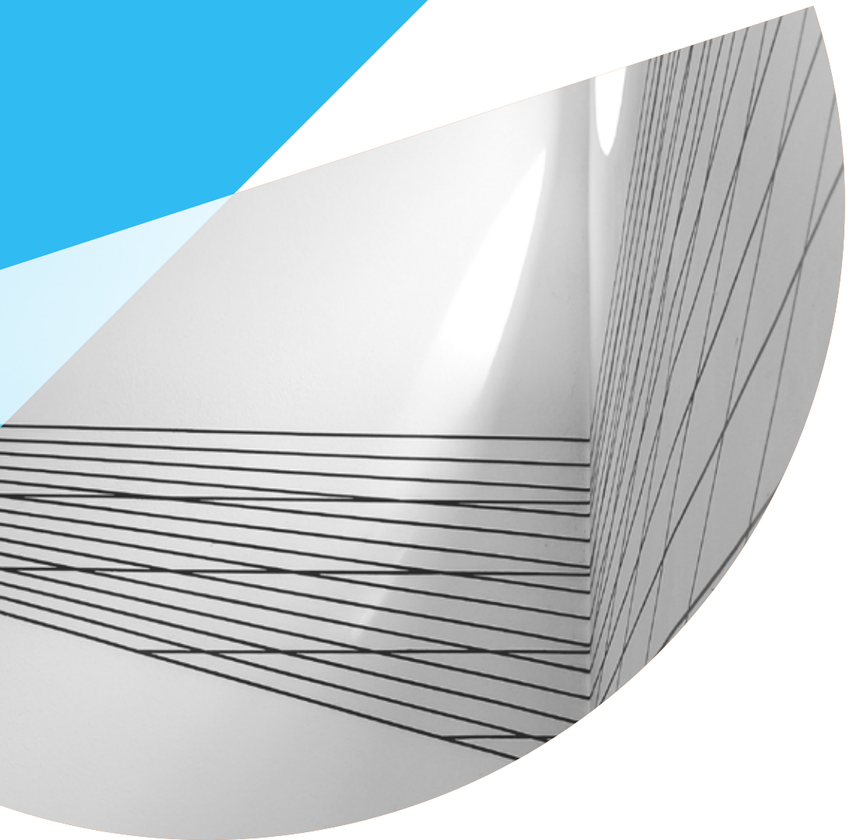
Students and company leaders always agree that the practice should be professional and mutually beneficial, promising and motivating, while students want the practice to be educational, interesting and communicative, and the leaders - effective, efficient and useful. For students and leaders, family, health and self-realization are important values.

Open dialogue can be organized on smart learning communities. The main tasks of the dialogue are to find out what is the difference between the needs of the employer and the needs of the new employee who came to work in the company, what should the managers do for the effective work of the young specialist.

During the dialogue, students and employers can discuss and express their expectations and ideas about industrial practice, the first month of work, career growth and values of generations. Highlighted differences and common ground - on what a joint professional path can be based.

Implementing smart learning communities

Implementing smart



Axis #1. Management and coordination

Axis #1 objective consists in the implementation of a well-coordinated, comprehensive and various ensemble of interrelated events to activate innovations, covering wider socio-economic environment.

The main expected deliverables are:

- Implementation of a coherent, comprehensive and diverse set of interrelated events that contribute to achieving the project outcomes;
- Applying, across all relevant activities, contents and agendas the Europe-wide instruments and tools (eqf, europass, esco, eqavet, esg) and coordinating their use in all project actions;
- Managing the expansion of the emerging smart communities beyond the project membership;
- Coordinating activities among the engaged regional clustered networks;
- Ensuring consistency between all project parts like objectives, resources and budget;
- Ensuring optimal utilization of the funded budget;
- Resolving all cases of possible over-allocation or underestimation of resources to guaranty the project implementation highest standard;
- Controlling quality and resources utilization by continuous evaluation, benchmarking, quantitative cost/benefit assessment using relevant kpi.
- Identifying challenges/risks and opportunities and developing appropriate response actions.

Axis #2. Alignment between overall European strategies and regional action

Axis No. 2 can help develop fresh, innovative and interdisciplinary approaches to teaching and learning, as well as develop breakthrough and sustainable innovations in the field of designing and providing education, teaching and evaluation method etc. These goals include the overall development and implementation of innovative ways of learning and teaching, such as interdisciplinary agenda aimed at students and based on real dilemmas of teaching and learning, more extensive implementation of microdata within the framework of the concept of "learning 4.0" etc. Axis No. 2 connects the definition of abilities important in the social domain for the conclusion, correlation and conclusion of broad public tasks, such as the nature conservation service, climate change, health care and the rural crisis, and also to increase resilience at the level of society and society, in large numbers through the cooperation of VET institutes and suppliers with state and regional, as well as the private sector to promote the development and implementation of smart specialization strategies in areas. This is planned within the framework of the alignment of "shared development", which unites the rise of clusters of areas, settlements and sections in the context of powerful, persistent, broad and active smart communities.

The main expected deliverables are:

- Assistance to innovative and interdisciplinary approaches to teaching and learning, as well as the development of breakthrough and persistent innovations in the field of design and provision of education;
- Joint development and implementation of innovative ways of studying and teaching based on the real dilemmas of education and implementation within the framework of the concept of "education 4.0", studying innovative smart educational environments;
- Identification of abilities important in the social domain for the conclusion, correlation and conclusion of broad social problems;
- Expansion of cooperation of VET institutions and suppliers with private sector, state and regional authorities;
- Implementation of the "shared development" layout, integrating the rise of clusters of areas, settlements and sections in the context of persistent and active smart communities;
- Ensuring that the impacts of the plan include the abilities associated with the transition to a radial and more greenish economy and associated with the ability to adapt, steer change, develop a sense of community, initiative and entrepreneurship, in all educational, professional and training materials for all related and appropriate professional profiles;
- Ensuring public and financial significance and dissemination of the results, objectives and outcomes of the project;
- Ensuring influence at the district, state and European levels on motivated groups and intrigued parties playing an important role in education and vocational training;
- Monitoring progress by associating measures to quantitative

targets, progress monitoring indicators and expected impact;

- Coordinating, developing and supervising the action plan developing to ensure the roll-out of results at national and regional levels;
- Development of the measures to identify finance resources (European, public and private) to ensure that the achieved results and benefits are transferable and replicable;
- Ensuring the effectiveness of the work plan implementation, including the detailed extent to which the resources assigned to ambitions are used in line with the relevant strategic objectives and planned long-term impacts.

Axis #3. Platform and knowledge agenda – contents, materials and resources sharing and delivery

Axis #3 is focused on increasing the "quality and relevance of skills" created and certified with the support of education and vocational training systems, covering fresh abilities and the elimination of inconsistencies of abilities, within the framework of the "rapid prototyping" approach for new and emerging skills as a lab for future smart education – community-centric, vigorously inclusive and life-long continued. Axis #3 aims at facilitating co-creation, co-design and co-development, between educational, municipal sector and the business sphere, sourcing inspiration from cross-sectoral fertilization, bauhaus approach (referring to the original period) among other educational examples and dynamism of digital media. This approach is making it possible to address nature protection and societal challenges in a balanced effective and efficient way, regardless of background regional dimensions or socio-economic levels. Axis #3 develops new methods of learning and teaching, established in cooperation with enterprises and aimed at increasing creativity and new professional opportunities. This response to the need for a demand-driven education – education programmes, challenges and assignments driven by actual, concrete and perceivable needs addressed in a fair, open, inclusive and pervasive – digital – approach.

Introducing a sense of initiative and entrepreneurship is critical for axis #3. These results in deliverables including these principles in every discipline, curriculum, course generated, co-designed, co-developed or implemented towards the initiative and entrepreneurial mindset. Co-development of innovative services, data, contents, intelligence and knowledge as part of developing smart communities and, more widely, smart valleys is seen as critical. Thus, axis #3 aims at creating smart collaborative environments enable by digital interoperability, security and data transparency for scaling up innovative solutions and succeed the innovation chain.

The main expected deliverables are:

- Using the "rapid prototyping" approach for new and emerging skills as a lab for future smart education - community-centric, vigorously inclusive and life-long continued;
- Facilitating the flow and knowledge co-creation, co-design and co-development sourcing inspiration from cross-sectoral fertilization, bauhaus approach (referring to both the original period and the current movement) among other educational examples and dynamism of digital media;

- Developing solutions for society challenges through the collaboration communities, making it possible to address nature protection and societal challenges in a balanced effective and efficient way, regardless of backgrounds regional dimensions or socio-economic levels;
- Responding to the need of a demand-driven education – education programmes, challenges and assignments driven by actual, concrete and perceivable needs addressed in fair, open, inclusive and pervasive – digital – approach;
- Introducing a sense of initiative and entrepreneurship including these principles in every discipline, curriculum, course generated, co-designed, co-developed towards the initiative and entrepreneurial mindset;
- Encounter educational and professional challenges through the co- development of innovative services, data, contents, intelligence and knowledge as part of developing smart communities and, more widely, smart valleys;
- Creating smart collaborative environments enable by digital interoperability, security and data transparency for scaling-up innovative solutions and succeed the innovation chain;
- Concentrating on the new-generation approaches that leads to innovative outcomes;
- Ultimate the digital skills integration into learning context;
- Forecast, preparation, implementation and dissemination of all developments and actions resulting from the proposed project and affecting smart communities, ensuring clear and intelligible coverage of all phases;
- Ensuring media produced materials are accessible and promoted without of closed licenses, disproportionate, unbalanced and unjustified restrictions

Axis #4. Future learning labs – smart communities in action for developing the enabling skills for the future through disruptive learning 4.0

Axis No. 4 is focused on the creation and assistance of effective and functioning systems of the highest and professional education and professional training, which are considered interrelated and inclusive and promote innovation. Future labs prioritize education and training integration in cooperation basing continuous education in digitally enable and ai-enhanced cooperative innovation.

The experiment the future labs are aimed at delivering is education for all bridging age, geography or contextual barriers, namely those that separate rural from metropolitan regions or convergence from innovation regions.

This is combined with the application, development and encouragement of a sense of initiative based on effective and concrete generationally neutral entrepreneurial skills. This opens

the room for a green landscape of innovation – creating regional communities, environments, valleys, for cooperation, sharing and support.

Axis #4 response to the need for an educational innovation community that takes care of every student regardless of age, background or geography towards a continuous, life-long, responsive, adaptative and regenerative education process.

The main expected deliverables are:

- Creation and assistance of effective and functioning systems of the highest and vocational education and training, which are considered interrelated and inclusive and promote innovation;
- The development and testing of conclusions to satisfy the urgent social needs unsatisfied by the market and aimed at vulnerable groups of society are considered a value for axis No. 4 and driving motivation for future educational laboratories.;
- The conclusion of public tasks, organizational structures and processes is considered as the last outcome of the proposed future educational laboratories;
- Developing a learner centring approach, delivering is education for all bridging age, geography or contextual barriers, namely those that separate rural from metropolitan regions or convergence from innovation regions;
- Discovering new learning approaches and opportunities based on the practical experiences is also an objective for the proposed future learning labs, combined with the application, development and encouragement of a sense of initiative based on effective and concrete generationally neutral entrepreneurial competencies and skills;
- Launching new start-ups reinforcing the regional smart valleys - enabled clustered networks;
- Creating regional communities, environments, valleys, for cooperation, sharing and support, opening the room for a greener, healthier, cleaner and safer innovation landscape;
- Introducing more “learner-centred approaches” making the person first to be in the centre of the vocational/educational focus regardless of difference and barriers namely age, origin and background;
- Responding to the need of an educational innovation community that takes care of every student regardless of age, background or geography towards a continuous, life-long, responsive, adaptative and regenerative education process;
- Developing the composition of regional level partnership in line with the possible projects action objectives;
- Grouping the appropriate organizations set, including professional education and professional training, the highest education and companies with important profiles, active at the regional level in every community;
- Forming the regional components of a smart communities by including local partnerships that adequately represent all relevant sectors ensuring effective cross-sectoral approach;
- Development of an effective mechanism to ensure effective

cooperation and coordination between participating organizations at the regional level;

- Ensuring the partnership composition at the regional level in accordance with the management objectives covering smart learning;
- Ensuring an effective cross-sectoral approach for optimal operation and development of the regional level valleys

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Axis #5. Skills event – gathering momentum for the smart communities of academia, business environment and regional governance.

Fostering corporate and institutional social and environmental responsibility is the opportunity targeted by axis #5 once proposing the skills event and by making rural regions be protagonists in its implementation.

Every participation region, in the skills event and more widely on the emerging smart communities, may see itself as anchorage of entrepreneur professionals, continuously interacting with the education/training system in permanent dialogue with the needs of innovation from their communities.

Preserving protecting and valuing learning 4.0 related activities in enterprises, institutions and networks is a vital part of axis #5. This includes accelerating study exchanges, involving of enterprise staff into education and going deeper on sourcing, sharing and analysing research data. The principle of the skills event' open-air universities, names transformation2030, is developing a learning centred community: all stakeholders focused on the objective of providing the knowledge-based environment for success.

Organising the skills event under the "future now" approach by generating an intelligent flexible, evolving, rapid, reactive, continued and adaptative base of knowledge to enable the emergence of the professions of the future. The transformation2030 open-air university operates in the wake of the skills event to consolidate the process of developing competencies and give room to learning as a service business entrepreneurial proposals and ventures to showcase.

The emerging smart communities, to be expanded from the possible projects, uses the skills event as instrumental to apply learning methods, to launch and organise innovative mobility and activities of students (seen as continued users of evolved education and training system), teachers, researchers, professionals and staff. This uses the skills event to cooperate and bring added value, in particular, show-casing learning as a service entrepreneurial projects during the open-air university. The skills event allows to mobilize, dialogue, co-developing and building smart communities of practice and developing opportunities for the entrepreneurial spirit to evolve.

The main expected deliverables are:

- Organising any kind of skills events;
- Fostering corporate and institutional social and environmental responsibility;

- Stimulating the entrepreneurial attitude, mindset and skills in learners – regardless of carrier, background, age or origin aligned with the entrepreneurship competence principle;
- Inviting participation regions to be part of the skills event, and more widely adhere to the emerging smart communities;
- Working with regions to turn the participating ones on proper anchorages for entrepreneur professionals' projects;
- Promoting learners continuous interacting with the education/ training system in permanent dialogue with the needs of innovation from their communities;
- Preserving protecting and valuing institutions and networks a vital part of the learning 4.0 ambition;
- Accelerating involvement of business representatives into education;
- Developing a learning centred community level least: all stakeholders together, at least at the regional level, focused on sharing the objective of providing the knowledge-based environment for success;
- Adaptation of the high education and VET to the needs by the method of developing and implementing sectoral training programs, integrating learning in the workplace (objective for the skills event follow-up "transformation2030" open-air university);
- Promoting a "future now!" Approach by generating intelligent flexible, evolving, rapid, reactive, continued and adaptative base of knowledge to enable the emergence of the professions of the future;
- Contributing to overcome the skills mismatch related to both resilience, circularity and market needs;
- Accelerating critical skills continued road-mapping, programming, development;
- Promoting competence-friendly environment for emerging capabilities within the regional innovation valleys;
- Developing the needed dialogue and wide understanding that is critical for the network success use promote smart learning;
- Using the transformation2030 open-air university to leverage new educating, training and learning methods;
- Launching mobility and innovative activities (seen as continued users of evolved education and training system), teachers, researchers, professionals and staff;
- The skills event allows to mobilize, dialogue, co-developing and building smart communities of learners in continuous interaction with education and training system, in learning as a service approach;
- Ensuring adequate representation of all education and training providers, in its several segments and diverse composition;
- Delivering clear added-value to each participant organisation by programming combined, integrating and scaling-up the roll-out of learning 4.0 features, namely AI in the context of smart valleys;
- Ensuring smart valleys' outcomes, namely the demonstrated

results, impacts and innovations will be used by smart communities members and other stakeholders, beyond the project partners;

- Measuring and monitoring results during the project lifetime and after it;
- Using skills event to promote the results and launch its effective exploitation;
- Implementation events of a clear intention to disseminate results, connecting appropriate actions and events to ensure excellence among stakeholders, members of smart communities and other audiences.

Axis #6. Replication and results – sharing the project results outcomes and opportunities across European member states

Axis #6 supports smart communities seen as regionally-based clustered networks to promote a community of confidence, support and trust for success, flexibility, commitment and innovation.

The main expected deliverables are:

- Development and creation of inclusive and interconnected systems of the highest education, VET and companies based on cooperative and flexible paths of interaction between VET and VET;
- Assistance to the mobility of students and staff for education and vocational training;
- Building on smart communities as regionally-based clustered network operating as a community of confidence, support and trust for success, flexibility, commitment and innovation;
- Maximizing the scale-up of project impacts;
- Promoting the dissemination of results, engaging with all representatives of education and training providers;
- Maximizing the added value generated through possible projects and smart communities of demonstrated results, outcomes and innovations;
- Development, management and implementation of property assurance devices for recognition and proof of qualifications that are required to meet the tools and fundamentals of transparency and recognition;
- Attracting, developing and consolidating contributions from partnerships beyond the project members to develop, maintain and sustain (which includes institutionalising) a widely participated network;
- Creation and expansion of smart communities, open to participating organizations from partner countries, reproducing

the model of smart valleys;

- Managing the dispersal of commitments and tasks based on the presentation by participating organizations of extended smart communities (other than project partners) that comply with the required values of commitment and intensive contribution to their specific skill and cooperation;
- Creating the ground for the management of expanded intellectual societies (in addition to project partners), taking into account the quality management and coordination of networks and leadership in a difficult environment;
- Prolonging and sustain the project results, expectations and impacts beyond the work-programme duration;
- Establishing the project communication web platform and expanding it to support the extended smart communities.

Development guidance

Design and implementation

Development guidance

Design and implementation

Concept and methodology

The keystone of possible projects is maybe merging all baseline assets into a new paradigm of digitally, and artificial intelligence enhanced learning process – learning 4.0 and learning as a service business model – to achieve success critical mass.

Integration of existing or recent capabilities and results is the methodology main feature. These environments ensure the presence of critical factors of success:

1. Well, developed, competitive and innovative entrepreneurial environment;
2. Dense, comprehensive and successful business ecosystem;
3. Ambitious, dynamic and influential metropolitan region.

Thus, the critical mass of robust baseline elements is established to achieve a successful learning 4.0 approach to be developed within well-established smart learning communities.

1. Learning components;
2. Digital environment;
3. Artificial intelligence services.

Learning 4.0 process fits the learning as a service business model that was widely accepted among the smart communities community as the one fitting the levels of multi-disciplinarity, the needs of continuity and the requirements of interoperability typical of the dynamic smart communities environment, in particular, that of their entrepreneurial smart communities.

Smart communities perspective

Communities faced the need to evolve towards intelligent dynamic soft-infrastructures (creative clusters, culture-focused programmes, entrepreneurship boosting programmes, environment redesign and protection) that serve citizens' expectations and communities' sustainability. This created the need for skills and competencies, as well as for the learning processes, that provides communities around Europe with capabilities to succeed at the smart transformation.

Ambition guide pursues to go forward on the path that leads to a more digital, green, and inclusive future, we need to work together. We remark the need for the smart communities to have a shared platform to act and invest synergically in order to succeed at the Europe decade objectives.

Cooperate, co-design, co-create and co-develop innovative solutions for cities and communities, and to build a smarter tomorrow, naturally shifts the focus of competencies acquisition from the systemic teaching – education and training – to the organic learning process. The next challenge, the one this project matches, is to turn the learning (instead of teaching) process into adding value ones – actual learning and competencies building instead of unfocused, dispersion to spontaneous unorganised useless skills. This is why basing the learning 4.0 approach into well-established environments, starting points and baselines is critical for this project methodology.

Also aligning learning 4.0 process experimentation with compliance with accreditation and recognition is taken as a full part of the proposed work programme and so a key element of the proposed methodology.

Adopting a holistic approach, based on a multidisciplinary, cross-cutting vision is realise the common ambition on the strategic alignment.

A European level transversal approach

This ambition guide is based on the assumption that innovation and education should be treated not only as a sectoral issue but as a cross-cutting dimension of all high-level EU policy initiatives and cohesion policy, namely working with cities and regions, in particular, those engaged with European commission's ambition for 100smartcities and living-in.eu.

By developing and creating fresh curricula for higher education (HE) and professional education and study (VET), supporting the formation of a sense of initiative and entrepreneurial thinking in the eu.

These methodological principles of transversality, interoperability and continuity of competencies development, focused on learning (demand-side) instead of the systemic offer-side process are critical for the proposed work plan and the ambition guide approach as a whole.

Clusters and value chains

By considering entrepreneurial smart communities as the primary target of the learning 4.0 enhanced skills, the cooperation supports the strengthening of collaboration, networking and learning across regions, acting as innovation support providers by providing or channelling knowledge and stimulating innovation activities.

Focusing on clusters offers the opportunity for individual smart communities members and organisations to develop their competencies as part of the community in which they may thrive, evolve, compete, innovate and scale up. This allows sharing experiences and knowledge with counterparts once improving regional innovation and competitiveness, namely in less well-served regions.

Entrepreneurship as the main driver

This ambition guide aims to support creation of innovative possible projects that operate as an open ecosystem to connect innovation both in academia and in the labour market. This response to the drivers set by the European commission. Eventually, the project wants to promote a series of competencies and skills to guarantee an evolution to a sustainable, green, multidisciplinary, inclusive and prepared society for planning sustainable territorial development which will fit market needs.

A good entrepreneur's ecosystem is fundamental to reach sustainable development. Having an entrepreneurial ecosystem will require teaching new skills to develop and implement a new economy and ensure that possible projects has prepared citizens, with more sense of initiative and entrepreneurial mindsets. This is why, methodologically, all the project develops from the needs from entrepreneurial smart communities to the integration, aggregation and combination of successful, cooperation's and platforms.

The project ambition is to identify and develop an enabling skills agenda, both digital and transversal, to implement this new green economy, and ensure the successful development of cities and regions. It is essential to develop links with non-academic platforms and companies around Europe, a much completer and more prepared to learn for the global challenges that projects face both economically, socially and environmentally. In addition, this promotes EU values by pooling the enormous value of the cultural diversity of European countries and regions and showcasing and sharing them with non-European students and institutions.

Sustainability as the main goal

One of the main goals of ambition guide is to raise awareness on the importance of science for the true sustainable development of our planet and, consequently, to promote research and innovation on sciences linked to sustainable development and sdgs.

We must ensure that new generations have a solid scientific knowledge set and, more importantly, must have the ability to understand the interactions between global, natural, and human systems, and how they affect the interactions sustainability competence. There will be a responsible identity and will lead activities contributing to certain sustainable development goals and combat climate change.

As part of the proposed methodology, participatory activities are organised for the communities to which the partnerships (between universities, regions and chambers) belong, namely for the learning 4.0 approach and wider actions are proposed to involve the communities in a wider reach. In addition, a dynamic promotion plan will be implemented to encourage perm students (permanent,

continued, life-long students) or learning 4.0 participants to benefit from awareness-raising programmes around them.

Entrepreneurial mind-set

Developing transversal skills in a time of academic transition (among many other contextual transformations) is critical. The focus has shifted from the number of diplomas a candidate has to focus on the development of transversal skills. Shifting the focus from teaching (offer-side driven) to learning (demand-side driven) promotes the capacity to adapt to change and so rewards and favours the sense of initiative and entrepreneurship. Learning 4.0 fits the need to rapidly acquiring the necessary skills to enter the world of start-ups and entrepreneurship.

As in the previous point, we know that it is crucial to make all generations aware of the transaction that we have to develop towards a sustainable and adapted society, so we will ensure the development of green skills, knowledge and application of the circular and environmental responsibility. In addition, there will be a regional guidance and support network, where the different students can be advised by professionals in the field who are interested and have more knowledge about the labour market, entrepreneurship and the skills that are required today and in the future. This focus is strongly related to the principle of learning community critical to the proposed methodology.

Learning 4.0 approach focuses on keeping compliance with high-quality standards of content, skills and competencies so making possible integration with accreditation schemes and the mainstreaming of learning as a service business model.

Boosting innovation – deagglomerating economy

Nowadays, we live in a system based on the agglomeration economy where there are often problems that are difficult to solve, many of them associated with mobility: pollution, climate change, traffic congestion, urban sprawl, etc.

Transport is a critical example of the relation between agglomerated economy and climate – deagglomeration means saving energy and reducing emissions – and the pressing need for deagglomeration. This need operates as a driver for proposed projects and follows the activities of smart learning communities and learning 4.0 approach.

In cities and regions, it is not only important to limit environmental impacts, but also to ensure that the quality of life in this environment is as high as possible so that cities are places where social and economic activity is attractive. This requires a better distribution of skills, capabilities and innovation so a more even sharing of economic opportunities may drive the deagglomeration of the economic model.

This is the basic principle underlying the proposed structure for the smart communities. A chain of smart innovation communities (regionally clustered networks of co-innovating partners) supported by smart learning communities (focusing on continuity and adaptiveness of learning processes, digitally enhanced, that may be recognised and accredited as integrated education and training).

Methodological added-value of innovation

Comparing with existing projects and initiatives the possible projects following the ambition guide methodology add innovation value to the following areas.

Digital marketplaces related advances.

Digital markets are now thriving thanks to advanced technologies and platforms. The digital transformation of marketplaces will enhance the transformation of farmer's markets to commodities that deliver trusted personal experiences by standardizing the exchange of products and services. Online markets with digitalized commodities will unlock the integration of rural communities into the digital single market, simplify transactions and compress hierarchies through the deployment of decentralized approaches thanks to dlt to solve trust issues for peer-to-peer transactions). Since future online markets are supposed to operate in peer-to-peer concepts (trust, rules, identity and payment), they open the door to the consolidation for more specialized marketplaces. This approach is the methodological baseline for AI enhancement of the learning 4.0 process.

Data marketplaces.

Data markets implement all kinds of data types from all kinds of sources, where data providers have every chance to offer data in specific formats to individual buyers. There are 3 leading data markets in the likeness: i) an individual markets that allows individuals to sell their own data on their own terms; ii) a business market using a b2b data exchange model used for marketing, sales and business analytics; and iii) sensor markets or online things give customers data collected from online things in real time. Data marketplaces sell different types of data from various sources, where data providers may offer data in specific formats for individual customers. There are 3 main types of data marketplaces: i) personal marketplace allowing individuals to sell their data on their terms; ii) business marketplace that uses a b2b model of data exchange used for marketing, sales, and business intelligence; and iii) sensor or IoT marketplaces provide buyers with data collected from IoT in real-time. The international data spaces association has made available a reference architecture model which is a virtual data space leveraging existing standards and technologies, as well as governance models well-accepted in the data economy, to facilitate secure and standardized data exchange and data linkage in a trusted business ecosystem.

Community-oriented marketplaces.

A marketplace aims to scale up start-up investments enabling the development of so-called collaboration communities. Such marketplaces provide transparency for management and flexibility for balancing issues while engaging new stakeholders by building collaborations within communities including local community groups, civil society organizations, councils, for-profit businesses, corporates, member-based partnerships, social enterprises and not-for-profits, school communities, and academic and research institutions. Online community-engaged markets unlock the potential of local responses to local demands, while the created local markets are incorporating multiple trust-enable stakeholders and create an ecosystem that allows the incorporation of new members.

Ai-related advances.

The learning 4.0 process is based on an AI that allows the management and access control to the knowledge-flows provided by integrated vertical skills development solutions to feed the needs of the innovative services to be co-developed under the smart learning communities and exploited by regionally-clustered smart valley. This operates and an ai-enabled process of trading of learning commodities adapted to specific individualised needs. Once coupled with digital and AI technology (namely digital twins), in-community marketplaces of skills enhance the integration of owners, financiers/investors, host governments, service providers and technology suppliers to bring new businesses, linked with smart communities and regional clustered innovation and competitiveness ecosystems.

Guidance for quality

Quality assurance

Monitoring

Impact verification strategy

Impact evaluation strategy

- Boosting innovation
- Developing a sense of initiative and entrepreneurial mind-sets, competencies and skills
- Standards and references for benchmarking and evaluation
- Resilience, market needs and emerging professions
- Decision-making

Guidance for quality

Quality assurance

Smart communities dispose with significant innovation potential, under a disruptive integration approach of education and training components integration into interoperable, continued, individualised learning.

Facing the challenge of integration into disruptive innovative results, quality has to be assured all along the innovation chain, namely on aspects related to the digital environment to be used and interoperability environment – vital for learning as service business model to succeed. In this sense, the following innovative aspects are addressed to quality assurance:

- total vendor-neutrality thanks to concept openness and decentralism. Smart communities uses the concept of a decentralized (p2p) network of data-interoperability links, that are managed by the users themselves, where any central components that could be objects of potential vendor lock-ins will be replaceable based on open interfaces, defined with the reference architecture. Moreover, all the core components will be open source and based on open standards and apis. Thus, potential adopters can replace them with their implementations while keeping interoperability with other digitally-enabled components.
- cross-sector semantic interoperability, supporting horizontal services. The smart communities learning process interoperability concept recognizes several interoperability layers (physical, vertical-domain specific, horizontal-domain independent, and online commodity layers). Each of these layers is offered with open apis that are common for appropriate software developers (system integrators, data scientists, app developers, etc.). Thus, integration of any 3rd party services is made as easy as possible. Living-in.eu, oasc-developed, minimum interoperability mechanism are followed for cross-sector semantic interoperability.
- commoditization of smart cities and communities products and services, supported by distributed ledger technologies. Smart communities reference architecture introduces a commodity

layer to describe digitalised resources, products and services that can be then offered in online marketplaces (energy, dairy products, logistic services, “servitization” of agricultural equipment, etc.). Such an approach organically supports the use of various distributed ledger technologies (dlt), establishing independent and decentralized marketplaces. Hence, the commoditization of rural products and services offers a generic (sector-independent) way for “match-making” between local offers and local demands for any type of product.

- system-level support for novel technology options like AI with semantic discovery options. Smart communities decentralized (individualised) approach perfectly settles down the foundations for artificial intelligence framework, where different modules (e.g., trainers, inferences, etc.) Could be straightforwardly deployed according to the underlying requirements of rural services/applications. The openness of the concept facilitates the integration of required features/functionalities intuitively. Moreover, the semantic interoperability pursued in the project permits a seamless data gathering from the various smart learning communities infrastructures, regardless of their domain/area of interest;
- enhanced data sovereignty – data stays under the data owners control. The data transfer among smart learning communities of users is realized in a peer-to-peer way. Such an approach organically supports end-to-end data encryption and lets the thegdprd control the access to their data (and resources) per visitor and data source. Thus, smart communities complies by design to critical requirements of gdpr. This is critical to eliminate eventual barriers to the success of the learning as a service business model.

Guidance for quality

Monitoring

Have extensive, integrated knowledge of European governance and project planning and evaluation. The focus will be placed on social and environmental responsibility within development sustainability; learning 4.0 approach and open-air university transformations4.0 participants should be able to analyse concepts, theories and ongoing issues about the sustainable development, the central issue of current international development policies (in line with 2030 European goals); the same participating community, should be able, as a result of their participation, to understand sustainable development processes and their reference frameworks in diverse local and cultural settings and: a) recognise local and sustainable development processes and their traits, especially on a space-time multi-scale and multi-cultural level; b) evaluate these processes at each development level (economic, social, cultural and ethical); c) solve critical problems with autonomous decisions within specific disciplines by using performance tests and teamwork (e.g. Simulation seminars with shadowing).

Smart learning communities participants must be able to: a) work in a team and coordinate group work; b) initiate communicative processes toa the use promotea the use local development dynamics; c) create and initiate local and social network dynamics; d) and work in multicultural contexts. All of these skills are fostered in specific courses and assessed with presentations and simulations, as well as transversally to other activities.

European participants, regardless of origin, region or background must be able to: a) consider their learning process as regards local development and, more broadly, the social and economic issues behind development; b) assess the process itself; c) establish methods and tools (e.g., further courses, training) to enhance knowledge and competences and so express and express the sense of entrepreneurship and initiative.

Impact verification strategy

Visual monitoring of kpis: ambition guide integrates tools, a dashboard for visual monitoring, offering many capabilities for the presentation, aggregation and comparison of the different kpis, supporting several different graph types and interfaces. It is a web interface implemented in html, css and javascript (angularjs) and works in a modularized way, allowing the creation of different views, with different types of widgets, so that it is fully customizable according to every application need. Semi-automated as well as real-time processes are offered for the raw data collected from the cities, needed for the kpis calculation. Within ambition guide, the visual analytics dashboard functionalities are expected to be delivered in conjunction with the collaboration platform ones, described above, resulting in a holistic principle of knowledge sharing and business processes/environmental/cost-effectiveness related kpis' monitoring, potentially increasing productivity and awareness within particular vertical domains.

Impact evaluation strategy

The following main factors are considering as verification points to assess the impact of the project results:

Boosting innovation

Shared development and implementation of learning and teaching ways (such as fresh interdisciplinary curricula based on real dilemmas teaching and learning etc);

Development and testing of education programs with the enterprises participance;

Development and testing solutions to satisfy urgent social needs that are correspond to the market needs, organizational processes and services and addressing vulnerable groups of society;

Development of conclusions for challenging goals, innovations and processes through the cooperation of students, teachers and entrepreneurs..

Development of entrepreneurial competencies and skills

Development tools included the transversal learning and its application within the highest education and VET frameworks creating in cooperation with enterprises, increasing the employment, creativity and fresh professional paths, aiming at helping the entrepreneurial competitiveness of smart communities;

Bringing entrepreneurship mind-sets into this discipline, curriculum, direction, etc. To give students, researchers, employees and teachers responsibility and opportunities. They will have the opportunity to face different challenges in their own educational, professional and own life, which makes this aligned with "learning 4.0";

The invention of new opportunities thanks to practical experience that may lead to the launch of new projects, products and prototypes, start-ups offering smart communities a constant stream of abilities and opportunities;

The introduction of more "student-oriented approaches" takes into account the personal educational students' trajectories, thus, the introduction of the learning potential as a business model.

Standards and references for benchmarking and evaluation

Creation of inclusive and interconnected systems of higher education, VET and companies based on trust, cooperation and recognition, flexible paths of interaction between VET and VET and promoting mobility of students and staff, integration of the 4.0 learning into the processes and ensuring its accreditation and recognition.

Internships and work related to academic fields at enterprises that are fully integrated into the curriculum, recognized and enrolled; test innovative measures; study and work exchanges for a limited period; transfer of incentives for recruiting staff of the firm to teaching and research; test of these studies. In this way, the transformation of apprenticeship into a mandatory role share in intellectual learning societies allows us to benefit from the integrated, unchanging individualized and compatible nature of the 4.0 learning paradigm.

Resilience, emerging professions by market needs

Identification of the market needs and professions, increasing the market responsiveness of systems at all levels; adaptation of the highest education and VET system to the needs in abilities by the method of developing and implementing sectoral training programs that integrate learning in the workplace;

Solve societal challenges (climate change, health care etc.) and increase resilience at the society level, in what quantity through the partnership of VET institutes and suppliers with state, regional and district authorities, as well as the personal sector, in order to contribute to the development and implementation of smart specialization strategies;

Offer help in overcoming the skills mismatch as for durability, for example, and for the necessities of the market, using the direct demand the alignment of learning 4.0.

Sample and testing new studying and learning ways, organize events for academic mobility of students, teachers, researchers and employees supporting the main forms of partnerships and enter a secondary contribution to the realization of the project objectives.

Decision-making

The rapidly changing context – technological environment; evolving social fabric – and the sheer importance of the challenges – societal, environmental – communities are facing clearly defines the innovation process needed to respond as a disruptive one (following definition from christensen et al., 2015).

Disruptive factors – the rapidity of the changing context and the subsidence of the existing models – affects all the education and training processes, the learning models and the ability of the individuals and communities to acquire the skills and capabilities they need. On the other hand, the rapid evolution of the very nature of the needed skills also operates as a disruptive factor. Thus, the learning process is currently a paradigmatic example of disruptive innovation.

Then a disruptive innovation management model is adopted for designing, planning, conducting and implementing activities along with the possible projects.

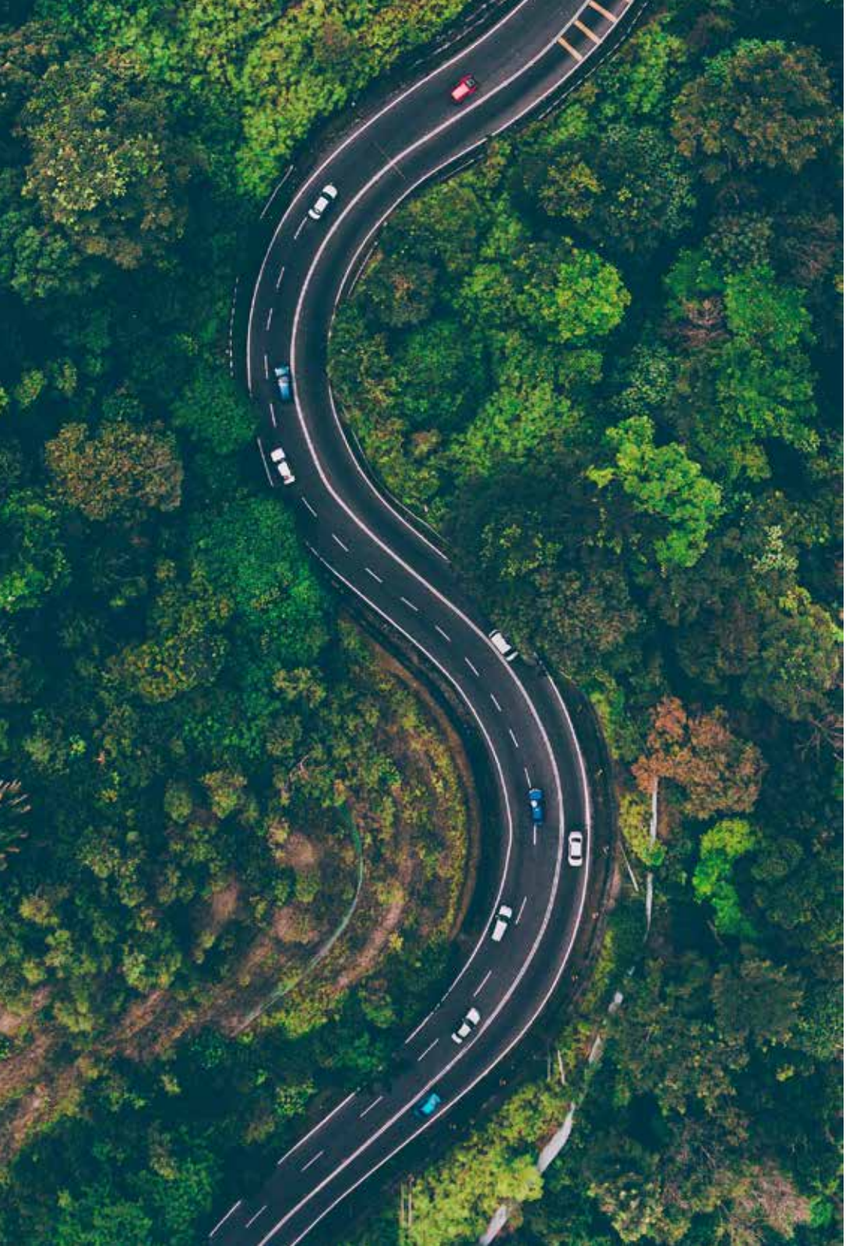
Normally, disruptive innovation emerges from the fringes – organisational, commercial or cultural – to replace the incumbent processes. Inevitable it is what is happing in future with education and training. Ambition guide' contribution is to use disruptive innovation management process to ensure that the replacement process occurs in line with the wider European objectives and serves the communities, by integrating with the smart cities and communities movement.

Christensen, the most recognised author in the field of disruptive innovation, specifically emphasizes new products, from new entrants, that begins in the "low end" of a market, with inferior quality, and gradually improve until they win over the high-end customer of an incumbent. That's what ambition guide propose once experimenting with learnign4.0 in a context that is making usable, attractive and valid for all the communities.

Certification, recognition and accreditation of artificial intelligence enhanced learnign4.0 plays a critical role in mainstreaming integrated, interoperable and individualised learning processes emerging from disruptive innovation managed processes.

Disruptive innovation goes beyond making available new technologies and products. It relates to creating a new marketplace, new segmentation, new thinking, new mindset and new communities.

Ambition guide //Follow-up roadmap



Ambition Guide

follow-up roadmap

In the upcoming years, the cross-cutting challenges described above are, therefore, approachable by the smarter use of resources and emerging digital technologies and, most importantly, partnerships. Smart communities are instrumental to achieving the objectives of the European decade and the development of the desired and clearly outlined EU ecosystem of change, social innovations and new approaches to territorial development which aim to improve citizens' quality of life through the use of suitable cutting-edge technological solutions.

An informed top-down vision is no longer effective. Co-designing and co-creating to help the communities to become smart by engaging the end-users into the problem-solving process and, therefore, providing more efficient delivery of services, management of critical infrastructure and free and transparent data gathering and analysis for social good. Through this new paradigm of development that considers digital open innovation and social innovation as its drivers, the exchange of ideas and solutions and co-design approach become the key to achieving significant progress towards climate neutrality, economic and social digital transitions.

Smart communities, therefore, can be defined as the network of local and regional communities which put the needs of their citizens first and have integrated the digital interoperable environment of services platforms into their local contexts to proactively preserve nature, local ecosystems and create an inclusive, fair and connected society. For smart communities it is natural to connect and integrate various sub-systems (such as energy, transportations, healthcare, agriculture, tourism, education, buildings, etc) to meet people's needs and a particular focus is placed on the active integration of the most vulnerable categories, whilst protecting the environment and ensuring climate neutrality.

Smart tourism interlinks digital and environmental dimensions. It promotes sustainable kind of tourism implementing on digital platforms that supports tourism development. It is focused on increasing the productivity of resource management, maximizing competitiveness and increasing resilience through the application of technological innovations and practices;

Under **Smart mobility** we understand a new and

revolutionary way of transforming how we move, rethinking our transportation models and infrastructure. It is sustainable, shared, flexible, clean and accessible;

Smart health can be qualified as the use of digital technologies in healthcare systems improving the life quality of old people and people with disabilities. This is an open technological platform based on standards, which allows innovators to make applications that simply and safely work in the healthcare system. This interconnected smart health system has the opportunity to make better clinical support, studies, social health and coordination between medical professionals and patients;

Smart agriculture and farming as a management concept is related to collecting data from spaces and providing appropriate tools to the agricultural consultant and farmer so that they will be able to produce the best and more economical agricultural products. It is focused on the promotion of organic farming methods, the protection of food products and conclusions for smart farming. For example, he uses these technologies, such as online things, robotics, unmanned aerial vehicles and fake intelligence, to increase the number and properties of products while optimizing human labor, which is important for production;

Smart energy focuses on powerful, sustainable renewable energy sources that promote greater eco-friendliness while driving down costs and facilitate the full and direct involvement of citizens in the configuration and operation of the energy system;

Context (skills, governance, culture and media) provides the environment for smart communities successful development and impact enhancement;

Skills (see enabling skill above);

Media is a key social and business tool for communities to enhance innovation and to improve the management of urban services. It refers to the utilization of information and communication tools, becoming this way a crucial tool in the development and functioning of the smart community. Media channels serve the cities and governments to disseminate communications more effectively and achieve greater participation and engagement by stakeholders. In smart communities the technology serves the media to provide everyone with equal and unbiased news and tools for free communication;

Governance is the enabling environment that requires adequate legal frameworks and efficient processes to enable the responsiveness of government to the needs of citizens. It defines openness, engagement and inclusion of socio-cultural contexts by cooperation in decision-making process of different stakeholders;

Culture in smart communities plays one of the central roles because of its potential to change attitudes and behaviour to ensure sustainable and social development. It shapes the society's way of life and therefore contributes to building the lively communities and to bring people's well-being, as well as social cohesion, inclusion and openness towards a multicultural society.

Use of smart communities platforms is underpinned by the following important areas: intelligence, knowledge, datasets, contents and services which are enabled by skills and capabilities

developed under smart learning communities' learning 4.0 process.

Intelligence in this case is the acquisition, processing and storage of information, higher-level abilities and utilization of resources to efficiently meet the demands of the environment/ community. Using technology to transform core systems and optimize the return through learning, know-how, creativity, innovation via intelligent solutions

Knowledge in smart communities context refers to all systematized and organised information about know-how, innovations and practices of participating smart communities across 5 verticals and beyond: knowledge can be accumulated in the sphere of effective governance, approaches to media or education.

Datasets are indispensable since smart communities through the use of sensors, smart objects and other data collection points from the platforms. Datasets could be used to derive knowledge.

Contents: one of the principles of smart communities is openness and transparency. Free and digitally-enabled content creation is vital for the ideas and innovations free flow and media credibility.

Services are an integral part of the smart communities' ecosystem facilitating participation in open marketplaces and creating the environment for prosumer culture. Horizontal services and vertical services from a variety of domains are integrated into one architecture to develop platforms for connected smart objects and services, to support citizens and businesses for a multiplicity of novel applications. Innovation platforms and investment platforms are intended to pioneer in enabling and supporting innovative services and businesses development on a large scale for smart communities. Enabling skills agenda is critical to achieving that prosumer culture.

Prosumer culture: prosumers are citizens who combine the roles of consumers and producers to participate in the creation of products and services. They are defined by three factors: commitment, creativity and collaboration. In this way, the public administration empowers citizens to be providers of their needs and thus be able to channel their independent, creative and voluntary ideas and activities towards something real.

Co-development describes the process of bringing stakeholders into the development process. The activity where the users of the planned new system actively collaborate in defining the problem definition), defining the development process and the acceptance of the results. Its collaborative nature allows the active participation of all parties throughout the whole process.

Sovereignty is a crucial element to help citizens design their digital future by giving them control over their personal information. This not only guarantees people's rights to privacy but also enables them to share their data for the public good.

Finally, technology serves the smart learning communities and smart communities in general as enabling environments. Three main elements are key: interoperability, data and security.

Interoperability is acknowledged in importance by the

European commission, as already mentioned in the European decade chapter, and crucial for smart communities in many aspects as without interoperability the service delivery is fragmented and inconsistent. It allows the electronic exchange of the information in the form accessible and understandable by all participants.

Data in this roadmap is related to the standards of data management: open data is necessary to create new services. Smart communities should benefit from increased data availability and data management tools to have a holistic digital representation of the territory and its different activities.

Digital security Nowadays, our lives and personal data reside online and we pursue our daily tasks mainly in the digital world. However, this increase in digital dependence entails numerous risks and threats (i.e., data theft, system breaches, virus-based attacks) that can also make our lives and cities more vulnerable. Therefore, to tackle and overcome these challenges it is pivotal to create strong digital security tools, such as web services, antivirus software, secured personal devices, among others.

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Since 1995 IrRADIARE has developed its own skills in the design, implementation, availability and maintenance of energy, environmental and territorial management systems. Urban management, smart city solutions, energy costs reduction, process safety optimization, environment protection areamong IrRADIARE's target sectors. IrRADIARE operates European-wide from Brussels and Lisbon, within an outreach active network of more than one thousand entities in a significant number of EU regions and cites. Climate, society, sustainability, integration, procurement, investment, data are among the domains on which IrRADIARE works. EU relations, affairs and networks are transversal to IrRADIARE's activity namely to support interaction with EU programmes.

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AURORAL (Architecture for Unified Regional and Open digital ecosystems for Smart Communities and wider Rural Areas Large scale application) focuses on increasing connectivity and delivering a digital environment of smart objects interoperable services platforms able to trigger dynamic rural ecosystems of innovation chains, applications and services. Thus, AURORAL contributes to increase economic growth and create jobs in rural areas and to tackle significant societal challenges, contributes to overcoming digital divide between rural and urban areas and to develop the potential offered by increased connectivity and digitisation of rural areas. AURORAL digital environment is demonstrated by cost-efficient and flexible cross-domain applications through large-scale pilots in five European regions.

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LEARNING 4.0 Ambition Guide

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