BOOSTING SUSTAINABLE DIGITALISATION IN AGRICULTURE, FORESTRY AND RURAL AREAS BY 2040

Highlights from the DESIRA webinar

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On 30 June 2021, the DESIRA Rural Digitalisation Forum (RDF) held a webinar to discuss the role of digitalisation in the European Commission's long-term vision for rural areas (LTVRA), and the policy support needed to ensure that digitalisation leads to the sustainable development of rural areas.

With this EU initiative - developed through a participatory process with rural actors which included a public consultation, stakeholder-led events and an ENRD conference among others - the European Commission launches a holistic vision that proposes a new Rural Pact and a Rural Action Plan with a number of flagship initiatives to help rural communities and businesses reach their full potential by 2040.

DESIRA contributed to this process by capitalising on the knowledge produced so far in the project, and gathering the views of experts of the DESIRA RDF on how digital technologies can contribute to build desirable futures for rural areas by 2040 (See more information here). The RDF also proposes seven guiding principles that need to be applied in order to boost sustainable digitalisation in agriculture, forestry and rural areas.

DIGITALISATION IN THE EU LONG-TERM VISION FOR RURAL AREAS (video)

Juan Manuel VELASCO
Directorate-General for Agriculture and Rural Development (DG AGRI), European Commission

Juan Velasco introduced some of the evidence gathered by the European Commission to build the LTVRA. He outlined the importance of this initiative for Europe as a whole, as rural areas cover 80% of the EU territory, and are home to almost 150 million of European citizens.

The public consultation highlighted several challenges faced by rural areas, for which action is needed: the lack of access to quality public services and infrastructure compared to urban areas; limited employment opportunities, and poor digital and transport connectivity. Digitalisation could be a game changer to tackle these issues.

However, only 60% of rural households have access to broadband coverage of 30Mbps or above, compared to an average of 80% in the whole EU territory. This is a challenge, especially in today's post-pandemic context. Mr Velasco explained that connectivity involves much more than broadband access, and to guarantee a sustainable future for rural areas, digital skills of citizens and rural businesses should accompany the deployment of broadband infrastructure.

Mr Velasco also highlighted the funding mechanisms that the European Commission has in place to promote digital connectivity. The new Common Agricultural Policy (CAP) will require farmers to adopt digital solutions, alongside many other tools. The European Agricultural Fund for Rural Development (EAFRD) has provided support for the last decade to promote digital connectivity. Other mechanisms include the European Regional Development Fund (ERDF), the Connecting Europe Facility (CEF) and, recently, the Recovery and Resilience Fund, 20% of which will be earmarked to strengthen digitalisation.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 818194

PRINCIPLES FOR A SUSTAINABLE RURAL DIGITALISATION

(presentation, video)

Gianluca BRUNORI
Coordinator of DESIRA, University of Pisa (Italy)

Gianluca Brunori presented DESIRA's contribution to the long-term vision for rural areas, which outline experts' views for boosting sustainable digitalisation of agriculture, forestry and rural areas.

He explained that digitalisation is a socio-technical process (Figure 1), which involves infrastructure, application contexts, services and devices, and that civil society, public administrations and private businesses embody these elements. The interactions between them produce certain effects and outcomes. However, from a policy point of view, the digitalisation process should commence from the needs of society, and the expected and desired outcomes from the digital transformation process.

Mr Brunori stressed that digitalisation is not beneficial per se, as it entails certain risks (such as loss of autonomy, increased surveillance, security risks, etc.) (Figure 2). That is why DESIRA understands **digital technologies as the means to an end, and not an end itself**. Digitalisation can apply to different context and for different purposes such as enhancing productivity, quality of environment or resource efficiency, etc. Mr Brunori explained that when planning a digitalisation process in a given context, it is important to take into consideration all the potential effects. it might have, hence looking at the role of each technology, and the relationship between the different elements of the system, defined in DESIRA as the Socio-Cyber-Physical System.

Figure 2. Risks of digitalisation

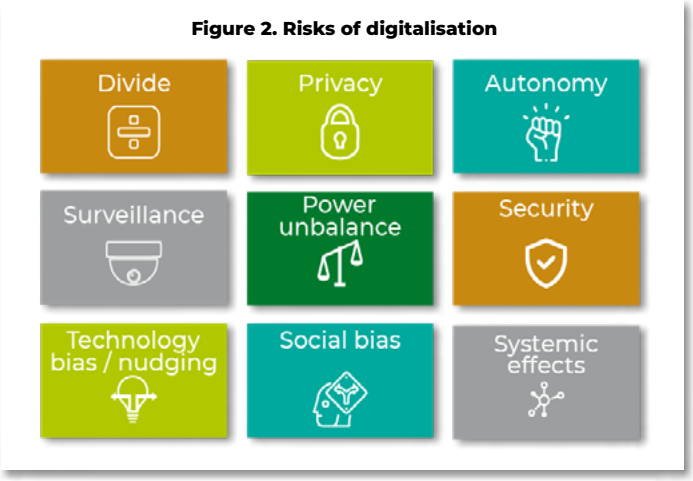
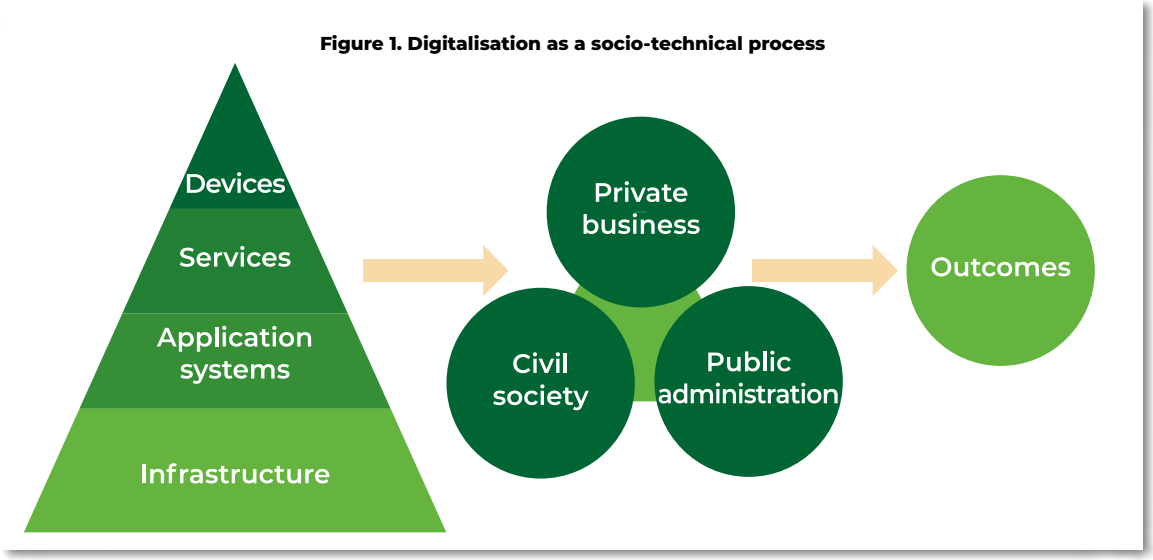


Figure 1. Digitalisation as a socio-technical process



Finally, Mr Brunori elaborated on the 7 guiding principles for sustainable digitalisation developed by experts of the DESIRA Rural Digitalisation Forum:

- Ensure the basic conditions for digitalisation, in terms of human capital, infrastructure and economic gains;
- Anchor digitalisation to the Sustainable Development Goals (SDGs);
- Adapt digitalisation to different contexts, through a participatory and place-based approach;
- Favour digital inclusion to ensure no one is left behind
- Develop digital ecosystems, by promoting the role of digital hubs, innovation brokers, LAGS, etc.;
- Develop adaptative governance models, that are proactive instead of reactive;
- Design policy tools for sustainable rural digitalisation, as Regional Digitalisation Agencies or Agricultural and Rural Knowledge Innovation Systems (ARKIS).

Needs and expectations for digitalisation emerging from DESIRA Living Labs (presentation, video)

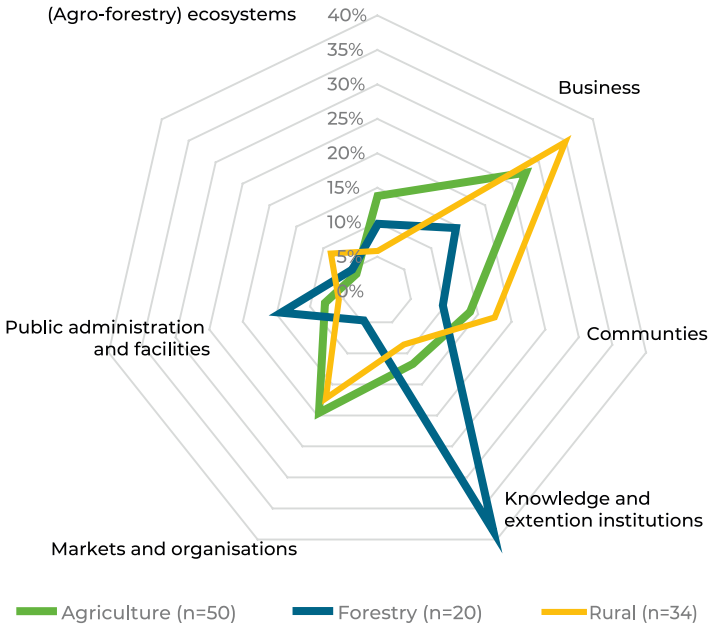
Fabio BARTOLINI
University of Ferrara (Italy)

Fabio Bartolini presented the preliminary results of the DESIRA Needs, Expectations and Impacts (NEI) report, in which the 21 DESIRA Living Labs (LLs) participated. The survey and interviews carried with the different stakeholders involved in the LLs show that there is a clear urban-rural divide in terms of digitalisation, especially in relation to access to digital public services, participation of women in digital contexts, and digital skills to use technologies.

When stakeholders were asked about the **needs for digitalisation** in agriculture, forestry and rural areas, the answers varied (Figure 3). In agriculture, they suggested digitalisation should support the creation of new business opportunities, facilitate access to new markets and value chains, as well as provide new possibilities for farm diversification. In the forestry sector, stakeholders pointed out that digitalisation is needed to enhance access to knowledge, improve support from forest advisors, and collect and interpret new forest data to enhance forest management practices. In rural areas, actors indicated that digitalisation should strengthen local governance systems facilitating the involvement of citizens, and support the creation of new business opportunities.

Figure 3. Needs for digitalisation

(% of LL stakeholders that identified each statement)



Regarding the **adoption of digital technologies** in the next five years, more than 50% of the stakeholders are likely to increase their use of basic technologies (as web platforms, cloud services or social networks), but they were not as optimistic about the use of advanced technologies (as augmented or virtual reality, artificial intelligence or blockchain).

Mr Bartolini highlighted that the **main obstacles to digitalisation** were the costs of implementation, the lack of ICT skills among the staff, and the low levels of digital connectivity and digital infrastructure (Figure 4).

Finally, he outlined the impact of digitalisation on stakeholders in enabling them to access to new tools, technical means, and equipment that improve their working conditions. However, some other aspects have worsened, or show no impact, as employment, or compliance with safety and health standards (Figure 5).

Figure 4. Obstacles for adoption of digital technologies

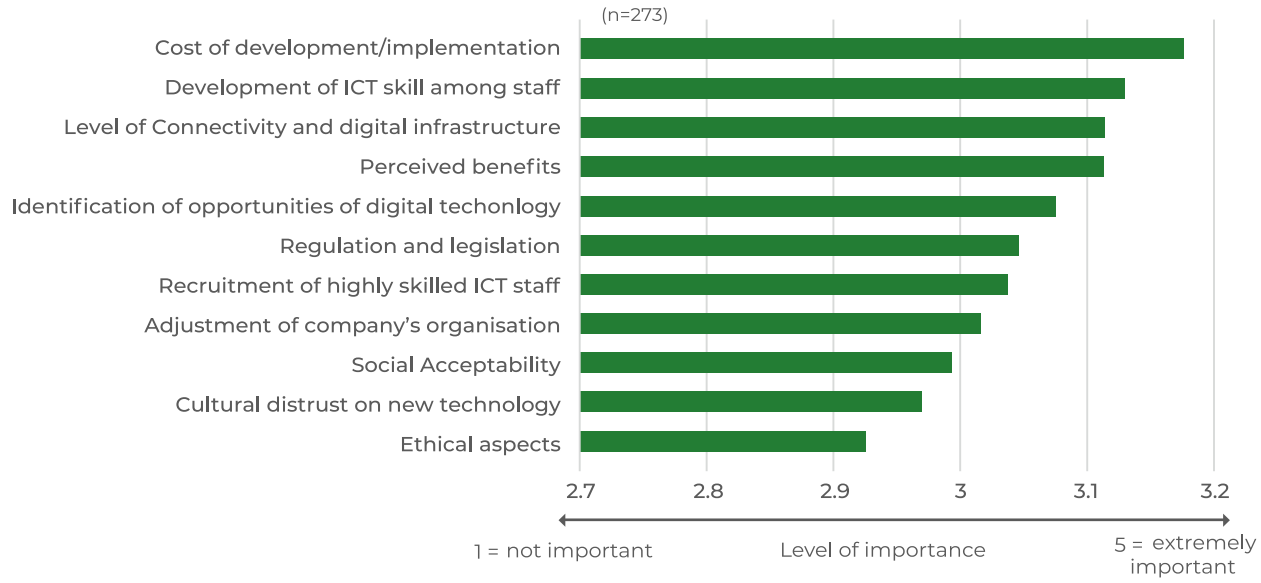
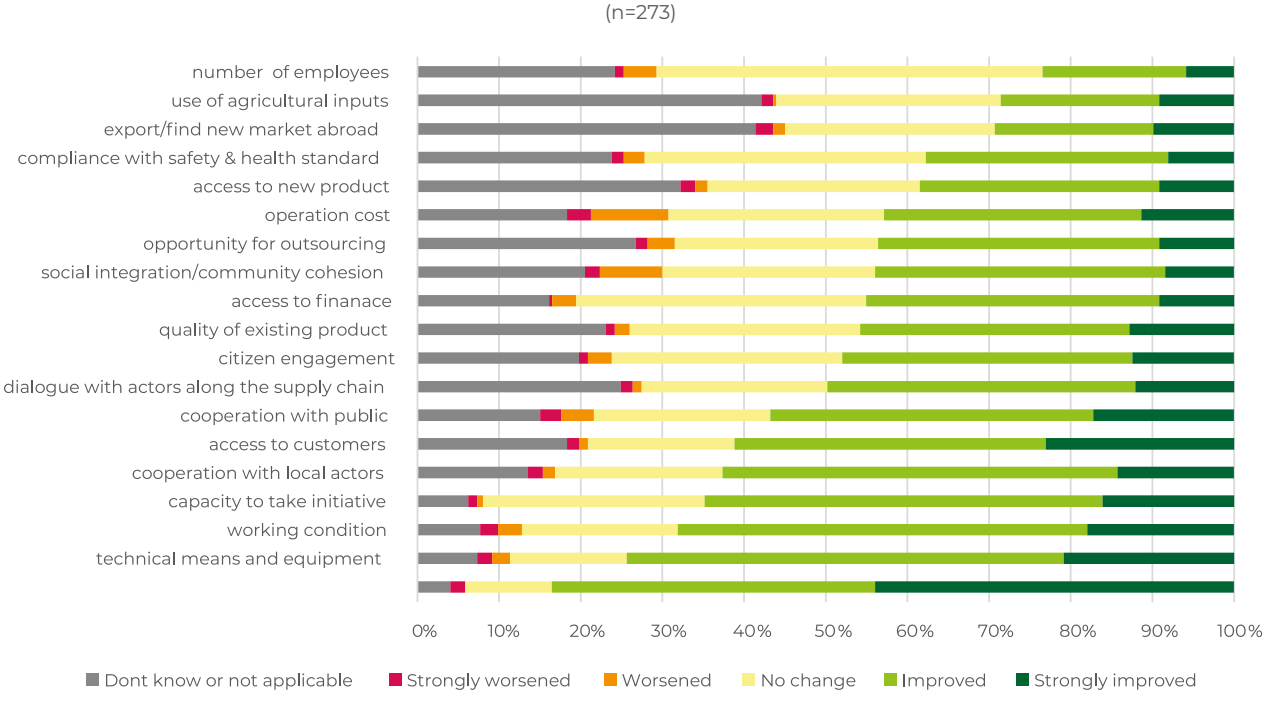


Figure 5. Current impact of digitalisation



Digitalisation in agriculture by 2040 (presentation, video)
Cynthia GIAGNOCAVO, University of Almería (Spain)

Cynthia Giagnocavo focused her presentation on managing the digital transition in agriculture by 2040. Among the challenges, she explained the problem of adopting a technology-centric approach to digitalisation. She highlighted that for the success of digital transformation in businesses, it is necessary to operate at three levels at the same time, namely governance, management and implementation. Regarding the opportunities for digitalisation in agriculture, she pointed to the search for innovative and value-added 'business models'. She stressed that the concepts of value and competition have to be re-thought in terms of sustainability.

Ms Giagnocavo outlined that the positive impact of digitalisation requires the intersection of organisational, technical, social, economic and institutional innovation, as well as the three dimensions of sustainability (social, environmental and economic). This requires innovative business models for a more equitable approach to digital transformation.

At the policy level, Ms Giagnocavo recommended that policies should not put the burden and risk on farmers and they must contribute to reverse the logic of the market, where the environment competes with the value or market growth.

Digitalisation in forestry by 2040 (presentation, video)
Monia SANTINI, CMCC Foundation (Italy)

Monia Santini focused her presentation on application scenarios for forest management and introduced participants to the Programme Destination Earth (**DestinE**; 2021-2030), which aims at developing a high precision digital twin (a replica) of our planet, to understand the past, monitor the present and predict the future.

Another example presented was the **Madames-AX** project, aimed at analysing mitigation and adaptation strategies for Mediterranean forest ecosystem services, by translating models into useful information to assess, monitor and predict forest cycles. Forest-specific data, together with forest management information, fitted the model and using various processed data and databases. This in turn revealed the need for data harmonisation to make it available at the same resolution and make it easily applicable.

Ms Santini concluded by outlining three key elements which are vital for supporting digitalisation in the forestry::

- Synergistic use of multi-source monitoring data (in situ, satellite, drones, etc.) and modelling approaches (statistical, machine learning, process-based model, etc.).
- Investments in High Performance Computer (HPC)/data infrastructure in order to store as much data as possible at high resolution.
- Use of indicators to generate user-tailored information. Indicators that synthesise the outputs from models into easily understood information for users. This is possible through co-design, co-evaluation, directly with users. Having short-feedback loops and understand which could be the more effective and efficient information that science could create.

Digitalisation in rural areas by 2040 (presentation, video)
Emilija Stojmenova, 4P Digital Innovation Hub (Slovenia)

Emilija Stojmenova presented her vision for the digitalisation of rural areas by 2040. She noted the need for functional, efficient and human-centric technologies, with an emphasis on the opportunities these technologies can offer. She drew particular attention to those technologies that drive social innovation forward and offer solutions for climate risks mitigation, as well as lifelong learning for people and businesses. The latter can enable at-scale reskilling of rural inhabitants (especially populations at risk of unemployment), and equip the whole population with the digital and cognitive skills they need to succeed in a future of work context.

Ms Stojmenova stressed the importance of seeing innovation on a broader spectrum, namely social innovation, technological innovation and community-led innovation. The later seems to be emerging strongly as a suitable approach for driving innovation in rural areas based on the cooperation of key actors.. In addition, she outlined how digital technologies can be used in a variety of rural fields and sectors such e-education, e-health or culture, to create new opportunities and business models.

Ms Stojmenova pointed out the importance of intermediaries for driving rural innovation, also in non-agri-food sectors. – people that animate, lead and bring in knowledge to facilitate the digitalisation process. Hence, there is a need to build the digital capacities and skills of rural communities.In this regards, she advocates for a ringfencing of 30% of the EU funds allocated to support Digital Innovation Hubs (DIH) across Europe for targeted actions in rural areas to make sure these important intermediaries also plan bring change in rural communities and business.

Finally, Ms Stojmenova elaborated on the **recommendations for digital transformation policy** that emerged from the Interreg project on Smart Villages and outlined the complementarities with the DESIRA's guiding principles to boost digitalisation.

CURRENT CHALLENGES & OPPORTUNITIES FOR DIGITAL TRANSFORMATION

The following are the main challenges and opportunities outlined by participants in the discussion groups organised within the webinar. It does not intend to be a comprehensive report but a brief snapshot of the main points identified by the members of the Rural Digitalisation Forum.

Main challenges

- **Poor access to digital connectivity and high-quality internet infrastructure, and low digital skills of rural citizens and businesses**. The most prominent rural-urban divide is related to digital connectivity and access to quality internet. The divide also refers to the lack of skills and capacities to adopt digital technologies among rural citizens and businesses, which hampers the social and economic use of available infrastructure.
- **The cost to access, design and deploy digital technologies**. This is particularly important when the application of new digital technologies is an obligation. The existing variety of financial sources with different rules, deadlines, requirements, controls, etc., makes it very difficult for local stakeholders to access the funding opportunities needed for the design and deployment of new technologies.
- **Low motivation and lack of capacities of local actors to participate and lead digital transformation processes at local level**. Rural communities and municipalities have limited capacity and resources to drive the complex process of digitalisation. There is a need for supporting technical assistance to small or remote rural areas so they can identify, design and implement digital technologies that respond to their needs and allow them to access the financial resources available to fund digitalisation. Supporting the role of digital brokers (which can take different forms such as DIH, universities, SMEs, civil society organisation, fablabs, LAGs, etc.) is key to ensure all rural areas can have the capacity to embark in a digital transformation process.

Relevant opportunities

- **Access to markets and opportunities for new business models**. Digitalisation is creating opportunities for rural businesses (agricultural and non-agricultural) to adapt their business models and reach out new markets. It is also enabling the creation of new market opportunities in newly emerging sectors (nomad and remote workers, energy, e-health, mobility, etc.).
- **Enhance access to services**. Digital technologies are offering the possibility to reduce distances and create sufficient critical mass that allows the implementation of new models for the delivery of essential services in rural areas (public administration, education, health, care, mobility, etc.).
- **Enhance productivity and resource efficiency**. Digitalisation enables the application of new technologies that reduce of use of inputs (e.g. in agriculture, forestry or public administration), resulting in better incomes and, in certain cases reducing the impact on climate change and to the environment.
- **Enable community-led innovation**. Digitalisation might reshape the way rural areas and citizens interact with each other, and create new and adaptive governance models. Increased social cohesion in rural areas is an essential aspect for enabling community-led innovation in all relevant rural fields. Also, it might facilitate access to new knowledge sources, practices, examples and create spaces for co-creation and innovation.

POLICY SUPPORT NEEDED ON THE GROUND TO ENSURE SUSTAINABLE DIGITALISATION

Set up a holistic framework of targets for rural digitalisation. Rural digitalisation targets should be set up at all levels of power (EU, national, regional and local) and should go beyond infrastructure and broadband deployment and encompass other important aspects such as skills and access to digital technologies.

Ensure that policies supporting digitalisation do not trigger or widen the rural-rural divide. Existing dynamic rural areas will actively boost digitalisation processes in their territories. There is a risk that a results-based policy may just target support areas that can produce quick results, while leaving behind those that do not have the capacity to embark on digital transformation on their own. Particular attention should be given to ensuring that areas lagging behind can access support to take advantage of digitalisation. Otherwise, there will be an increase in development inequalities between different rural areas.

Policies should support digitalisation, but not at any cost. Digitalisation draws a lot of policy attention, presenting a growing risk of developing instruments that support the deployment of digital technologies for the sake of it. Policies should be designed to facilitate digital transformation, following a holistic approach of social, environmental and economic sustainability. This requires time and a comprehensive assessment of the territorial conditions, to enable communities and business to seize the available opportunities and avoid the risks digitalisation might post.

Digital infrastructure and digital skills are the preconditions for digitalisation. As a basic condition, broadband coverage and infrastructure need to be ensured, especially in remote rural areas. However, this is not enough. Policies should be oriented toward guaranteeing human capital, by providing training in the appropriate use of digital technologies. Capacity building and awareness raising are not only essential for end-users, but also for policy-makers and innovation brokers or connectors, to understand the benefits of digitalisation and its application, and to present and explain its use to different communities and sectors.

Support is needed for local cooperation in digitalisation in a variety of rural fields. A call was made for policy instruments that allow communities to cooperate among each other, and with DIHs, ICT companies, innovators, knowledge centres, etc., enabling the creation of local innovation ecosystems. These cooperation projects should aim to maximise the bottom-up approach (local know-how, assets, etc.) while integrating the top-down approach (knowledge external to the communities, e.g. technological options, ICT design, etc.).

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