

SmartCommUnity Project

Report on the links between WP1 and WP2

The INTERREG Alpine Space SmartCommUnity project | APRIL 2025

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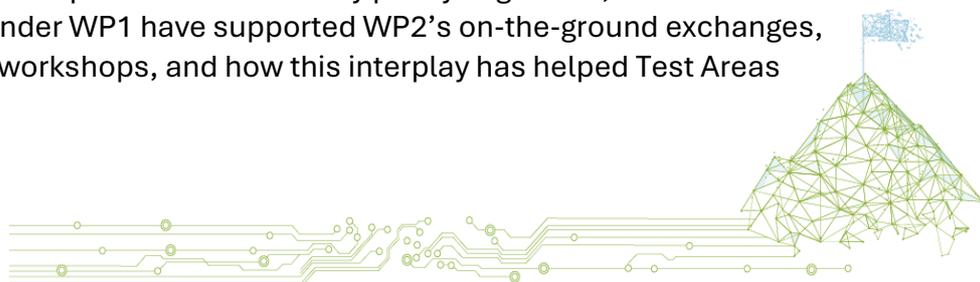


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Introduction

This report explores how WP1 — EUSALP uptake and policy integration — has worked hand in hand with WP2 — test activities and networking to turn the SmartCommUnity vision into practice across the Alps. It looks at the way policy alignment, network governance and outreach under WP1 have supported WP2’s on-the-ground exchanges, from study visits to partner workshops, and how this interplay has helped Test Areas



learn from each other and position their work within the SmartAlps network framework. Where facts about the network's mandate, structures and formats are needed, they draw on the validated account in Deliverable D.1.1.1.

The chapters that follow bring together evidence from the project's study visits and partner sessions, including systems-thinking and foresight activities, and trace the concrete pathways by which Test Areas have connected with SmartAlps through membership, webinars, forums and shared tools to sustain exchange beyond individual pilots.

The report closes with a synthesis of the added value created by the WP1–WP2 linkage and a set of forward-looking recommendations and next steps suited to the project's conclusion and the continued stewardship of results under the SmartAlps umbrella.

Background: WP1, WP2, and the SmartAlps network

WP1 (EUSALP uptake and policy integration) and WP2 (test activities and networking) were conceived to be mutually reinforcing. WP1 provided the governance framework, policy alignment and network facilitation that allowed exchanges among Test Areas to happen in a coherent way across countries. WP2 translated that framework into practice through study visits, peer learning and field testing. The SmartAlps network acted as the connective tissue between the two, offering a shared identity, a light governance structure and common formats (webinars, forums, membership pathways) that helped partners and Test Areas to meet, compare approaches and carry insights back home for application. The institutional set-up for SmartAlps—its steering and secretariat functions, membership logic and the early development of digital exchange formats—is documented in Deliverable D.1.1.1 and forms the baseline for how the network supported and amplified WP2's learning processes.

Within this arrangement, the Autonomous Region of Valle d'Aosta (RAVA), as co-leader of WPEU, played a bridging role: facilitating participation from Test Areas and SmartAlps members by reimbursing travel and accommodation costs for study visits, and commissioning external facilitation from Skopìa Anticipation Services Srl to run thematic workshops. The results of workshops with partners are consolidated in this deliverable, while workshops with schools conducted in different Alpine regions are reported in D.1.4.1. Descriptive overviews of the study visits themselves are available on the Smart-Alps blog (<https://smart-alps.eu/blog/>), which serves as a public record of activities and a pointer to the territories visited.

Study Visits: Overview and Methodology

Study visits were planned from the outset to put Test Areas in direct contact, compare practical solutions and exchange good practices under real conditions. Four visits were organized with SmartCommUnity partners in the Test Areas of Valle d'Aosta (Italy), Lienz (Austria), Valence (France) and Freiburg (Germany). Each visit combined on-site demonstrations with structured peer-learning moments and feedback loops to make



sure takeaways were explicit and transferable. Participation was opened beyond project partners to include SmartAlps members and local stakeholders, and RAVA enabled this broader involvement by reimbursing travel and accommodation costs. This ensured that knowledge did not remain confined to project teams, but reached municipalities and actors who could put it to use.

Across the four visits, a common methodology was applied. Hosts curated short field itineraries and concise showcases focused on problems and solutions rather than generic presentations. Sessions for testing SmartAlps tools and gathering immediate impressions were embedded in the agenda so that partners could assess usefulness and barriers while the experience was still fresh. Skopïa Anticipation Services Srl facilitated thematic workshops using systems-thinking and foresight lenses to surface assumptions, map interdependencies and turn observations into actionable insights. These facilitated moments helped participants connect what they saw on the ground with strategic choices back in their territories, and created comparable outputs across visits.

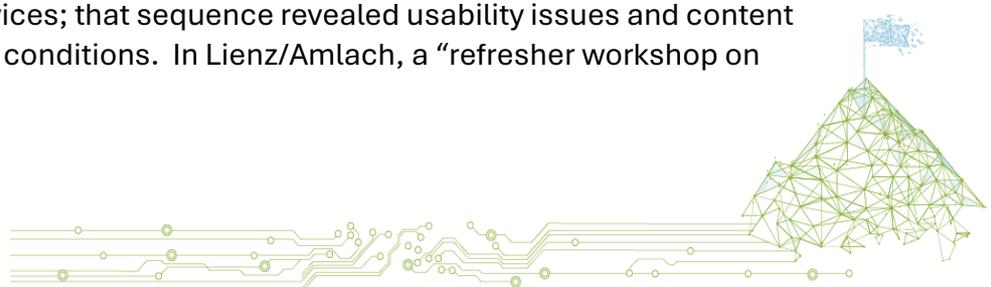
In order not to overload partners with extra meetings, follow-up discussion and consolidation were channelled into the monthly PMB meetings, where insights from each visit were reviewed and, where relevant, aligned with SmartAlps network activities such as upcoming webinars or forum topics. Public-facing summaries and visuals were posted on the Smart-Alps blog (<https://smart-alps.eu/blog/>) and Facebook channel (<https://www.facebook.com/smartcommunityproject>) to make the evidence discoverable outside the project.

Main findings from Study Visits

Across the four study visits in Valle d’Aosta (5–7 Mar 2024), Lienz/Amlach (15–16 Oct 2024), Valence / Baronnies en Drôme Provençale (19–20 Mar 2025) and Freiburg / Elzach & Winden im Elztal (1–2 Oct 2025), a clear set of cross-cutting lessons emerged about what enables smart transitions in Alpine territories and how WP1–WP2 collaboration translates into tangible local change. The evidence below synthesizes the most recurrent, well-documented findings from the project study visits.

1) Putting tools into real contexts surfaced what works—and what doesn’t—faster than desk testing.

Hands-on sessions with Smart Alps components provided immediate, practical feedback loops. In Valle d’Aosta, partners trialled the Visit Gran Paradiso app in the field, coupled with e-bike mobility and wildlife monitoring demonstrations, before moving to a WPIT workshop to test smart-alps.eu features (including the chatbot) in multiple languages and devices; that sequence revealed usability issues and content gaps only visible under real conditions. In Lienz/Amlach, a “refresher workshop on



tools used in the Aosta Valley visit” was deliberately held in Hochsteinhütte, reinforcing lessons in situ and keeping iteration cycles short.

2) Data infrastructure and sovereignty matter—local storage and shared rules build trust.

The Lienzer Talboden Test Area presented a concrete architecture for municipal data spaces: widespread LoRaWAN sensors across 15 municipalities, local storage of data, and a pathway to value creation through datahub.tirol, with accompanying discussions on EU-compliant data-space governance and “sovereign data exchange.” This showed participants how technical choices (where data lives, who can use it, under what conditions) underpin long-term adoption and inter-municipal cooperation.

3) Systems thinking and foresight gave partners a shared language for change.

Methodological workshops—introduced in Aosta with a first “systemic reading” lab and continued in Lienz with key conditions for innovation and megatrends and future technologies sessions (including a student track), then used again in Valence and Freiburg—enabled partners to map interdependencies, compare assumptions, and turn observations into actionable insights across very different territorial contexts.

4) Youth engagement is not a “nice to have”, it changes priorities and makes solutions stick.

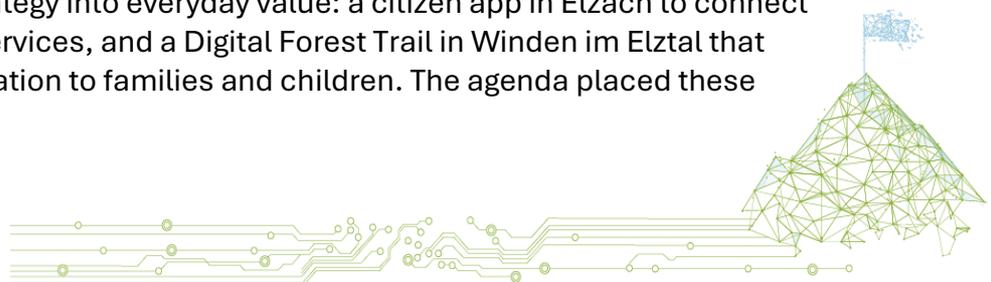
From the Montagna 4.0 interaction in Aosta (more than 200 students) to Megatrends workshops with secondary students in Lienz, Valence and Freiburg, to EUSALP Youth Council contributions at the Freiburg Final Conference, the study visit format consistently opened space for young people to co-shape agendas. Partners reported that youth inputs shifted emphasis toward accessibility, learning, and everyday usefulness of digital tools.

5) Smart mobility, cultural access and place-based services anchor “smartness” in daily life.

The French visit showed how pragmatic, human-scale initiatives can unlock inclusion: inter-communal cultural-access policies (including Micro-folies—a digital gateway to national museum collections in rural areas), a local museum (J.F. Layraud) integrated into the itinerary, and mobility actions such as “Vélo pour tous.” These concrete services framed discussions on climate adaptation, housing and social participation, illustrating how WP1 policy frames and WP2 test-area practice reinforce each other.

6) Municipal pilots demonstrated that co-design delivers visible public services.

In and around Freiburg, site visits and the Final Conference spotlighted how co-designed pilots turn strategy into everyday value: a citizen app in Elzach to connect residents with municipal services, and a Digital Forest Trail in Winden im Elztal that brings environmental education to families and children. The agenda placed these



examples alongside expert inputs from BBSR and Fraunhofer IESE, situating local practice within wider European innovation frameworks.

7) Study visits doubled as governance moments to keep the network aligned.

Beyond field demonstrations, each mission integrated structured partner and network time: in Aosta, a WPEU workshop and world-café on LTA/FTA linkages; in Lienz, a PP meeting and sessions on dataspace strategy; in Valence, an internal consortium meeting plus a workshop on “conditions to maintain the SmartAlps network and foundations for a future project;” in Freiburg, PP and AG5 meetings preceded the conference. This cadence allowed WP1 policy alignment and WP2 field learning to feed each other continuously.

8) Broad, transnational participation amplified impact and diffusion.

Attendance lists across visits and the Final Conference evidence sustained involvement from partners, SmartAlps members, regional/national authorities and observers (e.g., datahub.tirol presentation in Lienz; strong local government presence in Valence; broad stakeholder mix in Freiburg), which increased opportunities for replication and policy uptake.

9) Narrative, identity and policy framing matter as much as technology.

A consolidated narrative from the study visit corpus underscores that successful pilots were those that blended technology with community identity and service logic—be it a sensor network for public buildings (Lienz), an AI-enabled heritage guide (Gran Paradiso), a bike-lending scheme (Baronnies), or a municipal citizen app (Elzach). Study visits repeatedly confirmed that “smart” becomes durable where tools, governance, learning and place-pride meet.



Insights from Systems Thinking and Foresight workshops with partners

Across the SmartCommUnity study visits, partners participated in a series of facilitated workshops designed and conducted by Skopia Anticipation Services to introduce and apply **systems-thinking and foresight methods** as shared learning frameworks. These sessions provided a structured way for partners to interpret complex territorial dynamics, co-design strategies for innovation, and envision how SmartAlps and local test areas could evolve beyond the project.

From Systemic Reading to Shared Understanding (Aosta, March 2024)

The first workshop, “*Introduction to systemic reading of good practices*” (Aosta, 5 March 2024), introduced participants to key systems-thinking principles such as **emergent properties, delays, leverage points, wicked problems, and mental models**.

Through practical exercises using **Behaviour-Over-Time Graphs** and **Connection Circles**, partners explored how to visualise temporal trends, map interdependencies, and reveal causal feedbacks underlying successful or struggling practices in Alpine territories.

These tools were then used during site visits as interpretive “lenses” to read good practices systemically — helping participants see beyond individual projects and identify enabling conditions (actors, resources, feedbacks) that sustain innovation over time.

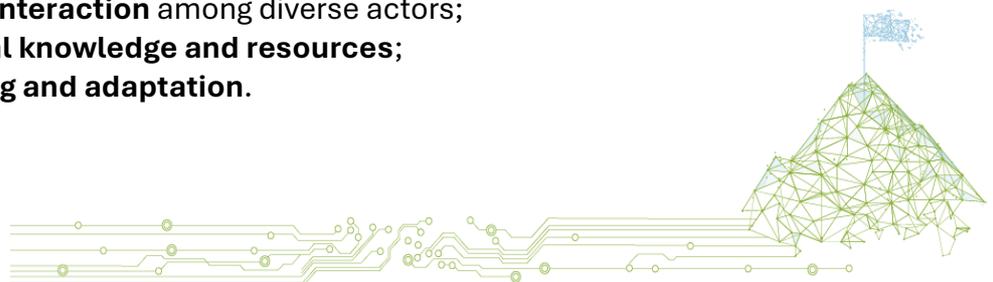
Tools for Mapping Innovation Ecosystems (Lienz, October 2024)

The second workshop consolidated this shared vocabulary by re-applying the framing, BOTG, and Connection-Circle methods. Partners discussed how frames (spatial and temporal boundaries) shape understanding and how visualising circular causality helps to design adaptive interventions.

The following day, the workshop *Promoting Innovation - Systems Thinking to identify and amplify key conditions for innovation* extended this reflection. Working in small groups, partners mapped **innovation ecosystems** related to topics such as **circular processes in food production and distribution** (with reference to the GreenPoint LL project), **flood management** (disaster response or emergency management and anticipation), and **short supply chains** (focusing on Pomurje region, Slovenia).

These collaborative maps revealed that innovation in Alpine regions depends on **three interlinked pillars**:

- **Collaboration and interaction** among diverse actors;
- **Valorisation of local knowledge and resources**;
- **Continuous learning and adaptation**.



Participants then identified **key informative feedbacks** and **practical actions**—for example, integrating regenerative and precision farming, improving communication tools for disaster management, and reinforcing data transparency through blockchain systems.

The exercise highlighted how systems thinking can uncover leverage points for resilience and provide a framework to connect local experimentation with macro-regional policy goals.

Designing Innovation Systems (Valence, March 2025)

The Valence study visit advanced the foresight component with the workshop “*Ecosystems of Innovation | Innovation ecologies - A systems perspective for Self-Sustaining Innovation*”, with the aim of exploring the conditions for the network to be maintained and the foundations for a future project.

Starting from the concepts of **innovation systems**—defined as dynamic networks of actors, institutions and resources generating valuable novelty—participants reflected on the prerequisites for **self-sustaining innovation** within Smart Communities.

The workshop combined **AI-assisted co-design** (collaborative prompting with chatbots such as ChatGPT and Gemini) and **systemic group dialogue** inspired by the World-Café format. Four mixed partner groups co-created preliminary project ideas around key transition domains:

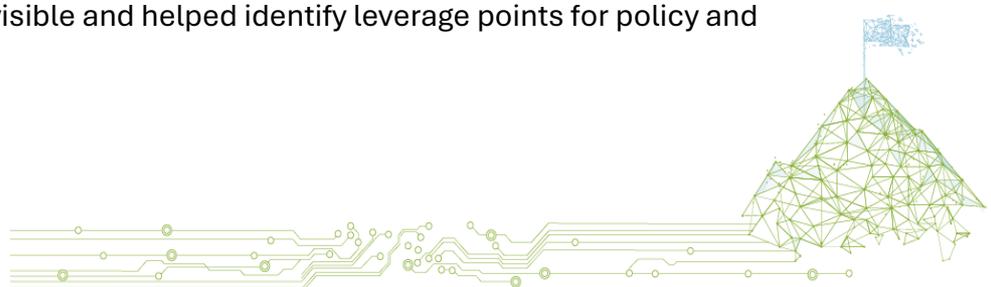
1. **Digital inclusion and literacy (DigiFriends)** – establishing rural digital innovation hubs and community digital ambassadors;
2. **Integrated water management** – combining IoT, AI and nature-based solutions for climate-resilient governance;
3. **Rural revitalisation through digitalisation** – enabling remote work, education and civic participation;
4. **Energy self-sufficiency** – promoting community-led solar and hydropower solutions.

For each concept, participants discussed enabling conditions, governance models, and mechanisms for long-term self-sustainability. The co-use of AI tools accelerated ideation and exposed opportunities and risks of digital collaboration, reinforcing the principle that **innovation emerges from interaction rather than technology alone**.

Cross-cutting Insights

Across all workshops, several recurring insights emerged:

- **Systems thinking and foresight provide a common language** that bridges disciplines and national contexts, enabling partners to articulate how local projects contribute to broader Alpine transitions.
- **Visualization tools** (BOTGs, connection circles, ecosystem maps) made interdependencies visible and helped identify leverage points for policy and project design.



- **Innovation is relational:** it arises from trust, dialogue, and iterative learning among actors rather than isolated technological adoption.
- **Foresight methods stimulate creative anticipation**, allowing partners to frame innovation with long-term perspectives and to recognise potential unintended effects.
- **AI-supported co-design** can enhance collaboration when used transparently and critically, complementing—not replacing—human sense-making.
- **Youth participation** in parallel workshops proved crucial to broaden perspectives on desirable futures and to align innovation agendas with emerging generations' values.

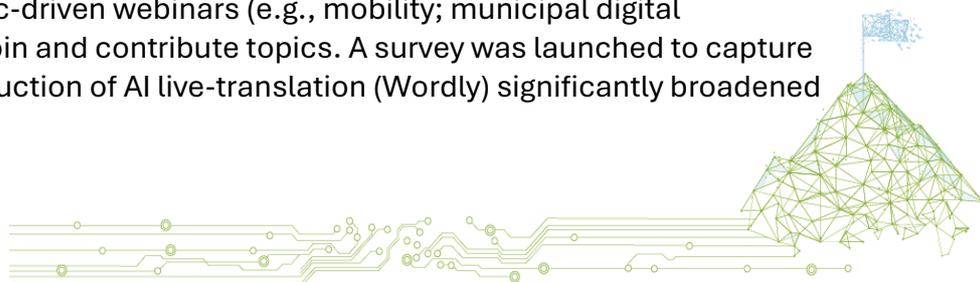
Together, these workshops transformed study visits from simple knowledge-exchange events into **collective learning laboratories**, generating a coherent methodological spine for SmartCommUnity and laying the groundwork for the SmartAlps network's future capacity-building activities.

Integration of TAs within SmartAlps

Starting point and intent. The SmartAlps network—set up at the end of the SmartVillages project—was structurally in place at the outset of SmartCommUnity but test areas (TAs) were not yet integrated as members. During SmartCommUnity, partners used events, study visits, and interactive webinars to bring TAs into SmartAlps so that good practice exchange could continue beyond the project lifecycle. This approach aligns with the network's governance and engagement formats documented in D.1.1.1, which describes the Steering Board/Secretariat set-up, member & contributor pathways, and a programme of webinars and forums intended to sustain transnational exchange.

Onboarding moments embedded in study visits. TA integration was deliberately built into the field missions. In Valle d'Aosta (Mar 2024), the WPTAN world-café included a dedicated theme on “embedding the participation of TAs into the SmartAlps network,” turning a technical visit into a network-onboarding step. In Valence (Mar 2025), ADRETS hosted a stakeholder welcome evening specifically to present the SmartAlps network and the smart-alps.eu platform to local actors (communes and the inter-communal authority), again using the study visit to broaden SmartAlps reach. In Freiburg (Oct 2025), a Project Partners (PP) meeting and an AG5 meeting framed the final public conference, ensuring the network perspective accompanied the Elzach–Winden pilot showcases.

Reducing access barriers through webinars and language support. Throughout the project, SmartAlps ran topic-driven webinars (e.g., mobility; municipal digital platforms), inviting TAs to join and contribute topics. A survey was launched to capture TA priorities, and the introduction of AI live-translation (Wordly) significantly broadened



participation beyond English-speaking audiences—an explicit response to partners’ feedback that language had limited TA involvement. These measures are recorded in D.1.1.1 and partner reports, and they provided a scalable way for TAs to enter the network’s routines between physical meetings.

Using the innovation platform as a shared home. The project re-launched the SmartAlps Digital Exchange Platform with forums and tool access to support ongoing exchange among members. Early utilisation of the forums was modest due to recent launch and minor technical inconsistencies, with a plan to promote their use once issues were resolved—a pragmatic sequencing that still gave TAs a clear entry point and a recognizable “home” in the network.

Making participation feasible for local actors. A recurring practical enabler was cost coverage for TA stakeholders to attend transnational events. As co-leader of WPEU, RAVA financed T&A reimbursements for TA and SmartAlps representatives, which directly lowered the threshold for municipalities and local organisations to show up, present, and ultimately join the network pathways.

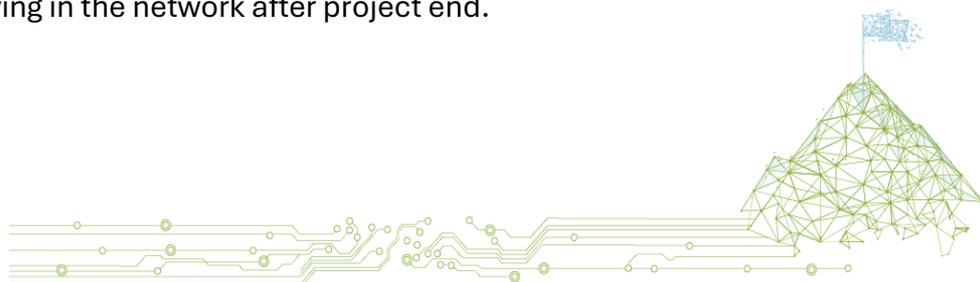
Evidence of growing integration. Across the missions, TA actors are visible in agendas and attendance lists: municipal leaders and stakeholders in Valle d’Aosta and Lienz/Amlach, a strong presence from CC Baronnies en Drôme Provençale and local communes in Valence, and extensive municipal and regional representation at the Freiburg partner meetings and Final Conference. In parallel, D.1.1.1 documents an expanding membership base and a formalised governance able to onboard newcomers—conditions that make sustained TA participation feasible beyond the project.

What changed for TAs by the end of the project

Awareness and access: TAs were systematically exposed to SmartAlps tools and formats—on site, online and at network events—so that joining felt like a natural continuation of project collaboration rather than a new, separate step.

A standing place to meet: The platform and webinars provided durable venues where TAs could keep sharing practices (e.g., mobility, digital platforms) and discover peers tackling similar issues across borders.

Bridges to policy and other AGs: The AG5 frame ensured TAs’ experiences flowed upward to macro-regional conversations (e.g., DAC agendas; AG5 meetings), reinforcing the value of staying in the network after project end.



A note on continuity. SmartAlps' regulations, Secretariat and Steering Board (as set in D.1.1.1) give the network a backbone for the post-project phase, while the forums/webinars and member pathways offer day-to-day continuity for TAs. Label options and additional recognition mechanisms were also explored to deepen engagement and signal quality, which can further incentivise TAs to remain active contributors over time.

Synthesis: WP1–WP2 Synergies and Added Value

The SmartCommUnity project stands out for the depth and continuity of dialogue between WP1 (EUSALP uptake and policy integration) and WP2 (test activities and networking). This synergy was not just a matter of parallel workstreams—it was actively cultivated through a series of joint meetings, shared workshops, and integrated governance routines.

Extensive dialogue and coordination. Early in the project, WP1 and WP2 established a habit of regular, focused meetings with WP3 (innovation tools), which allowed technical and policy teams to align on priorities and troubleshoot emerging issues. As the project matured, these exchanges were integrated into the monthly Project Management Board (PMB) meetings, making it easier for all partners to coordinate, share updates, and respond to challenges in real time. This move from siloed to integrated governance was a key enabler for cross-work package learning and rapid adaptation.

Concrete results showcased and amplified. A major source of added value was the ability to showcase tangible WP2 results (pilots, tools, and local innovations) at high-profile WP1 events, most notably the Digital Alps Conference workshops. These events did more than disseminate findings: they expanded the audience for test area results, connecting local actors with regional and macro-regional stakeholders, and provided a platform for peer learning and policy dialogue. The visibility gained through these events helped test area innovations gain traction and credibility, and fostered new collaborations across the Alpine region.

Integration into policy recommendations. The dialogue between WP1 and WP2 was not just about sharing updates—it directly shaped the policy recommendations developed and discussed in deliverable D.1.5.1. By integrating concrete results and lessons learned from WP2 into the policy process, SmartCommUnity ensured that recommendations were grounded in real-world experience and reflected the needs and aspirations of local communities. This iterative feedback loop—where field practice informed policy, and policy in turn supported further innovation—was a hallmark of the project's approach.

Synergies in practice:



- Study visits and events became living laboratories for WP1–WP2 interaction, with policy frameworks tested and refined through hands-on experimentation in the test areas.
- Systems thinking and foresight workshops provided a shared language and methodology for partners to map interdependencies, anticipate challenges, and co-design solutions.
- Youth engagement and cross-border participation ensured that the project’s impact extended beyond technical outputs to include social learning and capacity building.

In summary:

The synergy between WP1 and WP2, anchored in ongoing dialogue, joint governance, and the public demonstration of results, was central to SmartCommUnity’s success. It enabled the project to move beyond isolated pilots and policy papers, creating a dynamic, transnational network where innovation and policy reinforce each other, and where the lessons of the test areas can continue to shape Alpine resilience for years to come.

Recommendations and Next Steps

The SmartCommUnity project has demonstrated that resilient, innovative Alpine regions are built through ongoing collaboration, practical experimentation, and a commitment to human-centered digital transformation. As the project concludes, several clear recommendations and next steps emerge to ensure that the momentum, learning, and connections established continue to deliver value for test areas and the wider SmartAlps network.

1. Sustain the SmartAlps network as a living platform for exchange.

The integration of test areas into SmartAlps—through study visits, webinars, and shared tools—has created a foundation for ongoing transnational learning. To maintain this, it is essential that the network remains active, welcoming, and responsive to the evolving needs of its members. The transition of network management to the Horizon Smart Era project provides a concrete pathway for continuity, ensuring that test areas wishing to remain engaged can do so with support, access to resources, and opportunities for collaboration.

2. Continue to prioritize bottom-up governance and adaptable solutions.

The most effective innovations observed during the project were those rooted in local context and co-designed with communities—whether a citizen app in Elzach, a bike-sharing scheme in Baronnie, or an AI heritage guide in Gran Paradiso. Future



initiatives should build on this principle, supporting test areas to experiment, share results, and adapt solutions to their unique challenges.

3. Leverage systems thinking and foresight for strategic planning.

Workshops and facilitated sessions using systems thinking and value-based design have equipped partners with tools to map interdependencies, anticipate change, and co-create strategies. Embedding these methods into future SmartAlps activities will help the network remain agile and forward-looking.

4. Ensure youth engagement and cross-generational learning remain central.

Youth participation brought fresh perspectives and shifted priorities toward accessibility, sustainability, and everyday relevance. The network should continue to create space for young people to contribute, learn, and lead, making smart transitions truly intergenerational.

5. Use events and digital platforms to amplify impact and policy influence.

Showcasing concrete results at high-profile events (such as the Digital Alps Conference) has expanded the audience for test area innovations and facilitated their integration into policy recommendations (as detailed in D.1.5.1). Future SmartAlps activities should maintain this dual focus: celebrating local achievements while connecting them to broader policy frameworks.

6. Lower barriers to participation and foster inclusivity.

Efforts to reimburse travel and accommodation, provide live translation, and tailor engagement formats have made it easier for diverse test areas to join and contribute. These practices should be continued and expanded, ensuring that SmartAlps remains accessible to all interested communities.

7. Anchor continuity in clear governance and open membership.

The SmartAlps network's formal structures—Steering Board, Secretariat, member pathways—should be maintained and periodically reviewed to ensure they support active participation and knowledge sharing. Label options and recognition mechanisms could further incentivize ongoing engagement.

Next Steps:



- Horizon Smart Era will take on the management of the SmartAlps network, providing a bridge for test areas to continue collaborating, sharing good practices, and accessing new opportunities.
- Test areas are encouraged to remain active in the network, participate in upcoming webinars, contribute to the digital platform, and propose new joint initiatives.
- Partners should continue to document and disseminate results, ensuring that lessons learned inform future projects and policy development across the Alpine region.
- The SmartAlps network should seek new partnerships, funding opportunities, and thematic focus areas to keep the community vibrant and relevant.

In closing:

By the end of the Freiburg conference, with the Alps gleaming through the windows of the old merchant hall, it was clear that SmartCommUnity had grown from a project into a community of practice. The exchange of methods like systems thinking and value-based design gave partners lasting tools for future collaborations. More than anything, these study visits left behind a shared conviction: the path to resilient Alpine regions will come not through uniform templates, but through adaptable, creative and human-centered approaches that keep the mountain's rhythm in every digital step forward.



Annexes

List of study visits and participating TAs

Below is a brief summary of the study visits carried out and the partners involved (signature sheets).

Study visit 1 — Valle d’Aosta (Aosta, Cogne, Champdepraz), 5–7 March 2024

The first transnational study visit brought partners and stakeholders together in Valle d’Aosta for three days of peer learning, field demonstrations and facilitated workshops. Day 1 in Aosta opened with institutional welcomes and an exchange with the Montagna 4.0 – FuturAlps initiative, where more than 200 students presented ideas to project partners, followed by a Project Management Board session, a WPEU workshop on a shared smart community definition and macro-regional links with other relevant projects (Smart Era and More than a Village), and an introduction to “systemic reading” methods for analysing cases (facilitated by Skopia).



Figure 1. Systemic reading workshop in Aosta





Figure 2. Montagna 4.0 – FuturAlps initiative



Figure 3. WPEU workshop with other relevant projects

Day 2 in Cogne (Gran Paradiso LTA) combined a WPTAN world-café on LTA/FTA linkages and embedding TAs in SmartAlps with on-site testing of practices and tools—including the Visit Gran Paradiso app, e-bikes and wildlife monitoring—plus a WPIT hands-on session where partners trialled the Smart-Alps.eu platform and the chatbot; in parallel, a workshop with local students explored Alpine megatrends.





Figure 4. WPIT workshop



Figure 5. Study visit in Cogne

Day 3 moved to Champdepraz (Mont Avic FTA) for a study visit to interpretive installations (QR-code content, sensor-based visitor monitoring, camera/audio traps), a workshop to share “systemic observations” from test areas, and a closing cultural visit in Aosta featuring a VR experience at the Megalithic Area. Participation included consortium members, SmartAlps stakeholders and youth representatives, as reflected in the official attendance list. In line with the SmartAlps networking approach under WP1, RAVA supported wider stakeholder participation in the study-visit series by allocating a budget for travel and accommodation costs.

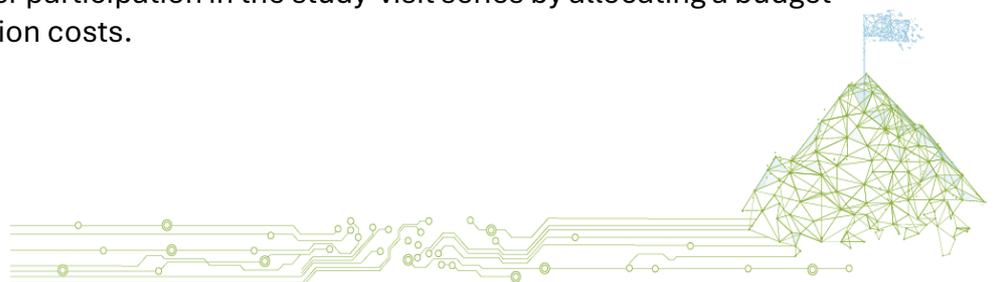




Figure 6. Systemic observations workshop



Figure 7. Study visit in Champdepraz





SmartCommUnity 3rd Project Meeting
5-7 March 2024, Valle d'Aosta

Attendance List

#	Name	Organisation	Signature (sign for each day of attendance)		
			Meeting 5.3.2024	Meeting 6.3.2024	Meeting 7.3.2024
1	Denisa Bonda Leusca	UL			
2	Nataša Božić	UL			
3	Alexandre BERLINGER	REGION LUSERN WEST			
4	Tomen Pečič	LAG South of Aosta			
5	Giuseppe Amadio	LAG South of Aosta			
6	DARJA KUKOVIĆ	ITC			
7	MARINA BALATK	Green Point (ITC)			
8	NOÉMIE LECHAT	ADRETS			
9	Gabriel Olbrich	eNu			
10	Michela Hermaschi	LEO Po Collette Valmeinie			



11	Magdalena KONTREKSKA	LAG South of Aosta			
12	Tomaz Zareba	LAG South of Aosta			
13	Daniel Bobl	SAT			
14	Deja Martinica Gil	SCCH			
15	Jana Reibelmann	RVSO			
16	ALESSIO PASTORINO	RAVDA			
17	CARLO VIGIA	RAVDA			
18	LOISA VUILLERMOZ	FONDATION GRAND PARADIS			
19	CHIARA BARTOLINI	FONDATION GRAND PARADIS			
20	AUGUSTA CEVUSO	ARGILEORT			
21					
22					
23					
24					
25					



Figure 8. Attendance list Valle d'Aosta study visit



Study visit 2 — Lienz (Mühlgasse & Amlach), 15–16 October 2024

Hosted by Standortagentur Tirol (SAT) in the Lienzer Talboden Test Area, the fourth SmartCommUnity partner meeting and second study visit brought partners to Lienz (Liebburg Town Hall) and Amlach (Municipal Office) for two days of field exchange and workshops. The agenda featured welcomes from Elisabeth Blanik (Mayor of Lienz) and Markus Stotter (Chairman, Planning Association 36), a technical input on regional broadband (RegioNet®) by Oskar Januschke and presentations on the SAT-led rollout of a LoRaWAN sensor network with local data storage and links to datahub.tirol, complemented by a session on dataspaces and sovereign data exchange by Fritz Fahringer.



Figure 9. Meeting at Liebburg Town Hall

Field components included a visit to SÄGEBOX Unterrainer (Ainet) and a refresher workshop on tools tested during the Valle d'Aosta visit led by Rocco Scolozzi at Hochsteinhütte; in parallel, a Megatrends & Future Technologies workshop engaged students from Sillian.



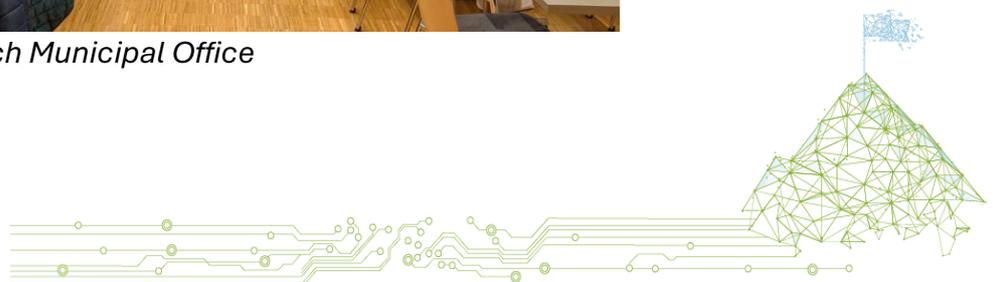


Figure 10. Study visit to SÄGEBOX Unterrainer

Day two in Amlach focused on “Smart Region District Lienz” (presented by Stefan Clara) and an update from KLAR! regions (Lower Austria) (Gabriel Lang, Tino Blondiau), followed by a systems-thinking workshop to identify and amplify key conditions for innovation facilitated by Rocco Scolozzi. Attendance by project partners and SmartAlps stakeholders is recorded in the official attendance list.



Figure 11. Meeting at Amlach Municipal Office



15/16th of October 2024

ASP Smart CommUnity Project Meeting

Lienz, Austria

Attendance List: Please sign for every event section that you attend

	Organisation	Name and Surname	Project meeting 15.10.2024	Study visits 15.10.2024	Dinner 15.10.2024	Study visits 16.10.2024
1	UL	Jure Trilar				
2	ITC	Darja Kukovič				
3	Poliedra	Gianluca Lentini				
4	ADRETS	Elsa Vacheron				
5	ADRETS	Noémie Lechat				
6	RVSO	Stephanie Ecks				
7	SAB	Peter Niederer				
8	SAT	Raphael Schaller				
9	eNu	Tino Blondiau				



10	eNu	Gabriel Lang				
11	RLW	Alexander Bernstein				
12	RAVA	Alessio Pastorino				
13	ANCI Liguria	ANALISA CEVASSO				
14	SAT	FRITZ JÄHLE				
15	ANCI LIGURIA	FRANCESCA RIVISICCO				
16	SCCH	Jorge Martinez Gil				
17						
18						
19						
20						
21						
22						
23						



Figure 12. Attendance list Lienz study visit



Study visit 3 — Valence (Communauté de communes des Baronnies en Drôme Provençale), 19–20 March 2025

The fifth SmartCommUnity partner meeting and third study visit, hosted in Valence and across the Communauté de communes des Baronnies en Drôme Provençale (La Roche-sur-le-Buis and Nyons), combined an internal consortium session with a full-day field programme for Test Areas and stakeholders.

Day 1 in Valence covered project management and WPEU/WPTAN/WPIT updates, followed by a facilitated workshop on conditions to maintain the SmartAlps network and lay foundations for a future cooperation project, and a welcome evening introducing the SmartAlps network and the smart-alps.eu platform to local stakeholders.



Figure 13. Meeting at Bureaux and Co in Valence

Day 2 featured site visits with bilingual (FR/EN) interpretation, including greetings by local authorities, presentations on cultural-access policies (Territorial Cultural Project; Micro-folies digital access to national museum collections), a stop at the J.F. Layraud Museum, split sessions on local economy (SME Sanisphere) and smart mobility & climate adaptation (“Vélo pour tous”; Climastory®), and services for residents (France Services; Sophora coworking).





Figure 14. Visit at J.F. Layraud Museum

Participation by consortium members and SmartAlps stakeholders is recorded in the official attendance list; RAVA supported stakeholder participation by reimbursing T&A and, with external expert Skopia, delivered an Exploring Megatrends workshop with students and a partner workshop on network sustainability (with EUSALP Youth Council participation).



Figure 15. Study visit at Sanisphere



19/20th of March 2025

ASP SmartCommUnity Project Meeting

Valence, France

Attendance List: Please sign for every event section that you attend

	Organisation	Name and Surname	Project meeting 19/03/25	Lunch 19/03/25	Study visits 20/03/25	Lunch 20/03/25
1	UL	Deniz Buntarovic				
2	ITIE	DARJA KUKOVIC				
3	LC Pagnat	DENIS GOST				
4	ANCI LIGORIA	ANALISA GAMBINO				
5	ANCI LIGURIA	FRANCESCA RUSILLO				

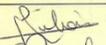
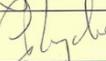
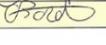
6	SCCH	Jorge Melendez Gil				
7	COMUNE DI COGORNO	ENRICA SOMMERIVA				
8	UL	JURE TRILAR				
9	SAT	RAPHAEL SCHALLER				
10	RUSO	Stephanie Eckes				
11	RAYDA	CARLO VIGNA CARLO VIGNA				
12	RLW	Alexandra Bontzol				
13	SAB	Peter Niederer				
14	Skopje	Rocco Scolori				



15	RAVA	Alessio Parbani	Alan Parbani			
16	POLIEDRA	GIANLUCA LENTINI				
17	Vacheron	Elsa				
18	FEUSALP Youth Council	Yannick Werner				
19	Green Point LL	Maria Bobaic				
20	eNu	Blondiau TIKO				
21	eNu	Gabriel Laug				
22	LIENZ	Stefan CLARA				
23	JANJA	VINEZ				

24	ADRETS	Néemie Leclat				
25	ADRETS	Elsa Vacheron				
26	FONDATION GRAND PARADIS	CHIARA BARTOLINI				
27	FONDATION GRAND PARADIS	ELISABETTA FILIPPINI				
28	"	LUISA WILLOPPOZ				
29	CCBDP	COTA Natilda				
30	CCBDP	AKA MOUPE Guehry				
31	CCBDP	Amelou Rufort				
32	CCBDP / CD26	RODRIGUES Pascale				



33	Commune de la Roche / Le Buis	Claudine GOURDOL conseiller municipal				
34	CCBDP	Mario Moreau				
35	Brigitte ARTHAUD Conseillère municipale					
36	DARJA KUKOVIC	ITC				
37	CCBDP	GUEIDAN Ambou				
38	Mario Nils MPS	Centre michail				
39	Juwan Penette	Juwan Penette				
40	CCBDP	Myschaud Christelle				
41	CCBDP	BOREL Chloé				

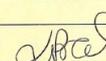
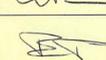
42	Commune de Les Communes Gruébriens - Puy	PEAS, H Laetha				
43	Commune de Les Communes Gruébriens - Puy	Emmanuelle Tivilliere				
44						
45						
46						
47						
48						
49						

Figure 16 Attendance list Valence study visit



Study visit 4 — Freiburg (Elzach and Winden im Elztal), 1–2 October 2025

The final SmartCommUnity study-visit unfolded over two days in and around Freiburg, combining on-site learning in the German Test Areas with governance and network moments and culminating in the public Final Conference.

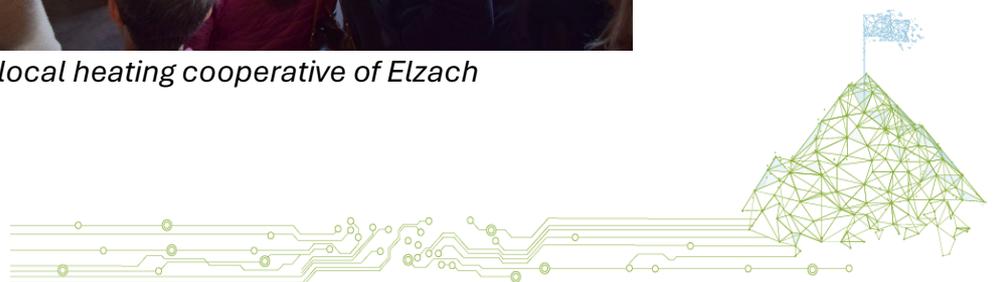
On 1 October, the partner delegation met at Freiburg main station before travelling to Elzach for a joint session with the mayors of Elzach and Winden im Elztal at the local history museum (intro to the two communities, presentation of the local tourist society, and a visit to Elzach’s heating cooperative).



Figure 17. Joint session with the mayors at the Elzach local history museum



Figure 18. Study visit to the local heating cooperative of Elzach



The group then continued to Winden for a working lunch at Gartenstüble and an introduction to the Digital Forest Trail.



Figure 19. Study visit to the Digital Forest Trail in Winden

Back in Freiburg, the afternoon featured a Project Partners (PP) meeting and an AG5 meeting hosted at VRSO (Verband Region Südlicher Oberrhein), followed by a network dinner.

On 2 October, the Final Conference took place at the Historisches Kaufhaus (Freiburg), opening with greetings from Wolfgang Brucker (Verband Region Südlicher Oberrhein) and Dr. Jure Trilar (University of Ljubljana, Lead Partner of SmartCommUnity project).



Figure 20. SmartCommUnity Final Conference at Historisches Kaufhaus

The morning keynotes addressed “Smart regions: improving quality of life through digitalisation” (Dr. Bettina Distel, BBSR) and “Digital solutions for rural areas” (Dr.



Matthias Berg, Fraunhofer IESE). The programme then showcased test-area presentations and technological ideas for rural areas, moved to school workshop experiences and an input from the EUSALP Youth Council (Rocco Scolozzi with Filippo Benedetti), and convened a panel with the mayors Roland Tibi (Elzach) and Klaus Hämmerle (Winden im Elztal) joined by Dr. Matthias Berg, Dr. Bettina Distel, Janja Viher (Smart Alps President) and Hajar Abba as EUSALP YC representative, moderated by Thomas Egger (SAB). Closing remarks were given by Gianluca Lentini (Poliedra), Carlo Vigna (Autonomous Region of Valle d’Aosta) and Wolfgang Brucker.

At the end of the conference, participants had the opportunity to try out the applications and products developed in the project's test areas.

Summary tables of main findings

Main Finding	Evidence / Example	Implication for Project / Network
1. Field testing reveals real strengths and gaps	Partners trialled SmartAlps tools (apps, chatbot, forums) in Valle d’Aosta and Lienz/Amlach	Immediate feedback led to rapid improvements and practical tool adoption
2. Data sovereignty and local infrastructure build trust	LoRaWAN sensor network and local data storage in Lienzer Talboden; datahub.tirol governance	Enabled collective ownership, transparent decision-making, and scalability
3. Systems thinking and foresight create shared language for change	Workshops in Aosta, Lienz, and Valence (systemic reading and innovation mapping)	Partners mapped interdependencies and co-designed actionable solutions
4. Youth engagement shifts priorities and ensures relevance	Montagna 4.0 (Aosta), student workshops (Lienz, Valence and Freiburg), EUSALP Youth Council at Final Conference (Freiburg)	Youth input emphasized accessibility, learning, and everyday usefulness
5. Smart mobility, cultural access, and place-based services anchor “smartness”	“Vélo pour tous” (Baronnies), Micro-folies, local museums, citizen app (Elzach), Digital Forest Trail	Demonstrated how WP1 policy and WP2 practice reinforce daily life inclusion
6. Co-design delivers visible public services	Citizen app (Elzach), Digital Forest Trail (Winden im Elztal), AI heritage guide (Gran Paradiso)	Pilots became everyday tools, increasing local buy-in and impact
7. Study visits doubled as governance and alignment moments	WPEU workshops, PP meetings, AG5 sessions, stakeholder evenings, world-café	Ensured WP1–WP2 alignment and continuous feedback between policy and practice

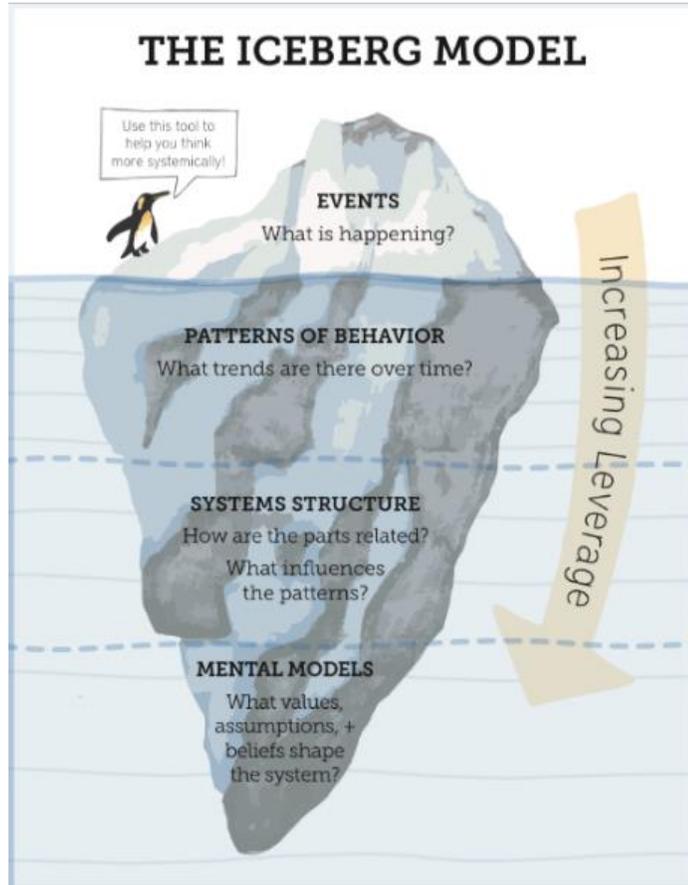


Main Finding	Evidence / Example	Implication for Project / Network
8. Broad, transnational participation amplified impact	Attendance lists show mix of TAs, SmartAlps members, regional/national authorities, youth	Increased opportunities for replication, policy uptake, and sustainability
9. Narrative, identity, and policy framing matter as much as technology	Technology blended with community identity (sensor networks, AI guides, mobility schemes, apps)	Durable “smartness” comes from combining tools, governance, and local pride

Report on Systems Thinking and Foresight workshops

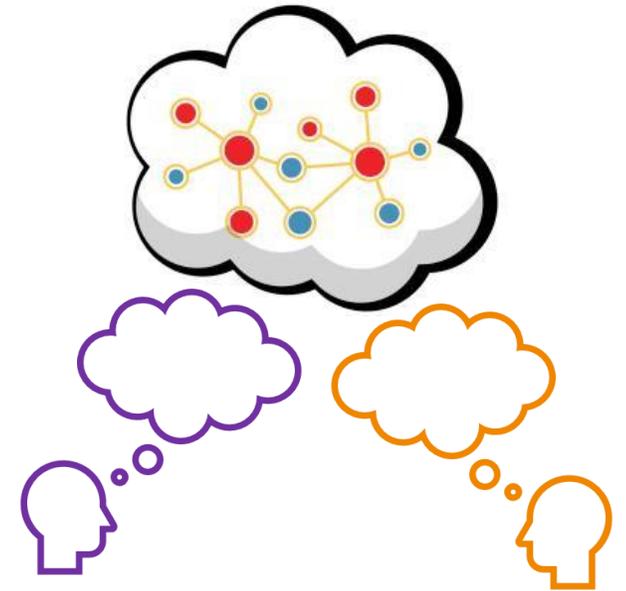
Attached are the reports on systemic thinking and foresight workshops produced by Skopja.





Introduction to *a systemic reading* for understanding case studies and good practices

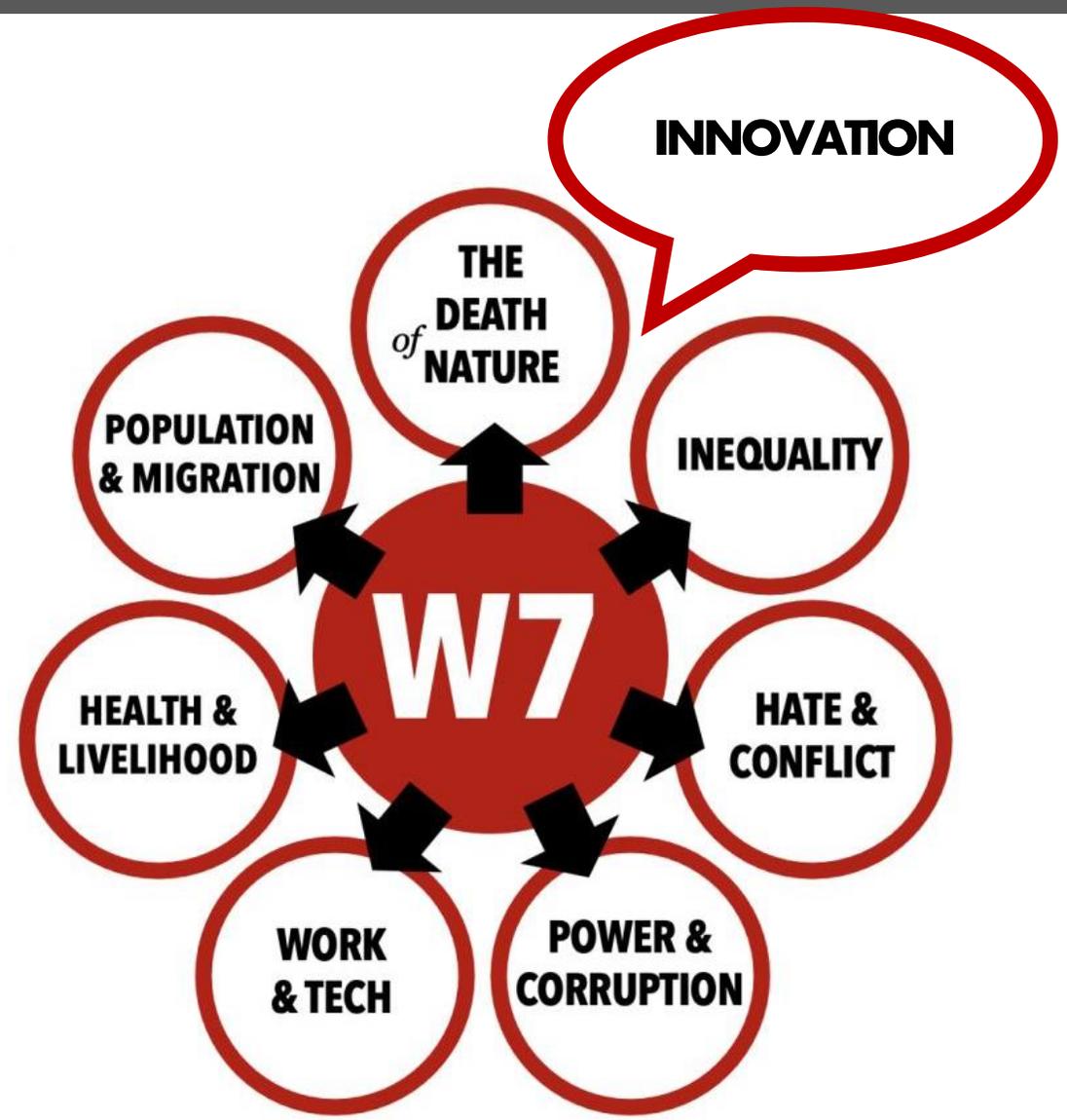
...and their enabling systems

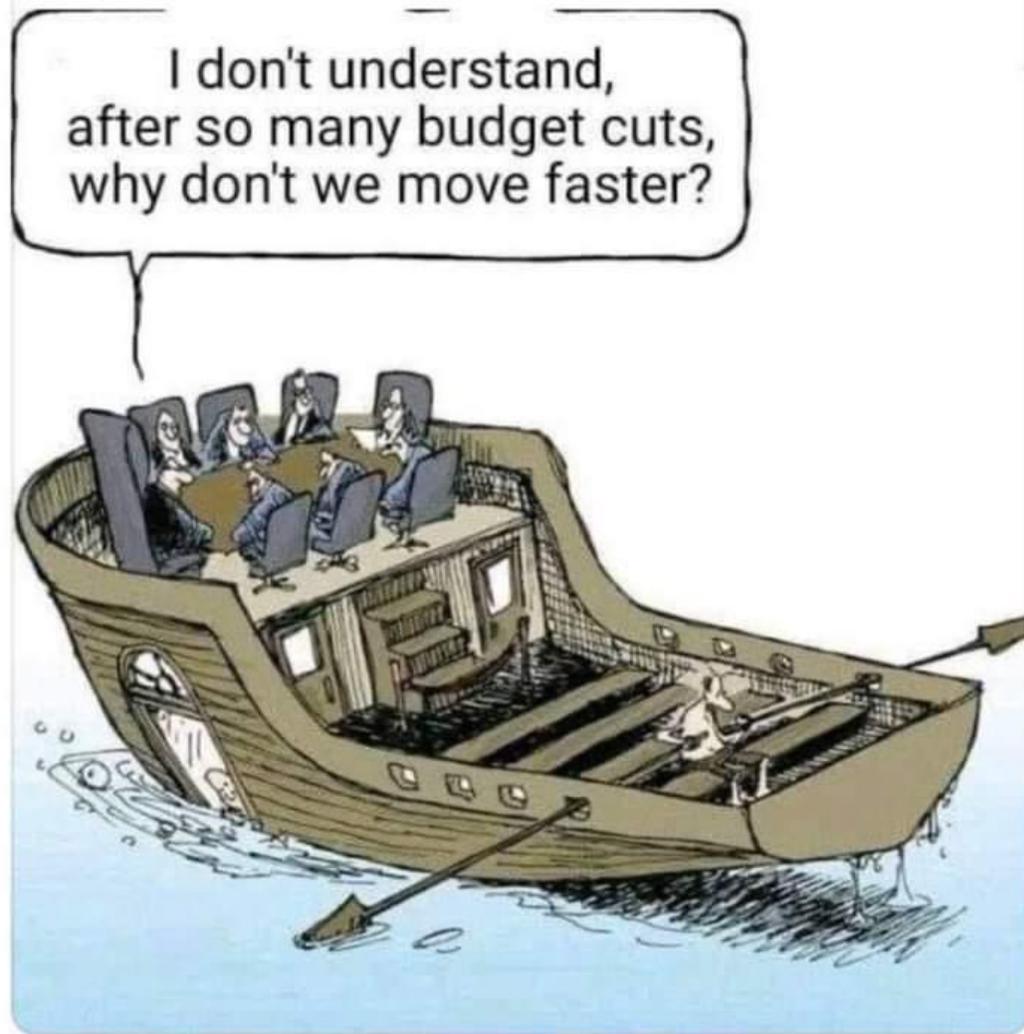


Communities experience wicked problems



adapted from: *Dilemmas in a General Theory of Planning*
Horst W.J. Rittel and Melvin M. Webber (*Policy Sciences*, June 1973)





Thinking

Thinking is about building mental model of real world around us.

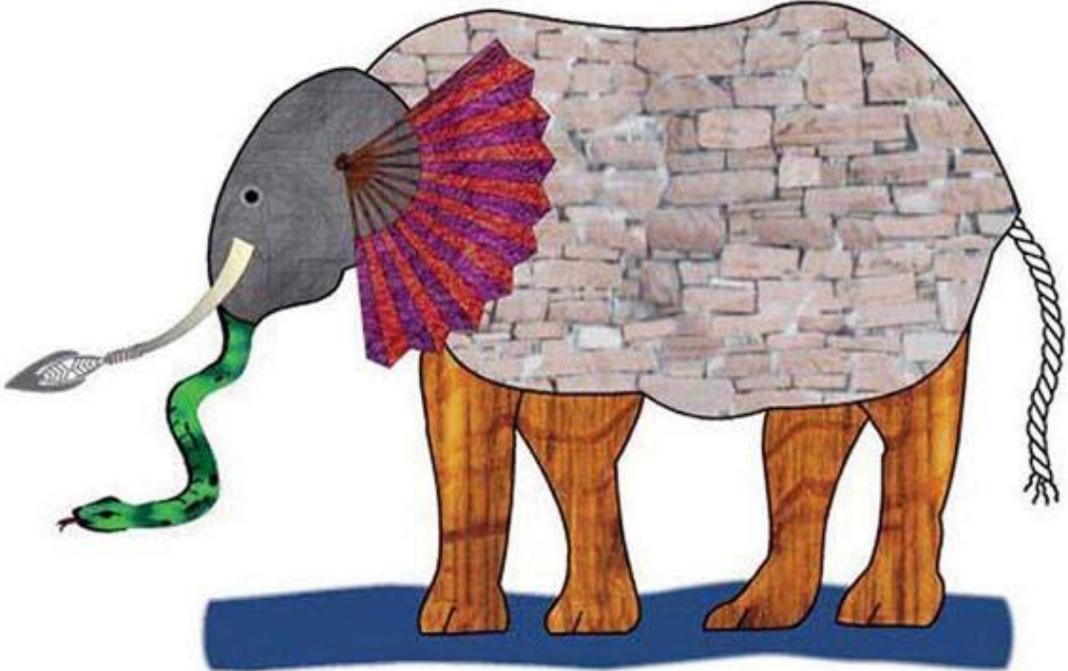
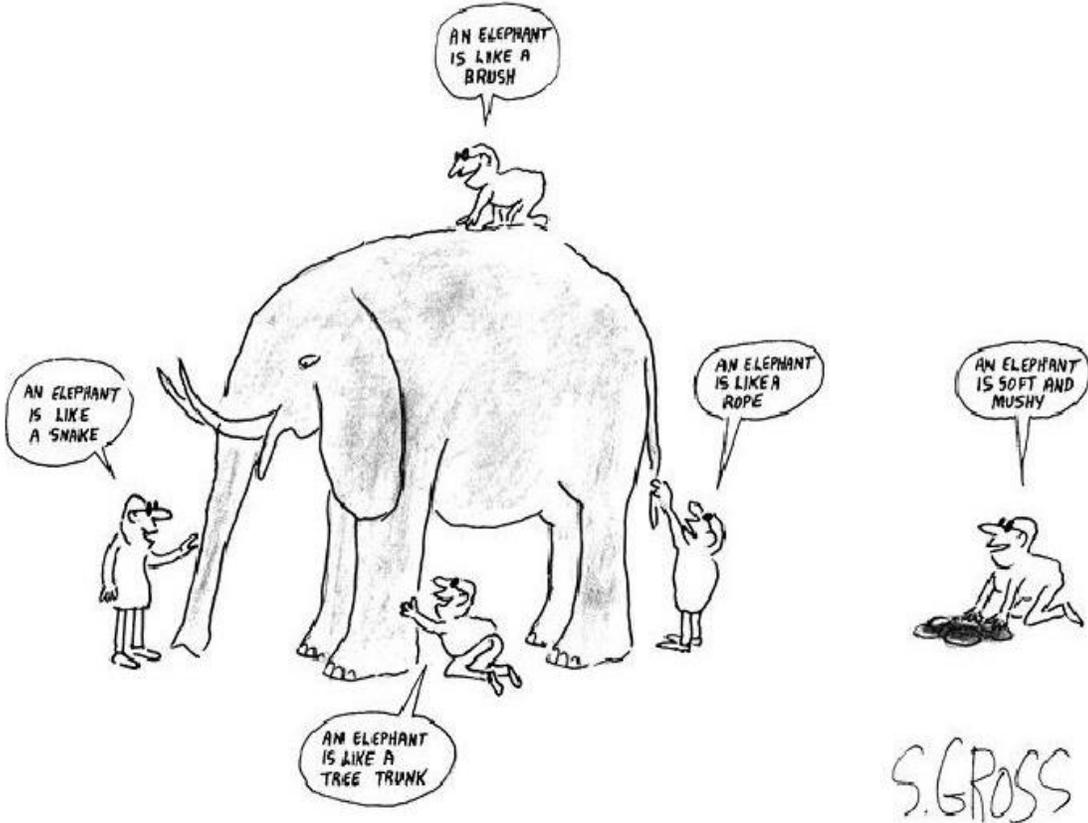
See - Acting

Everything we see, every action we do depends on our mental models

We interact with world indirectly through our mental models, not directly.

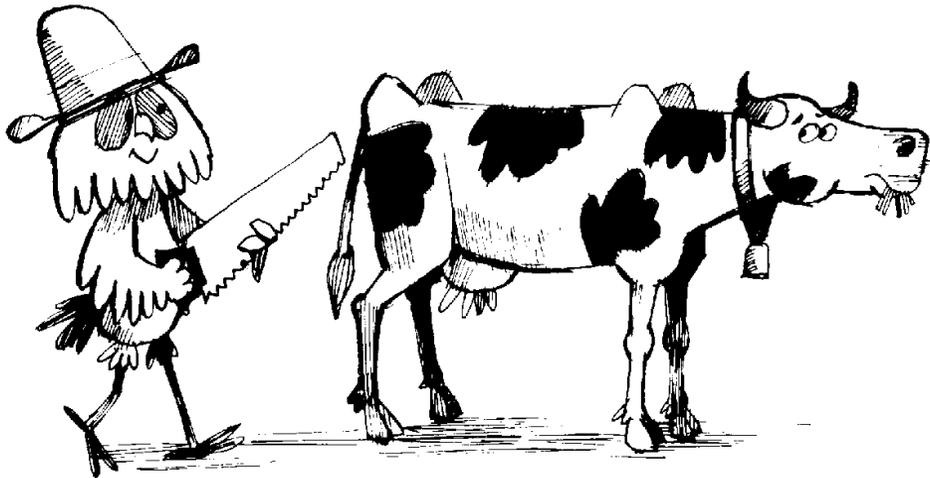
Fragmented knowledge

... this is a best practice as defined by economist, sociologist, ecologist, geographer, ... by mayor, farmer, teacher, ... 😊



... reality by the perspective of specialist/fragmented knowledge

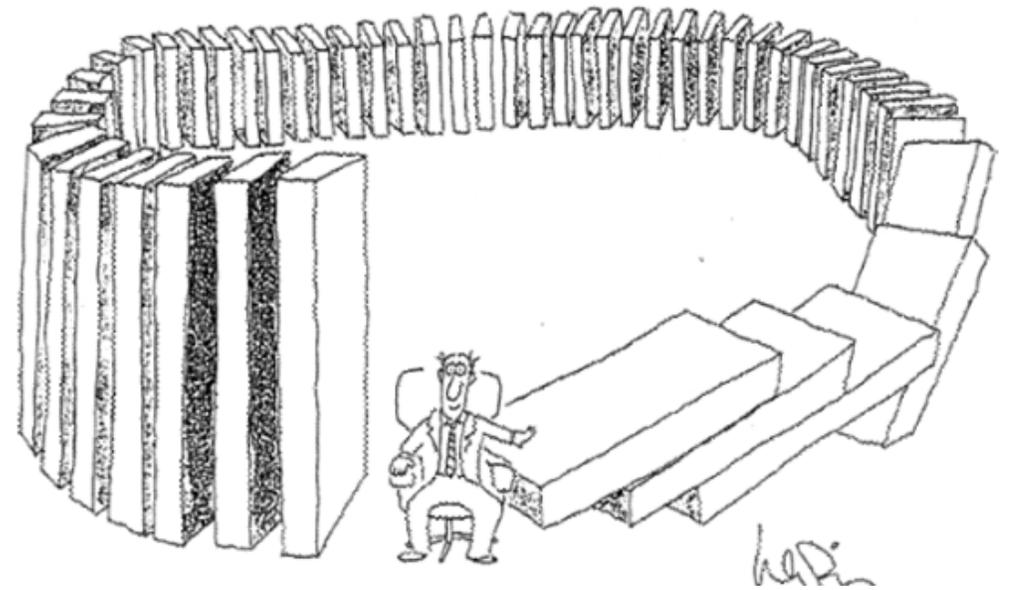
Linear thinking



“Dividing a cow in half does not give you two smaller cows.” Kauffmann, 1991

**over-reductionism or
over-simplification**

... this is a best practice, divide it in two and apply it everywhere, it will surely work the same way!

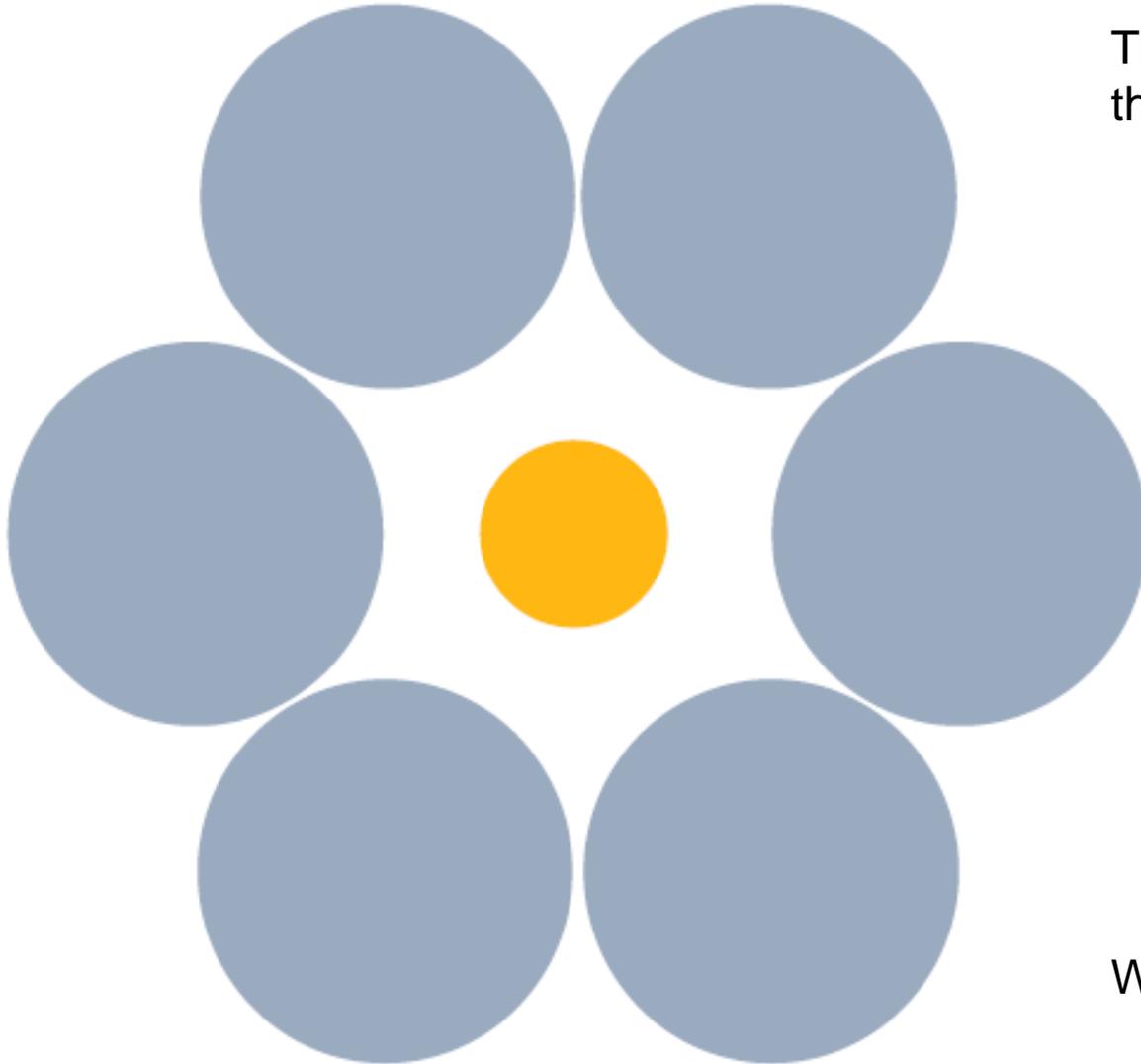


Disregarding side effects

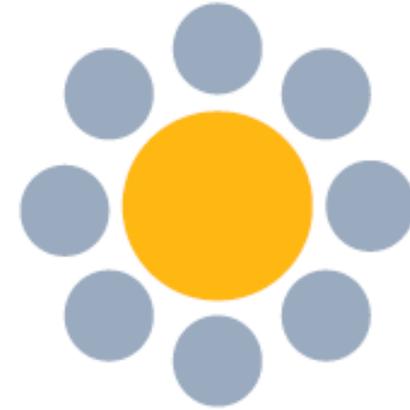
(less visible as they are often far from the decision in space and time)

... this practice will never have any side effect!

... thinking and biases

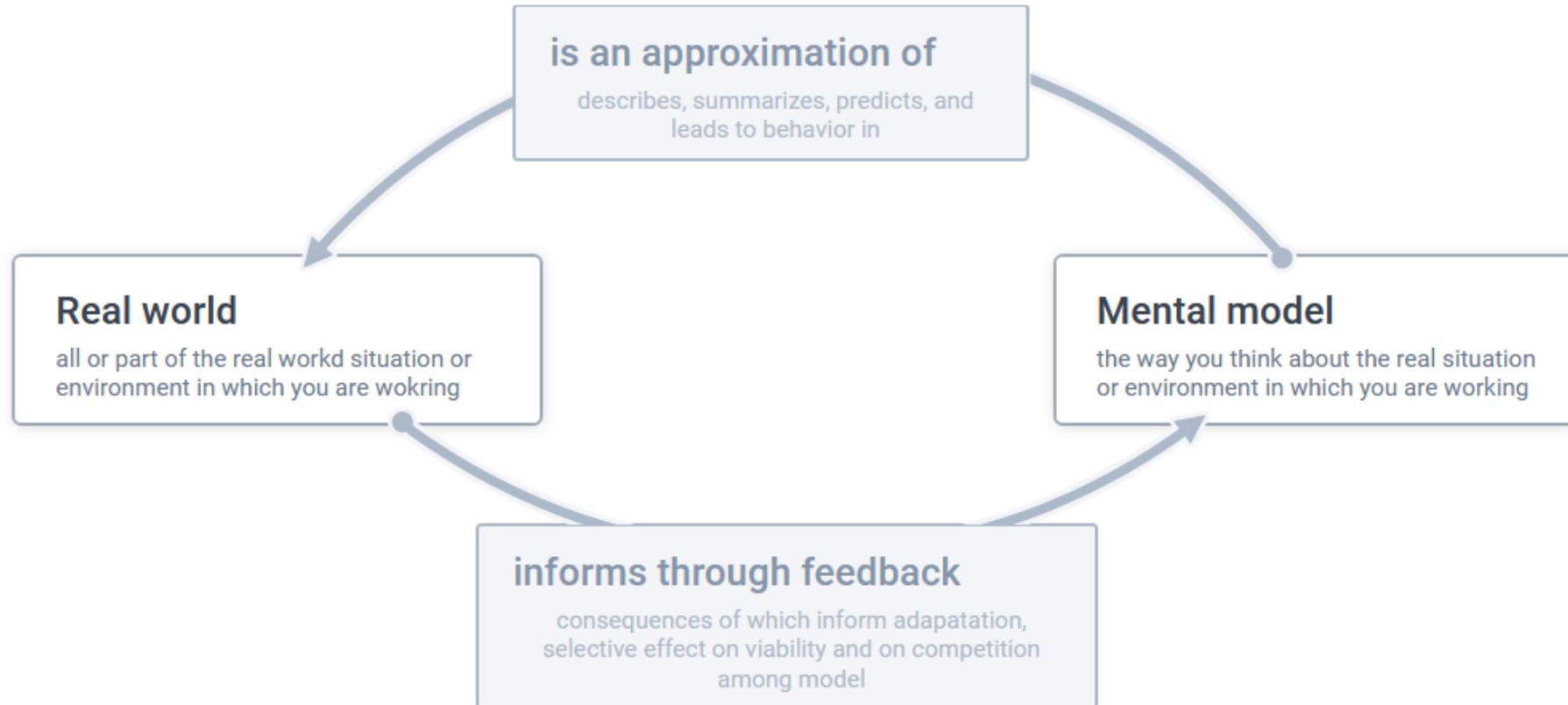


Things are defined by the things that surround them.



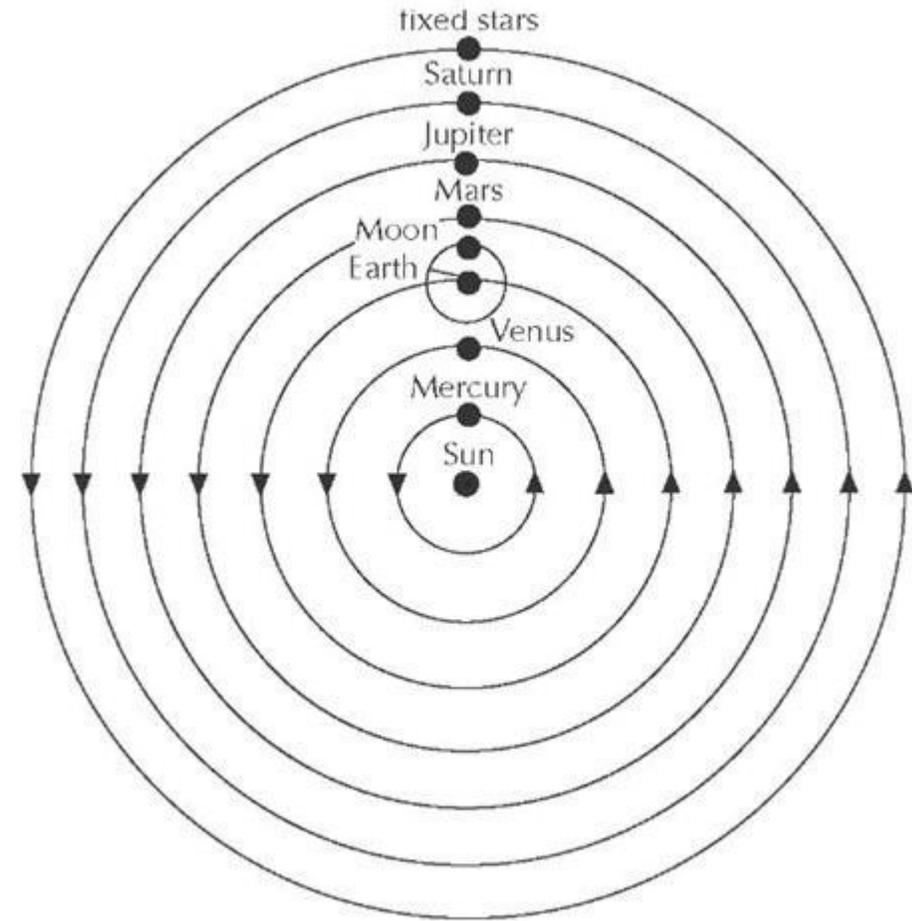
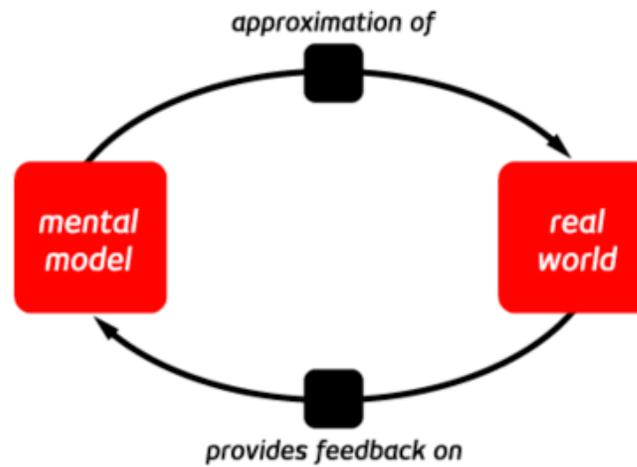
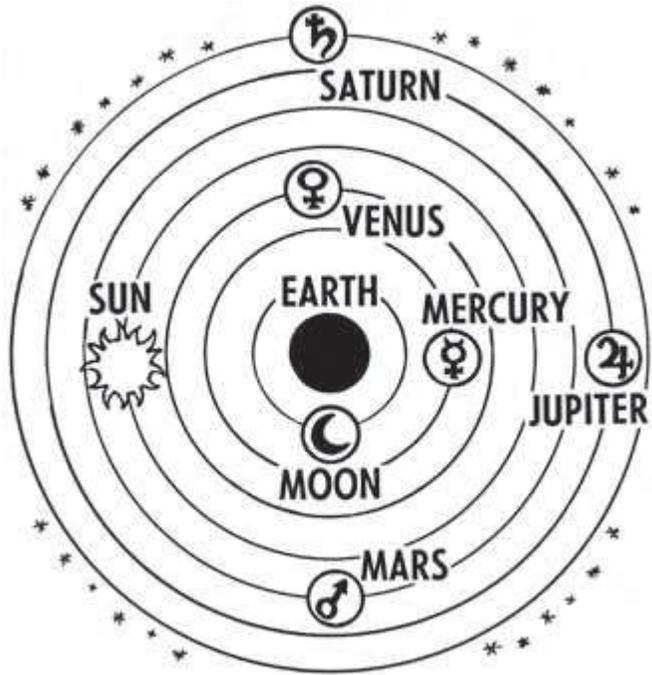
We naturally have biases.

Thinking is a complex adaptive system

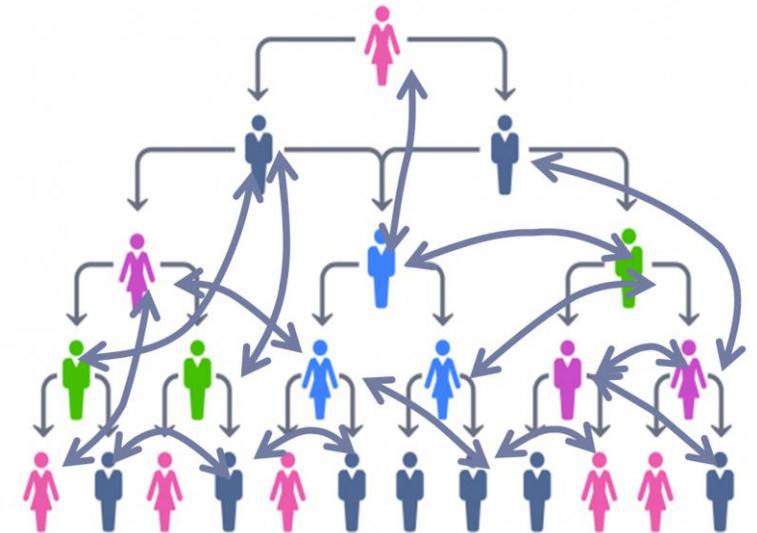
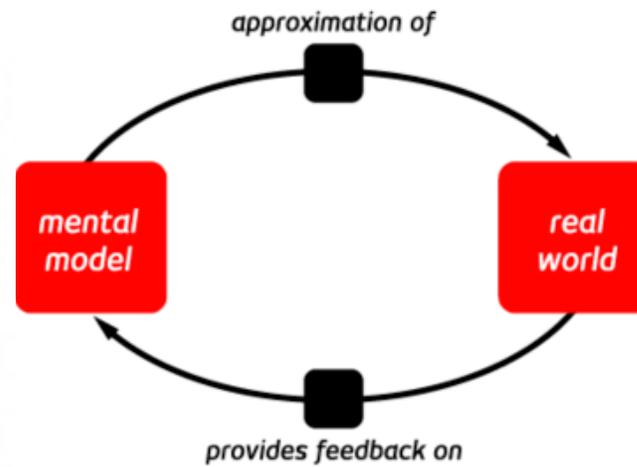
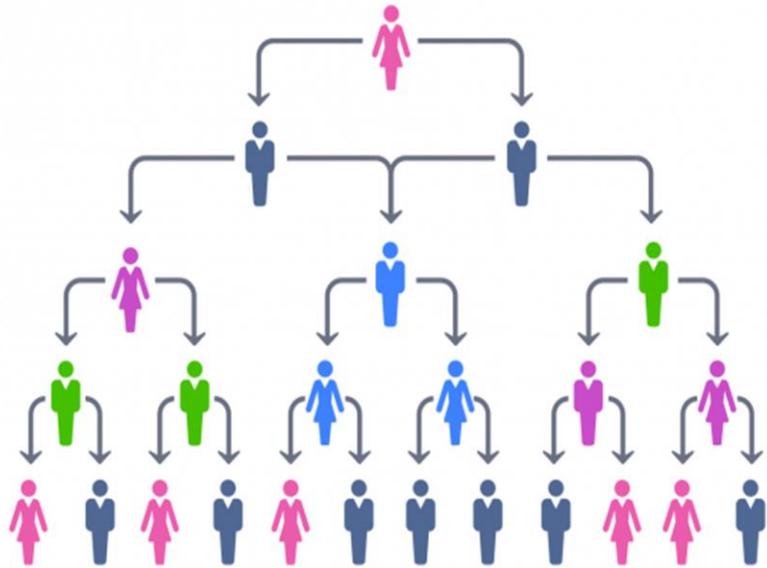


...as long as this loop continues we learn and innovate, otherwise we repeat an available knowledge or existing beliefs

Thinking is a complex adaptive system



Thinking is a complex adaptive system



what is a «system»?



...what is a good practice?

what is a «system»?

example:



this is a heap



this is a system.

**a set of parts
interconnected and organized
in a way that achieves something**
(Donella Meadows)

...this is like a «best practice»!

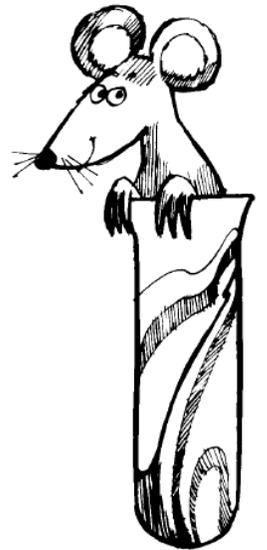
System characteristics



The parts of a System must all be present for the System to perform its function (\neq collection)



The parts of a System must be organized in a specific way



"...molecules in a mouse are organized..."

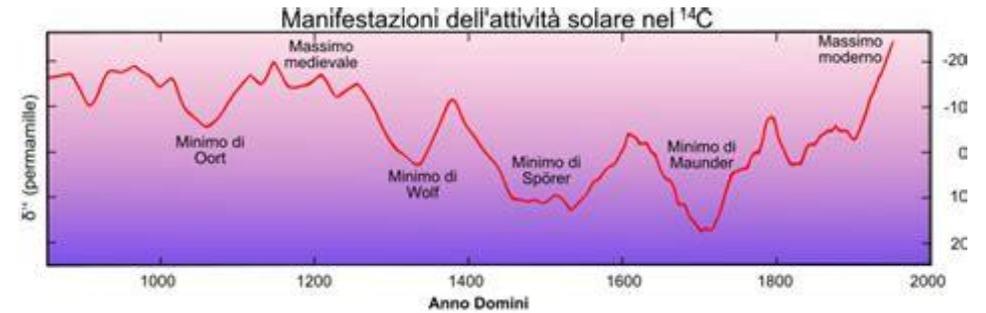
...this is also like a "good practice"

System characteristics

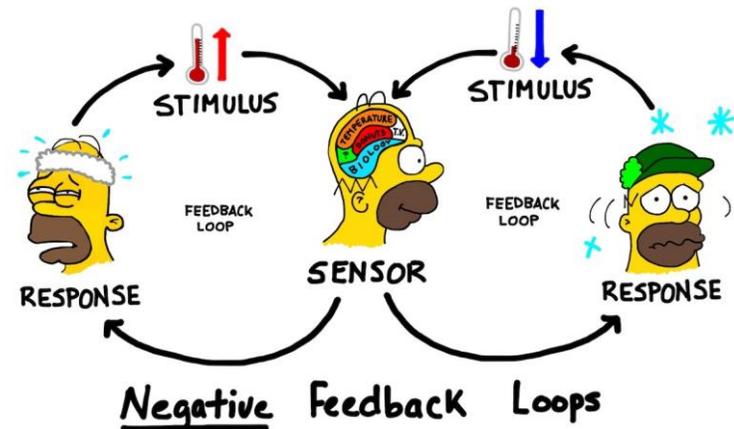


Systems have a specific purpose within larger systems, the boundary depends on our scope

Their behavior emerges from internal feedbacks



They maintain their stability through fluctuations and adjustments



...and this too is like a "best practice"

Best practice characteristics

1. Its parts must all be present for the System to perform its function
2. The parts must be organized in a specific way
3. It have a specific purpose within larger systems, the boundary depends on its scope
4. It maintain their stability through fluctuations and adjustments
5. Its behavior emerges from internal feedbacks.

System of Innovation

**Alpine Community as
System of Innovation**

System of Innovation

A dynamic and **interconnected network** of actors, institutions, and resources that **interact to generate**, diffuse, and utilize new knowledge and technologies.

Alpine Communities as Systems of Innovation

Despite their often rural and remote nature, local alpine communities have the potential to become dynamic systems of innovation due to several factors:

Unique resources + Shared Challenges and Opportunities

Social capital + Diversity and Proximity

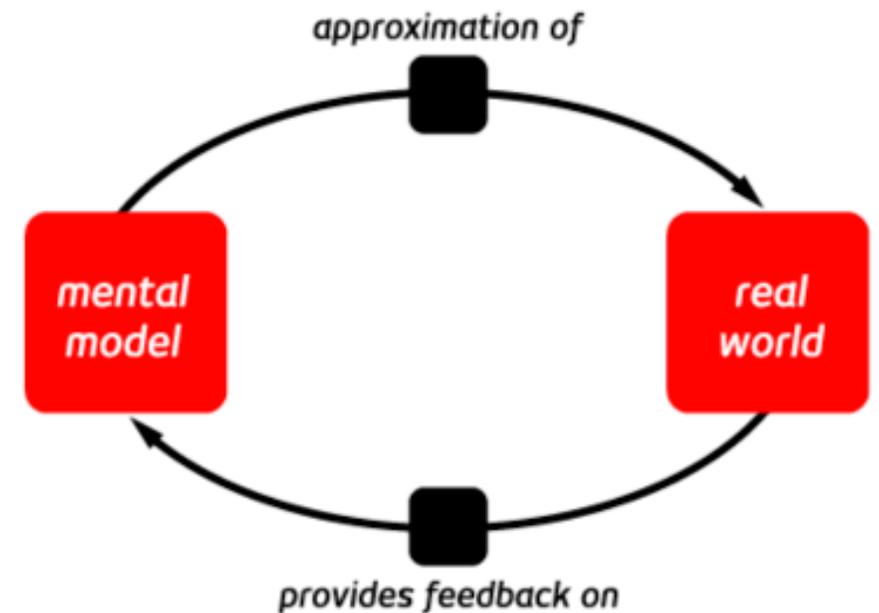
Entrepreneurial spirit + Living laboratories

Focus on sustainability

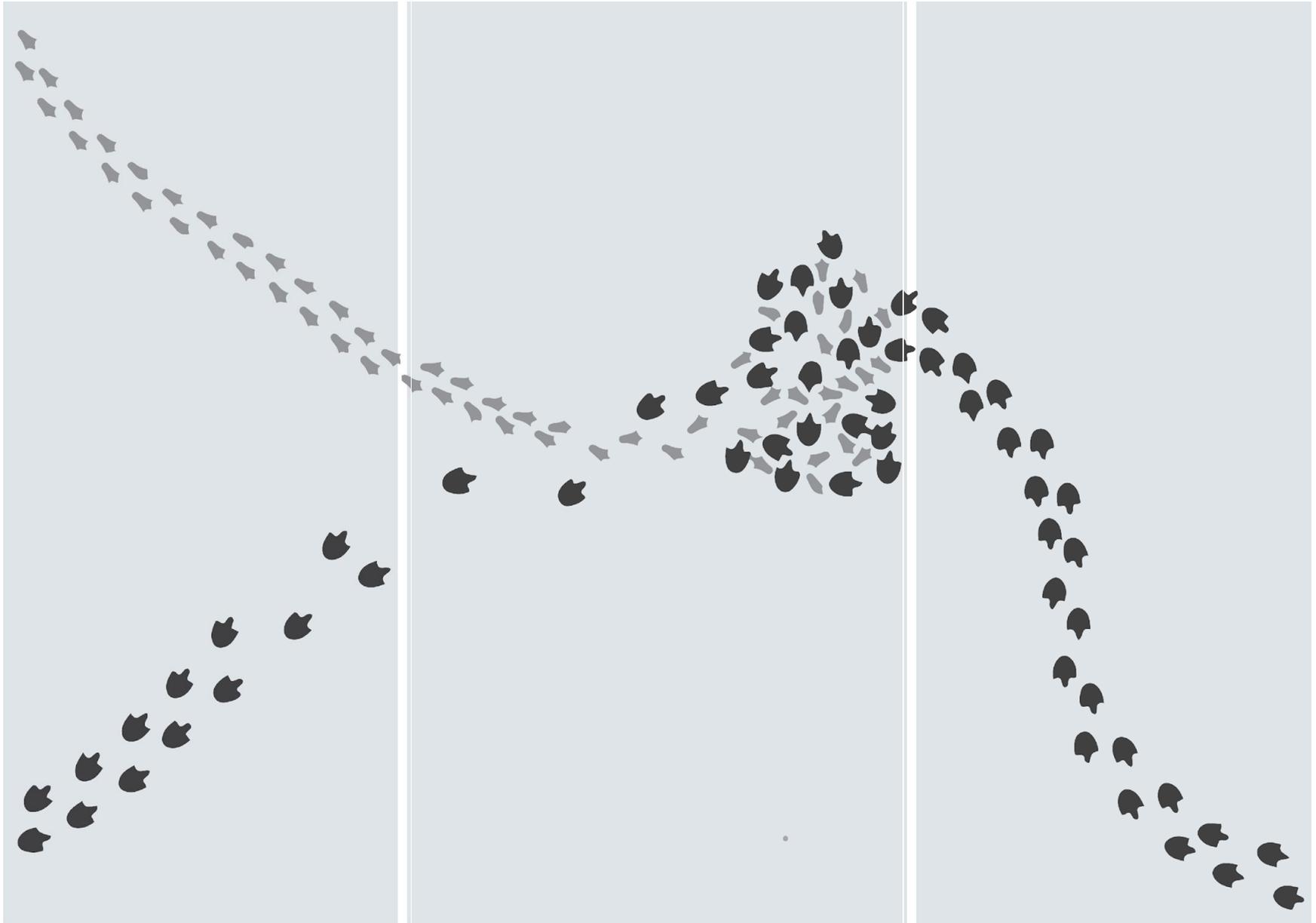
Alpine Community as System of Innovation

3 pillars:

- **Collaboration** and interaction are crucial.
- **Local** knowledge and resources are valuable assets.
- **Continuous learning** and adaptation are essential for success.



Frames



...let's image using a limited framework to understand a "best practice"

Frames

...frame a system to understand it



The frames we use to look at the reality shape our understanding.

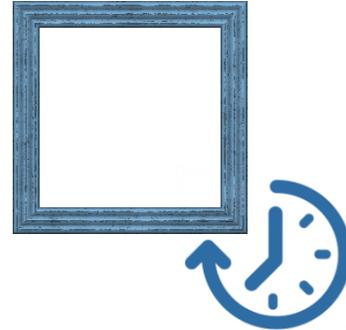
We are often unaware of how we are framing a problem.

To find effective solutions, it is often essential for us consciously to reframe our dilemmas, to redefine their boundaries.

Frames

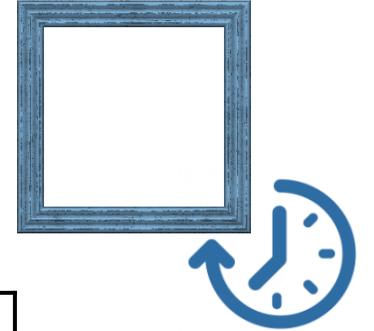
...frame a system to understand it

The issue «.....»	
Space frames	Time frames



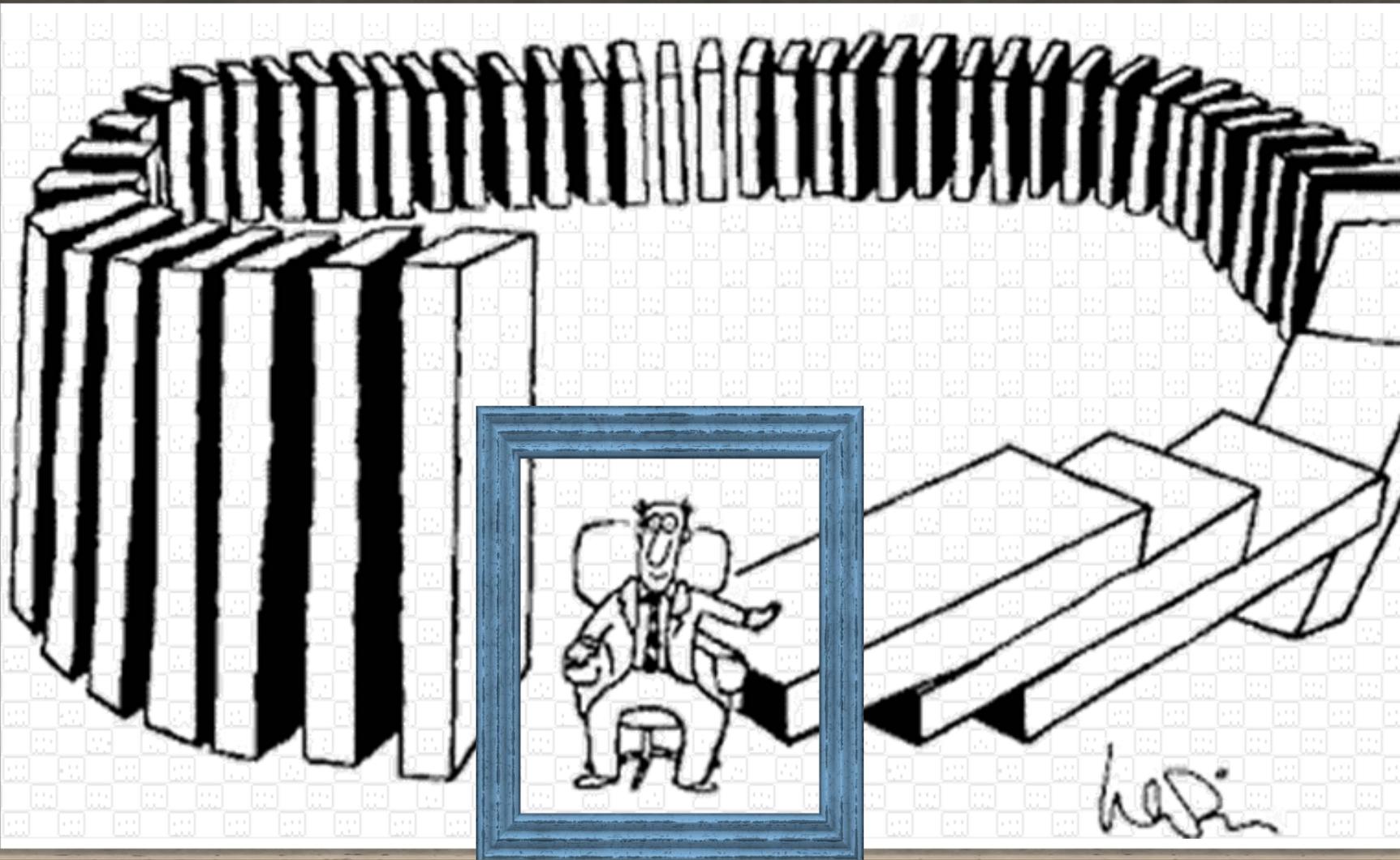
Frames

...better problem setting will support problem solving



The issue «overload of emails»	
Space frames	Time frames
My box / my time ("personal" frame)	Days
My collaborators' box ("working group" frame)	Months
The sector (or department) ("sector" frame)	Quarters



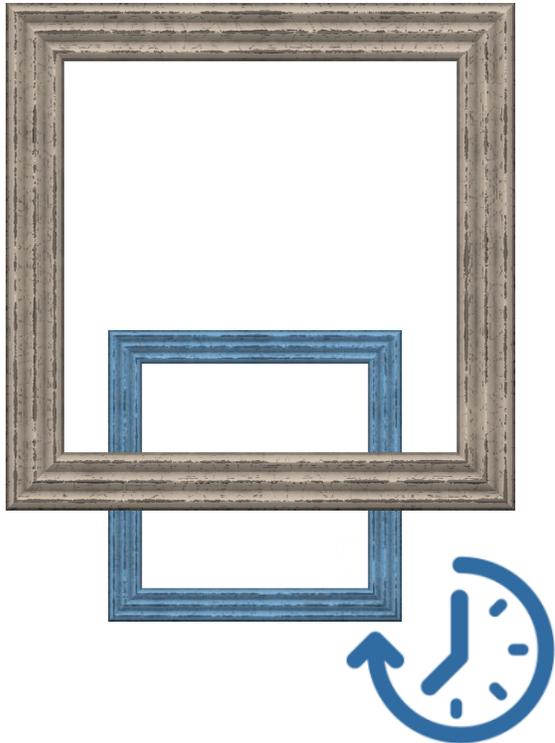


We fail more often because we solve the wrong problem

RUSSELL L. ACKOFF



Framing the behaviour over time

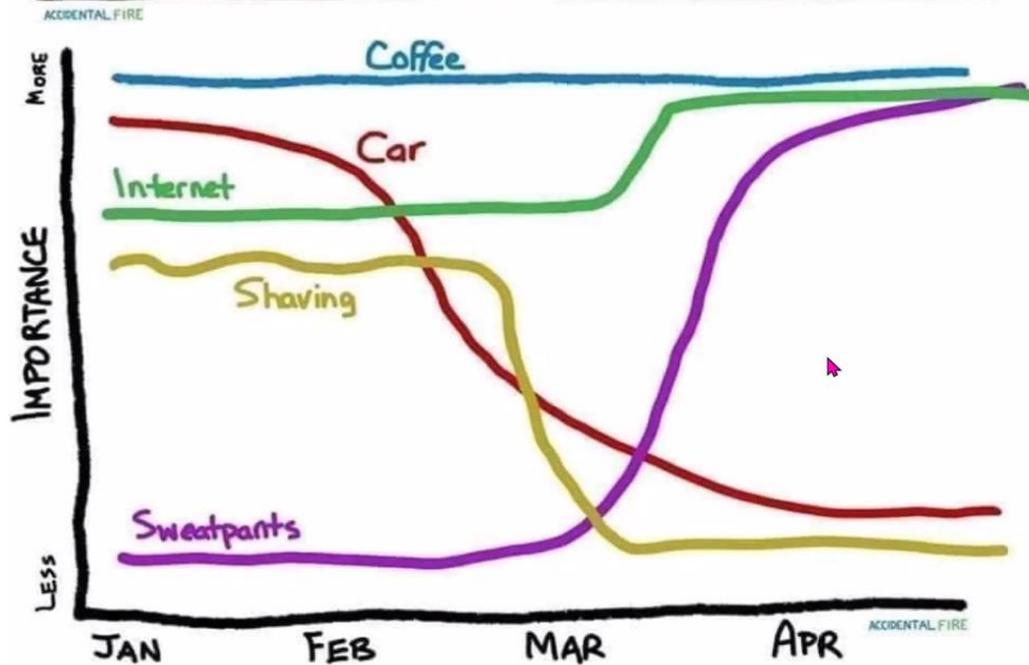


What period of time is implicit in the data we use to think about Smart Community issues?

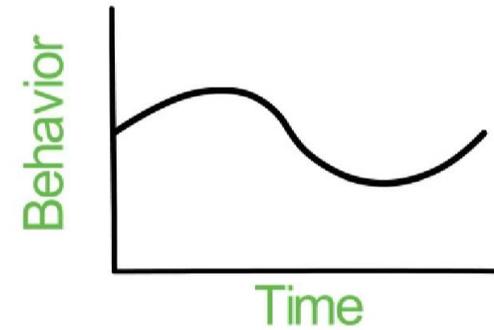
How can we know if we have taken a long enough view of the systems to detect important changes?

How could we align the frames in discussion about Smart Community issues?

RELATIVE IMPORTANCE IN 2020, SO FAR



Behavior-over-time Graphs aka BOTGs



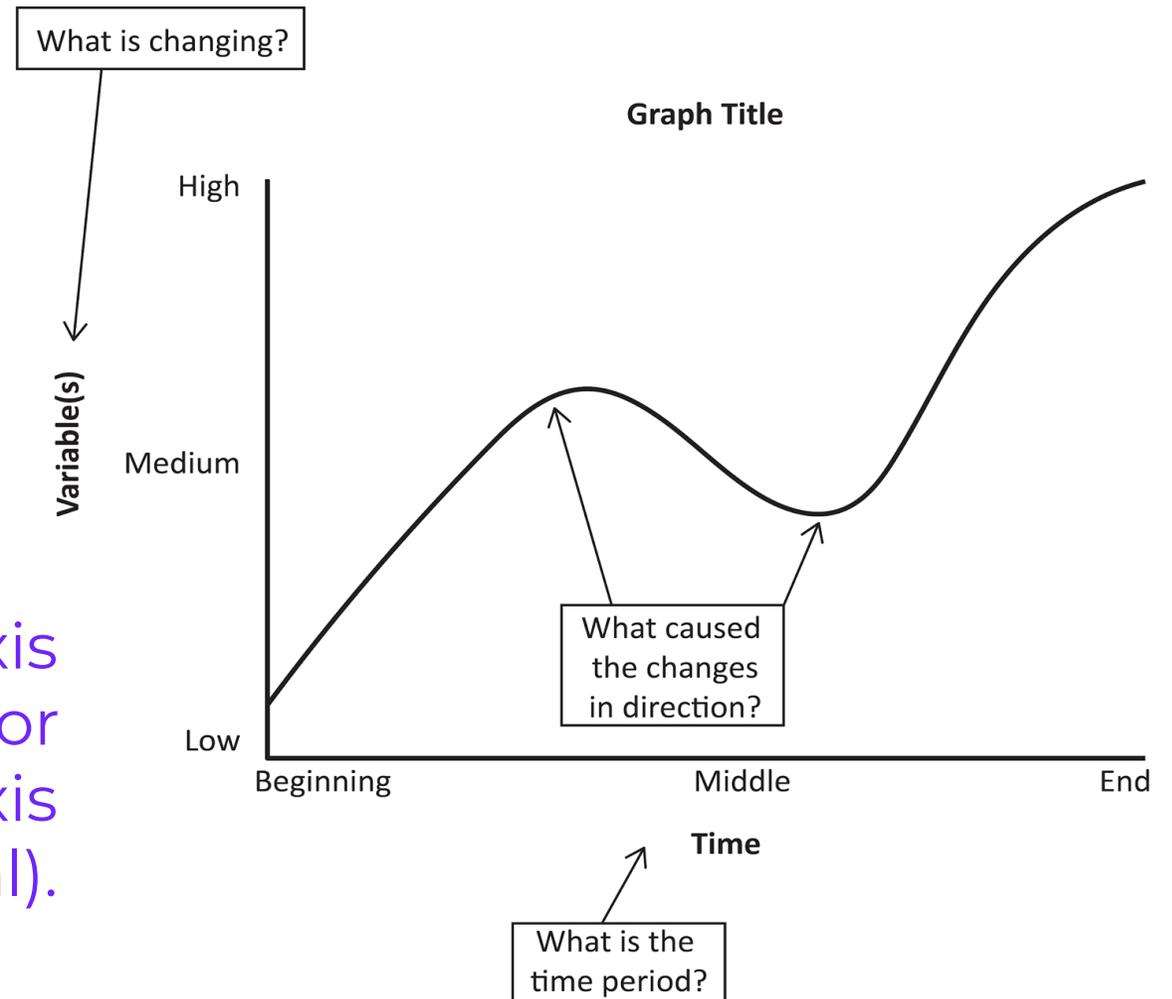
<https://youtu.be/1lo5XOe2iZ8?si=36UVMNG7XjAWvxFR>

Behaviour-over-time graph (BOTG)

Systems thinkers focus on the nature of change over time.

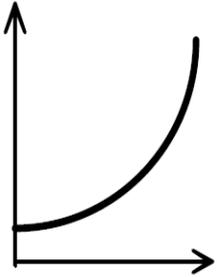
BOTGs are simple tools that illustrate patterns and trends and demonstrate how something changes over time.

Graphs with time along the x-axis (horizontal) and the scale of one or more variables along the y-axis (vertical).

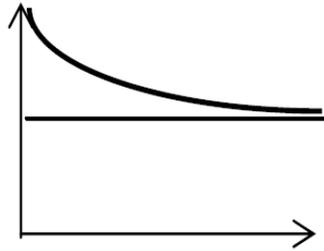


Behaviour-over-time graph (BOTG)

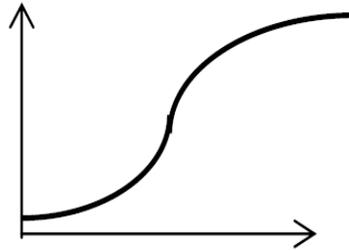
Exponential Growth



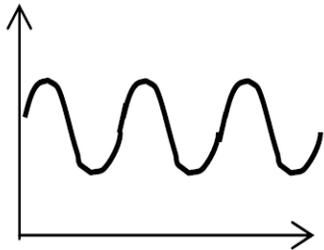
Goal Seeking



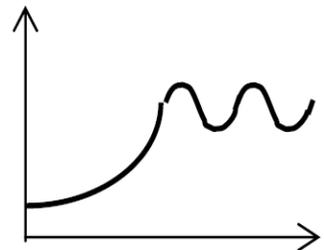
S-Shaped Growth



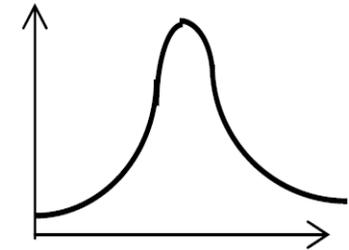
Oscillation



Growth with Overshoot

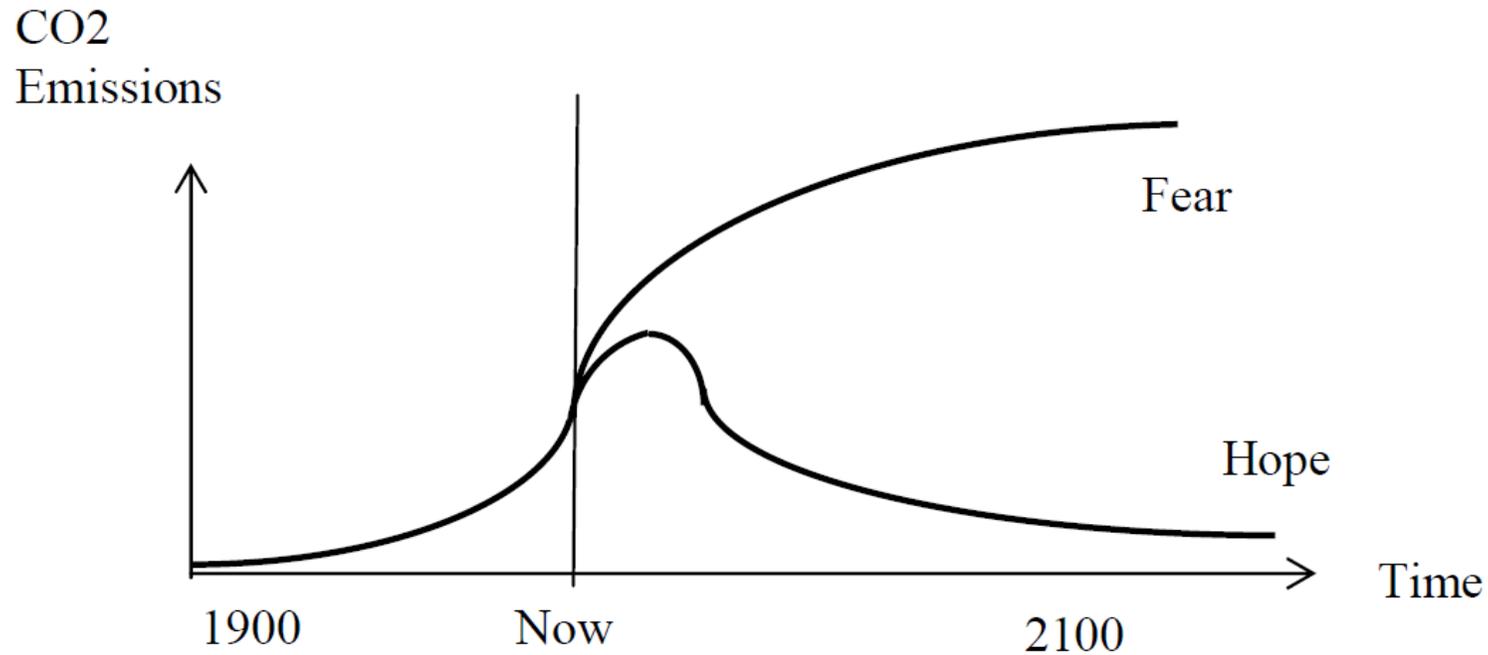


Overshoot and Collapse



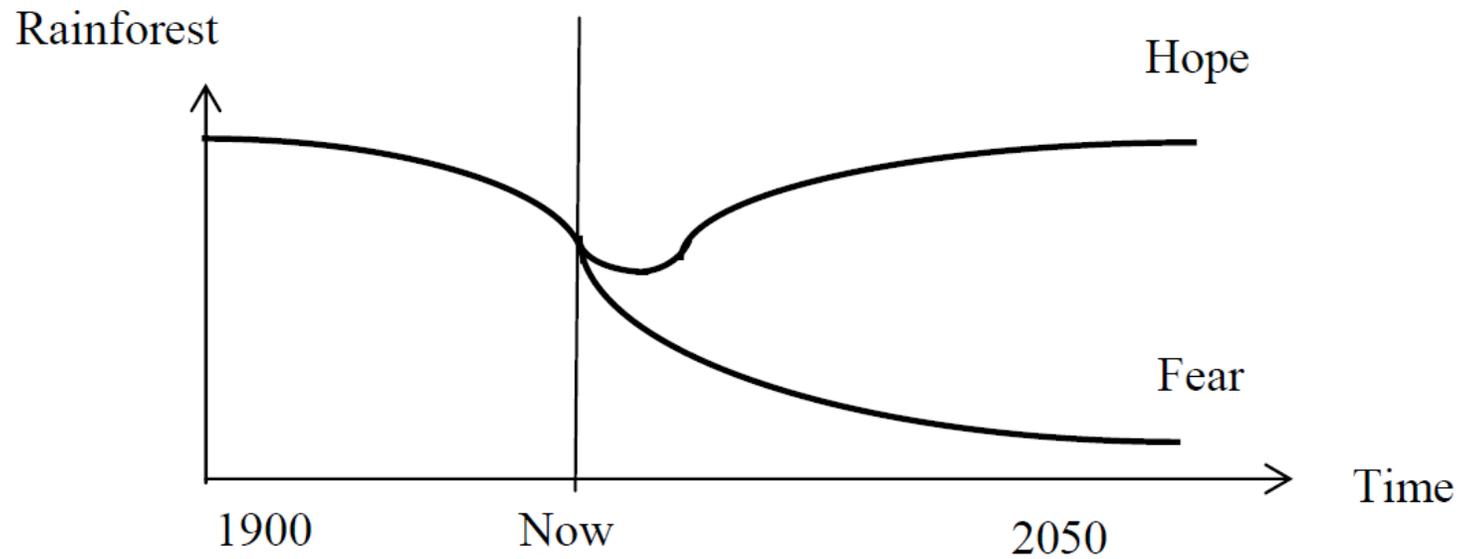
They are useful for highlighting/explaining the overall **shape of change** rather than the exact location of data points.

Behaviour-over-time graph (BOTG)



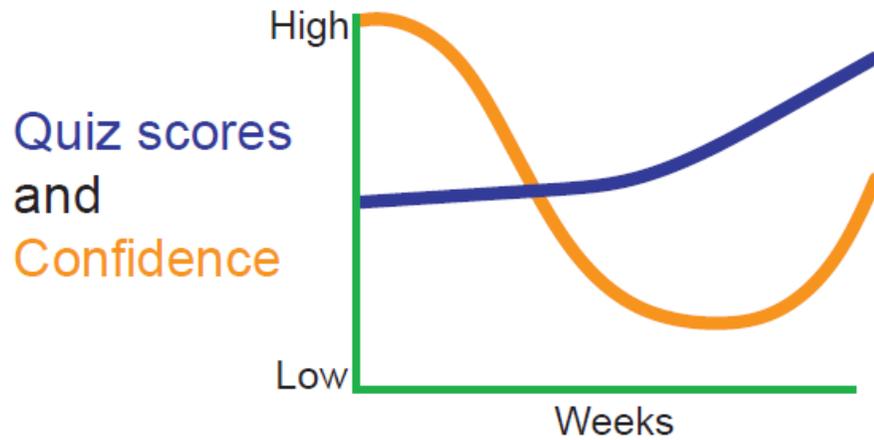
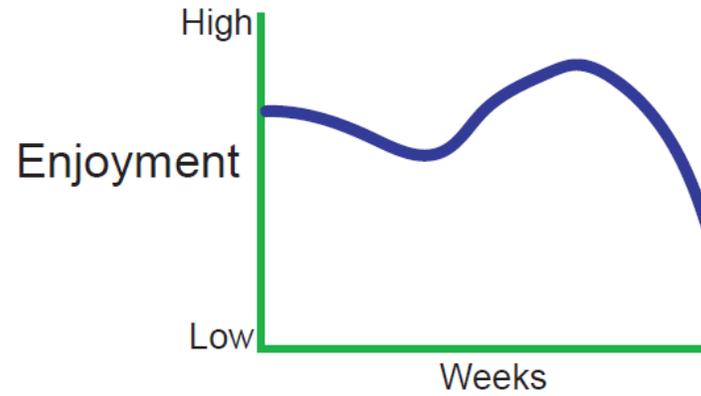
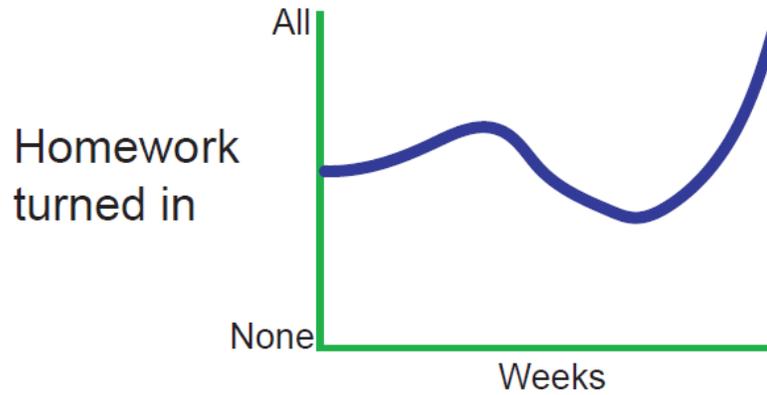
**A generator of
“powerful questions”**

Behaviour-over-time graph (BOTG)



**A generator of
“powerful questions”**

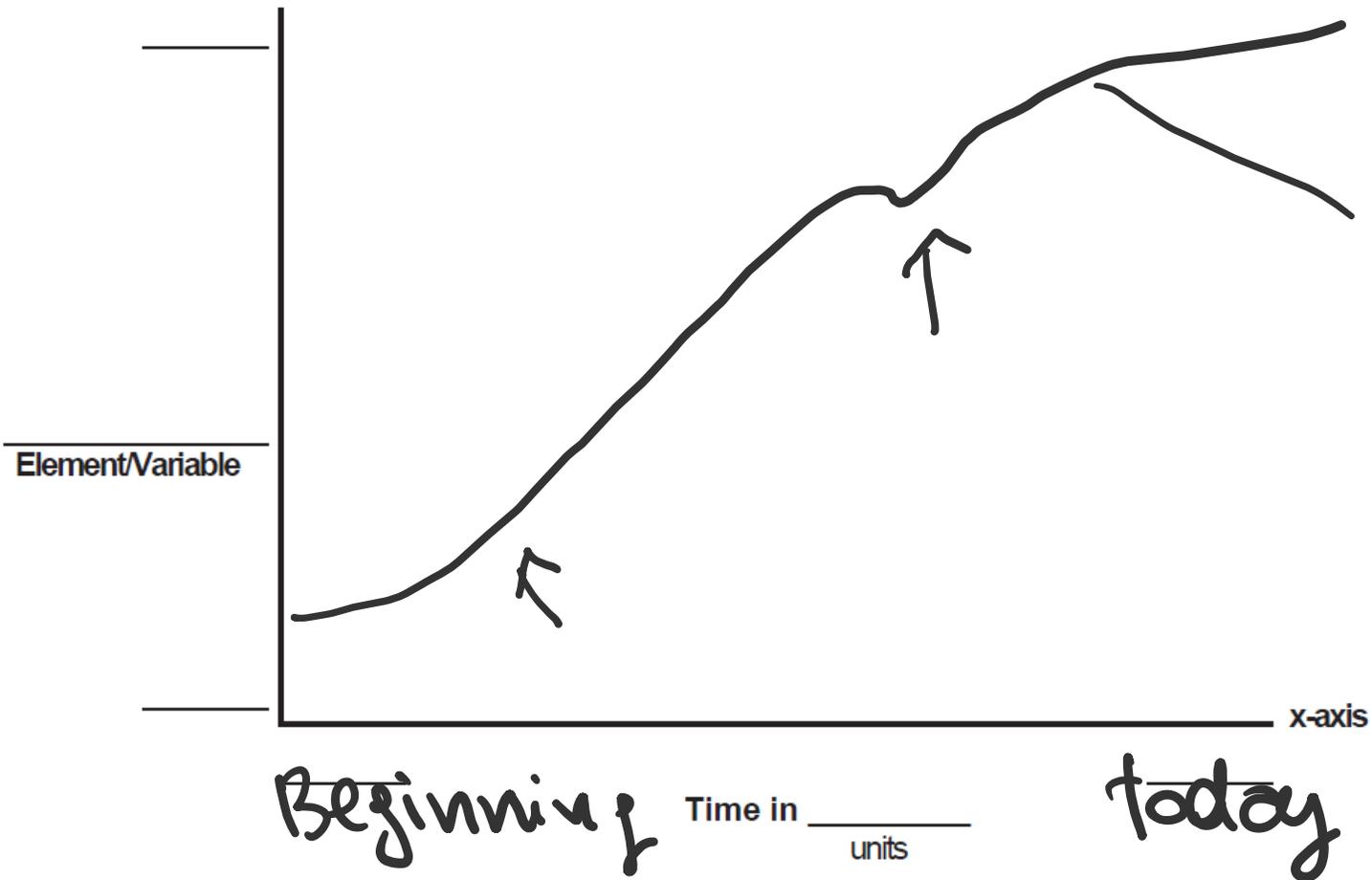
Behaviour-over-time graph (BOTG)



**A generator of
“powerful questions”**

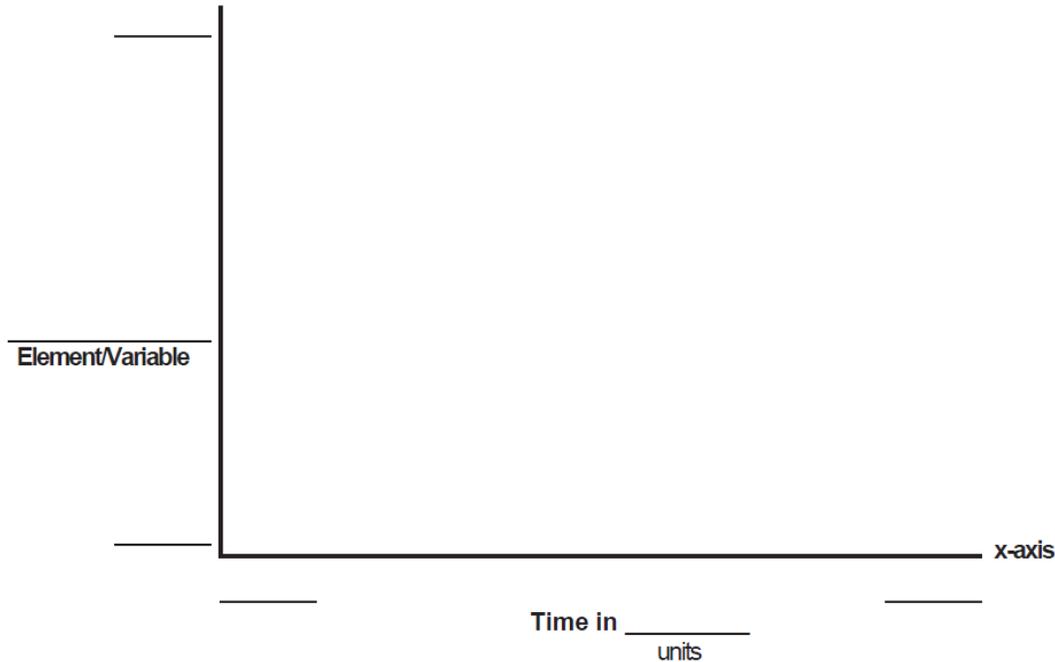
Behaviour-over-time graph (BOTG)

Title: ENGAGEMENT IN THE PROJECT



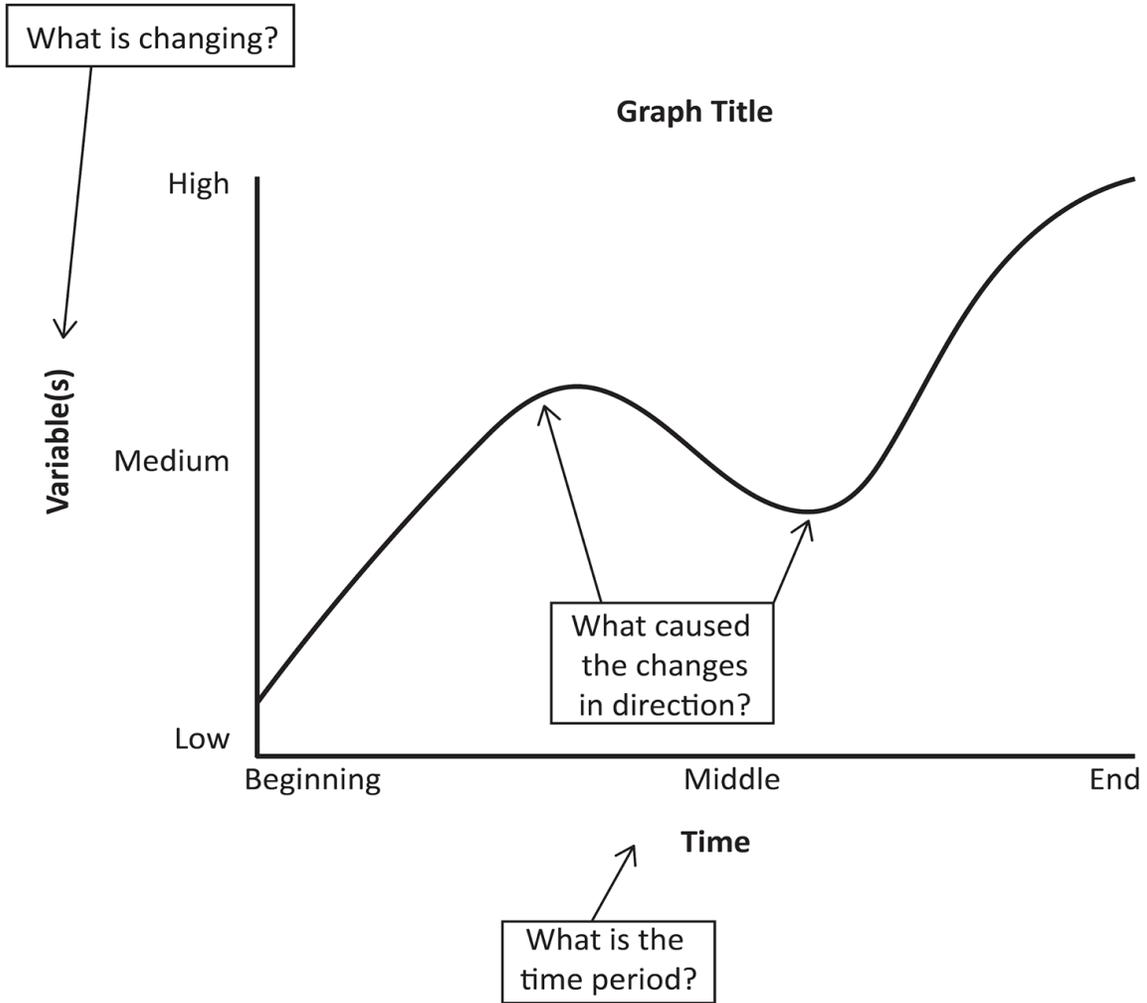
Create your BOTG

Title: _____



Some sample questions to ask when analyzing parts of a system that change over time:

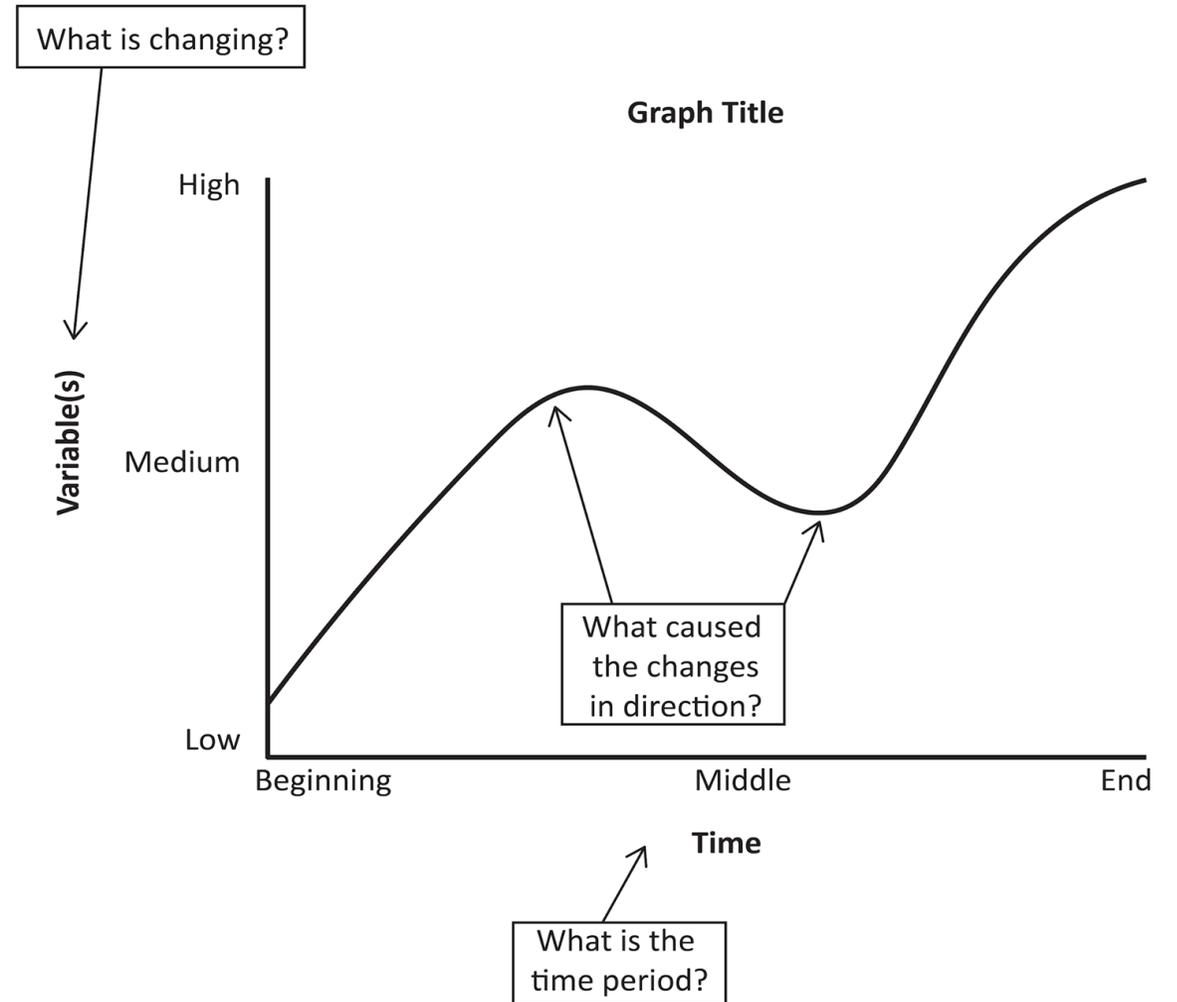
1. What important elements have changed over time?
2. How has _____ changed over time?
3. During what period of time have the changes occurred?
4. Where on the y-axis should the graph start and why?
5. How would you label the bottom/middle/top of the y-axis?
6. What evidence supports the graph being created?



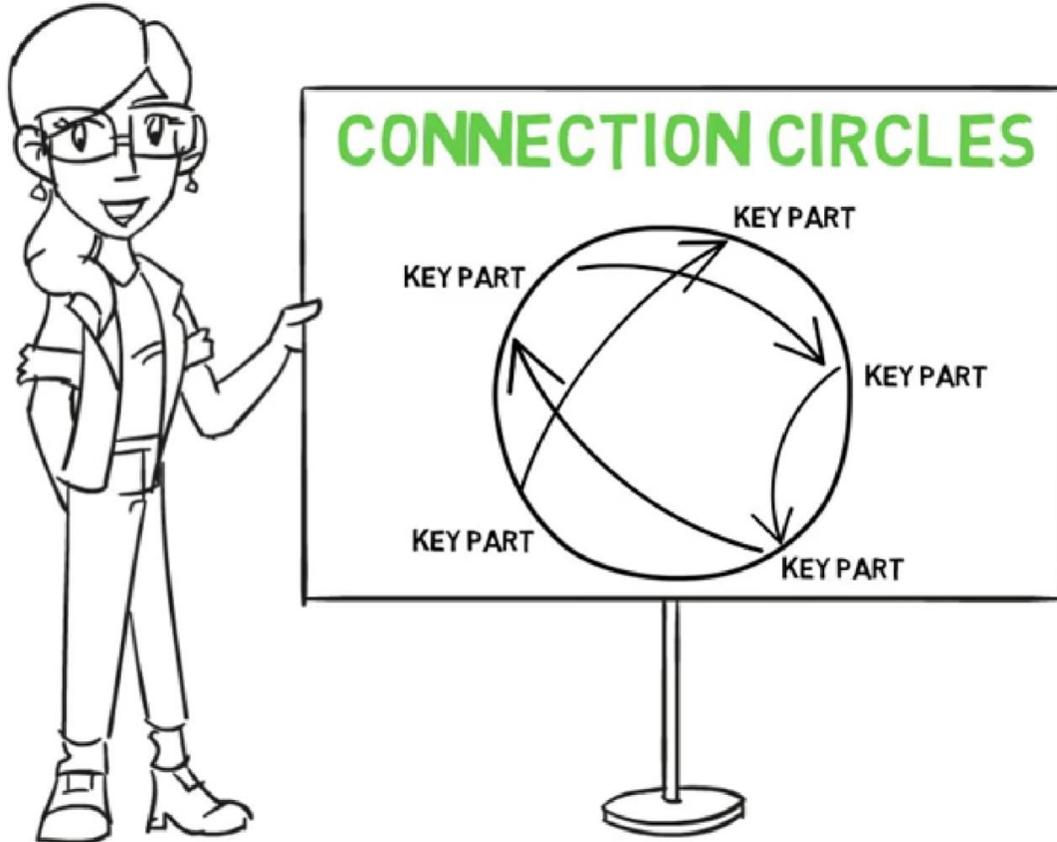
Questions to consider once BOTGs have been created:

1. What caused any changes in direction or slope?
2. How are interpretations of a graphed element the same or different?
3. What changes may happen in the future based on what has been happening?
4. Do you see any connections (interdependencies or causal relationships) between/among graphs?

BOTG as insight generator:
at the beginning of a participatory session, a coaching session, or a strategic conversation within the organization, it is an effective tool for specifying the system concerned.



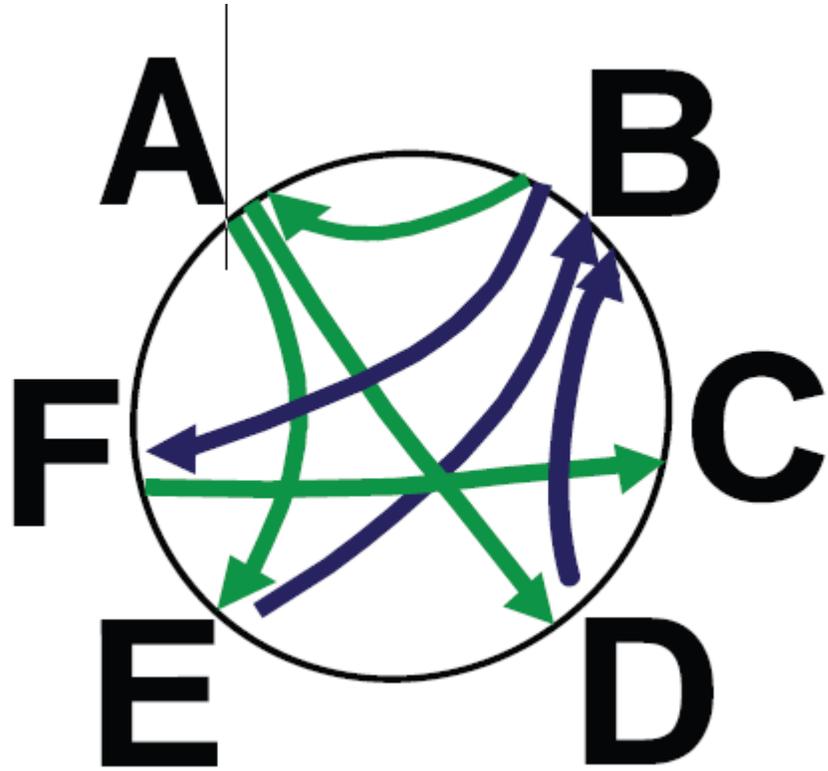
connection circle



A connection circle is a visual tool that shows the relationships between variables in a story or complex situation. When using a connection circle consider:

- What are the key factors or variables in this story?
- What are the cause and effect relationships between the variables?

connection circle

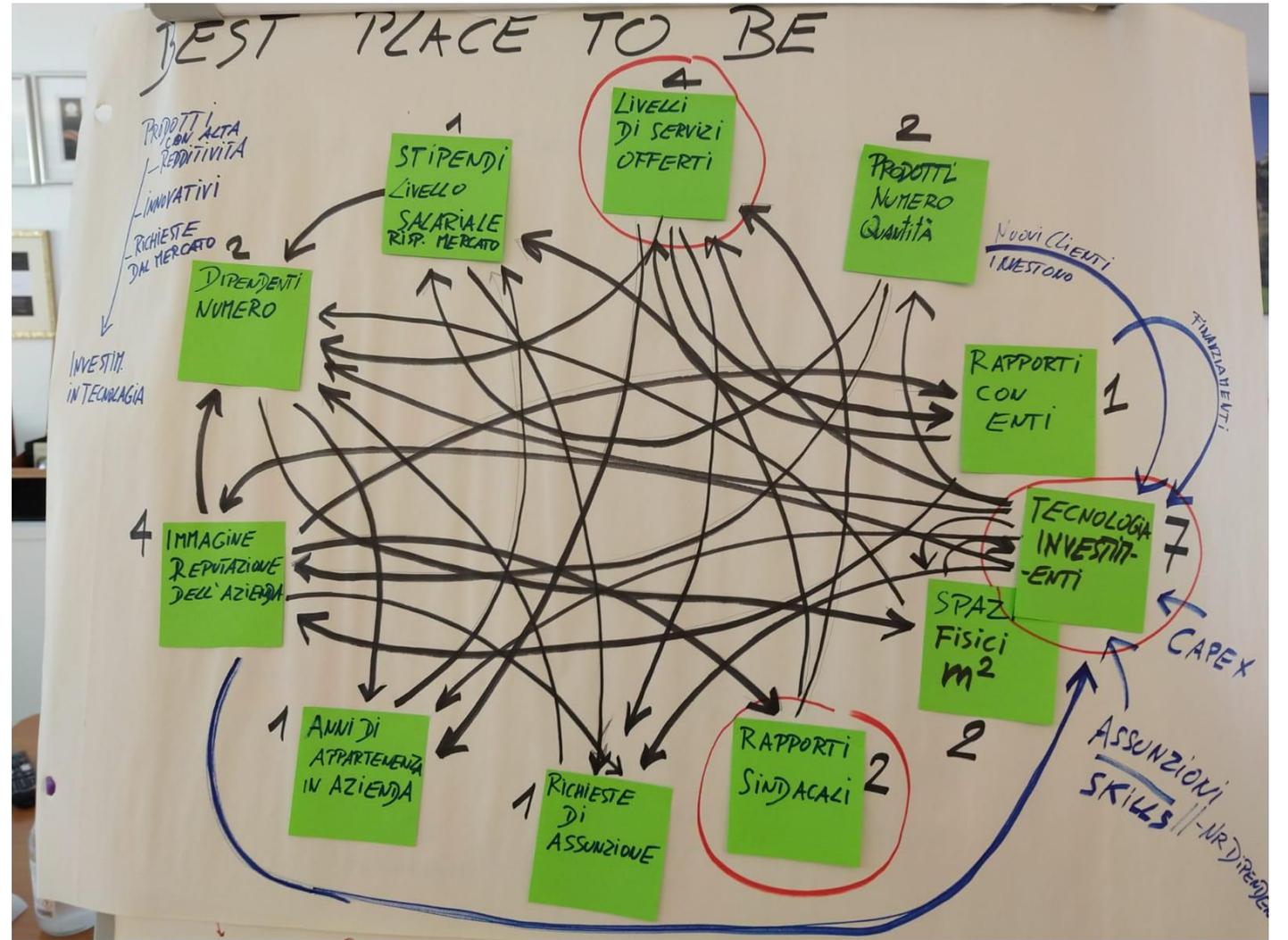
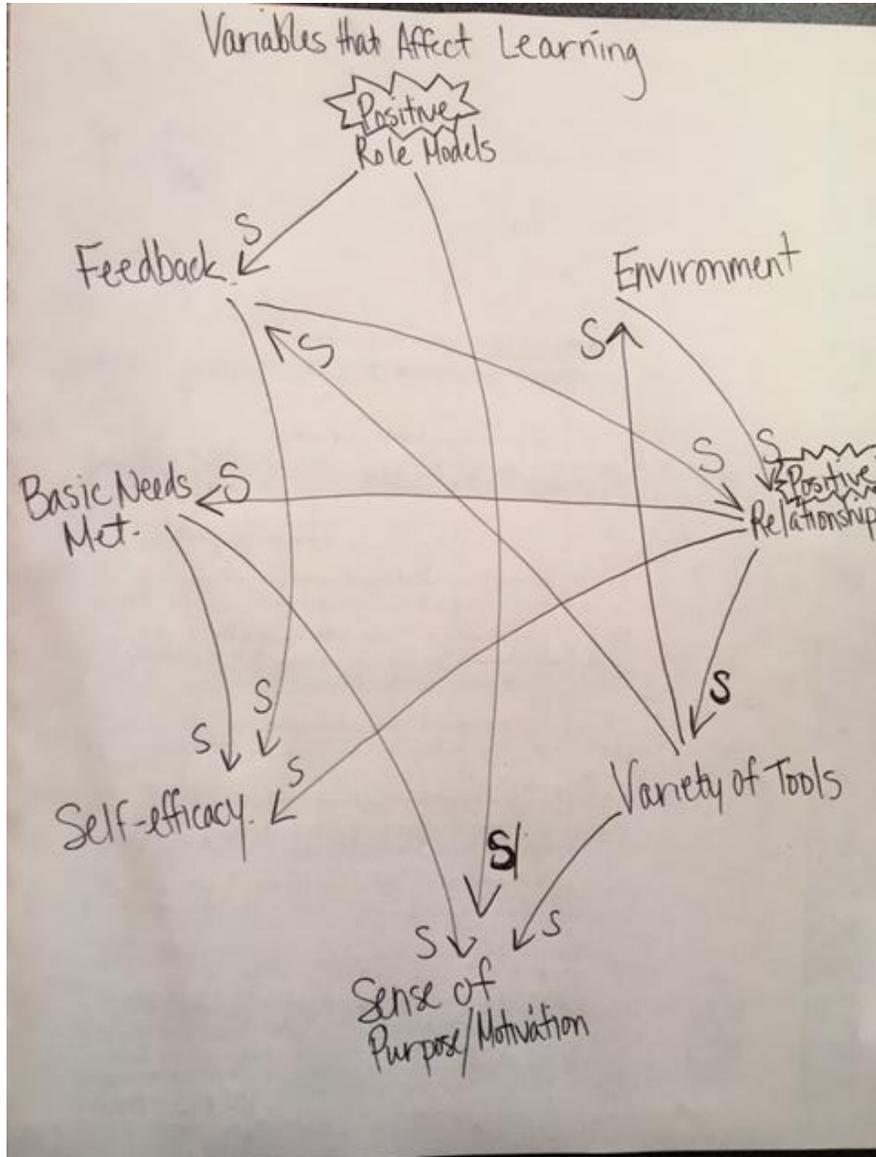


*Choose elements from the story or situation that meet these criteria:

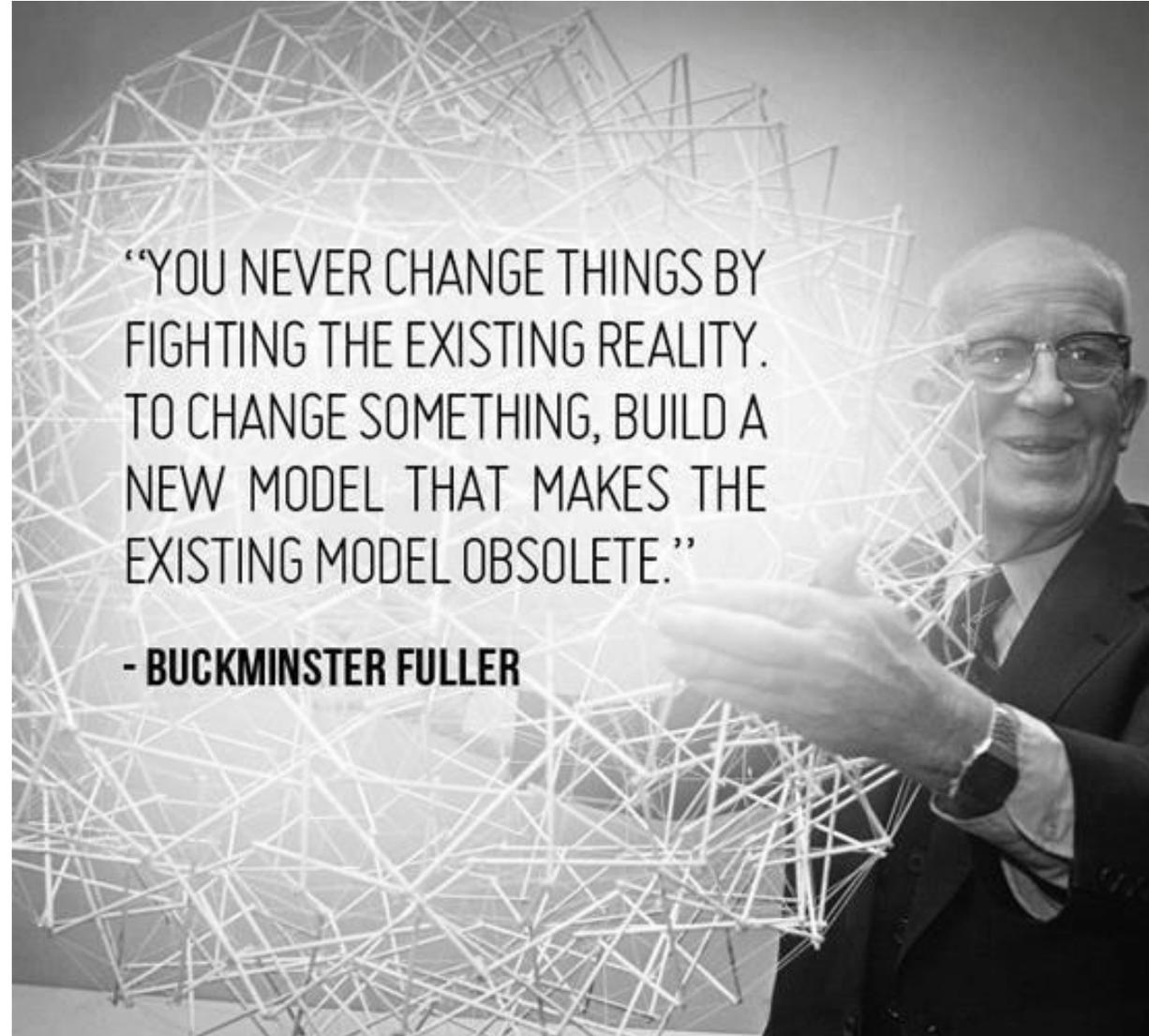
- They are important to the changes in the story.
- They are nouns or noun phrases.
- They increase or decrease in the story.

Guidelines

1. Draw a large circle and list* 5-10 important elements around the circle.
2. Identify an element that causes another element to increase or decrease.
3. Draw an arrow through the circle from the cause to the effect. Make sure that the causal connection is a direct one.
4. Identify polarity (+ or -) of link and label at the arrowhead.
5. Continue to identify elements with causal connections.
6. Identify feedback loops and tell emerging "stories."



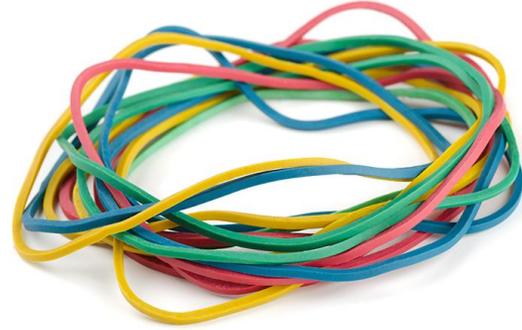
Systems thinking to improve our systems... creating better ones



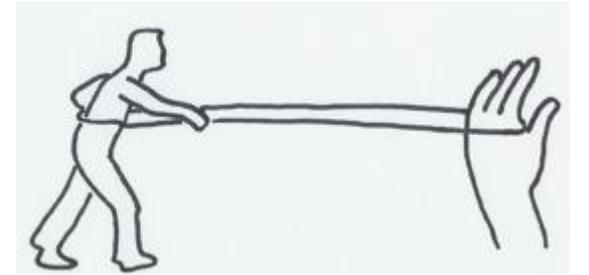
“YOU NEVER CHANGE THINGS BY
FIGHTING THE EXISTING REALITY.
TO CHANGE SOMETHING, BUILD A
NEW MODEL THAT MAKES THE
EXISTING MODEL OBSOLETE.”

- BUCKMINSTER FULLER

Creative Tension and the Importance of Gaps

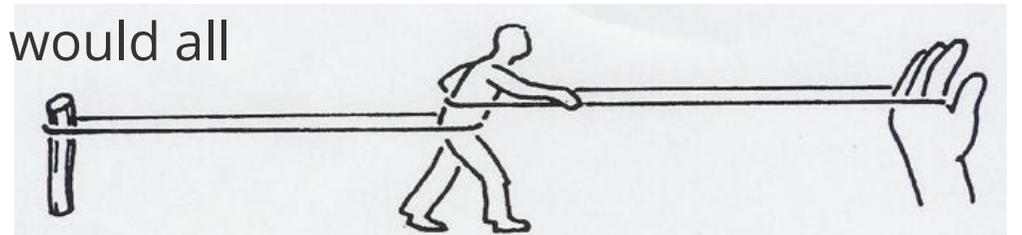


What did you learn from your partner as he or she was describing the current or desired state of the Smart Community?



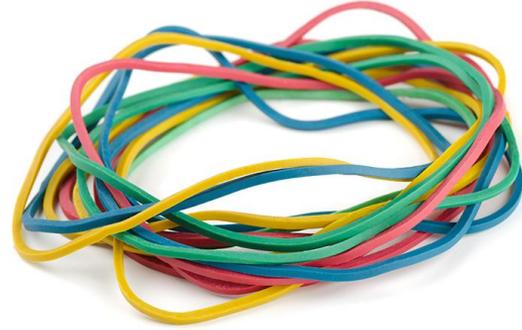
We surfaced several views of the current state of this system (Smart Community) and several views of the desired state of the system.

If we were to collect those views, do you think they would all be the same? Why or why not?

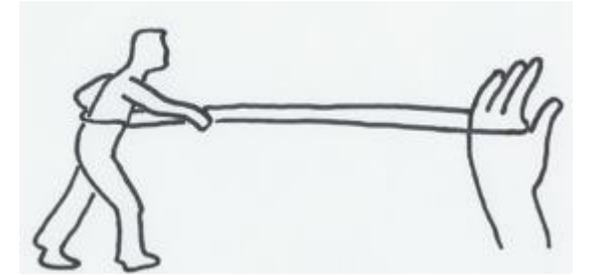


How did it feel when **A's** had the courage to take a small step? Did anyone do this naturally without being invited to do so?

Creative Tension and the Importance of Gaps

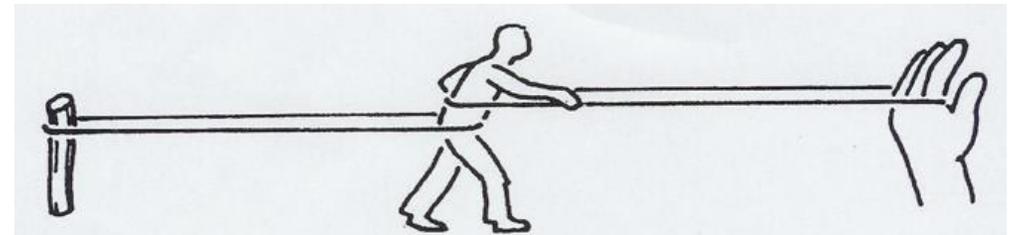


What causal factors help people take small steps toward the desired state for the system?

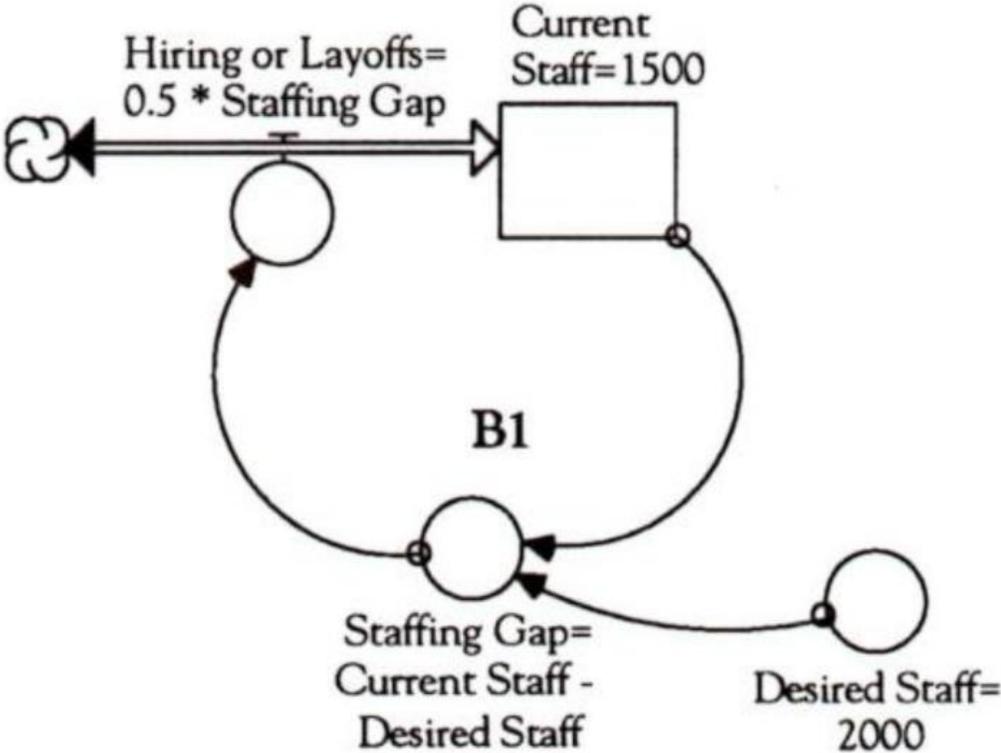
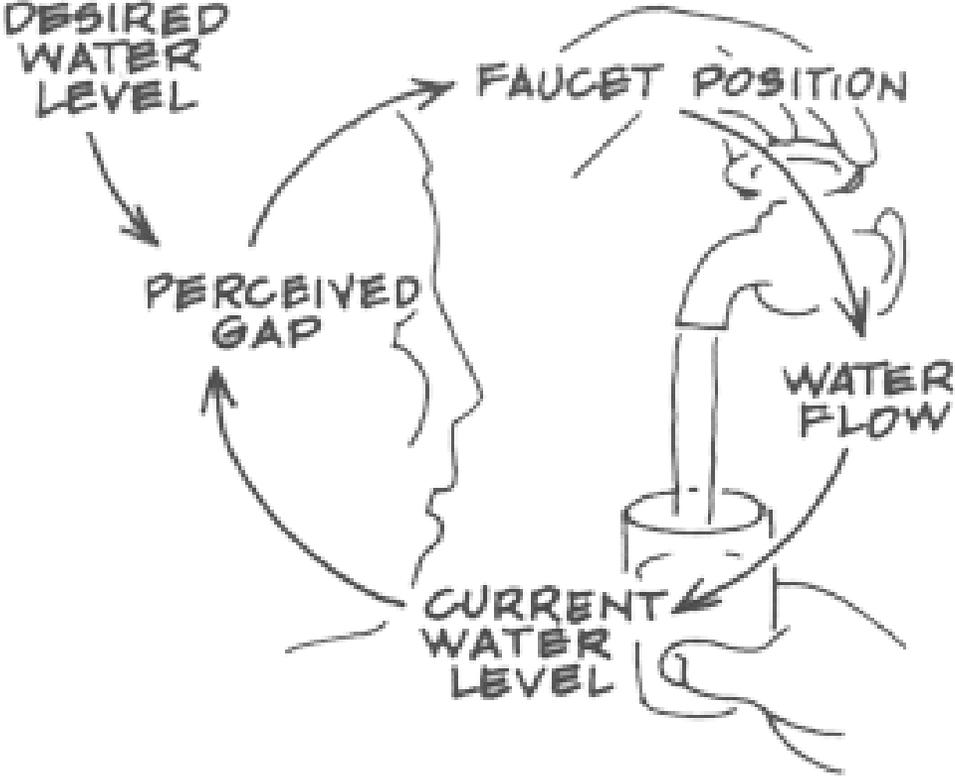
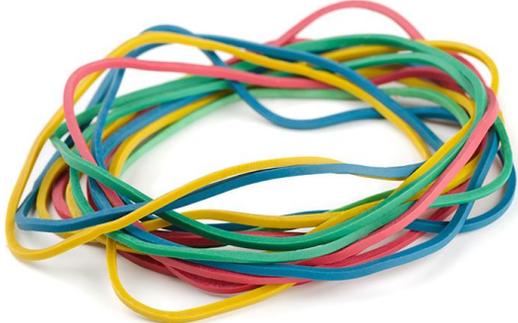


What causal factors hold people back?

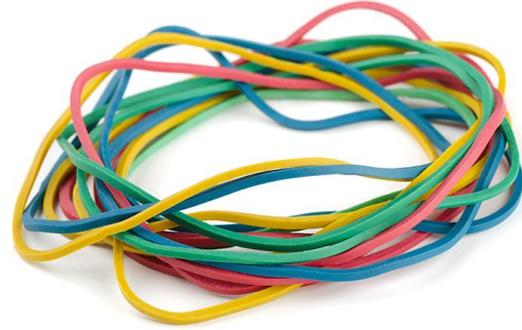
What connections can you make between this exercise and what is happening in the system you addressed?



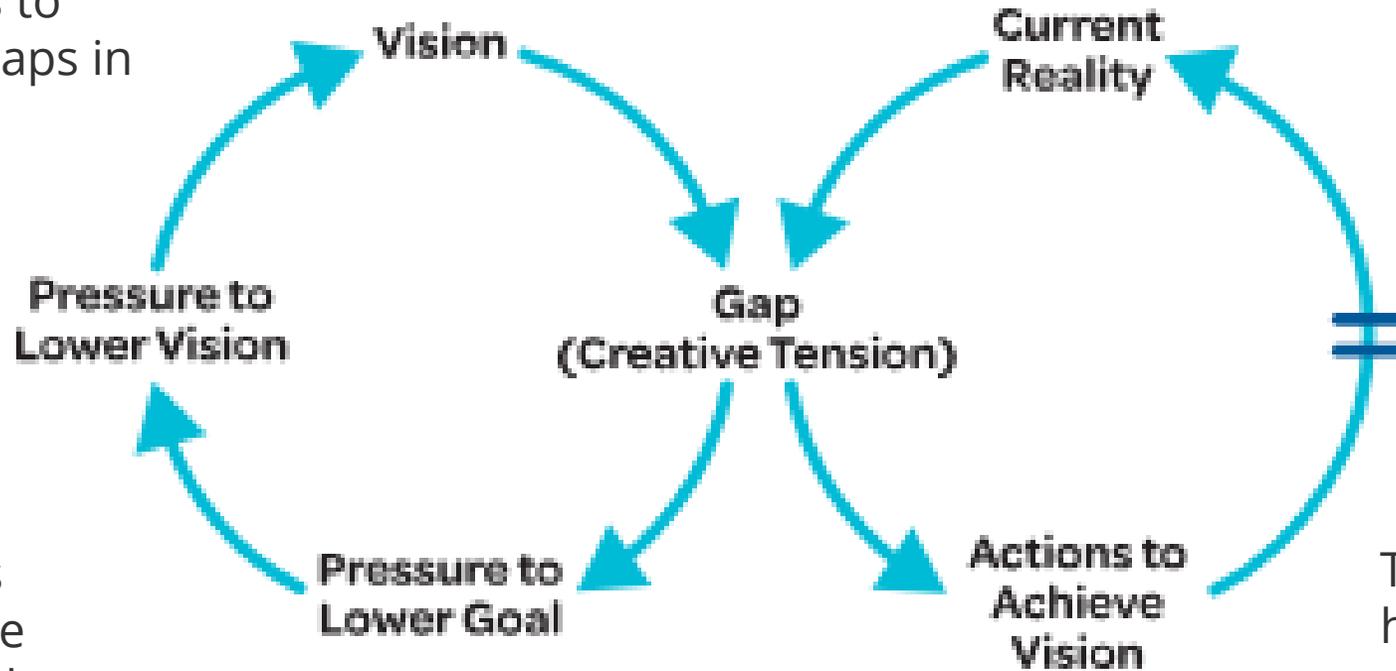
Creative Tension and the Importance of Gaps



Creative Tension and the Importance of Gaps

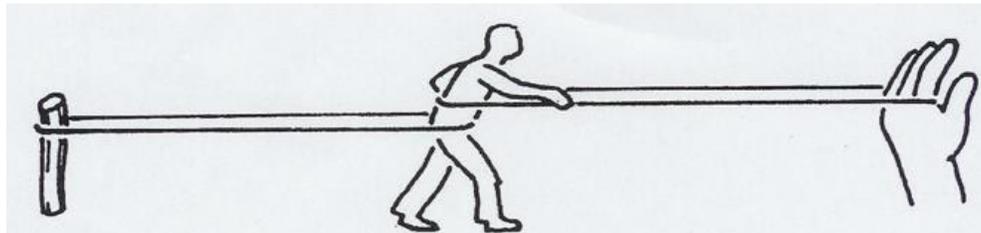


There are two ways to close or minimize gaps in a system

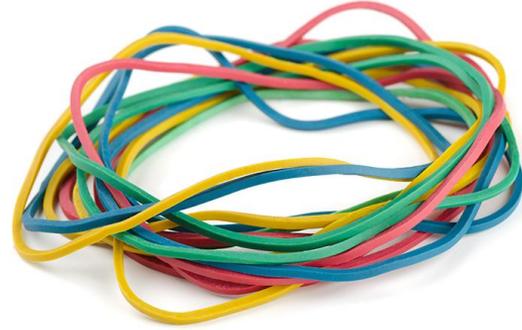


The left loop shows how gaps can create emotional tension that can pressure people to decrease aspirations and lower the goals or vision.

The right loop illustrates how creative tension can inform actions that help the system achieve success and move closer to a vision.

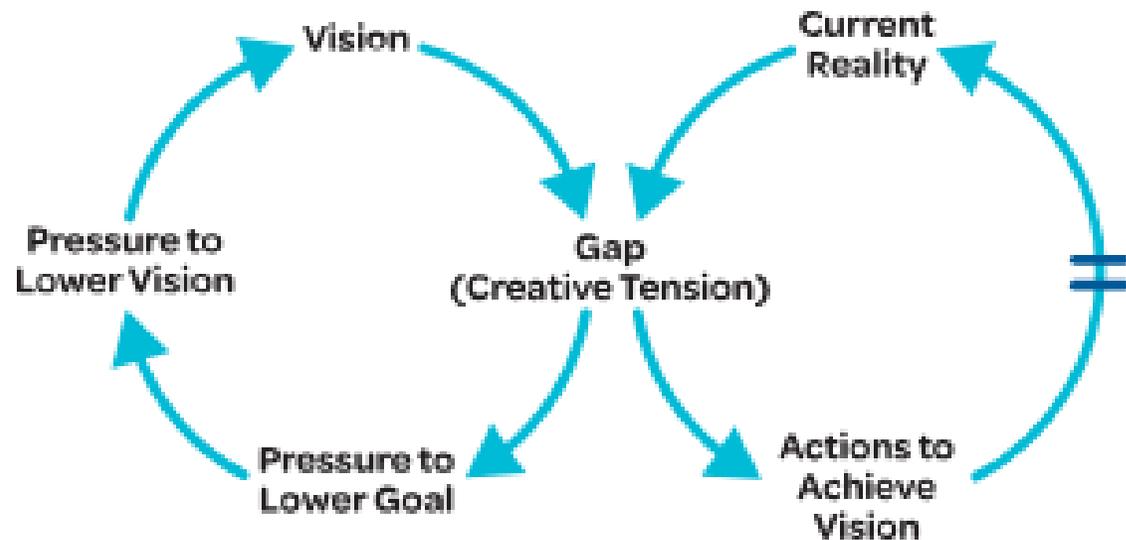


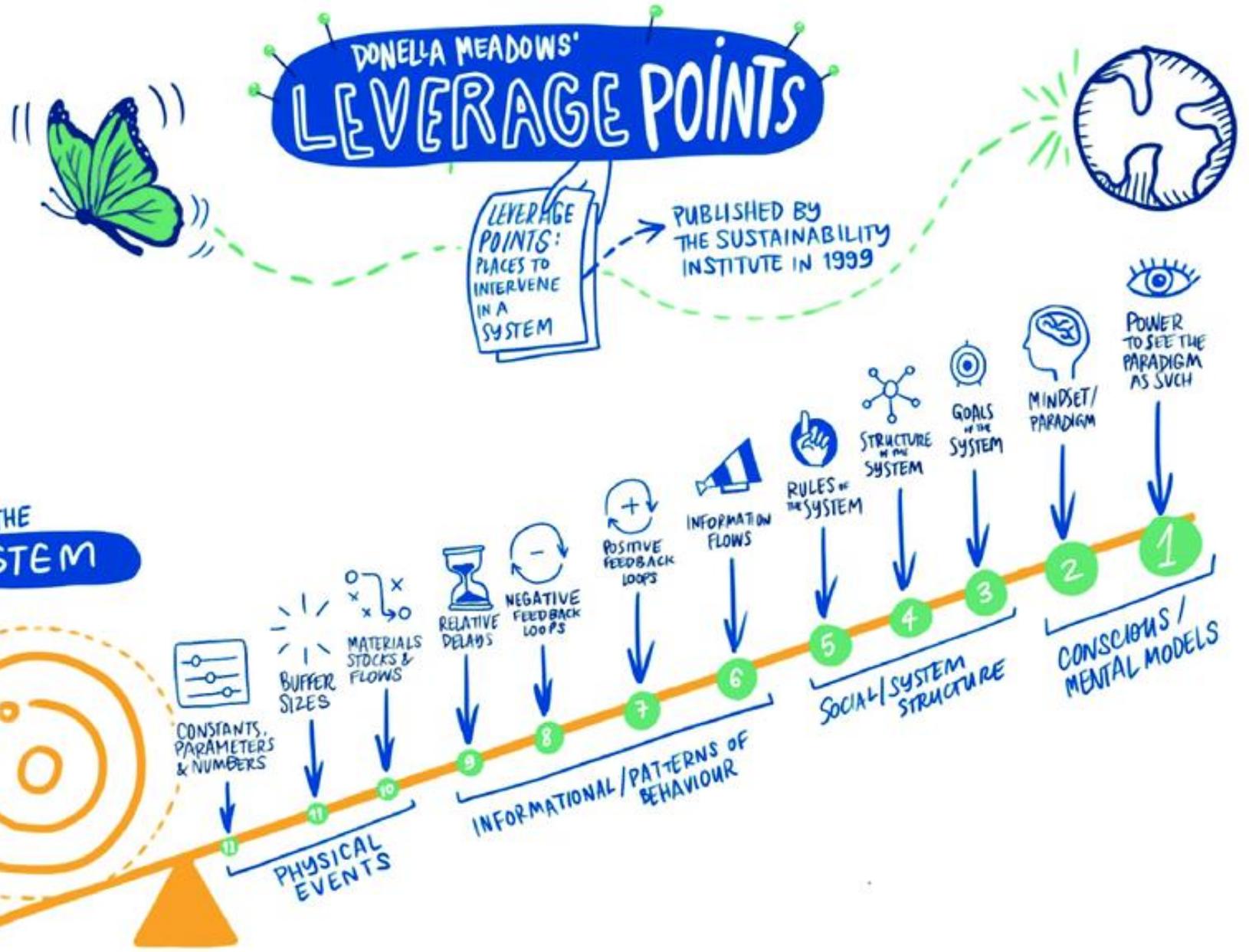
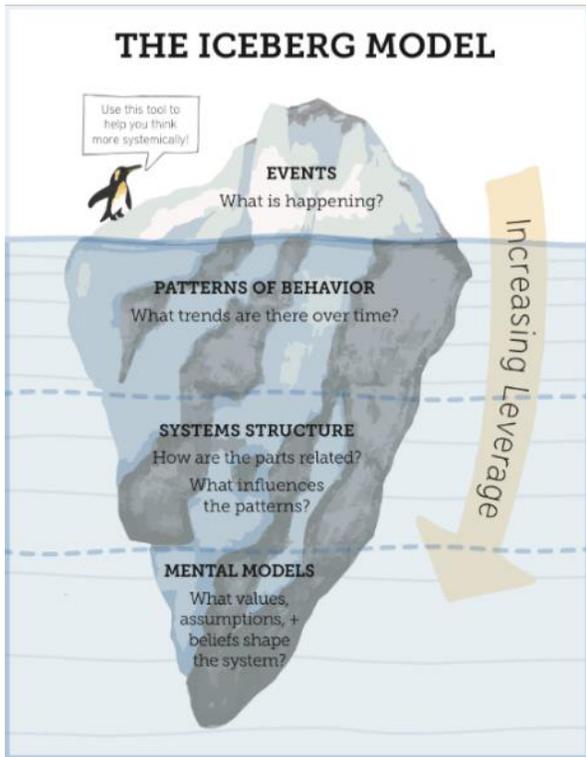
Creative Tension and the Importance of Gaps



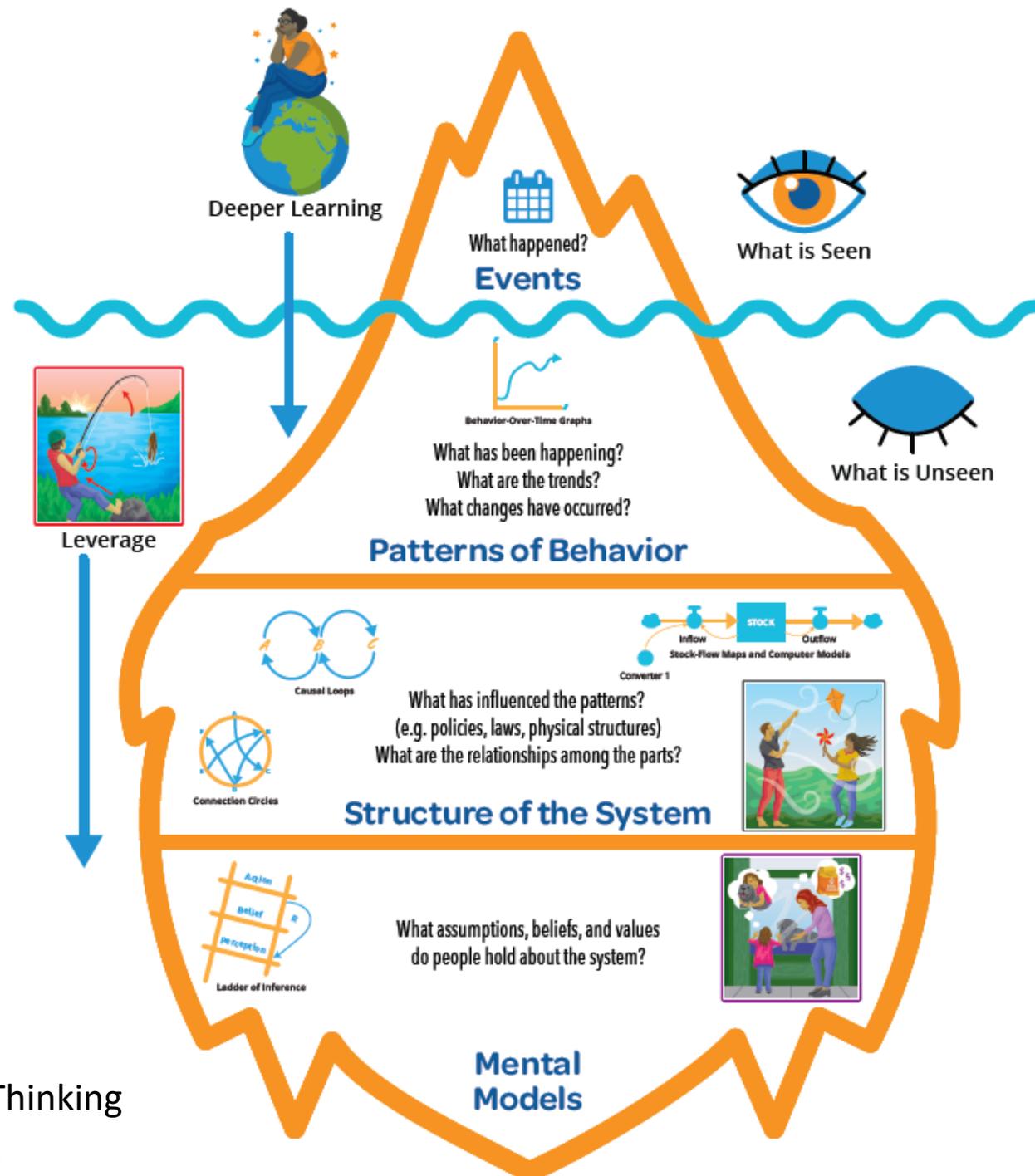
A **systems thinking leader** is one who effectively utilizes creative tension to manage gaps. How?

- They work to minimize fear by appreciating gaps.
- They manage the size of gaps.
- They help build understanding of what is causing gaps.
- They facilitate the selection of strategies to address gaps (leverage).
- They monitor the emotional tension that can be caused by gaps.





Iceberg model

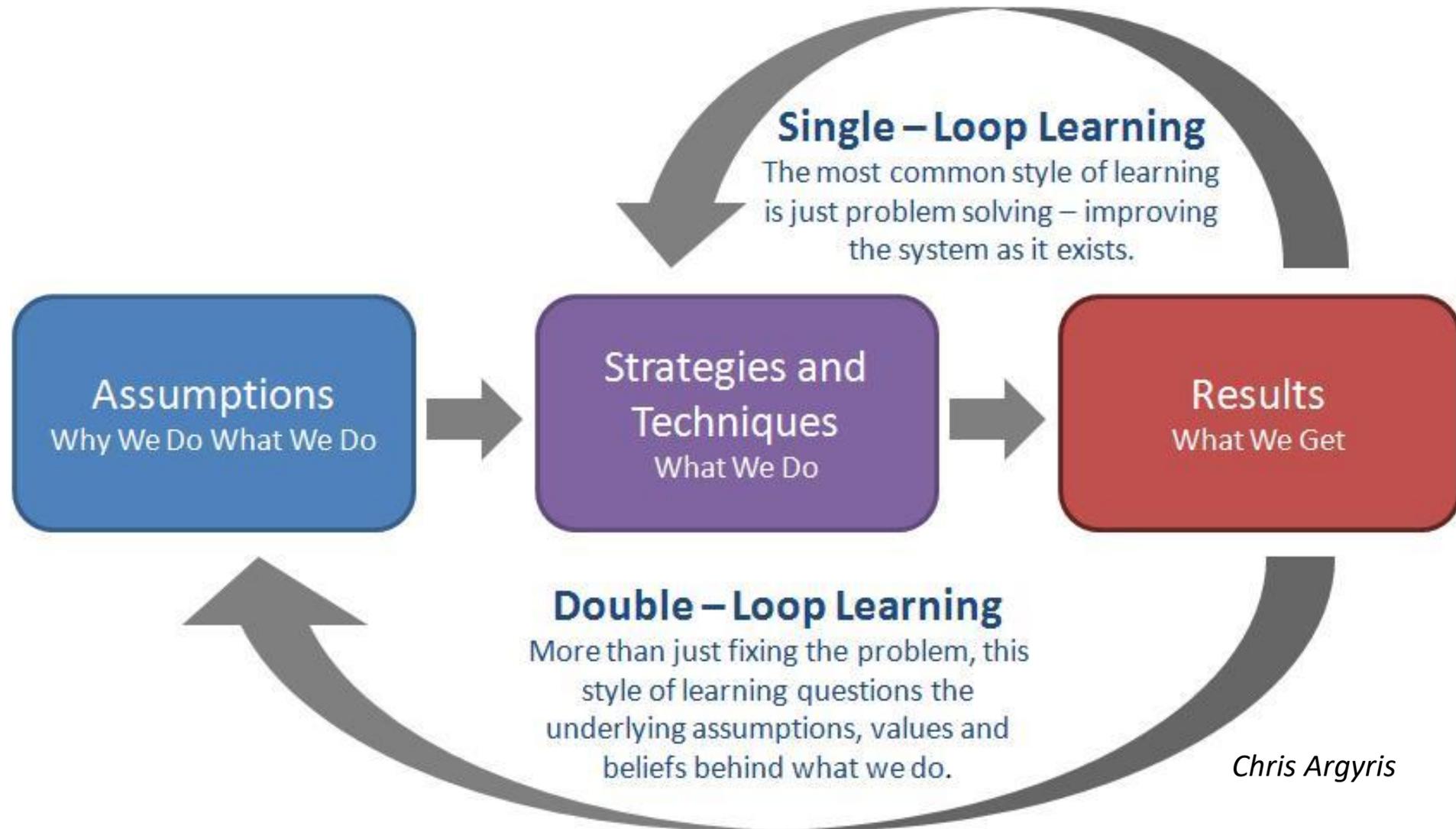


Systems Principles

When struggling to understand complex problems...

- 1. Everything is connected – there is no ‘away.’**
- 2. Everyone uses mental models to make decisions.**
- 3. Nothing grows forever – systems tend toward equilibrium.**
- 4. Systems are usually resilient, resisting change but may still be pushed out of equilibrium.**
- 5. Feedback is embedded in all actions.**
- 6. Cause and effect are often not closely related in time or space.**
- 7. There are seldom simple solutions.**
- 8. Solutions often become problems.**
- 9. Actions may be ineffective due to low leverage policies or incorrect application of high leverage ones.**
- 10. What appears to be good in the short term is often bad in the long term, and vice versa.**
- 11. Almost nothing is exogenous – causes of problems are within systems (endogenous).**
- 12. Systems and problems within them may display parallel structures even though the contexts are unlike. (Generic structures)**

Systems thinking to improve our assumptions



Chris Argyris

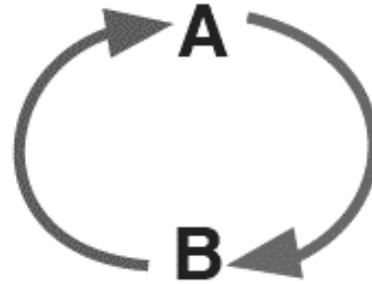
Systems thinking Tools



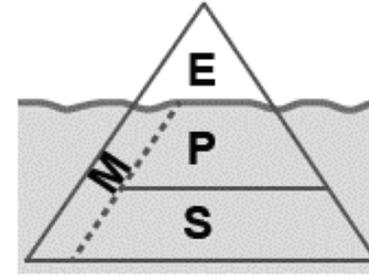
Behavior-over-time graph



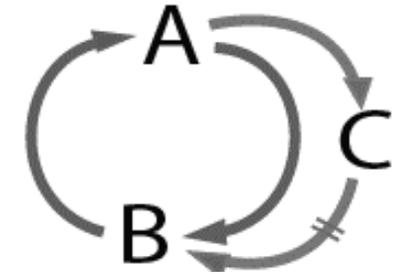
Connection circle



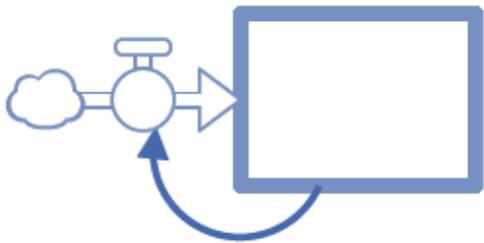
Causal Loop Diagram



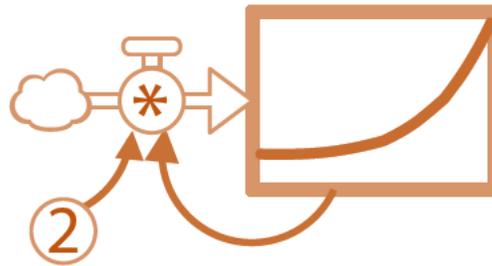
Iceberg model



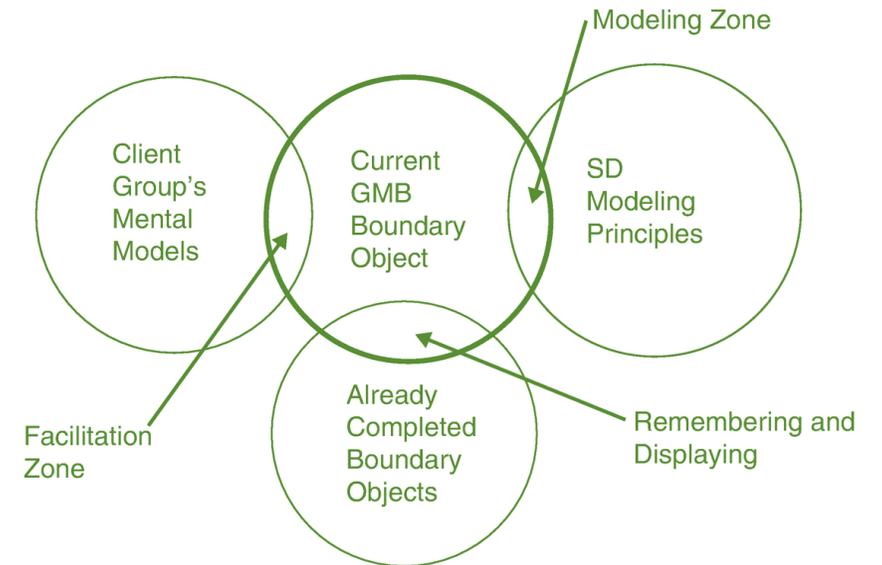
Archetypes



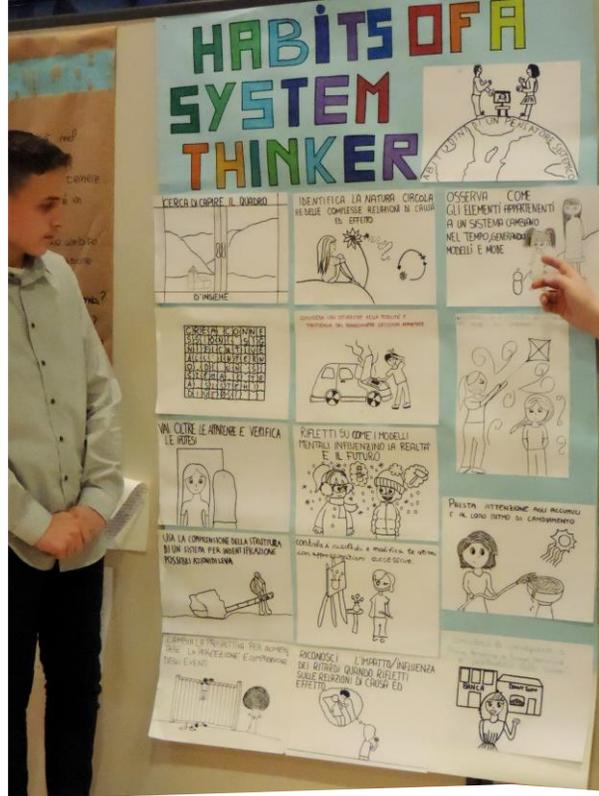
STOCK&FLOWS MODELS



SIMULATION MODELS



GROUP MODEL BUILDING



I miei futuri in valle: 2035 in carriera e soddisfatto
 (middle school) IC Strigno Tesino, IC valle dei Laghi

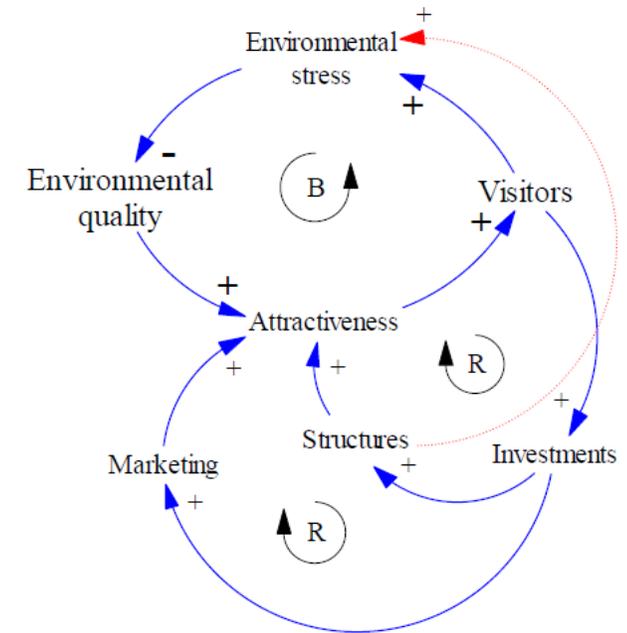
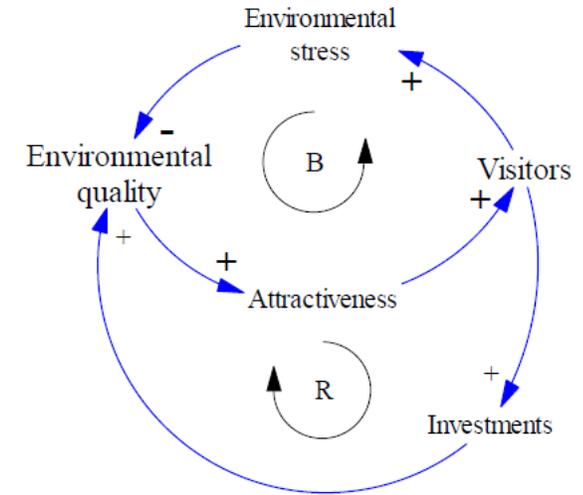
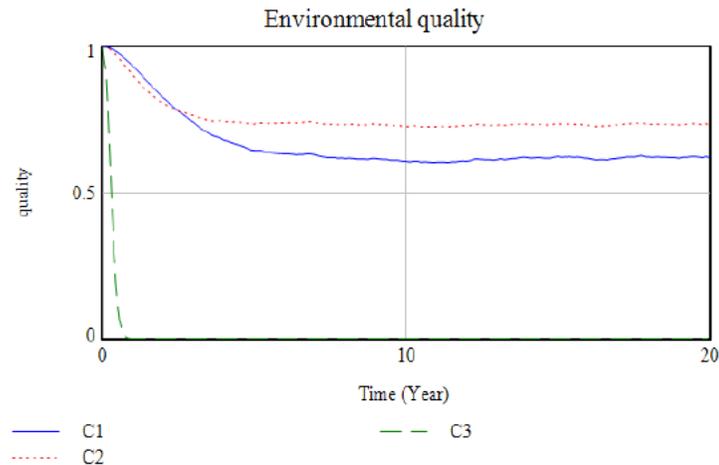
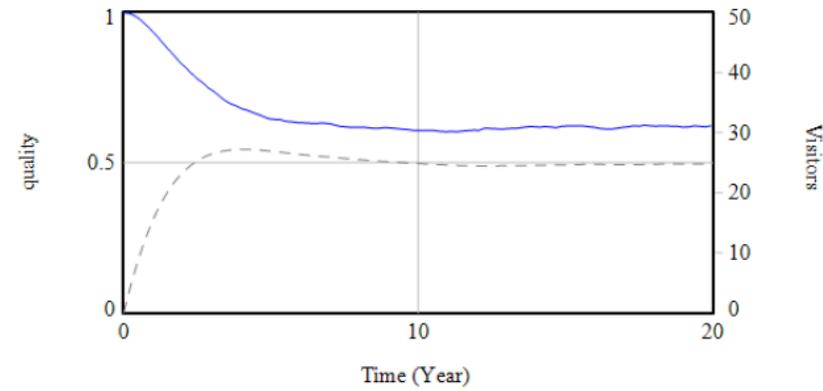
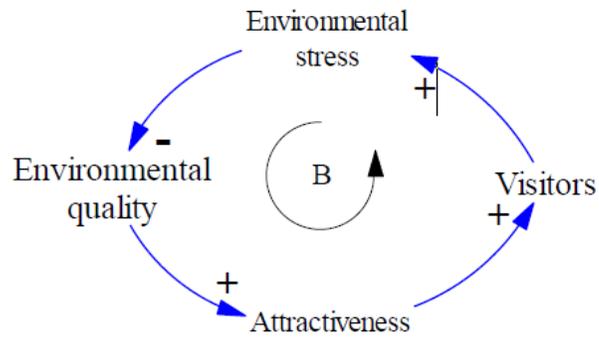
“Autumn School of Anticipation” (VET schools)

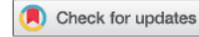


Enhancing Ecosystem Services Management in Protected Areas Through Participatory System Dynamics Modelling

Abstract

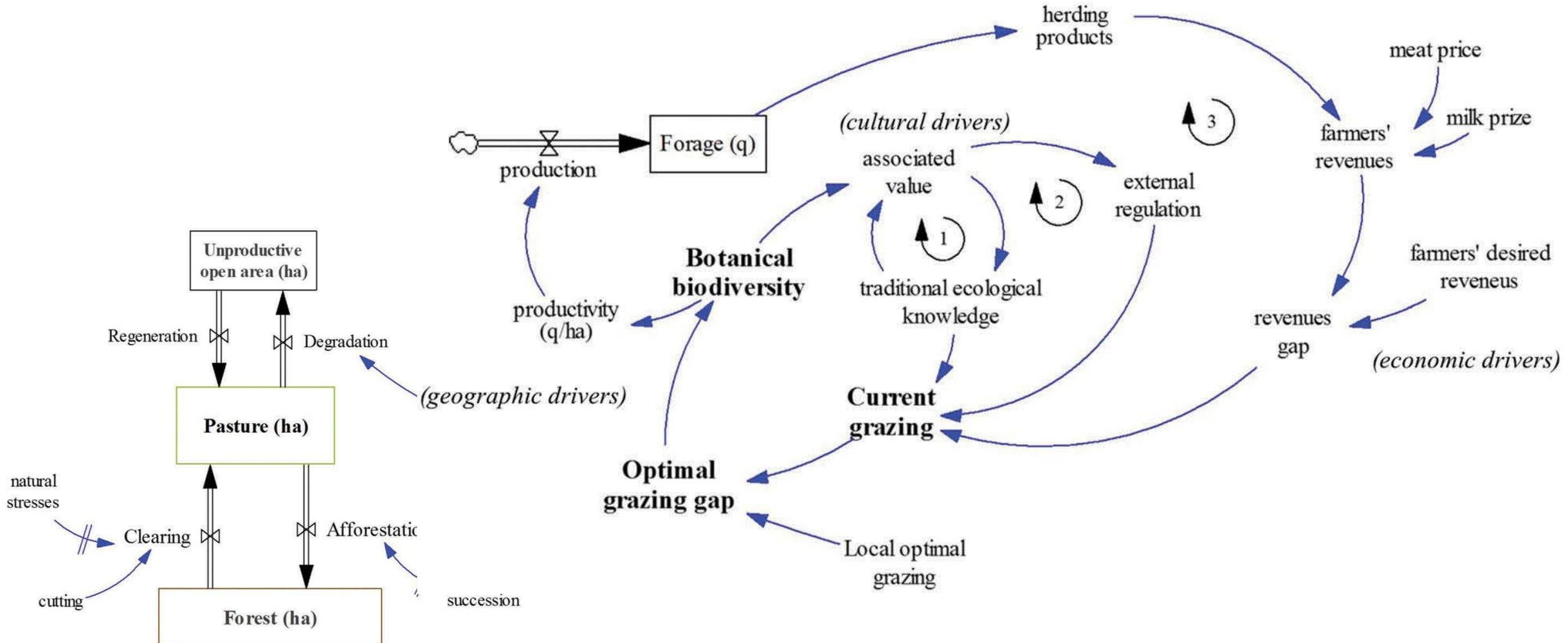
Rocco Scolozzi^{1,2*}, Uta Schirpke^{3,4},
Davide Geneletti^{2,5}





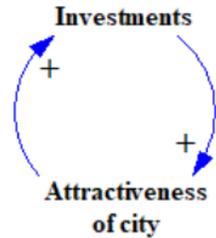
Governing mountain landscapes collectively: local responses to emerging challenges within a systems thinking perspective

Alessandro Gretter^{a,b}, Marco Ciolli^c and Rocco Scolozzi^{d,e}

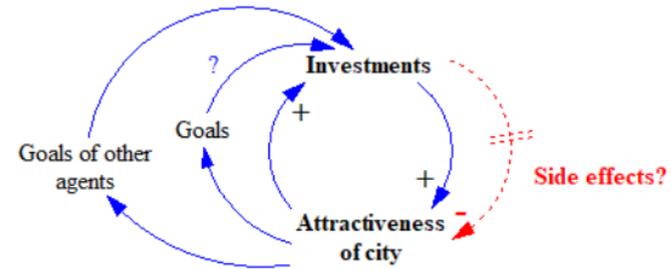




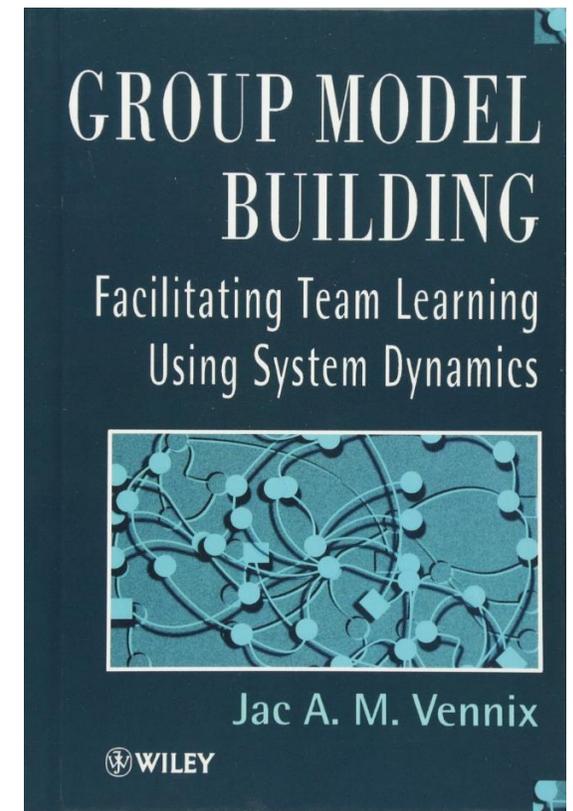
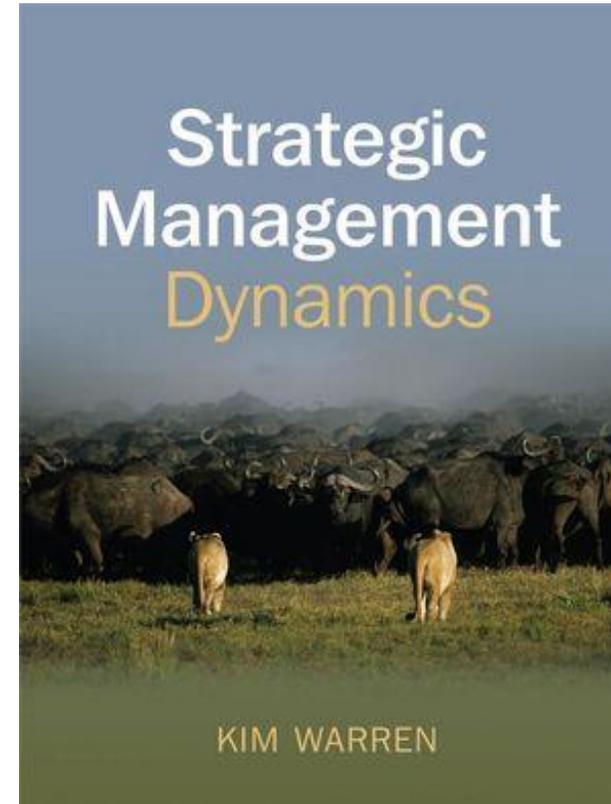
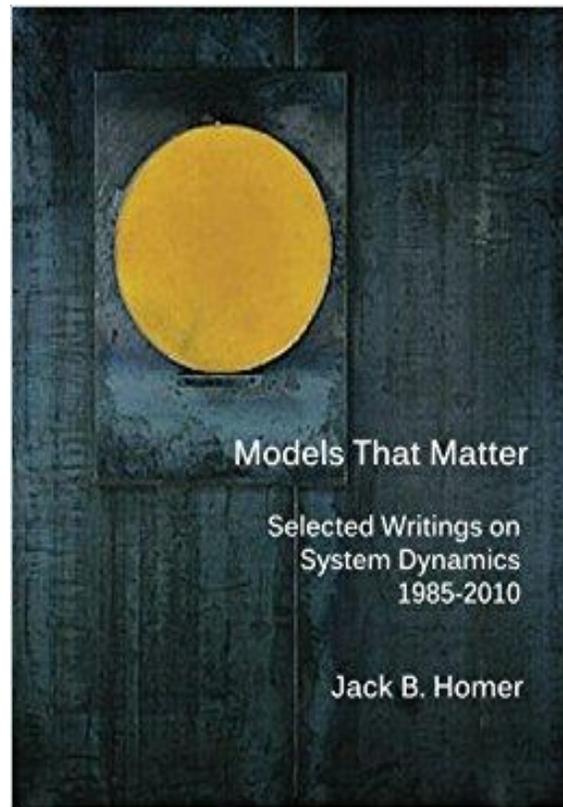
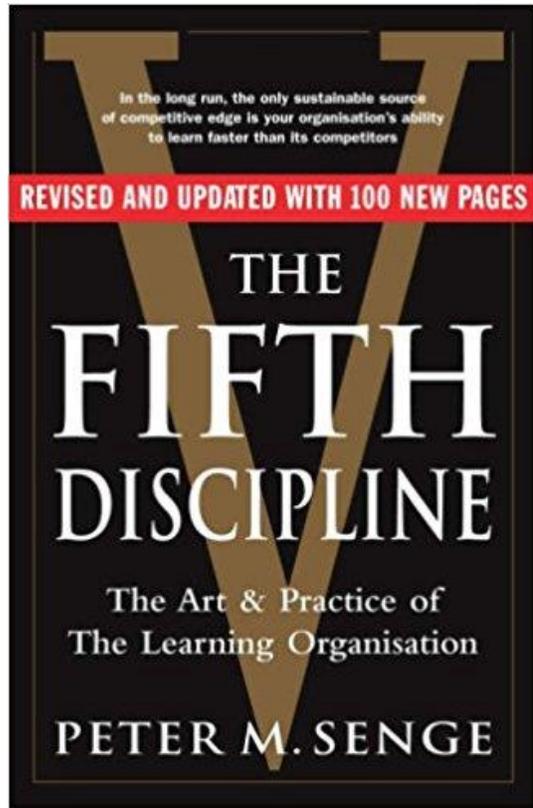
Investments in the development of a city increase its attractiveness, this increase will in turn increase investments.



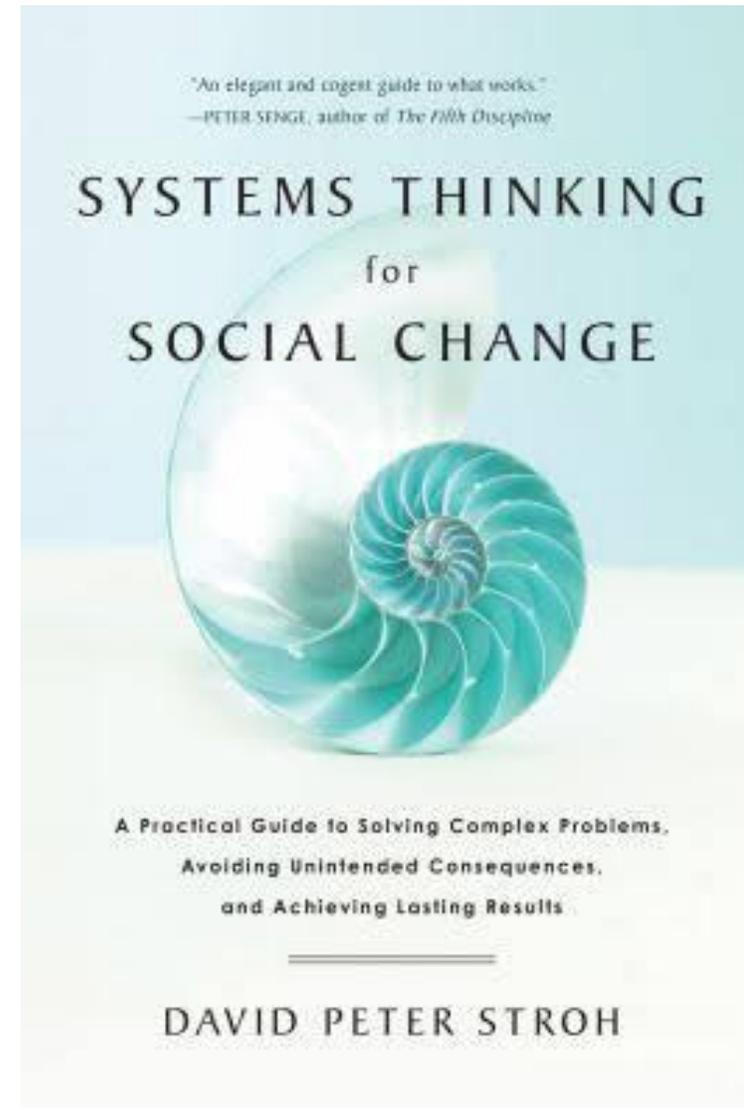
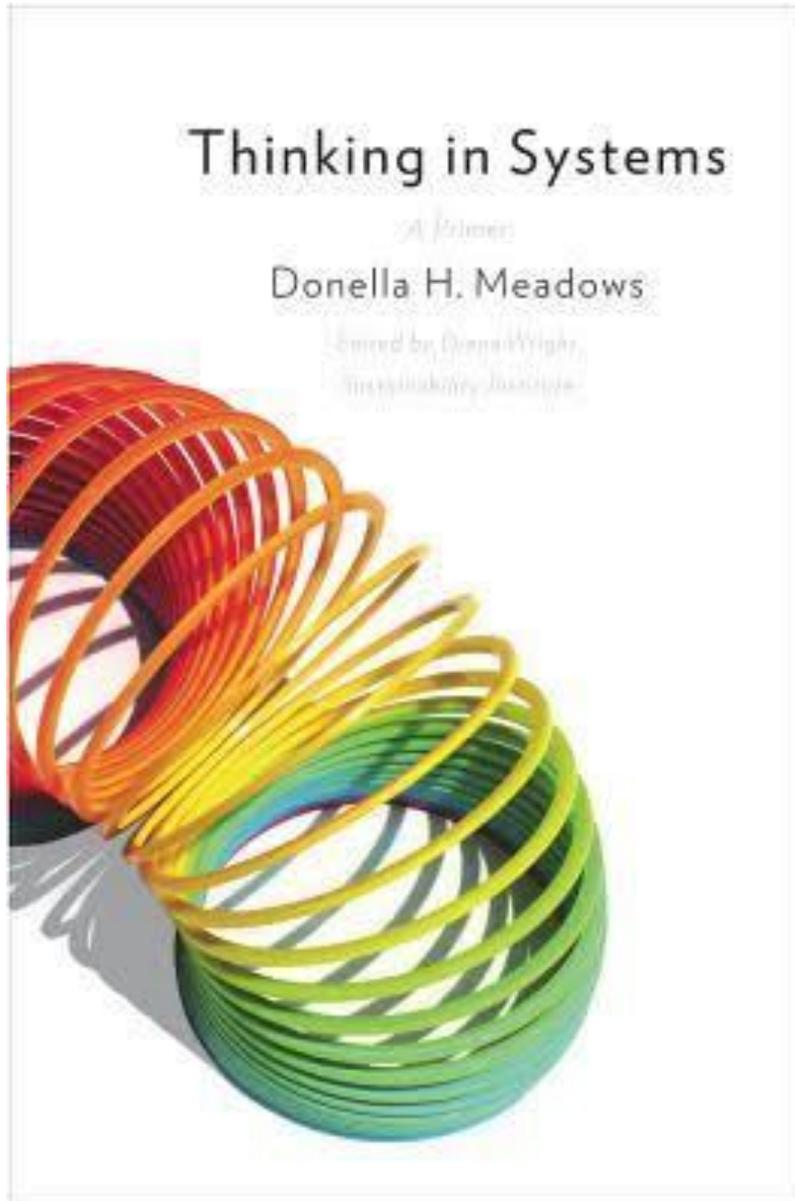
But in systems, rarely does an action only have an effect! Moreover, different agents act according with their own goals.

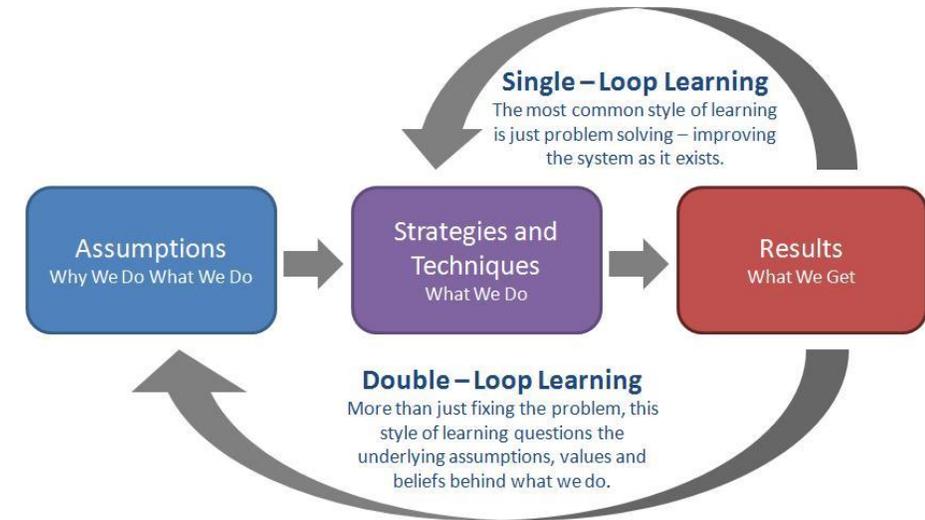
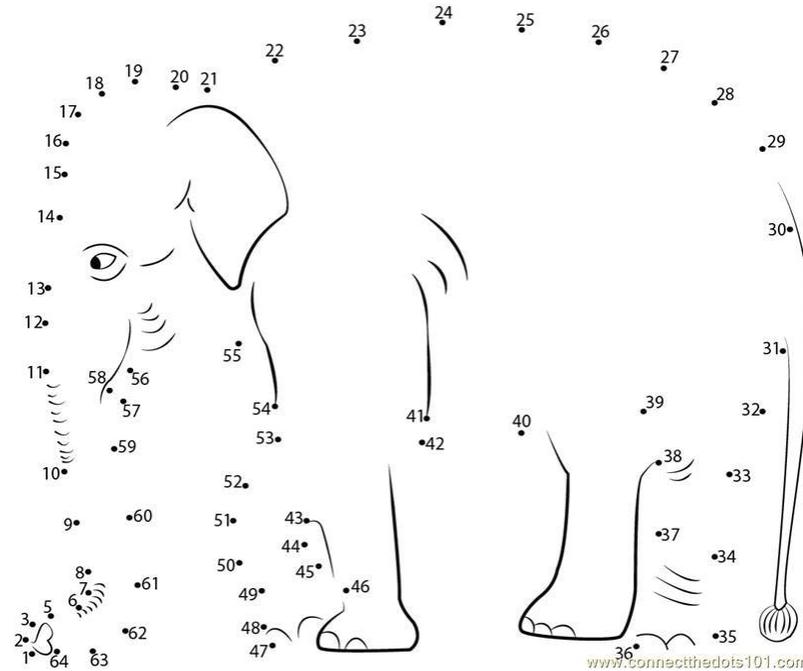


This is one of the complexities of a city system, which must be taken into account in sustainability.



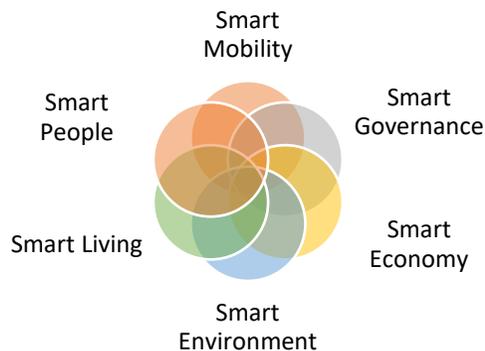
My favorite work tools





Systems thinking

- is a discipline for looking at systems 'holistically' and understanding how their internal structures create the dynamics and events we see around us.
- it offers a framework for defining problems, organising and sharing ideas, asking better questions and making better decisions.
- requires a lot of practice 😊



Systems thinking – systemic understanding of case studies and good practices

The SmartCommUnity project includes various pilot initiatives aimed at fostering smart transitions in Alpine areas. Key solutions from pilot cases include:

- 1. Guillestrois-Queyras (FR):** Housing matchmaking and support networks for the elderly.
- 2. Baronnies en Drôme Provençale (FR):** Mobility service center for collaborative transport.
- 3. Pomurje (SI):** Green Point Living Lab, a short food supply chain integrating blockchain.
- 4. Elzach (DE):** Citizen app for city communication.
- 5. Winden im Elztal (DE):** Multifunctional meeting place and civic center for citizens to host co-working and commercial activities
- 6. Cogorno (IT):** Training hub for agriculture and tourism.
7. ...

<https://www.alpine-space.eu/project/smartcommunity/>
Accessed October 13th 2024

- What factors enable or hinder innovations in Alpine communities?
- What feedbacks between different upcoming changes will influence these innovations in the coming years?
- How to make local development robust, adaptive and megatrend-proof?

Frames

Systems thinkers change perspectives to increase understanding

The frames we use to look at the reality shape our understanding. We are often unaware of how we are framing a problem.

«overload of emails»		
Space frames	Time frames	Issues
Unread emails in my box	Days	A busy day?
Unread email in my office (collaborators' box)	Months	Too many emails for me and my colleagues?
Unread emails in the entire department	Quarters	Dysfunctional communication in the organization



We fail more often because we solve the wrong problem

RUSSELL L. ACKOFF

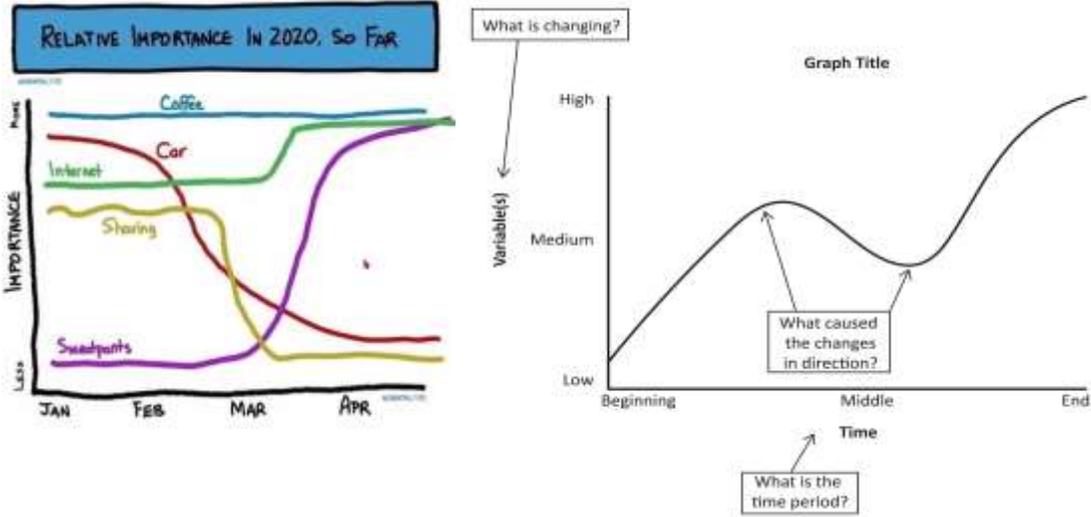
Consider a pilot, identify three different possible frames, and write down in the table below an issue that come to mind based on these different frames, as in the email example.

Pilot case or related problem: _____		
Space frame	Time frame	Issue

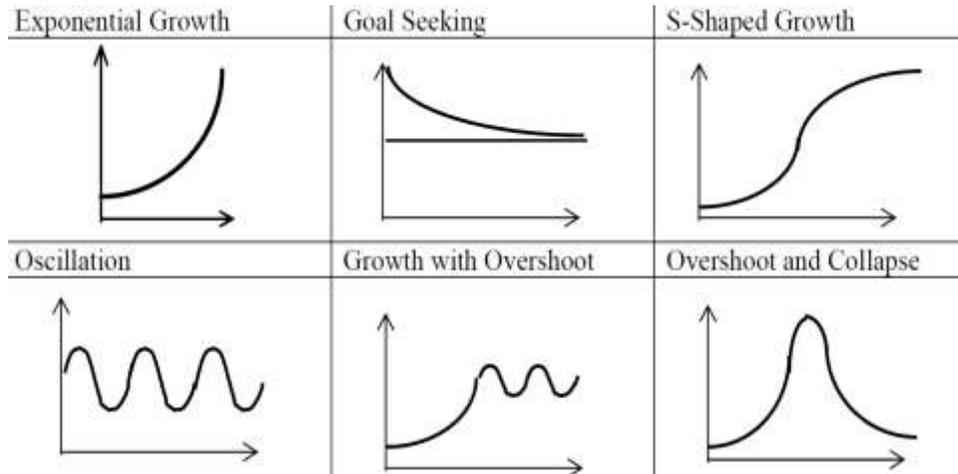
- What time frame is implied in the pilot solution and its expected operation?
- What can we understand differently by changing the frames?

Behaviour-over-time graph (BOTG)

Systems thinkers focus on the nature of change over time.



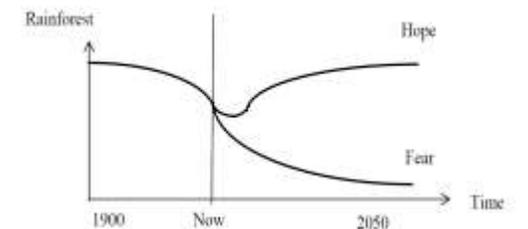
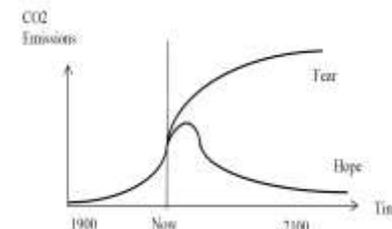
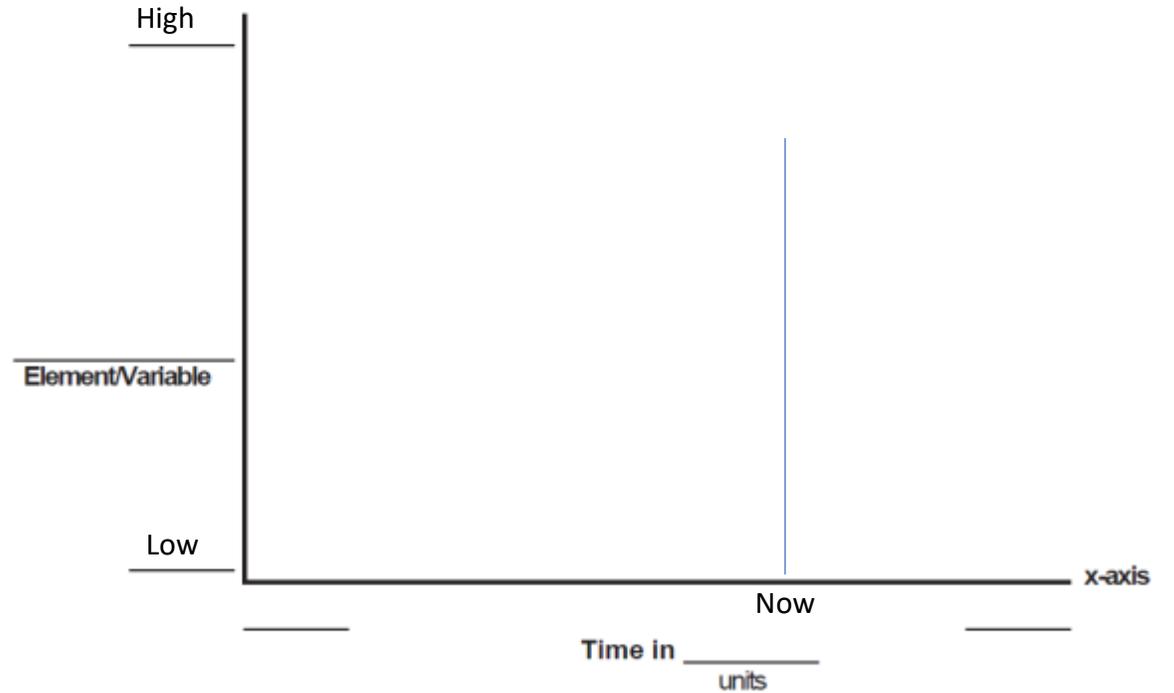
The BOTG is useful to focus on the forms of change over time, rather than the exact value of each instant, to make the frameworks explicit, to relate changes in different variables over time.



Consider a pilot:

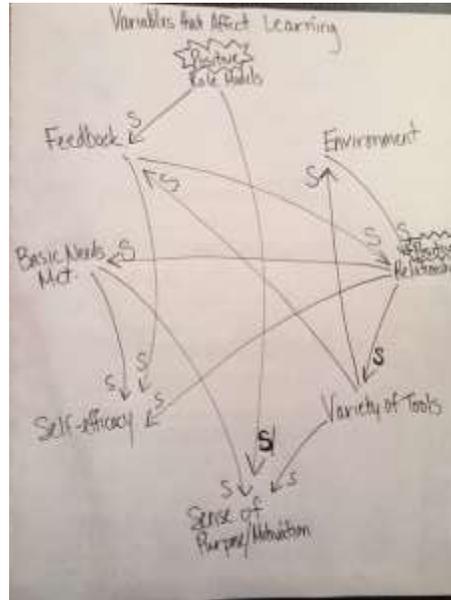
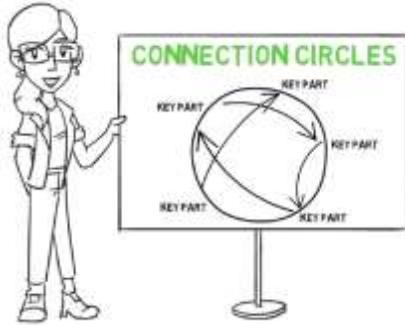
1. What important elements have changed over time?
2. How has _____ changed over time? (Draw it)
3. In what period of time did the changes occur? (write the beginning and end)
4. What changes may happen in the future based on what has been happening?
5. Which changes in the variable are desirable and which are undesirable? (Distinguish them by drawing "hope" and "fear" as below)

Title: _____



Connection circle

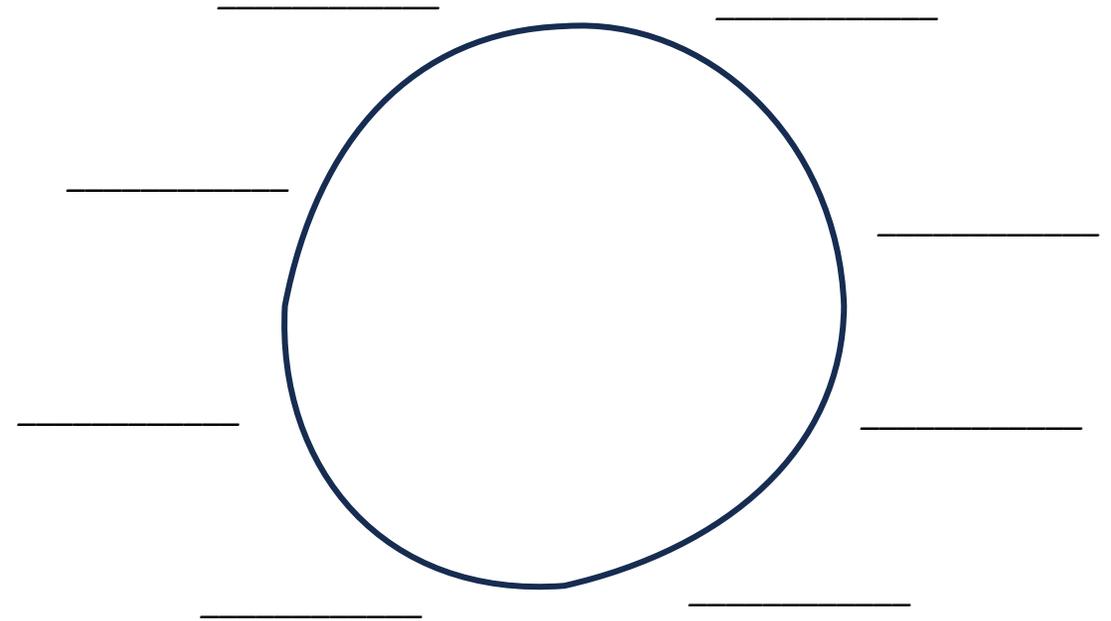
Systems thinkers identifies the circular nature of complex cause-effect relationships



Consider a pilot:

1. Draw a large circle and list of 6-7 important elements* around the circle.
2. Identify an element that causes another element to increase or decrease and draw an arrow through the circle from the cause to the effect
3. Identify polarity (+ or -) of link and label at the arrowhead.
4. Continue to identify elements with causal connections.
5. Identify feedback loops and tell emerging "stories."

Case: _____



A connection circle is a visual tool that shows the relationships between variables in a story or complex situation.

When using a connection circle consider:

- What are the key factors or variables in this story?
- What are the cause-effect relationships between the variables?

*Choose elements from the story or situation that meet these criteria:

- They are important to the changes in the story.
- They are nouns or noun phrases.
- They increase or decrease in the story.



Promoting Innovation

A Systems Thinking Workshop to identify and amplify Key Conditions for Innovation

Workshop Objectives:

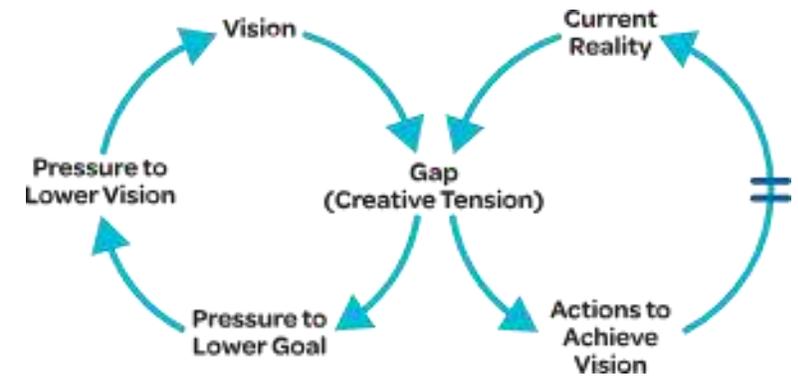
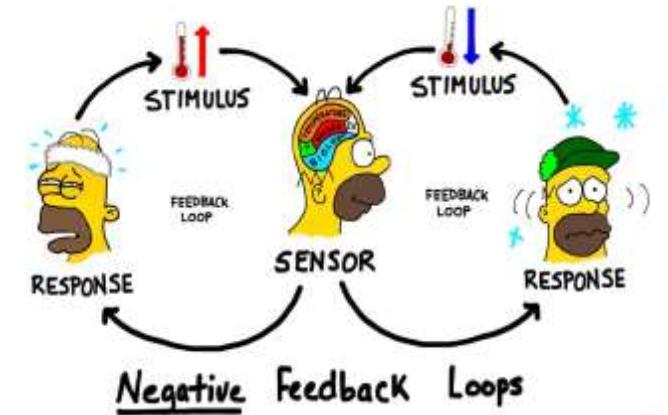
- **Understanding the system:** Provide participants with an overview of the SmartCommUnity project ecosystem, identifying the interconnections between the various elements.
- **Identify levers:** Identify key conditions that foster innovation within the project.
- **Generate concrete actions:** Develop specific strategies and actions to strengthen key conditions and promote a culture of innovation.

*What are the main challenges and opportunities of the project?
How can we maximize our impact?*

Smart Alpine Communities as Systems of Innovation



- Systems have a specific **purpose within larger systems**
- They maintain their stability through **fluctuations** and adjustments
- Their behavior emerges from internal **feedbacks**

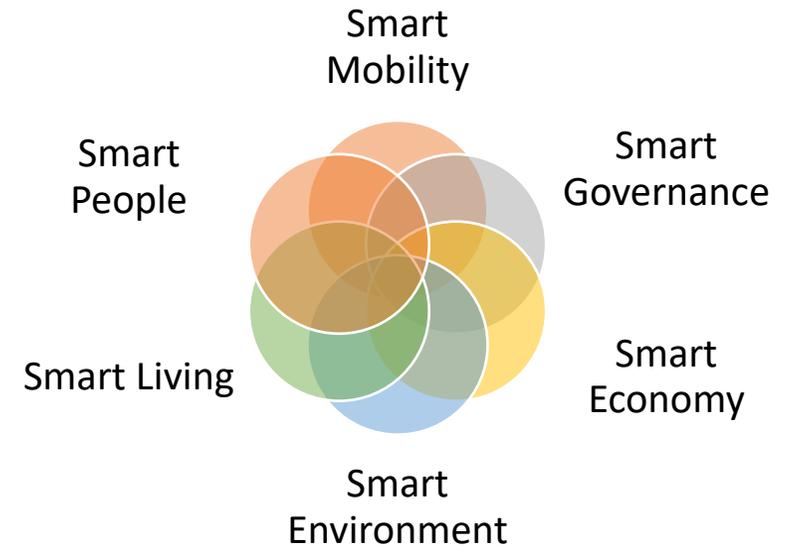


Smart Alpine Communities as Systems of Innovation

<**Systems of Innovation**> A dynamic and **interconnected network** of actors, institutions, and resources that **interact to generate**, diffuse, and utilize new knowledge and technologies.

Local alpine communities have the potential to become dynamic systems of innovation due to several factors:

- ✓ **Unique resources**
- ✓ **Shared Challenges and Opportunities**
- ✓ **Social capital + Identity and Proximity**
- ✓ **Entrepreneurial spirit + Living laboratories**
- ✓ **Focus on sustainability**

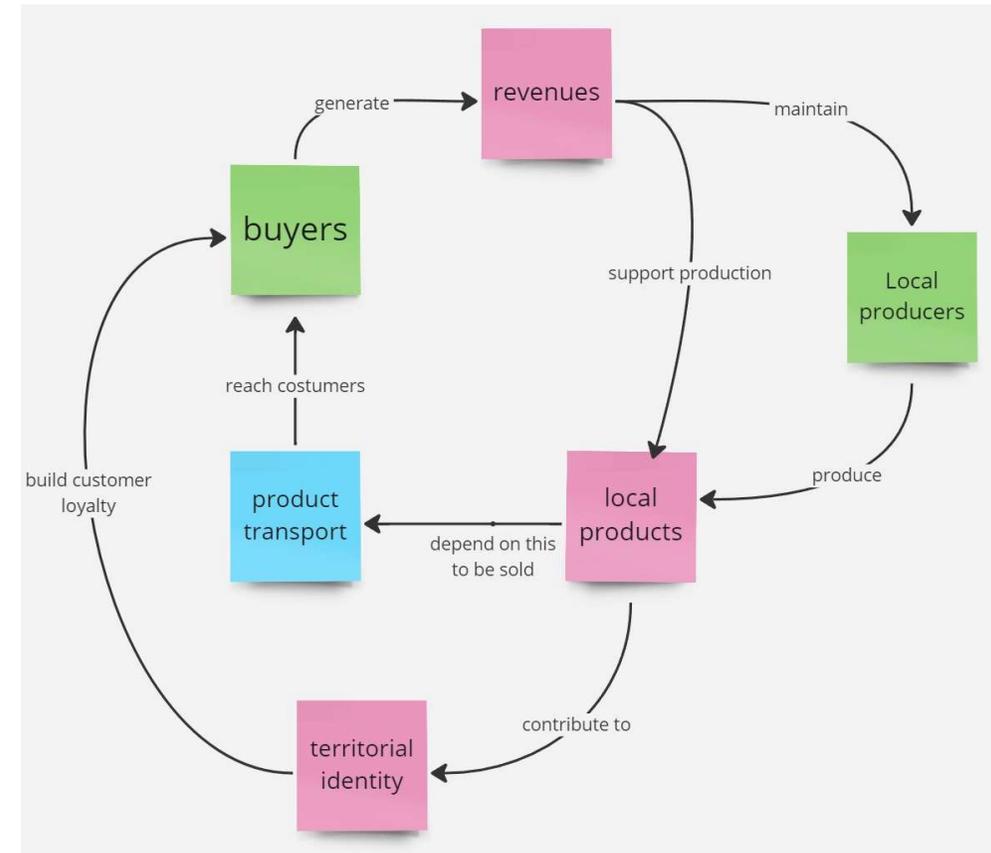


Three premises/pillars:

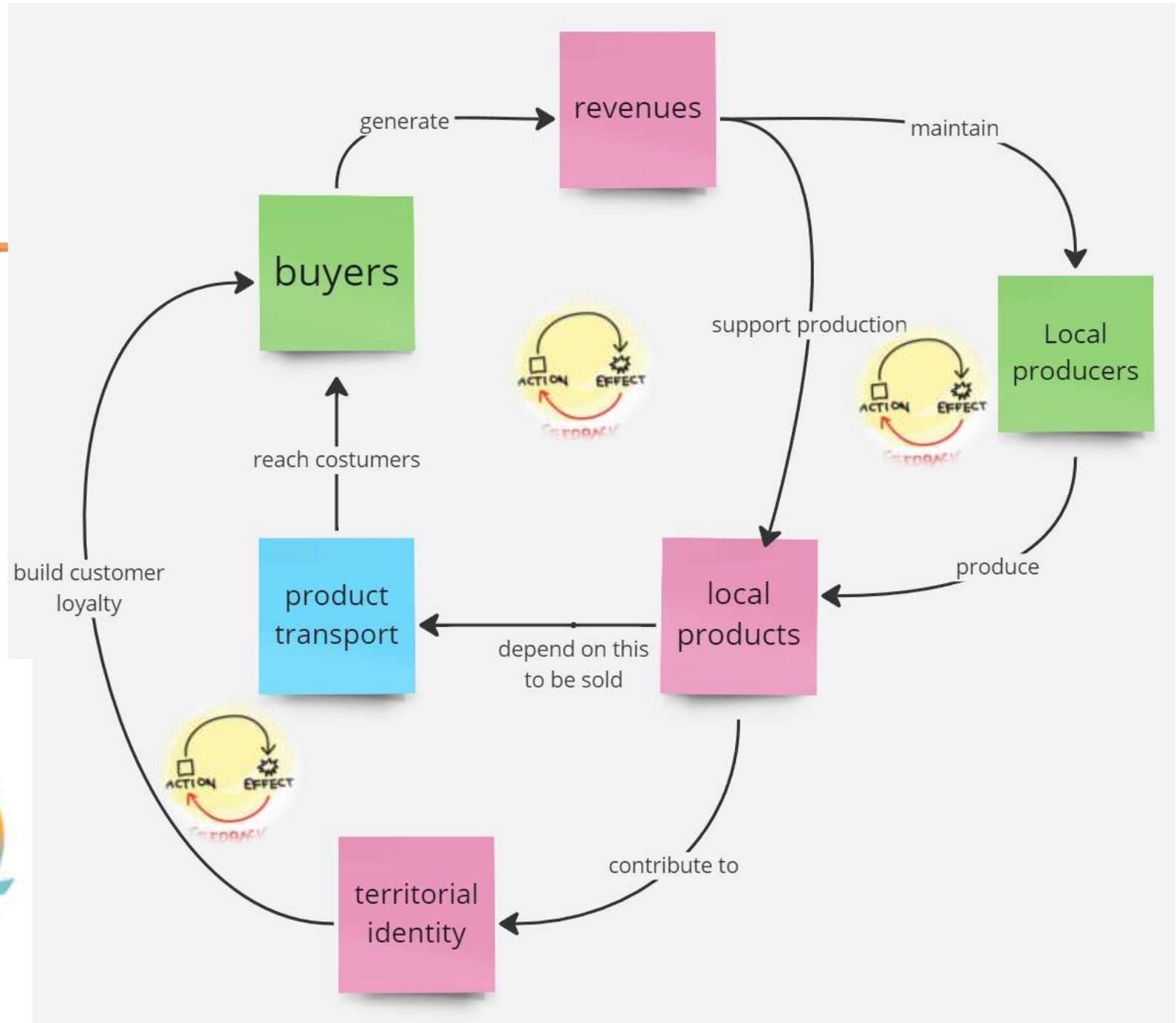
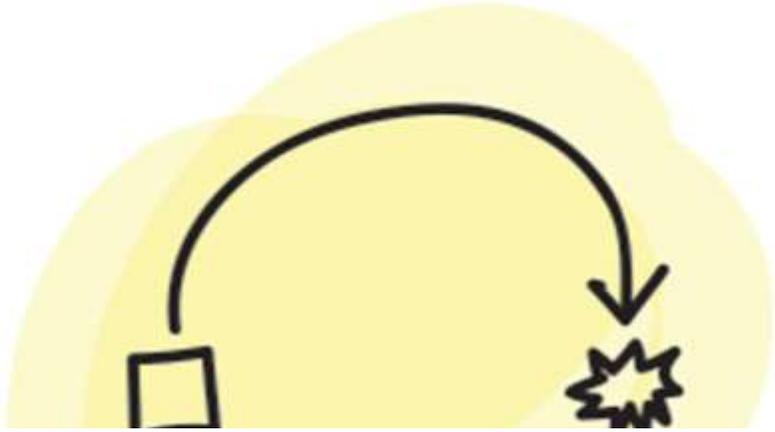
- **Collaboration** and interaction are crucial.
- **Local knowledge and resources** are the most valuable assets.
- **Continuous learning** and adaptation are essential for success.

Mapping «innovation ecosystems»

- In groups (20 min):
 - consider a pilot or an example of smart Governance | Mobility | Living | Economy | Environment | People **and specific frames**
 - create a visual map of the «related ecosystem», identifying the main factors that enable or hinder innovation in Alpine communities distinguishing:
 - Green Post-it notes: Key actors (partners, stakeholders, end users, ..)
 - Red Post-it notes: Resources (technological, financial, human, ..)
 - Blue Post-it notes: Processes (making, selling, implementing, ..)
 - Arrow-links: Relationships with tags (such as *collaborates*, *competes*, *depends on*, etc.)
 - highlight feedback loops in the system
 - prepare to share the story by the map

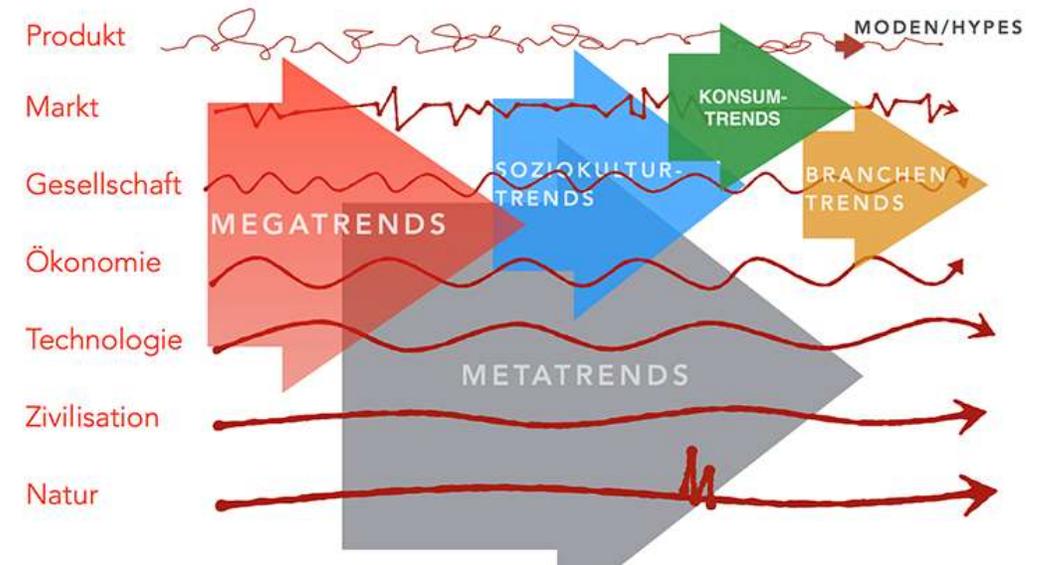
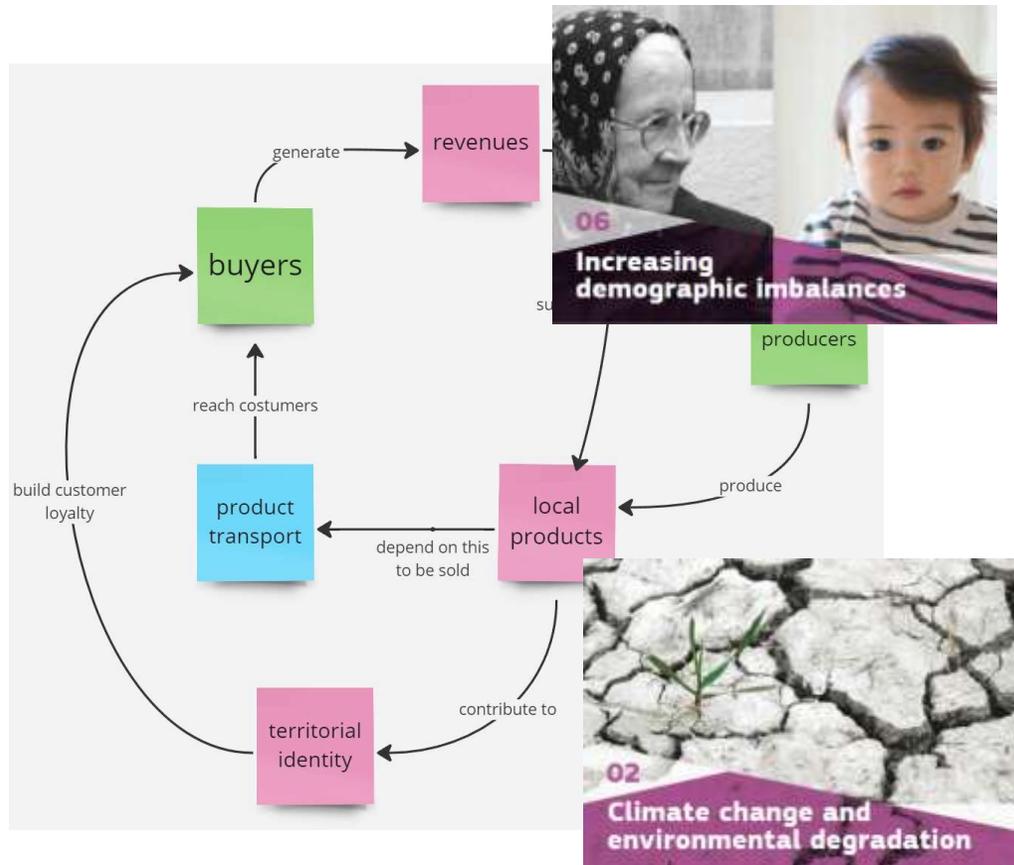


Mapping



Identification of key conditions for innovation

- **Guiding questions for discussion in groups (20 min):**
 - What dynamics (feedbacks) emerge as most critical for promoting innovation?
 - What changes (such as megatrend) could have the greatest impact where addressed/not addressed?

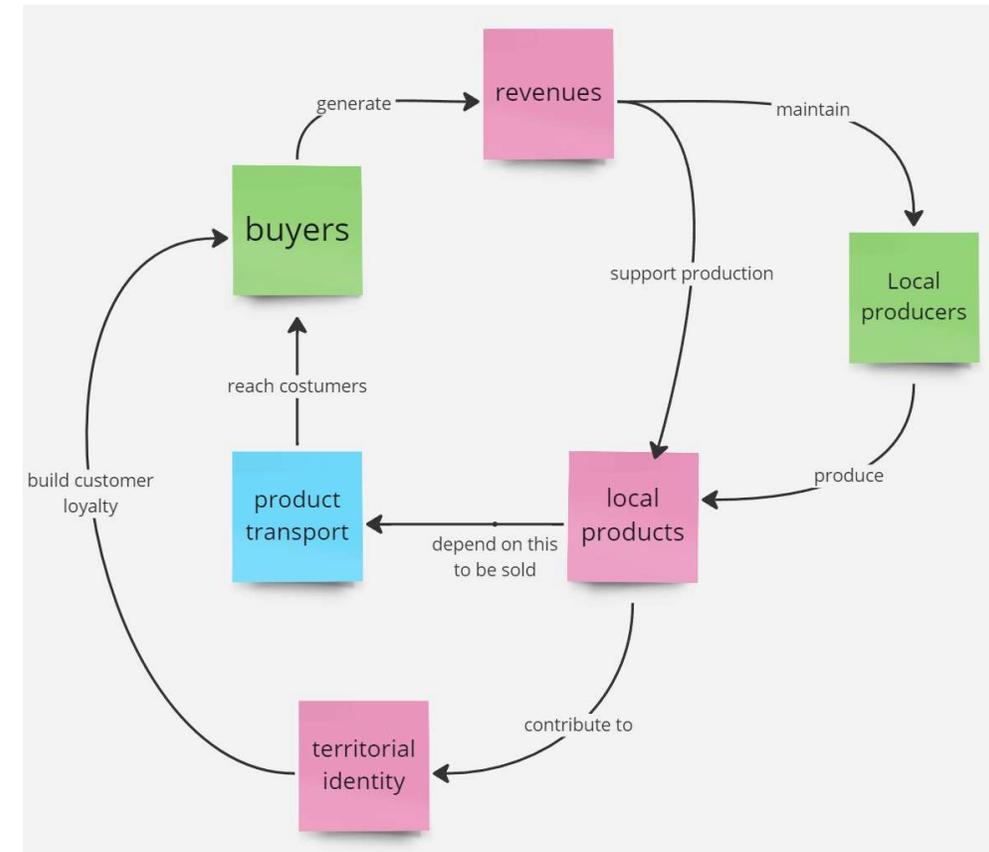
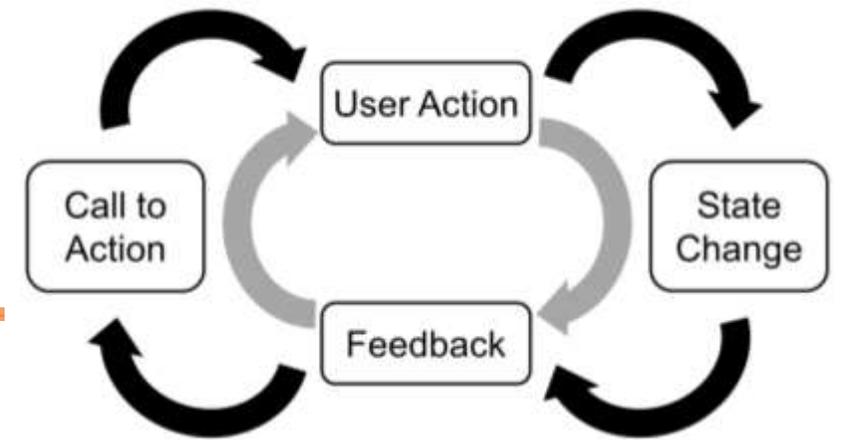


Practical actions

Define concrete actions: Each group selects one or two key feedback loop and discusses possible actions to amplify them.

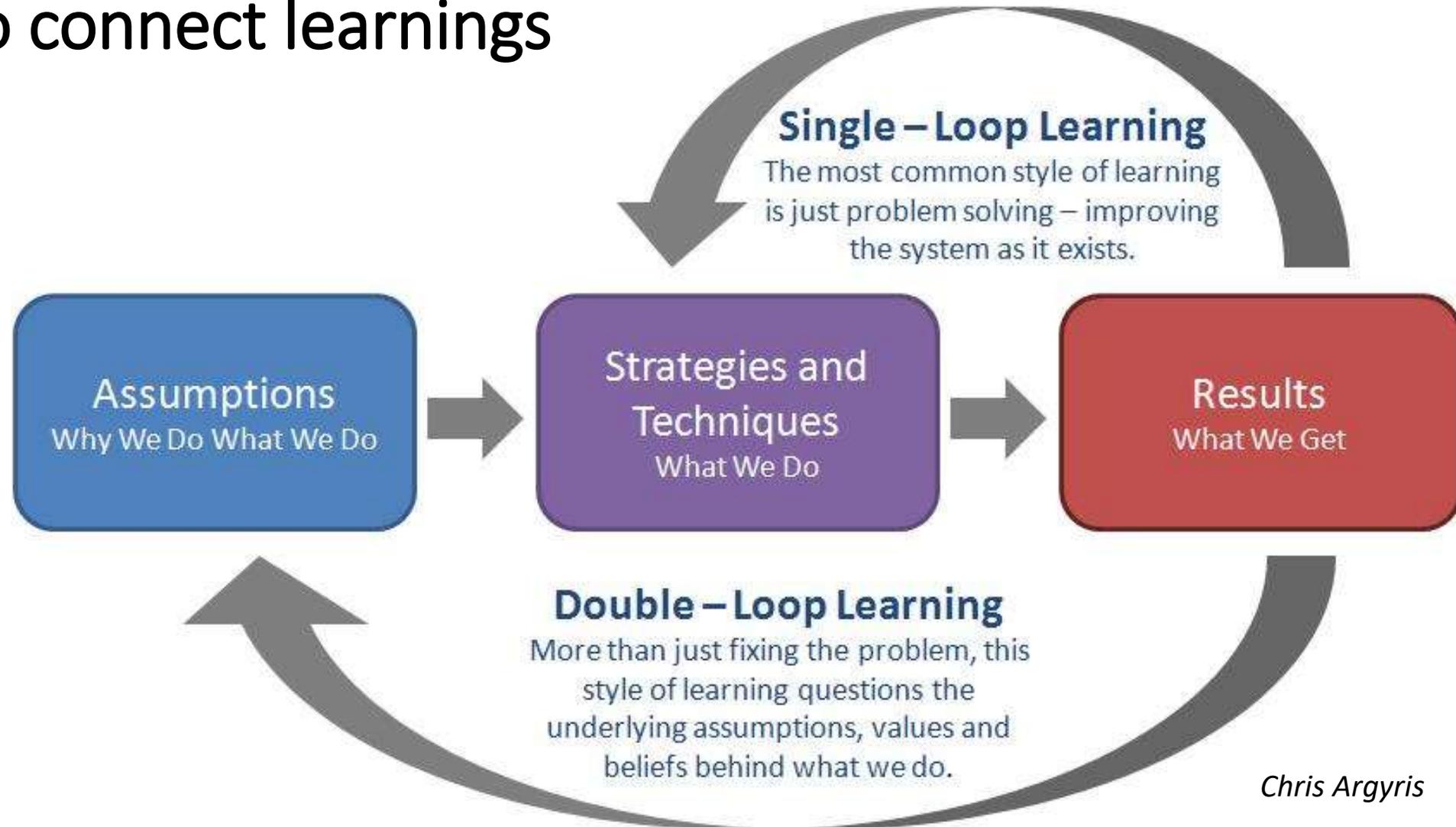
- What resources or collaborations could strengthen these conditions?
- What should be done to reduce the negative impacts of the selected megatrends or enhance their positive effects?

Action sharing: Each group shares a concrete action proposal that it intends to promote or explore in the context of the SmartCommUnity project.



Systems thinking

- to improve our assumptions
- to connect learnings



Chris Argyris



What do you
take home
from this
session?

2. Workshop on “Explore the conditions for the network to be maintained and the foundations for a future project”

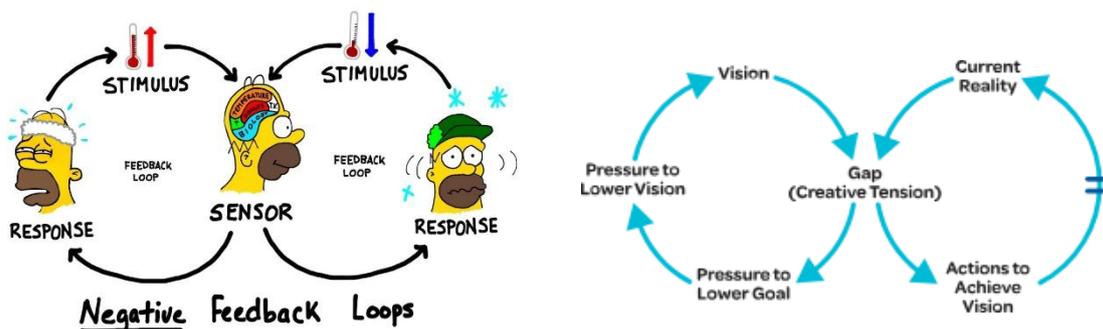
This workshop consisted of the following activities:

- Introduction to the **concepts of ecosystems of innovation – innovation ecologies**, a systems perspective for self-sustaining Innovation
- Group discussion inspired to the World Café method and with a shared digital whiteboard (in Miro) concerning the ideas for the next project

The workshop objective included the framing of innovation from the systems perspective and start a group discussion on the next possible projects and topic using a creative approach.

2.1. Concepts of innovation and *innovation systems*

The concept of innovation systems emerges from considering the Meadows’ definition of a system: a set of elements, interconnected and organized in a way that achieves something or works as a whole (in D. Meadows, *Thinking in systems* 2001). Any system has a specific purpose within larger systems, they are dynamic and maintain their stability through fluctuations and adjustments, their behaviour emerges from internal feedbacks.



Accordingly, an *innovation system* can be defined as “a dynamic and interconnected network of actors, institutions, and resources that interact to generate and benefit from innovations”. Benefiting from innovation is the fuel for change; since interacting costs effort, the perceived benefits should outweigh these interacting costs.

Local alpine communities have the potential to become dynamic systems of innovation due to several factors:

- Unique resources
- Shared Challenges and Opportunities
- Social capital, Identity and Proximity
- Entrepreneurial spirit and Living laboratories
- Focus on sustainability

Innovation is a widely used term in every field, in almost all economic, social and territorial development projects “promoting innovation” recurs as one of the main objectives. Often, however, the concept of innovation is ambiguous and fuzzy, mixing different possible meanings, or it is taken for granted that for all actors involved have the same understanding and operational definition of ‘innovation’.

We propose to distinguish “innovation” and the action of “innovating” as it follows:

- **innovation: a valuable change about new***
 - things: products, tools, services
 - processes: New ways of producing, moving, offering, interacting
 - thinking (framing): value, priority, perception, perspective

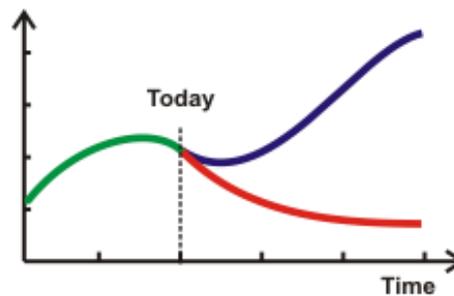
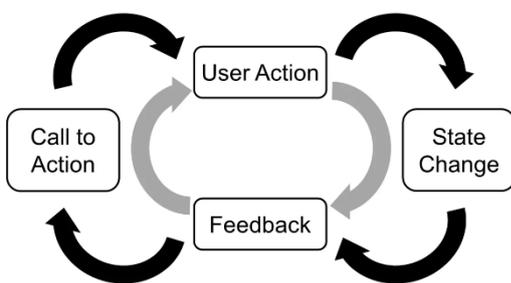
*Being new as different from the previous a novelty here, there, regionally, globally

- **Innovating: is about**

- adding novelty, which means to start something new
- modifying something existing, which means to continue something existing
- dismissing something existing, which means to stop doing something

Smart communities as systems of innovation depend upon three premises:

- **Collaboration** and interaction are crucial.
- **Local knowledge and resources** are the most valuable assets.
- **Continuous learning** and adaptation are essential for success.



When pursuing innovation in smart communities, it is necessary to consider that innovation is never neutral, i.e. it is not always positive in the medium term. While there may be positive short-term changes, an innovation can have unexpected consequences or undesirable side effects in the medium to long term. Thus, to avoid negative consequences, it is advisable to share and use long time horizons (> 10 years) and broad spatial horizons in defining the innovations to be pursued and evaluating their expected impacts.

2.2. Workshop structure

The workshop lasted about 2 hours and was divided in four phases, in which 4 groups of participants discuss on 4 topic from different perspectives. The four general topic were: Digital transition skills and infrastructure, Energy transition, Water transition, Rural revitalization by digitalization. The table 1 specifies the structure of the workshop.

Table 1 Workshop structure

Steps	Trigger questions - indications	Rationale – expected output
1 Sketch a project outline with AI-chatbot (20 minutes)	<p><i>Create a project draft with chatbot (ChatGPT, Gemini, or others) following these guideline about design requirements:</i></p> <p><i>> the project should be</i></p> <ul style="list-style-type: none"> ● <i>Relevant for the Alps</i> ● <i>Related to AG5 focal points</i> <p><i>> Prompting guidelines</i></p> <ul style="list-style-type: none"> ● <i>Define a role</i> ● <i>Provide the context</i> ● <i>Define what you want</i> ● <i>Specify the response format</i> ● <i>Summarize the proposal</i> 	The group should discuss and write together a prompt to sketch out a specific, hypothetical project regarding the topic assigned to the table and coherent with SmartCommunities project.
2 Define project requirements: actions that make it possible and self-sustainable (20 minutes)	<i>Considering the proposal on the table (defined by a different group), without discussing or modifying it, identify actions and related conditions to make the proposed project self-sustaining.</i>	This task is intended to highlight the importance of defining projects that can generate resources on which further development can take place;
3 Systematization: defined what will make it an “innovation system”	<i>How do we transfer it, how do we communicate it, how do we involve the most interesting subjects in its developments? How to connect beneficiaries, providers and stakeholders?</i>	this stage is intended to invite participants to “think in systems” about the innovation in smart communities.
4 Discussion and overview	<i>Identify the priorities and the most interesting actions (dot-voting)</i>	This phase is intended to invite participants to get a general idea of all the groups' overall results and assess which ideas might be most interesting for their own purposes.

The collaborative use of AI (step 1) is intended to speed up the ideation and schematization phase of project development; the idea of collaborative prompting is meant to put the focus on conscious use, deepened with group discussions and sense-making. In other words, the use of the chatbot is intended to catalyse agile and productive discussions in design groups.

The requirement for projects to be at least partially self-sustaining, i.e. to generate resources to invest in their continuation or development, relates to the issue of dependence on EU funding, which is particularly critical in this period of continent-wide re-prioritization.

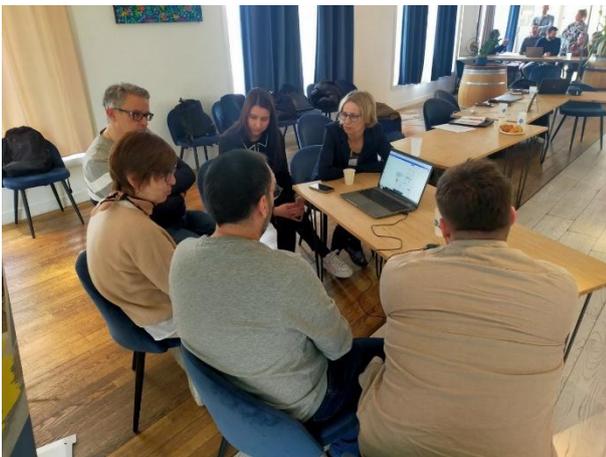
In line with the above, the workshop understood innovation as a “emergent property” that emerges from the complexity of interactions between actors; it cannot be grafted on from outside, nor can it develop through the merit of any one actor. In order to evolve and generate value over time, innovation continuously requires new relationships and their evolution.

The Miro board can see explored at this link: <https://shorturl.at/RCOmM>.

3. Workshop results

The full transcript of the digital whiteboards can be found in the appendices, here we present a summary of the results at the 4 tables, produced with Gemini and trained ChatGPT and personally reviewed by the author.

The following results should be interpreted as preliminary results of a collaborative brainstorming session that lasted less than two hours of discussion, so ideas are only sketched out. The intent was twofold: to generate useful ideas collaboratively, drawing inspiration from a variety of perspectives, and to explore a mixed methodology combining group discussion and AI chatbots.



3.1. **Table 1: Building Digital Resilience thru DigiFriends (rural digital innovation hubs)**

Project summary

The project aims to build digital resilience in Alpine communities by addressing the gaps in digitalization that leave portions of society behind. It proposes establishing a sustainable support system through rural digital innovation hubs and "DigiFriends" to provide ongoing training, maintenance, and updates. The project emphasizes the importance of local impact, community revitalization, and social interaction by training "digital ambassadors" and empowering "community champions" to bridge the digital divide.

Key concepts include:

- **DigiFriends:** Friendly, accessible digital support services for all age groups.
- **Digital Ambassadors and Community Champions:** Local individuals trained to support peers in navigating digital services and tools.
- **Human-centred approach:** Embedding technology support in community life, tailored to the Alpine socio-cultural context.

Actions

To make the initiative both feasible and self-sustaining, the following actions were proposed:

1. **Targeted Awareness and Promotion:** Launch campaigns within communities to define the project identity and attract diverse users and volunteers.
2. **Capacity Building and Peer Learning:** Establish a pan-Alpine network to share training resources, facilitate cross-regional knowledge exchange, and support local champions.
3. **Local, Friendly Digital Services:** Implement DigiFriend services offering:
 - Remote learning support for young people.
 - Digital help for elderly users (e.g. administrative tasks, eHealth).
 - Digital civil protection services (e.g. alerts for natural disasters).
4. **Facilities and Equipment Provision:** Equip and revitalise underused community spaces as co-learning hubs with internet access and digital tools.
5. **Institutional and Financial Support:** Collaborate with municipalities and state bodies for funding, infrastructure, and long-term backing.

Systematisation

To evolve into a replicable **innovation system**, the project proposes:

- **Sustainable Support Structures**
Develop a decentralised network of local tech facilitators and trainers, integrated into community life.
- **Digital Literacy Fund**
Establish a dedicated funding mechanism to support ongoing education, infrastructure maintenance, and digital inclusion programmes.
- **Integration into Local Education and Public Services**
Embed digital skills training into schools and municipal service delivery.
- **Space Reutilisation**
Repurpose vacant or underused spaces to host digital hubs, turning physical decline into social opportunity.
- **Future-Oriented Planning**
Avoid short-term fixes by creating a roadmap for scaling, sustainability, and evolving community needs.

Comments:

<p>Strengths</p> <ol style="list-style-type: none"> 1. Community-Driven Approach: Local ambassadors ensure that digital support is culturally relevant, trusted, and sustained by peer-to-peer learning. 2. Focus on Long-Term Support: The project recognizes that digital skills development is not a one-off endeavour and emphasizes the need for a sustainable support system with ongoing training and updates. The project goes beyond access to infrastructure, addressing confidence, skills, and meaningful use within a inclusive vision: 3. Potential for Regeneration: By revitalising unused spaces and connecting generations, the project contributes to social cohesion and place-based renewal.
<p>Suggestions for Improvement</p> <ol style="list-style-type: none"> 1. Clarify the Scaling Strategy: Define specific indicators and mechanisms to measure progress and enable replication across the Alpine region. 2. Strengthen Youth Involvement: Engage younger generations not only as learners but also as digital mentors to foster intergenerational learning. 3. : Explore partnerships with private foundations, EU missions, or CSR programmes to reduce reliance on public funding alone 4. Sustainability Mechanisms: The project mentions "Sustainable Support & Long-Term Vision" and the need for a long-term plan, elaborating on the specific mechanisms for financial sustainability and diverse funding sources (e.g., funding sources, revenue models), including operational sustainability (e.g., maintenance, updates), would strengthen the proposal.

3.2. Table 2 *Integrated Water Management in the Alpine Space*

Project summary

This project aims to establish an integrated and innovative system for the sustainable management of water resources in Alpine regions. It addresses challenges linked to climate change, demographic pressures, and economic development. The approach combines digital technologies (IoT, AI, satellite data) with nature-based solutions to ensure climate resilience, water security, and community well-being.

Project Outline

The proposed initiative is structured to serve multiple stakeholders, including:

- **Municipalities** – improving water infrastructure and risk management.
- **Citizens** – ensuring clean water access and fostering conservation behaviours.
- **SMEs and industries** – adopting water-efficient technologies.
- **Farmers** – implementing smart irrigation and soil moisture strategies.
- **Energy and infrastructure providers** – optimising resource use and system resilience.

The project is framed around shared governance, technology integration, and environmental stewardship, with pilot sites planned across selected Alpine territories and potential for scalable expansion.

Actions

1. **Data-Driven Water Monitoring**
Implementation of real-time monitoring using IoT sensors, satellite data, and AI to assess water availability, usage, and quality.
2. **Sustainable Infrastructure Investments**
Upgrading existing infrastructure (pipelines, reservoirs, treatment plants) to reduce loss and contamination while improving efficiency.

3. **Nature-Based Solutions**
Reforestation, wetland restoration, and soil retention initiatives to enhance natural water cycles and buffer climatic impacts.
4. **Public-Private Partnerships**
Involving SMEs and industries in circular water economy models, fostering innovation and local entrepreneurship.
5. **Policy and Governance Improvements**
Encouraging cross-border cooperation and harmonised regulations for shared water resources.
6. **Awareness and Education Campaigns**
Promoting responsible water use and eco-conscious behaviour among citizens and businesses.

Systematisation

To transform the project into a replicable **innovation system**, the following structuring principles are proposed:

- **Clear Goal Definition:** Break down objectives into measurable indicators (e.g. % water loss reduction, % increase in reused water).
- **Structured Phases:** Sequence the process into stages—needs assessment, pilot implementation, monitoring, and scaling.
- **Defined Roles and Responsibilities:** Assign specific tasks to stakeholders based on their capacities and areas of impact.
- **Standardised Processes:** Create shared templates and protocols for data collection, reporting, and decision-making.
- **Technology Integration:** Embed digital tools (IoT, GIS, AI) into daily water governance practices.
- **Funding and Governance Framework:** Leverage EU funding (e.g. Interreg Alpine Space, Horizon Europe) and establish a multi-stakeholder steering group.
- **Continuous Evaluation:** Define KPIs, conduct regular reviews, and implement adaptive strategies.

Comments:

<p>Strengths</p> <ol style="list-style-type: none"> 4. Integrated, multi-stakeholder approach: The project actively involves municipalities, citizens, SMEs, farmers, energy providers, and infrastructure managers, fostering synergies across diverse interests and addressing various aspects of water management, from infrastructure and technology to policy and education. 5. Adoption of innovative technologies: The use of IoT sensors, satellite data, AI, and GIS mapping enables precise and real-time monitoring of water systems. 6. Strong sustainability and resilience focus: The integration of both infrastructural upgrades and nature-based solutions (e.g. reforestation, wetland restoration, soil management) supports climate adaptation and biodiversity protection.
<p>Suggestions for Improvement</p> <ol style="list-style-type: none"> 5. Strengthen the social and cultural dimension: Enhance the project by incorporating citizen engagement practices (e.g. co-design workshops, living labs) to encourage adoption of innovative technologies and maximise educational impact. 6. Strengthened Emphasis on Self-Sustainability: The project mentions sustainability, but elaborating on the specific mechanisms and strategies to ensure long-term financial and operational viability would be beneficial. 7. Improve internal communication among stakeholders: Develop a collaborative and transparent management system (e.g. shared dashboards, digital workflows) to coordinate effectively between public and private partners.

3.3. **Table 3 Digitalization for Rural Revitalization**

Project summary

The project envisions leveraging digital technologies to increase the population in rural Alpine areas by addressing the lack of schools, educational offerings, and job prospects that contribute to an aging population and youth migration. The core strategy involves implementing remote education, remote work opportunities, digital community engagement platforms, and digital health and smart farming solutions. The expected outcomes include increased retention of young families, attraction of retirees, economic growth, and an improved quality of life.

Project outline

The vision is to **revitalise rural areas** by embedding digital innovation into everyday life, making rural living viable and attractive.

Objectives:

- Reverse population decline through digital-driven opportunities.
- Improve access to education, healthcare, and employment in remote areas.
- Foster community cohesion through virtual platforms and digital engagement.

Target Groups: Young families, remote workers, retirees, local entrepreneurs, public administrations.

Key Sectors:

- Education & Skills
- Employment & Entrepreneurship
- Healthcare
- Agriculture (Smart Farming)
- Local Governance & Civic Engagement

Actions

To bring the project to life and ensure sustainability, the following key actions are proposed:

- Remote Education and Skills Development
 - Online schooling and vocational training.
 - AI-powered personalised learning platforms for digital and professional skills.
- Remote Work & Entrepreneurship
 - Creation of digital job platforms and rural co-working/start-up hubs.
 - Introduction of digital nomad visa programmes and remote work incentives.
- Digital Civic Life
 - Virtual town halls, local online forums, and social platforms to foster engagement and connection.
- Smart Healthcare & Farming
 - Telemedicine services and AI diagnostics.
 - Digital tools for precision agriculture and land use.
- Next-Gen Connectivity
 - Deployment of 5G or satellite internet.
 - Exploration of community-owned broadband models.
- Blockchain for Public Services
 - Transparent land registry, service delivery, and local governance tools using blockchain.
- Sustainable Financing Models
 - Use of crowdfunding, crypto-based local economies, or cooperative funding schemes.

Systematisation

To evolve into a fully-fledged **innovation system**, the project includes:

- **Political Advocacy** Advocate for national and regional policies supporting rural digitalisation, leveraging evidence from the COVID-19 pandemic to demonstrate impact.
- **Multi-Stakeholder Governance** Form inclusive partnerships between municipalities, tech companies, civil society, and residents. Use co-design formats like forums and participatory workshops.
- **Community Engagement & Behavioural Shift** Campaigns to promote digital adoption, supported by **local ambassadors** to build trust and support long-term behavioural change.
- **Stakeholder Platform** Launch a digital hub to connect stakeholders, share resources, and offer training.
- **Monitoring & Adaptation** Regular tracking of indicators (e.g. migration trends, platform usage, digital job uptake) and iterative improvements based on community feedback.

Comments:

<p>Strengths</p> <ul style="list-style-type: none"> ➤ Comprehensive Approach: The project addresses multiple interconnected challenges in rural communities (education, employment, community engagement, and access to services) through a suite of digital solutions. ➤ Strong Emphasis on Local Empowerment: Community ambassadors and participatory governance ensure local ownership and trust. ➤ Forward-Thinking Infrastructure: Embraces cutting-edge technologies like AI, blockchain, and 5G tailored to rural contexts. The project recognizes the importance of self-sustainability and outlines actions related to infrastructure, partnerships, community engagement, and ongoing support to achieve this. <hr/> <p>Suggestions for Improvement</p> <ul style="list-style-type: none"> ✓ Clarify Long-Term Governance: Define who will maintain platforms, training, and infrastructure once initial funding ends. The proposal could benefit from a more detailed strategy outlining specific funding models (e.g., crowdfunding), revenue streams, and long-term operational plans to ensure the project's continued success. ✓ Develop a Clear Scalability Plan: Outline how successful models from pilot areas can be adapted and adopted across the Alpine region. ✓ Ensure Digital Inclusion for All: Proactively address potential barriers for the elderly, migrants, and low-income households through inclusive design and dedicated support schemes.

3.4. **Table 4 To be self sufficient in energy production**

Project summary

The project aims to combat climate change and enhance energy security by maximizing the use of solar and hydropower technologies in the Alpine region. Key objectives include increasing solar PV deployment, optimizing existing hydropower, developing new sustainable projects, integrating renewable sources into the grid, and increasing off-grid solar and hydro solutions. The project proposes actions related to solar energy, hydropower, grid integration, and policy, with a focus on mandating solar PV integration in new buildings.

Project outline

This project aims to tackle climate change and enhance energy independence in Alpine communities by promoting **widespread adoption of solar and hydropower technologies**, supported by **smart grids** and

community energy models. The initiative seeks to empower citizens and local stakeholders to become active participants in the energy transition through both on-grid and off-grid solutions.

Key Objectives:

- Accelerate the deployment of **solar PV** (large-scale, rooftop, and building-integrated).
- Optimise and expand **sustainable hydropower**, especially small-scale projects.
- Ensure effective integration of renewables into the grid through smart technologies and energy storage.
- Support the creation of **energy communities** that manage their own production and consumption.
- Promote environmentally responsible practices and policy frameworks.

Target Areas:

- Residential buildings
- Rural municipalities
- Off-grid mountain settlements
- Local public infrastructure

Actions

Solar Energy Expansion

- Financial incentives for installation (including BIPV – building-integrated photovoltaics).
- Streamlined permitting processes.
- Support for community solar schemes and solar water heating.
- Investment in R&D and pilot models.

Hydropower Modernisation and Development

- Upgrade existing infrastructure for efficiency and sustainability.
- Promote small-scale, low-impact hydro solutions.
- Conduct environmental impact assessments and introduce modern turbine tech.

Smart Grid Integration & Storage

- Develop decentralised energy management systems.
- Deploy storage solutions and demand response technologies.
- Improve interconnectivity between local and regional grids.

Policy and Building Regulations

- Mandate integration of solar PV in all new constructions and major renovations.
- Introduce carbon pricing, phase out fossil fuel subsidies, and establish long-term support policies.

Citizen and Stakeholder Engagement

- Information campaigns and events to raise awareness.
- Local workshops to co-design energy projects.
- Training programmes for community-led energy management.

Systematisation

To ensure the project evolves into a long-term innovation system, it includes:

1. Community Energy Mobilisation

- Use diverse outreach methods (social media, events, door-to-door) to build interest in public/private energy communities.
- Establish demonstration projects and local case studies.

2. Capacity Building and Feedback Loops

- Organise workshops and technical training to build local expertise.
- Collect and analyse feedback from existing energy communities to continuously refine practices.

3. Governance and Legal Frameworks

- Develop supportive legal and regulatory structures for local energy ownership.
- Define clear management systems and operational standards.

4. Knowledge Sharing Platforms

- Create channels for experience exchange among Alpine communities.
- Promote open access to energy production data, methodologies, and policy tools.

Comments:

Strengths

- **Citizen-Centred Approach:** Empowers residents to co-create and manage their own energy solutions, increasing ownership and long-term commitment.
- **Integrated Perspective:** Combines infrastructure upgrades, policy reform, community mobilisation, and smart technology in a cohesive strategy.
- **High Replicability:** Modular approach with scalable actions suitable for varied Alpine contexts, from isolated villages to larger valleys.

Suggestions for Improvement

- ✓ **Detailed Implementation Methodology:** While the project outlines actions, providing a more detailed methodology for mobilizing and informing the public, organizing workshops, and establishing local energy communities would be beneficial.
- ✓ **Strengthen Cross-Border Collaboration:** Encourage coordination between Alpine regions in different countries to share best practices and align standards.
- ✓ **Elaboration on Legal Framework and Energy Management Systems:** The project mentions establishing and supporting the legal framework and energy management systems, but further elaboration on the specifics of these systems and how they will be developed and implemented would strengthen the proposal.

4. Conclusion

This report has detailed the activities conducted during the SmartCommUnity project's study visit to Valence and the Communauté de communes des Baronnies en Drôme Provençale on the 19th and 20th of March, 2025. The visit successfully enabled a valuable exchange of knowledge and ideas, contributing to the project's overall aim of strengthening connections within the Alpine Space.

The Megatrend workshop with students proved to be a particularly insightful exercise, providing a glimpse into the perspectives of the younger generation on the future of their community. Their engagement with the concepts of megatrends, digitalisation, and AI, and their ability to articulate both the potential benefits and risks, highlights the importance of incorporating youth voices in shaping the future of smart communities.

The workshop with project partners focused on innovation ecosystems fostered a collaborative environment for discussing future project directions. The workshop participants applied systems thinking and AI-assisted design to co-develop innovative project concepts across four critical areas: digital inclusion, water management, rural revitalisation, and energy self-sufficiency. The emphasis on self-sustaining innovation, driven by local knowledge and continuous learning, aligns with the SmartCommUnity project's commitment to delivering long-term, impactful change within the Alpine region.

The outcomes of these workshops, while preliminary, offer a solid foundation for the further development of project initiatives. The insights gained will be useful in refining strategies and ensuring that the SmartCommUnity partnership can continue, and perhaps evolve, to respond in innovative ways to the evolving needs of Alpine communities.

Annex 1: transcription of Miro board

Steps	Table 1 Digital transition skills / infrastructure	Table 2 Integrated Water Management in the Alpine Space	Table 3 Digitalization for Rural Revitalization	Table 4 To be self sufficient in energy production
<p>1 Work with chatbots on the next project (20 minutes)</p>	<p>Building Digital Resilience thru DigiFriends/rural digital innovation hubs</p> <p>Objective: Address the gaps in digitalisation where there is none.</p> <p>Problem: With digitalisation projects and public digital service we are often leaving great portions of society behind. Before we can explain tech, it is already evolved and digital skills development programmes is not a one-off project. We need to build resilience thru long-term support.</p> <p>Proposal/solution: Rural digital innovation hub: We need to establish a sustainable support system that provides ongoing training, maintenance, and updates.</p> <p>Think about local impact - further develop, revitalisation the concept of community, social interaction.</p> <p>Digital Ambassadors & Community Champions: Bringing Tech Closer to Home.</p> <p>We need human faces and local voices to bridge the digital divide. Let's train "digital ambassadors" from within the community, people who understand the local context and can provide personalized support.</p> <p>These ambassadors act as a bridge between residents and technical experts.</p>	<p>Project draft</p> <p>1. Introduction The Alpine region faces increasing water management challenges due to climate change, demographic shifts, and economic activities. This proposal aims to establish a comprehensive and sustainable water management framework benefiting municipalities, citizens, SMEs, farmers, energy sectors, and infrastructure providers.</p> <p>2. Objectives</p> <p>Ensure sustainable water resource management to support local communities and economic sectors. Enhance climate resilience by mitigating risks related to floods, droughts, and water scarcity. Foster collaboration among stakeholders to improve water governance and efficiency. Promote innovative solutions and technologies for water conservation and reuse.</p> <p>3. Key Stakeholders</p> <p>Municipalities: Improve urban water infrastructure and disaster preparedness.</p> <p>Citizens: Ensure access to clean drinking water and promote water conservation awareness.</p> <p>SMEs: Encourage efficient water use and integration of smart water technologies.</p>	<p>Project draft:</p> <p>Role: Mayor of a Rural Municipality</p> <p>Context:</p> <p>Many small communities lack schools, educational offerings, and job prospects.</p> <p>Population is aging due to migration and lack of opportunities for youth.</p> <p>Objective:</p> <p>Increase population in rural areas by leveraging digital technologies for work, education, and community engagement.</p> <p>Key Actions:</p> <p>Remote Education:</p> <ul style="list-style-type: none"> • Offer online schools and vocational training programs. <p>Remote Work:</p> <ul style="list-style-type: none"> • Create digital job platforms for remote work and start-up hubs. <p>Digital Community Engagement:</p> <ul style="list-style-type: none"> • Virtual town halls and social hubs to connect locals. <p>Digital Health & Smart Farming:</p> <ul style="list-style-type: none"> • Telemedicine services and digital tools for agriculture. <p>Expected Outcomes:</p> <p>Increased retention of young families and attraction of retirees. Economic growth via remote work, entrepreneurship, and digital jobs. Improved quality of life with better access to education, healthcare, and community resources.</p> <p>Success Metrics:</p>	<p>(solar wind and hydro power)</p> <p>To combat climate change and enhance energy security, we must maximize the use of abundant and mature solar and hydropower technologies.</p> <p>Key Objectives:</p> <ul style="list-style-type: none"> • Dramatically increase solar PV deployment (both large-scale and rooftop). • Optimize existing hydropower and develop new, sustainable projects. • Integrate these renewable sources effectively into the grid using smart technologies and energy storage. • Increase off grid solar and hydro solutions. • Ensure environmentally responsible hydropower development. <p>Primary Actions:</p> <ul style="list-style-type: none"> • Solar: Implement strong incentives, streamline permitting, promote community solar, invest in R&D, and push for building integrated solar solutions. • Hydropower: Modernize existing plants, develop sustainable small-scale projects, invest in pumped storage, conduct rigorous environmental assessments, and improve turbine efficiency. • Grid Integration: Invest in smart grids, energy storage, demand

	<p>Find the local champions, the people that are already using the digital world, and empower them to teach others.</p>	<p>Farmers: Support sustainable irrigation practices and soil moisture management. Energy Sector: Optimize hydropower and cooling water usage. Infrastructure Providers: Enhance water storage, distribution, and wastewater treatment systems. 4. Proposed Actions Data-Driven Water Monitoring: Develop real-time water monitoring systems using IoT sensors and satellite data. Sustainable Infrastructure Investments: Upgrade pipelines, reservoirs, and water treatment plants to minimize losses and contamination. Nature-Based Solutions: Implement reforestation, wetlands restoration, and soil retention measures to regulate water cycles. Public-Private Partnerships: Engage SMEs and industries in developing circular economy models for water use. Policy and Governance Improvements: Strengthen regional cooperation on transboundary water management. Education and Awareness Campaigns: Encourage citizens and businesses to adopt water-saving behaviours. 5. Expected Impact Increased water security and reduced vulnerability to climate-related water stress. Enhanced economic resilience by supporting businesses reliant on stable water supplies. Improved quality of life through better drinking water and sanitation infrastructure.</p>	<p>Increased population and migration to rural areas. High participation in digital education and work programs. Growth in local businesses and digital job creation.</p>	<p>response programs, and improved grid interconnection.</p> <ul style="list-style-type: none"> • Policy: Establish clear regulations, phase out fossil fuel subsidies, and implement carbon pricing. • Building construction : <ul style="list-style-type: none"> • Mandatory Integration: New buildings and major renovations must incorporate solar PV (especially BIPV) and, where feasible, micro-hydropower. • Comprehensive Approach: Covers solar water heating, optimal building orientation, and grid integration. • Incentives & Support: Financial incentives, technical assistance, and streamlined permitting will facilitate adoption. • Expected Outcomes: Increased renewable energy generation in buildings, reduced fossil fuel reliance, enhanced grid resilience, lower energy costs, and reduced greenhouse gas emissions.
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<p>2 Project Requirements: defining what actions make it possible and self-sustainable (20 minutes)</p>	<p>Actions for Building Digital Resilience: define & promotion within target groups capacity building -- pan-alpine network create local friendly services (DigiFriend) dealing with remote learning for young people co-learning hub (facility & infrastructure) and elderly people for administrative tasks and administrative support and civil security digital services (natural disasters)</p> <p>Conditions: funds, support, facilities, supported by municipalities & state, equipment procurement</p>	<p>Actions</p> <p>Data-Driven Water Monitoring: Develop real-time water monitoring systems using IoT sensors and satellite data.</p> <p>Sustainable Infrastructure Investments: Upgrade pipelines, reservoirs, and water treatment plants to minimize losses and contamination.</p> <p>Nature-Based Solutions: Implement reforestation, wetlands restoration, and soil retention measures to regulate water cycles.</p> <p>Public-Private Partnerships: Engage SMEs and industries in developing circular economy models for water use.</p> <p>Policy and Governance Improvements: Strengthen regional cooperation on transboundary water management.</p>	<p>By focusing on infrastructure, partnerships, community engagement, and ongoing support, the project can be self-sustaining and thrive in the long term.</p> <p>Smart Connectivity Solutions: Implement 5G or satellite internet for high-speed rural connectivity. Explore community-owned broadband networks.</p> <p>Collaborative Digital Ecosystem: Create digital innovation hubs with shared resources for startups, remote workers, and tech companies.</p> <p>AI-Powered Skill Development: Use AI-driven personalized learning platforms for vocational and digital skills training.</p> <p>Remote Work & Digital Nomad Visas:</p>	<p>information events for publics and citizens to create publics and privates energies communities (wind, solar, hydropower and geothermal energies) and establish and support their development and the legal framework and the energy management systems to improve them</p>

		<p>Education and Awareness Campaigns: Encourage citizens and businesses to adopt water-saving behaviours.</p>	<p>Introduce digital nomad visa programs and offer incentives for companies to establish remote teams in rural areas.</p> <p>Blockchain for Governance & Services: Use blockchain for transparent governance, land registry, and secure transactions.</p> <p>Smart Healthcare Solutions: Implement telemedicine with AI diagnostics and remote health monitoring.</p> <p>Sustainable Digital Financing Models: Develop crowdfunding platforms or cryptocurrency-based initiatives to finance rural projects.</p>	
<p>3 Systematization: defining what is need to design “systems of innovation</p>	<p>Sustainable Support & Long-Term Vision": This could involve creating a network of local tech support providers, establishing a digital literacy fund, and integrating digital skills into the local education system. Create a long term plan for the future, and not just a quick fix. use the spaces that are unused and give them new purpose</p>	<p>Define Clear Goals – Break objectives into measurable outcomes. Structure Actions – Organize tasks into phases (assessment, implementation, monitoring). Assign Responsibilities – Clarify roles for municipalities, SMEs, farmers, and infrastructure providers. Use Standardized Processes – Develop templates for data collection, reporting, and decision-making. Leverage Technology – Implement IoT sensors, GIS mapping, and AI for monitoring. Ensure Funding & Governance – Align with EU programs and establish a multi-stakeholder governance framework. Continuous Evaluation – Set KPIs, conduct periodic reviews, and adjust strategies based on results.</p>	<p>Political Advocacy: Advocate for digital infrastructure and policies to support rural digitalization. Use examples like the COVID-19 pandemic to highlight benefits and engage policymakers.</p> <p>Multi-Stakeholder Involvement: Create networks with governments, tech companies, and local groups. Involve diverse stakeholders through workshops and forums for co-development.</p> <p>Engaging the Community: Launch campaigns to promote digital tools in rural areas. Use local ambassadors to build trust and encourage participation.</p> <p>Shifting Habits and Overcoming Resistance: Offer training programs and incentives for adopting digital tools. Use success stories and peer support to motivate change.</p>	<p>Part 1 : information events for publics and citizens to create publics and privates energies communities (wind, solar, hydropower and geothermal energies) Decline a methodology to mobilise and inform people about publics and privates energies communities through : social media, door to door, events ... Organise workshop and training for the establishment of a local energy production by using wind, solar, hydropower or geothermal energies Make feedback from local energy communities to find solutions</p> <p>Part 2 : establish and support their development and the legal framework and the system management energy to improve them</p>

			<p>Connecting Stakeholders: Develop a central digital platform to connect all parties. Use it for resources, training, and ongoing engagement.</p> <p>Continuous Monitoring: Set up a system to track progress and gather feedback. Provide regular reports to ensure transparency and adjust as needed.</p>	
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