TANGO-W

Transformative capacity in energy-food-water

Good Practice Playbook

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Lead Partner: Smart Innovation Norway

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About TANGO-W

The TANGO-W project is an applied research project that develops urban transformative capacities (UTC) as a novel governance ability at the interface of food, energy, and water. TANGO-W follows Wolfram's (2016) capacity building approach, adopting a needs and requirements-based focus on the capacity building priorities of urban stakeholders. At the heart of TANGO-W is the two-level capacity building approach. At the urban level, TANGO-W designs and implements Urban Living Labs 2.0 (ULL). At the European level, TANGO-W establishes a transdisciplinary Community of Practice (CoP) as an integrative coordinating transformation system. Both provide the spaces for the development of UTC according to the needs of urban actors in several dimensions (i.e., transformative governance formats, shaping new transformation roles, self-organisation, and technical skills and tools). At the same time, the ULLs and CoPs act as novel governance formats at the local and EU levels to accelerate urban change in a desired, sustainable direction. The activities of TANGO-W result in policy recommendations for replication and upscaling measures as well as in training concepts and pilot courses that support capacity building in TANGO-W fellow cities.

Technical references

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Contents

1. Initial situation and goal of the report

Climate change is one of the greatest challenges facing our world today. It has the potential to disrupt ecosystems, communities, and economies around the world, with urban areas particularly vulnerable to its impacts. Cities are also major contributors to global greenhouse gas emissions, making it imperative that they develop strategies that enhance their transformative capacities to effectively mitigate the impacts of climate change and drive the transition to a more sustainable future.

A critical aspect of urban transformation capacity is the ability to adapt to changing circumstances and environmental conditions. As climate change progresses, cities will need to adapt to new weather patterns, sea level rise, heat islands, climate migration and other impacts. This may require the introduction of new infrastructures and systems for water management, energy generation and waste disposal, as well as the development of policies and programmes to promote social inclusion and sustainable urban growth and development.

Urban transformation capacity includes not only the ability to anticipate and calm social turbulence, but also to reduce greenhouse gas emissions and shift to more sustainable forms of energy production and consumption. Cities are responsible for a significant share of global greenhouse gas emissions, so they have a crucial role to play in the transition to a low-carbon economy. This can include implementing policies and programmes to promote energy efficiency and renewable energy, as well as investing in public transport and other initiatives to reduce dependence on fossil fuels.

In addition to these practical measures, cities also need to build the institutional and social capacity to support sustainable development. This involves working with a wide range of stakeholders, including local businesses, community organisations and government agencies, to develop and implement common goals and effective policies and programmes. Central to urban resilience is empowering local organisations and their decision-makers to take on the role of transformation managers to make the transition to a more sustainable future just in time and on demand.

The aim of this report is to identify limits and options for managing transformation processes and to derive preconditions and success criteria for successful transformative projects from theory and practice. Based on the results of Deliverable 2.1[1], we derive central preconditions for successful transformation from Wolfram's point of view and complement these with preconditions for success resulting from the foundations of the constructivist theory of 2nd order cybernetics. We then define principles and communication elements for successful, transformative governance based on the theory of systemic consulting and illustrate this with a TANGO-W example for enabling system learning. This chapter on success-critical communication elements for building a transformation room is complemented by the presentation of the transformative instrument "TANGO-W Impact Monitoring", which aims to support the development of UTC capacities in all relevant project partners with regard to Urban Transformative Capacity (UTC) and the expansion of sustainable, socio-technical solutions at the ULL level. This theory and tool-oriented part of the report is complemented by a compact presentation of risks and lessons learned from relevant European and TANGO-W specific ULLs. On the basis of these practical ULL

[1] Aguiar Borges, L. and Rohrer, L. (2022). D2.1 Needs and challenges of ULLs for building urban transformative capacity: Analysis and mapping of strategic and prototype cases in Austria, Lithuania, Norway, and Sweden. TANGO-W. JPI Urban Europe.

experiences, ULL-specific and general success criteria for the management of transformative research projects can be formulated.

The final résumé then reflects on the success criteria generically derived from the European and TANGO-W ULLs with the help of the theory-based framework developed at the beginning. This allows a complementary highlighting of criteria for the successful governance of complex social processes within innovative research projects and completes the definition of success criteria for the new actor, the TANGO-W Transformation Counsellor, whose task is to support a successful project process for all relevant objectives and actors.

The result of these steps is a "Failure & Good Practice Playbook" that can be consulted by those interested in future initiatives and used for transformative change. This playbook not only identifies potential pitfalls to avoid, but also provides valuable guidance on how to positively target and effectively manage the long-term impacts of transformative change for cities.

2. Precondition for successful urban transformation according to Wolfram

Preconditions for transformative change refer to the necessary factors that must be present for a significant change to take place. These can include a pressing need for change, access to sufficient resources and support, and a well-defined plan for the desired outcome. Transformative change can be challenging to achieve, and these preconditions can help to create an environment conducive to its success.

One of the key preconditions that Wolfram identifies is a strong political will to enact change. Without political support and leadership, efforts to transform urban cities are likely to be fragmented and ineffective. Additionally, Wolfram emphasizes the importance of collaboration and coordination among different stakeholders, including government agencies, businesses, and community organizations.

Another precondition for transformative change, according to Wolfram, is a focus on long-term planning and sustainability. Urban cities must take a holistic approach to planning and consider the impact of their decisions on future generations. This includes investing in infrastructure and public services that are resilient to the challenges of a changing climate.

Furthermore, Wolfram argues that successful transformation of urban cities requires a commitment to equity and social justice. This means addressing the systemic inequalities that exist within cities and ensuring that all residents have access to opportunities and resources.

This is deliverable aims to incorporate Wolfram's conceptualization of urban transformative capacities into the urban living labs participating in Tango – W. By meeting these preconditions, the pilots in Tango - W can pave the way for sustainable and inclusive growth in the participating cities.

TABLE 1. WOLFRAM'S SUCCESS CRITERIA.

Wolfram's Success criteria at a glance	
– Need for change, – Political will to implement change, – Definition of desired outcomes, – Holistic - transdisciplinary approach,	– Long-term planning, – Clear medium-term and short-term planning, – Collaboration between all stakeholders, – Equal access to resources for all, – Investment in infrastructure and public services.

3. Success requirements for transformation from the 2nd order cybernetics perspective

(1) Limits and Options for governing Transformative change

The JPI Urban Europe is dedicated to coordinating and strengthening urban research and innovation across Europe. Cities are complex systems with a cross-level character based on different levels of action and scale (Wolfram 2016[2]; Olsson et. al. 2004[3]; Armitage et al. 2009[4]). The urban Transformative Capacity Framework (TCF), as a conceptual framework for interventions at the root of societal problems (Wolfram 2016), identifies ten interdependent "capacities" grouped into three:

a) Forms of action and interaction include Transformative Leadership empowered and autonomous communities of practice and inclusive, multi-faceted governance (shared network experience with urban challenges and needs).
b) Core development processes include system(s) awareness and memory (stakeholder understanding of the dynamics undermining urban sustainability), a future perspective (collective vision, alternative scenarios), community-based experimentation (creating transformative knowledge and social learning), embedding innovation in routines and legal frameworks, and reflexivity and social learning.
c) The relational dimensions that impact on all other capacities relate to work across all levels and all administrative levels and geographical scales.[5]

In terms of forms of action and interaction, Transformative Capacity does not describe how communication between the niche and the regime, as well as the numerous smaller initiatives at the niche level, need to be coordinated to achieve path-breaking urban change. A better understanding of how system change could be orchestrated through multi-level coordination processes towards new governance is therefore needed. The Urban Living Labs of the JPI Urban Europe programmes enable testing and specifying the new roles and interventions required to orchestrate urban transformation processes.

[2] Wolfram, M., & Frantzeskaki, N. (2016). Cities and Systemic Change for Sustainability: Prevailing Epistemologiesand an Emerging Research Agenda. Sustainability, 8(2), 144. doi:10.3390/su8020144

[3] Olsson, P., Folke, C., & Hahn, T. (2004). Social-Ecological Transformation for Ecosystem Management: TheDevelopment of Adaptive Co-management of a Wetland Landscape in Southern Sweden. Ecology and Society, 9(4), 2. doi:10.5751/ES-00683-090402

[4] Armitage, D. R., Plummer, R., Berkes, F., Arthur, R. I., Charles, A. T., Davidson-Hunt, I. J., Diduck, A. P., Doubleday, N. C., Johnson, D. S., Marschke, M., McConney, P., Pinkerton, E. W., & Wollenberg, E. K. (2009).Adaptive co-management for social–ecological complexity. *Frontiers in Ecology and the Environment*, *7*(2), 95–102. doi:10.1890/070089

[5] Wilhelmer, D., Wagner, P., Haindlmaier, G. (2020): Transformation rooms: Building transformative capacity for European cities. (IJUPSC). Special issue of International Journal of Urban Planning and Smart Cities, Volume 2; Issue 2; July - December 2021.

If JPI-urban Europe projects want to successfully realise the initiation and implementation of urban transformation processes called for here, this requires their engagement with the fundamentals of change processes and thus with the limits and possibilities of steering complex social systems such as communities.

(2) System change needs a view of the system as a whole

The term "system" derives from the Greek and means "standing together" of a whole that only exists in the interaction of single parts. "The whole is more than the sum of its parts" says Aristotle. Systems theory is about attempts to explain how actions and their effects are connected. Through insight into interdependencies, we also understand what an ecosystem is and how it functions. Organisational and urban systems dynamics are no different. We therefore speak of the "mobile effect" because almost every intervention in the system has an impact on the whole system.

Our explanations, theses and theory models are always themselves part of the systemic processes they attempt to describe, because we humans are always already part of the systems "nature", "society", "organisation" and "world" etc. There is no independent observer position for us humans. Wherever we look, we are "biased" and always see ourselves, our own mental constructs, and projections.

The initial questions of Piaget[6], Bateson[7] and Watzlawick[8] were: If someone does something and wants to achieve something with his actions, then he can either succeed and achieve his goal or he can fail. If an actor does not achieve what he is aiming for, he will usually change his approach, his strategy. Through feedback he learns to act more appropriately. But he can also reflect on himself, on his goals, wishes, values and norms. This reflection work would then be learning how to improve the original learning. Double loop learning is called the learning of learning (Argerys[9]), it enables the breaking of thought patterns and has a self-governance effect.

Systemic family therapy also plays an important role in the question of suitable intervention options for complex systems. Difficult family situations cannot usually be resolved with therapy for individual persons but require an understanding of the living conditions and the interaction of all those involved. The Milan School around Selvini Palazzoli[10] developed systemic intervention methods such as reframing, paradoxical intervention and circular questions, and the Heidelberg School developed this approach further by actively involving the role of the therapist in the analysis and design of the counselling process and giving the client back the absolute responsibility about the assessment of helpful or less helpful interventions. The expert and decider always remain the client or patient and is never an asymmetrically "above" counsellor or therapist.

In organisational and management theory, all approaches flow together: The system theory roots are particularly evident in the focus on interactions, patterns, and processes in the professional context. Apparent individual problems are reconstructed and contextualised at the level of communicative patterns

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[6] Jean Piaget (1973): Structuralism. Olten, Freiburg (im Breisgau) : Walter, 1973. ISBN: 3530650048

7 Bateson Gregory (1985): Ecology of the mind. Anthropological, psychological, biological and epistemological perspectives. Editor: Suhrkamp paperback science.

8 Watzlawik, P. (2010): How real is reality? Delusion, deception, understanding. Piper, Munich 1976, ISBN 3-492-02182-4; 9th edition 2010.

[9] Argyris Chr., Schön D. (2008), The Learning Organisation. Fundamentals, Method, Practice
Publisher: Schäffer-Poeschel 8.10.2008

[10] Selvini Palazzoli M., L. Boscolo G. et.al (1985): Paradox and counter paradox (Concepts in the Human Sciences): A new model of therapy for the family with schizophrenic disorder. Publisher: Klett-Cotta /J. G. Cotta'sche Buchhandlung Nachfolger, ISBN 10: 3608953752ISBN 13: 9783608953756

and relationship structures. It is about individuals (as environments of organisations). It is about group events, learning, management and about general social and economic as well as technical issues. The systemic models for the transformation of organisations have been further developed by Peter Senge[11], Argryris and Schön, Hedberg, Willke[12] and Backer[13], among others.

Transformation needs actors, i.e., decision-makers/managers, expert advisors and systemic counsellors. This applies not only to business organisations but to all complex social systems and thus also to communities. The systemic counsellor as a facilitator of transformation has a key role to play.

In systemic counselling, attitude and actions are not thought of as separate from each other. The attitude (value system) shows what the counsellor focuses on in his observations, descriptions, and evaluations and how the systemic counselling process with its interventions is set up. The attitude of the counsellor becomes visible in the action (intervention). Guiding principles of action for systemic counsellors are (a) impartiality towards persons, contents, and basic orientations such as problem/solution orientation, change/preservation, as well as context sensitivity, respect towards persons and disrespect towards ideas. Their goal is to initiate and accompany long-term and sustainable learning and renewal processes to make systems (organisations) more survivable, successful, and effective. That is the point around which everything revolves.

The constructivist roots come to the fore in that the counsellor's internal system (thinking, feeling, possibilities for action) is taken as the starting point. Steps of systemic counselling that want to enable transformation should be able to connect to the communication patterns of the client system without simply reproducing its patterns and thus prolonging the status quo by "more of the same". The roles of content expertise and decision-making responsibility clearly lie with the decision-makers of the client system, while systemic counsellors take responsibility for designing transformational facilitative communication processes. The following diagram compares systemic counselling and non-systemic consulting.

TABLE 2. JANES, A., PRAMMER, K., SCHULTE-DERNE, M. (2001): TRANSFORMATION MANAGEMENT. CHANGING ORGANISATIONS FROM WITHIN. VIENNA-NEW YORK: SPRINGER.

Non-systemic management & consulting	**Systemic Counselling**
Focus on the individual	Focus on relationship patterns and on the individual as a "role bearer" (person)
True/false as an evaluation scheme	Useful as a rating scheme
Knowledge	Non-knowledge and questions as expertise, hypothesis formation
Consultant as expert for content-related solutions and as mediator of insights	Counsellor as an expert in communication processes,
External control, instructive interaction	Self-control, self-organisation, autopoiesis, personal responsibility

[11] Peter M. Senge (2011): The fifth discipline: art and practice of the learning organisation (Systemic Management). Schäffer Poeschl Publishing House 2011
[12] Willke, H. (2005): Systemtheorie II : Interventionstheorie: Grundzüge einer Theorie der Intervention in komplexen Systeme. Publisher: Lucius and Lucius; University paperback - 22 October 2005
[13] Baecker, D. (2019): Intelligence, Artificial and Complex (IMD). Merve Publishing, Paperback - 1 September 2019.

Advice and instructions	Curiosity, questions, reflection, interspersing ideas
Problem orientation	Solution orientation
Deficit orientation: problems as problems	Resource orientation: Problems as attempts to solve them
Past orientation, analysis, and explanations	Future orientation, metaphor, visions
Uniqueness	Options

In the case of the JPI-UE project TANGO-W, the research organisations AIT, SIN, NR and KTU are required to take on the role of systemic counsellors to the urban transformation processes in addition to their project manager role at national level. Thus, the researchers have to live goal and result orientation vis-à-vis the funding organisations on the one hand, in order to lure the funding associated with the achievement of the goals. On the other hand, they have to build local transformation spaces and interventions that enable all actors to experiment with open-ended, new perspectives and solutions and thus build urban transformative capacities. This is about enabling intrinsic, bottom-up emergent transformation processes beyond the pressure of time and results. The permanent balance of these insoluble, contradictory demands in the doing of transformative research represents the new, great challenge for researchers who want to successfully accompany the transformation of ULL 2.0 as systemic advisors. Only the research organisation 4ER is clearly positioned as an expert advisor for a new tariff design and implementation of energy communities.

4. Principles and elements of transformative governance

4.1. Six Principles for transformative context governance

Transformation can never be initiated top-down and through people, but only by creating contexts that promote innovation for different groups of actors (innovation milieu) and accompany them in the long term. With the help of 6 principles from the theory of constructivism, we show in this chapter the emergence of this basic assumption.

Principle 1: Transformation processes need a systemic world view

Transformation counsellors and transformation managers (decision makers e.g., politicians and civil servants) need a systemic worldview. This is most easily described in comparison to the mechanistic one. The most striking difference lies in the way of cognition. Based on the different position of the observer, the mechanistic view focuses on WHAT, whereas the systemic view focuses on HOW. In the mechanistic worldview, a reality without an observer is assumed, whereas in the systemic worldview, the observer sees himself as part of the observed and uses the difference of the observations for the cognition process.

This corresponds to the fact that in the mechanistic worldview truths are assumed, whereas systemic counsellors use their subjective hypotheses to test them beyond the practice of verification and

falsification with regard to their usefulness for the client system's gain of knowledge (Ebbecke-Nohlen 2009)[14]:

TABLE 3. EBBECKE-NOHLEN, A. (2009): INTRODUCTION TO SYSTEMIC COUNSELLING. CARL AUER COMPACT PUBLISHER, HEIDELBERG, 2009

MECHANISTIC WORLD VIEW	SYSTEMIC WORLDVIEW
Observers stand outside the observation	Observers are part of the observation
Formal logic, freedom from contradiction	Relational thinking, integration of contradictions
Objectivity, one truth, immutable laws	Subjectivity, many perspectives, and hypotheses
Hard data	Integration of hard and soft data
Assumption of a stable environment, exclusion of dynamic aspects	Assumption of a dynamic environment, interactions between system and environment
Context-independent statements	Contextual statements
Linear causality	Circularity, interactions between system and environment
Linear progress	Nonlinear development

Principle 2: Processing and reactions originate from a "black box".

Heinz von Foerster explores the question of the limits and options of instructive control: Second-order cybernetics was developed by the physicist Heinz von Foerster (1993)[15]. For him, circularity and self-referentiality of cognition are central principles of communication. Every observation needs an observer who finds himself in what he observes. The objective world is not discovered but invented. The environment contains no information, it is what it is, it receives information only through observation and communication.

In opposite, machines as trivial systems can be described precisely in their mode of operation due to their causality: they function independently of the past and their effects are predictable. Deviations are considered a malfunction in this logic.

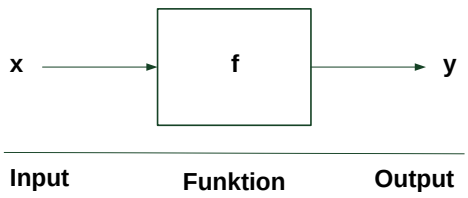

FIGURE 1: TRIVIAL MACHINE (SOURCE: FOERSTER 1993, P. 245)

In contrast, the actions of people, teams and organisations are non-trivial and unpredictable: The structure inside living systems, their constantly changing inherent logic (Z), determines how an input is processed in

[14] Ebbecke-Nohlen, A. (2009): Introduction to systemic supervision. Carl Auer Compact Publisher Heidelberg, 2009.
[15] Heinz von Foerster (1993): Knowledge and Conscience. An Attempt at a Bridge. Suhrkamp Paperback Science 1993.

the living system (F) and with what "output" the living system will react. What a manager triggers through his steering attempts is related to the history and current dynamics of the system as well as its internal structures.

The human image of 2nd order cybernetics[16] sees people as non-trivial machines. They are to be understood as possibility beings who behave differently in surprising ways according to the same input again and again.

Non-trivial systems are history-dependent since they permanently change their internal states in the process of self-reproduction as well as through the processing of inputs (recursive loops). Since the internal processing processes are in principle unpredictable, they are called "black boxes".

Instead of linear cause-and-effect thinking, circular processes are pursued: For example, if employees in a department do not comply with agreed decisions, the manager must ask himself/herself what produced this behaviour and how the employees' behaviour might have been influenced by the current situation and the past and what effects this in turn had on his/her own actions.

In essence, the difference between a trivial and a non-trivial understanding of control lies in understanding the triggered effects not as a disturbance but as feedback and as information.

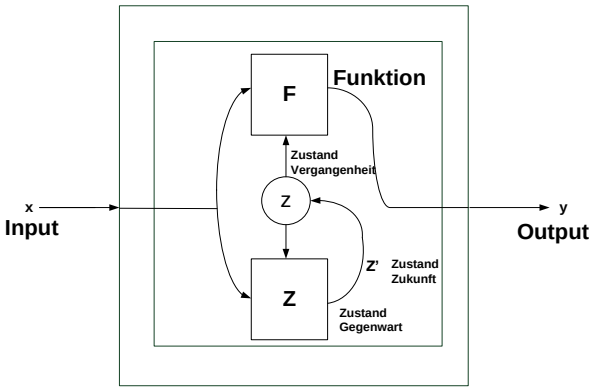

FIGURE 2: NON-TRIVIAL MACHINE (SOURCE: FOERSTER, 1993, P. 248)

From this image of a non-trivial, unpredictable human being who, as an observer, creates his own realities, decisive ethical consequences are derived for the acting individual. "If I myself am the only one who ultimately decides how I act, then I am also responsible for my actions." Accordingly, Hein von Foerster's ethical imperative is: "Always act in such a way that the number of choices available to everyone increases" (Foerster 1993).

Principle 3: Transformation processes need the learning of all participants

The concepts of change management are mostly described from the perspective of top management. In the paradigm of first-order cybernetics, it describes deficiencies of the "observed object organisation", defines corresponding change targets for subsystems or for the system as a whole and commissions external consultants to implement them. Top management's own role in shaping problem and solution patterns in the organisation remains excluded from the diagnosis and transformation process.

[16] Heinz von Foerster (2001) Truth is the Invention of a Liar. Conversations for Sceptics. Carl Auer Systeme Verlag, 3rd edition 2001.

Systemic counsellors and systemic transformation managers position themselves in contrast to change management models dominated by business administration by focussing on the system as a whole and the corresponding cycles of action between all relevant actors in the system. Here, top management becomes the co-author of communication patterns that it wants to change. System change is only possible through self-change of all - and thus also of the client and of the consultant.

The two different mental models of business-driven change management and systemically oriented transformation management lead to different observations, explanations, assessments, and interventions in transformation processes.

Principle 4: Transformation processes need context governance by managers and advisors

If living systems such as people, teams and organisations cannot be changed causally and logically from the outside, then managers and counsellors must create contexts that make learning processes more likely. Context management (Willke 2004) aims at creating "framework conditions conducive to change". In this context, people, teams, and organisations can only be understood in relation to their respective relevant environments. It is not the change itself, but the benefit expected from the actors in the respective context that serves as an attractor for throwing old routines overboard and starting search processes for new solutions. The focus is on the system-environment relationship design and its repercussions on the actors. This makes "controlling", "learning" and "developing" relational variables (Willke 1998[17], p. 45).

In the following, we call learning and governance settings that enable transformations in cities "transformation spaces". Depending on the local goals and actors, their roles and communication formats must be individually designed in such a way that important decision-makers, institutional guidelines, and necessary expertise for change processes become quickly available. Thus, transformation spaces enable transformative leadership for agenda setting and mutual interactions/impacts in change processes beyond the usual planning practice, such as a strong command and control mode and the need for immediate concrete results and immediate concrete outcomes.

The strength of the transformation space thus lies in the context governance of urban living labs, e.g., in the field of neighbourhood and urban development, and enables the building of transformation capacities through multidimensional interactions between niche and regime via the orchestration of a shared learning process.

Principle 5: Transformation processes need continuous dialogue between niche and regime

Transformation spaces are learning and governance settings for all actors of urban living labs. As an instrument of context governance of Urban Living Labs, the Transformation Space represents a new urban governance format. With its respective specific architecture, it allows for context-specific adaptations to

[17] Willke, H.(1998): systemic knowledge management. Publisher: Lucius & Lucius 1998. 3-8252-2047-8.

address the specific local challenges for cities (reflecting the call for place-based approaches in urban planning, see e.g., Barca et al 2012[18], Caragliu & Del Bo 2012[19], Giffinger & Haindlmaier 2014[20]).

The core competence of the transformation space of the ULLs is to work out a common direction for change and to link actors of niche and regime in the transformation process in such a way that an understanding of the potentials and needs of both worlds can thus enter an innovative dialogue. Transformation only becomes possible through understanding and utilising the possibilities and limits of both worlds. Transformation spaces therefore need decision-makers from both worlds (niche, regime) and a neutral, impartial systemic consultant who can support excursions into both worlds as a prerequisite for fruitful learning processes.

Principle 6: Transformation as a learning process requires role distance of all participants

In the transformation space, everyone temporarily steps out of their everyday habit and reality to enable systemic change within the framework of the ULL as a change project. Temporary membership in the transformation space enables decision-makers and counsellors to question stable patterns and rules of their daily routines and to search for new forms of partnership governance in change processes. Only by distancing oneself from one's own organisation-of-origin with its routines the interplay between niche and regime becomes possible in the sense of sustainable transformation. Trying out and experimenting with new options and patterns in Living Labs thus requires role distance of all participants as a basis for joint learning processes. Only in this way is context-sensitive system learning by doing and thus concrete transformation possible in a concrete place with concrete actors.

4.2. Architectural elements for setting up Transformation Rooms

"System change needs the building of a transformational space for learning processes that enable the building of transformational capacity in terms of transformative leadership and guidance of change processes beyond usual planning practice. This makes change possible beyond the strong command and control modes and the need to immediately achieve concrete results and get to concrete outcomes [...]"(Neuvonen, Ache 2017; p. 76). The strength of the transformation space is to enable, with the help of concrete architectures, a multidimensional linking of central actors from niche and regime of the respective relevant levels for novel learning processes.

However, context governance of neighbourhood and urban development via transformation spaces also requires good interaction between the central actors from niche and regime. We call this interaction transformative leadership. Transformative leadership deals with orientation-creating, leading communication of the leadership team with all actors involved and includes both, decision-makers (transformation managers) and systemic transformation counsellors. Its task is to design interventions over time to co-create, test, and implement novel forms of governance (cooperation roles and rules of the game) and technical solutions in the context of urban living labs. The core competence of the members of the transformative leadership teams is to initiate, promote and accompany the non-linear change of

[18] Barca, F., McCann, P., & Rodriguez-Pose, A. (2012). The case for regional development intervention: Placebased versus place-neutral approaches. *Journal of Regional Science*, *52*(1), 134–152. doi:10.1111/j.1467-9787.2011. 00756.x

[19] Caragliu, A., & Del Bo, C. (2012): Smartness and European urban performance: Assessing the local impacts of smart urban attributes. Innovation (Abingdon), 25(2), 97–113. doi:10.1080/13511610.2012.660323.

[20] Giffinger, R., & Haindlmaier, G. (2015). Smart City: Innovationspotenziale für eine wettbewerbsfähige und nachhaltige Stadtentwicklung? In J. Fritz & N. Tomaschek (Eds.), *Stadt der Zukunft*. Waxmann.

experimental transformation processes. We will deal with this aspect in more detail in Deliverable 2.3. Our focus here is on the prerequisites for designing architectures that enable learning processes for all relevant actors in the transformation space.

How to build transformative architectures

Architectures link expert advisers and systemic process counsellors with representatives of the urban system who want to realign the city with the help of counselling. In the systemic counselling literature, this system is called the "client system" - in contrast to the "consultant system": Here, the consultant system and client system together form the so-called counselling system in which learning processes take place. In the context of systemic neighbourhood and urban development, we call this counselling system a "transformation space", because learning here aims at a sustainable transformation of socio-technical systems. The function of the architectures is to combine and coordinate actors and actions in a novel way within a temporal and spatial framework in relation to specific change topics through specific set-ups and interventions.

Changes in cities as social systems must be organised in the sense of context governance, i.e. communication spaces and communication settings must be made available and allow new actors to couple with novel actions and inventions emerging in the process. Cooperation and decision-making processes take place here at eye level, i.e., that here - entirely in the sense of cocreation - governance develops further into joint co-steering processes. We call this new form of steering "governance".

Every managed change needs a frame of reference in which it takes place, i.e., it needs a "change organisation" that clearly demarcates it from the routines of operational business and thus also clearly distinguishes it. We call this change organisation "transformation space":

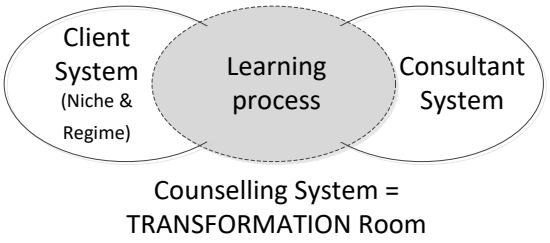

FIGURE 3: TRANSFORMATION ROOM / COUNSELLING SYSTEM (SOURCE: ROSWITHA KÖNIGSWIESER AND AXEL EXNER 1998)

The transformation space encompasses all communications (actions) relevant to change:

- is oriented towards an architecture,
- is linked to varying degrees to the "everyday organisation" of the regime's organisation- of-origin (= varying degrees of independence),
- Realises itself factually in communication processes,
- requires the development and agreement of new structures: roles, committees, and formats.

We speak of "architecture" in counselling processes, but do not want to express that it is a fixed and finished building, but rather a planning opening of possibilities and development spaces. Just as architects design spaces and thus create frameworks in which the most diverse things can happen, transformation consultants and transformation managers define social, temporal, spatial, content-related, and symbolic

design elements, and fixed points that pre-structure interaction processes. In this sense, architectures are interventions. The basis of architectural designs - as with all our intervention decisions - are hypotheses.

Change project architectures:

- serve to reduce complexity,
- relieve the top-down organised organisations-of-origin,
- ensure continuous processing of complex, novel topics,
- provide security through predictability,
- are innovation systems, fields of experimentation and social laboratories: new solutions, practices and pattern-breaks can be realised here,
- organise and coordinate new types of networking,
- are flexible, few,
- provide control options.

Good architects develop their designs together with the client and their users, considering not only the existing needs but also all the framework conditions such as zoning and development plans, building codes, etc. In the same way, the transformation counsellors, together with the transformation managers as representatives of the client system, construct the overall conception of the counselling process on the factual-contents, social, temporal, spatial and symbolic dimensions. Here, too, plans change and are revised according to the situation.

The architecture determines that something takes place and what takes place, the headlines, the cornerstones, the rough planning, so to speak. Design is used to decide how the content, social, temporal, spatial and symbolic dimensions are to be shaped within the given framework. As already mentioned, design can be compared to interior design.

Architectural elements have a paradoxical function: they create fixed frames for free spaces. Counselling processes that have a good architecture facilitate new perspectives, allow for diverse perspectives (e.g., heterogeneous group composition), introduce differences (e.g., interviews with target groups, integration of strategic partners) and open new opportunities for observation, feedback, or reflection (e.g., through elements such as the sounding board). They facilitate the breaking of ingrained patterns of thought and action and promote learning to learn and thus self-direction. Process know-how forms the basis for designing demanding development processes in transformation spaces:

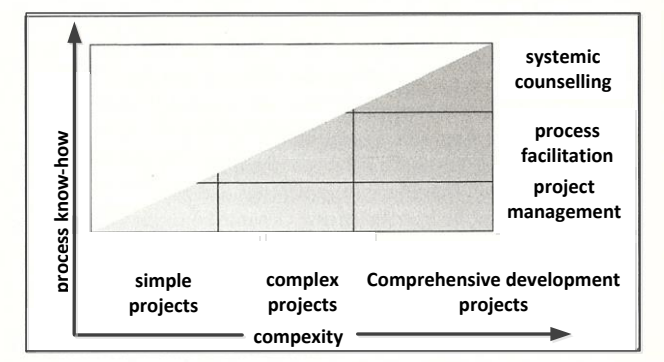

FIGURE 4: PROJECT ARCHITECTURES AND COMPLEXITY (SOURCE: KÖNIGSWIESER ET.AL. 2009)

Simple projects can be handled well with classic project management tools. For more complex projects, the demands on process know-how increase. In comprehensive (organisational, urban, and regional)

development projects, the know-how regarding project management and process facilitation forms the basis for systemic transformation counselling.

Simple projects can be handled well with classic project management tools. For more complex projects, the demands on process know-how increase. In comprehensive development projects, the know-how regarding project management and process facilitation forms the basis for systemic counselling.

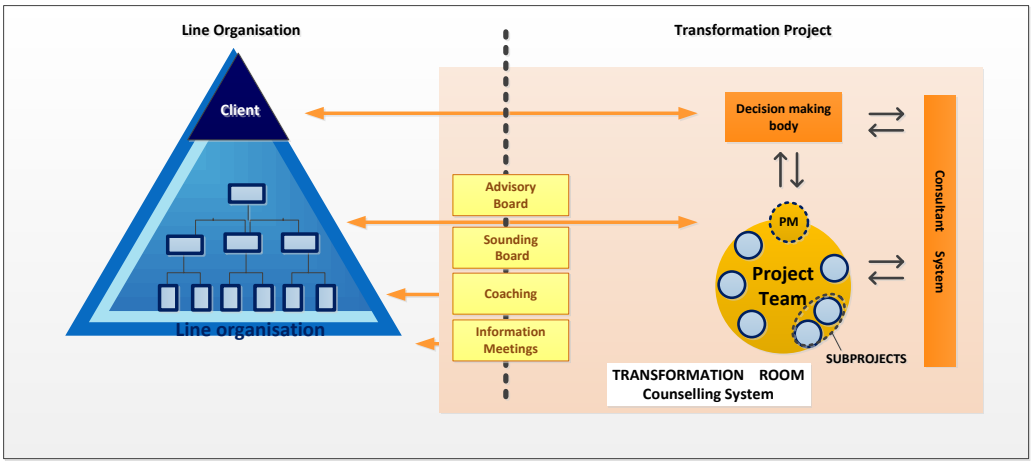

FIGURE 5: TRANSFORMATION SPACE AS A LINKING OPPORTUNITY BETWEEN PROJECT AND LINE (SOURCE: WILHELMER 2022)

Architectural elements form the foundation stones for the transformation space. They enliven the system because they make new interactions possible, and pattern changes easier. However, it is essential that the transformation expert advisors and systemic counsellors design, shape and accompany these forums to increase the reflective capacity in the system.

Critical to the success of using the transformation space as a learning space is the implementation of clear project roles: The client (function) initiates the project, sets the strategic direction and goals, decides on the scope, importance, and resources, and acts as a role model. The internal project management is responsible for leading the strategic and operational processes of project management. They do not have to take on all the tasks themselves, but by virtue of their function they are responsible for ensuring that they are completed within the given time frame with the resources provided and at a high level of quality.

Some transformation processes use the instrument of a system diagnosis to build a deeper understanding of latent patterns and system logics. Group interviews are often used for this purpose, to which ideally all stakeholders relevant to the change issue from all organisations and functions are invited. System diagnosis is an intervention in the system with the aim of strengthening the system's self-observation capacity through self-assessment. At the same time, it serves to build the relationship and trust between the consultant and the client system. Repeatedly carried out, it serves as a process evaluation. In urban development projects, this type of system diagnosis and process evaluation is often adopted by process-oriented impact monitoring processes.

Since system diagnoses often focus on identifying problem areas and subgroups often tend to complain about situations and leadership actions they experience as unsatisfactory, a system diagnosis that is not carried out in a solution-oriented way can also lead to the construction of secrets between the transformation consultant and subgroups and thus to the loss of the centrally important all-partiality of the transformation consultants. The second danger lies in the construction of simple cause-effect

relationships, where situations described as problems are stigmatised as the cause of undesirable developments. Potentials inherent in these quasi "problematic situations" are subsequently faded out and can no longer be used for the development of complex solutions.

Reflection workshops of system diagnoses have the same function as kick-off events, where the client clarifies the necessity for the planned change from his point of view and invites all participants to a common formulation of goals. It is important to have a common picture of the situation one wants to "get away from" and the desirable future one wants to "get to". The result of this is a definition of goals and a direction that is equally supported by all relevant people concerned. In the case of reflection workshops, it is important to ensure that they do not get stuck in the problem description of the "away from" but also create a powerful, common vision and goal description.

- The representation of architectures corresponds to a map: The individual settings or programmes are listed on the left-hand side. The subsequent time axis visualises the frequency and simultaneity of the individual steps taking place. This enables both managers and consultants to regularly determine where exactly they are in the process and whether the parallel management of specific steps is still functional or should be revised due to contextual changes.

- Communication always needs an occasion, a goal or an attractive vision, and a certain combination of actors who meet for the purpose of carrying out a certain sequence of actions.

- Communicating requires the provision of communication spaces: time-space and physical spaces where representatives of the client (the city) and counselling system (systemic counsellor, non-university research) meet at certain times to realise agreed objectives in a specific combination of actors. These communication spaces or settings are also called "settings" or "bodies".

TABLE 4. SETTINGS OF TRANSFORMATIVE ARCHITECTURES (SOURCE: KÖNIGSWIESER 2009)

Settings	**Function of settings of transformative architectures**
Decision-making body	Deciding on interim results and concepts recommended by the project team.
Core Group/Steering *Group (Extended project management)*	Engine of the change process. Reflective and catalytic role in relation to new ideas and initiatives and stakeholder engagement. Contact point for concerns related to the transformation process. Sounding out and reflecting on culturally relevant discussions, moods, actions, and decisions in the organisation. Management function: Initiate necessary decisions and ensure operational implementation. Controlling function: Incorporating feedback loops into the procedure and evaluating how the change process is going, where problems arise and how to readjust. It has a client function for initiating sub-projects, a decision-making function, and an internal marketing function.
Project teams	Develop solutions, map and integrate the interests of the affected subsystems in the solutions. (Project team, sub-project teams, core/extended project team, working groups, etc.).
Sounding Board	Implemented by the steering group: "microcosm" - feedback from relevant stakeholders on half-finished concept fragments; advise project team; communicate project successes to the organisation. Resonance and feedback on the project. Can be a small group or large event.

Group of key decision maker	Feedback and resonance on the project - advising the steering group on the process. Intervention platform.
Advisory boards	Expert groups and advisory board. Representatives of relevant environments or subsystems or experts for specific, strategically relevant topics.
Information body	Staff meeting etc. Invited to understand, follow up and contribute to the implementation of the plan and outcomes.
Workshops	Topic- and process-specific retreats, each with a specific composition (e.g., diagnostic, retrospective, transfer workshops)
Moderated Community of practices (CoP) *(Jean Lave & Etienne Wenger)*	Facilitated CoPs build on current practice issues and enable peer learning between more experienced and less experienced process counsellors/ moderators during design development and facilitation.
Online Community of Practice (CoP)	The CoP enables the self-organisation of content-related learning processes by practitioners for practitioners based on resources made available (time, space, money to invite experts, technical infrastructure). In addition, online CoPs can also be used for (peer-)coaching in transformative European projects.
Dialogue forums	Dialogue-oriented events (it is about "understanding"); fireside evenings, company dialogue, World Café: coordination between top management, the core group/steering group, the client, and other relevant environments. Reality check for the steering group.
Sub-projects	Develop concepts, decision-making bases, and their implementation. Increase the number of people involved, the quality of the results and the acceptance of the transformation process.
Large group events.	Possibility to reach many people at the same time. Building a sense of purpose and a sense of WE. Mobilising collective energy for sustainable change.
Stakeholder conferences	Obtain feedback from relevant environments (customer days, parliaments, key account events, etc.).
Coaching project management	Passing on the process know-how of the transformation consultant to the internal project management. Supporting the bridge function of the project management between the consultant system and the client system. Stabilisation of project and process;
Coaching of the clients and Top decision-makers	The mayor, minister, board, management should be personally and emotionally involved in transformation processes. In this way, they can act as role models, set standards, adopt regulations, and lend credibility to the change process. Proverb: "You sweep the stairs from the top".

Architectures thus enable both: "staying in the plan" and "tailoring" the plan to the goals and benefits of the client. According to Fritz Simon[21], "maps are never landscapes" and "menus are never the food that is actually served". Accordingly, architectures make it possible to recognise these differences as quickly as

[21] Simon F. (2004): Together we are stupid!? The intelligence of companies, managers and markets.
Fourth, unchanged edition, 2013; ISBN: 978-3-89670-436-8; © 2004, 2013 Carl-Auer-Systeme Publisher Heidelberg

possible and to take appropriate "countermeasures" to achieve a newly lived life at the end of a transformation process.

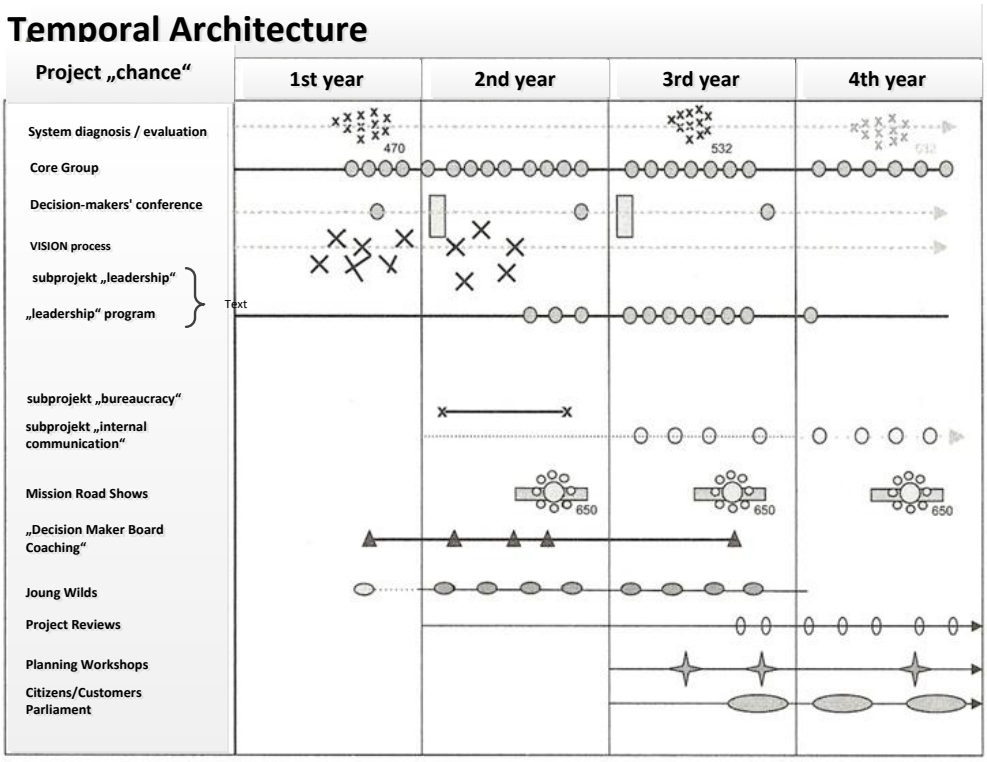

FIGURE 6: EXEMPLARY ARCHITECTURE OF A TRANSFORMATION SPACE (SOURCE: KÖNIGSWIESER 2009)

4.3. TANGO-W customised CoPs as architectural elements

Already in the project design phase, the knowledge management instrument "Community of Practice" (CoP | Jean Lave and Etienne Wenger 1991)[22] was chosen as the setting (architecture element) for orchestrating the learning process between all TANGO-W project members: To enable reflexive system learning on the one hand and the further development of content-related innovations on the other, two different modes of CoPs were installed:

The online CoPs bring together experts from the fields of food, water and energy from Norway, Sweden, Lithuania, and Austria, who learn from each other along the lines of the questions arising in the Living Labs and invite experts from outside the project to thematic workshops. The online CoP in governance is an exception: this CoP functions as a coaching CoP and continuous process support for the individual Living Labs, where ambiguities, blockages or conflicts can be worked on together and also resolved with the help of an external perspective.

In contrast, the Face-to-Face CoPs (f2f CoPs) focus on the social learning processes of all consortium members during the six f2f CoP workshops: these workshops are always hosted by one of the seven TANGO-W cities. The goals of the f2f workshops are developed in a circular goal-setting process with representatives of all consortium partners and take up current topics from the Living Labs and the

[22] Lave, J., & Wenger, E. (1991) Situated Learning: Legitimate Peripheral Participation. Cambridge: Cambridge University Press. http://dx.doi.org/10.1017/CBO9780511815355

individual work packages of the research project. To support the achievement of the objectives, analogue and analytical interaction methods are used in the planning of the individual workshop designs to support the cognitive and emotional learning of all participants. For the implementation of the facilitation of the individual workshops, a temporary advisory system will be established in which the technical and process advisors of the project coordinator (AIT) will work together with the technical advisors of the R&D partners at eye level. Within this temporary advisory system, all methods are thought through and adapted in detail, all working documents are prepared and the necessary organisational details are also discussed. On site, the consortium leadership then takes over the moderation tasks together with representatives of HOST. In this way, on the one hand, the connectivity to the visited Living Lab and the needs of all consortium partners is ensured and, on the other hand, learning in the joint, temporary advisory system is made possible.

The core of the TANGO-W project is to build transformation spaces at local and European level in such a way that security and mutual trust, understanding and appreciation for unfamiliar learning processes can emerge. The CoPs at consortium level are a key element for this: only insights and new methodological repertoires that are acquired or tested here in the common CoP experimentation and protection space can then be passed on at local level by the same people.

5. Impact Assessment as a transformative governance instrument

The Tango-W project aims to develop a framework for ensuring feedback loops that facilitate learning and reflexivity to progress towards a proposed vision. This framework includes the development of skills for governing and monitoring the processes of living labs, as well as the creation of diverse reflexivity formats that allow understanding and evaluating the progress towards local visions. The coordination of corresponding reflections and feedback loops through impact monitoring aims to support transformative change at local level.

In the area of impact monitoring, Tango-W works on the two levels of a) urban transformative capacity UTC and b) the implementation of socio-technological solutions to increase sustainability at the urban level. The UTC indicators formulated deductively in the tradition of Wolfram will be used equally in all Living Labs in the TANGO-W project. The respective set of urban indicators in the field of sustainability monitoring, on the other hand, includes the adaptation of European indicators of the F.W.E Nexus to the respective national and local framework conditions, whereby the leaders of the Living Labs work together with local research organisations on the development of these criteria.

The aim of impact monitoring is to support cities in building transformational capacity and expanding the reach of their transformative solutions through continuous feedback and learning processes. It will also provide valuable insights into the effectiveness of ULLs as experimental and transformational spaces at the local level on their journey towards greater resilience and sustainability in relation to food, energy and water.

The TANGO-W Impact Monitoring addresses the two central levels of the TANGO-W project with its objectives and indicators:

UTC monitoring – equal for all ULL

- Monitoring of achievements concerning Urban Transformative Capacities (UTC) during the project and providing a proven approach and lessons learned to the cities for future projects concerning transformative capacities and governance structures.

Sustainability monitoring – specific for each ULL (food, energy, water)

- Monitoring of achievements concerning the scope of the Urban Living Labs (food, energy, water) and learning about the methodology of impact monitoring in the different thematic areas.

5.1. Observation areas and quantitative Indicators

(1) UTC-Monitoring

The TANGO-W project sees itself as part of the transformative research approach. At its core, this is about research projects a) initiating transformative change through their activities and b) questioning and further developing their own lenses of observation and interventions for initiating urban change and technological innovation.

Impact monitoring, in the context of evaluating the impact of ULL interventions, aims on the one hand to match the observation glasses of project members (observation areas and indicators) and on the other hand to stimulate the description of impact cycles because of interventions. Efficacy and effectiveness are seen here as important target dimensions that can no longer be explained from the perspective of causal logical explanatory contexts. While the report on the indicators achieved serves to prove the legitimacy of the measures taken, the type of explanatory contexts also focuses on effective areas of intervention for the future.

TABLE 5. TANGO-W UTC OBSERVATION AREAS AND QUANTITATIVE INDICATORS ON AN OVERVIEW

TANGO-W UTC observation areas and quantitative Indicators on an overview	
Qualitative Areas	**Quantitative UTC Indicators**
– Participation of citizens and different types of organizations in defining goals, planning, implementation of measures and review – Decision making within ULL during different phases of the project (who is involved, how many persons, way of deciding, etc.) – Areas covered by shared vision (different social, economic and quality of life needs) – Resources provided for different types of activities during the project (information and knowledge sharing, time for discussion and decision making, financial resources for technical and social implementation, etc.) – Results from internal reflection and review - lessons learned. – Capacities developed by different participating groups and individuals (knowledge	– Number of citizens and different types of organizations involved in participation and decision making. – Percentage of jointly made decisions during the project (with people form at least two other groups or organizations involved) – Number of public servants or municipal employees involved in participation and decision making. – Number of public servants or municipal employees trained in participatory processes.

and skills, network resources/social capital, financial resources)

In the Tango W project, several areas were identified as key areas that need to be monitored to ensure the success of the transformative research project.

- Wolfram addresses the need for a "holistic, transdisciplinary approach" and "collaboration between all stakeholders" in his criteria for success. This dimension is also represented in the UTC indicator set of TANGO-W through the focus on the participation of citizens and different types of organisations and institutions in goal setting, planning, action implementation and evaluation. With a view to the systemic approach of context steering, the way of involving the different stakeholders within the transformation space is then organised, coordinated, and advised per ULL. The observation of participation through impact monitoring enables the evaluation of how wide the spectrum of stakeholders involved is and to what extent the stakeholders are involved in decision-making. (Indicator: number of citizens and different types of organisations involved in participation and decision-making).
- The nature of stakeholder involvement within the different project phases in the decision-making processes of the project and the cities is addressed as a second, important area of observation of impact monitoring: Among other things, who is involved in the decision-making process, how many people are involved and how decisions are made are observed. (Indicator: percentage of decisions made jointly during the project with people from at least two other groups or organisations). Joint evaluation processes with all stakeholders should ensure transparency and integration of all relevant stakeholders.
- Visioning and long-term planning is one of Wolfram's success criteria, whereby visions are seen as a reflection of existing, often insufficiently considered, target group-specific stakeholder needs. Here, UTC impact monitoring focuses on observing in what way and to what extent the various, social, economic and quality-of-life needs in the cities are pursued with the aim of being able to meet them as comprehensively and adequately as possible. This in turn supports the holistic and transdisciplinary approach of transformative projects with a view to positive effects for the community and society called for by Wolfram (indicator: number of public servants or municipal employees trained in participatory processes).
- Another focus of impact monitoring is the type and extent of resources made available during the project: a prerequisite for success in Wolfram's view is "equal access to resources for all" and "investment in infrastructure and public services". In addition to the extent and type of use of financial resources (technical, social), time capacities for exchanging information, decision-making and joint learning processes should also be examined. (Indicator: number of public servants or municipal employees involved in participation and decision-making) Among other things, the observation of the effects of the use of resources on the impact of project results will be followed up.

With a view to the overarching goal of strengthening urban transformative capacity in the ULLs, impact monitoring in the TANGO-W project aims to provide the following impulses for all project members and stakeholders involved:

1) Questioning and aligning the observation glasses of researchers, policy makers and civil servants.
2) Focusing attention on impact cycles and complex interrelationships beyond economy driven causal logic.
3) Supporting the ULLs through participatory evaluation processes on the course and results of the individual ULLs.

(2) Sustainability Monitoring

On a local level the impact of the urban living labs regarding the areas of food, water, and energy will be measured on how they affect the following systems:

- Economy
- Ecology
- Social system
- Political system
- Technology and common knowledge incl. sharing of knowledge and learning

Additionally, the impact on the quality of life of citizens should be described in a qualitative way.

To address the food energy and water nexus there have been developed a suggestion of indicators for the living labs to measure derived from EU 8th environmental action program and from the jointly cocreated TANGO-W Vision:

TABLE 6. EXAMPLES FOR GOALS AND INDICATORS (FROM THE EU 8TH ENVIRONMENTAL ACTION PROGRAM)

Examples for goals and indicators (from the EU 8th environmental action program)			
Food	Energy	Water	Governance
Reduction of transport (related emissions, km) of food (per unit)	Existing monitoring system for energy produced and consumed by households, industry and other businesses	Drinkable water consumption	Participation in decision making
Amount of locally produced food (of different type) per agricultural land area	Amount of renewable energy produced/consumed, share of total energy used	Water footprint: sums over all water-consuming or polluting processes taking place	Jointly developed values, visions and roadmaps
Water footprint of food production	Investments in improving energy efficiency	Existing sustainable water management system: measuring consumption, defined goals, measures and monitoring	Agile, co-creative, municipal development processes
Agricultural water withdrawal as % of total renewable water resources	Greenhouse gas emissions per unit of energy produced.		
Greenhouse gas emissions per unit produced			

5.2. OECD Framework for reviewing TANGO-W monitoring indicators

The six OECD's Criteria

The impact monitoring process of a Living Lab intervention is crucial for the quality of the data collected and the overall success of the intervention. To ensure the success of impact monitoring, it is important to

have concrete criteria for evaluating the process that will be used to measure the impact of the Living Lab. These criteria should help in deciding which indicators are relevant for observing which objective.

The OEDC's six criteria can be seen as a helpful framework for assessing the value of single indicators, allowing the observation of the impact of interventions. These six criteria provide a comprehensive framework for supporting the assessment of the relevance, coherence, effectiveness, efficiency, impact, and sustainability of an intervention[23]. Therefore, all impact monitoring indicators selected should meet these criteria in their definition.

When reviewing the relevance of indicators, serving as observation categories, we must assess, whether these indicators help to verify, if interventions address the most important problems and address them in an appropriate way. This is to ensure that the interventions address the needs of the divers targeted groups on the one hand and serve the mandated objectives of the Living Lab on the other.

Under the second criterion of coherence, indicators are defined and narrowed down to allow observation of how well the intervention fits into the broader context of the Living Lab. This criterion is important because it ensures, that the intervention fits well into the interrelationships of the whole Living Lab ecosystem without creating unintended harm.

The third criterion of effectiveness delimits indicators that can be used to observe and evaluate, whether the intervention is achieving its intended goals. The focus here is on evaluating the desired impact on divers targeted groups.

The fourth criterion, efficiency, sorts out the indicators that can be used to observe, how well the resources allocated to the intervention are used. Here, the best possible benefit in relation to the use of resources is the focus of observation.

The fifth criterion, impact, helps to narrow down indicators, that can be used to observe and evaluate the overall difference that an intervention makes. The focus is on the long-term impact on the population targeted and on the whole ecosystem of the Living Lab.

The sixth and final criterion, sustainability, narrows down the indicators that can be used to observe, whether the positive impact of the intervention on the target population and ecosystem will last in the long term.

TABLE 7. OECD CRITERIA

Six OECD Criteria	
– Relevance – Coherence – Effectiveness	– efficiency – impact – sustainability

Overall, the OECD's six criteria provide a speed helpful framework for building an impact monitoring system to assess the benefits and value of a Living Lab intervention. By applying these criteria, we can

[23] OECD: Evaluation Criteria, n.d.

ensure that the impact monitoring process is of high quality and provides valuable insights into the success of the intervention.

How does the UTC monitoring link to OECD's Criteria?

The participation of citizens and different types of organizations in defining goals, planning, implementation of measures, and review can be linked to the criteria of relevance, coherence, and sustainability for several reasons. First, involving a diverse range of stakeholders in these processes ensures that the goals and plans developed reflect the needs and priorities of the community. This ensures that the actions taken are relevant to the local context and have a greater likelihood of being effective. Second, involving multiple perspectives and experiences in the decision-making process can help to ensure that the plans and measures developed are logically consistent and feasible. This coherence helps to ensure that the actions taken are well-aligned and can be implemented successfully. Finally, involving stakeholders in the review process allows for ongoing evaluation and adaptation of the plans and measures, ensuring that they remain relevant and effective over time. This sustainability helps to ensure that the actions taken can be sustained and continue to produce positive outcomes for the community. Overall, the participation of citizens and organizations in defining goals, planning, implementing measures, and reviewing progress can be linked to the criteria of relevance, coherence, and sustainability, contributing to the success of the efforts being undertaken.

The decision-making processes that take place within ULL during the different phases of a project can be linked to the criteria of effectiveness and efficiency. It is important to consider who is involved in these decisions, how many people are involved, and the methods used to make decisions in order to ensure that the actions taken are effective and efficient. For example, involving a diverse range of stakeholders in the decision-making process can help to ensure that a wide range of perspectives and experiences are considered, leading to more effective solutions. Similarly, using efficient decision-making methods, such as those that allow for quick and easy consensus-building, can help to ensure that decisions are made in a timely and effective manner.

When assessing the relevance and impact of an urban living lab, it is important to consider the specific areas that it will cover and the unique social, economic, and quality of life needs of those areas. This is because different communities may have different priorities and needs, and an urban living lab that is relevant and has a significant impact in one area may not necessarily be relevant or have the same impact in another area. By considering the shared vision of the different areas covered by the urban living lab, it is possible to ensure that it is designed to address the specific needs and priorities of those communities. This can help to increase the relevance and impact of the urban living lab, as it will be more closely aligned with the needs and goals of the communities it is intended to benefit. Additionally, involving the communities in the planning and implementation of the urban living lab can help to build support for the project and ensure that it is well-received by the people it is intended to benefit.

When monitoring the efficiency and sustainability of an urban living lab, it is important to consider the resources provided for different types of activities during the project. This includes resources for information and knowledge sharing, time for discussion and decision making, and financial resources for technical and social implementation. By ensuring that the urban living lab has sufficient resources for these different types of activities, it is possible to increase the efficiency and sustainability of the project. For example, providing resources for information and knowledge sharing can help to ensure that all stakeholders have access to the information they need to make informed decisions, which can help to up

the decision-making process and avoid costly delays. Providing time for discussion and decision making can also help to ensure that all stakeholders can contribute to the decision-making process and reach consensus on key issues. And providing financial resources for technical and social implementation can help to ensure that the urban living lab has the necessary funding to carry out its activities and achieve its goals. Overall, by considering the resources provided for different types of activities during the project, it is possible to increase the efficiency and sustainability of the urban living lab.

When it comes to evaluating the impact and sustainability of a project, it is possible to consider the capacities developed by different participating groups and individuals. This includes knowledge and skills, network resources and social capital, and financial resources. By focusing on the development of these capacities, it is possible to increase the impact and sustainability of the project. For example, providing training and support to help participating groups and individuals develop knowledge and skills can help to ensure that they are able to effectively contribute to the project and achieve its goals. Building strong networks and social capital can also help participating groups and individuals to access additional resources and support, increasing the sustainability of the project. And providing financial resources can help to ensure that participating groups and individuals have the necessary funds to carry out their activities and achieve their goals. Overall, the development of capacities is an essential factor in the impact and sustainability of a project.

In conclusion, the OECD's six criteria can be linked to the various areas of UTC monitoring, including defining goals, planning, implementing measures, and reviewing progress. The relevance criterion ensures that the intervention is addressing the right issues and is aligned with the overall goals of the living lab, while the coherence criterion ensures that the intervention is integrated into the broader ecosystem of the living lab. The effectiveness criterion evaluates whether the intervention is achieving its intended objectives, and the efficiency criterion assesses how well the resources allocated to the intervention are being used. The impact criterion evaluates the overall difference that the intervention is making, and the sustainability criterion assesses whether the benefits of the intervention will last over the long term.

Overall, we can say that the UTC indicators of TANGO-W reflect the six OECD criteria and thus represent good monitoring criteria for evaluating the success of interventions towards the expansion of UTC and for gaining valuable insights into their impact.

5.3. TANGO-W Impact monitoring process

UTC Monitoring

Design phase

- At the f2f CoP in Halden (Sept. 2022), the AIT presented a two-level monitoring system (UTC/sustainability) and first UTC indicator-set and agreed on them with all TANGO-W project members. Possible feedback and further suggestions from the project partners will be collected until the next workshop. 2,
- In addition, a first, more general framework for sustainability indicators for the F.W.E. Nexus and a local impact monitoring process will be developed until the next f2f CoP,
- The general indicator framework for UTC and sustainability and the local implementation process will then be discussed with all project partners in the f2f CoP in Norrtälje (April 2023) and approved for implementation.

Implementation phase at local level

(1) from autumn onwards, reformulation and concretization of the framework set of sustainability indicators will take place between ULL project leaders and national research partners at local level. In addition, the interventions to be evaluated at local level according to the indicators will be determined, including the corresponding planning of review workshops.
(2) Between late autumn 2023 and late autumn 2024, approx. 2 impact monitoring review workshops will take place at the local level. The first workshop evaluates the current UTC situation at the beginning of the ULL implementation in 2023 and the second workshop records the changes regarding transformative capacity that have been achieved because of interventions during the third year of the project.

Evaluation

- In 2025 local results will be included in the TANGO-W Good Practice Guides and the TANGO -W final report.

With respect to participatory governance this process ensures that all project partners are actively involved at project and local level in the design phase to develop their own appropriate set of indicators for the local ULL . In addition, the procedure places the implementation responsibility entirely in the hands of the local ULL managers and research partners. This enables locally planned review workshops to be used for self-assessment and planning of development steps, thereby enabling self-initiated learning and development processes beyond external assessments and controls.

Local sustainability impact monitoring in the F.W.E. Nexus

The individual steps of the impact monitoring process at local level are as follows:

- the local scientific partners bear the overall responsibility for the process at the local level and are supported and guided by the AIT.
- an impact monitoring CoP is set up and planned for each ULL in cooperation between the ULL responsible and the national research partner. The stakeholders involved in the process are identified and invited to participate in the CoP meetings. 3.
- during the CoP meetings a) the ULL interventions to be monitored are narrowed down, b) local experts with relevant data know-how are invited, c) specific ULL indicators are tailored. These will be derived from the local visioning process (spring 2023) and adapted to the specific contextual conditions of the city and the substantive ULL transformation targets. In doing so, care is taken to ensure that the indicators are also used to identify non-target areas.
- regular impact monitoring CoP meetings will be used from autumn 2023 onwards to report on progress and share experiences and lessons learned at local level. Indicators can be adjusted in the process as needed based on the progress and results of the ULLs.

6. ULL Practice: H2020 Lessons Learned and Criteria for Success

In TANGO-W Deliverable 2.1, a TANGO-W adapted version of the Wolfram method for assessing Living Labs UTCs was presented. Then, a typification of ULLs into strategic and prototypical cases as well as typical project phases for implementation planning of ULLs was introduced. This provided the methodological framework for an initial assessment of the TANGO-W Living Labs in order to get a better understanding of the existing strengths and development areas of the ULLs in relation to their transformative capacity (see D2.1 SWOT analysis).

The chapter builds on this preliminary work of D2.1. Based on benchmarking, comparable projects in the F.W.E. nexus are outlined on the one hand, and on the other hand two comparable, meaningful European projects are described in more detail in order to be able to derive success criteria from them. In a second step, success criteria are then also derived from the planned TANGO-W Living Labs.

Both aim to add generically developed success criteria for ULLs to the already described success prerequisites and success criteria derived from theory. The overall result is then intended as a compact summary of success prerequisites, success criteria, principles and elements of transformative governance and of steering instruments to sum up the requirements for transformative ULLs. In this way, the present playbook should serve as a good basis for the development of an innovative ULL2.0 design guide.

6.1. European Good Practice Examples in the F.W.E. nexus on an overview

TABLE 8. RELEVANT PROJECTS TO EXTRACT GOOD PRACTICES FOR TANGO-W

Food - Water		
Project	**ULL**	**Description**
ZeroW	- FLW monitoring & assessment - Consumer Engagement and Everyday Life - Efficient food bank networks	EU project about systemic innovations for zero food waste. ZeroW creates impact through the demonstration of innovative food loss and waste (FLW) reduction solutions in nine living labs along the real-life food chains to effectively address the multidimensional issue of FLW.
Waste FEW ULL	Bristol	This ULL aims to minimize linear and wasted flows of food, energy, and (nutrients in) water using market and non-market micro and macroeconomic valuation, systems modelling, and targeted impact planning to disrupt business as usual.
	Cape Town	This ULL is a demonstration, research, and innovation site that uses nature-based solutions to treat contaminated runoff from an informal settlement, and to use this water to safely irrigate vegetables and to generate energy from microbial activity during the treatment process.
*Private Initiative	Growing Underground, London	The UK start-up Growing Underground is cultivating micro-greens in a vertical hydroponic system at 33 metres below ground in an abandoned air raid shelter owned by the governmental transport body Transport for London (Jans-Singh et al., 2020; Walsh, 2021).
*Urban Intervention	Urban Farming Food Chain, Los Angeles, USA.	Architectural and planning intervention which aims to eradicate hunger in urban areas. Utilizing existing infrastructure, the project is designed as a green path, comprised of a network of vertical farming walls for growing produce, and kitchen/education hubs that serve as community centres.
Desira	Oosterwold, The Netherlands	This project aims to transform the Oosterwold area to become the food producer of 10% of the nearby city of Almere. In the area, networks of producers (private, semi-professionals and professionals) are emerging and there is the need to find how to organize a short supply chain to exchange the area's products, within and beyond the area.

--	Gröna Solberga, Stockholm, Sweden	Residential area used as a ULL where innovative technologies can be studied from the technical, societal, and business model perspectives. Of interest for TANGO-W is that Kretsloppsbolaget implemented an aquaponics system in a residential building.
Bundesministeriums für Bildung und Forschung	Roof Water Farm, Berlin, Germany	Roof Water Farm is a real-world laboratory at the interface between urban research and urban society in the middle of Berlin. It combines wastewater treatment technology with food production as a "Closed-Loop Urban Farming Approach".
B-Water Smart	Oldenburgisch-Ostfriesische Wasserverband, East Frisia, Germany	The ULL run by a German water supplier seeks to increase the resilience of the water supply through i) identification of alternative resources, ii) intelligent protection strategies for groundwater bodies, and iii) improved treatment of process water for reuse in milk production.
STREFOWA	--	The STREFOWA project is a Interreg Central Europe project that aims to make more efficient use of food and therefore reduce food-waste. The project is focused on reporting on food waste and creation of materials to reduce it.

Energy

Project	**ULL**	**Description**
Energy City Hall REC-1	Magliano	This renewable energy community project aims to re-vitalize Magliano's territory after the COVID pandemic. The project focuses on citizen engagement and exploring innovative business models for energy activities.
Ecosystemic Transition Unit (ETU)	Energy Community, Monachil	The ETU brings together governance, economic competitiveness, and social innovation to revitalize rural areas and increase their resilience to climate change.
SCHALTwerk2030	Unsere Energie Kremsmünste	One of the first functioning energy communities in Austria, consisting of eight members.
CO2mmunity	Energy Community Pilot Project, Mārupe, Latvia	Implementation of a renewable energy community project. The involved parties are already equipped with competencies and know-how from establishing and running a successful renewable energy cooperative partnership (RENCOP).
Green Charge (H2020)	Røverkollen housing cooperative, Oslo, Norway	This living lab has a particular focus of providing cost-efficient home charging facilities for inhabitants living in blocks of flats with limitations in the local grid, considering energy generation, storage, and management.
MERLON (H2020)	COMPTEM – Enercoop, Spain	Non-for-profit energy cooperative with the objective of generating rebates on members' energy bills and eventually supplying 100% renewable energy to the whole town of Crevillent. This case demonstrates good collaboration between the local administration and the energy cooperative. Moreover, the financing model was chosen to convince people who may otherwise be reluctant to participate.

Dutch Nature and Environmental Federation Project	Energy Gardens, The Netherlands	Project that aims to address the need of expanding renewable energy generation and its interaction with the natural environment. Furthermore, the project also aims to involve all stakeholders from its start date in order to maximize the acceptance and potential of the implemented solution.
Ruggedised	Smart City Brno 2050	The project aims to improve quality of life in the city by supporting effective governance, preserving natural resources, and enhancing energy sustainability through clever, sensible, and effective uses of modern technology and approaches.
Urban Transformation Processes		
Project	**ULL**	**Description**
REMOURBAN	--	REMOURBAN will implement large-scale interventions and intense dissemination initiatives to demonstrate the potential of the urban regeneration model in the energy, mobility, and ICT sectors. The project has been selected for its good reporting on lessons learned and success criteria.
Scalibur	--	The SCALIBUR project, leading waste management companies, technology developers, and research organisations have teamed up with four European cities to demonstrate innovative solutions to transform urban food waste and sewage sludge into high value-added products.
Other		
Project	**ULL**	**Description**
COMERES	---	COME RES does not directly involve ULLs or RECs, but it provides an overreaching framework for energy communities to foster their development through knowledge sharing. The project has influence in Belgium, Germany, Italy, Latvia, Netherlands, Norway, Poland, Portugal, and Spain, and it engages with 24 H2020 projects which do have ULLs.

6.2. Two European Good Practice Examples

In this section, besides Ruggedised and COM RES the most relevant projects from In TANGO-W Deliverable 2.1, a TANGO-W adapted version of the Wolfram method for assessing Living Labs UTCs was presented. Then, a typification of ULLs into strategic and prototypical cases as well as typical project phases for implementation planning of ULLs was introduced. This provided the methodological framework for an initial assessment of the TANGO-W Living Labs in order to get a better understanding of the existing strengths and development areas of the ULLs in relation to their transformative capacity (see D2.1 SWOT analysis).

The chapter builds on this preliminary work of D2.1. Based on benchmarking, comparable projects in the F.W.E. nexus are outlined on the one hand, and on the other hand two comparable, meaningful European projects are described in more detail in order to be able to derive success criteria from them. In a second step, success criteria are then also derived from the planned TANGO-W Living Labs.

Both aim to add generically developed success criteria for ULLs to the already described success prerequisites and success criteria derived from theory. The overall result is then intended as a compact summary of success prerequisites, success criteria, principles and elements of transformative governance and of steering instruments to sum up the requirements for transformative ULLs. In this way, the present playbook should serve as a good basis for the development of an innovative ULL2.0 design guide.

6.3. European Good Practice Examples in the F.W.E. nexus on an overview

Table 8 are analysed to present cases of Good Practice which can serve as foundation to define the project's success criteria, as well as providing relevant insight to the challenges the ULLs can face during the three phases of the project: Conceptualization, Implementation, and Operationalization.

The selection of good practice examples from In TANGO-W Deliverable 2.1, a TANGO-W adapted version of the Wolfram method for assessing Living Labs UTCs was presented. Then, a typification of ULLs into strategic and prototypical cases as well as typical project phases for implementation planning of ULLs was introduced. This provided the methodological framework for an initial assessment of the TANGO-W Living Labs in order to get a better understanding of the existing strengths and development areas of the ULLs in relation to their transformative capacity (see D2.1 SWOT analysis).

The chapter builds on this preliminary work of D2.1. Based on benchmarking, comparable projects in the F.W.E. nexus are outlined on the one hand, and on the other hand two comparable, meaningful European projects are described in more detail in order to be able to derive success criteria from them. In a second step, success criteria are then also derived from the planned TANGO-W Living Labs.

Both aim to add generically developed success criteria for ULLs to the already described success prerequisites and success criteria derived from theory. The overall result is then intended as a compact summary of success prerequisites, success criteria, principles and elements of transformative governance and of steering instruments to sum up the requirements for transformative ULLs. In this way, the present playbook should serve as a good basis for the development of an innovative ULL2.0 design guide.

6.4. European Good Practice Examples in the F.W.E. nexus on an overview

Table 8 has been done following a multiple criteria analysis. First, the availability of relevant project documentation in the form of project reports has been controlled, then from the projects with proper reporting a deeper analysis of the reports available has been done in order to identify the ones whose main focus was closely related to TANGO-W's. From the final selection, the ones with better information regarding good practices and lessons learned have been chosen. This section – and the report - aim to provide examples and tools for ULLs to ease the project development path and identify potential challenges they could face and alternative solutions.

The Good Practice examples are given as follows: first an introduction to the project is provided to contextualize the scope, size, and potential impact of the presented case. Within this presentation, similarities with TANGO-W will be highlighted (if any) together with the main sources used to create the content of the good practices report. Then, the good practices cases are listed framing them in one or more categories of the TANGO-W UTC analysis framework. This connection between other projects and TANGO-W's developed framework is done to ease the contextualization of good practices within the current work frame in the project.

6.4.1. RUGGEDISED:

The RUGGEDISED[24] project is a smart cities project funded under the H2020 research and innovation program. The project has a high number of similarities with TANGO-W, but it is exclusively focused on innovative smart solutions related to energy, data, and city development. Therefore, it excludes the higher complexity created by the **F.E.W.** nexus.

RUGGEDISED has a total of six urban living labs which are categorized as either "lighthouse city", which are equivalent to TANGO-W's prototype cases, or "fellow cities" which are equivalent to TANGO-W's strategic cases. The cities participating in the project are: Roterdam, Umeå, Glasgow (lighthouses), and Parma, Brno, and Gdańsk (fellows). In each of the cities the project has actively collaborated with a broad number of stakeholders focusing on Citizens, Private partners, public institutions, and the Research community.

Furthermore, the project reporting (still undergoing) is very extensive and contains high quality information that can be useful for TANGO-W consortium partners to gain a better understanding of the challenges of implementing innovation programs such as ULL and UTC strategies enhancement. The core content presented in the paragraphs below has been extracted from RUGGEDISED Deliverables: *D1.7*[25], and *D5.6*. Additionally, lighthouse- cities-specific reports should be considered during the project since they can give relevant insights to more specific challenges and good practices that will be needed further in TANGO-W.

Good practices:

1. Development project versus innovation programme *All cases*	**REFLEXIVITY**
Include unintended events in the reflection of development projects	

All projects: The implementation of smart city projects, in general, is different from traditional development projects. The cross-sectional nature of these projects together with the uncertainty linked to their innovative approach and proposed solutions requires a different mind-set. This mind-set needs to be open to change (uncertainty), but above all to collaboration. As highlighted in RUGGEDISED D1.7: "*Unexpected events are key windows of opportunity to really fundamentally change existing institutional settings.*"

2. Joint and binding vision *Theoretical innovative business case design, Umeå*	**VISIONING**
Create a common, binding vision (or business strategy) with all relevant stakeholders.	

Theoretical innovative business case design, Umeå: The definition of a joint vision at the early stages of the project is crucial for its success. This vision cannot be developed by a single or a few stakeholders in the ULL (e.g: the *guardians of the process*), it is fundamental to develop or align the strategic vision

[24] RUGGEDISED project page. Link: https://ruggedised.eu/legacy/
25 RUGGEDISED D1.7 Lessons learned on the implementation of smart solutions in the Lighthouses. Link: https://ruggedised.eu/project/materials/guides/

with all the stakeholders of the ULL. RUGGEDISED highlights the lack of time for overall reflection in the project, but specifically for strategic vision reflection.

As a specific example of good practice: in the lighthouse Umeå, a theoretical innovative business case design was built in in one of the smart solutions (U1). This business case involved the sustainability of an area of the city, therefore bringing together all ULL stakeholders and allowing them to know each other better and openly discuss their interests and stakes. This process ended up benefiting the whole project execution since ULL stakeholders gained trust for the implementation phase.

3. Strategic positioning of the programme within the organisations *All cases*	**DECISION-MAKING**

Choose project partners who have sufficient decision-making scope in their organisation and anchor them as accepted project team members with decision-making functions capable of acting at the municipal level.

All projects The positioning of the project team within the municipal organization, but also the positioning of the partners within their organization is crucial. At municipal level the right positioning can ensure better inter-department alignment but also access to influential people that can provide or remove political support to the project. From the rest of the partners perspective positioning is relevant, since depending on it project participants will (or will not) have the capacity to adapt to the innovation program needs.

4. Strategic positioning of the programme within ULL strategic planning *Area-wide business model for sustainability energy, Umeå*	**DECISION-MAKING**

Integrate the new change project into the series of existing projects supporting the urban development strategy within consistent, long-term urban programmes.

Area-wide business model for sustainable energy, Umeå: RUGGEDISED has identified that in the case of innovation programs, such as increasing the UTC of cities, projects work better if they are used as part of a process. In other words, the projects are used to proceed dedicated steps in the innovation/transformative journey. From RUGGEDISED the best example of this is the Umeå lighthouse where the RUGGEDISED project was used (among others) to set the business model to transform a whole area towards sustainable energy. Overall, the rest of the lighthouses also build on previous projects and had plans to continue developing their cities after RUGGEDISED. However, this approach can also create some challenges. This has been the case of Rotterdam where RUGGEDISED was planned to be an add on to an existing (and ongoing) project. This has resulted in multiple challenges from the contractual perspective.

5. Innovation training *All cases*	**CAPACITIES, RESOURCES**

Bring together project decision-makers with responsible municipal administrative departments (e.g. finance, legal, etc.) for innovation training and clarify innovative goals and operational feasibility or contractual requirements at an early stage.

All projects.: Vertical alignment means that all the involved parts in the project have proper connection. This is particularly relevant for actors that will implement the solution (*guardians of the process* and *decision makers*), but the *affected persons* should be considered in this alignment. The

categorization of this point within the Capacities & Resources categories is due to how, guardians and decision makers should be aligned: In the RUGGEDISED project Rotterdam and Glasgow highlighted that they would really benefit from setting up an **'innovation training'** for their financial/accountancy/legal departments, and probably the other way around would be interesting too. This training would aim to introduce decision makers to the operational challenges of the project, and to introduce guardians of the process (at operational level) to the challenges of contracts, legal, and financial stuff.

Additionally, and highlighting the good practices mentioned above, Umeå mentioned that if the operational colleagues would have been part of the RUGGEDISED proposal writing, the suggested smart solutions would have been differently designed.

6. Embeddedness *Glasgow and Umeå*	**PARTICIPATION, RESOURCES**

Let new systems and methods be evaluated not only by decision-makers and technicians, but above all by future users!

Glasgow & Umeå: RUGGEDISED highlights the relevance of pre-deployment assessment of the selected solutions/new methods, from both technology integration but also future users of it. This is particularly important for the deployment of innovative technologies, otherwise they can end up underutilized or not being used at all. A good example of how "not-to" is the case of Rotterdam the LoRa-network has been installed but is not being used now. However, this poses a relevant dilemma with research and innovation processes: How should innovations be designed and implemented in a **demand driven** or **supply driven way**? Overall, demand driven should be the standard, but supply driven solutions usually have bigger potential of disruption. Therefore, a thoughtful consideration process must be performed before promoting the implementation of a supply driven solution.

7. A systems-perspective on learning process *All cases*	**INTERNAL REFLECTION & REVIEW**

Provide cross-cutting reflection and learning groups (CoPs) that enable systemic networking of different actors and interdisciplinary approaches to solutions.

All projects: Initially the RUGGEDISED project implemented three Liaison Groups (CoP), one for hardware, one for software, and one for organization activities. However, the group participants discovered through the project that the solutions implemented (innovations) were mostly systemic and therefore not having a joint group where they could tackle systemic challenges was an issue. After a few initial independent gatherings of the three groups, project participants decided to adapt to the systemic challenges by creating a single group where subjects were discussed from all perspectives.

8. Exchanging lessons learned: context-specific and generic factors in determining success *All cases*	**INTERNAL REFLECTION & REVIEW**

Bring together specific and generic approaches in learning settings to enable difference learning and second-order learning.

All projects: Projects such as TANGO-W (and RUGGEDISED) with multiple ULLs and very diverse use cases to explore, can face the challenge of context-specific versus generic factors for success, and also

for the learning processes. The experience for RUGGEDISED shows that even if some of the challenges are very ULL specific, it is relevant to share them and the lessons learned because, as literally stated in D1.7:" This *helped participants to better understand and value their own situation. Looking at challenges from a different perspective* [other ULLs] *also allows to fundamentally reflect on their own context that is often taken for granted. It stimulates second order learning. We did find this in particular regarding the role the government has in society".*

9. Complexity of connecting fundamental reflections to everyday practice *All cases*	**INTERNAL REFLECTION & REVIEW**

Translate basic or theoretical considerations into practical questions: This creates understanding and acceptance for the project among stakeholders and facilitates practical implementation measures.

All projects: Increasing the UTC of a ULL is not an easy task. The examples above show that. This needs to be considered when working in Internal reflection and review processes, and when engaging with stakeholders during the project. As stated in D1.7:" A *key issue to address in cross-city learning is the relevance of fundamental reflections for everyday practice*". Sometimes is hard to fulfil the expectations of stakeholders when having meetings, this needs to be properly management to avoid frustrations at all levels: a) guardians of the process, b) decision makers, and c) clients/end-users.

6.4.2. COME RES

COME RES[26] is a H2020 project that aims to facilitate the uptake of Renewable Energy Sources (RES), particularly through the development of Renewable Energy Communities. When compared to TANGO-W COME RES has a narrower scope; however, the implementation of RECs as an innovative and cross-sectional endeavour, also presents challenges on the three spheres: Technology, Business, Society.

COME RES does not directly involve in ULLs or RECs, but it provides an overreaching framework for energy communities to foster their development through knowledge sharing. The project has influence in Belgium, Germany, Italy, Latvia, Netherlands, Norway, Poland, Portugal, and Spain, and it engages with 24 H2020 projects (*related projects*) which do have ULLs.

One of the main advantages of COME RES being an overreaching project aiming to disseminate knowledge and good practices is the very relevant reporting the project does on regulatory frameworks at national level, good practices, and success stories from the *related projects*. The core content presented in the paragraphs below has been extracted from COME RES *D5.3*[27], with the addition of relevant insights from SONNET[28]. In those cases that it is necessary, the good practices examples from COME RES will be adapted to TANGO-W's wider scope that extends from only energy related ULLs to FEW nexus ones.

Good practices:

1. Inclusion of the project within the ULL vision *Energy City Hall REC-1 and SONNET Mannheim ULL*	**VISIONING, RESOURCES**

[26] COME RES project – Link: https://come-res.eu/
[27] COME RES D5.3 *Synthesis Report based on in-depth assessment of 10 transferable best practices*. Link: https://come-res.eu/resource?uid=1308
[28] SONNET project – Link: https://sonnet-energy.eu/

Energy City Hall REC-1 | SONNET - Mannheim ULL: The municipality of Magliano Alpi has officially included in its visioning documents the scope of the Energy City Hall REC-1 project, this was done with the aim to combine the advantage of already existing financial frameworks for development and, in this case, incentives for RECs. In Italy, for instance municipalities have State support for the energy transition (2021-2023) which allow them to acquire enabling technologies which for instance can facilitate the aggregation of RECs, improving their business case, and consequently operating as innovation catalysts.

To further showcase the potential of these strategies, in Magliano Alpi the city council started the transformation process with a first investment alone, which was followed by private investments, to exceed today a total of 200.000€ in investments.

The Mannheim ULL also was fitted within the municipality's broader plan to establish energy urban renovation management of a neighbourhood. Furthermore, the project goals were included in the city's Mission Statement "Mannheim 2030", particularly contributing to the strategic targets.

2. Role of local governance *Energy City Hall REC-1*	**DECISION-MAKING**

Energy City Hall REC-1: In Italy, with a very fragmented State administration a good decision-making positioning do a lot for the success of projects. From Magliano Alpi's project, the fragmentation has been seen as an asset which allowed for citizen participation, thanks for the proximity between voters and the elected representatives that had the power to make decisions.

3. Inclusiveness/Participation/Social acceptance *Energy City Hall REC-1*	**PARTICIPATION**

Energy City Hall REC-1: Energy Communities can be considered one of the most prominent examples of end-user participation, and social change through innovative business models (even if profit should not be their scope by definition). The participation in the energy community provides economic benefits to its members, but it also engages them in the development process of energy infrastructure and energy services. In the case of Magliano Alpi the involvement of citizens and small enterprises in the role of prosumers and users is a growing trend, the last step of which saw the presence of seven prosumers and 40 users. The governance structure of the association is adequate to manage the decisions of the REC and to plan future growth actions, as well as to promote new interventions in the area. The mayor in his position as president of the association guarantees trust and facilitates the interest of an increasing number of citizens.

4. Stakeholder mapping and needs analysis *SONNET Grenoble ULL , Lightness ULL*	**PARTICIPATION, INTERNAL REFLECTION & REVIEW**

SONNET – Grenoble | Lightness: In SONNET, Grenoble the ULL managers reflected on past projects experience to implement a successful (and context-based strategies) co-creation strategy. In Grenoble's case they knew that a need analysis is crucial to understand the needs of stakeholders and provide them

the right conditions to secure their engagement throughout the project. Tailor made strategies such as documentation and events to explain the function of energy systems, and explanation of the potential savings created by the project helped to increase the interest and engagement from ULL citizens participating in the project.

The case of Lightness is equally relevant thanks to its learnings. During the project, the internal reflection process brought to light how ULLs' had significantly different engagement levels of end users. Further exploration led to the conclusion that each of the ULL had significantly different underlying social infrastructures which turned out to be very relevant for recruitment and engagement of stakeholders (d'Oca et. al, 2021)[29]. The implications of this discovery should be considered at the initial stages of the project and remedial actions should be taken to avoid engagement issues.

TABLE 9. SUMMARY OF SUCCESS CRITERIA FROM EUROPEAN PROJECTS.

Success criteria of European projects at a glance
– Including unexpected events in the reflection of development projects.
– Create a common, binding vision (or business strategy) with all relevant stakeholders.
– Choose project partners who have sufficient decision-making scope in their organisation and anchor these accepted project partners with decision-making capacity at the municipal level.
– Integrate the new change project into the series of already existing projects for the realisation of a medium-term urban development strategy within the framework of a medium-term, consistent urban programme. .
– Bring together decision-makers and operational managers of municipalities (e.g., finance, legal, etc.) in workshops and training sessions so that operational feasibility is considered in decision-making and appropriate contracts and processes are set up as early as possible.
– Let new systems and methods be evaluated not only by decision-makers and technicians but also by future users before they are implemented.
– Provide cross-disciplinary reflection and learning groups (CoPs) that do justice to the systemic networking of different disciplinary approaches to solutions.
– Bring together individual and prototypical/generic solution models in shared learning and reflection spaces: All offer new perspectives to bring taken-for-granted solutions and patterns of one's own community back into view and in the process of learning how to keep learning (2nd -order learning). – Political will to implement change
– In workshops, translate basic considerations into practical questions for all stakeholders: this creates understanding and acceptance for the project and facilitates practical implementation measures for the researchers.

[29] d'Oca, S.; Breukers, S.; Slingerland, S.; Boekelo, M.; van Welie, M.J.; Moscardi, C.; Aggeli, A.; Burgstaller, K.; Coosemans, T.; Hueting, R.; Throndsen, W. A Social Engagement Fast Track on Energy Communities—Key Lesson Learned from H2020 EU Projects. Environ. Sci. Proc. 2021, 11, 17. https://doi.org/10.3390/environsciproc2021011017

- Integrate the new change project into already existing visions. regional/local support measures and comprehensive plans of the city administration to sustainably support the implementation of planned city strategies.
- Use the proximity between voters and elected city representatives to bring together fragmented policies and administrative routines into useful implementation measures thanks to local decision-making roles.
- Use associations and cooperatives that provide visible benefits to citizens (e.g., energy communities) to expand cooperation and trust between the community and citizens and to strengthen social change in the field of sustainability.
- Investigate and integrate citizens' needs and goals into the tailoring process of strategies and events. This increases interest and citizen participation in the community.

7. ULL Practice: TANGO-W Lessons Learned and Criteria for Success

7.1. Case Specific barriers

This section aims to define a first draft of success criteria for the TANGO-W ULLs and to identify barriers that TANGO-W might face. The project barriers defined based on the SWOT analysis of D. 2.1. provided the basis for deriving initial, phase-specific (design, implementation, operation) success criteria for TANGO-W Living Labs.

We assume that some success criteria and barriers are very context-specific and therefore rather limited in their validity for all ULLs. To address this challenge, we start with the context description of all ULLs to provide a framework for identifying context-specific barriers. At the cross-cutting project level, we then identify recurring barriers that can be overcome at the project level itself in the context of exchange between ULLs and system learning.

Furthermore, as properly defined in *Section* ***Fehler! Verweisquelle konnte nicht gefunden werden.***, we explore how ULL specific barriers could benefit from good practices and fulfilled success criteria at project level. In doing so, we also draw on the *counselling system/ transformation room approach*, among others: Here, the derived success criteria are subsequently to be discussed and reviewed from everyone's perspective and jointly defined.

Urban Agriculture in Stockholm Royal Sea Port, Stockholm

Stockholm ULL is one of the prototype cases, which due to their aim for technology deployment tend to present higher (context-specific) risks and potential stopers. Based on the SWOT analysis performed in D2.1 Stockholm context-specific potential risks and barriers are:

Risks of ULL Stockholm at a glance
Size of the city: Which poses challenges in terms of stakeholders, institutional interaction, etc

Food safety: The deployment of agricultural solutions in urban areas create questions around how urban pollution can negatively impact the quality of the food produced
Land cost: Very densely populated urban areas tend to present high costs of land (versus the much lower cost of rural terrains), therefore this is a relevant factor which could hinder the implementation of the technology.

It is recommended that after updating the ULL Stockholm objectives, the development of a helpful ULL process architecture incl. ULL roadmap aims to build risk mitigation strategies directly into the architecture of the ULL transformation room.

Success Criteria for ULL Stockholm at a glance
Involvement of key decision-makers and experts in the city in important project functions such as client role, decision-making group, resonance board.
Test plantings at exposed sites followed by food analysis: This would provide opportunities for health impact analysis and identification of incompatible planting sites for further health promotion measures.
Cooperation with soil culture experts for experimenting with cultivation possibilities even of small areas with diverse plants and foods.

Implementing aquaponics system in Bovieran housing complex, Norrtälje

Norrtälje ULL is one of the prototype cases, which due to their aim for technology deployment tend to present higher (context-specific) risks and potential stopers. Based on the SWOT analysis performed in D2.1, Norrtälje context-specific potential risks and barriers are:

Risks of ULL Norrtälje at a glance
Lack of official agreement: There is no official agreement between Campus Roslagen (pilot site) and the Bovieran board. This is an obvious threat to the project that needs to be addressed as soon as possible.
Previous disagreements: There has already been opposition in on Boverian site against implementation. Therefore, not only there is the risk of not having an agreement, but it is accentuated by previous events.

This situation requires a renewed mission clarification, checking whether the need and desire for a aquaponics implementation on the part of the organisation and end-users exists at all. This needs to be complemented by looking for an alternative way to implement aquaponics in a context, where there is a need, desire and willingness for end-users to actively support it.

As stated in *Section* ***Fehler! Verweisquelle konnte nicht gefunden werden.***, in such situations it is important to avoid " *believing in a "right" solution and pushing for its implementation*", but letting all stakeholders participate in the ULL definition, offering them a half-finished solution to be further developed together.

Additional ULL specific challenges
Disagreement on food production: This is a potential thread, the disagreement between residents on the type of food produced in the aquaponic system can suppose challenges that

need to be addressed already at early stages of the ULL development (conceptualization phase).
Complexity with ownership: Cultivation of food in water tanks and the lack of boundaries compared to traditional gardening with soil-based cultivation in plots makes ownership tricky. This is another identified challenge that should be properly addressed with all the stakeholders of the ULL.

Success Criteria for ULL Norrtälje at a glance
Clarification of the mandate with the potential clients.
Courage to decide against the planned concept at an early stage in case of rejection or high scepticism of the clients.
Exploring possible clients for an alternative ULL concept and jointly developing an alternative concept with the clients.

Hi-Harbach renewable energy community, Klagenfurt

Klagenfurt ULL is one of the prototype cases, which due to their aim for technology deployment tend to present higher (context-specific) risks and potential stopers. Based on the SWOT analysis performed in D2.1, Klagenfurt context-specific potential risks and barriers are:

Risks of ULL Klagenfurt at a glance
Lack of a local good practice example for an energy community: The lack of a comparable example in the city can lead to significant uncertainty about which actors might have an interest in becoming an active part of the community.
Scepticism towards energy communities on the part of the energy provider: The local energy provider currently has no experience with an energy community with an attractive role for itself.
Property developers and energy suppliers: A possible barrier could be the willingness of Stadtwerke/Energy Klagenfurt GmbH and WBT (building cost carriers) to participate in the development and implementation of a renewable energy community. The operating costs for electricity generation are seen as the future responsibility of the tenants.

These are the main context-specific barriers/challenges related to ULL in Klagenfurt. As can be seen, they are all related to the implementation of an energy community and the behaviour of the different actors during the project development.

Success Criteria for the ULL Klagenfurt at a glance
Provide good practice models from other Austrian cities.
Clarify goals and roles with the energy supplier and the property developers with the aim of finding an attractive role in the process together with both important actors, which promises high benefits for all organisations.
Enabling a pioneering role for developers and energy providers

The way to minimise risks here is to present good practice models from other Austrian cities and to involve all relevant stakeholders already in the conception phase. It seems important here that both the vision of

the project and its concrete goals are defined together, and implementation steps are planned and decided.

Vision 2050, Weiz

The Weiz ULL falls into the category of strategic cases. The plan here is to conduct a long-term oriented foresight process with the involvement of all, highly diverse stakeholder groups of the city. Analogous to all complex strategy development processes, the following challenges exist here:

Risks of ULL Weiz at a glance
The mayor fears demands and disappointed expectations on the part of the citizens.
Individual interest groups lobby unilaterally for their interests.
Little trust in dialogue with politics on the part of citizens.
Individual parliamentary groups want to use the process for party-political trench warfare.
Irritations cannot be used for urban system learning due to a high security need of the city.

The context-specific obstacles here refer on the one hand to existing values regarding diversity and the usefulness of citizen participation on the part of the city and on the other hand to the trust of citizens in local politics and the previous experience of population groups with participatory processes. The approaches of cities and their citizens can differ greatly in Northern, Southern, Western and Eastern European countries.

Success Criteria for the ULL Weiz at a glance
Establish a relationship of trust between the mayor and the transformation advisors.
Develop a vision (overarching goal) with all stakeholders and political groups in the "communicative space" of large stakeholder forums, to which all individual interests are voluntarily subordinated.
Ensure that what is said is consistent with what is done, and that political commitments are reliably kept.
Individual parliamentary groups want to use the process for party-political trench warfare.
Appreciate scepticism as new information and raise important information behind irritations.

Food waste reduction programme, Halden

Halden's ULL falls into the strategic case category. When compared to the previous case, Weiz, Halden's SWOT presents context-specific challenges:

Risks of ULL Halden at a glance
Resistance to the project: On the one hand the municipality thinks that water and waste managers can present opposition to the project due to changes in their work environment. On the other hand, the municipality also fears backlash from people who considers that the food is not clean.
Weak economy: Halden municipality highlights that its economy is weak at the moment. This is something to be considered while defining the ULL targets and implementation strategy, and during the visioning process.

Changes in the regulatory framework: Changes in the regulatory framework are always a risk during project development. However, the implementation of UTC strategies needs more than any other project to be resilient and flexible. Therefore, Halden municipality should include potential regulatory changes within its project development process.

To check the assumed risk of resistance on the part of waste management and citizens, a stakeholder analysis workshop with the municipality would be recommended, in which possibly critical actors in the municipality could be identified. These can be addressed as partners and, together with supportive actors, included in a "resonance group" accompanying ULL. The criterion for success in this case would be the appreciative inclusion of sceptics in the process. The aim here would be to make the information hidden in the scepticism accessible to the project.

Success Criteria for the ULL Halden at a glance
Elicit the wishes and needs of sceptical stakeholders.
Appreciative integration of sceptical stakeholders into the project with the help of process-accompanying project functions such as resonance groups, advisory boards, etc.
Give companies the opportunity to develop desired, new services or product ideas for future business relations together with the city within the framework of roadmap workshops.

In order to be able to set impulses for a weak economy, it would be recommended to invite companies into several follow up workshops to the visioning process. This could end with an action plan in which companies are invited to develop products and services to reduce food waste in heaps.

Awareness program: urban water usage and sustainable food production, Marker

Marker's ULL falls into the strategic case category. When compared to the previous case Marker has identified a significant number of context-specific challenges. The context specificity of some of the barriers is blurry, and they could be generalized to project-level so it would be interesting for other ULLs to consider if Marker's identified barriers could apply to their ULL. The identified challenges are:

Risks of ULL Marker at a glance
Building understanding locally: Marker fears that a lack of understanding of the project among local stakeholders could create a lack of engagement from their side, due to low ownership feeling.
Long-term visioning for urban agriculture may be difficult to make.

The two abovementioned barriers have close similarities with some of the project overreaching challenges, therefore success criteria guidelines o them can be found in the *Project wide challenges and draft success criteria* part of this section. The additional barriers identified from Marker are:

Additional challenges of ULL Marker at a glance
Stakeholders have raised hesitations about theoretical value and practical value being too small.
Water availability uncertainty due to climate change impact.
Challenges of coordination for food distribution to social institutions and local consumers.

From these three barriers, the firs is the one that needs to be addressed at early stages of the project. It is important to make stakeholders part of the conceptualization process and grow on them an ownership

feeling of the project. From the other two barriers, the distribution-related one must be addressed during the conceptualization phase, where stakeholders can debate about the right approach to avoid or mitigate this risk. Finally, the issues with the water resources are something that cannot be within the scope of the project but have to be brought to the municipality visioning process to be considered.

Success Criteria for the ULL Marker at a glance
Jointly clarify both the stakeholders' and the city's goals and negotiate goals to be pursued together.
Developing solutions for the stakeholders' objectives - in addition to the planned objectives of the city.
Develop risk management measures to counteract water shortages for the city.
Develop and agree on an equitable distribution formula with all social institutions and local consumers.

Foresight for an energy efficient and sustainable city, Alytus

Alytus's ULL falls into the strategic case category. When compared to the previous case Alytus has identified a significant number of context-specific challenges. The identified challenges are:

Risks of ULL Alytus at a glance
Low community involvement in decision making, and high initial skepticism. Alytus highlights the fact that tools for decision making are in place, but people do not use them. The high initial skepticism could be due to a high number of past decisions done without consultation, which might have resulted in a loss of trust.
Aging community. Young people are leaving moving away from the city, which has the impact of changing the needs and interests of its citizens.
Competition for the local government, that can make the decision process complex and "unpredictable".

The first two case-specific barriers have some connection points and can therefore partly influence each other. As mentioned in the case of Weiz, the older population may not be interested in urban transformation projects and 2050 roadmaps as they do not see any direct benefit for themselves. However, it must be checked whether this is not a prejudice, because no generalised statements are made for each age group. All generations have both people who are resistant to change and people who are open to change. Here it is important to look carefully at who acts how in which situations. In any case, it is important to actively involve the population in the decision-making process by informing them about the project through the right channels and with the right messages, considering the ideas, needs and interests of the respective target group. Building trust and ownership is the way to achieve citizen engagement and participation. The last barrier poses a direct risk to the development of the ULL. Therefore, as with the elderly, it is important to involve all political parties that have influence over the ULL in a communication and dissemination campaign that shows the relevance of the project and the potential benefits for the city. This is one way to mitigate the potential impact of a change in governance.

Success Criteria for the ULL Alytus at a glance
Build a trusting relationship between the transformation counsellor and the local government and invite key people in the local government to take on attractive roles in the process.
Set a stage for visibility and appreciation of local government in the process.

	Reach out personally to businesses, associations and citizens and invite them to the process.
	Ensure a balanced distribution of different interest groups, generations and genders in the process.
	Ensure that what is said matches what is done and that all commitments made by the municipality are reliably kept.

7.2. Project wide challenges and draft success criteria

Fehler! Verweisquelle konnte nicht gefunden werden. shows the project-wide challenges identified from the analysis of the SWOT matrices of the individual ULLs. In the table (see below), similar challenges in the ULLs are each characterised with a "call name" and assigned in the table to the corresponding TANGO-W UTC impact monitoring area on the one hand and to the ULLs where the problems occur on the other hand.

A project challenge does not necessarily mean that it occurs in all ULLs; in fact, some of the identified barriers are mentioned exclusively in one ULL. However, their relevance and potential replicability for other ULLs makes them cross-project issues.

TABLE 10. CROSS-ULL IDENTIFIED BARRIERS

Barrier	TANGO-W Impact Monitoring areas	ULLs
'We have always done it this way' mentality	**Decision-making** *within the ULL at different stages of the project (who gets involved, how many, how decisions are made, etc.)*	Weiz, Norrtälje, and Stockholm
Silos governance	**Decision-making** (see above)	Stockholm, Halden, and Weiz
Stakeholder engagement	**Participation** *in the definition of objectives, planning, implementation and evaluation by citizens and different types of organisations*	Weiz, Klagenfurt, Marker, Norrtälje, and Halden.
Find a common (strategic) direction early on	**Visioning**: *Areas covered by the shared vision (different social, economic, and quality of life needs)*	Weiz, Klagenfurt, and Marker
Missing guidelines for management of innovation projects	**Capacity** *developed by different groups and individuals involved (knowledge and skills, network resources/social capital, financial resources).*	Norrtälje
Economic concerns	**Resources** *allocated to different types of activities during the project (information and knowledge sharing, time to discuss and decide, financial resources for technical and social implementation, etc.).*	Stockholm. Weiz, Klagenfurt, Marker, Norrtälje, and Halden.

In the following sections each of the barriers will be presented, describing the case-specificity of each city and drafting the first success criteria.

'We have always done it this way' mentality & Silos governance

All TANGO W ULLs share the concern about a rather sceptical and retarding approach of the public administration to transformative research projects with new ideas and concepts.

The City of Stockholm, for example, has already introduced an interdepartmental steering group to coordinate transdisciplinary R&D projects. While this facilitates the linking of projects with each other, it

has not yet been able to increase the willingness for cross-departmental cooperation in the municipality. In such a case, vision development that is only carried out for the R&D department, for example, can unintentionally create barriers to the other departments of the municipality beyond its integrative effect. The city of Weiz has set itself a high standard for change and is accordingly in the process of permanently implementing research projects. Employees of the municipal administration, who are sceptical about the constantly new projects, are repeatedly experienced as slowing down the efforts to make rapid progress. In contrast, the city of Klagenfurt describes major communication barriers between the departments of the city administration, which are attributed, among other things, to insufficient resources and increased claims to power by individuals. Due to the high level of scepticism in Boverian locations regarding a possible role as a TANGO-W ULL, Campus Roslagen of Norrtälje launched a comprehensive needs assessment in all Boverian locations and has since shelved the ULL concept due to the high level of rejection and scepticism that was reported back. Currently, a strategic ULL concept is being sought with Norrtälje City itself to implement the Campus Roslagen Aquaponique prototype. Halden and Marker are also aware that they have problems with silo governance.

Since both barriers have a direct impact on the quality and duration of the decision-making processes of the municipalities, they are discussed here in the context of the impact monitoring area "decision-making". For the "we've always done it this way" mentality, **the overarching success criterion suggested is "inclusion of relevant stakeholders in the early concept phase":**

Good practices: Success Criteria "Inclusion of relevant stakeholders in the early concept phase"	
Use municipal sceptics as "quality assurers" in the conception phase.	*Purpose: critically questioning the planned goals, target groups and milestones. Scepticism usually hides rich experience about the failure of past projects. Identifying the reasons for failure can help to avoid avoidable mistakes in the new project.*
Identify the project stakeholders critical to success at the beginning of the transformative project.	*In a stakeholder analysis at the beginning of the project conception, for example, the departments that are critical to the success of the project and should therefore be included in the conception phase can be jointly identified and the corresponding resources planned for.*
Include all departments of the administration, that are affected in terms of content, in the process of concept development (goals, content, procedure).	*Experience has shown that participation in the project definition helps to overcome reluctance towards the new project. Depending on the political will, the available resources and the know-how required in the project, the integration of the administrative departments can then take place sooner or later during the conception phase*.

Attention to this success criterion also contributes to early clarity and can be done, among other things, during a joint vision development. This suggested success criterion has also a lot to do with the other project challenge "Ensuring Early Clarity", which is also interlinked with the issue of "Visioning Processes". For more possible ideas on clarity and visioning, see the relevant subsection.

Regarding the challenges of silo governance, the REMOURBAN project faced similar challenges in its implementation (see D1.13) and proposes the following solutions:

Lessons Learned REMOURBAN:

- Try to introduce common project planning tools in the departments affected by project development: These serve as knowledge management tools allowing to keep coherence among staff members who may not often work on the project.
- Clarity of contribution and accountability for efforts.

Establishing these mechanisms in conjunction with a vision, appropriate timing and the use of common planning tools helps to clarify the distribution of effort so that occasional participants feel less harassed when the project expects them to contribute.

Stakeholder engagement

Involving key stakeholders is a common practice in complex research projects. Today, change can no longer be implemented top-down. To be effective across the board, it requires the cooperation of all relevant and affected decision-makers and experts in the different sectors "politics", "business", "research & education" and "civil society & citizens". Since municipalities are the driving force behind change projects, they are also the ones responsible for the proper involvement of their relevant stakeholders.

The TANGO W ULLs identified various challenges or obstacles in terms of stakeholders and stakeholder involvement: To mobilise the municipal employees of Weiz and to encourage them to take on more of their own responsibility, previous strategy development processes in Weiz had mainly been carried out across departments within the city. Only a change of mayor brought about a shift in municipal strategy and vision development processes towards increased citizen participation. Regarding other issues, Weiz has already abroad experience with citizen participation. Currently, insiders criticise that the "usual suspects" are often invited or that despite broadly designed invitation procedures, mostly the "usual suspects" come to the workshops. Business owners in particular tend to stay away from participatory processes and try to place their interests in politics elsewhere. In the meantime, it goes without saying that the City of Weiz always assumes the role of an inviter towards its stakeholders, trying on the one hand to address as many people as possible and on the other hand to reduce the available frame time for dialogue processes due to lack of time and resources. The reduction of dialogue time can thereby unintentionally increase the suspicion of manipulation of the participation processes. Klagenfurt, which has much less experienced with participatory processes than Weiz, has its own list of important stakeholders from business, industry and academia, who are regularly invited to and do attend important city events. Communication with the citizens themselves is delegated to Diakonie as an intermediary, which carries out all invitations for comprehensive information events or workshops. The municipality of Marker, on the other hand, complains that the attempted involvement of important stakeholders often fails due to the lack of time of the relevant actors. As a small municipality, the stakeholders would be challenged on many issues, which would overburden the municipality's operations.

To provide insights towards a success criterion to overcome this barrier, the lessons learned during the projects REMOURBAN and Scalibur will be used. On the one hand, the Scalibur project gives a relevant overview of the strategies used to engage citizens in *D2.1*[30]. On the other hand, the REMOURBAN project it provides a more systematic approach to stakeholder engagement, subdividing stakeholders in 4 categories Financial players, Political players, Citizens, and Technical players.

In a first step we want to formulate success criteria for the involvement of citizens and technical actors. Afterwards, we will briefly present the guidelines for problem solving formulated in the REMOURBAN project. Further information can be found in REMOURBAN Deliverable 5.2.

[30] Scalibur D2.1 *Stakeholder engagement plan per pilot municipality and identification of current promising practices*. Link: https://scalibur.eu/resources/

TABLE 11. SUCCESS CRITERIA FOR STAKEHOLDER ENGAGEMENT.

Success Criteria "Stakeholder Engagement"
Invite a balanced mix of different stakeholder groups (politics, citizens, business, industry, research and education, civil society).
The city acts from the responsible role of the inviter.
Use channels appropriate to the target group for addressing stakeholders and inviting them (from personal addresses to social media).
Appreciative communication and overarching transparency
Reliability and certainty of expectations with regard to all decisions and commitments.
Clear roles and communication rules for all project participants

Starting with Citizen engagement success criteria, the following list provides indicative guidelines of a possible approach to stakeholder engagement. The origin of the content is indicated with an **R** for REMOURBAN, and **S** for Scalibur:

a) Start by **mapping and auditing the current practices**, channels, and tools for communication and dissemination. Then, design a strategy that aims at maximizing the already existing channels and tools. [R[31]]
b) **Target-group specific information campaigns**, combined with stablishing channels that allow for direct dialogue and questions. This approach showed the citizens that their doubts were answered, and their concerns were heard and considered. [R[31] & S[32]]
c) **Building trust through transparency**. For Lund (the best example of Scalibur ULL) the success that started with information campaigns and direct communication, kept growing thanks to a good communication strategy where the positive results of citizen behaviour were highlighted. This kept building trust and gave ownership of the success to the project stakeholders. [S[32]]
d) Finally, Lund highlights **the importance of reliability**. Urban transformation projects need long-term engagement of stakeholders, so it is very relevant to become reliable on preforming the two abovementioned strategies. [S[32]]

In the case of the success criteria for technical players, first and foremost REMOURBAN defines Technical players as industrial players (such as suppliers, procurement experts, consultants and contractors) that require to be strengthened through appropriate financial model in order to make the creation of new business opportunities. Due to their very relevant role for the implementation and success of the project they must be active part of a decision-making support procedure together with municipalities and social players. It is in this context where REMOURBAN, suggests:

– During the project conceptualization stage, formulate possible scenarios considering industrial partners' technology packages. This use-case creation process should start defining the roles and

[31] Miguel Á. García1 , Cristina de Torre1 , Ana Quijano1 , Marian Gallego1 , Jane Lumb2 , Murat Aksu3 , Baturay Yenilmez3 , Angela Rivada4 , Elena Hoyos4 , Isabel Tomé5 , Marjan Sarshar6 , Muhammad Usman Mazhar6 , Marcello Bardellini7 ,Elisabeth Schmid7 , Matthieu Grosjean8 , Valerie Bahn8 , Philippe Compère9 , Christelle Degard9, Zoé Lejeune9, istván Nagy10 , Alessandra Cassisi11, Anna Rita Giacovelli11(1CAR, 2NCC, 3 TEP, 4 VAL, 5 IBE, 6NTU, 7 YOU, 8 SEZ, 9 SER, 10MIS, 11VER). D5.2: Model for replication potential. REMOURBAN. H2020. https://ec.europa.eu/research/participants/documents/downloadPublic?documentIds=080166e5adee8a3e&appId=PPGMS

[32] Diedrich, A-C., Ioannidou, D., Grossi, F., Fedato, C., Diéguez, J-L., Diaz, L., and González Pérez, R. (2019). D2.1 Stakeholder engagement plan per pilot municipality and identification of current promising practices. SCALIBUR, EU Horizon 2020. https://scalibur.eu/wp-content/uploads/2022/03/Attachment_0-1.pdf

collaborations that industrial actors will take during the different stages of the project and in some cases in the different use-cases.

Providing early clarity

The challenge of ensuring clarity at an early stage was highlighted by Weiz and is overall a key challenge in project management. The development of the concept between clients and transformation consultants and decision-making between the client and all relevant project partners is mentioned by all ULLs as a more or less major challenge, in addition to vision development.

With regard to the planned foresight process, Weiz addresses the necessity of creating clarity at an early stage on the basis of two points: 1) Firstly, from Weiz's point of view, vision development offers the possibility of early, medium-term orientation of central fields of action of urban development, 2) if the methods of vision development are new for all participants, they can cause irritation as well as enthusiasm if they are not linked to the definition of medium-term, quantitative goals as usual. Between the city and the transformation consultants of AIT, a) goals, b) fields of action, c) the roles of the community members, d) the role of the citizens and affected stakeholders were therefore clarified during several meetings in 2022 and it was agreed that the result demanded by the city, namely the definition of approx. 6 development projects for the next 5 years, would be available as a result of the process. Based on these assurances, it was possible for the city to accept the hitherto unknown methods as the expertise of the transformation consultants, without being able to know and control them in detail. The development of indicators to control the new development projects will also be carried out during TANGO-W, thus building the possibility of success control into future change projects. This has already ensured early clarity at the start of the project design.

TABLE 12. SUCCESS CRITERIA FOR EARLY CLARITY.

Success Criteria "Early Clarity"
Acceptance of the project objectives, project milestones and expected results by the client, transformation consultants and all relevant stakeholders.
The expected outcome is clear to all.
Clear roles and communication rules for all project participants
Quantitative and qualitative methods are used
Targets and indicators are available for reviews.

Missing project management standards and methods for innovation projects

This barrier was only highlighted by Norrtälje but was considered relevant enough to be a potential cross-project barrier. First and foremost, Norrtälje mentioned in the survey that no project management standards have been defined at the municipality level, leaving the way the project is managed open and determined by the context of each project.

On the one hand, this allows for flexibility and adaptability of the project. However, as already explained in D2.1, innovation projects bring challenges that require, if not clear management standards, then a clear project description including possible risk mitigation measures. Cities need to have tools to deal with high uncertainty and the requirement for constant changes to the original plan. Furthermore, the fact that this challenge was not mentioned in any other SWOT analysis does not mean that it does not exist for some of

Here the success criteria need to be linked to project management methods, as innovation projects are very uncertain and irregular but fast. It is suggested to adopt (to some extent) the agile methodology approach to project management. There are numerous resources on the agile framework on the internet. The main differences of the agile approach, suitable for innovation projects, to common ones are:

TABLE 13. SUCCESS CRITERIA FOR GOVERNING INNOVATION PROJECTS.

Success Criteria for "Governing Innovation Projects"
Project management training for internal project managers of cities.
PM Standards for project managers in cities
Context and tasks specific implementation of project management and process governance methods
Work on delimited and manageable, smaller tasks (Springs)
Create transparency by visualising the concepts
Work closely with relevant stakeholders at each stage of the project
Give and receive constant feedback

Agile project management was developed for customer-oriented software development. Nowadays, however, it is used in a wide range of project-oriented companies. The basic idea is to work in sprints, i.e. in "encapsulated" work areas. These sprints make it possible to achieve very concrete goals and to tackle challenges systematically, as several sprints take place during a project.

The agile methodology is a comprehensive variant of project management. It is difficult for municipalities to implement in the short term. For complex projects, its systematic, causal-logical approach can be both helpful and harmful. It is recommended that municipal project managers be trained in PM methods so that they can decide for themselves which method can be helpful for which context and task.

Economic concerns

Economic concerns are one of the most common obstacles mentioned by TANGO-W ULLs. For example, Weiz highlights that the project relies on subsidies, the removal of which would have a critical impact on the development of the ULL. Similarly, Alytus highlights that funding for ULLs usually comes from national and EU projects, which, apart from the challenges of obtaining this funding, is also an obstacle to the freedom of local project management. Halden highlights that the economic situation is not the best at the moment, which is a threat to the development of ULLs, as it was in the case of previous ULLs. The situation is somewhat different in Stockholm, where risks have been identified in relation to urban agriculture and the high cost of land in the Stockholm region.

One of the challenges of innovation and research is to develop products, services, and concepts to bring them up to market readiness with a viable business model. The case of TANGO-W is because it presents a mix of initiatives looking forward developing new concepts and business, such as renewable energy communities and urban gardening concepts, as well as to contribute to the municipalities overall visioning processes, and to implement new strategies to become more sustainable. In terms of economic concerns, it is relatively harder to define a success criterion that fits the specificities of all the ULLs. However, the following ideas, extracted from the REMOURBAN project, can serve as starting points for ULL success criteria definition:

- Increase awareness of local support for project funding in term of grants and preferential loan finance. This must be done at ULL level and requires devoting resources either from local administration or the consultant partners of the project.
- Assist initiatives promoting crowdsourcing, microfinance, and community project ownership. Good examples of this approach are renewable energy communities, where members (and co-owners) must pay a monthly/yearly membership fee, which allows them to become an active part of them and benefit from it.

The RUGGEDISED[33] and REMOURBAN[34] projects, both suggest a more long-term approach for success criteria in the case of *Economic concerns*. This success criteria can have significant benefits for the Municipalities (if they can be implemented, which is not always the case):

TABLE 14. SUCCESS CRITERIA FOR ECONOMIC CONCERNS

Success Criteria for "Economic Concerns"
Continuous training of the finance department of municipalities
Increase knowledge in municipal administration to manage and request funds and use funding programmes
Establish a fund management department to manage innovation projects, from fund control to knowledge of funding programmes, including proposal preparation skills
Implement innovative financing models for municipalities (PPP, tax increment financing, green bonds, crowdfunding).

So far, this section has focused on barriers identified from ULL in the SWOT analysis, it has listed projects that could provide inspiration and relevant documentation, it has provided good practices examples, and finally it started addressing the identified barriers by suggesting a first draft of success criteria. However, it is highly recommended for pilots before moving forward, to go back to D2.1 SWOT analysis and read through their Strengths and Opportunities part of the table, together with having an overview to the other ULLs SWOTs. This exercise will help to start identifying which knowledge and capacities, do they (and the project partners have) that can be part of the solution to the identified barriers. On a similar, note it is highly recommended for ULLs to reach to each other (through the project stablished communication channels and strategies) in search for expertise.

8. Resume

8.1. New requirements for transformative ULLs at a glance

In summary, we can say that the ULL success criteria derived from the ULL practice examples in this report confirm the success prerequisites defined by Wolfram at different levels of detail.

TABLE 15. SUMMARY OF WOLFRAM'S SUCCESS CRITERIA.

Wolfram's Success criteria at a glance

[33] RUGGEDISED D1.8 Guide on RUGGEDISED implementation and innovation of smart solutions. Link: https://ruggedised.eu/fileadmin/repository/Publications/D1.8_-_Guide_on_RUGGEDISED_implementation_and_innovation_of_smart_solutions.pdf

[34] REMOURBAN D5.2 *Model for replication potential*. Link: https://ec.europa.eu/research/participants/documents/downloadPublic?documentIds=080166e5adee8a3e&appId=PPGMS

- Need for change,
- Political will to implement change,
- Definition of desired outcomes,
- Holistic - transdisciplinary approach,
- Long-term planning,
- Clear medium-term and short-term planning,
- Cooperation between all stakeholders,
- Equal access to resources for all,
- Investment in infrastructure and public services.

The success criteria derived are primarily concerned with the risks and requirements of managers of complex research projects. Principles of the systemic world view, that project managers and transformation consultants as observers of the ULLs are always part of the ULLs and thus part of their own observations, are usually not considered in the description and analysis of good practice examples, nor is the fundamental subjectivity of all descriptions and socio-technical perspectives and solutions. Some proposed solutions (e.g., agile project management) are based on a systematic processing of tasks without considering the circularity and interactions between individual functions and groups and their environment. Non-linear developments of social systems are often seen as unpopular undesirable developments in the world of project management that need to be prevented.

Situations are always created through communication between people or groups and are therefore always the result of lived relationship patterns. For example, if someone unilaterally pushes for goals that have not been previously agreed with relevant groups of actors, this creates the need for other people or groups to defend themselves to avert the expected disadvantages. The more one person pushes, the more the others are pushed to their limits. Such people are then often devalued by project managers as 'unwilling to change', 'resistant', 'complaining' groups, because they have lost sight of their own role in this kind of relationship building. The invention and attribution of personal characteristics takes the place of describing and changing dysfunctional relationship patterns. Similarly, ambiguities and challenges in projects are often described as problems through the lens of lack of knowledge or experience. The evaluation of situations as 'problems' devalues previously valid attempts at solutions and competences used, and thus weakens and neutralises existing problem-solving competences in the system. In contrast, in systemic counselling, ignorance is the starting point for asking questions and forming hypotheses, all aimed at strengthening the system's capacity for self-governance and increasing its capacity for choice.

Self-governance capacity builds on existing competencies and the will to change from the "inside out". Appreciative communication and the implementation of architectural elements with unusual combinations of decision-makers and/or technicians from "niche" and "regime" bring new perspectives and thus impulses into the system that support mutual learning and thus transformation. Instead of complaining about the "frayed developers" or the "immobile bureaucrats", there is a moderated exchange between both worlds, bringing new impulses into proven processes and the question of feasibility into innovative research laboratories. Mutual appreciation and understanding in the relationship between "niche" and "regime" become the basis for learning processes at eye level and thus for voluntarily change processes "from the inside out". Contextual management thus aims to create innovative milieus for relevant stakeholder groups that enable them to define common development goals and to bring them together on the path of existing value creation processes. From this perspective, vision development processes and impact monitoring can be seen as transformative interventions in existing settings of innovation milieus. Architectures, as structural elements (roles and rules of the game), secure the existence of these innovation milieus vis-à-vis everyday realities and thus serve as a so-called "transformation room" for complex transformative research projects. From this perspective, the ULL experimental spaces can be seen as structurally protected innovation milieus: Governance- and development architectures serve to contextualise cooperation and learning processes that enable the independent further development of parts of the city in the desired direction.

In the chapter on consultation architectures in their function as transformation spaces, we also learned that as the complexity and size of research projects increases, so do the demands for integrating systemic perspectives and attitudes into the governance of projects.

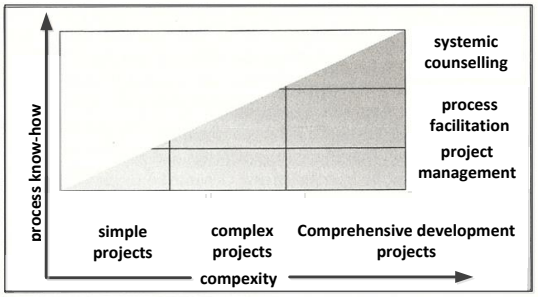

FIGURE 7: PROJECT ARCHITECTURES AND COMPLEXITY (SOURCE: KÖNIGSWIESER ET.AL. 2009)

The integration of systemic transformation consultants in transformative research projects thus becomes a new prerequisite for success. However, this means that two different management/governance logics collide in project governance.

Project management control logic	Governance logic of systemic counselling
Focus on effective goal achievement	Focus on communication processes and relationship patterns
Focus on best practice models and content solution models	Supporting all project members in developing and deciding on suitable solution options
Increasing the speed of change by integrating new projects into existing visions and change programmes	Visualise existing potentials and competences and support in critically reviewing necessary change targets that could facilitate dealing with current contextual demands.

This exemplary list of the different approaches of project managers and systemic counsellors can be extended at will, depending on the situation. But how can people with such different perspectives work together in leading complex projects without constantly coming into conflict?

A good answer is to set up a transformation room as a consulting system that brings together project managers from the client side and systemic counsellors in a joint development and governance process. While the project manager in the system of e.g., a municipality sets up and manages the project, the systemic consultant supports all, the project manager, and his supervisor as well as all relevant stakeholders involved in the process in their joint learning and cooperation process to reach the overarching goal (vision) that is attractive for all. In this process, the project manager becomes a translator and mediator of different perspectives, needs, and interests and helps all project partners to repeatedly switch to a meta-level by asking themselves questions and thus to repeatedly look at the overall system and their own role in the overall system. This meta-reflection on lived patterns of relationships makes it possible to correct one's own role and actions and thus change the system through mutual reflection and learning processes. Aufbau eines Beratungssystems hilft bei der Rollengestaltung zwischen Projektmanager und Transformationsberater

8.2. New requirements for transformation counsellors on an overview

Urban Living Labs are usually set up to initiate and accompany the transformation of neighbourhoods and cities into a socially, ecologically, and economically sustainable future. The mandate itself (e.g., a specific JPI UE Call) thus unilaterally abolishes the neutrality between "preservation" and "change" that is necessary for successful transformation processes in favour of a goal of change. We know from many

valuation approaches (Matthias Varga von Kibed[35], Königswieser etc.) that paradoxes are sources of change. For example, transformations become more possible when the existing situation is met as a successful attempt to solve previous problems. Only the appreciation of the tried and tested creates security and joy for experimenting with new ones.

TABLE 16. KNOCK-OUT & SUCESS CRITERIA FOR TRANSFORMATIVE COUNSELLORS.

Failure criteria	Criteria for success
Adopt the client's perspective and goals	Social neutrality towards all persons, hierarchical levels
The transformation consultants and clients believe in a "right" solution and push for its implementation.	Construct-neutrality: All-party inclusion of all content-related approaches and questioning of the effects in relation to the achievement of goals in workshops. Offer half-finished solution models and further develop them into a helpful solution with all participants.
Devaluation of the status quo with simultaneous pressure for a necessary, rapid change	Neutrality regarding change: To highlight the value of current situations and the attractiveness of desirable future situations.
Organisational functions place the value of their own specialisation above the value of all other functions. The others are experienced as a disturbance of their own world view (=silo).	Support the view of all functions towards an overarching goal that needs the contributions of diverse disciplines and functions to successfully be realised.
The transformation consultants act as internal project managers in the client system - without distance and their own room for manoeuvre.	Establish a transformation space with architectural elements and clear roles and rules of play for cooperation between clients on the one hand and the complementary (technical/process) advisory system on the other.
Transformation consultants support existing roles and routines hindering the emergence of and experimentation with novel perspectives and actions.	Within the transformation room establish both: a) a room for steering and decision making as well as b) rooms for experimentation and thus for transformation. Transformation needs space for developing new ideas beyond established routines.
Transformation consultants one sided support efficiency goals and short-term results in economy and policy.	Initiate long-term transformative perspectives and processes - open to specific results - by widening transformative capacity allowing a flexible generation of short-tern results just in time and on demand.
Exclusive use of experts from research and community / client system	Cooperation between technical and systemic process consultants in the consultant system
The expert advisor (e.g., expert from non-university research) leaves the joint advisory team in favour of being very close to the client system.	Technical and process consultants act as a joint consultant team[36]: hypothesis formation and intervention planning of the complementary transformation consultants (technical and process consultants) at eye level (Wilhelmer 2009).

[35] Varga von Kibed M., Sparrer I. (2020): Quite the opposite: Tetralemma work and other basic forms of Systemic Structural Constellations - for lateral thinkers, and those who want to become one (Systemic Constellations), Carl Auer Paperback - 5 November 2020.
[36] Wilhelmer, D. (2009): Remembering a better future. Syntax for complementary innovation counselling. Carl Auer Publishing House

The complementary advisors act together with their clients as "knowers" beyond learning processes.	Technical and process counsellors define themselves as learners in a joint transformation process
Projects are either implemented only within regime organisations or only outside these regime organisations in niches.	Harnessing the potentials of the worlds of "niche" and "regime" to enable viable, innovative solutions.

Following the principles for successful transformation processes described above, we assume that the consortium can only function as an initiator and facilitator of sustainable transformation processes in the areas of governance, food, water and energy if it succeeds in transforming itself into a transformation room and thus in building trusting relationships between all members, and if both representatives of the "consultant systems" and the "client systems" learn with and from each other during the implementation of the local Living Lab experiment. According to the motto "Only those who are in motion can move others", the project consortium itself functions as a transformation space on a European level, complemented by the local transformation spaces of the Living Labs in the TANGO-W cities.

9. Outlook to the Living Lab 2.0 Design Guide

In the Design Guide Living Lab 2.0 we want to apply the basic insights and cornerstones of context governance outlined in the Playbook to the TANGO-W project itself and its TANGO-W ULL cases and process phases. We will examine the extent to which they meet the requirements for the governance of complex and large ULLs, and where the specific design of the architectures may hide potential pitfalls for future development. Another focus will be on how the strengths identified in the ULL cases can be further strengthened in the sense of self-control.

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