

Public Value Creation in an Open Digital Living Lab: Stress Conversion and Mandate-Carrying in UpdateDeutschland

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Abstract

UpdateDeutschland presents a valuable empirical case for studying the transition from massive civic participation to persistent public value in an open digital living lab. There are over 4400 participants, 581 proposals, 330 initiatives within the programme, around 70 initiatives in operation after the opening phase, 30 selected initiatives, 14 collaborations between public and civic sectors, and 9 collaboration initiatives. These levels are not regarded as equal but rather as different layers of evidence. There are four approaches employed in the study: Configurational Stress-Conversion Analysis, Open Funnel Retention Analysis, Role-Weighted Evidence Balance, and Mandate-Carrier Coupling. The funnel reveals that deep comparative evidence issues involve 0.20% of the conservative participant population, and that the interview layer includes more representatives from public managers and organizers and commentators, compared to the whole archive. Calibration at the case level results in the identification of three patterns: compressed cases, learning-reservoir cases, and carrier-capable cases. The primary finding here is that durable public value does not emerge through openness, ideation, or prototyping alone. Durable public value emerges when adaptive participation is linked with mandate anchoring, ownership, artefact maturation, and continuance vehicle. Thus, the current paper interprets UpdateDeutschland as stress-conversion process in which collaborative energy turns into public value provided it is evidenced, authorized, owned, and carried out of the lab.

Keywords: public value; living labs; collaborative innovation; open social innovation; mandate-carrier coupling; public management; case analysis

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1. Introduction

Open digital living labs offer opportunities for broadening the generation of public solutions through bringing together citizens, civil society organizations, public administrators, foundations, technical specialists, social entrepreneurs, and intermediary actors into a common forum. It is not difficult to see the appeal of such an approach. Many public problems cannot be solved in an administrative routine fashion, and there is much knowledge available among non-public sector actors about problems, constraints, and possible solutions. Co-creation research demonstrates how public innovation can leverage on multi-actor contributions [1]. Scholarly literature on collaborative governance explains how various actors can participate in shared problem-solving [2]. Living-lab research offers a context for this kind of experiment [3]. Digital innovations extend the tools and forms of interaction available to participants [4]. An open-innovation framework connects knowledge outside the public organizations [5]. Collaboration and sustainability of contributions from various actors is crucial for successful public innovation [6]. Digital collaboration opens up more participation opportunities but also introduces new coordination challenges [7]. Open social innovation pays particular attention to actors outside the formalized public administration. However, this advantage entails an evaluation challenge as well. Large numbers of participants can serve as a demonstration of reach but reach does not mean durable public value. One can document the civic imagination but one cannot generate an accountable service, public mandate, responsible owner, or continuation pathway just like this.

Public-value research recognizes that public value is multi-dimensional and that it should be understood in terms of collective interpretation of value dimensions [9]. This insight makes a difference when it comes to living labs since the outcomes can include learning, expectations readjustment, trust building, problem reframing, relationship forming, capability development, and institutional adoption [10]. However, the same insight can also undermine evaluation efforts if any positive interaction is interpreted as a form of public value. Thus, living lab activities generate public-value possibility throughout the entire process but yield only in those instances when the possibility becomes traceable, authorized, and carryable.

Secondly, public-sector open innovation research suggests that civic challenge frameworks are valuable in terms of attracting external contributions [11]. Still, the public value of these contributions depends on the ability of governing processes to filter, authorize and sustain them [12]. The readiness of the organization is the factor that will determine whether the external contributions can be brought into the official decision making processes [13]. In order to turn collaboration into public action, collaborative governance is necessary [14]. All these arguments lead us to the following concrete evaluation challenge: the living lab activities have to be evaluated not only in terms of volume of entries or participant satisfaction but also in terms of whether the generated works enter some kind of carrier arrangements with necessary mandate, ownership and continuation.

The term public-value yield refers to the proportion of collaborative activity which becomes evidencable, interpretable, and carryable in order to become relevant beyond the act of participation. The notion of yield does not imply implementation. Even learning which does not continue is still a valuable source of clarification of public needs and institutional constraints [15]. Collaboration can also generate civic and administrative value via the act of interaction and learning [16]. Hybrid public-service arrangements can preserve useful learning even when continuation fails [17]. Still, learning should not be called durable continuation if there is no actor capable of continuing it. On the other hand, implementation should not be considered full public-value success if the legitimacy or ownership is still questionable. The language suggested by the author distinguishes between reach, learning, and durable carrying capacity without undermining any of them.

UpdateDeutschland case is used as the empirical basis of this study. The recorded living lab involved a one year process starting from pre-programme activity and going through the kick-off hackathon, community programme for four months and post-programme continuation attempts [18]. The case includes more than 4400 participants, 581 proposals, 330 programme initiatives, roughly 70 initiatives continued after the first stage, 30 initiatives followed closely, 14 initiatives featuring the collaboration between public and civil sector, and 9 initiatives characterized as collaborative innovation. The case also contains 109 semi-structured interviews and more than 650 hours of participatory observation. The values mentioned above make this case suitable for stress-conversion analysis due to both mobilization and detailed case evidence in one empirical setting.

The research question is: how does participation funnel narrowing, evidence role balance, and case carrying capacity interact in order to explain whether an open digital living lab generates durable public value? The question does not assume a simple dichotomy of success vs failure reading. Instead, it raises the question of how broad participation arena can become a layer of evaluable collaboration, what kind of role balance in evidence generation can result in defensible claim, and how adaptive learning can be either stranded or carried on. Public value is expected to be yielded when three factors coincide. The position of the cases in participation funnel should be explicit since nine cases can hardly be interpreted as a reflection of thousands of participants. Role balance in evidence should be clear since citizens, civil society actors, public managers, organizers, and commentators shed light on different dimensions of public value. Finally, the adaptive energy should be linked with mandate, ownership, and continuation since plasticity without a carrier generates learning but leaves it fragile.

The tension inside digital living labs comes from the clash of two institutional logics. Participatory logic appreciates broad entrance, voluntary participation, explorative dialogue, and fast circulation of ideas. Public responsibility logic presupposes authorization, procedural fairness, resource commitment, legal accountability and sustainable stewardship. The combination of the two logics is critical for public innovation but this combination is inherently unstable. In case of dominance of participation, the lab can be inclusive and expressive but weakly connected to continuation. In case of dominance of administrative control, the lab can be manageable but lose the openness required for emergence of civic knowledge. The public value yield depends on the design capable of combining exploration and gradual identification of the carriers of the work. The literature on collaborative innovation describes this problem as a balance between openness and institutional coordination [19]. Public-sector innovation research stresses the importance of connection between experimental and organizational capacities [20]. The organizational change research explains why the stability and adaptation have to co-exist [33]. Research on coordination explains why the distributed actors need mechanisms of integration of their work over time.

Carrying capacity plays special role in digital environment due to the fact that mobilization appears easier than continuation. Online platforms, open calls and hybrid events reduce the entry costs and increase the number of contributors but they do not create the authorization, budget, ownership and service arrangements required for adoption. Any public-value claim should be able to answer the following three questions. What was generated or learned? Who recognized it as a basis for public action? Who can carry it beyond the living lab? These questions move the evaluation effort away from participation counting to institutional translation of the outcomes. At the same time, the processual public value is not overvalued: learning without a carrier is learning and not public-value yield.

The analysis is based on three empirical layers: participation-funnel layer, interview-role layer and case-conversion layer. The participation-funnel layer estimates narrowing from wide mobilization to the focal comparison. The interview-role layer makes a comparison between the full interview archive and focal case subset. The case-conversion layer evaluates nine collaborative innovation initiatives in terms of expectation plasticity, mandate anchoring, ownership clarity, artefact maturity, and scaling vehicle. There are four methods applied to these layers: Configurational Stress-Conversion Analysis, Open Funnel Retention Analysis, Role-Weighted Evidence Balance, and Mandate-Carrier Coupling. The main condition

is uncoupled plasticity: actors adapt to uncertainties and generate learning or prototypes but there is no carrier capable of taking this work ahead. The breakdown of collaborative innovation can occur due to unmet institutional expectations [21]. Therefore, expectation management is crucial for experimentation [22]. Readiness for continuation is required in the context of public-sector partnerships [23]. Networks and role alignment influence survival of collaborative work beyond initial initiative [24].

The article proceeds from the empirical evidence to analytical methods, results, practical implications and conclusion. Figures 1–8 illustrate scale, evidence, case and carrier relationships used in the interpretation. The numerical values used are the counts from the UpdateDeutschland case; transcripts of interviews, administrative documents and observation notes are not used.

2. Empirical Record and Analytical Design

2.1 Empirical record and analytical boundary

The empirical corpus is that of the UpdateDeutschland case study described by Lührs, Mair, and Gegenhuber [18]. The analysis is based on programme numbers, interview numbers, role distributions, and case descriptions: more than 4400 participants, 581 proposals, 330 programme initiatives, approximately 70 active initiatives, 30 closely followed initiatives, 14 public-civil collaborations, 9 focal cases, 109 semi-structured interviews, 53 focal case interviews, and more than 650 hours of participatory observation. It is not based on individual interview transcriptions, internal organizational documents, or personal field notes. The boundary is stated so that the tables differentiate documented numbers from calibrated case interpretation.

The evidence descent in Figure 1 provides the scale boundary for the whole analysis. It shows that broad mobilization and focal comparison are conducted at two different empirical resolutions: participation data provide evidence of reach, whereas the nine focal cases provide evidence of the deepest layer for carrier-sensitive interpretation.

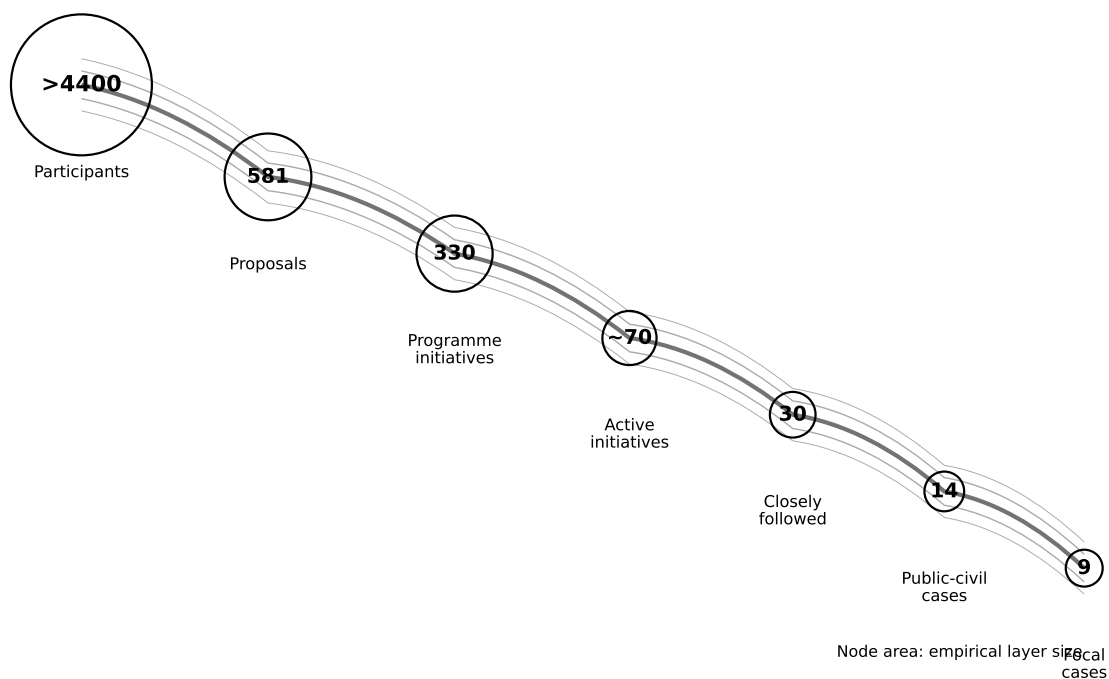


Figure 1. Evidence descent.

The narrowing shown in Figure 1 is not taken as an analytical deficiency on its own. It indicates the transition to another type of evidence. The upper layers document the reach of the living lab, while the lower layers identify those cases where public-civil collaboration was traceable enough to conduct carrier analysis. Such a difference prevents the manuscript from using the high participant number as rhetorical evidence for the claims made on the basis of another set of data - the nine focal cases.

The three-layer stress-yield ledger differentiates between different kinds of evidence. The first layer contains the living-lab funnel from mobilized participants to proposals, programme initiatives, active initiatives, closely followed initiatives, public-civil collaborations, and focal cases. The second layer contains the distribution of the interview roles in the full archive and in

the focal case subset. The third layer contains the conversion rates for CII#1–CII#9. The name ledger is chosen because these figures have different status of measurement: funnel numbers are descriptive quantities, interview distributions are composition indicators, and case conversion rates are comparative diagnoses.

Table 1 is significant since it distinguishes between descriptive reach, interview composition, and calibration of the case interpretation. These three columns cannot be considered equivalent in terms of observations. Participation is determined by the scale of the public effort, role by the kind of voice being interpreted, and case by the conditions in which the public value is squeezed, stored as learning or passed on. This way, the study becomes less optimistic than a single aggregate measurement of success.

Table 1. Stress-yeild ledger.

Layer	Empirical units	Recorded values	Analytical purpose
Participation funnel	Participants, proposals, programme initiatives, active initiatives, closely followed initiatives, public-civil collaborations, focal cases	> 4400, 581, 330, ~ 70, 30, 14, 9	Measures narrowing from open mobilization to deep comparative evidence.
Interview-role layer	Full interview archive and focal-case interview subset	Full archive: 109 interviews. Focal layer: 53 direct case interviews.	Tests whether the focal evidence has the same role composition as the full archive.
Case-conversion layer	Nine collaborative innovation initiatives, CII#1–CII#9	Five conversion variables plus coupling diagnostics	Distinguishes compressed, learning-reservoir, and carrier-capable outcomes.
Observation context	Participatory observation and documentary triangulation	More than 650 hours of observation	Supports contextual interpretation but is not transformed into a separate numerical variable.

2.2 Case variables

In case-conversion layer, there are five variables to be used. Expectation plasticity (EP) variable evaluates whether there was any potential for reinterpretation of openness and uncertainty as an opportunity for adaptation. Mandate anchoring (MA) variable assesses the presence of sufficient public legitimacy, endorsement, responsibility, and authorization to advance the case to the stage of action taking. Ownership clarity (OC) variable notes the presence of the specific actor or actor constellation capable of taking the responsibility for the initiative. Artefact maturity (AM) variable evaluates the substantive maturity of the product, which could range from early sketches to final arrangement. Scaling vehicle (SV) variable notes whether the mechanism of continuation existed outside the lab setting. The mentioned variables capture various links on the chain from ideation to public-value yield. EP captures adaptation, MA captures authorization, OC captures responsibility, AM captures output, and SV captures continuation.

There are three groups of cases used for interpretation. CII#1–CII#3 are compressed cases since the possibilities for collaboration run out before the adaptation and mandate are formed. CII#4–CII#6 are learning-reservoir cases since expectation plasticity is high while carrier capacity is low. CII#7–CII#9 are carrier-capable cases since mandate anchoring, ownership clarity, artefact maturity, and scaling vehicle variables correspond. This is not meant to be universal categories, just names for the observed empirical pattern.

3. Analytical Procedures

3.1 Configurational stress-conversion analysis

Configurational Stress-Conversion Analysis generates a public-value conversion score for each individual case. Public value is understood here as a configuration of interpretive adaptation, authorization, responsibility, substantive maturity, and continuation. This score is generated by the following formula:

$$PVCS_i = 0.22EP_i + 0.28MA_i + 0.20OC_i + 0.15AM_i + 0.15SV_i. \quad (1)$$

Anchoring by mandate receives the highest weight, as public value within a living lab setting will not be sustained without some sort of public mandate, endorsement, or recognition. Plasticity of expectations receives the second-highest weight, as collaboration amid ambiguity will require an adaptation of expectations. Ownership and scaling vehicle have been separated as responsibility and continuance are distinct concepts. Maturity of artefact has received a lower weight as even a mature artefact may be left unanchored without mandate or ownership. The weighted score is not intended to be a statement of estimation but rather a transparent calibration intended for interpretive cases.

3.2 Open funnel retention analysis

Open Funnel Retention Analysis assesses the transition from broad mobilization to focused evidence. At each stage s the conversion ratio is

$$CR_s = \frac{n_s}{n_{s-1}}, \quad (2)$$

where n_s represents the number of members at stage s while n_{s-1} represents the number of members at the previous stage. The cumulative share is calculated by dividing the number of members of each stage by 4400, which is the conservative lower bound of participant number. As the total number of participants is above 4400, the denominator tends to exaggerate the attrition a little bit. Narrowing is not considered as a negative quantity per se. Narrowing is natural in open call procedures. This is to avoid deriving public value from the number of participants directly.

3.3 Role-weighted evidence balance

Role-Weighted Evidence Balance measures the difference between the two evidence layers in terms of role composition. For each role class r in the evidence layer k , the evidence share is

$$ES_{rk} = \frac{n_{rk}}{N_k}, \quad (3)$$

where n_{rk} is the number of interviews in the role group and N_k is the total number of interviews in that evidence layer. The difference between layers is

$$\Delta ES_r = ES_{r, \text{focal}} - ES_{r, \text{full}}. \quad (4)$$

The comparison involves the use of three role categories within the focal layer, which include public administrators, citizens or members of civil society, and organizers, mentors, foundation delegates, or critics. In the comprehensive archives, organizers of the labs and other parties are categorized together under the organizer-critic category. The method does not imply that one role is more legitimate than another, but helps in understanding the legitimacy of the focal evidence. Focal layer with higher public administrator and organizer-critic proportions is very useful in analyzing mandate and continuity whereas the participant-dominated archive is useful for analyzing civic experience and motivation.

3.4 Mandate-carrier coupling and related diagnostics

Mandate-Carrier Coupling examines the link between adaptive learning and the credible carrier. It is computed as

$$MCC_i = MA_i (0.5OC_i + 0.5SV_i). \quad (5)$$

The multiplicative form is intentional. A case with civic ownership but no mandate receives a low score, and a case with public endorsement but no owner also receives a low score. Carrying capacity requires alignment. Plasticity Load is then calculated as

$$PL_i = EP_i (1 - MCC_i). \quad (6)$$

PL is high when actors are adaptive but carrier coupling is weak. Attrition Compression Score is calculated as

$$ACS_i = (1 - EP_i)(1 - MA_i), \quad (7)$$

and is high when a case lacks both adaptive interpretation and mandate anchoring. Residual Stranding Risk is calculated as

$$RSR_i = AM_i \left(1 - \frac{OC_i + SV_i}{2} \right). \quad (8)$$

The value of RSR is high when there is an artefact but low ownership and continuation. Combined together, these diagnostic indicators help reveal different failure modes that occur in similar conversion score ranges. Case-comparative research needs clear connections between the evidence and theory propositions [25]. In addition, disciplined case comparisons are required in comparative case studies [26]. Configurational analysis contributes to explaining why the same outcomes may be produced by different sets of conditions [27]. Process research also demands to consider sequence and developmental aspects [28].

4. Results and Discussion

4.1 Participation narrows dramatically before evidence becomes truly comparative

As shown in the participation funnel presented in Table 2, the living lab passed through two stages from large-scale participation to narrow focus on truly comparative cases. The living lab engaged over 4400 people in the process and produced 581 proposals. Out of these, 330 became programme initiatives. About 70 of them were active after the first stage, 30 were monitored, 14 included direct collaboration with the public and the civil sector, and 9 were selected as comparative cases. Based on 4400 participants, the focal comparative case level contains roughly 0.20% of the total number of participants mobilized. Such result does not make the focal cases insignificant. It defines the nature of their evidence value.

Table 2. Open-funnel retention.

Funnel stage	Count	Stage conversion	Cumulative share of mobilized participant base
Participants mobilized	> 4400	–	100.00% using 4400 as conservative base
Proposals generated	581	13.2%	13.20%
Programme initiatives	330	56.8%	7.50%
Initiatives active after initial phase	~ 70	21.2%	1.59%
Closely followed initiatives	30	42.9%	0.68%
Public-civil collaborations	14	46.7%	0.32%
Focal comparative cases	9	64.3%	0.20%

As shown in Table 2, the most significant interpretive shift is not merely the transition from thousands of participants to hundreds of proposals. Rather, the most significant shift in interpretation takes place when programme initiatives are faced with the requirement for sustained action. The shift from 330 programme initiatives to approximately 70 active initiatives retains no more than one fifth of the programme layer, while the remaining nine focal cases are further away from the entry population through several additional selection and continuation thresholds. Thus, the table confirms the following qualified claim: UpdateDeutschland had a wide coverage as a mobilization arena, but a narrow coverage as a deeply interpretable carrier-analysis record.

The most significant narrowing takes place after the entry into the programme layer. Transition from proposals to programme initiatives keeps 56.8% of the entries, meaning that the lab accepted or supported a considerable number of the proposed activities. The transition from programme initiatives to active initiatives keeps only 21.2% of the programme layer. This stage is crucial because in many public-innovation programmes, an idea gains a lot of enthusiasm at the beginning, but loses its continuity due to time pressures, uncertainty, limited administrative attention, or unclear authority structures. Recent research on collaborative innovation proves that conflicts, time pressures, and rapid decision making could transform promising cooperation into a fragile process [23]. Thus, the funnel analysis suggests that living-lab evaluation must be less focused on the number of entered ideas and more focused on what happens after the initial enthusiasm meets the requirements for continuity.

The second implication of the funnel concerns the question of responsibility for non-continuation. In an open lab, the attrition could happen for legitimate reasons such as being outside the scope of the public mandate, lack of time, duplication of solutions already provided by the lab, or inability of the public organizations to implement a solution within legal and financial constraints. However, the attrition becomes a problem when the reasons are invisible. This is why the stress-yield ledger must interpret funnel narrowing as an interpretive event. Each threshold should be accompanied by an explanation of what was chosen, what was not chosen, and which values survived in non-continuing cases. Such an approach would prevent the rhetoric of innovation from hiding governance choices.

Funnel discipline also applies to public-value interpretation. Focusing on more than 4400 participants is correct when describing the scope of mobilization arena. Conducting a case analysis of nine focal initiatives is correct when describing deeply observed public-civil collaboration. These two pieces of evidence cannot be substituted with each other. Mixing them results in scale inflation: the tendency to let a large entry number give a rhetorical support to claims which are actually based on a small case layer. OFRA solves this problem. It allows saying that UpdateDeutschland was a wide mobilization arena and a narrow carrier-analysis record. These two statements are equally true and analytically useful.

4.2 The focal evidence is more mandate-sensitive than the full archive

The evidence-balance comparison presented in Table 3 gives information about the role balance in the two interview layers. The full archive included 109 interviews: 17 public managers, 71 citizen participants, 10 lab organizers, and 11 other stakeholders. The focal case layer included 53 interviews: 13 public managers, 22 citizens or civil-society actors, and 18 organizers, mentors, foundation representatives, or commentators. Public manager voices constitute 15.6% of the full archive and 24.5% of the focal

layer – a positive difference of 8.9 percentage points. The voices of organizers and commentators constitute 19.3% of the full archive and 34.0% of the focal layer – a positive difference of 14.7 percentage points.

Table 3. Evidence-role balance.

Role group	Full archive count/share	Focal count/share	Share change	Interpretive implication
Public managers	17 / 15.6%	13 / 24.5%	+8.9 percentage points	Focal evidence is better positioned for mandate and authorization analysis.
Citizens and civil-society actors	71 / 65.1%	22 / 41.5%	-23.6 percentage points	Focal evidence is less participant-dominant than the full archive.
Organizers, mentors, foundation actors, and commentators	21 / 19.3%	18 / 34.0%	+14.7 percentage points	Focal evidence has stronger process-design and mediation visibility.

The changes in Table 3 influence how we understand the focal evidence layer. While the positive public-manager shift of 8.9 percentage points suggests that the focal layer is a better source of evidence for studying mandate and authorization than the full archive, the positive organizer-commentator shift of 14.7 percentage points allows us to see how mediation, expectation management, and process design took place in the case. The relatively small citizen and civil society part does not mean that the civic nature of the evidence layer disappears, but warns against interpreting the focal layer as average participant experience.

The role-composition shift is visualized in Figure 2. The ternary plot represents both the full archive and focal evidence layer in the three-role evidence space, demonstrating that the latter is less participant-dominant and more mandate-sensitive than the former one.

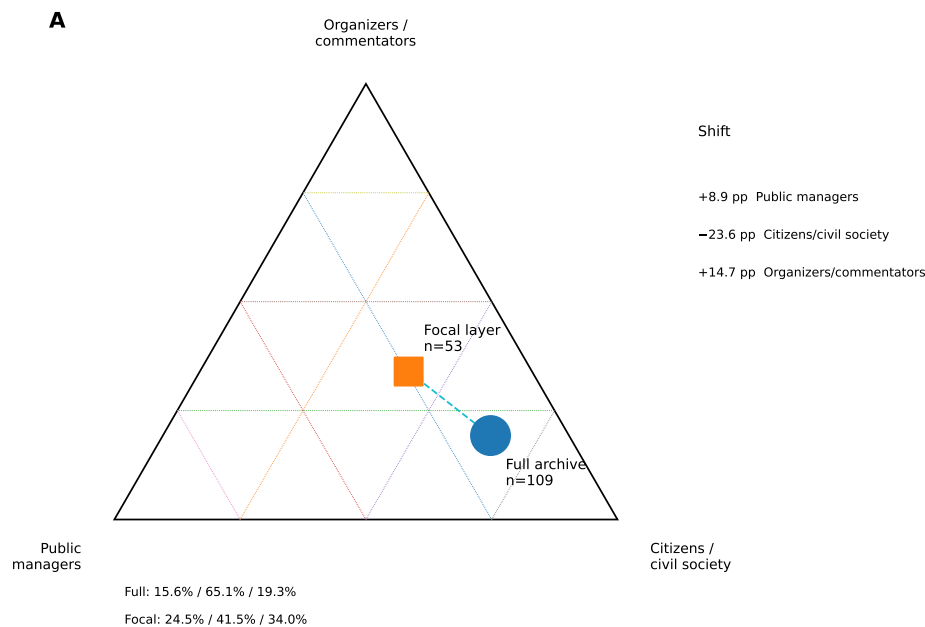


Figure 2. Role-composition shift.

The triangular field in Figure 2 gives the same result a spatial interpretation. The focal evidence layer moves away from the participant-dominant side and towards the side of the triangle where public managers' and intermediaries' voice carries more weight. Such shift is useful for answering the research question of the manuscript, as mandate, ownership, and continuation are generally better understood by public managers and intermediaries than by occasional participants. The visual result thus supports the carrier-focused interpretation of the evidence, without blurring its boundaries.

The role shift also bears a normative meaning. Public-value analysis should not presuppose that balanced evidence requires equal number of every kind of actors involved in a case. The relevant balance is research-question specific. For questions related to democratic inclusion, the lower share of citizens in the focal evidence layer will require certain precautions. For questions concerning mandate and continuation, the higher share of public managers and intermediaries is an advantage. What matters here is disclosure: when evidence composition is clearly identified, readers can decide whether the author's claims

are supported by the evidence he or she has. It is especially relevant for living labs, as organizers of such cases often mediate between citizens' enthusiasm and administrative feasibility; their accounts may help to trace the process of transformation of the expectations.

Such evidence pattern is relevant for public value, which is not only outcome-relative, but actor-relative as well. Citizens and civil-society actors are crucial to understand participation quality, civic motivation, and experience of collaboration; public managers are crucial to understand mandate, legality, feasibility, and institutional adoption; organizers and intermediaries are crucial to understand how the lab structured the process of expectation shaping. Participant-dominant archive can allow strong claims to be made about civic experience and weak claims about mandate. Public-manager-dominated archive can allow strong claims to be made about administrative feasibility and weak claims about lived participation. The focal evidence in our case stands somewhere between those extremes: it is still civic enough to cover public-civil interactions, but it contains enough material from public managers and intermediaries to justify the carrier capacity analysis.

The implication here is not that the evidence composition invalidates the case analysis, but reinforces it through evidence boundary visualization. The focal evidence layer is appropriate for answering why some collaborations received mandate and continuation and others did not, but inappropriate for assessing the average experience of all mobilized participants. RWEB therefore contributes to methodological discipline in public value studies by forcing the analyst to align the research question with the type of evidence available. In our case, the evidence structure justifies the research question of public-value yield, as the focal subset of the data is more mandate-sensitive than the full archive.

4.3 Stress-conversion scores distinguish compressed, learning-reservoir, and carrier-capable cases

The case-conversion scores in Table 4 distinguish the three outcome categories. Cases CII#1–CII#3 have low public-value conversion scores, which makes them compressed cases, as there is no expectation plasticity and weak or absent mandate anchoring. CII#1 and CII#2 have low scores of 0.03 and 0.02 respectively, indicating early closure before any responsibility or continuation emerged. CII#3 has score of 0.16, as there is mandate anchoring, ownership clarity, and artefact maturity in the case, but no expectation plasticity or scaling. These cases illustrate that the mere activity does not create public value in the absence of adaptation and authorization.

Table 4. Case calibration.

Case	Yield status	EP	MA	OC	AM	SV	PVCS	Case interpretation
CII#1	Compressed case	0.0	0.0	0.0	0.2	0	0.03	Early sketching did not stabilize expectations or responsibility.
CII#2	Compressed case	0.0	0.0	0.0	0.1	0	0.02	Interaction remained uncommitted and was experienced as unproductive.
CII#3	Compressed case	0.0	0.2	0.2	0.4	0	0.16	Activity persisted, but adaptation and continuation did not consolidate.
CII#4	Learning reservoir	0.8	0.0	0.2	0.3	0	0.26	Brief collaboration produced positive reflection without a carrier.
CII#5	Learning reservoir	0.9	0.3	0.4	0.5	0	0.44	Prototyping and mutual learning developed, but no scaling vehicle followed.
CII#6	Learning reservoir	0.9	0.2	0.3	0.3	0	0.36	Constructive exchange remained processual rather than implementable.
CII#7	Carrier-capable case	0.9	0.8	0.9	0.9	1	0.89	Municipal support and social-enterprise ownership created scalable continuation.
CII#8	Carrier-capable case	0.9	1.0	0.9	0.8	1	0.93	Participatory funding became an institutional policy instrument.
CII#9	Carrier-capable case	0.9	1.0	1.0	0.9	1	0.96	Municipal adoption and cooperative ownership produced a durable service vehicle.

From Table 4, it can be seen that public-value conversion is configurational rather than a simple causal relationship. The expectation plasticity of all the cases CII#4–CII#6 is relatively high, yet they still fail to be carriers because there is no match among mandate, ownership, and especially scaling vehicle. Cases CII#7–CII#9 have higher value not only because their artefacts are much matured, but also because there is an effective combination of public authority and a way of continuation.

Figure 3 shows the skyline of case yield. All of CII#1–CII#3 stay near the low-yield region, cases CII#4–CII#6 are in the intermediate learning-reservoir region, while CII#7–CII#9 form a cluster in the high-yield region above 0.89.

The skyline in Figure 3 indicates that the most significant empirical distinction lies between the learning-reservoir cases and the carrier-capable cases. Even with successful adaptation and exchange, the values of cases CII#4–CII#6 stay under 0.45 while those of CII#7–CII#9 go beyond 0.89 once mandate, ownership, artefact maturity and scaling vehicle come into combination. It is clear from the figure that durable public value cannot accumulate gradually, but it reaches the threshold of certain conditions of adaptation and carriership.

The clustered fingerprint in Figure 4 clarifies why there are differences between the three output categories. The compressed instances have no adaptation and carrier features; the learning-reservoir instances exhibit expectation plasticity and not continuation; and finally, the carrier instances involve adaptation together with mandate, ownership, artifact maturity, and scaling vehicle.

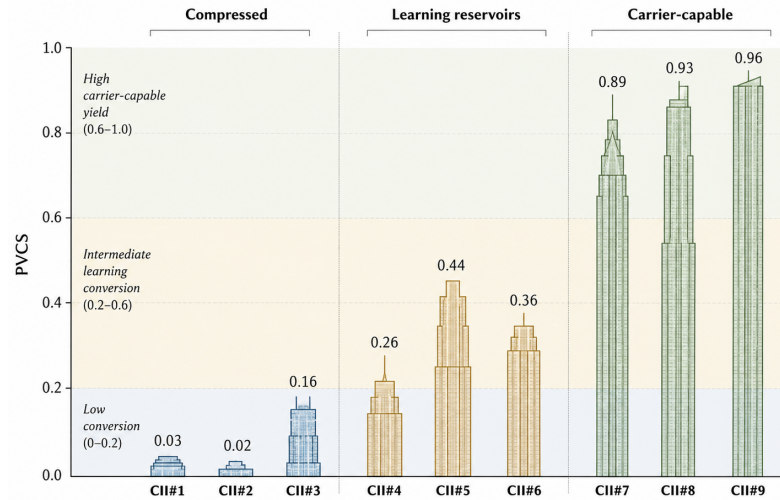


Figure 3. Public-value conversion skyline.

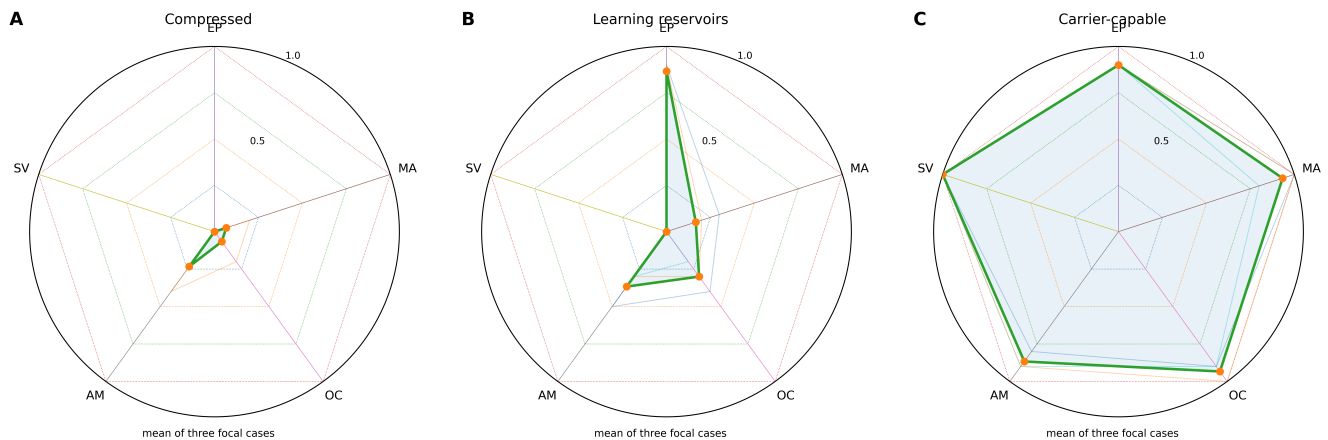


Figure 4. Conversion fingerprints.

The fingerprints in Figure 4 add further insight by revealing differences in shape between the outcome clusters, rather than only height. The compressed cluster shows little or no expectation plasticity and continuation support. The learning-reservoir cluster has good extension along expectation plasticity but continues to be poor in terms of mandate anchorage, ownership and scaling. The carrier-capable cluster extends across all five variables. This explains why processual value is real but partial: learning can be achieved without having a carrier part of the configuration sufficiently developed.

Cases CII#4–CII#6 belong to a middle zone. While they are not compressed failures, their expectation plasticity is still high: actors learned and created constructive interactions. PVCS values vary between 0.26 and 0.44. The best among them, CII#5, has high expectation plasticity complemented by some mandate anchoring, ownership and artefact maturity. However, their scaling vehicle values equal zero. Thus, CII#4–CII#6 can be characterized as learning reservoirs, useful for reflection and capability building but poorly positioned for continuation. This point matters for the public-value theory as it makes it possible to separate failure to implement from non-implementation. A collaboration can be not institutionalized while generating valuable learning experience but the problem is in its disconnect from a carrier.

CII#7–CII#9 make up the carrier-capable cluster. These cases show high values of PVCS: 0.89, 0.93, and 0.96. Cases have high expectation plasticity, mandate anchorage, clear ownership, mature artefacts and scaling vehicles. Continuation structures in them are also different. CII#7 is carried through municipal support and social-enterprise ownership. CII#8 becomes a participatory funding tool. CII#9 combines municipal adoption and cooperative ownership. The difference is important since carrying capacity is not an institutional form. Social innovation can go through various hybrids [29]. Public-service

transformation may also require mixed public, civic and entrepreneurial ownership [17]. Extended public-service networks can serve another way of carrying value [30]. Public value can therefore be carried by different organizational arrangements, provided that mandate, ownership, and continuation are aligned.

CII#7, CII#8, and CII#9 are also three carrier-capable cases, which suggest that there is no single institutional format for carrying capacity. Although all these cases differ in their format, each case combines mandate, ownership, and continuation much better than learning reservoirs do.

4.4 Coupling between mandate and carrier highlights uncoupled plasticity

In particular, the results of the coupling analysis shown in Table 5 make the difference between the non-continuing and continuing cases even more distinct. Compressed cases have very low MCC and high ACS. Both CII#1 and CII#2 have ACS equal to 1.00, which corresponds to the lack of expectation plasticity and mandate anchoring. CII#3 has ACS of 0.80 and MCC of 0.02, which means that there is some mandate and ownership, but no carrier at all. These values show that compression is not simply a low output condition; it is a failure of early alignment between interpretive adaptation and public authority.

Table 5. Mandate-carrier diagnostics.

Case	MCC	PL	ACS	RSR	Diagnostic reading
CII#1	0.00	0.00	1.00	0.20	Compression before adaptation; artefact activity is minor.
CII#2	0.00	0.00	1.00	0.10	Compression without meaningful artefact development.
CII#3	0.02	0.00	0.80	0.36	Strong compression despite some activity and minimal ownership.
CII#4	0.00	0.80	0.20	0.27	High learning potential without mandate or continuation.
CII#5	0.06	0.85	0.07	0.40	Strong plasticity and prototyping, but high stranding risk.
CII#6	0.03	0.87	0.08	0.26	Constructive learning remains weakly coupled to a carrier.
CII#7	0.76	0.22	0.02	0.05	Strong carrier alignment reduces stranding risk.
CII#8	0.95	0.05	0.00	0.04	Mandate and continuation are tightly connected.
CII#9	1.00	0.00	0.00	0.00	Full carrier coupling across mandate, ownership, and scaling.

Diagnostic readings provided in Table 5 are important for separating poor adaptation from unsupported adaptation. In cases CII#1–CII#3, there is low conversion rate since compression happens earlier than any expectation plasticity becomes meaningful. Cases CII#4–CII#6 have different problems: values of PL equal 0.80, 0.85, and 0.87 indicate adaptiveness of participants, but their MCC is close to zero. Moreover, case CII#5 has this property combined with the highest value of RSR, which equals 0.40. This makes CII#5 the most obvious example of stranded prototype among all the cases under study. In contrast to previous ones, CII#7–CII#9 have high carrier coupling and no stranding risk.

The diagnostic field presented in Figure 5 represents placement of all nine cases according to mandate-carrier coupling and plasticity load. Learning-reservoir cases are located in the high-plasticity, low-coupling area, while carrier-capable cases tend to be in the high-coupling, low residual plasticity area.

The field represented in Figure 5 reveals uncoupled plasticity as spatial pattern. While the learning-reservoir cases are high on PL but stay near the left side of the MCC scale, the carrier-capable cases shift towards lower-right area, which is characterized by high coupling and low plasticity load. Such placement explains why the same level of participation/learning may lead to different public-value results. The crucial thing here is not only learning itself, but its attachment to some carrier.

Profile of Residual Stranding Risk from Figure 6 divides artefact maturity and continuation risk. CII#5 becomes unique in the sense that although there is the development of artefacts, still the residual stranding is high due to non-consolidation.

The rail in Figure 6 illustrates the same point from the perspective of artefact development. It is not that CII#5 is the least strong learning reservoir case. Rather, it is the most vulnerable case where development has reached a point where it is possible to develop something strandable, but there is insufficient ownership and scaling. The rail thus highlights the importance of not confusing artefact development with public-value sustainability.

Figure 7 shows that the high-risk cases do not hinge on a particular type of organizational form. Each panel displays a distinct pathway along which mandate, ownership, and continuation vehicle come together in a carrier-ready case.

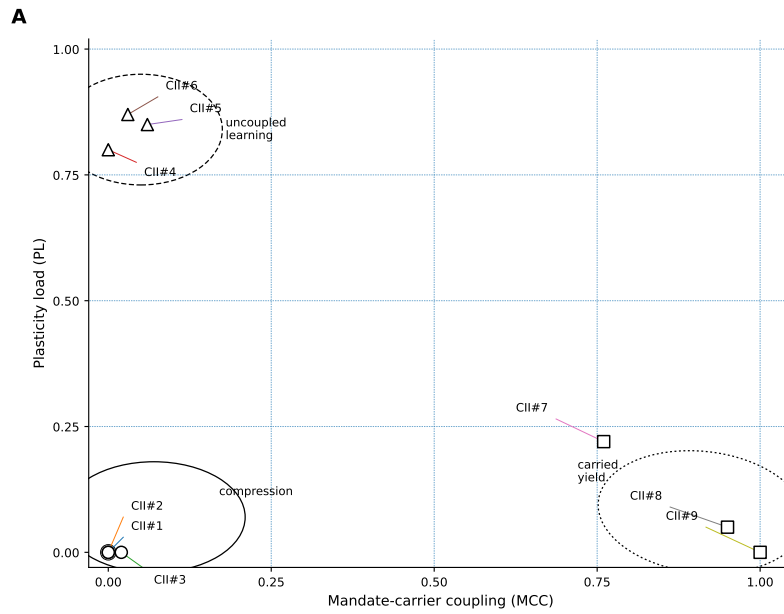


Figure 5. Mandate-carrier field.

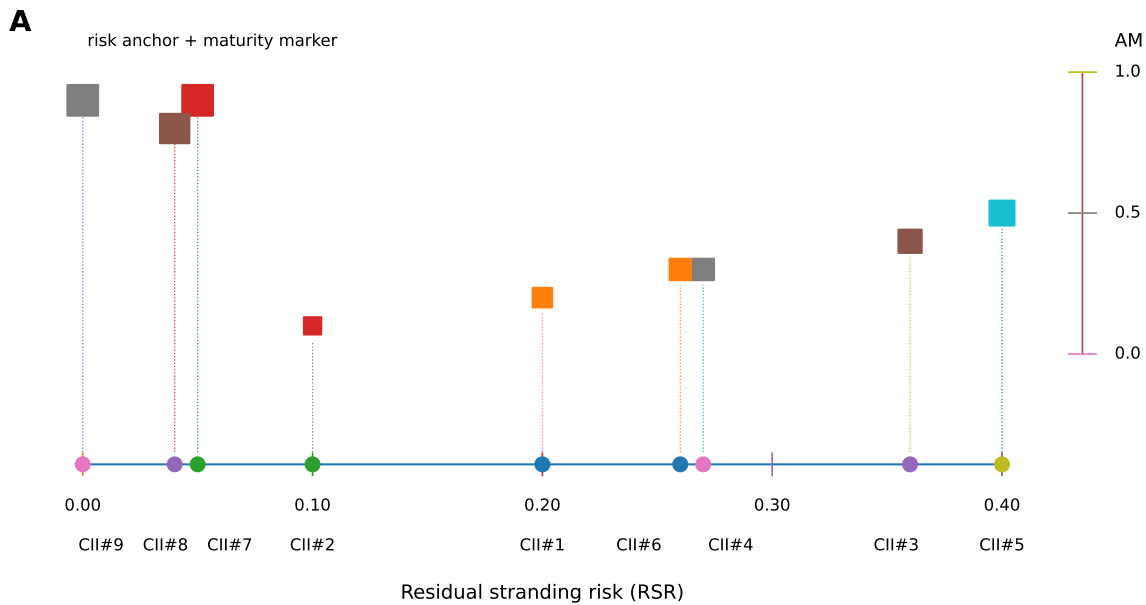


Figure 6. Residual stranding risk.

The panel of carrier-route diagrams presented in Figure 7 indicates that high yield cannot mean one and only one institutional realization. CII#7, CII#8, and CII#9 combine mandate, ownership, and continuation in distinct organizational arrangements. The common point is not organizational homogeneity but sufficient carriers: each of the cases has a reasonable actor or combination of actors that could take responsibility for carrying public value beyond the lab. This is why the manuscript presents carrying capacity as a relationship between mandate, ownership, and continuation and not as an implementation option label.

Reservoir learning cases are the most important set presented in the paper. CII#4, CII#5, and CII#6 are characterized by high PL values of 0.80, 0.85, and 0.87. This implies that there is plasticity of expectations, but mandate-carrier coupling is weak. CII#5 is characterized by the highest residual stranding risk, 0.40, because artefact maturity exceeds ownership and scaling development. This result suggests the particular danger associated with open living labs. This danger is not related to the

inability of participants to adapt. In the analyzed cases, participants successfully adapt. The danger consists in adaptation being a reservoir of learning without any carrier. This is why processual public value requires precise terminology. It is valuable, but it is not durable per se.

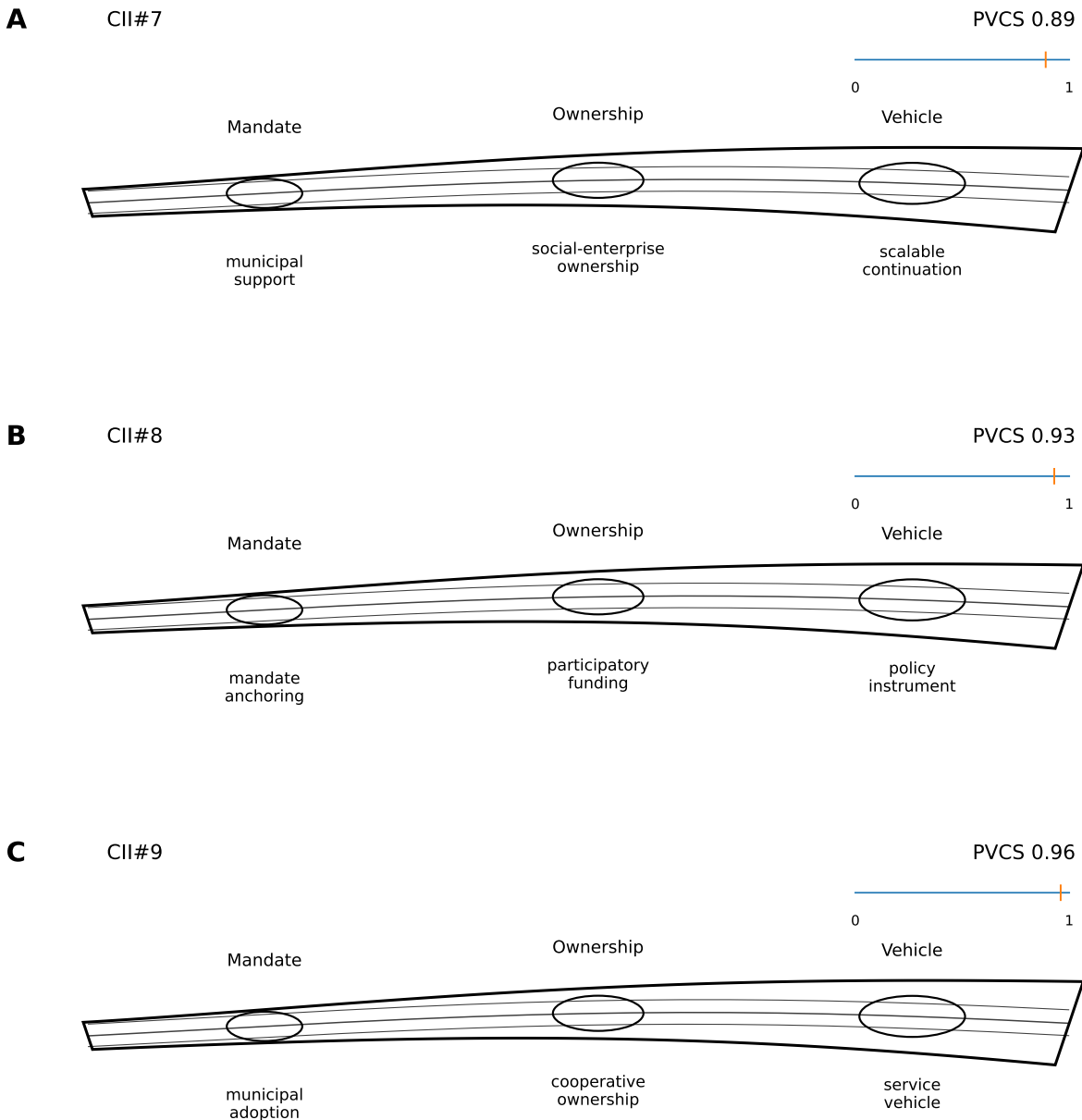


Figure 7. Carrier routes.

Capable carrier cases demonstrate the opposite pattern: MCC reaches its maximum value in CII#7, 0.76; in CII#8, 0.95; and in CII#9, 1.00; PL and RSR drop significantly in these cases. It should be noted that in these cases artefacts are not necessarily more mature than in the other cases. What changes is the linkage between artefact maturity and mandate/continuation. The contrast is especially visible between CII#5 and CII#7: both cases demonstrate substantial development and adaptation, but while CII#5 does not include any scaling vehicle and has weak mandate-carrier coupling, CII#7 includes the linkage between municipal support and social enterprise ownership. Consequently, MCC reveals something that is hidden by PVCS analysis: even in cases that promise some internal development, public value can be exposed to the dangers of stranding if there is no

reasonable carrier.

Consequently, the comparison demonstrates that high public-value conversion score should not be considered as a sign of successful adoption of one particular model but as a pattern of alignment. Social enterprise, municipal policy instrument, and cooperative service arrangement can be used to carry public value, but each of them carries particular risks: social-enterprise continuation is flexible, but fragile financially; policy-instrument continuation is reliable and authoritative but limits further civic experimentation after the adoption of the rules; cooperative continuation guarantees continued community ownership but requires sustainable public support. MCC does not compare these forms but checks whether the form available in the specific case is sufficiently coupled to mandate and continuation of public value. Therefore, this procedure takes plural public service networks into consideration instead of pushing all cases into a single implementation pathway.

This result contributes to the discussion of collaborative innovation failures and public-value co-creation. Collaboration can fail due to the misalignment of expectations and institutional conditions [21]. Misalignment is amplified when roles of collaborators are unclear [22]. The readiness of the public sector determines the possibility of translation of collaborative effort into authorized actions [13]. Collaborative governance becomes an additional mechanism of linking collaboration to public service network [14]. This analysis suggests the specific form of misalignment: uncoupled plasticity. In the case of living labs, ambiguity is not necessarily a problem. Contingency-oriented action can support experimenting under ambiguity [31]. Research on path creation demonstrates the mechanisms through which actors can create new options via iteration [32]. Organizational adaptation often depends on integration of stability and change [33]. Dynamic coordination helps distributed actors integrate their evolving contributions. The problematic situation occurs when ambiguity is resolved only in the level of learning of the participants.

4.5 Integrated interpretation: public value is a yield system

The three empirical layers provide a consistent interpretation. First, the participation funnel reveals that there is a very thin layer of the large mobilized population that is available for deep public-civil comparison. Second, the evidence balance reveals that the focal layer is especially good for mandate and continuation analysis since the public-manager and organizer-commentator perspectives are more visible than in the entire corpus. Finally, the case conversion and coupling analysis reveals that durable public value depends on whether there is adaptive learning and its connection to a carrier. All these results should be interpreted together. First, the focal cases are not just nine stories; they are the most interpretable layer within a much wider funnel. Second, the evidentiary structure of the cases reveals a carrier-focused interpretation.

The map presented in Figure 8 is the key summary of the overall interpretation of the paper. Participation reach, evidence depth and yield class are hierarchical categories rather than substitutes: each category provides an answer to the evaluation question about public value generation in a living lab.

Each colored ring in Figure 8 answers the research question by distinguishing three categories which are commonly collapsed into one. First, the outer ring is concerned with reach, the middle ring focuses on the evidence layer used for interpretive analysis, and the inner ring defines the nine cases in terms of yield classes. Each of the rings cannot stand independently. Reach without evidence depth overrates public value. Evidence depth without role disclosure conceals whose perspective provides the justification of the claim. Case classification without the outer rings disconnects durable yield from the mobilization process.

Such an integrated approach provides a refined way of interpreting the results of the living lab. The one success rate is misleading. The calculation of 9 focal cases from more than 4400 participants will underestimate the value of mobilization. The calculation of 330 programme initiatives will overestimate durable continuation. Calculation of institutionalized cases will overlook learning reservoirs. The more accurate interpretation is to characterize the living lab as a yield system with many thresholds. The entry volume represents reach. The active retention represents sustained engagement. The public-civil collaboration represents cross-boundary interaction. The focal cases represent deep evidence. The carrier-capable cases represent durable public-value yield. Each threshold answers a different question.

The analysis explains why durable public value cannot be generated through better control of the living lab process alone. On the one hand, excessive control may improve mandate clarity but decrease discovery, civic ownership and trust. On the other hand, low control may boost participation but create expectations about unrealistic continuation. Thus, the empirical pattern implies the principle of the middle ground: carrier pathways have to be made visible but not exclusive too early. Participants have to know the possible ways of continuation while the organizers have to maintain flexibility for new problem definitions. This design principle is compatible with strategic-control literature showing that planning and adaptive control have to be shifted across implementation phases [34].

The pattern of the case study demonstrates why living-lab design cannot consider openness and carrying capacity sequentially. When the carrier question is postponed to after experimentation, some promising cases may fall in the learning-reservoir zone with no continuation path. In case the carrier question becomes dominant too soon, the openness may be reduced before civic knowledge and alternative solutions emerge. This means that the design problem is temporal. Organizers have to keep enough

openness for discovery while making possible carrier pathways visible in time to avoid false expectations. This design dilemma is inherent in collaborative public management [19]. Recent research also proves the necessity of flexibility and accountability of the governance arrangements [34].

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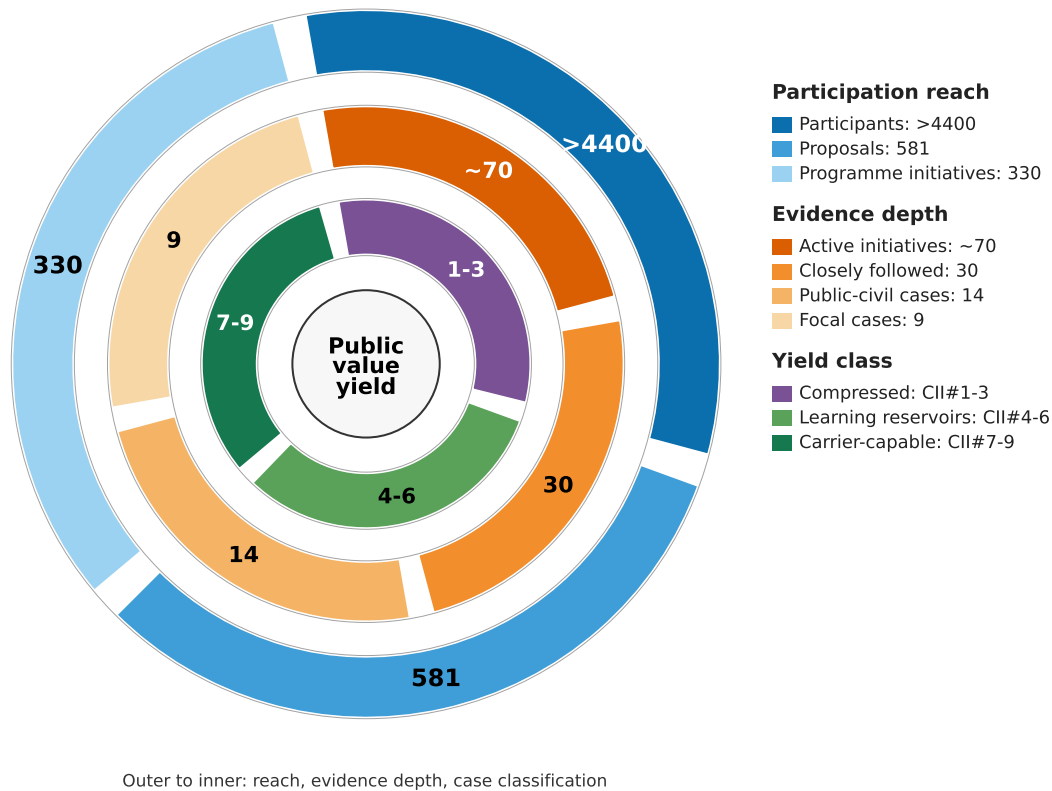


Figure 8. Yield map.

5. Practical Implications

The results have immediate consequences for public managers. Living-lab design should define both engagement and yield. Engagement planning addresses questions such as: What are ways to attract participants, solicit ideas, and enable interactions? Yield planning addresses questions such as: What are ideas that can be supported? What are actors who can authorize follow-on work? How will ownership be established? What are the continuation vehicles available? How will learning be secured in absence of continuation? It is not to say that all cases should always be ready for implementation at the outset. Participants need to know whether they are coming into learning arena, prototyping arena, policy-design arena, service-adoption arena, or mixed formats. Proper expectation management can preserve public trust and alleviate disappointment resulting from unsupported participation.

Living-lab designers need to report on entry volume, active retention, public-civil collaboration, and carrier-capable continuation. These metrics cannot be used to punish experimentation. They can be used to identify where collaborative energy gets lost, transformed, or preserved. Many proposals in but few initiatives are active suggests that post-launch support is weak. Many cases learn but few acquire carriers suggests that mandate design is insufficient. Many carrier-capable cases need workarounds suggests that formal public-sector adoption is too rigid. Value can be created in public-service networks by multiple organizational forms [29]. Their continuity is conditioned upon well-managed relationships between participating actors [24]. Public-sector open innovation involves governance strategies for filtering external contributions [11]. Public-sector open innovation also involves mechanisms for adoption and value maintenance beyond participation infrastructures [12].

Researchers may use the stress-yield ledger as a straightforward way to compare scale, evidence, and carrying capacity in case-based public management research. It is helpful when empirical accounts include participation counts and case narratives but lack connections between funnel position and continuation outcomes. Further applications may investigate whether the same coupling patterns emerge in other living labs and in public-sector contexts where mandate and ownership are different.

6. Conclusion

The inquiry aimed to explore whether participation-funnel narrowing, evidence-role balance, and case-level carrying capacity explain why an open digital living lab produces public value. The answer is context-specific for the UpdateDeutschland record. Participation-funnel narrowing defines the scale boundary: the living lab had over 4400 participants, 581 proposals, and 330 programme initiatives, but the most extensive public-civil comparison is built around nine focal cases, roughly 0.20% of the conservative participant count. Evidence-role balance defines the evidentiary claim: the focal layer is not a downsized copy of the full interview database, but a more mandate-sensitive subset with enhanced visibility of public managers and organizers' commentaries. Case-level carrying capacity defines the outcome difference: public value arises only where expectation plasticity is combined with mandate anchoring, ownership definition, artefact maturity, and scaling vehicle.

The substantive answer is that open digital living labs do not lose public value primarily due to uncertainty or openness. Uncertainty is supportive of learning, adaptation, and problem reframing. The key failure mode is uncoupled plasticity. CII#4-CII#6 demonstrate that adaptive collaboration can yield processual value despite low continuation position, which is due to inadequate mandate and carrier capacity. CII#7-CII#9 demonstrate the opposite situation: durable value emerges where there is a legitimate carrier through social-enterprise ownership, policy tool development, or cooperative service adoption. CII#1-CII#3 demonstrate compression before adaptation and mandate are established. Participation creates reach, evidence composition makes particular claim defensible, and carrier capacity makes learning productive of public value.

The contribution of the study is yield-oriented evaluation of living labs. The UpdateDeutschland record demonstrates that a living lab can be large, innovative, and socially relevant, while producing a limited number of carrier-capable cases. The result should not be automatically regarded as a failure. On the contrary, it should encourage more accurate reporting. Public value in open digital living labs emerges through participation, but is yielded through the combination of evidence, authorization, ownership, and carrier. Evaluation of living labs should therefore report on entry volume, evidence composition, carrier-capable cases, and uncoupled learning value.

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