TCI NETWORK

EVALUATING CLUSTERS FOR LEARNING:

A GUIDE FOR CLUSTER POLICYMAKERS AND PRACTITIONERS

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INSPIRED BY 10 YEARS OF ENGAGEMENT OF THE TCI CLUSTER EVALUATION WORKING GROUP

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Emily, Madeline and James in Toronto 2018.

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Building the right evaluation framework for any cluster program placed in any part of world is one of the most common challenges when managing a cluster initiative or policy. The idea with the TCI Evaluation Guide is to share experiences and learnings from across the world on how to build a better evaluation framework. Only with better evaluation tools and methods can we keep continuing learning and improving our cluster work – and create better cluster programmes and initiatives with higher impact.

With the immense challenges we face on green transition, more socially responsible and more digital societies, it is important to have an approach for tracking progress and learning along the way. As many transitional cluster policies and cluster strategies are implemented, the need for more and better evaluation is growing. Only through evaluation, new insights and knowledge can detect what is working, what isn't and to adjust in the light of the new insights.

This guide offers a cluster evaluation framework, ten key evaluation principles to consider, specific tools and methods for evaluation and a range of evaluation cases from across the world. The guide is structed in six parts to help develop a coherent cluster evaluation strategy. The guide is for all interested in cluster evaluation. For policymakers at all levels of experiences running a cluster program. For cluster managers wanting to monitor and track their impact.

All this wouldn´t exist without the immense and longstanding work of the TCI Evaluation Working Group led with passion and dedication by Madeline Smith, James Wilson and Emily Wise. TCI Network is forever grateful to these three unique cluster experts and the many TCI members that have shared their best practices, feedback and novel ideas on how to build an evaluation framework. Thanks!

Enjoy the reading and continue the journey of cluster learning.

Merete Daniel Nielsen
President, TCI Network

TEN YEARS LEARNING: INTRODUCTION AND BACKGROUND

Cluster-based programmes are used by regions across the globe as part of their industrial, innovation and development policies. They have become a key tool in smart specialisation strategies and are increasingly used to address social challenges. The contemporary popularity of cluster policies reflects the complexity of innovation and production processes, which places a premium on effective collaboration across actors with shared challenges and/or complementary capacities.

As interest in clusters has grown, the need for effective evaluation has also risen, not least to be able to show the return on investment in cluster initiatives. However, cluster evaluation has long been a source of frustration, with no recognised norms and a lack of sophistication in tools to capture the impacts of policy interventions.

To explore this challenge, the **TCI Cluster Evaluation Working Group** was formed in 2013, bringing together researchers, practitioners and policymakers, to share experiences, capture joint learning, and collaboratively develop new and better approaches to cluster evaluation.

Evaluating clusters is challenging, involving different policy levels and diverse audiences. In this context it is important to understand evaluation as a learning process, the outputs of which should feed back into future approaches. It is not just audit. As evaluation approaches have become more sophisticated, they have moved from merely looking at activity (numbers involved and engaged with the cluster initiative), to capturing the difference that this activity is making, both to the companies and to the region. In addition, emerging approaches are contributing to a deeper understanding of the processes that help build successful cluster initiatives, how the social capital and trust generated in clusters can be maximised, and the value of the leadership and influencing role of cluster organisations – all important aspects which often have been overlooked.

Since its inception, the TCI Cluster Evaluation Working group has met annually in dedicated workshops hosted in different locations. Each meeting has brought together 20-35 participants from academic, policy and practitioner circles, from a wide range of countries, to discuss and progress cluster evaluation agendas. This has been complemented by special sessions at the TCI Network's annual global conferences, the sharing of ongoing discussions, developments and outputs through an online platform on the TCI Network website, and a growing portfolio of publications. In recent years these workshops have been held online, continuing the participatory approach and enabling greater reach worldwide.

In the tenth year of building that collective knowledge, this guide has been developed to share what we have learned and support those tasked with delivering cluster evaluation. The guide has been inspired by international experience and developed gradually over time. Specifically, it is the result of interaction among a global group of policymakers, practitioners and academics in TCI Network's Cluster Evaluation Working Group that have contributed to ten years of learning[1].

[1] For detail on this experience see: Smith *et al.* (2020). 'Evaluating Clusters: Where Theory Collides with Practice', *Regional Science Policy and Practice,* 12(3): 413-430, https://doi.org/10.1111/rsp3.12279.

YEAR	WORKING GROUP MEETING	PARTICIPANTS (POLICY/PRACTITIONER/ACADEMIC)	METHODOLOGIES, PURPOSE, THEMES	TCI ANNUAL CONFERENCE ACTIVITIES
2013	Forres (UK) hosted by The Glasgow School of Art	18 from 9 countries (9/4/5)	Exhibit from pre-prepared inputs by participants and group discussions: • Exchange of current practices • Identification of key challenges	Kolding (Denmark): Keynote address & side-meetings
2014	Belfast (UK) hosted by Invest NI	25 from 11 countries (8/10/9)	Exhibit from pre-prepared inputs by participants and group discussions / interactive board game: • Good practices and techniques • Human element of cluster evaluation • Critical success factors for clusters	Monterrey (Mexico): Presentations in sessions & side-meetings
2015	Rzeszow (Poland) hosted by Effective Clusters (Podkarpackie Region)	31 from 13 countries (7/16/8)	Small group dynamics to validate proposals and focus groups exploring new themes: • Initial development of survey questions to evidence collaborative dynamics • Benchmarking of clusters	Daegu (Korea): Presentations in sessions and dedicated 2-hour 'policy lab'
2016	Barcelona (Spain) hosted by ACCÍO	29 from 11 countries (12/10/7)	Small group dynamics to validate proposals and focus groups exploring new themes: • Perfect cluster framework • Survey questions to evidence collaborative dynamics • Guiding principles of evaluation • Fit of clusters in policy mix	Eindhoven (Netherlands): Dedicated sessions in conference academic track and follow-up meeting

YEAR	WORKING GROUP MEETING	PARTICIPANTS (POLICY/PRACTITIONER/ACADEMIC)	METHODOLOGIES, PURPOSE, THEMES	TCI ANNUAL CONFERENCE ACTIVITIES
2017	Oslo (Norway) hosted by Innovation Norway	17 from 7 countries (8/6/3)	Peer review and exchange of pilot study results: • Programme level evaluations • Evidencing cooperative dynamics	Bogota (Colombia): Dedicated workshop session
2018	Cork (Ireland) hosted by Cork Institute of Technology	30 from 8 countries (12/8/10)	Experience exchange and small group dynamics: • Evidence of effects and framework of indicators • Evaluating the contribution of clusters to smart specialization strategies	Toronto (Canada): Dedicated workshop session
2019	Malmo (Sweden) hosted by Region Skåne	36 from 12 countries (17/13/6)	Peer review and exchange of pilot study results: • Monitoring regional cluster portfolios • Making use of survey & network data • Evidencing the role of clusters in territorial systems/strategies	Daegu (Korea): Presentations in sessions and dedicated 2-hour 'policy lab'
2020	Online Workshop	Over 200 registered from 41 countries (breakdown unavailable)	Evidencing the wider impact of clusters: • Understanding and evidencing system-level results in cluster initiatives • Evidencing shared value and other wider contribution of clusters	Special session as part of Online Conference

YEAR	WORKING GROUP MEETING	PARTICIPANTS (POLICY/PRACTITIONER/ACADEMIC)	METHODOLOGIES, PURPOSE, THEMES	TCI ANNUAL CONFERENCE ACTIVITIES
2021	Online Workshop	Over 100 registered from 40 countries (breakdown unavailable)	Peer review and exchange of pilot study results: • Programme level evaluations • Evidencing cooperative dynamics	Hybrid Conference, Kazan (Russia): Cross-cutting theme that ran throughout the conference sessions
2022	Bilbao (Spain) hosted by SPRI	30 from 10 countries (18/8/4)	Testing this guide (collaborative workshop): • Why, what, when to evaluate • Cluster policy framework of effects • Evaluation methods and tools • Cluster evaluation principles	Durban (South Africa): Dissemination of this guide

This guide is designed to support cluster policymakers and practitioners in the development of their evaluation strategies. It provides a learning-focused approach and unifying framework for cluster evaluation that can be used to:

- Inspire discussions among cluster stakeholders around why, how, and when to evaluate their activities
- Inform the development of coherent evaluation strategies at the cluster policy level and/or cluster initiative level
- Help identify specific methods that can be employed as part of a coherent evaluation strategy

The target audiences for this guide are **policymakers** that are starting new cluster-type programmes or renewing current programmes and **practitioners** working with cluster initiatives or in cluster organisations. Among both audiences there is demand from stakeholders for monitoring and evaluation of the impacts of their efforts. More importantly, however, there is an intrinsic need for monitoring and evaluation that can inform learning and boost effectiveness.

A GUIDE TO HELP DEVELOP COHERENT CLUSTER EVALUATION STRATEGIES.

THE GUIDE IS STRUCTURED IN SIX SECTIONS:

01

Key concepts for this guide

02

Why, what, when and who to evaluate?

03

How to evaluate clusters: a unifying framework

04

How to evaluate clusters: Indicators and methods

05

Actioning the framework: Examples from global practice

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Ten cluster evaluation principles

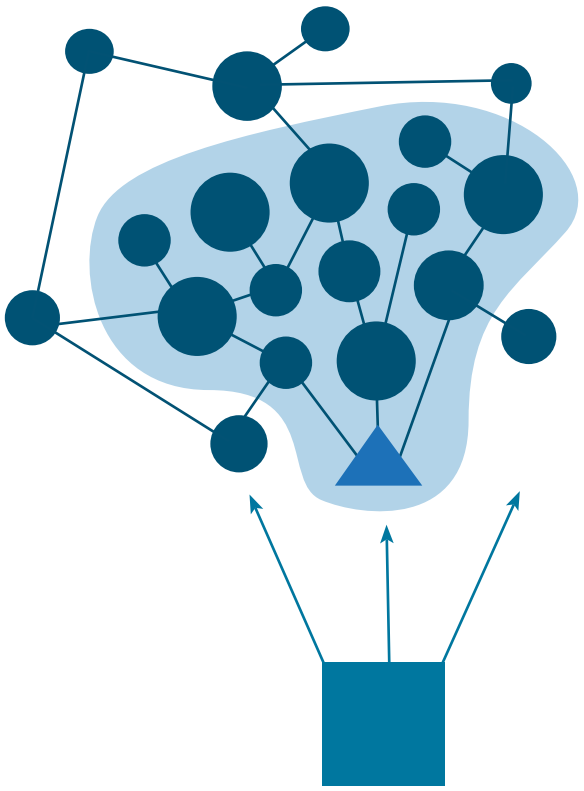
01

KEY CONCEPTS FOR THIS GUIDE

Clusters are geographical concentrations of businesses and other organisations (research, education, government, civil society …) that are engaged in related socioeconomic activities in a specific place (city, region, small country …). The different actors within a cluster typically interact with one-another through a combination of participating in related sectors, value chains or markets, working with related technologies and/or pursuing related societal challenges. There is therefore considerable heterogeneity in clusters. For example, while some involve only SMEs, others are built around large, anchor firms, or the research activities of universities.

Relationships between cluster actors occur naturally and informally given their geographic concentration. However, the presence of clusters often leads to purposeful attempts to strengthen the collaborative dynamics within clusters in the form of **cluster initiatives**. These cluster initiatives are often coordinated by specific organisations known as **cluster management organisations**. Moreover, in many countries and regions cluster initiatives are supported by government through **cluster policies** that finance different interventions to strengthen collaboration (e.g. cluster facilitation, cluster management organisations, collaborative projects). These four key cluster concepts are illustrated in Figure 1.

Figure 1: Cluster concepts



A cluster is formed by firms, universities, research organisations, etc. in a specific place that may collaborate with one another

A cluster initiative is a purposeful attempt to strengthen collaborative relationships within the cluster

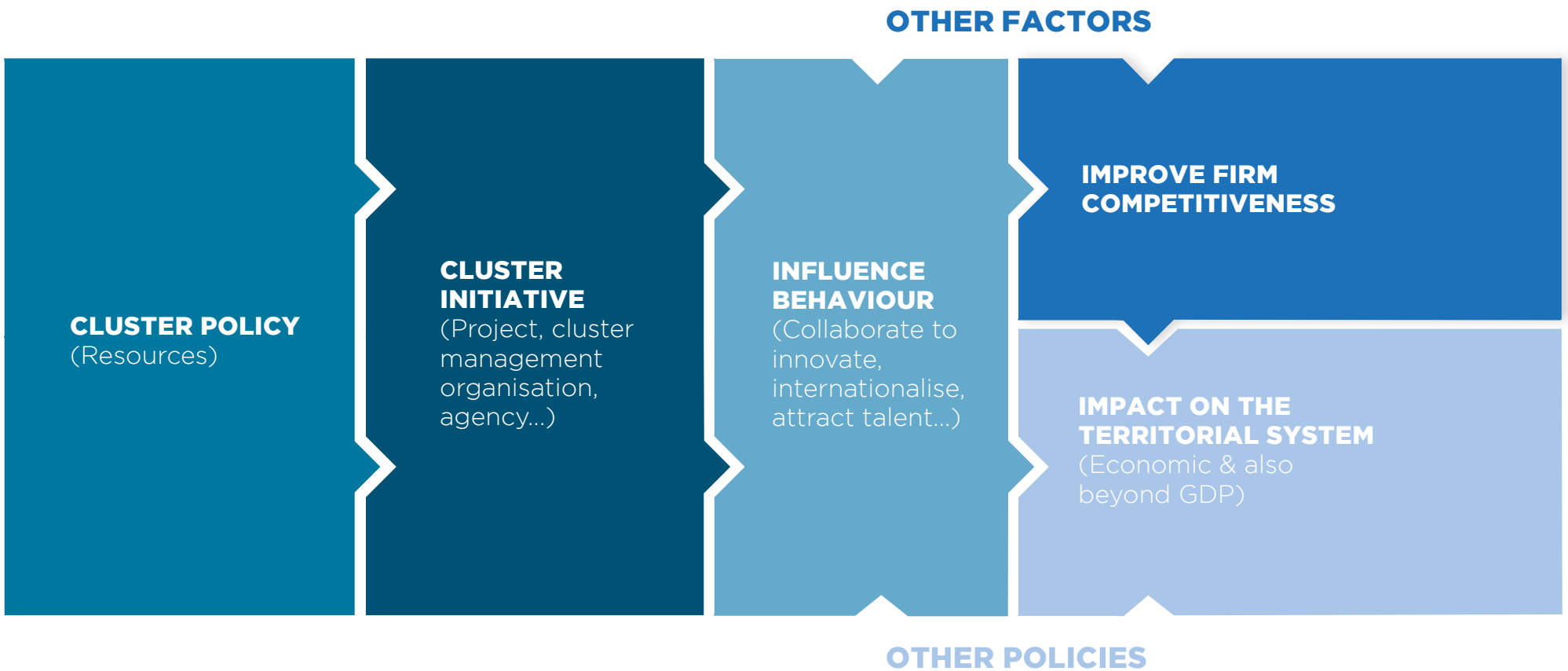
A cluster management organisation may emerge to coordinate the cluster initiative

Government may support cluster initiatives via dedicated cluster policies (and/or other policies)

The rationale for cluster policies is to **strengthen collaborative dynamics** in ways that improve firm-level competitiveness and ultimately have a positive impact on the socioeconomic development of the region. The generalised **cluster policy logic model** (Figure 2) is nevertheless complex and highlights the significant challenges in evaluating the effects of cluster policies, especially given the intangible human elements in building collaborative dynamics, the long timeframe often necessary to see the effects of changed behaviours, and the difficulty in isolating effects from the range of other policies and factors influencing business and regional competitiveness.

At a time when cluster initiatives and policies are more popular than ever, the aim of this guide is to support those working with cluster initiatives and policies to monitor and evaluate their efforts in ways that **facilitate learning and boost effectiveness**. However, it is explicitly NOT a 'how to guide' because each cluster initiative or policy sits within a very different context that inevitably conditions the possibilities for monitoring, evaluation, and learning. Our aim is to provide a **common framework** that can make sense of the diversity of cluster evaluation contexts and position different methods or tools that can be selected according to those contexts. Developing a shared vocabulary around a common framework and highlighting common elements across different tools will help to evidence the value of clusters in specific contexts and enable the ability to compare/learn between places.

Figure 2: A generalised cluster policy logic model



02

WHY, WHAT, WHEN AND WHO TO EVALUATE?

WHY?

The need to monitor and evaluate cluster initiatives and policies is rooted in their contemporary **popularity and relevance**. Cluster policy has seen renewed interest in recent years, with regional and national governments viewing it as a coherent way to build more competitive innovation systems, to support diversification and modernisation of the existing industrial base, and to stimulate new opportunities across emerging sectors.

As a policy focused on supporting relationships between actors, it is especially relevant given the systemic shift in innovation and competitiveness policy. Indeed, clusters are recognised as important elements for constructing transformative innovation policy (TIP), for the development of smart specialisation strategies (S3), and for the evolution towards sustainable smart specialisation strategies (S4) in the context of the collaborative dynamics required to accelerate green transition.

As investment in cluster policies increases, so too does the need to develop associated evaluation strategies that enable effective monitoring, evaluation, and policy learning. Indeed, while accountability is an important element of the need to evaluate, **the focus of evaluation should be learning and development**. Learning is the flip side of strategy and the strategic intelligence that an evaluation strategy generates should be used to inform future stages of cluster development and cluster policy delivery.

An evaluation strategy oriented towards learning requires reviewing **effectiveness** (did we deliver on what we had planned?), **efficiency** (did we deliver within planned resources?), and **relevance** (were those the right things to be doing to affect the change we envisaged?). For cluster evaluation, however, it is also critical to explore the **collaborative process** (what could we do together that we could not do alone, and how did that collaboration develop?).

WHAT?

When designing a cluster evaluation, it is first and foremost important to delimit the **focus and scope** of the evaluation strategy. This means asking what exactly should be evaluated, which in turn requires having a clear understanding of the intervention logic behind the cluster support actions being undertaken. In short, an evaluation strategy will be elusive without a clear reference of what it is you are seeking to achieve.

While there will be specifics to each intervention logic – for example, a focus on stimulating innovation or internationalisation - a distinction between two dimensions of cluster support interventions can help to clarify the focus and scope for a cluster evaluation strategy.

1. Project - Organisation - Programme (POP)

Building on the definitions of cluster, cluster initiative, cluster management organisation and cluster policy set out in the previous section, monitoring and evaluation activities can be focused on one of three broad types of intervention:

- An individual collaborative project targeted at/operationalised within a cluster **(P)**
- The collection of activities undertaken by a specific cluster initiative, typically under the coordination of a dedicated cluster management organisation **(O)**
- A complete cluster policy programme (encompassing several cluster initiatives, organisations, and/or projects) **(P)**

2. Actor - Group - System (ACS)

It is also important to clarify the scope of the evaluation in terms of the level(s) at which evidence of the effects of the intervention are sought. There are three broad levels at which the effects of cluster interventions can be felt (and evidenced) (ACS):

- At the individual actor level, among specific cluster actors **(A)**
- At the group level, among the cluster/collaborative initiative as a whole **(C)**
- At the system level, among the broader territorial innovation system **(S)**

Depending on the specific intervention logic of the policy or action, one or more of these levels of effects will be relevant for building an evaluation strategy.

ACTOR LEVEL (A)

The individual actor level (A) encompasses companies, research institutes and other organisations that are participants of the cluster/ collaborative initiative. These individual actors may commit themselves to the collaboration through formal mechanisms (e.g. letters of intent, membership fees) or through looser participation and engagement in collaborative activities. Their aim in engaging in collaborative initiatives is assumed to be strengthen their own capacities and performance, and evaluation at this level can seek to measure the effects of cluster collaboration on these capacities and performance.

CLUSTER INITIATIVE LEVEL (C)

The cluster initiative level (C) encompasses the set of individual organisations that act together in a collaborative group, with a common purpose. The aim of acting in collaboration is assumed to be to achieve results together that cannot be achieved by acting alone. Thus, an important focus for evaluation at this level is to capture how the strength (critical mass), dynamics and depth (collaboration), and strategic direction of the initiative evolves over time.

SYSTEM LEVEL (S)

Cluster policy interventions can also contribute to changes at the level of the broader (local, regional, national) territorial system (S). This is likely to occur most immediately among the natural cluster or agglomeration of related activities that exists beyond those actors explicitly targeted by the policy. However, cluster initiatives also connect with other related clusters in the region and are increasingly asked to contribute to more general regional improvement strategies. They may therefore exhibit strategic leadership effects as they adopt a leadership role in the territory (for example, acting as a credible, knowledgeable voice and through their roles in smart specialisation strategies), they may amplify and catalyse innovation in the region, and they may make higher-level contributions to broader territorial priorities (for example, societal challenges related to environment, inclusion, cultural vibrancy or wellbeing agendas). Thus, an important focus for evaluation at this level is to capture spill-over (or ripple) effects from the policy intervention that extend beyond specific cluster initiatives and generate change at the level of the broader territorial system.

WHEN?

Cluster policies are by their nature longer term, as it takes time to develop relationships, nurture trust and see the benefits of improved collaborative dynamics. Thus, many of the effects of cluster policy interventions can only be evaluated after several years. However, it is important to develop an evaluation strategy from the very beginning of a cluster policy intervention to: (i) build shorter-term indicators of progress; (ii) monitor the direction of travel and the achievement of key goals on the strategic path; (iii) facilitate an ongoing learning process that can feed back into the policy design.

It is therefore important to make a ***distinction in the timing of effects*** between:

- Short-term effects experienced 1-3 years after initiating collaborative activities **(ST)**
- Long-term effects that become consolidated after the first few years of activity **(LT)**

Different dimensions of the levels of effects explained above (ACS) will be more, or less, relevant in the short-term and long-term.

It is also important to bear in mind the question of when to stop evaluating. An evaluation strategy for a cluster intervention could cover huge ground, and there is an important trade-off between the inherent costs of evaluation and the benefits in terms of learning and improvement. Navigating this trade-off requires distinguishing between the 'need to know' and the 'nice to know' and establishing clear priorities within the evaluation strategy that are informed by the fundamental intervention logic.

SHORT TERM EFFECTS (ST)

Short term effects (ST) encompass changes in behaviours and perceptions alongside more concrete outputs that are experienced as a direct result of the cluster intervention during the first 1-3 years.

- For individual actors (A), these changes include (perceived) increases in competencies, knowledge exchange and capacity to innovate as well as changes in behaviour (e.g. engaging in collaborative activities).
- On the level of the collaborative grouping (C), one would expect to see indications of (increased) engagement from a diverse group of actors, new linkages (internally and externally), and the emergence of a shared view of the rationale and value of collective action, alongside a functioning governance for the collaborative initiative.
- At the level of the territorial system (S), a cluster initiative's activities may contribute to building system resources that help to improve the competitiveness and international attractiveness of the territory and/or develop a strategic leadership role within the territory. However, while one may see initial steps toward such system-level effects in the short-term, it generally takes more time before collaborative actions can affect or contribute to these more complex and indirect effects.

LONG TERM EFFECTS (LT)

Long-term effects (LT) encompass changes to performance, as well as changes to behaviours, structures, policies, and institutional arrangements that need time to consolidate. Although there is no well-defined timeframe, these longer-term effects may be observed after the first few years of a collaborative initiative.

- For individual actors (A), longer-term effects include strengthened economic performance, as well as more competitive strategies and behaviours.
- At the level of the collaborative grouping (C), one expects to see continued development over time of the types of effects that began in the short term (critical mass, new linkages, collective will), with their application to more complex challenges and a deeper level of collaboration. This also includes continual improvements to the quality and professionalisation of the collaborative governance.
- It is in the long term where the level of the territorial system (S) really comes into play. With more maturity, critical mass and capacity to drive complex collaborative actions, the cluster initiative is able adopt a stronger leadership role within the territory or domain. They may act as the voice of industry, influence policy and strategy, amplify the reputation and position of the sector and/or territory, and connect with other system leaders in new strategic partnerships that help align actors in a regional strategy. A cluster initiative could also make other higher-level contributions to broader priorities of importance to the territory, for example leading responses to key societal challenges.

WHO?

The capacity to effectively implement monitoring and evaluation is a key consideration if a cluster evaluation strategy is to fuel learning and improve intervention implementation. A key decision is which parts of an evaluation strategy could and should be done in-house and which parts are better done externally. There are two main dimensions to consider in making this decision:

- Skills and capacity: The quantitative and/or qualitative skills and/or capacity required to implement an evaluation strategy may or may not be present within the policy agency, cluster management organisation or cluster project team.
- Learning and legitimacy: While in-house evaluation processes can support internal learning and improvement, there are also dangers of internal bias (only telling the good stories or presenting figures to flatter). Achieving both learning and legitimacy therefore requires balancing these concerns across the evaluation strategy, perhaps opting for external input around some evaluation tasks to complement the in-house implementation of others.

Finally, given the heterogeneity of contexts in which cluster initiatives are active and cluster policies implemented, it is important to consider the value of peer review and learning to inject different experiences and voices as part of an evaluation strategy, and help ensure the right balance of skills, capacities, learning and legitimacy.

03

HOW TO EVALUATE CLUSTERS: A UNIFYING FRAMEWORK

Given the heterogeneity of different cluster policy contexts (answers to the why, what and when set out in the previous step), there is no one approach to an evaluation strategy, **no silver bullet to cluster evaluation**.

However, despite their differences, cluster projects, organisations and policy programmes share a **similar underlying rationale**: to strengthen interactions, learning and collaboration among the actors within clusters and thus contribute to enhanced productivity and competitiveness in firms and spillover effects into the broader territorial system.

The dimensions set out in the previous step can therefore be brought together into a **generalised framework for understanding the effects of cluster policy** that enables policymakers and practitioners in different contexts and at different stages of cluster policy development to position potential approaches to monitoring, evaluation and learning alongside others (Figure 3).

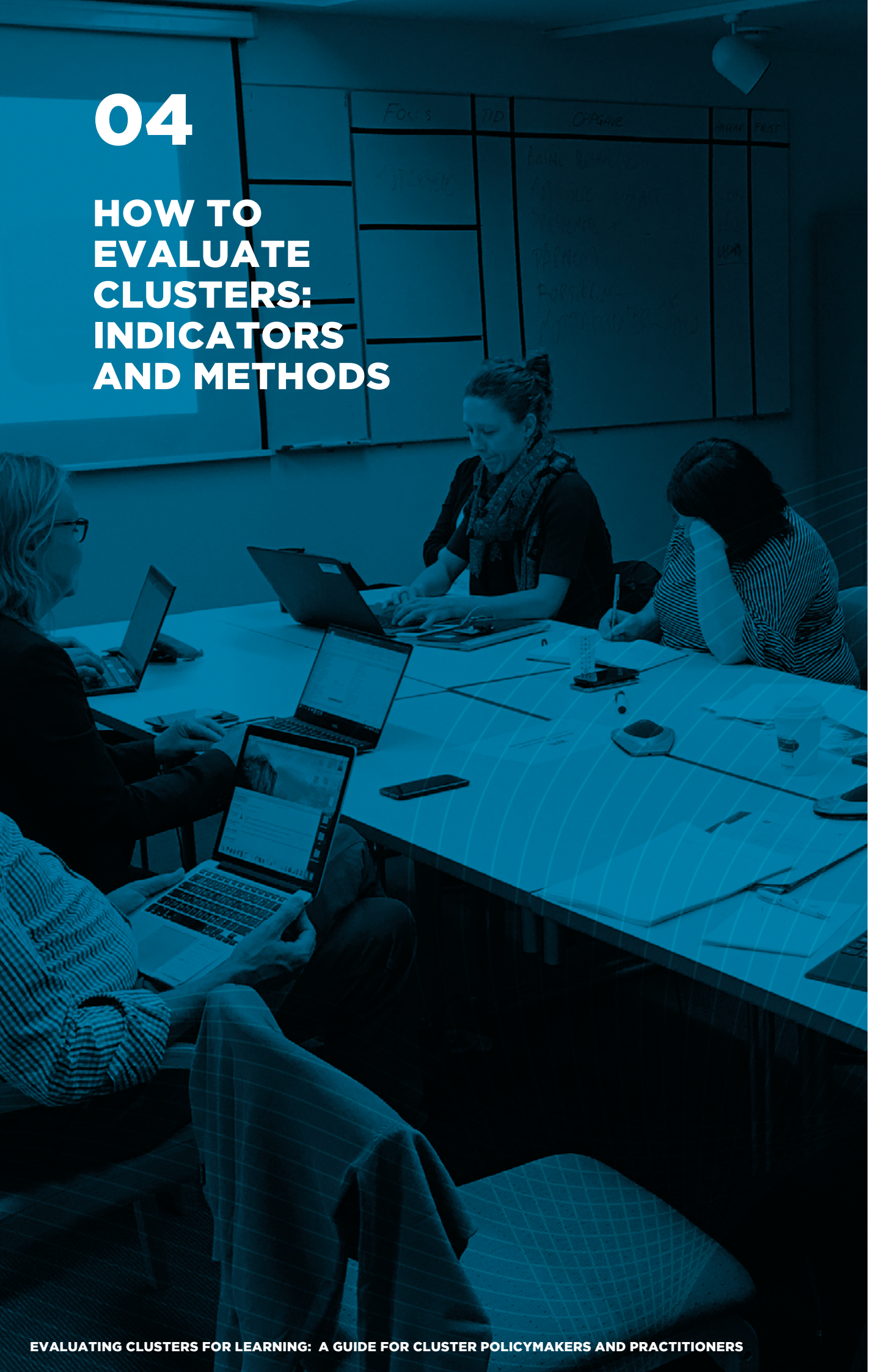
[2]For detail on the theoretical and practical underpinnings of this generalised framework see: Wilson, Wise and Smith (2022). 'Evidencing the benefits of cluster policies: Towards a generalised framework of effects', Policy Sciences, 55, 369-391doi.org/10.1007/s11077-022-09460-8

Figure 3: Cluster programme framework of effects

	SHORT-TERM RESULTS (1-3 YEARS) CLUSTER PARTICIPANTS *(direct/immediate results claimed by cluster participants)*	LONG TERM EFFECTS (3-10 YEARS) CLUSTER PARTICIPANTS & BEYOND *(indirect/subsequent effects that can be observed over time)*
INDIVIDUAL ACTOR (A)	**Perceptions, Capabilities & Behaviours** • Competence development • Knowledge exchange • Capacity to innovate • Involvement in collaborative activities	**(Economic) Performance experienced by individual actors**
COLLABORATIVE GROUP/CLUSTER INITIATIVE (C)	**Composition, Perceptions, Capabilities & Behaviours** • Engagement of different actor groups • Dynamics of linkages over time • Perceived value of collaboration **Collaboration Infrastructure** • Quality of cluster management • Leadership • Processes	
TERRITORIAL SYSTEM (S)	**System Resources** • Improving the competitiveness and international attractiveness of the innovation ecosystem **System Leadership** • Contributing to increased effectiveness (structures, policies and institucional arrangements) of the innovation ecosystem	**System Resources** • Improving the competitiveness and international attractiveness of the innovation ecosystem **System Leadership** • Contributing to increased effectiveness (structures, policies and institucional arrangements) of the innovation ecosystem

HIGHER LEVEL SYSTEM EFFECTS

The subsequent sections in this guide set out a series of indicators, methods and practical experiences with cluster evaluation that fit within this generalisable framework.



04

HOW TO EVALUATE CLUSTERS: INDICATORS AND METHODS

As part of the process of creating the framework, attention was also paid to describing concrete indicators that can be used to monitor development and evidence results over time. While the selection of indicators is dependent on the local context, the objectives of the cluster policy programme and the nature of the specific collaborative initiatives being supported, examples of the types of indicators were constructed for the different levels and timing of effects (Figure 4).

Figure 4: Cluster programme framework of effects - example indicators

	SHORT-TERM RESULTS (1-3 YEARS) CLUSTER PARTICIPANTS *(direct/immediate results claimed by cluster participants)*	**LONG TERM EFFECTS (3-10 YEARS) CLUSTER PARTICIPANTS & BEYOND** *(indirect/subsequent effects that can be observed over time)*
INDIVIDUAL ACTOR (A)	• New skills • Introduction of new products/services/ processes • Prototypes and patent applications • Articles (academic, other) • New markets and customers • Change in strategy	• Revenue growth • Productivity growth • Employment growth • Export growth • Improved market share/position
COLLABORATIVE GROUP/CLUSTER INITIATIVE (C)	• # and different types of actors engaged in the cluster initiative • #, types and volume of collaborative activities • New innovation partnerships • Willingness/perceived value of collaborating around a shared strategic direction • Labelling of cluster management quality (EUCLES, ESCA approach)	
TERRITORIAL SYSTEM (S)	• Initial milestones/key events on various "impact pathways"	• Knowledge development and dissemination • Experimentation and Entrepreneurship • Attracting investment • Developing physical or digital (R&I) infrastructure • Building reputation and position of the sector/thematic area • Connecting with other system leaders in new strategic partnerships • Influencing policy or strategy

• • • Clean energy or climate action
• • Equality, diversity and social inclusion
• Health and wellbeing

For individual actors (A), indications of progress in the short-term relate to changes in perceptions, capabilities and behaviours (e.g. strengthened knowledge exchange, capacity to innovate, or strengthened confidence with and increased involvement in collaborative innovation activities within or outside the cluster initiative), as well as to academic or commercial results (e.g. number of new patent applications, new skills or number of new products, services or improved business processes). In the long-term, these are expected to contribute to strengthened performance, using indicators of firm-level economic performance (e.g. growth in revenue, productivity, employment and export, or improved market share). It is important to note that when assessing firm-level performance, one should acknowledge the self-selection bias – i.e. that those firms who choose to participate in a cluster initiative are often those that are more entrepreneurial and innovative.

For the collaborative group/cluster initiative (C), indicators span the short and long term and are related to the evolution of collaborative strength and dynamics among participants in the cluster initiative (or the "collaborative journey" of the cluster). These include changes to the composition of the collaborative initiative (e.g. number and types of actors involved), and changes to collaborative behaviours, capabilities and perceptions (e.g. type and volume of collaborative activities undertaken, depth of collaboration or perceived value of collective action). A second type of indicator is also identified to capture the maturing professionalisation and strategic orientation of the collaboration infrastructure (i.e. the cluster organisation). Here, for example, there are well-established sets of indicators used by the European Clusters Excellence Labelling Structure (EUCLES).[3]

The level of the territorial system (S) is the most challenging (and least explored in current evaluation approaches), where indicators should capture how the collaborative activities supported by the cluster policy contribute to the broader territorial system. These system-level effects include immediate spill-overs and strengthened system resources (e.g. knowledge development and dissemination, entrepreneurship, investment and physical infrastructure), as well as strategic system leadership effects (e.g. serving as a source of trusted industry intelligence, influencing policy and strategy, amplifying reputation and position, developing new strategic partnerships). They may also include contributions to higher-level system effects (e.g. climate action, social inclusion, health and well-being). Typically, changes on the level of the territorial system (involving and affecting not only cluster initiative participants, but also surrounding stakeholders) are complex, context-dependent and long-term processes. As such there are no concrete indicators or measures suggested, but rather characteristics (resources, actors and institutions) and contributions to longer-term strategies of the regional innovation system that may be influenced and upgraded by the collective action of the cluster initiative, cumulated over time.[4]

Once relevant indicators for monitoring, evaluation and learning purposes have been selected, the next step is designing an evaluative strategy: considering and selecting a mix of methods for collecting data and evidencing different levels of effects at different points in time. The choice of methods will be driven by consideration of (financial and human) resources needed to collect and analyse data, relative to capacity, ease of implementation and timing.

For many actor-level indicators, use of surveys[5] or statistical data are typical methods of choice. To evidence other levels of effects (at cluster initiative and system levels), other methods should be considered. A short description of a selection of relevant methods for assessing these levels is presented below.

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[3]Information on the indicators used by the European quality labelling process for cluster management, formally known as ESCA, can be found here: https://eucles.be/labelling/#eligibility-criteria.

[4]For additional detail on the theoretical underpinnings and a practical attempt to define and categorise different system level effects for clusters and innovation ecosystems, see: Wise, Eklund, Wilson and Smith (2022). 'A participatory approach to tracking system transformation in clusters and innovation ecosystems – Evolving practice in Sweden's Vinnväxt programme', Research Evaluation, 31 (2): 271-287. doi.org/10.1093/reseval/rvac006

[5]TCI Cluster Evaluation Working Group has developed a standard survey that can be used to collect data on firms and other cluster participants.

METHOD:

USER/CLUSTER PARTICIPANT SURVEYS

EFFECT LEVEL	Actor level (and partially cluster initiative level)
INDICATOR OF	Perceived value of particular services and collaborative initiatives, engagement in collaborative activities, changes in behaviour and strategy, introduction of new products/processes, etc.
DESCRIPTION	Qualitative approach to gather perceptions and indications of changed behaviours and capabilities; a structured way to evidence shorter-term effects.
SKILLS NEEDED	• Experience with survey drafting, implementation and analysis • Experience with digital survey tools • Deep knowledge of the cluster management and cluster policy aims • Communication
ADVANTATGES	• Easy to tailor and implement on a regular basis • A form of evidencing progression over time • Provides timely strategic intelligence to improve collaborative initiatives • Relatively low cost
DISADVANTATGES	• Difficult to narrow-down to few questions/few indicators • Difficult to get strong response rate • Doesn't provide a quantifiable measure of impact

METHOD:

IMPACT ANALYSIS (WITH CONTROL GROUPS AND COMPARISONS)

EFFECT LEVEL	Actor level (and partially cluster initiative level)
INDICATOR OF	Firm-level performance (revenues, employment, profitability, etc.)
DESCRIPTION	Quantitative approach to capture average levels of firm-level performance for cluster participants (treated firms) in comparison to a control group of firms who are not participants in the cluster initiative (non-treated firms)
SKILLS NEEDED	• Quantitative/statistical analysis • Econometrics • Matched sampling
ADVANTATGES	• Provides a quantifiable measure of impact • Objective as uses statistics • Clear and strong communicative messages (attractive to politicians)
DISADVANTATGES	• May not have access to statistics at the relevant geographical level or time period • Difficult to establish a relevant control group • Difficult to evidence connection/trace contribution from cluster initiative activities to longer-term performance in firms

METHOD:

SOCIAL NETWORK ANALYSIS (SNA)

EFFECT LEVEL	Collaborative/cluster initiative level
INDICATOR OF	# and types of actors engaged; #, type and volume of collaborative activities
DESCRIPTION	SNA is a process of investigating social structures through graphic and statistical analysis of network structures and their dynamics. It characterizes networked structures in terms of nodes (individual actors, people, or things within the network) and the ties, edges, or links (relationships or interactions) that connect them.
SKILLS NEEDED	• Interviewing • Quantitative/statistical analysis • Social Network Analysis (SNA)
ADVANTATGES	• Visualisation of nodes and linkages supports easy communication and insights • A “quantification” of typically soft measures (relationships)
DISADVANTATGES	• Time-consuming (qualitative processes) to establish initial lists of participants and their connections with other actors • Requires software/analytical tools and capacities

METHOD:
CLUSTER MANAGEMENT QUALITY LABELLING

EFFECT LEVEL	Collaborative/cluster initiative level
INDICATOR OF	Cluster management capacities and capabilities; # and types of actors engaged; #, type and volume of collaborative activities
DESCRIPTION	Cluster management quality labelling is a qualitative approach to assess the capacities and capabilities of cluster organisations (or other institutions for collaborative management). Aspects assessed include: the structure of the cluster initiative, governance and cooperation within the cluster initiative, financing of cluster organisation management, strategy and services, achievements and recognition.
SKILLS NEEDED	• Knowledge of European quality labelling process for cluster management • Interviewing • Documentary analysis • Benchmarking techniques • Communication
ADVANTATGES	• Internationally-established system (and set of indicators) for cluster management quality labelling exists through EUCLES[6], supporting benchmarking and learning between cluster management organisations • Established process for assessments leveraging international experts
DISADVANTATGES	• Time-consuming (and costly – depending on label level) process to gather data and be assessed by external experts • Does not include a robust assessment of effects or the cluster organisation's contribution to effects

[6]The non-profit association European Cluster Labelling Excellence Structure (EUCLES) has responsibility for implementation of the European labelling scheme, in operational partnership with VDI/VDE-IT (see: EUCLES – European Cluster Labelling Excellence Structure and The European Secretariat for Cluster Analysis (ESCA) — ESCA (cluster-analysis.org)).

METHOD:
SUCCESS STORIES/ IMPACT CASES

EFFECT LEVEL	System and collaborative/cluster initiative level
INDICATOR OF	Development steps or effects achieved and how the cluster initiative's actions contributed (over time)
DESCRIPTION	A qualitative approach focused on the story of change, to describe (a collection of) results or milestones for a particular period of time including details on the involvement of cluster participants and collaboration partners, the role of the cluster organisation, the significance of the results/milestones for the cluster initiative, and (where relevant) the contribution to broader strategies and system change processes.
SKILLS NEEDED	• Deep knowledge of the cluster management, cluster policy aims, and context • Documentary analysis • Interviewing • Communication (written, oral and visual)
ADVANTATGES	• Low cost and ease of implementation • Describes the connection between cluster initiative activities and the results (evidencing contribution and role of collaborative leadership) • Reflection and learning built in to inform improvement • Good to use for communication and engagement
DISADVANTATGES	• Subjective and selective • Difficult to assess[7] and benchmark (no standard structure)

[7]ESCA cluster management labelling does have an approach for assessing success stories, using four criteria: 1) complexity of the objectives and activities; 2) positive impact on the majority of cluster participants and industry in general; 3) relevance and degree of contribution to the achievement of the cluster initiative's strategic objectives; and 4) contribution to the sustainability of the cluster organisation's development

METHOD:

PROCESS TRACING/ OUTCOME HARVESTING

EFFECT LEVEL	System and collaborative/cluster initiative level
INDICATOR OF	Development steps or effects achieved and how the cluster initiative's actions contributed (over time)
DESCRIPTION	Process tracing/outcome harvesting is a qualitative analysis methodology used to collect evidence of what has changed (outcomes) and then determine whether and how an intervention has contributed to these changes. Process tracing involves the application of formal tests (in real time) to examine the strength of evidence linking potential causes to the changes. Outcome harvesting starts with the change observed and the reflects backwards to evidence how the intervention has contributed.
SKILLS NEEDED	• Deep knowledge of the cluster management, cluster policy aims, and context • Document and other real-time data analysis • Interviewing • Facilitation of stakeholder reflection processes • Structured documentation and communication
ADVANTATGES	• A structured (scientifically-accepted) approach for capturing broader developmental steps over time • Describes the connection between cluster initiative activities and the outcomes (evidencing contribution) • Rich in context-specific detail and therefore learning potential
DISADVANTATGES	• Can be perceived to be subjective (if not based on multiple perspectives) • Can require external resources (action/interaction researchers) • Difficult to assess/evaluate comparatively

METHOD:
BIG DATA ANALYTICS

EFFECT LEVEL	All levels (actor, collaborative/cluster initiative and system levels)
INDICATOR OF	Multiple indicators (e.g. firm performance, actor linkages)
DESCRIPTION	Big data analytics is the process of examining big data to uncover information – such as hidden patterns, correlations, market trends, and customer preferences – that can help organizations make informed business decisions. This often involves accessing and linking various (very large) data sets/databases that include structured, semi-structured and unstructured data from different sources and in different sizes.
SKILLS NEEDED	• Deep knowledge of the cluster management, cluster policy aims, and context • Multi-programming skills • Data handling and interpreting • Quantitative and advanced analytic techniques • Data visualization and communication
ADVANTATGES	• Visualisation of various data points (in new combinations) supports easy communication and insights • Once data sources accessed and linked, can be an automated and efficient source of multiple data points
DISADVANTATGES	• Requires highly and multi-skilled individuals – both programming and analysis • Time-consuming to initially establish analytical goals and access data sources • Requires deep contextual knowledge and sense-making

05

ACTIONING THE FRAMEWORK: EXAMPLES FROM GLOBAL PRACTICE

Through the TCI Cluster Evaluation Working Group, we have developed a collaboration within which we can regularly discuss our experience and share our evaluation practice[8]. We have found that the practical demonstration of evaluation on the ground has helped our collective learning. In this section TCI members[9] share their evaluation experiences, showing in practice how cluster evaluation can be implemented and contribute to improvement.

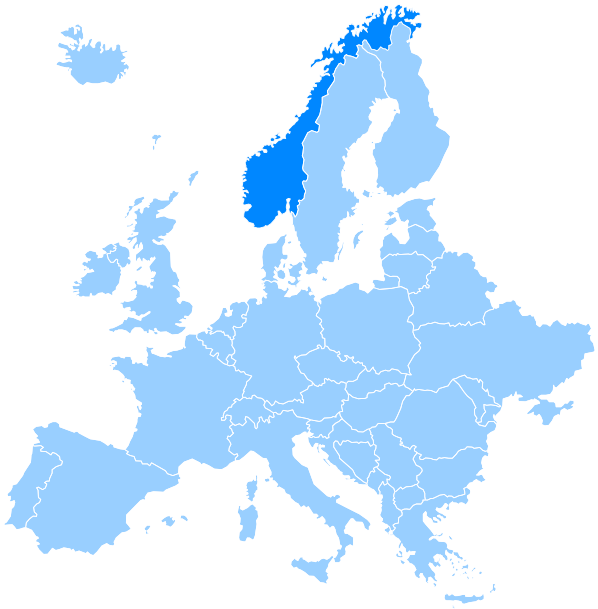
It should be understood that each context is different, and so the approach taken in one territory may not be completely replicable in another. However, by considering the evaluation through the framework of effects presented above we can still learn from the experiences of others, and then adapt to our own context and requirements.

It is also worth noting that it is rare for an evaluation strategy to include everything described so far. This is why the concept of a guide is our preferred description, enabling the evaluator to reflect and select the right method and approach to address the challenge presented. We hope by sharing these experiences it gives practical examples of how evaluation is be used, demonstrating some of the methods outlined previously, and creating valuable information to evidence the value of clustering and develop improved cluster interventions.

[8]See https://tci-network.org/tci-cluster-evaluation-working-group/ for reports and presentations from the working group meetings

[9]We would like to thank TCI members who contributed to these cases for sharing their learning and experience

INNOVATION NORWAY



EFFECT LEVEL

Actor level (firms)

CASE OF

Analysis of cluster firms' economic performance in comparison with control groups

DESCRIPTION

Beginning in 2014 as part of annual reporting processes to the two ministries approving the budget for the Norwegian Innovation Clusters programme, Innovation Norway commissions an econometric analysis of cluster firms' economic performance in comparison with that of a control group of firms. The analysis employs a version of matched difference-in-differences (MDID) method of econometric modelling to evidence the effects of cluster initiatives (called cluster projects in Norway) on firms' employment, sales revenues and value added. The method was initially developed and implemented by Statistics Norway, and (since 2017) has been implemented by Samfunnsøkonomisk Analyse/Economics Norway (an independent analytical group). From 2017, the annual analysis also uses micro data from the national RDI tax incentive scheme as an innovation indicator.[10]

USED BY

Innovation Norway in annual reporting of Norwegian Innovation Clusters programme to Ministries of Trade, Industry and Fisheries and of Local Government and Regional Development

FOR MORE INFORMATION

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See Røtnes, Norberg-Schulz, Rybalka, Walbækken, Gran, Håkansson and Izsak (2017). *Evaluation of Norwegian Innovation Clusters*. Report 76-2017 from Samfunnsøkonomisk analyse AS for Innovation Norway and Cappelen, Fjærli, Iancuand Raknerud (2015) "Effect on firm performance of support from Innovation Norway", Statistics Norway Reports 2015/35.

[10] In addition to micro data on innovation and economic performance, analysis includes micro data on firms' participation in publicly funded RDI projects to assess the evolution of cluster firms' involvement in collaborative projects (before and after the start of a cluster initiative) with other actors in the cluster initiative (and other cluster initiatives supported by Innovation Norway). This analysis of collaboration patterns is done every few years.

Innovation Norway

FIAL

EFFECT LEVEL

Actor level (firms) and Group level (cluster initiative)

CASE OF

Showcasing innovative capability of firms within the clusters (success stories)

DESCRIPTION

Each year FIAL publishes an Innovation Book, **Celebrating Australian Food and Agribusiness Innovations.** The annual publication shares stories of innovation from businesses, within Australia's Food and Agribusiness sector, that have been supported by FIAL through their various initiatives since their formation in 2013. Each book, now in its 6th edition, showcases up to fifty different cases across the country and industry. The aim is to capture the unique journey of a company in addressing a challenge and how they collaborated to find solutions to create impact for its business, whilst sharing learnings to inspire others. As well as useful for sharing innovative approaches across the sector, an appearance in the book is seen as great publicity and endorsement of the companies from a national organisation. The 2021 edition focused on companies operating within food and agribusiness cluster organisations, further reinforcing their innovation credentials and raising the profile of their cluster and region. In addition, the innovation book acts as a positive message about the sector, showing its creativity and forward looking companies, which helps with the reputation and image of the industry more broadly.

USED BY

Food Innovation Australia Limited (FIAL) as a mechanism to showcase innovative practice across the industry

FOR MORE INFORMATION

FIAL, info@fial.com.au
See https://www.fial.com.au/sharing-knowledge/innovation-book

FIAL
Food Innovation Australia Ltd

SPRI AND ORKESTRA

EFFECT LEVEL

Collaborative group / cluster initiative level

CASE OF

Survey to capture the perceptions of cluster participants

DESCRIPTION

A revision of the long-standing Basque cluster policy during 2014/2015 identified the need for new evaluation tools that could support strategic reflection among both the cluster organisations and the policy agency. Inspired by exchanges within the Clusters3 Interreg project and the TCI Network cluster evaluation working group, a survey was developed as a learning tool based on understanding the "voice of users" of Basque clusters. The survey was co-designed by SPRI, Orkestra and the Basque cluster organisations, piloted in 2017, and fully implemented among the members of all Basque cluster organisations in 2018. It asked questions about: (i) participation in cluster activities; (ii) the value of specific cooperation areas; (iii) the impacts of cluster cooperation; and (iv) the maturity of cooperation dynamics. Individualised reports were produced for each cluster organisation to compare its own results with the average across all cluster organisations, and these reports have been used as an input to discussions between the cluster organisations and SPRI around their annual strategic planning. The process is due to be repeated in 2022.

USED BY

Basque Cluster organisations and the Basque Business Development Agency (SPRI) as an input to reflections on strategic direction and policy learning

FOR MORE INFORMATION

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David Fernández, SPRI
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See Elola and Wilson (2021) *"How to integrate the "user voice" into evaluating and guiding cluster strategy"*, Cuadernos Orkestra, 14/2021.

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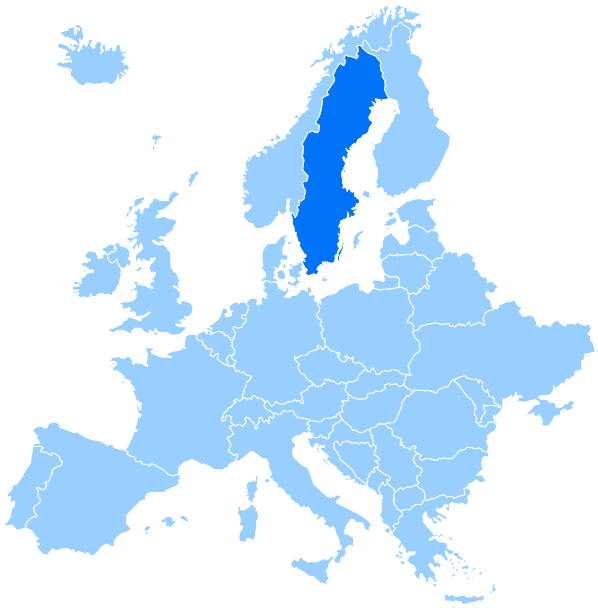
FUNDACIÓN DEUSTO

VINNOVA



EFFECT LEVEL

System level and collaborative group / cluster initiative level

CASE OF

Participatory approach to tracking system transformation (a form of real-time outcome harvesting)

DESCRIPTION

As part of annual reporting processes, Vinnväxt programme management at Vinnova introduced (in 2012) the “layer model” – a conceptual model to illustrate the different layers of effects that are catalysed by Vinnväxt initiatives. Layers 1, 2 and 3 represent different types of collaborative project funding. Layer 4 is a listing of key events and system-level developments that can be linked to the financial and human resources mobilised in the first three layers. As such, this “layer model” provides a way of documenting the ripple effects to which the collaborative Vinnväxt initiatives contribute and capturing the development of the innovation ecosystem over time. Support in documentation is provided by embedded action/interactive researchers.

USED BY

Vinnväxt initiatives’ self-reporting to Vinnova (funding innovation agency), as an input to reflections and dialogue on strategic development and contributions to system change.

FOR MORE INFORMATION

Göran Andersson, Vinnova (goran.andersson@vinnova.se)

See Wise, Eklund, Smith and Wilson (2022) “A participatory approach to tracking system transformation in clusters and innovation ecosystems – evolving practice in Sweden’s Vinnväxt programme”, Research Evaluation, 31 (2): 271-287. doi.org/10.1093/reseval/rvac006.

VINNOVA
Sweden’s Innovation Agency

BIVIZIO

EFFECT LEVEL

All levels (actor, collaborative/cluster initiative and system levels)

CASE OF

Use of a digital platform, web scraping techniques and big data analytics on ecosystem members and social media (Innovation Tags)

DESCRIPTION

The FCI-Canada Project focuses on creating a national, sector-wide data platform with enterprise-to-enterprise connectivity capabilities, aiming to strengthen Canada's domestic food supply chain, and diversify Canada's plant-based food, feed, and ingredients offerings through collaborative partnerships. Building on Quebec Food Processing Council (CTAQ)'s existing collaboration platform, developed by Bivizio, the platform provides information and visualisation of multiple data points for organisations in the ecosystem including location address, products, services, contacts, company description, NAIC classifications, and social media used on innovation themes.
Whilst the primary focus is for the information to provide insights and learning to guide companies and consumers through the COVID19 disruption, recovery, and reimagination of a resilient and vibrant agri-food sector, it has also proved extremely useful as an evaluation tool to track change in the networks and collaboration activity. The big data analytics on the ecosystem members are used as KPIs to monitor connectivity and member interactions with the platform and between them using the collaborative space.

USED BY

The FCI-Canada project[11] is financed as part of the **Protein Industries Canada** Supercluster's Ecosystem Capacity Building program. Data Sciences research project is also funded by MITACS.

FOR MORE INFORMATION

Vincent Dugré, Bivizio
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Information on the FCI-Canada project:
https://www.proteinindustriescanada.ca/projects/securing-and-strengthening-canadas-food-supply-chain
And information on the MITACS Research project supporting FCI Canada with data and methods development:
https://www.mitacs.ca/en/projects/food-convergent-innovation-canada-start-updeveloping-data-and-methods-support-digital

[11]With consortium members: CTAQ, BCFB, FBA, FBM, FBO, FBC, McGill University, University of Ottawa, Bivizio

06

TEN CLUSTER EVALUATION PRINCIPLES

01. EVALUATION STRATEGY

Evaluation practice should be part of a coherent evaluation strategy, which also includes being clear on the policy objectives against which we are evidencing progress. This will help define the scope of the evaluation and the methods used.

02. AUDIENCES: WHO IS INTERESTED? WHO IS LISTENING?

Think about different audiences (and potentially involve them in the evaluation design). What is most relevant for these audiences? Tips for reaching these different audiences include telling stories as well as highlighting facts and figures, tailoring appropriate communication to the level of analysis (project, organization, programme), and presenting things visually to show progress and change.

03. UNDERSTANDING THE CONTEXT

Understanding the context implies understanding the external environment in which cluster initiatives operate (which can change rapidly), their interactions with other actors and with other policy programmes, and the wider system in which they operate. Cluster initiatives are often only part of the policy mix to try and enhance competitiveness in the region, and understanding and acknowledging how those other policies can also affect performance is important when evidencing cluster performance.

04. WHAT SHOULD WE MEASURE - SCOPING EVALUATION?

The scope of the evaluation needs to be very clearly defined. Are you evaluating a broad cluster Programme (covering many initiatives), an individual cluster initiative or Organisation, or a particular cluster Project? Consider the focus of evaluation (POP), as this will help guide which levels (and indicators) to consider.

05. WHAT SHOULD WE MEASURE - LEVELS OF EFFECTS?

The effects of clustering that an evaluation is looking to evidence can be seen at different levels. Effects can be expected at the level of the individual Actor (A), of the Cluster initiative (or other collaborative group), or of the territorial System (country, region, city, etc.). Consider the scope of evaluation (ACS), as this will help shape the selection of indicators and methods of data collection and analysis.

06. WHEN SHOULD WE MEASURE AND WHEN SHOULD WE STOP?

Cluster initiatives and cluster policies work on very long timeframes. Cluster initiatives demonstrate different evidence at different stages of development. It is important to know what to look for and to understand that some things take time to deliver. Evaluation should appreciate that desired impacts may only emerge in the long-term, and

also look to capture short-term 'hits' along the way. Importantly, design of a strategy for evaluation should be embedded at the beginning to establish a baseline from which to track changes and to facilitate continual learning. However, it is also important to be realistic about how much data to gather for an evaluation and the risk of "analysis paralysis".Keeping evaluation practical will give more meaningful results and ensure a better integration with cluster and policy development processes.

07. SOCIAL CAPITAL AND TRUST IS THE FOUNDATION OF CLUSTER WORKING

It is critical to find ways to show progress and change in the softer – human – elements of trust, motivation, satisfaction and behavioural change that are the foundation of cluster interventions. Such changes should be linked to more tangible results (e.g. has the collaboration led to new/different services, attracted new customers, led to new partnerships etc.?). It is possible to collect 'hard data' on 'soft issues' to evidence that story of change.

08. BE AWARE OF THE CAUSALITY CHALLENGE

Cluster initiatives are charged with developing collaborative dynamics that contribute to longer-term change and system transformation processes. Causality is difficult to prove as it is not a simple linear process, and control groups are hard to find. Consider showing progress against baselines, mixed methods, story-telling and above all a "basket" of evidence to demonstrate change and inform future development steps.

09. GETTING THE RIGHT INFORMATION FROM EVALUATION - THE DAVID TEST

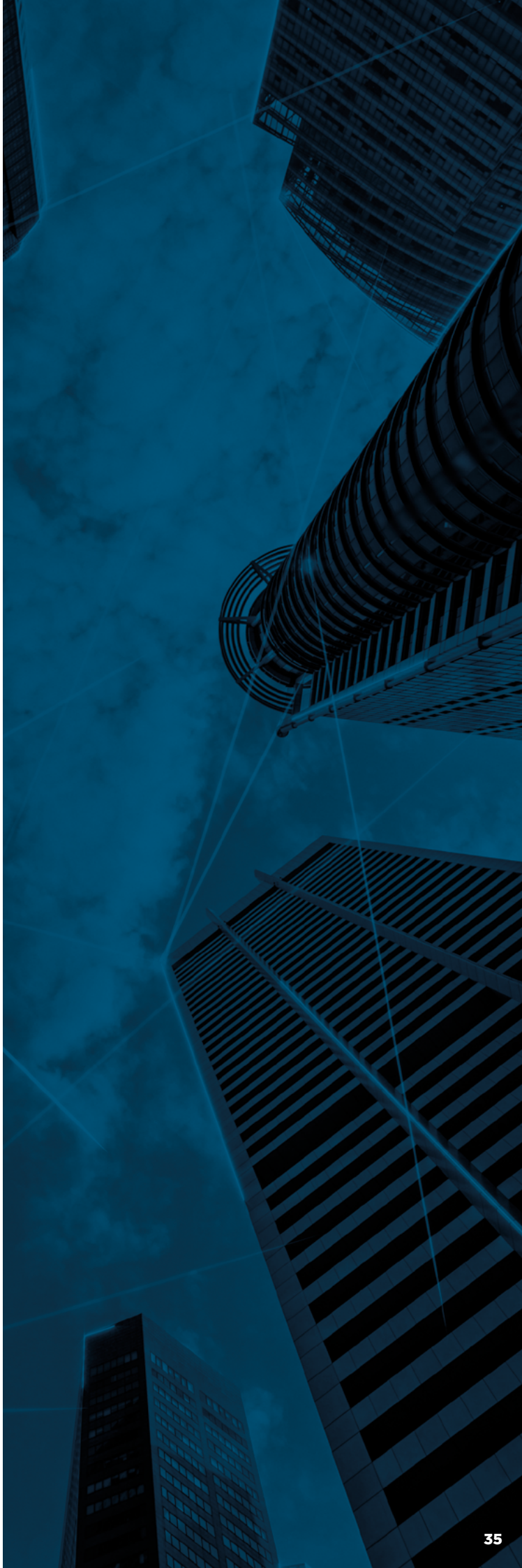
Evaluation can ask a lot of questions - but is what it generates useful and usable? When designing an evaluation, does it answer the questions you posed, and does it pass the DAVID test? Evaluation needs to:

- Generate useful **D**ata
- Be **A**nalysed
- Give **V**aluable **I**nformation
- Be **D**isseminated to inform change

10. EVALUATION FOR LEARNING AND DEVELOPMENT

Cluster evaluation is about learning, not just audit (although demonstrating return on investment is important). Cluster evaluation should drive improvement. Consider how the information will be used to improve what we do and how we do it. Importantly evaluation also should help to review if we are doing the right (most relevant) things, or if change needs to make the programme different not just better.

Cluster evaluation should be a process of continuous learning that informs strategy, feeds both the policy and the delivery process, and helps deliver improvement.



TCI NETWORK