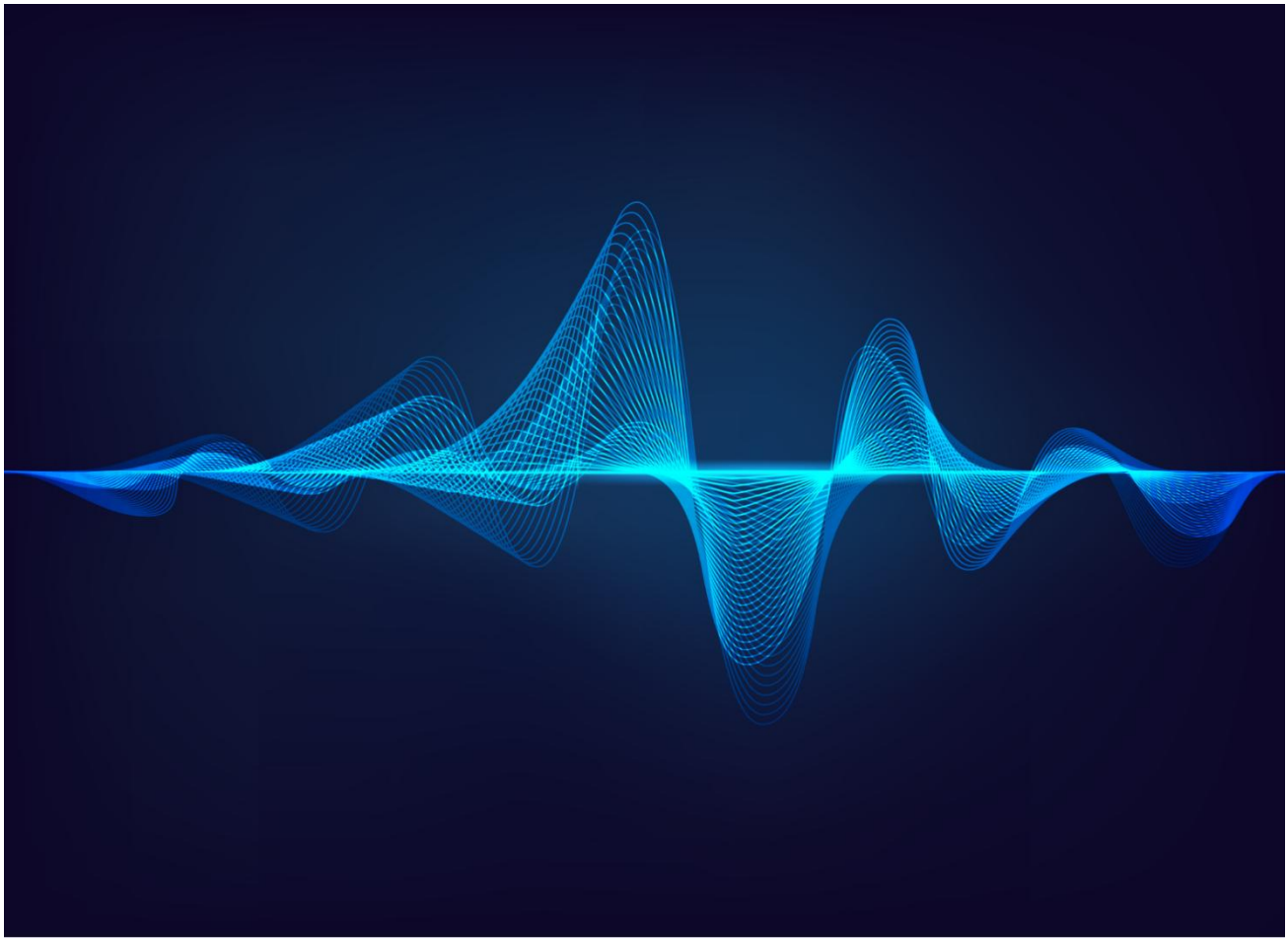

Deliverable D3.4 – Comprehensive indicators for the assessment of European music ecosystems

OpenMusE

An open, scalable data to-policy pipeline for European music ecosystems

Funded by the European Union

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Executive Summary

An expected outcome of the Horizon Europe call text “HORIZON-CL2-2022-HERITAGE-01-05 - Towards a competitive, fair and sustainable European music ecosystem” is to “develop indicators to better detect the performance of the European music sector and its contribution to economic and social development, as well as to sustainability”. The first deliverables in OpenMusE WP1-3 featured sections on indicators: respectively, on music economics (WP1); music diversity and circulation (WP2); and music, society, and citizenship (WP3) (including topics relevant to music innovation and future trends).

During the project interim review, it was suggested to harmonise the indicators developed across work packages to expedite policy coordination. This deliverable proposes a **generalizable music ecosystem indicator framework** based on Nobel Prize-winning economist Elinor Ostrom’s **social-ecological systems framework (SESF)**. The SESF offers a well-established template for operationalising the parameters of European music ecosystems as recently defined by Music Moves Europe (MME) (2024). It is also transferrable across cultural sub-sectors and fit for alignment with *Report on the State of Culture in the EU* and *EU Cultural Data Hub* proposed in the *Culture Compass for Europe* (COM(2025) 785 final).

The deliverable tests the potential of the SESF by applying it to a live music pilot study. It then generalises the framework for use on a whole-of-sector level. The SESF was utilised as an indicator communication framework in OpenMusE deliverables D1.5, D2.2, and D2.3. It was validated during the project’s final meeting at Linecheck in November 2025 and during a Horizon music cluster joint policy roundtable conducted on 9 December 2025 (the briefing document is available at: https://www.openmuse.eu/policy_pathways).

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Introduction

This deliverable proposes a generalisable framework for the development of indicators on European music ecosystems, based on Nobel Prize-winning economist Elinor Ostrom's social-ecological systems framework (SESF). The framework is adaptable to the assessment of economic dimensions of music (WP1), aspects of diversity and circulation (WP2), the social and political aspects of music (WP3), and music innovation and technology (WP4). It follows the indicator development cycle of Eurostat and has been iteratively improved and validated in stakeholder workshops conducted during the European Music Export Exchange forum (23-26 June 2025) and Music Week Poland (26-29 June 2025), as well as in a Horizon Music Cluster Joint Policy Roundtable conducted on 09.12.2025 (cf. https://www.openmuse.eu/policy_pathways).

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1 Research aims

The OpenMusE project (https://openmuse.eu/) was funded under the call HORIZON-CL2-2022-HERITAGE-01-05 – "Towards a competitive, fair and sustainable European music ecosystem"[1]. An expected outcome of this call is the development of "indicators to better detect the performance of the European music sector and its contribution to economic and social development, as well as to sustainability"[2]. Accordingly, the first three project tasks identified indicator candidates on European music economies (WP1); music diversity and circulation (WP2); and music, society, and citizenship (WP3, including also topics relevant to WP4 on music innovation and future trends). These indicator candidates are presented in D1.1, D2.1, and D3.1, respectively.

The project's approach to indicator development was inspired by the **Eurostat harmonised methodology for statistical indicators** (2014; 2017a; 2017b). Authored by a working group of experts on sustainable development, the methodology handbooks are pragmatic, stressing that "unlike the data from which they are derived, indicators are used for specific purposes" (2014, p. 7). They advise that indicator creation should not be top-down, but rather "a circular process involving all interested parties" (p. 16). Drawing on several use cases, they demonstrate how indicators should adhere to "logical frameworks" aligned to the objects of assessment. For instance, economic cycle indicators focus on signals that lead changes in macroeconomic conditions, are coincident with them, and lag behind them; project management indicators focus on task inputs, outputs, outcomes, and impacts; and sustainable development indicators focus on levels of policymaking and implementation (p. 12-15).

The OpenMusE indicator candidates were developed in accordance with the Eurostat handbooks' methodological precepts. Specifically, they were:

- **Defined with a clear purpose:** respectively, to measure music economies; music diversity and circulation; and music, society, and citizenship on the European and member state levels.
- **Defined together with stakeholders:** existing cultural indicator frameworks were assessed for relevance to music in particular. Workshops were held with policymakers and statisticians, and indicator candidates were presented and discussed at scientific and industry conferences.
- **Defined within logical frameworks.** Work package 1 on European music economies followed traditional macroeconomic indicator frameworks (see D1.1 Sections 4.3 and 5.2). Work package 2 on music diversity and circulation mapped diversity targets in EU law and industry codes and plotted these in a two-dimensional matrix against music sector practices (see D2.1 Sections 4 and 6). Similarly, work package 3 on music, society, and citizenship mapped EU cultural policy priorities and plotted these in a matrix against the four Eurostat "dimensions of culture" (2012) (see D3.1 Sections 3 and 5). In both the WP2 and WP3 matrices, each cell could be filled with one or more indicators.

One important stakeholder consultation was the project's interim review meeting itself. One takeaway of this meeting was that the frameworks proposed by each work package were overly-fitted to their respective domains. This imperils their communicability across disciplines and to non-specialists, even within the multidisciplinary project team itself. Accordingly, a new deliverable was added in WP3 / T3.1., with the aim of proposing **harmonised indicators** in all three domains.

[1] Note the reduced call text available on CORDIS at the time of writing does not include all of its original expected outcomes (cf. https://cordis.europa.eu/programme/id/HORIZON_HORIZON-CL2-2022-HERITAGE-01-05/en).

[2] "An indicator is a summary measure related to a key issue or phenomenon and derived from a series of observable facts. Indicators can be used to reveal relative positions or show positive or negative change. Indicators are usually a direct input to Union and global policies. In strategic policy fields they are important for setting targets and monitoring their achievement" (European statistical programme 2013-17, Regulation [EU] No 99/2013 of 15 January 2013, cited in European Commission 2014a, p. 3).

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2 Generalisable music ecosystem indicator framework

After discussion, the project team reached the conclusion that a **harmonised indicator framework** would be more feasible – and more useful to the music sector – than a set of harmonised indicators. A requirement for this framework is that it accommodate indicators on both the economic and non-economic value of music. It should align with conceptual touchpoints such as the Eurostat framework for cultural statistics, the draft UNESCO framework for cultural statistics, and the Music Moves Europe definition of "music ecosystems". It should be flexible enough to support both the project pilot studies (T1.6, T2.3, T3.3, T3.5, T4.3) and use-cases outside the project, which will feature different data needs, availabilities, and gaps. Finally, it should take account of the environmental, social, and governance sustainability of the sector, which has been the focus of various studies and interventions, but remains under-theorised in current "music ecosystem" concepts.

The role of an **indicator framework** is to "determine exactly what we want to measure, its key dimensions and the links between them, and which indicators to use" (European Commission, 2014b, p. 12). An effective framework must be grounded in a "sound theoretical analysis" of both the object of research and its context (European Commission 2017a, p. 11; p. 22-24). Identifying frameworks appropriate to each OpenMusE work package was uncomplicated: the **economics framework** was grounded on basic macroeconomic theory, the **diversity and circulation framework** on legal diversity targets, and the **society and citizenship framework** on a typology of policies to promote music as a public good. While the stakeholders we consulted voiced conflicting opinions on some details, they understood these frameworks and accepted that they were fit-to-purpose. The project's challenge going into this new task was to find a similar consensus on the parameters of a **generalisable music ecosystem indicator framework**.

2.1 A social-ecological systems (SES) perspective on music

2.1.1 Defining "music ecosystems"

Until recently, there has been no shared understanding of the **key dimensions of "music ecosystems"** (Berkers et al., 2024, p. 137). However, this is changing. In 2022, the European Commission Directorate-General for Education, Youth, Sport and Culture initiated Music Moves Europe (MME), a series of dialogues tasked with defining EU music ecosystems and mapping their needs (tender reference number: EAC/2022/OP/0001). The MME **definition of the European music ecosystem** is given in a 2024 working paper:

> "The European music ecosystem is the network of music sector actors - including e.g. artists, music companies, live music venues, streaming platforms, festivals, policymakers, and audiences - their environment, and their interdependencies. These are interacting through the production, distribution and consumption of music so that value is created for the system itself, and for the systems it is part of. It draws its particular strength from European ideals such as openness, equality, fairness, diversity and democracy, and is future focussed through active investments in its sustainability and resilience" (Music Moves Europe, 2024, p. 16).

The MME working paper's aim is to nudge "conventional sector and value chain based policy" toward a "future ecosystem and value network based policy" (p. 22). This would equip the sector to better understand contemporary challenges, while also supporting policy integration vertically across levels and horizontally across fields. It would also promote alignment with European Union industrial policies, which recognise the

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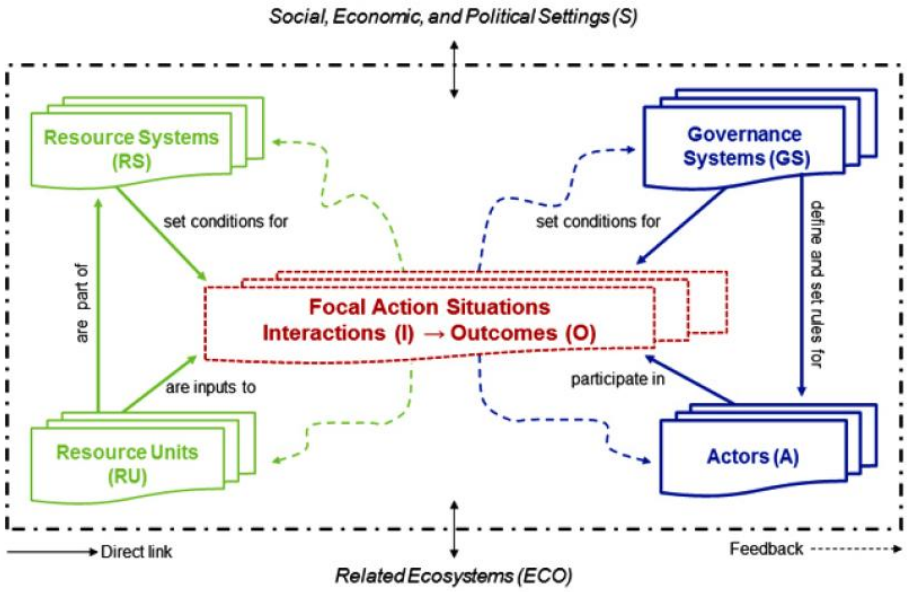
cultural and creative sectors and industries as strategically relevant “industrial ecosystems”, but pay little attention to music in specific (European Commission 2021, p. 97-103).

2.1.2 The generalisable social-ecological systems framework (SESF)

The MME definition bridges music research with **social-ecological systems theory**. A social-ecological system (SES) is any system in which *actors* interact, while using human and non-human *resources*, under the governance of *rules*. An SES model well-suited to indicator development is Elinor Ostrom’s **generalisable social-ecological systems framework (SESF)** (McGinnis and Ostrom, 2014). It specifies five first-tier components of any social-ecological system:



(Figure cf. McGinnis & Ostrom, 2014)

- **Actors** are decision-making entities active in the system;
- **Governance systems** are rules that constrain actors, as well as rule-setting institutions;
- **Resource units** are natural and human-made goods used within the system;
- **Resource systems** are the structures within which resources circulate; and
- **Action situations** are ‘scenes’ in which “individuals (acting on their own or as agents of formal organizations) **interact** with each other and thereby jointly affect **outcomes** that are differentially valued by those actors” (McGinnis & Ostrom, 2014).

Two additional elements in the framework are **social, economic, and political settings** and **related ecosystems**. Social, economic, and political contextual variables can include level of economic development, demographics, and political structures, while related ecosystem variables can include climate patterns, pollution patterns, and flows into and out of the focal SES. For a list of second-tier variables, see Annex 1.

2.1.3 Applying the social-ecological systems framework to research cases

McGinnis and Ostrom (2014) describe applying the SESF as a three-step process:

1) Selection of a focal social-ecological system based on research and policy interests;
2) Selection of variables and means of measurement;
3) Communication of findings.

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In OpenMusE, the first step was in part pre-determined by the objectives established in the Grant Agreement. The second step required rethinking the original SESF: new second-tier variables were proposed in all categories, and two top-level categories were modified. The third step required consideration of the fact that some tasks collect confidential data, which must be communicated in anonymised, pseudonymised, and/or aggregated form (see D6.2 Ethics framework and D6.3 Data management plan)[3].

A more granular, ten-step method for applying the SESF is described by Nagel and Partelow (2022). This method is based on a systematic review of numerous applications of the SESF, mostly in research on natural resource governance/management. Scientific publications in preparation by the deliverable author explore the applicability of this more granular method to music ecosystem indicator development (Edwards, forthcoming; Edwards, Cernigliaro, & Cholewicka, forthcoming).

2.2 Test application: T3.3 European live music census

The Music Moves Europe working paper observes that despite the "shift in the dominant business model from recorded music towards live music", the European live sector has undergone significant disruption in recent years (2024, p. 7). This is due to trends such as market concentration and digitalisation, as well as crises such as COVID-19 and, in Ukraine, the Russian invasion of 2022. Mitigating and adapting to such disruptions requires a better understanding of the sector.

A proven tool in live music research is the "live music census". This method has been applied in Edinburgh, Glasgow, Melbourne, Newcastle, Oxford and elsewhere (Behr et al., 2015; Flynn et al., 2018; Music Victoria, 2022). Among live music censuses, the OpenMusE census was the first to simultaneously assess cities in multiple countries: Helsinki, Finland; Lviv, Ukraine; Mannheim, Germany; and Vilnius, Lithuania. First, all venues in each city were mapped and contacted with a pre-snapshot survey; based on the survey and other data sources (social media, websites, print media), venues hosting events during the snapshot period were identified. The research teams in each city visited these venues during the week leading up to 11 October 2024 in order to distribute QR codes linking to an online audience survey.

On 11 October, the teams in each city visited as many venues as possible to distribute flyers and collect supplementary data. Finally, after 11 October, a follow-up survey was sent to venues that hosted events. In Lviv and Mannheim, the research teams also conducted qualitative interviews with venue staff and artists, some of which were video-recorded as a communication and dissemination measure (the census process and findings are reported in detail in D3.3 Pilot study – European live music census).

Ideally, indicator development should precede data collection. In this case, the SESF-based indicator framework was developed *in parallel with* rather than prior to the live music census. As a result, the research team did not explicitly take Ostrom's second-tier variables into account while designing the census. Rather, variables and means of measurement were based on the UK live music census methodology (which task leader Martin Cloonan helped develop). However, an advantage of the SESF is that many variables are intuitive enough to allow existing data to be mapped to them post-hoc.

2.2.1 Focal social-ecological system (SES) and units of analysis

Live music scenes have often been analysed in ecosystem terms, with Behr et al. defining a "live music ecology" as "a mix of venues of different capacities, demographic variations and the distinctive features of its local

[3] Data management guidelines are explained in the OpenMusE deliverables D6.2 Ethics framework and D6.3 Data management plan, available on the project website (https://www.openmuse.eu/).

government and infrastructure" (Behr et al., 2015, p. 1; cf. Behr et al., 2016a, 2016b). This definition aligns with the top-level categories of the social-ecological systems framework. Each municipal live music scene was thus defined as a focal social-ecological system. Factors that define their boundaries include:

- Governance system boundaries: basic licensing and zoning regulations, noise regulations, curfews and agent-of-change clauses, etc. are often implemented on a municipal level (though district-by-district variation is normal).
- Actor system boundaries: municipal-level sectoral and industry organisations are important actors; informal social networks of musicians and music professionals also often have municipal centres of gravity.
- Resource system boundaries: municipal public transportation systems, zoning regulations, and other factors tend to shape "catchment areas" beyond which live music staging and attendance entail higher costs and effort for venues and audiences, respectively.

Following our live music census, four focal SES were selected as units of analysis: Mannheim, Germany; Helsinki, Finland; Lviv, Ukraine; and Vilnius, Lithuania.

2.2.2 Variables and means of measurement

Applying the SESF to municipal music scenes made it clear that the original second-tier categories "resource units" and "resource systems" were ill-suited to most music sector cases. The original framework conceives of resource units as material objects (e.g., fish or trees). Second-tier variables include unit mobility, growth or replacement rate, economic value, etc. (see Annex 1). Resource systems are defined as the ecosystems that generate and support these resource units (e.g., streams or forests). Second-tier variables include ecosystem size, productivity, and equilibrium properties. These definitions only accommodate a small subset of music cases, such as the manufacture of musical instruments (Allen, 2023; Edwards & Konishi, 2023). A wider selection of music research cases could be accommodated by extending the "resource" category to include continuous flows as well as discrete units: e.g., public and private services (such as energy and transportation) and public and private financing (such as event sponsorship and grants). Such resources are critical to the survival of live music in particular.

Within the live music census, the following variables were considered.

- Actors:
    - Venues: number, attributes, histories, locations, attitudes. Measured through desk research and surveys.
    - Audiences: number, attributes, behaviours, attitudes. Measured through surveys.
- Governance systems: governmental organisations, non-governmental organisations, operational rules. Measured through desk research and surveys.
- Resources and resource systems:
    - Venue side: availability of relevant public and private goods (e.g., properties), services (e.g., transportation), and financing. Measured through surveys and desk research.
    - Audience side: availability of relevant public and private services; spending on goods/services. Measured through surveys.
- Interactions/outcomes: economic and non-economic value added. Measured through surveys.

Figure 2 below visualises the focal SES with examples of indicators.

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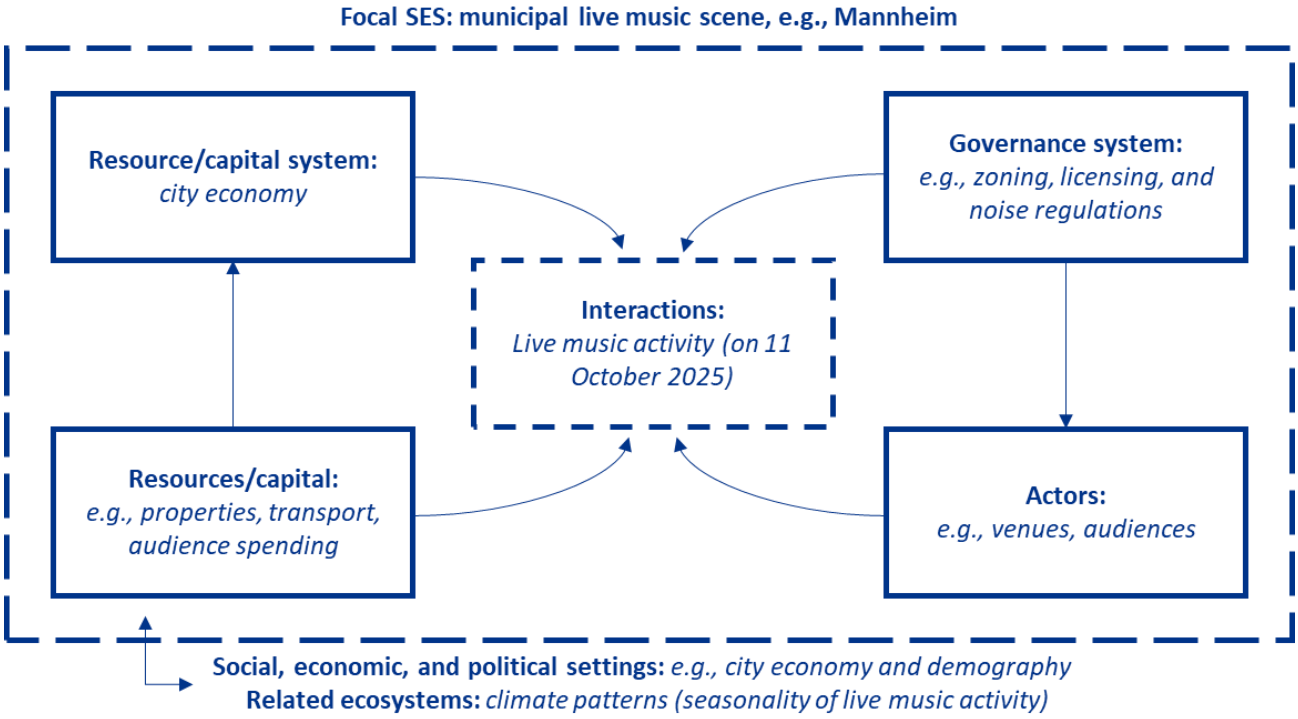

Annex 2 breaks down these variables in tabular form by SESF top-tier category, indicating which are present in the original model and which are novel. The table also provides examples of specific indicators with data types and analysis methods.

2.2.3 Communication of findings

The live music census snapshot was conducted on 11 October 2024. Post-snapshot surveys were kept open for an additional month. Data were analysed in early 2025. The pilot study's concluding deliverable was submitted to the European Commission in parallel to this deliverable. The live music census data will be disseminated through scientific articles, policy briefs, and data dashboards[4]. Selected data will also be made available in open-source repositories.

Mapping the Mannheim live music census data to the SESF yielded a structured, vivid, and communicable portrait of the municipal scene. Mannheim's **live music scene actors** include a range of long-established venues that provide diverse music offerings mainly Thursday through Saturday year-round. Most small venues are clustered downtown, while larger venues sit in the periphery. Gig-goers are predominantly youthful and gender-balanced. Attendance is modest, but audiences esteem the live music scene, and would view venue closures as a grave loss. Most favour very-small or small venues – exactly those that feel most threatened under current economic conditions.

Regarding **live music resources and resource systems**, Mannheim's cultural infrastructure is supportive yet patchy. The tram-and-bus network offers late-night service, but a substantial minority of gig-goers still cite inadequate transport as a deterrent. Cultural funding is available, but accessing it requires knowing how to navigate bureaucracy, and directing funding at venues can distort the market for those without access. A

[4] A demo dashboard is available at: https://www.openmuse.eu/live-music-census-dashboard/

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tightening property market is squeezing venue affordability; subsidy programmes exist, but Mannheim lacks the protective “culture-district” zoning seen in some cities.

Live music governance in Mannheim is multi-level. Like many German cities, Mannheim is regulation-dense: mechanisms exist to ease constraints for night-economy players but require navigating bureaucracy. Actors such as NEXT Mannheim and the Mannheim Music Commission can offer a crucial compliance resources for emerging cultural entrepreneurs. Safeguarding central, grassroots spaces (through noise-mitigation rules, predictable funding and audience-development measures) is critical for maintaining the city’s musical ecosystem and pipeline for talent.

2.3 Validation: European Music Exporters Exchange and Music Week Poland

In 2024 and 2025, several validation exercises were conducted:

- 8 August 2024, Berlin Ethnomusicology and Anthropology of Music working group: the author moderated a discussion on applying the SESF to music ecosystems.
- March, April, and May 2025: introductory discussions with selected stakeholders[5]
- 3 April 2025, Tallinn Music Week: the author took part in a roundtable on adapting to the platformisation of the music industry hosted by the EKIP Innovation Policy Platform, during which the policy relevance of the music ecosystem concept was discussed.
- 23 June 2025, European Music Exporters Exchange (EMEE) Forum: the author co-moderated a workshop with Virgo Sillamaa (EMEE) on the suitability of the SESF to music export organisations’ business indicator development.
- 26 June 2025, Music Week Poland: the author co-moderated a follow-up workshop Virgo Sillamaa (EMEE) on the application of the SESF to a broader range of music export cases.
- June and July 2025: follow-up one-on-one validation discussions with selected stakeholders.
- 3 July 2025, Humboldt University of Berlin Collegium Musicologicum: the author presented and moderated a discussion on theoretical and methodological dimensions of applying the SESF to music.

During the 23 and 26 June workshops, we started by introducing the system, framing music export as an “action situation” comprised of specific interactions and outcomes, and asking questions such as:

- Where would you define the boundaries of your ‘music export ecosystem’?
- What actors interact within this situation, under what rules, using what resources?
- What social, economic and political settings and related ecosystems have an impact on these interactions?

We used Figure 3 below as a discussion aid:

[5] Many thanks to Virgo Sillamaa (EMEE), Carsten Winter (Music Moves Europe), Andy Pratt (CICERONE project and UNESCO FCS development team), Toby Bennett (CICERONE project), Patrycja Rozbicka, Mat Flynn, Adam Behr and colleagues (Live Music Mapping Project), Frank Kimenai (KEA), the Music Innovation Hub team and Berlin Innovation Hub team, and all others who contributed to this work.

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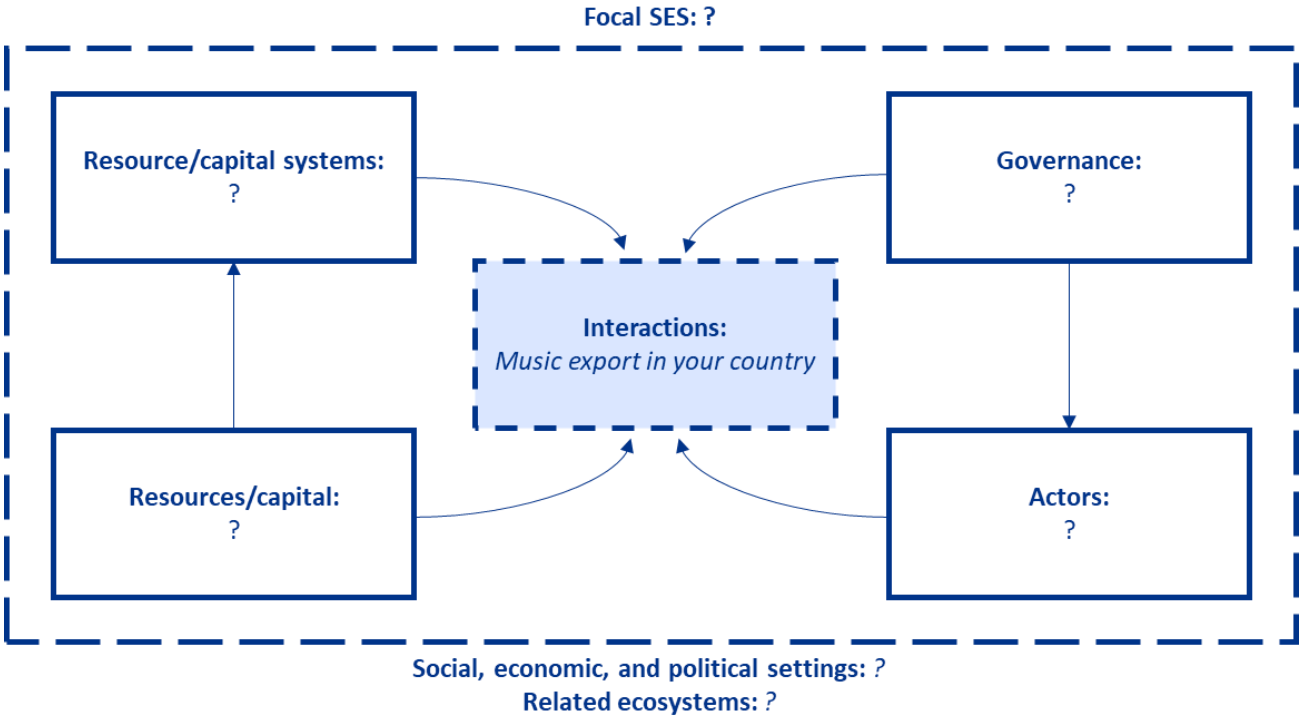

The workshops provided input for a provisional extension of the SESF to music export cases. Elements identified by the participants included:

- **Actors**: music export offices; 'source' and 'target' music market actors (e.g., promoters, festivals, venues, etc.), other cultural export/exchange entities (e.g., in Germany, Goethe Institut);
- **Governance systems**: regulations on cross-border circulation of copyrighted works, regulations on mobility of persons, regulations in source and target music markets (e.g., broadcast quotas that could impact the viability of export);
- **Resources and resource systems**:
    - **Economic capital**: grant schemes, private investment;
    - **Cultural capital**: collaborations, creative inspirations, knowledge exchange;
    - **Social capital**: new market access, possibility of discovery in new markets, network-building, recognition and reputation-building.

The workshops proved the utility of the SESF as a heuristic which helped participants 'de-silo' their understanding of music export by making clear the range of actors, governance systems, and resources in play. They also provided constructive criticism of the framework. A key point was that unlike municipal live music scenes, music export 'systems' are not spatially fixed – indeed, their elements are by definition spatially distributed. They thus do not adhere to the traditional definition of a social-ecological system as "a complex, adaptive system consisting of a bio-geophysical unit and its associated social actors and institutions" (Glaser et al., 2012, p. 4).

The next step in the validation exercise is to work with a smaller group of music export offices to develop SESF-based performance indicators for their operations and map their current data collection activities to these indicator frameworks. This will be done in coordination with EMEE in 2026.

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3 Extension to work package domains

Testing the social-ecological framework within the live music census pilot study and validating it through EMEE and MWP stakeholder workshops expedited its extension to the OpenMusEwork package domains. Three takeaways were:

- The SESF can effectively extend the MME definition of the "European music ecosystem" (2024).
- Most SESF first-tier categories and many second-tier variables are transferrable to music research (see Annex 1 for second-tier variables); the categories "resource units" must be modified to "resources" to encompass services and other 'continuous resources' in addition to discrete material goods.
- Further consideration must be given to how to apply the framework to focal systems in which key actors, governance systems, and/or resources and resource systems are spatially distributed rather than fixed: e.g., music export ecsystems (see conclusion).

Extending the framework from a concrete pilot study to the more general work package domains required revisiting the work package data collection targets/indicator candidates. The two-dimensional matrices proposed in D2.1 and D3.1 proved inspirational:

- The OpenMusE WP2 framework plotted areas of music sector practice (rows) against legally established diversity targets (columns).
- The OpenMusE WP3 framework plotted Work Plan for Culture 2023-2026 priorities and actions (rows) against ESSnet-Culture statistical dimensions (columns).

Notably, the CICERONE project (https://cordis.europa.eu/project/id/822778) independently developed a similar matrix logic, plotting statistical dimensions (similar to the ESSnet-Culture dimensions; cf. OpenMusE D3.1) against phases in a cultural production cycle inspired by the UNESCO framework for cultural statistics (2023). This matrix logic provides a basis on which to build out the SESF first-tier categories into indicator development frameworks suited to each work package. Each variant consists of:

- Dimension 1 (columns): the SESF first-tier categories, which define sets of **data subjects**.
- Dimension 2 (rows): **analytical lenses** suited to each work package objective.

The following matrices map data collection targets suggested in D1.1, D2.1, and D3.1 into SESF-based frameworks. Quantitative, qualitative, or mixed indicators and means of measurement could be defined for each cell in the matrix based on research objectives. For instance, for the data collection target "employees in music creation and production" (WP1), a national statistics institute would require a count derived from a labour force survey. However, a study on health and wellbeing might require subjective assessments of employment conditions derived from sample surveys or qualitative interviews.

3.1 WP1. Economy of music in Europe

Examples of focal systems here would be the European music economy as a whole, a national music economy, or an urban music economy. The SESF first-tier categories are clearly relevant to economic activity, and can be plotted in columns. With inspiration from the CICERONE project (and ESSnet-Culture statistical dimensions or UNESCO draft framework for cultural statistics), phases in production/value generation can be plotted in rows. The below table gives examples of data collection targets mapped from D1.1 Section 5.2 or D3.1 Annex 5. In cells without a good match, targets are suggested based on Eurostat categories of cultural statistics. The framework could be applied on an EU or national level.

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Rows: Phases of production	Columns: SESF first-tier categories			
	Actors	**Resources**	**Governance**	**Interactions**
Creation and production	Enterprises & employment (D1.1) – *note CICERONE has categorized NACE codes by phase of production*	Funding for music creation / production (new)	Economic impact assessment of copyright and collective management systems (new)	Total production at basic prices (D1.1) Number of works registered (new)
Dissemination	Enterprises & employment (D1.1)	Funding for music dissemination (new)	Economic impact assessment of broadcasting and streaming licensing system (new)	Trade in goods and services (new)
Consumption	Enterprises & employment (D1.1)	Funding for music performance (new)	Economic impact assessment of sales tax and VAT systems (new)	Household expenditure (D3.1) Musical participation (D3.1)

3.2 WP2. Music diversity and circulation

Examples of focal ecosystems here could vary widely: the total European music ecosystem or a national music ecosystem could be analysed for diversity and circulation, but units as small as an individual organisation could as well. As in WP1, the SESF first-tier categories define domains for data collection. As described in D2.1, diversity and circulation in the music sector can themselves be viewed through several lenses: the diversity of persons active in the sector, the diversity of musical content, and the diversity of stakeholders and stakeholder interactions are all relevant. The below table gives examples of data collection targets on the diversity of persons, content, and stakeholders, mapped from D2.1 Section 4.2 Tables 27, 28, and 29 respectively. In cells without a good match, targets are suggested based on stakeholder workshops.

Rows: Diversity targets	Columns: SESF first-tier categories			
	Actors	**Resources**	**Governance**	**Interactions**
Diversity of persons (D2.1 Table 27 & 28)	Diversity in music employment (new)	Diversity-targeted funding (D2.1)	Regulations to prevent discrimination (D2.1)	Representation metrics in live and recorded music (D2.1)
Diversity of content (D2.1 Table 29)	Enterprises and organisations promoting small repertoires (new)	Mechanisms to support small repertoires (new)	Regulations to safeguard small repertoires (new)	Diversity of music consumption (D2.1)

Diversity of stakeholders (D2.1 Table 30)	Diversity within stakeholder networks (D2.1)	Cross-sectoral networking mechanisms (D2.1)	Regulations to promote participatory decision-making / policymaking (new)	Participation in decision-making / policymaking (new)

This model is utilised in D2.2 “Music Diversity and Circulation: Policy Recommendations” (Section 3.4).

3.3 WP3. Music, society, and citizenship

Examples of focal systems here could vary widely as well, from the total European music ecosystem to ultra-local music communities to spatially distributed music subcultures. As in WP1 and WP2, SESF first-tier categories define domains for data collection. Within each domain, rows could define data collection objectives on numerous social, cultural, and political aspects of music. In D3.1 Annex 7, a long list of topics were selected based on the ICET model (information, communication and community, enjoyment and expression, transaction) and the Work Plan for Culture 2023-2026 priorities. Short lists were then chosen for three data collection activities: a representative music audience survey (T3.2), a live music census (T3.3), and the environmental, social, and governance sustainability assessment of small music sector organisations (T3.5). The below matrix maps data collection targets on three dimensions of the ICET model – information, communication and community, and enjoyment and expression (which are explored in D3.1 Annex 7) – against the top-tier categories of the SESF (the fourth dimension of the ICET model, transaction, is covered in WP1 Economics). Many of these data points are being collected in the representative music audience surveys conducted in DE, ES, FR, HU, IT, PL, and SK.

Rows: ICET model	**Columns: SESF first-tier categories**			
	Actors	**Resources**	**Governance**	**Interactions**
Information	Music education system actors (D3.1) Enterprises active in music discovery (D3.1)	Funding for school music education (D3.1) Funding for non-school music education and discovery (D3.1)	Regulations to promote music education (D3.1) Regulations pertinent to music discovery (D3.1)	Participation in music education (D3.1) Music discovery usage and attitudes (D3.1)
Communication and community	Audience segmentation by attitudes toward music, society, and politics (D3.1)	Attitudes toward music in society (D3.1)	Attitudes toward music and politics (D3.1)	Correlation between music attitudes and social cohesion indicators (D3.1)
Enjoyment and expression	Audience segmentation by types of musical enjoyment (D3.1)	Access to music-making resources (D3.1)	Attitudes toward freedom of expression (D3.1)	Amateur, semi-professional, and professional music-making, etc. (D3.1)

This model is utilised in D3.2 “Report on Music, Society, and Citizenship” (Section 3).

4 Discussion

Developing the Music Moves Europe definition of the "European music ecosystem" in a social-ecological systems (SES) direction would help shift music ecosystem discourse, as Berkers et al. put it, "from metaphor to measurement" (2022). SES models can:

- Give evidence-based guidance on defining system boundaries, operationalising system variables, and untangling "wicked problems" involving many types of variables (Music Moves Europe, 2024, p. 6).
- Provide an interface with the "sustainability" and "resilience" metanarratives in European cultural policymaking, as well as a vocabulary shared with policymakers and scientists.
- Bring non-human ecosystems back into the picture – no longer as colourful metaphors for cultural activity, but as material contexts and components that are necessary for culture to flourish.

Ostrom's social-ecological systems framework (SESF) offers a "metatheoretical language" for describing the key elements of various social-ecological systems: **actors**, **governance systems**, **resources/resource systems**, and **action situations** (interactions/outcomes). Mapping data collected in the Mannheim live music census to the SESF on a post-hoc basis demonstrated its transferability to music ecosystem analysis. Workshops with music export stakeholders validated its relevance for the analysis of a very different – and notably complex – music 'sub-system'.

An open question is whether the indicator framework under development here can be better described as an *application* of Ostrom's social-ecological systems framework, or as a *novel framework* based on the SESF. McGinnis and Ostrom (2014) describe the challenge of revising the SESF to make it "potentially applicable to a broader range of empirical settings without becoming so general as to be vacuous". For instance, McGinnis and Ostrom (2014) allowed the possibility that resources in social-ecological systems could be "continuous" rather than discrete: for instance, energy flows. This is a good precedent for extending the category of "resources" to include things like affordable commercially-zoned properties and transportation systems in live music scenes, or streaming platforms in recorded music distribution systems. However, McGinnis and Ostrom eventually declined to change the category title from "resource units" to "resources" as "some of the second-tier labels in their current form would no longer be meaningful when applied to this new interpretation, so this change would generate unnecessary confusion". The proposed extensions also invalidate some original SESF variables and call for the addition of others, which some environmental economists might argue distort the original meanings of the first-tier categories to the extent they lose their usefulness.

Viewing the framework as a new development inspired by SESF would open room for adaptation. For instance, a very wide selection of music research cases can be accommodated by expanding the category of resources to include any form of capital: economic, social, cultural, natural, symbolic, etc. As theorised by Bourdieu (1997) and demonstrated in numerous empirical studies, cultural practices almost always entail conversions between such forms of capital. For instance, a musician can leverage social network presence (social capital) and trend awareness (cultural capital) to build a personal brand (symbolic capital) and a paying fandom (economic capital). In this view, "resource systems" can be reconceived as "capital systems" in which different forms of capital circulate and are converted. This would bridge SES theory with mainstream cultural studies and music sociology, in which the analysis of social and cultural capital is foundational (cf. Scott, 2012; Whiting, 2021).

Another open question is how suited the SESF is to analysing music systems in which key actors, governance mechanisms, and resources are spatially distributed rather than spatially fixed. This is challenging, as the first

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step in applying the framework is defining the boundaries of the focal system. In cases such as urban live music ecosystems, clear boundaries can be identified on the levels of:

- Governance systems: licensing and zoning regulations, noise regulations, curfews, etc. are often implemented on a municipal level (though district-by-district implementation is also normal).
- Actor systems: both formal organisations such as music commissions and social networks of musicians and music professionals often have municipal centres of gravity.
- Resource systems: public transportation systems, zoning regulations, and other factors can shape "catchment areas" beyond which live music staging and attendance become more expensive and time-consuming.

Applying the SESF to systems with spatially articulated boundaries is straightforward, as they match natural scientific definitions of social-ecological systems as "bio-geophysical units" and their associated social structures (Glaser et al., 2012, p. 4). However, social-ecological systems theory more broadly has also developed methods and models for analysing "nested" and "coupled" systems, including "telecoupled" systems in which key interactions take place over distances. Tonini and Liu's (2017) "telecoupling toolbox", for instance, includes R and Python scripts for mapping and visualising geographically distant actors and subsystems, the flows (of capital, energy, information, resources, etc.) that connect them, and the chains of cause and effect that such flows engender. We will explore the applicability of this toolbox to music export systems and flows in our forthcoming consultations with music export offices.

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Conclusion

As described in Section 3 of this deliverable, most data collection targets and indicator candidates developed in the OpenMusE work packages can be mapped onto the social-ecological systems framework. Accordingly, during the remainder of the project, variants on the SESF will be used to ensure that data collection targets, key findings, and policy-relevant conclusions can be communicated in a single, interdisciplinary vocabulary. This should shed light on the "metatheoretical" questions (to borrow McGinnis and Ostrom's term) raised in the discussion section, and drive the further development of the framework.

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Annex 1: Original SESF variables (McGinnis & Ostrom, 2014)

Tier-one category	Variable	Variable description
Social, political, and economic settings	S1	Economic development
	S2	Demographic trends
	S3	Political stability
	S4	Other governance systems
	S5	Markets
	S6	Media organisations
	S7	Technology
Resource systems	RS1	Sector
	RS2	Clarity of system boundaries
	RS3	Size of resource system
	RS4	Human-constructed facilities
	RS5	Productivity of system
	RS6	Equilibrium properties
	RS7	Predictability of system dynamics
	RS8	Storage characteristics
	RS9	Location
Resource units	RU1	Resource unit mobility
	RU2	Growth or replacement rate
	RU3	Interaction among resource units
	RU4	Economic value
	RU5	Number of units
	RU6	Distinctive characteristics
	RU7	Spatial and temporal distribution
Governance systems	GS1	Government organisations
	GS2	Nongovernment organisations
	GS3	Network structure
	GS4	Property-rights systems
	GS5	Operational rules
	GS6	Collective-choice rules
	GS7	Constitutional rules
	GS8	Monitoring and sanctioning processes
Actors	A1	Number of relevant actors
	A2	Socioeconomic attributes
	A3	History or past experiences
	A4	Location
	A5	Leadership/entrepreneurship
	A6	Norms (trust-reciprocity)/social capital
	A7	Knowledge of SES/mental models
	A8	Importance of resource (dependence)
	A9	Technologies available
Interactions	I1	Harvesting
	I2	Information sharing

	I3	Deliberation processes
	I4	Conflicts
	I5	Investment activities
	I6	Lobbying activities
	I7	Self-organising activities
	I8	Networking activities
	I9	Monitoring activities
	I10	Evaluative activities
Outcomes	O1	Social performance measures (e.g., efficiency, equity, accountability, sustainability)
	O2	Ecological performance measures (e.g., overharvested, resilience, biodiversity, sustainability)
	O3	Externalities to other SESs
Related ecosystems	ECO1	Climate patterns
	ECO2	Pollution patterns
	ECO3	Flows into and out of focal SES

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Annex 2: T3.3 European live music census variables

Social, economic, and political settings

Second-tier variable	Indicators	Means of measurement
Economic development (O)	Basic national / regional / municipal economic statistics	Quantitative secondary data analysis
Demographic trends (O)	Municipal demographic trends	Quantitative secondary data analysis
Media organisations (O)	Key sources of information on live music	Desk research
Cultural context (N)	Qualitative description of city culture	Desk research; qualitative stakeholder interviews

Actors: Venues

Second-tier variable	Indicators	Means of measurement
Number of relevant actors (O)	Number of venues disaggregated by size and type	Venue mapping; venue surveys
Socioeconomic attributes (O)	Venue legal status; venue space use arrangement (e.g., own, rent); employment; revenue; expenditure	Venue surveys
History or past experiences (O)	Venue length of operation; days open; months open; types of events staged; genres of music staged; operational barriers (e.g., regulations, economic conditions, etc.)	Venue surveys; qualitative stakeholder interviews
Location (O)	Venue location disaggregated by size	Venue mapping; venue surveys
Knowledge of SES/mental models (O)	Venue attitudes toward environmental, social, and governance sustainability	Venue surveys
Importance of resources (O)	Importance to venues of public and private goods and services (e.g., grants, transportation)	Qualitative stakeholder interviews

Actors: Audiences

Second-tier variable	Indicators	Means of measurement
Number of relevant actors (O)	Estimated audience attendance on snapshot day; estimated average attendance per period of week, per season	Audience survey; venue surveys
Socioeconomic attributes (O)	Audience age and gender distribution	Audience survey
Location (O)	Audience place of residence	Audience survey
Knowledge of SES/mental models (O)	Audience attitudes toward live music	Audience survey

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Knowledge of SES/mental models (O)	Audience attitudes toward environmental, social, and governance sustainability	Audience survey
Importance of resources (O)	Audience transportation use	Audience survey
Consumer behaviour (N)	Audience average live music attendance	Audience survey
Consumer behaviour (N)	Audience spending on ticket/entry, transportation, food/drink, merchandise, accommodation	Audience survey

Governance systems

Second-tier variable	Indicators	Means of measurement
Government organisations (O)	Basic structure of municipal cultural governance	Desk research; qualitative stakeholder interviews
Nongovernment organisations (O)	Relevant NGOs/CSOs within the city	Desk research; qualitative stakeholder interviews
Operational rules (O)	Relevant regulations: curfews, licensing, noise, zoning	Desk research; qualitative stakeholder interviews
Monitoring and sanctioning processes (O)	Existing procedures to monitor live music	Desk research; qualitative stakeholder interviews

Resources and resource systems

Second-tier variable	Indicators	Means of measurement
Public goods and services (N)	Availability and use of public transportation	Audience survey; qualitative stakeholder interviews
Private goods and services (N)	Availability of live music venue spaces	Desk research; qualitative stakeholder interviews
Clarity of system boundaries (O)	Perceived clarity of municipal music ecosystem boundaries	Desk research; qualitative stakeholder interviews
Size of resource system (O)	Perceived scope of municipal music ecosystem	Desk research; qualitative stakeholder interviews

Interactions and outcomes

Second-tier variable	Indicators	Means of measurement
Capital circulation (N)	Gross value added by live music to the city economy	Audience survey combined with venue surveys
Conflicts (O)	Perceived conflicts between stakeholder groups	Qualitative stakeholder interviews
Investment activities (O)	Subjective assessments of investment activity	Qualitative stakeholder interviews
Lobbying activities (O)	Subjective assessments of lobbying activity	Qualitative stakeholder interviews

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Self-organising activities (O)	Subjective assessments of self-organising activities	Qualitative stakeholder interviews
Networking activities (O)	Subjective assessments of networking activities	Qualitative stakeholder interviews
Monitoring activities (O)	Subjective assessments of monitoring activities	Qualitative stakeholder interviews
Evaluative activities (O)	Subjective assessments of evaluative activities	Qualitative stakeholder interviews
Social performance measures (O)	Music/culture indicators used by government organisations	Qualitative stakeholder interviews

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