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REPORT ON THE RI'S DISTRIBUTED ARCHITECTURE

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Table of contents

1. Executive Summary	3
2. Introduction	4
3. Governance structure and management procedures	5
4. Internal procedures for Member interactions	10
5. External Procedures for interacting with Users	17
6. Physical component Needs and Improvements	20
7. Human Resource Management	22
8. Conclusions and Future Directions	24
List of abbreviations	26



1. Executive Summary

METROFOOD-RI - *Infrastructure for Promoting Metrology in Food and Nutrition* (www.metrofood.eu) is a distributed RI aimed to promote scientific excellence in the field of food quality and safety. It provides high-quality metrology services in food and nutrition, comprising an important cross-section of highly interdisciplinary and interconnected fields throughout the food value chain, including agrifood, sustainable development, food safety, quality, traceability and authenticity, environmental safety and human health. It combines a Physical-RI (P-RI) and an electronic-RI (e-RI) for open data deposition, access and processing. The P-RI coordinates and integrates an existing network of state-of-the-art facilities including: in the “Metro” side, laboratories for the full chemical, physical-chemical and microbiological characterisation of foods and any matrix of interest in relation to the agrifood (e.g., environmental matrices from the agroecosystem of production, feeds, food contact materials, etc.), and plants for Reference Material (RM) development and production; in the “Food” side, experimental fields/farms for crop production and animal breeding, small-scale plants for food processing and storage, kitchen-labs for food preparation, and “demo” sites for direct stakeholder engagement (e.g., to run Living Labs). The e-RI consists of a service-oriented electronic architecture providing an accessible platform for sharing and integrating data, knowledge and information on metrological tools for food analysis and for facilitating the availability and use of agrifood data to the user community. The e-RI collects, integrates and makes the P-RI results open and interoperable, organising and complementing them with existing data and providing tools for various uses of the data, even promoting their interoperability and the integration with data arising from other existing networks and infrastructures. METROFOOD-RI users are individuals, teams or institutions who are foreseen to use the services of the RI. Four main user categories have been identified as follows: Researchers and academic communities; Policy makers/food inspection and control agencies; Food business operators (FBOs); Consumers/citizens.

METROFOOD-RI is structured according to a *Hub & Nodes* model. The Central Hub (CH) will be the statutory seat of the ERIC and will represent the heart of the strategy, coordination, communication and administration of METROFOOD-RI, coordinating the overall infrastructure and managing the central e-portal, which will give access to all the resources and services of the infrastructure. The CH will act as a coordinating European layer across all National Nodes (NNs), while the NNs will represent the operational sites of the infrastructure. The distributed nature of METROFOOD-RI facilitates collaborative research and service provision, leveraging the strengths and capabilities of diverse national institutions.

METROFOOD-EPI (GA 101130162) is the Horizon Europe funded project supporting the Early Phase Implementation of METROFOOD-RI. Its overarching mission is to advance the building process of METROFOOD-RI as infrastructure consolidated for its full implementation and ensure an effective start of the operational phase. This report specifically serves Objective 1 of the METROFOOD-EPI project, i.e. support the establishment of the legal entity that will manage the RI.



2. Introduction

This document lays out the framework for these interactions, defining clear roles, responsibilities, and communication protocols. The internal procedures include guidelines for decision-making, reporting, and coordination between the CH and NNs. The external procedures are designed to facilitate interactions with users and stakeholders such as researchers, policymakers, food businesses, and inspection agencies.

Having identified the ERIC (European Research Infrastructure Consortium) as the legal entity for the infrastructure and based on the *Hub & Nodes* model of the infrastructure, it is necessary to properly define the interactions between the CH and the NNs and operational functions compliant with the complex distributed architecture of the distributed RI. The CH represents the statutory seat of the ERIC, being the heart of the strategy, coordination, communication and administration of METROFOOD-RI, coordinating the overall infrastructure and managing the central e-portal, which will give access to all the resources and services of the infrastructure. The CH will act as a coordinating European layer across all National Nodes (NNs), while the NNs will represent the operational sites of the infrastructure.

A well-structured and straightforward coordination and interaction between the CH and NNs is crucial for ensuring the smooth functioning of this complex, distributed infrastructure. By establishing robust internal and external procedures, enhancing the physical and electronic components, and finalising a clear governance structure, METROFOOD-RI will be well-positioned to achieve its goals and make significant contributions to the field of food and nutrition in support to the agrifood.

The key areas related to the interactions between the CH and the NNs are the followings:

- **Governance Structure and Management Procedures:** Finalising the governance structure and management procedures to ensure clear, efficient, and compliant operational functions within METROFOOD-RI's complex distributed structure. This includes the development of Terms of Reference (ToR) and Rules of Procedure (RoP) for the various governance bodies involved in the ERIC
- **Internal Procedures for Member Interactions:** Establishing internal procedures enabling the effective interactions among the ERIC Members (and Observers)¹, designed to facilitate efficient service provision, research & development activities, internal communication, feedback mechanisms, and training programs. This includes the definition of roles and responsibilities, interaction protocols, and decision-making processes to ensure smooth operations and integration across the RI.
- **External Procedures for Interacting with Users:** Establishing external procedures for engaging with users benefiting from the infrastructure's service provision and accessing its facilities. This includes the definition of roles and responsibilities, interactions protocols and procedures ensuring clear communication (both internally within the RI, and between the RI and its users), accessibility to services, and responsiveness to users' needs and feedback.
- **Improvements of the CH and the distributed facilities for full implementation:** Identifying

¹ "Members and Observers": are countries for which official government level representatives, entitled to represent the Country (Member State or Associated Country), participate in METROFOOD ERIC and will therefore be part of the relevant bodies.



and addressing the needs for improvements in the physical infrastructure for both the CH and the distributed facilities (within the NNs). This involves ensuring that all facilities are properly equipped with state-of-the-art technology, accessible, and compliant with quality and operational standards.

- **Management of human resources:** Developing suitable procedures for human resources management and appropriate training programs to enhance staff skills at all the management, executive and operational levels (e.g. for management, finances, external relations, IPR, research & technology development, knowledge and technology transfer, etc.).

3. Governance structure and management procedures

The **Central Hub (CH)** will be the statutory seat of the ERIC and will represent the heart of the strategy, coordination, communication, and administration of METROFOOD-RI, coordinating the overall infrastructure and managing the central e-portal, which will give access to all the resources and services of the infrastructure. As central coordinating entity of METROFOOD-RI, the CH is responsible for the legal, financial, administrative, strategic, and operational management of the infrastructure, ensuring that all the activities of METROFOOD-RI are aligned with its strategic goals and all policies and procedures are implemented effectively.

The CH will host the personnel directly operating there, hired by the ERIC or seconded (in kind or against contribution). Main roles and responsibilities within the CH are referred to:

- **Coordination and management**
Executive Director (ED) - Day-to-day management of the METROFOOD ERIC, implementation of the decisions taken by the General Assembly (GA), including annual work plan and yearly budget and the five years strategy and financial plan, overseeing and coordination of the infrastructure activities. The ED is supported by the *National Nodes Committee (NNC)* in developing the (multi)annual work-program allowing the proper implementation of the decisions taken by the GA and aligning and coordinating the national scientific communities from the NNs.
- **Development and dissemination of harmonized strategies, policies, procedures, and guidelines to be followed by the NNs**
- **Legal, financial and administrative functioning of the ERIC**
Legal Officer - monitoring and advice for all legal matters within the ERIC, ensuring compliance with EU and national regulations, preparation and revision of documents for agreements, contracts, certificates, etc.
Financial Officer - daily administrative functioning and coordination of finance and accounting; preparation of the budget planning and financial reporting.
Human Resource (HR) Officer - HR management, development, recruitment, and training; measurement and appraisal of performances, implementation of reward systems and professional development.

- **Coordination of the service provision**
Service Officer - coordination and organisation of the service provision and access to the different facilities; organisation of the calls for access, their review and assessment; realisation of the link between the users and the CH and then between the user and the NNs and specific facility(ies) providing the services.
- **Coordination of the implementation of the science & research agenda**
Scientific officer – support to the development, proper implementation and update of the science & research agenda and the definition of the research goals; supervision of the execution of research projects in which the ERIC is involved; evaluation and monitoring of the scientific performances of the ERIC.
- **Quality assurance and quality control & Data Management**
Quality & Security manager & Data Manager – monitoring of the quality and security management system of the CH, interfacing with the NNs for ensuring harmonised approaches; elaboration of good practices and Standard Operating Procedures (SOPs); risk monitoring, with development and implementation of mitigation measures and contingency plans. Coordination and monitoring of the Data Management Plan (DMP) implementation, within the CH and among the NNs.
- **External Relations**
External Relation Officer – liaison and engagement with external stakeholders; identification and development of European and international partnerships; support to international outreach and partnering initiatives; support to the development and execution of the plan for communication, dissemination, exploitation and outreach.

The **National Nodes (NNs)** are the operational sites distributed across the ERIC Members (and Observers). They represent the service-providing institutes of the countries involved in the pan-European infrastructure and can be composed by a single institute or more, internally organised at a country level with an agreement among the institutes (e.g., a Joint Research Unit). NNs are responsible for the implementation of the ERIC policies and strategies, and for providing scientific services and performing Research & Innovation activities in accordance with the RI's goals. Each Country, Member or Observer, through its Representing Entity², appoints one National Node, which has the central role to provide major scientific equipment, sets of instruments, research facilities, resources and related services to the infrastructure users, enabling the conduct of top-level research in their respective fields.

Between the CH and the NNs there will be a contractual liability, particularly via the Service Level Agreement (SLA) defining the relationship between the CH and each NN in the provision of equipment, research facilities, resources and services based on the METROFOOD ERIC strategy. The SLA also defines the rights and responsibilities toward the Parties in accordance with the policies set out in the METROFOOD ERIC Statutes. The NNs will have also to implement the ERIC policies set up by the CH. Under a financial point of view, NNs ensure their own self-sustainability and proper operation for service provision. Each NN is overseen by a *National Node Representative (NNR)* to

² Representing Entity - a public entity, including regions or private entities with a public service mission, which represents the Member or the Observer country.

ensure cohesiveness and one point of contact. NNR is in charge to coordinate the national activities at the Operative Level.

To support collaboration, communication and user engagement, NNs engage with local partners, including research institutions, policy makers and industry stakeholders, to enhance service delivery and innovation.

NNs submit regular progress reports to the CH, detailing their activities and achievements, as well as eventual challenges. These reports also include updates on interactions with local, regional, and other national service providers, outlining collaborations, partnerships, and the support received from external stakeholders. The NNs coordinate with the CH to ensure that these interactions are aligned with the overall strategic goals of METROFOOD-RI, ensuring cohesive efforts across the distributed infrastructure.

The **governance structure and management procedures** of METROFOOD-RI are designed to ensure efficient, transparent, and effective coordination and oversight of its diverse and distributed activities. METROFOOD ERIC will have centralised governance; the governance bodies will exert their mandate with the utmost regard to transparency and fairness. The key components of this structure are highlighted in Figure 1, while Figure 2 depicts the governance structure of the ERIC with the relevant bodies engaged at the decision, executive and operative level (as already defined at the time of the Preparatory Phase and approved by the InterMinisterial Group).

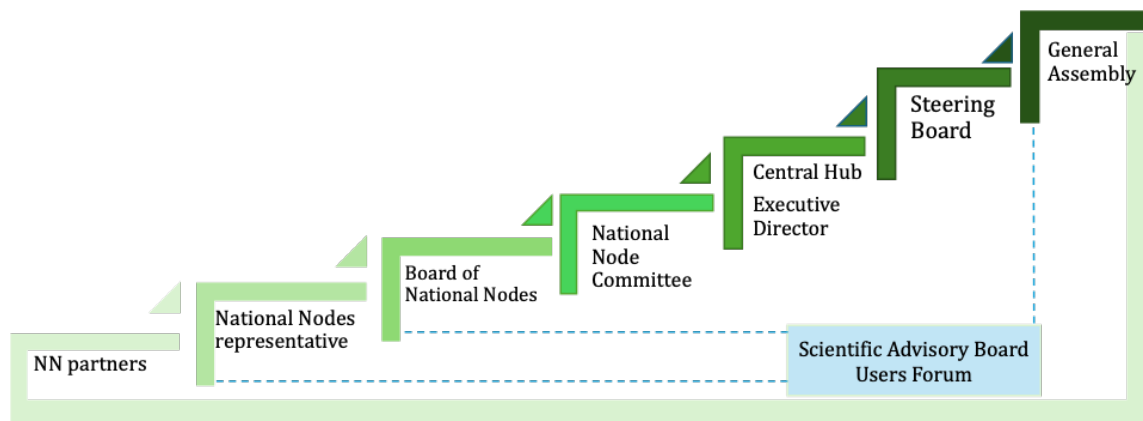


Figure 1 – Key criteria of the communication plan

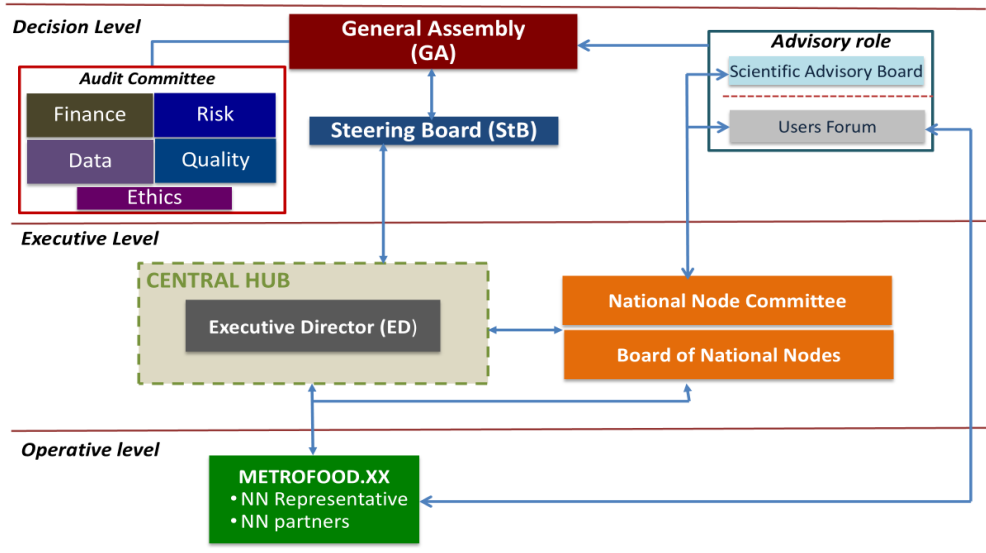


Figure 2 – METROFOOD ERIC governance structure

According to the ERIC statutes (under finalisation), METROFOOD ERIC key governance bodies are:

General Assembly (GA) - It represents the highest decision-making body for METROFOOD ERIC, it is responsible for the overall direction and supervision of the METROFOOD ERIC, ensuring coordination, implementation and progress. It decides inter alia on the strategic orientation, the budget of the legal entity, its structure and termination. Each Member or Observer shall nominate two official representatives in accordance with its own principles. One of them is the Head of the delegation. The GA shall be responsible for the overall direction and supervision of METROFOOD ERIC.

Audit Committee (AC) - It is appointed by the GA and paid by the ERIC. The AC evaluates the whole METROFOOD ERIC activities, i.e.: the scientific and strategic orientation given by the ERIC, including the operations of the NNs, as well as the management and preparation of the financial plan of the METROFOOD ERIC, its expenditure and accounts, and its financial planning. The results of the evaluation are reported to the GA. The AC can perform audits in the CH and in the NNs. If needed, the GA may assign other tasks to the AC.

Executive Director (ED) - The ED is responsible for central service functions. ED is appointed by the GA, after an international selection between high-quality candidates with proven scientific and managerial experience. ED is the Chief Executive Officer of the METROFOOD ERIC and should be employed by METROFOOD ERIC (hired or seconded). The ED shall be based at the METROFOOD ERIC Headquarter.

Steering Board (StB) - It is composed by the Chairperson and vice-chairs of the GA and the Chairperson of the Audit committee. The StB is responsible for supporting and monitoring the performance of the ED in implementing the decisions of the GA, including the Strategic Plan, the Work Programme and the budget and reports thereof to the GA. Members of the StB do not represent the

organisation to which they belong; they act in the best interest of METROFOOD ERIC, within the powers mandated by and according to the decisions taken in the GA.

Board of National Nodes (BNN) - It is made up of the National Nodes Representatives from Members and Observers. A Chairperson and a Vice-Chairperson can be elected for the duration of one calendar year and may be re-elected for no more than two consecutive mandates. The BNN provides advice in developing the (multi)annual work program and the Scientific Research Agenda. It also has the duty to align and coordinate the national scientific communities from the National Nodes.

National Nodes Committee (NNC) - It is made up of the Executive Director and three NN Representatives from METROFOOD ERIC Members, elected by the BNN. The ED chairs the NNC. The NNC supports the ED in developing the (multi)annual work program and allows the proper implementation of the decisions taken by the GA. It also has the duty to align and coordinate the national scientific communities from the National Nodes.

Scientific Advisory Board (SAB) - It consists of external and independent scientific experts chosen to complement the consortium's expertise and to maximise benefits; it shall provide scientific input for strategic decisions and advises on scientific programmes and scientific assessment. SAB shall report to the GA once a year or when requested. It shall: advice on the scientific quality of the activity of METROFOOD ERIC and the NNs; provide feedback and make recommendations on actions to improve the effectiveness of METROFOOD ERIC and NNs outcomes in the scientific community with a view to further develop METROFOOD ERIC's scientific activities. The GA appoints max 7 members to be chosen among scientists of recognized international experience in their own right, not as representatives of Member States. The GA has the possibility to asks for some more participants when it is needed for some specific topic.

Users Forum (UF) - It has an advisory role; it consists of a maximum of 12 European or international organisations or Initiatives, selected by the GA, representing different types of user categories related to the METROFOOD ERIC field of interest. Each organisation is represented in the UF by one person. The UF is the main interface for civil society, industry and academia to interact with the food & nutrition area. As one of the advisory boards, the UF contributes to the Scientific Agenda of METROFOOD ERIC implementation and further progress by providing advice on the update and implementation of the Scientific Research Agenda, knowledge & technology transfer and supporting the realisation of a sustainable relationship between the food & nutrition community and its stakeholders.

Terms of Reference (ToR) and Rules of Procedure (RoP) are essential documents that establish the framework and operational guidelines for the ERIC. While the ToR defines the purpose, scope, and high-level responsibilities, the RoP provides the practical steps and protocols necessary for effective governance. Together, these documents ensure that ERIC operates transparently, efficiently, and in line with its mission to support research infrastructure in Europe. The ToR are foundational documents that outline the purpose, objectives, scope, and structure of ERIC's bodies, providing a detailed description of roles, responsibilities, and the expected outcomes of each entity within the ERIC. They serve to guide the ERIC's activities and decision-making processes by defining:

1. Purpose and Objectives: a clear articulation of the body purpose and how it aligns with ERIC's overall mission and goals. This section outlines the specific objectives that the ERIC intends to achieve through its operations.



2. **Membership and Composition:** The ToR specifies the membership criteria, including the qualifications, expertise, and stakeholder representation required for participation. It defines the roles, including chairpersons, secretaries, and other officials.
3. **Duties and Responsibilities:** The ToR delineates the specific responsibilities and duties of each body. This includes outlining the tasks to be performed, the decision-making powers granted, and the level of autonomy afforded to each body.
4. **Operating Procedures:** Although detailed procedures may be outlined in the RoP, the ToR provides a general framework for how meetings are conducted, decisions are made, and how communication flows within the ERIC.
5. **Reporting and Accountability:** The ToR typically includes provisions for regular reporting to the ERIC governing bodies, ensuring accountability and transparency in operations.

The RoP are the detailed operational guidelines that govern the functioning of ERIC's bodies, as outlined in the ToR. The RoP provides a more granular set of instructions to ensure smooth operations, transparency, and consistency. These rules include:

1. **Meeting Protocols:** The RoP specifies how meetings are convened, the frequency of meetings, quorum requirements, and the procedure for agenda-setting. This section may also include guidelines for minute-taking and dissemination of meeting outcomes.
2. **Decision-Making Processes:** The RoP outlines how decisions are made within the ERIC. This may involve voting procedures, consensus-building methods, and the roles of various members in decision-making. It also details the process for handling conflicts of interest and the recourse in case of disputes.
3. **Communication and Documentation:** The RoP establishes the protocols for communication within the ERIC, including how information is shared with members, stakeholders, and the public. It also addresses record-keeping, confidentiality, and the publication of reports.
4. **Amendments and Revisions:** As ERIC evolves, the RoP typically includes procedures for amending the rules and revising terms as necessary, including the process for proposing, reviewing, and approving changes.
5. **Financial and Administrative Procedures:** The RoP might include guidelines for budget management, financial reporting, and resource allocation. This ensures that the ERIC operates within its financial means while fulfilling its obligations.

4. Internal procedures for Member interactions

Internal procedures for coordination and interaction between the CH and NNs and for Member (and observer) interactions within METROFOOD-RI are crucial to ensure the efficient functioning of the infrastructure, effective collaboration, clear communication, and effective implementation of the infrastructure's goals. These interactions must be governed by well-defined procedures to ensure proper communication, coordination, and collaboration, including feedback mechanisms to foster a cohesive and productive working environment. This includes regular updates on activities, operational planning, decision-making processes, and resource allocation. The CH disseminates

policies, guidelines, and protocols to NNs, ensuring uniformity across all NNs. Regular internal meetings, semi-annual reviews, and progress reports facilitate smooth interaction, allowing for continuous assessment and adjustment of the RI's objectives. The CH also provides support to NNs, ensuring they meet the international standards required for the infrastructure operation and service provision. Main linkages among the CH and NNs for the working procedure interactions are summarised in Figure 3.

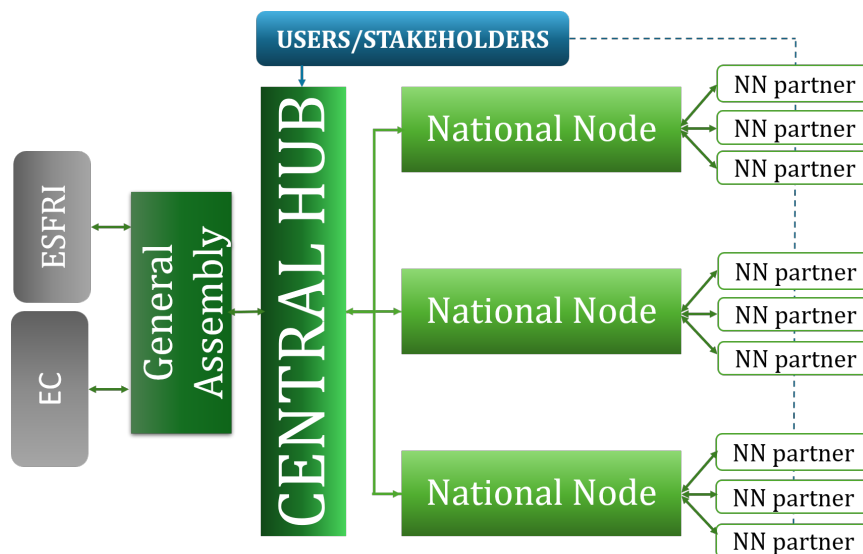


Figure 3 – Working procedure interactions

Key aspects of these interactions, including communication protocols, reporting mechanisms, and decision-making processes, are detailed hereinafter.

Role and Responsibilities

Clear definition of roles and responsibilities is essential to avoid overlaps and ensure accountability among the ERIC members. The following steps are implemented to achieve this:

Detailed Role Descriptions: Each member (and observer) of METROFOOD ERIC is provided with a comprehensive role description that outlines specific duties, responsibilities, and reporting lines. These descriptions are regularly reviewed and updated to reflect changes in the infrastructure's needs and member capacities.

Organisational Chart: An organisational chart is developed and maintained, showing the hierarchical structure and relationships between different roles and bodies within METROFOOD ERIC. This chart helps members (and observers) understand their position and how they interact each other and with the CH.

Role-Specific Guidelines: Detailed guidelines are created for each role, providing clear instructions



on how to perform specific tasks, handle common issues, and access necessary resources.

Communication Protocols

Effective communication is essential for the seamless operation of METROFOOD-RI. Communication across the CH and the NNs is important not only for routine operations but also for ensuring alignment on strategic objectives, resource management, and risk mitigation. A well-defined internal communication framework is therefore crucial to foster collaboration, ensure transparency, and facilitate decision-making across various governance layers as well as proper operation.

To this end, the following comprehensive communication protocols have been designed to meet the needs of a large-scale and widely distributed research infrastructure as METROFOOD-RI, where both horizontal (peer-to-peer) and vertical (top-down and bottom-up) communication flows are critical for optimal functionality.

1) Regular Meetings

- a. The GA shall meet at least once a year. A meeting of the GA is convened by the Chairperson at least once per calendar year, usually at the end of the year for approving the budget for subsequent period, otherwise when the Chairperson considers it necessary, or it is requested by at least three Members. A first meeting of the General Assembly shall be called by the State where METROFOOD ERIC has its statutory seat as soon as possible after the Commission decision setting up METROFOOD ERIC takes effect.
- b. Semi-Annual Coordination and Management Meetings. These meetings involve - separately - the BNN, the NNC and the StB. The agenda typically includes updates on project progresses, implementation of the science & research agenda, status of service provision, discussion of challenges, and planning for upcoming activities. Additionally, the meetings provide a forum for discussing budget allocations and expenditures, ensuring financial transparency and that resources are being used effectively across all NNs. Risk management is also a key topic, where potential risks are identified, and mitigation strategies are discussed to pre-emptively address any challenges that could hinder progress. These meetings help maintain alignment and ensure all parties are informed and engaged.
- c. Annual Progress Review Meetings. An annual meeting to review the overall progress of METROFOOD ERIC, assess the achievements of the past year, and set objectives for the coming year will be held involving the BNN, the NNC and the StB (separately and prior to the GA annual meeting). In addition to strategic planning and performance evaluation, the annual review also includes a detailed examination of the financial performance of the infrastructure. The review covers budget adherence, financial sustainability, and the reallocation of funds to areas that require additional resources. Risk management is discussed in this context to ensure that the infrastructure remains adaptable to unforeseen circumstances and external changes. These meetings serve to align financial planning with strategic objectives and to reinforce risk mitigation measures for the following year. Extraordinary meetings can be requested by the Chair (for the BNN) or the Executive Director (for the NNC).
- d. Annual Meetings of the SAB and UF. These meetings (separately and prior to the GA annual meeting) are designed to collect scientific input for strategic decisions and



advices on scientific programmes and the scientific quality of the activity of METROFOOD ERIC and the National Nodes, and collect recommendations on actions to improve the effectiveness of METROFOOD ERIC and NNs outcomes in the scientific community (SAB), and to collect advice on the update and implementation of the Scientific Research Agenda, and support knowledge & technology transfer along with the realisation of a sustainable relationship between the food & nutrition community and its stakeholders (UF). Additional meetings can be called when urgent advice is needed.

2) Reporting Mechanisms

- a) METROFOOD ERIC annual activity report to the EC. METROFOOD ERIC shall produce an annual activity report, containing in particular the scientific, operational and financial aspects of its activities. The report shall be approved by the GA and transmitted to the Commission and relevant public authorities within six months from the end of the corresponding calendar year. This report shall be made publicly available.
- b) ED report to the GA. The GA is responsible to prepare and submit to the GA the annual activity report of the ERIC, as well as the annual work plan and any other report or in general answers where requested by the GA.
- c) AC report to the GA. The Audit Committee shall produce a report to the GA on the audits performed in the CH and NNs, with the results of its evaluation on the METROFOOD ERIC activities, including the operations of the NNs, the management and preparation of the financial plan of the METROFOOD ERIC, its expenditure and accounts, and its financial planning.
- d) Annual report of the SAB and UF to the GA.
- e) Annual Progress Reports from NNs. Each NN is required to submit a comprehensive annual progress report to the CH. These reports provide detailed information on scientific and operational activities, achievements, challenges, and key milestones. Financial reports are also included to ensure transparency in the use of allocated funds. The reporting structure is designed to capture deviations from planned objectives and provide insights into local node operations.
- f) Periodic Updates from NN Partners. NNs ensure that their partners provide regular updates on ongoing projects and service delivery. These updates are consolidated by the NNs and submitted to the CH.

Authentication and Authorization Infrastructure and digital communication tools

The CH will run and manage the Authentication and Authorization Infrastructure (AAI) of the ERIC, comprising a section for Management & Administration and a section for Public Resources. It is a set of protocols that allows user to use the same password and login in different systems – a single sign-on (SSO) system. The AAI acts as supportive tool for the internal management of the ERIC being specifically designed to provide a secure environment for document sharing and storage. It allows for:

- Secure Upload and Access: only authorised users can upload, access, or modify documents.



The system employs role-based access control (RBAC) to ensure that each user has appropriate permissions.

- Version Control: the portal tracks changes in uploaded documents, allowing users to access previous versions, compare modifications, and ensure that they are always working with the latest updates.
- Centralised Repository: all reports, strategic documents, technical guidelines, and financial records are stored in a centralised location, reducing the risk of fragmented or misplaced information. This helps streamline internal audits, reporting cycles, and strategic evaluations.
- Audit Trail and Compliance: the portal provides a clear audit trail, recording who accessed or modified documents and when, which enhances accountability and ensures compliance with internal and external governance requirements.

This secure platform facilitates the structured submission of reports and supporting documents, such as technical papers, performance evaluations, and financial statements. The portal also allows for real-time tracking of submissions, helping the CH and NNs to stay on top of reporting deadlines and pending actions. This way, METROFOOD ERIC ensures data consistency and minimises the risk of unauthorised access to sensitive information. Furthermore, thanks to the AAI, the CH will be able to continuously monitor the involvement of the physical and electronic facilities of the NNs in the infrastructure activities, plans for maintenance (the NNs will be in charge for) and plans for upgrading.

The implementation in the e-infrastructure and use of digital tools such as video conferencing, collaborative platforms, and document sharing systems allow facilitate real-time communication and collaboration. The secure platform serves as the CH for official document submission and long-term storage, while the other tools are used for day-to-day collaboration, discussions, and preliminary document drafts. This combination of tools helps to ensure efficient communication while safeguarding the most critical and sensitive data within a secure platform.

Decision-Making Process

Decision-making within METROFOOD-RI is structured to ensure transparency, accountability, and alignment with strategic objectives. The following processes are established to support effective decision-making:

Policy Implementation:

- Development and Dissemination. The CH is responsible for developing policies and guidelines, which are then disseminated to NNs. These policies cover various aspects, such as procurement, access, Intellectual Property Right (IPR), scientific evaluation, Human Resource (HR), and data.
- Local Implementation and Compliance. NNs are responsible for implementing these policies locally and ensuring compliance. This involves adapting local procedures, monitoring adherence to guidelines, and training staff.

Service Level Agreement (SLA):

- It is defined as a bilateral agreement between the CH and each NN.
- It has the purpose to define the relationship between the CH and the NN in the provision of equipment, research facilities, resources and services based on the METROFOOD ERIC



strategy.

- It defines the roles and responsibilities of the CH and NNs.
- It aims at defining the rights and responsibilities toward the Parties in accordance with the policies set out in the METROFOOD ERIC Statutes.

Feedback and Continuous Improvement:

- Structured Feedback Mechanisms. Regular feedback is gathered from both the CH and NNs through surveys, feedback forms, and discussion forums. This feedback is used to identify areas for improvement and to refine processes and procedures. Feedback is collected both internally, from the CH to the NNs, and from the NNs to the partner institutes, as well as externally towards stakeholders and the (potential) user community.
- Performance Evaluation and recording of Key performance Indicators (KPIs): The CH conducts regular performance evaluations based on predefined KPIs and performance metrics. In turn, also the NNs collect internally data on the relevant KPIs. These evaluations help in assessing the effectiveness of policies, SLAs, and overall project implementation.

Coordination of Activities

To ensure the seamless coordination of activities across the distributed infrastructure, the following practices are adopted:

- Integrated Planning - Joint planning sessions are conducted involving representatives from the CH and NNs. These sessions focus on aligning local activities with the overall strategic plan of METROFOOD ERIC.
- Task Allocation and Monitoring - Specific tasks and responsibilities are allocated to NNs based on their expertise and capabilities. The CH monitors the progress of these tasks and provides support as needed to ensure timely completion.
- Resource Sharing - Resources such as data, equipment, and expertise are shared across the infrastructure to optimise efficiency and enhance the quality of services. The CH facilitates this resource sharing through centralised coordination and management.
- Technical Support and Assistance - The CH provides technical support and assistance to NNs, for improving their capabilities.

Internal training Programs

Training programs are essential to upskill members with the knowledge and skills needed to perform their roles effectively and to stay updated with new developments within METROFOOD-RI.

- Initial Training for New Members. Comprehensive orientation and training sessions are provided for new staff to familiarise them with METROFOOD-RI's goals, structure, procedures, and their specific roles. This includes both theoretical and practical training modules.
- Ongoing Training and Professional Development. Regular training sessions are organised to keep the infrastructure's staff (for both the CH and NNs) updated on new policies, procedures, and best practices. These sessions cover a wide range of topics, including data management,



quality assurance, service provision, and technical skills.

- Specialized Workshops and Seminars (Webinars). Specialised workshops and seminars are conducted on specific areas of interest or emerging issues. These events are aimed at enhancing the expertise of members and fostering knowledge sharing across the infrastructure.
- E-Learning and Online Resources. An e-learning App is established to provide members with access to training materials, webinars, and online courses. This platform allows for flexible learning opportunities and ensures that all members (and observers), regardless of location, have access to essential training resources.

Feedback Mechanism

Feedback mechanisms are critical for continuous improvement and addressing the needs and concerns of METROFOOD-RI members. The primary objective of the feedback mechanism (FM) is to foster continuous improvement, ensure alignment with METROFOOD-RI's strategic goals, and address the needs and concerns of its members. By systematically collecting, analysing, and acting upon feedback, METROFOOD-RI aims to enhance communication, operational efficiency, and member satisfaction, while promoting a collaborative and transparent working environment.

- Regular Surveys and Feedback Forms. Surveys and feedback forms are distributed regularly to collect input from members and the staff of the CH and NNs on various aspects of their experience, including the effectiveness of communication, quality of training programs, and operational challenges. This feedback is analysed to identify areas for improvement.
- Feedback Sessions and Open Forums. Feasibility check sessions and open forums are organised to provide members with an opportunity to voice their concerns, share their experiences, and suggest improvements. These sessions facilitate open dialogue and ensure that all members feel heard and valued.
- Performance Reviews and Evaluations. Regular performance reviews and evaluations are conducted to assess the effectiveness of members in their roles. These reviews are based on predefined KPIs and performance metrics and include feedback from peers and supervisors. The results are used to provide constructive feedback and support professional development.
- Issue Resolution. A clear process is established for resolving issues and conflicts that may arise among members. This process includes steps for reporting issues, mediation, and escalation to higher authorities if necessary. Ensuring a fair and transparent resolution process helps maintain a positive and productive working environment.



5. External Procedures for interacting with Users

Effective external procedures are essential for METROFOOD-RI to successfully engage with its (potential) users and more widely with stakeholders. These procedures focus on stakeholder and user engagement, service offerings and provision, users support, and feedback mechanisms to ensure high-quality service delivery and continuous improvement. External communication in METROFOOD-RI focuses on facilitating effective interactions between the CH and various external stakeholders, including users, policymakers, industry partners, and regulatory bodies. The CH serves as single access point to the RI's services and the main point of contact for all external communication, ensuring that users never directly interact with NNs, but instead communicate through a centralised platform. This structure enhances the coordination and consistency of information exchange. External communication channels include the website, a dedicated access portal, email communication, newsletters, social media platforms (such as LinkedIn and Facebook), and regular stakeholder meetings, as well as co-creation initiatives. These tools are designed to provide timely updates on METROFOOD-RI services, access to resources (knowledge, skills, facilities and technologies), and engagement opportunities. The CH also manages feedback mechanisms, ensuring responsiveness to user needs and fostering collaboration with stakeholders. All external communication must align with governance policies and ensure compliance with international standards, maintaining transparency and efficiency throughout the process.

Access portal - METROFOOD-RI provides a dedicated access portal that serves as the main platform for users to interact with the infrastructure. Through this portal, users can access services, submit requests, and stay informed about updates and developments. The access portal ensures secure communication and centralises all user interactions, offering a streamlined experience where users can browse available services and facilities, check pricing, and monitor the status of their requests. This centralised system ensures that users engage directly with the CH, rather than the NNs, maintaining consistency in communication and centralised service provision.

Events - METROFOOD-RI organises various events to facilitate engagement with users and stakeholders. As an example, *webinars* provide opportunities for users to learn about the latest developments in the scientific fields related to metrology in food and nutrition and agrifood systems (including, e.g., food quality and safety, food transparency, traceability and authenticity, circular bioeconomy and industrial symbiosis, sustainable development, environmental safety, and human health), while *open days* offer direct access to experts and facilities. *Workshops* are designed to foster collaboration and skill-building, and regular *meetings* and *conferences* allow for knowledge exchange across different sectors. These events help users stay connected with METROFOOD-RI's ongoing research and service offerings, ensuring continuous dialogue and collaboration. Additionally, *forums* are held to address specific topics of interest, where users can contribute to shaping the future of the infrastructure.

Trainings - METROFOOD-RI offers a wide range of training opportunities to support the professional development of users. These include *training events* (e.g., *summer/winter schools*, *staff exchanges*, *student hosting*, etc.) that provide hands-on experience with advanced technologies in support to the agrifood and methodologies in food metrology. *Training videos* and *online courses via e-learning* are available through the web portal, offering flexibility for users to learn at their own pace. In addition, *training materials* are distributed alongside these courses, providing users with comprehensive guides and resources to further their expertise. The training offerings are designed to equip users with the knowledge needed to maximise their use of METROFOOD-RI's services.



Publications - METROFOOD-RI ensures the dissemination of research findings and strategic information through a variety of publications. Scientific publications document the results of the infrastructure's research and are shared with the broader scientific community. In addition, METROFOOD-RI publishes strategies and roadmaps that outline its long-term goals and plans. Programmes and annual reports are released to update users and stakeholders on key achievements and developments within the infrastructure. These documents are complemented by posters and presentation slides that are used during events to communicate METROFOOD-RI's mission and progress to the public.

Communities within METROFOOD-RI are composed of experts from both within the infrastructure and external stakeholders who specialise in particular scientific or technological themes. These communities are responsible for driving the development of standards, services, and training programs, which users can access. Communities provide a space for knowledge exchange and innovation, ensuring that METROFOOD-RI remains at the forefront of developments in food metrology and related fields supporting the agrifood. By participating in these communities, users gain access to cutting-edge research and collaborative opportunities with leading experts.

Focus Groups are formed to address emerging topics and specific areas of interest within METROFOOD-RI. These groups bring together users, researchers, and stakeholders to develop strategies around new scientific or technological challenges. While not all Focus Groups evolve into permanent communities, they play a vital role in identifying new directions for METROFOOD-RI's services and research. Focus Groups provide users with an opportunity to engage with METROFOOD-RI in shaping future services and research areas, offering a platform for long-term collaboration with other research infrastructures and initiatives.

Stakeholder communication is essential and dynamic, which means that it should evolve throughout the life cycle of a project. First, the identification and mapping of relevant stakeholders to identify influence, interest, and expectations to tailor communication accordingly were performed. has prepared the background for the use of appropriate communication channels, including newsletters, social media updates, webinars, and workshops. Regular dissemination of newsletters and bulletins keeps stakeholders informed about the latest developments, research findings, and upcoming events. Social media platforms, such as Twitter, LinkedIn, and Facebook, can be used to share updates, promote events, and engage with a broader community. Additionally, webinars and workshops provide opportunities to discuss project progress, present research findings, and gather feedback from stakeholders.

Stakeholder meetings and consultations should be held regularly to gather feedback, discuss needs, and explore potential collaborations. These interactions help align METROFOOD-RI's services with stakeholder expectations and foster a sense of community. Consultative meetings with key stakeholders can provide valuable insights into their needs and expectations, which can be used to tailor services more effectively. Focus group discussions can delve deeper into specific issues or areas of interest, allowing for more detailed feedback and the development of targeted solutions.

Dissemination of relevant information to stakeholders is also a priority. Stakeholders should have access to research findings, service offerings, and policy updates through an online portal, publications, and presentations at conferences and industry events. The development of a user-friendly and regularly updated online portal ensures that stakeholders can easily access relevant information. Publications in scientific journals, industry magazines, and other outlets help to reach a



wider audience. Conference presentations offer an additional opportunity to showcase METROFOOD-RI's work and engage directly with stakeholders.

In order to monitor the effectiveness and needs, survey for different stakeholders are prepared. As an example, in this stage two different questionnaires have been prepared: one for the general public (citizens) in national languages covering Dutch, French, Italian, Spanish, Romanian, Turkish, Slovenian, Czech, and English, and the second for scientific stakeholders in English. This approach will help to measure the impact of our communication strategy and obtain feedback on user requirements and demand and their perceptions.

Feedback and Improvement Loop - Continuous feedback and improvement are vital for ensuring that METROFOOD-RI's services meet the evolving needs of its (potential) user community. This involves:

- **Regular Surveys and Feedback Forms** - Distribute surveys and feedback forms to users after the completion of services to gather their input on the quality and effectiveness of the services provided; analyse this feedback to identify trends and areas for improvement.
 - o *Post-Service Surveys*: Conduct surveys immediately after services are rendered to gather fresh and relevant feedback.
 - o *Feedback Forms*: Provide easy-to-access feedback forms on the online portal.
- **Stakeholder Feedback Sessions**: Organise periodic feedback sessions with stakeholders to discuss their experiences, challenges, and suggestions for improvement. These sessions provide valuable insights and foster collaborative problem-solving.
 - o *Regular Feedback Sessions*: Schedule feedback sessions at regular intervals to maintain a continuous improvement cycle.
 - o *Open Forums*: Create open forums where stakeholders can discuss their experiences and suggest improvements.
- **Actionable Insights and Improvements**: Use the feedback collected to implement changes and improvements in service provision. Develop a systematic process for reviewing feedback, prioritising actions, and tracking the implementation of improvements.
 - o *Data Analysis*: Analyse feedback data to identify patterns and areas needing improvement.
 - o *Action Plans*: Develop and implement action plans based on feedback.
 - o *Tracking Improvements*: Monitor the implementation of improvements to ensure effectiveness.
- **Transparent Reporting**: Regularly publish reports on the feedback received and the actions taken in response. This transparency builds trust with stakeholders and demonstrates METROFOOD-RI's commitment to continuous improvement.
 - o *Feedback Reports*: Publish detailed reports on the feedback received and the steps taken to address it.
 - o *Progress Updates*: Provide regular updates on the progress of implemented improvements.



6. Physical component Needs and Improvements

The physical infrastructure of METROFOOD-RI comprises a network of facilities across 12 European countries. It coordinates and integrates an existing network of state-of-the-art facilities including:

- in the “Metro” side, laboratories for the full chemical, physical-chemical and microbiological characterisation of foods and any matrix of interest in relation to the agrifood (e.g., environmental matrices from the agroecosystem of production, feeds, food contact materials, etc.), and plants for Reference Material (RM) development and production.
- in the “Food” side, experimental fields/farms for crop production and animal breeding, small-scale plants for food processing and storage, kitchen-labs for food preparation, and “demo” sites for direct stakeholder engagement (e.g., to run Living Labs).

To fully realise the potential of METROFOOD-RI, several areas within the physical infrastructure need to be addressed and improved. In particular:

- **Technological Upgrades** are essential to ensure that METROFOOD-RI continues to offer high-quality, accurate, and reliable services. As the field of research evolves, staying at the forefront of technological advancements allows the infrastructure to meet international standards and offer innovative solutions to emerging challenges in the agrifood.
- **Accessibility Enhancements** extend beyond just physical modifications for researchers with disabilities. This can also include improvements in digital accessibility, such as user-friendly interfaces for e-infrastructure, ensuring that data and services are easily accessible to all researchers, regardless of location or ability. Broader accessibility considerations also include ensuring that all researchers, regardless of their background or geographical location, can benefit from the facilities and services provided by METROFOOD-RI.
- **Safety and Compliance** improvements are critical to maintain a safe research environment that adheres to local, national, and international safety standards. Regular updates ensure that staff and users are protected, and that METROFOOD-RI operates in full compliance with legal requirements. This also encompasses cybersecurity and data protection, ensuring that the infrastructure remains resilient against digital threats.
- **Capacity Expansion** addresses the growing demand for METROFOOD-RI’s services. As more researchers and institutions rely on the infrastructure, expanding facilities, staff, and service lines ensures that METROFOOD-RI can accommodate increased usage while maintaining high service standards. Expanding capacity also opens up opportunities for future research areas, ensuring that METROFOOD-RI remains adaptable to evolving research needs.
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Recommendations for Upgrades and Maintenance

To address the identified areas for improvement, the following recommendations are proposed:

State-of-the-Art Facilities:

- **Regular Upgrades:** Ensure that all facilities are equipped with the latest technology and are regularly upgraded to maintain high standards. Prioritise the acquisition of cutting-edge analytical instruments, high-throughput data management systems, and



advanced food processing equipment.

- Strategic Investments: Allocate funding for strategic investments in new technologies and infrastructure enhancements. This should be based on a thorough assessment of current and future needs.

Accessibility and Safety:

- Physical Accessibility: Ensure that all physical and digital infrastructures are fully accessible to all researchers and users, including those with disabilities. This includes availability of accessible workstations, and ensuring digital platforms meet web accessibility standards.
- Assistive Technologies: Provide assistive technologies and devices, such as screen readers, hearing aids, and adaptive equipment, to support researchers and users with disabilities in performing their work effectively. Ensure staff are trained in using and supporting these technologies.
- Safety Protocols: Regularly review and update safety protocols, not only for physical safety (e.g., fire drills, safety equipment) but also for data and cybersecurity. Ensure compliance with local, national, and international standards, and provide regular safety drills, risk assessments, and training sessions for all staff.

Maintenance and Upgrades:

- Routine Maintenance: Implement a routine maintenance schedule to keep all equipment in optimal condition. This includes regular inspections, calibration of instruments, and preventive maintenance to avoid unexpected breakdowns.
- Facility Management: Develop a comprehensive facility management plan that outlines responsibilities, schedules, and procedures for maintaining and upgrading the infrastructure.

Capacity Expansion:

- Facility Expansion: Plan and execute expansions of physical space where needed. This may involve constructing new buildings, adding laboratory space, or creating additional pilot-scale processing units.
- Staffing and Training: Increase staffing levels to support expanded operations and provide ongoing training to ensure staff are proficient in using new technologies and equipment.

Sustainability and Greening Initiatives:

- Energy Efficiency: Implement energy-efficient practices and technologies to reduce the environmental footprint of the facilities. This includes upgrading to energy-efficient lighting, heating, and cooling systems.
- Waste Reduction: Develop waste reduction strategies, such as recycling programs and the use of sustainable materials, to minimise the environmental impact of operations.
- Water-Efficient Operations: Implement water-saving technologies in daily operations, including automated irrigation systems, water-efficient equipment, and leak detection systems.



- Green Procurement Policies: Developing a green procurement strategy involves sourcing products and services that meet sustainability standards. This includes choosing suppliers committed to eco-friendly practices and prioritizing goods made from recycled or sustainable materials.
- Digitalisation and Paperless Operations: Adopting digital technologies for communication, documentation, and data management can significantly reduce paper usage. Transitioning to paperless workflows not only saves resources but also streamlines operations.
- Use of green solvents: adopting the use of green solvents (such as water, ethanol, or supercritical CO₂) in laboratory processes can significantly reduce the release of harmful volatile organic compounds (VOCs), thereby minimising the environmental and health impacts associated with traditional solvent use.

7. Human Resource Management

Effective human resource management (HRM) is crucial for the success of any research infrastructure, as it ensures that the institution has a well-trained, motivated, and highly skilled workforce. In a research environment where rapid technological advancements and innovative methodologies are the norm, strategic HRM combined with continuous upskilling is key to maintaining a competitive edge and achieving scientific excellence.

HRM in a research infrastructure involves recruiting, managing, and retaining talent that can contribute to the institution's scientific goals. It requires developing policies that not only attract top researchers but also support their professional growth and ensure a productive, inclusive work environment. Key aspects include:

- **Talent Acquisition and Retention:** Identifying the specific skills and expertise required for research projects is essential. This involves recruiting researchers, technicians, data scientists, and administrative staff who bring the necessary technical knowledge and innovative thinking to the institution. Retention strategies, such as competitive salaries, benefits, and opportunities for career development, are equally important to keep valuable talent within the infrastructure.
- **Diversity and Inclusion:** Promoting diversity and inclusion within the workforce enriches the research environment by fostering a variety of perspectives and ideas. Creating an inclusive culture, where researchers from different backgrounds and disciplines can collaborate, leads to more innovative solutions and a more dynamic research process.
- **Performance Management:** Establishing clear performance management processes, including setting research goals, providing regular feedback, and conducting performance evaluations, helps align individual efforts with the overall objectives of the infrastructure. Recognizing achievements and addressing areas for improvement supports a culture of continuous progress.



Given the fast-paced evolution of scientific research and technology, upskilling is critical to ensure that staff members remain at the forefront of their fields. Upskilling involves continuous learning and development to enhance the knowledge, skills, and capabilities of the workforce.

METROFOOD-RI prioritises the continuous development and upskilling of human resources to ensure the efficient functioning of its infrastructure. This focus on capacity building involves both internal and external training programs designed to enhance the skills and knowledge of staff and collaborators. Internally, METROFOOD-RI organises training sessions for staff, ensuring that they remain up to date with the latest methodologies, technologies, and regulatory requirements in food metrology and quality management. These sessions are tailored to cover key areas such as accreditation procedures, quality management systems, and operational best practices, guaranteeing high levels of service delivery across the infrastructure. In addition to internal programs, METROFOOD-RI also collaborates with external partners to provide specialised training. This may include tutorials, workshops, and courses that focus on advanced topics like data management, scientific research methodologies, and emerging trends in food safety. These external training events enable METROFOOD-RI staff to interact with industry experts, academic institutions, and other research infrastructures, further enhancing their competencies.

The infrastructure also develops online training resources, including video tutorials and e-learning courses, making training accessible to all staff regardless of location. This approach ensures that human resources are continuously upgraded to meet the evolving demands of the infrastructure, with a focus on maintaining high standards of accreditation, quality management, and technical excellence across all activities.

To maximise the benefits of upskilling, METROFOOD-RI should cultivate a learning-oriented culture that values knowledge sharing, professional development, and adaptability. This involves:

- **Encouraging Continuous Learning:** Promoting a mindset of lifelong learning and curiosity among staff is crucial. This can be achieved by providing access to online learning platforms, facilitating participation in conferences, and offering sabbaticals for researchers to pursue advanced studies or collaborations.
- **Supporting Career Progression:** Clear career pathways and support for staff pursuing higher qualifications, such as doctoral or postdoctoral research, motivate individuals to continue growing within the institution. This not only boosts staff morale but also increases the overall research capacity of the infrastructure.
- **Flexible Work Environments:** Creating a flexible work environment that supports remote work, flexible hours, and collaboration tools enables researchers to balance their professional and personal development more effectively. This adaptability helps attract and retain top talent.

In summary, human resource management and upskilling are central to building and sustaining a highly skilled workforce in METROFOOD-RI. Strategic HRM practices attract and retain talent, while a commitment to continuous learning and development ensures that staff remain adaptable and equipped to tackle the challenges of a rapidly evolving research environment. By fostering a culture of learning, supporting career growth, and staying attuned to emerging trends, METROFOOD-RI can maintain their position at the forefront of scientific discovery and innovation.



8. Conclusions and Future Directions

In conclusion, the development and implementation of a robust, distributed architecture within METROFOOD-RI is pivotal in advancing the infrastructure's objectives and ensuring a proper operation of the ERIC. By establishing a well-defined governance framework, clear internal and external procedures, and ensuring continuous technological and structural improvements, METROFOOD-RI is setting a solid foundation for sustainable growth and impactful research outcomes in the field of food and nutrition and in support to the agrifood. This section highlights the key findings and outlines strategic directions for the future, guiding METROFOOD-RI toward achieving its long-term goals.

Key Findings

Distributed Architecture - The implementation of a well-structured distributed architecture is fundamental to the success of METROFOOD-RI. The seamless interaction between the CH and NNs can be facilitated through clear communication channels, regular meetings, structured reporting mechanisms, and transparent decision-making processes. This approach ensures effective coordination, enhances collaboration across different components of the infrastructure, and supports the integration of various activities, leading to a cohesive operational environment.

Governance Structure and Management Procedures - The establishment of a clear governance structure, including the development of detailed Terms of Reference (ToR) and Rules of Procedure (RoP), provides a solid framework for METROFOOD-RI's operations. This promotes transparency, accountability, and efficiency in decision-making processes, thereby supporting the infrastructure's overall mission and ensuring smooth management across all levels of the organization.

Internal Procedures for Member Interactions - Effective internal procedures are at the heart of METROFOOD-RI's operational success. Clearly defined roles, comprehensive training programs, and robust feedback mechanisms allow to foster collaboration among members. These procedures contribute to a productive working environment by promoting the efficient exchange of knowledge and resources. In turn, this internal coherence strengthens METROFOOD-RI's ability to fulfil its mission and respond dynamically to emerging research challenges.

External Procedures for Interacting with Users - Comprehensive external procedures allow to effectively interact with users, ensuring the infrastructure's services are accessible, relevant, and of high quality. This includes a well-structured stakeholder and user engagement plan, clear service offerings, and dedicated support mechanisms. Additionally, the integration of continuous feedback and improvement loops enable METROFOOD-RI to adapt its services to meet the evolving needs of stakeholders, enhancing the impact and accessibility of its offerings.

Physical Component Needs and Improvements - Maintaining a state-of-the-art physical infrastructure is essential for supporting METROFOOD-RI's research activities. Regular upgrades, accessibility enhancements, and strict adherence to safety standards have been prioritised to ensure that the infrastructure remains capable of meeting the project's goals. The whole infrastructure is



highly enhanced by integrating the physical components with e-infrastructure elements, improving data management and resource sharing capabilities.

Future Directions

Building on the above reported key findings, the following key future directions have been identified to address ongoing challenges and adapt to the evolving landscape:

Enhanced Technological Integration - To remain at the forefront of metrology in food and nutrition and effectively addressing agrifood systems challenges, METROFOOD-RI will continue to invest in cutting-edge technologies. A key focus will be on the integration of advanced e-components, enhancing data analysis, and facilitating efficient resource sharing. Furthermore, METROFOOD-RI will explore opportunities to leverage artificial intelligence (AI) and machine learning (ML) to improve data interpretation and service provision. By adopting these technologies, METROFOOD-RI aims to increase the accuracy, reliability, and impact of its research activities.

Expansion and Capacity Building - As the demand for high-quality research in food and nutrition continues to grow, METROFOOD-RI plans to expand its facilities and services to meet these emerging needs. This expansion will be supported by capacity-building initiatives, including targeted training programs and the recruitment of skilled personnel. Additionally, METROFOOD-RI will foster collaborations with leading research institutions and industry partners, further enhancing its expertise and research capabilities.

Sustainability and Environmental Impact - In line with global efforts to promote sustainability, METROFOOD-RI will implement initiatives to reduce its environmental footprint. This will include adopting energy-efficient practices, waste reduction strategies, and promoting sustainable research methodologies. By prioritising environmental conservation, METROFOOD-RI not only improves its operational sustainability but also contributes to research and innovations that support sustainable food systems.

Strengthened Stakeholder Engagement - To ensure it remains responsive to the needs of its stakeholders and potential user community, METROFOOD-RI will enhance its stakeholder and user engagement strategies. This includes fostering stronger collaborations with policymakers, industry leaders, and consumer organisations to influence and support the development of food safety and quality standards. By actively engaging with a broad range of stakeholders, METROFOOD-RI can adapt its services to be more relevant and impactful, driving progress in agrifood research.

Continuous Improvement and Innovation - Finally, METROFOOD-RI is committed to fostering a culture of continuous improvement. Regularly reviewing and updating its procedures, technologies, and services will be a key focus, ensuring that the infrastructure remains agile and responsive to new developments in the field. Encouraging innovation through interdisciplinary research, pilot projects, and the exploration of new methodologies and technologies will further solidify METROFOOD-RI's position as a leader in food and nutrition metrology and research and technology development in support to the agrifood.



List of abbreviations

AAI - Authentication and Authorization Infrastructure
AC - Audit Committee
AI - Artificial Intelligence
BNN - Board of National Nodes
CH - Central Hub
DMP - Data Management Plan
ED - Executive Director
ERIC - European Research Infrastructure Consortium
e-RI - Electronic Research Infrastructure
FBOs - Food Business Operators
FM - Feedback Mechanism
GA - General Assembly
HR - Human Resource
HRM - Human Resource Management
IPR - Intellectual Property Rights
ML - Machine Learning
NN - National Node
NNR - National Node Representative
NNC - National Nodes Committee
P-RI - Physical Research Infrastructure
RBAC - Role-Based Access Control
RoP - Rules of Procedure
RM - Reference Material
SAB - Scientific Advisory Board
SLA - Service Level Agreement
SOPs - Standard Operating Procedures
SSO - Single Sign-On
StB - Steering Board
ToR - Terms of Reference
UF - Users Forum
VOCs - Volatile Organic Compounds