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# D3.3 POLICY ENHANCEMENT RECOMMENDATIONS

| Work Package | WP3, FAIR Data Policy and Practice |
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| X | PU: Public |
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| | PP: Restricted to other programme participants (including the Commission) |
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## Abstract

Based on an analysis of the data policy landscape in 2019, FAIRsFAIR has prepared a series of practical recommendations for policy enhancement to support the realisation of a FAIR ecosystem. These recommendations will be used to inform the development of support, guidance and resources in the FAIRsFAIR project. They are released as a living document that will be refined to reflect the forthcoming work in FAIRsFAIR, other projects funded under the INFRAEOSC-05-2018-2019 call, and other relevant initiatives.

## Versioning and contribution history

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| 0.1 | 06.12.2019 | Joy Davidson (DCC), Marjan Grootveld (DANS), Angus Whyte (DCC), Patricia Herterich (DCC), Vanessa Proudman (SE), Claudia Engelhardt (UGOE), Lennart Stoy (EUA) | Document compiled based on the landscape analysis carried out for T3.1 |
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## Disclaimer

## Abbreviations and Acronyms

| | |
|---|---|
| CORDIS | Community Research and Development Information Service |
| FAIR | Findable, Accessible, Interoperable, Reusable |
| EGFC | European Group of FAIR Champions |
| EOSC | European Open Science Cloud |
| ESFRI | European Strategy Forum on Research Infrastructures |
| HEIs | Higher Education Institutions |
| HLAC | High Level Advisory Committee |
| INFRAEOSC | European Commission's H2020 INFRAEOSC-05-2018-2019 call |
| RI | Research Infrastructure |
| RPO | Research Performing Organisation |
| TFiR | Turning FAIR into Reality |
| WG | Working Group |

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# Introduction

Policies are a crucial component in the FAIR ecosystem. To this end, FAIRsFAIR Work Package 3 (WP3): FAIR Data Policy and Practice carried out an analysis of the current data policy landscape at various levels (national, funder, publisher, institutional) to provide a snapshot of the situation in 2019 and to identify policy elements that support or hinder FAIR data practice. To provide a comparative baseline for reviewing the data policies of various stakeholders, the priority and supporting actions presented in the Turning FAIR into Reality (TFiR) action plan were employed. To assess how well the policies of different stakeholders currently reflect TFiR's action plan, we carried out desk research to characterise policies, undertook an analysis of responses to an open consultation, and conducted a small number of interviews. The results of the landscape analysis (presented in D3.1 FAIR Policy Landscape Analysis[1]) shows that the priority and supporting actions outlined in the Turning FAIR into Reality (TFiR)[2] report are being reflected in the policies of various stakeholders to some extent. However, there is still room for improvement to foster and harmonise policies in support of the aims of the European Open Science Cloud and to realise the vision of TFiR.

Based on the initial landscape assessment and the work of related initiatives, FAIRsFAIR has prepared a series of practical recommendations for policy enhancement to support the realisation of a FAIRer ecosystem. A key aim for FAIRsFAIR is to amplify existing policy recommendations wherever possible rather than to duplicate what has already been done. In this respect, the initial set of recommendations builds upon recommendations made by a number of initiatives including EOSC-hub[3], EOSCpilot[4], RDA Europe[5], OpenAIRE[6], FREYA[7] and FAIRsFAIR[8].

Key findings from the landscape assessment and our draft recommendations are presented below under each of the three stages outlined by Turning FAIR into Reality. The list of potential stakeholder groups and specific actors reflects both those who have an interest in and/or are actively working to progress some aspects of the recommendations. The list of stakeholders is not intended to be exhaustive and FAIRsFAIR welcomes additions from the wider community.

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[1] https://doi.org/10.5281/zenodo.3558173

[2] Directorate General for Research and Innovation (European Commission). Turning FAIR into reality. https://doi.org/10.2777/1524

[3] https://www.eosc-hub.eu/deliverable/d28-first-data-policy-recommendations-approved-ec

[4] https://eoscpilot.eu/news/eoscpilots-9-recommendations-eosc-policy

[5] https://www.rd-alliance.org/rda-europe

[6] https://www.openaire.eu/

[7] https://www.project-freya.eu/en

[8] https://zenodo.org/record/3585742#.XklmOXd2vIU

## *Define - concepts for FAIR Digital objects and the ecosystem*

| # | Key finding from landscaping activity | Recommendation | Potential stakeholder(s) involved (in addition to FAIRsFAIR) |
|---|---|---|---|
| 1 | Efforts are needed to raise general awareness about the FAIR principles and how to implement them in a practical sense. | Provide practical guidance to researchers and data stewards[9] on how to implement FAIR within different domains – specifically on how to describe data using appropriate metadata standards, data tags[10] and ontologies. Commitments are needed from all stakeholders to support and meet training needs relating to Open Science - for both researchers and data stewards.[11] | Researchers, Research Infrastructures (RIs), RPOs, related projects and initiatives(e.g., INFRAEOSC[12]), funding bodies, publishers, HEIs, repositories, governments, national support initiatives (e.g., Dutch National Coordination Point Research Data Management (LCRDM)[13], Swedish National Data Service (SND))[14] |
| 2 | The policies of funding bodies are the key driver for many of the stakeholders developing policies – both at the national and institutional level. | Cooperate with relevant initiatives to support funding bodies to characterise and, where needed, enhance policies to align with FAIR principles - either explicitly or implicitly. | Funding bodies, related projects and initiatives (e.g., INFRAEOSC), RIs, associations, membership organisations, and partnerships (e.g., SPARC Europe[15], |

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[9] As outlined in recommendation 3 of Recommendations for Services in a FAIR data ecosystem https://zenodo.org/record/3585742#.Xkl5X3d2vIU

[10] As outlined in recommendation 4 in EOSC-hub D2.8 First Data policy Recommendations

[11] As suggested in Action 3.2, EOSCpilot D3.6 Final Policy Recommendations https://www.eoscpilot.eu/content/d36-final-policy-recommendations

[12] https://www.eosc-portal.eu/about/eosc-projects

[13] https://www.lcrdm.nl/en

[14] https://snd.gu.se/en

[15] https://sparceurope.org/

| | | | Science Europe[16]), policy registries (e.g., FAIRsharing[17], OpenAIRE[18]) |
|---|---|---|---|
| 3 | To support both human interpretation and machine actionability, it is crucial that policies make clear the period of time to which they apply. | Support policy makers to ensure that they include the dates of validity[19] for their policies as well as any planned review dates. | Grassroots initiatives (e.g., RDA Research Metadata Schemas WG[20], Data Policy Standardisation and Implementation Interest Group of the Research Data Alliance (RDA)[21]),  policy registries (e.g., FAIRsharing, OpenAIRE), funding bodies, publishers, RIs, RPOs |
| 4 | The policies of all stakeholders should be described consistently using a structured data markup schema to support both human and machine readability. | Building on the work of other initiatives (FAIRsharing, EOSCpilot, RDA), agree on a common set of FAIR policy elements and work with stakeholders to employ them to describe their policies. The emphasis should be on describing those policy elements that may be considered 'rules' rather than simply suggested good practice to support machine-actionability. | Grassroots initiatives (e.g., RDA Research Metadata Schemas WG, Data Policy Standardisation and Implementation Interest Group of the Research Data Alliance (RDA)), related projects and initiatives(e.g., EOSCpilot[22], ENVRI-FAIR[23] Policy WG), policy makers, RPOs, funding bodies, RIs, publishers, policy registries (e.g., FAIRsharing, OpenAIRE) |
| 5 | Policies should be assigned persistent identifiers (PIDs) and be registered to ensure that the right | PIDs should be assigned to clearly versioned policies. These PIDs should be included in the metadata records in registries such as FAIRsharing.org or other | Grassroots initiatives (e.g., Data Policy Standardisation and Implementation Interest Group of the Research Data Alliance (RDA)), policy makers, policy |

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[16] http://www.scienceeurope.org/

[17] https://fairsharing.org/

[18] https://www.openaire.eu/

[19] As described in EOSCpilot Open Science Monitor diagram https://eoscpilot.eu/news/3-major-updates-eosc-policy-supporting-services

[20] https://www.rd-alliance.org/groups/research-metadata-schemas-wg

[21] https://www.rd-alliance.org/groups/data-policy-standardisation-and-implementation-ig

[22] https://eoscpilot.eu

[23] https://envri.eu/

| | | | |
|---|---|---|---|
| | version can be found and fed into machine actionable pipelines. | policy registry services (such as those envisaged by EOSCpilot[24]). | registries (e.g., FAIRsharing, OpenAIRE), related projects and initiatives(e.g., EOSCpilot, INRFRAEOSC) |
| 6-8 | Clearer definitions of data and expectations around sharing are needed. Definitions and expectations should be harmonised across stakeholders. | (6) Working with research communities to define data outputs, policymakers should adopt standard descriptions to ensure that definitions provide clarity on the range of outputs that should be considered and what might be considered "FAIR enough".<br><br>(7) Standardised exceptions for not sharing data should be developed and promoted in associated policy guidance.<br><br>(8) Standard exceptions should be added to metadata schemas used by repositories for consistency. | Research communities, RIs, related projects and initiatives(e.g., INFRAEOSC) funding bodies, national policy makers |
| 9-11 | Policies should provide greater clarity over licensing of research outputs to support FAIR. | (9) Working with relevant stakeholders, support adoption of rights and licensing documentation schemas for different types of research outputs as they are defined[25].<br><br>(10) Provide mechanisms to enable searching for data by license type in repositories.<br><br>(11) Provide legal guidance on choosing appropriate licenses during active stage of research and for assessing the compatibility of different license types | Related projects and initiatives (e.g., EOSCpilot, OpenMINTED[27]), registries (e.g., re3data[28], DataCite[29]), associations, membership organisations, and partnerships (e.g., SPARC Europe), national services (e.g., Jisc[30]) |

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[24] EOSCpilot D3.4 Open Science Policy Registry https://eoscpilot.eu/content/d34-open-science-policy-registry

[25] As recommended in Implementation Action 4.1 of EOSCpilot D3.6 Final Policy Recommendations https://www.eoscpilot.eu/content/d36-final-policy-recommendations

[27] http://openminted.eu/

[28] https://www.re3data.org/

[29] https://datacite.org/

[30] https://www.jisc.ac.uk/

| | | when reusing multiple data outputs[26]. | |
|---|---|---|---|
| 12 - 13 | National policy makers, funding bodies and journal publishers could strengthen their expectations around the sharing of both data and metadata. | (12) Working collaboratively, define and require standardised Data Accessibility Statements.<br><br>(13) Provide support to repositories and data stewards to develop tombstone metadata records that are maintained - even when data is no longer available - and to ensure that these metadata records are referenced in Data Availability Statements. | National policy makers, funding bodies, publishers, associations, membership organisations, and partnerships (e.g., Belmont Forum[31], JATS for Reuse[32]), RIs, RPOs, Repositories, publisher initiatives (e.g., STM Research Data[33]) |

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[26] As outlined in recommendations 6 & 7 of Recommendations for Services in a FAIR data ecosystem https://zenodo.org/record/3585742#.Xkl5X3d2vlU

[31] The Belmont Forum Data Accessibility Statement Policy and Template https://doi.org/10.5281/zenodo.1476871

[32] JATS4R (JATS for Reuse) https://jats4r.org/

[33] https://www.stm-researchdata.org/

## Implement - culture, technology and skills for FAIR practice

| # | Key finding | Recommendation | Stakeholder(s) involved |
|---|---|---|---|
| 14-18 | Requirements for research data management (RDM) and data management plans (DMPs) should be harmonised across stakeholders. | (14) Working with all stakeholders, ensure that data management planning is supported across the entire research lifecycle so that data can be "born FAIR" and kept "FAIR enough" over time. Require updating of DMPs over the research lifecycle leading to comprehensive, high-quality end stage DMPs that are included in end-stage reporting.<br><br>(15) Policies and related guidance should emphasise that data management planning and sharing data supports research integrity goals, enhances data quality and contributes to reproducibility and transparency.<br><br>(16) Support researchers to assess the potential risks, benefits and associated costs to enable the sharing of FAIR data as they draft their DMP.<br><br>(17) RDM support should place an emphasis on selecting which data to make and keep FAIR as well as advising on where data should be deposited[34].<br><br>(18) Where resources allow, RPO's should provide domain specific RDM support locally (research group, faculty/department). Where local support isn't feasible, the development of shared domain-specific resources should be supported and maintained with resources provided by all stakeholders. | Research communities, funding bodies, publishers, RIs, RPOs, associations, membership organisations, and partnerships (e.g., SPARC Europe, Science Europe), related projects and initiatives (e.g., INFRAEOSC) |

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[34] As outlined in recommendation 7 of Recommendations for Services in a FAIR data ecosystem
https://zenodo.org/record/3585742#.Xkl5X3d2vIU

| 19 | Clarification is needed on eligible RDM and data sharing costs. | Building upon previous work on defining cost types[35] work with funding bodies and research performing organisations to implement these in new grant applications.  RPOs should monitor and review RDM costings over the life of the project and beyond to assess the effectiveness of current cost models. | Funders, RIs, RPOs, repositories, national policy makers, related projects and initiatives(e.g., EOSChub), working groups (e.g., EOSC Sustainability WG) |

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[35] As outlined in Implementing Action 3.3 of EOSCpilot D3.6 Final Policy Recommendations
https://www.eoscpilot.eu/sites/default/files/eoscpilot-d3.6-v2.7_0.pdf

## Embed and Sustain - incentives, metrics and investment

| # | Key finding | Recommendation | Stakeholder(s) involved |
|---|---|---|---|
| 20 | Funding bodies and publishers could strengthen their requirements in relation to data citation and provide clearer guidance on how to do this in a standardised way. | Provide guidance on how to cite a broader range of research outputs including data and software, as well as actors and enablers such as data managers, data stewards, funding bodies, research infrastructures and organisations. | Funding bodies, publishers, related projects and initiatives (e.g., CReDiT[36]), RIs, RPOs |
| 21 | More equitable business models are needed to ensure that the costs of making and keeping data FAIR over time is split more equally between stakeholders | Working collaboratively on carefully scoped pilots, funding bodies, RPOs and repositories should assess and report on the costs of making and keeping data FAIR to build up a picture of how the costs might change over time and to leading to the development of sustainable funding models[37]. | Funding bodies, RIs, RPOs, publishers, related projects and initiatives (e.g., INFRAEOSC) |
| 22 | National policy makers (where relevant), funding bodies and publishers should enforce the data sharing policies that they have put in place. | Support stakeholders to consider compliance monitoring across the FAIR ecosystem using identifiers and knowledge graphs. An emphasis should be placed on rewarding good practice but, where necessary, the introduction of penalties for non-compliance should be considered. | Funding bodies, RPOs, national policy makers, governments, publishers, research infrastructures |

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[36] https://casrai.org/credit/

[37] As outlined in recommendation 4 in Recommendations for Services in a FAIR data ecosystem
https://zenodo.org/record/3585742#.Xkl5X3d2vIU

## Next steps

These recommendations are released as a living document that will be refined to reflect the forthcoming work of other projects funded under the INFRAEOSC-05-2018-2019 call and other relevant initiatives.

FAIRsFAIR will work collaboratively to provide practical support to a range of communities – including national policymakers, funders, publishers, repositories, research infrastructures and institutions – to implement policy enhancements and/or to develop new policies. We will develop practical guidance, templates and training resources to support stakeholders in implementing these policy recommendations. Wherever possible, we will seek to work closely with other initiatives active in the policy landscape to co-develop and implement the recommendations including national Open Science initiatives, policy registries (e.g., FAIRsharing), associations, memberships and partnerships (e.g., SPARC Europe, Science Europe) as well as the working groups of the Research Data Alliance and EOSC (focusing on the Landscaping, FAIR, and Rules of Participation WGs in particular).

# Annex 1: Draft recommendations in relation to *Turning FAIR into Reality* actions

Below is a mapping of the Turning FAIR into Reality (TFiR) priority and supporting actions (those reviewed for D3.1 FAIR Policy Landscape Assessment[38]) against the draft recommendations. Please note that the recommendations below are not intended to be a one-to-one mapping with each of the TFiR actions but simply related to the TFiR action.

| Turning FAIR into Reality - lifecycle stage | Turning FAIR into Reality Action | | Related recommendations |
|---|---|---|---|
| **DEFINE** | Action 1.3: The relationship between FAIR and Open should be clarified and well-articulated as the concepts are often wrongly conflated. FAIR does not mean Open. However, in the context of the EOSC and global drive towards Open Science, making FAIR data a reality should be supported by policies requiring appropriate Openness and protection, which can be expressed as 'as Open as possible, as closed as necessary'. | | Cooperate with relevant initiatives to support funding bodies to characterise and, where needed, enhance policies to align with FAIR principles - either explicitly or implicitly.

Standardised exceptions for not sharing data should be developed and promoted in associated policy guidance.

Standard exceptions should be added to metadata schemas used by repositories for consistency.

Working collaboratively, define and require standardised Data Accessibility Statements. |
| | Action 3.2: By default, the FAIR ecosystem as a whole and each of its individual components should work for humans and for machines. Policies and DMPs should be machine-readable and actionable. | | Building on the work of other initiatives (FAIRsharing, EOSCpilot, RDA), agree on a common set of FAIR policy elements and work with stakeholders to employ them to describe their policies. The emphasis should be on describing those policy elements that may be considered 'rules' rather than simply suggested good practice to support machine-actionability.

Support policy makers to ensure that they include the dates of validity for their policies as well as any planned review dates. |
| | Action 17.1: The greatest potential reuse comes when data are both FAIR and Open. Steps should be taken to ensure coherence across data policy, emphasising both concepts and issuing collective statements of intent wherever possible. | | Working with research communities to define data outputs, policymakers should adopt standard descriptions to ensure that definitions provide clarity on the range of outputs that should be considered.

Working with relevant stakeholders, support adoption of rights documentation schemas for different types of research outputs as they are defined.

Provide mechanisms to enable searching for data by license type in repositories.

Provide legal guidance on choosing appropriate licenses during active stage of research and for assessing the compatibility of different license types when reusing multiple data outputs. |

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[38] https://doi.org/10.5281/zenodo.3558173

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| | Action 17.3: Policies should be versioned, indexed and semantically annotated in a policy registry to enable broad reuse within the FAIR data ecosystem. Resources mandated by policies (e.g. consent forms) should be treated the same way. | PIDs should be assigned to clearly versioned policies. These PIDs should be included in the metadata records in registries such as FAIRsharing.org or other policy registry services (such as those envisaged by EOSCpilot). |
| | Action 17.6: Policies should require an explicit and justified statement when (publicly funded) data cannot be Open and a proportionate and discriminating course of action should be followed to ensure maximum appropriate data accessibility, rather than allowing a wholesale opt-out from the mandate for Open data. | Standardised exceptions for not sharing data should be developed and promoted in associated policy guidance.<br><br>Standard exceptions should be added to metadata schemas used by repositories for consistency. |
| **IMPLEMENT** | Action 5.1: Research communities must be required, supported and incentivised to consider data management and appropriate data sharing as a core part of all research activities. They should establish a Data Management Plan at project outset to consider the approach for creating, managing and sharing all research outputs (data, code, models, samples etc.). | Policies and related guidance should emphasise that data management planning and sharing supports research integrity goals, enhances data quality and contributes to reproducibility and transparency. |
| | Action 5.2: Data Management Plans should be living documents that are implemented throughout the project. A lightweight data management and curation statement should be assessed at project proposal stage, including information on costs and the track record in FAIR. A sufficiently detailed DMP should be developed at project inception. Project end reports should include reporting against the DMP. | Working with all stakeholders, ensure that data management planning is supported across the entire research lifecycle so that data can be born FAIR and kept FAIR over time. Require updating of DMPs over the research lifecycle leading to comprehensive, high-quality end stage DMPs that are included in end-stage reporting.<br><br>Building upon previous work on defining cost types work with funding bodies and research performing organisations to implement these in new grant applications. RPOs should monitor and review RDM costings over the life of the project and beyond to assess the effectiveness of current cost models.<br><br>Support researchers to assess the potential risks, benefits and associated costs to enable the sharing of FAIR data as they draft their DMP. |
| | Action 5.3: Data Management Plans should be tailored to disciplinary needs to ensure that they become a useful tool for projects. Research communities should be inspired and empowered to provide input to the disciplinary aspects of DMPs and thereby to agree model approaches, exemplars and rubrics that help to embed FAIR data practices in different settings. | Where resources allow, RPO's should provide domain specific RDM support locally (research group, faculty/department). Where local support isn't feasible, shared domain-specific resources should be developed and maintained with resources provided by all stakeholders. |

| | | | |
|---|---|---|---|
| | Action 16.3: Guidelines for the implementation of FAIR in relation to research data, to metadata, to code, to DMPs and to other relevant digital objects should be developed and followed. | | Provide practical guidance to researchers and data stewards on how to implement FAIR within different domains – specifically on how to describe data using appropriate metadata standards, data tags and ontologies. Commitments are needed from all stakeholders to support and meet training needs relating to Open Science - for both researchers and data stewards. |
| | Action 17.8: Concrete and accessible guidance should be provided to researchers to find the optimal balance between sharing whilst also safeguarding privacy. There are many exemplars of good practice in providing managed access to sensitive data on which researchers can draw. | | Funding bodies should provide clearer guidance spelling out precisely what costs can be requested. HEIs should develop clear pricing structures for value-added services offered by central support units that can be included - including data stewardship time - in grant applications as directly incurred costs. Plans for longer-term preservation also need to be considered and costed. |
| | Action 18.3: Guidelines should be provided for researchers and reviewers to raise awareness of eligible costs and reinforce the view that data management, long term curation and data publication should be included in project proposals. Funders should collaborate to enhance guidance. | | Building upon previous work on defining cost types work with funding bodies and research performing organisations to implement these in new grant applications. RPOs should monitor and review RDM costings over the life of the project and beyond to assess the effectiveness of current cost models.

Working collaboratively on carefully scoped pilots, funding bodies, RPOs and repositories should assess and report on the costs of making and keeping data FAIR to build up a picture of how the costs might change over time and to leading to the development of sustainable funding models. |
| | Action 20.1: Policy should require data deposit in certified repositories and specify support mechanisms (e.g. incentives, structural funding and/or funding for deposit fees, and training) to enable compliance. | | RDM support should place an emphasis on selecting which data to make and keep FAIR as well as advising on where data should be deposited.

Provide support to repositories and data stewards to develop tombstone metadata records that are maintained - even when data is no longer available - and to ensure that these metadata records are referenced in Data Availability Statements. |
| **EMBED AND SUSTAIN** | Action 26.2: Citation of data and other research outputs needs to be encouraged and supported - for example, by including sections in publishing templates that prompt researchers to reference materials, and providing citation guidelines when data, code or other outputs are accessed. | | Provide guidance on how to cite a broader range of research outputs including data and software, as well as actors and enablers such as data managers, data stewards, funding bodies, research infrastructures and organisations. |
| | Action 26.4: A broader range of metrics must be developed to recognise contributions beyond publications and citation. These should recognise and reward Open and FAIR data practices. | | Support stakeholders to consider compliance monitoring across the FAIR ecosystem using identifiers and knowledge graphs. An emphasis should be placed on rewarding good practice but, where necessary, the introduction of penalties for non-compliance should be considered. |