Research Data Management Plan: guidance and resources

Dublin City University

Introduction

Research Data Management Plan: Guidance and Resources is a short guide to assist you with creating a Research Data Management Plan (DMP). Research Data Management is an integral part of the research process: it aims to make the research process as efficient as possible and meet expectations and requirements of the university, research funders, and legislation. The Research Data Management Plan is a document that describes how research data will be managed during the research lifecycle and this Guide takes you through the basic sections of a research data management plan: data collection; documentation and metadata; ethical and legal compliance; storage, backup and security; selection and preservation; data sharing; responsibilities and resources. Each section listed below outlines the key questions you need to consider and provides guidance on how to respond to these questions. Each section also contains a list of selected additional resources as well as links to DCU's supports, services and policies related to research data management.

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Section in DMP	Questions to address in DMP	Guidance
Data Collection	*What data will you collect or create?*	**Consider the following aspects:** • What type, format and volume of data? • Do your chosen formats and software enable sharing and long-term access to the data? • Are there any existing data that you can reuse? • How to make your data files distinguishable from each other within their containing folder? • How to make the location and retrieval of your data files easy for both creator and other users? Give a brief description of the data, including any existing data or third-party sources that will be used, in each case noting its content, type and coverage. Outline and justify your choice of format and consider the implications of data format and data volumes in terms of storage, backup and access. **Definition of research data:** any information in digital, computer-readable format or paper based that has been collected, observed, generated or created to develop, support or revise theories, practices and findings. Data may be numerical, descriptive, or visual. Data may be raw, abstracted or analysed, experimental or observational. Data include (but not limited to): laboratory notebooks, field notebooks, questionnaires, texts, audio and video files, models, photographs, test responses

		Examples of research data: interviews, diaries, anthropological field notes, focus groups, answers to survey questions; transcribed test responses; coded numerical responses to surveys; digital audio or video recordings, photos; digital images; database contents; digital models, algorithms or scripts; maps & geospatial data; ephemera; archival material; text documents, notes; numerical data; questionnaires, surveys, survey results; database content (video, audio, text, images); mathematical models, algorithms; software (script, input files); results of computer simulations; laboratory protocols, methodological descriptions. **Data Description:** • Give a summary of the data you will collect or create. Consider how your data could complement and integrate with existing data, or whether there are any existing data or methods that you could reuse. • Indicate which data are of long-term value and should be shared and/or preserved. **Volume:** • Note what volume of data you will create in MB/GB/TB. Indicate the proportions of raw data, processed data, and other secondary outputs (e.g., reports). • Consider the implications of data volumes in terms of storage, access and preservation. Do you need to include additional costs? • Consider whether the scale of the data will pose challenges when sharing or transferring data between sites; if so, how will you address these challenges? **Format:** • Clearly note what format(s) your data will be in, e.g., plain text (.txt), comma-separated values (.csv), geo-referenced TIFF (.tif, .tfw). • Explain why you have chosen certain formats. Justify the use of certain formats. For example, decisions may be based on staff expertise within the host organisation, a preference for open formats, standards accepted by data repositories, widespread usage within the research community, or on the software or equipment that will be used • Using standardised, interchangeable or open formats ensures the long-term usability of data; these are recommended for sharing and archiving.

		Ensure that the files are sorted in a logical sequence, are backed up and cannot be accidentally overwritten or deleted. **File formats and standards** Various disciplines will have their own standards for file formats. The following resources identify preferred and acceptable file formats for various disciplines and types of data: • UK Data Service Recommended Formats • Digital Repository of Ireland: Guidance on File Formats • Open Data Handbook: File Formats • DataONE Best Practices for file formats **DCU supports:** • DCU Library guidance: "Managing Research Data: finding and reusing existing datasets"
	How will the data be collected or created?	**Consider the following aspects:** • What standards or methodologies will you use? • How will you structure and name your folders and files? • How will you handle versioning? • What quality assurance processes will you adopt? • How can you enable re-use of your data? Outline how the data will be collected/created and which community data standards (if any) will be used. Consider how the data will be organised during the project, mentioning for example naming conventions, version control and folder structures. Explain how the consistency and quality of data collection will be controlled and documented. This may include processes such as calibration, repeat samples or measurements, standardised data capture or recording, data entry validation, peer review of data or representation with controlled vocabularies. Consider what other documentation is needed to enable re-use. This may include information on the methodology used to collect the data, analytical and procedural information, definitions of variables, units of measurement, and so on.

		Useful resources and further guidance: 1. CESSDA Data Management Expert Guide: Organise and Document Data (Consortium of European Social Science Data Archive) 2. Digital Repository of Ireland: How to DRI: Contextual Information (for Social Sciences and Humanities)
Documentation and Metadata	*What documentation and metadata will accompany the data?*	**Consider the following aspects:** • What information is needed for the data to be to be read and interpreted in the future? • How will you capture / create this documentation and metadata? • What metadata standards will you use and why? Decisions about the type of data to be collected and the data's scope, quantity and format should be documented. This is likely to change as your DMP is adapted during the research life-cycle. This becomes critical once the data are no longer active and have been transferred to an archive for long-term preservation and sharing if appropriate. Your project documentation should be preserved with your data. Describe the types of documentation that will accompany the data to help secondary users to understand and reuse it. This should at least include basic details that will help people to find the data, including who created or contributed to the data, its title, date of creation and under what conditions it can be accessed Documentation may also include details on the methodology used, analytical and procedural information, definitions of variables, vocabularies, units of measurement, any assumptions made, and the format and file type of the data. Consider how you will capture this information and where it will be recorded. Wherever possible you should identify and use existing community standards. **Metadata** is another form of data and is simply 'data about data'. Metadata is descriptive or contextual information which refers to or is associated with another object or resource. For example, web pages often include metadata in the form of meta tags. Description and keywords meta tags are commonly used to describe content within a web page. Search engines can use this data to help understand the content within a page. The quality of the descriptive information (metadata and documentation) regarding the data has a profound impact on their reusability, so the more documentation and metadata you can provide, the better. In your DMP you should reflect on the type of metadata that could be included when saving/storing your research data, as applicable to your discipline. For

		those disciplines that have not yet decided on their metadata standards and for those research projects that generate inter-disciplinary or multi-disciplinary data, there are broader metadata standards that can be followed to comply with research data management (RDM) requirements. For example, OpenAIRE Guidelines provide guidance on how to specify access rights, funding information, and related publications, datasets, software etc. for publication repositories, data archives, software repositories. **Useful resources and further guidance:** • Metadata Standards Directory for STEM and AHSS disciplines (hosted by the Research Data Alliance) • Metadata Standards Catalogue • FAIRsharing (resource on data and metadata standards) • DCC List of Metadata Standards • The Data Documentation Initiative (DDI) https://www.ddialliance.org/
Ethics and Legal Compliance	*How will you manage any ethical issues?*	**Consider the following aspects:** • If personal data are processed, how will compliance with legislation on personal data and on security be ensured? • Have you gained consent for data preservation and sharing? • How will you protect the identity of participants if required? e.g. via anonymisation • Consider whether ethical issues (e.g. sensitive data) can affect how data are stored and transferred, who can see or use them, and how long they are kept. Demonstrate awareness of these aspects and respective planning • Follow the national and international codes of conducts and institutional ethical guidelines, and check if ethical review (for example by an ethics committee) is required for data collection in the research project Ethical issues affect how you store data, who can see/use it and how long it is kept. Managing ethical concerns may include: anonymisation of data; referral to departmental or institutional ethics committees; and formal consent agreements. You should show in your DMP that you are aware of any issues and have planned accordingly. If you are carrying out research involving human participants, you must also ensure that consent is requested to allow data to be shared and reused. **Definition of personal data**

		Personal data is any information about a living person, where that person is either identified or could be identified, from the data itself or when it is combined with other data. Typical examples of personal data in a research context are: a) paper based records e.g. research participant files, patient records, consent declarations, interview notes etc. b) electronic records e.g. database of participant details, online survey returns, photos, audio & visual recordings, IP addresses, diagnostic / clinical imaging etc. c) other e.g. genetic data, biometric data, clinical or medical samples etc. Note: Any data that is fully and completely anonymous is not considered to be personal data. Ensure that when dealing with personal data, data protection laws (e.g. GDPR) are complied with:[1] - gain informed consent for preservation and/or sharing of personal data - Consider anonymisation of personal data for preservation and/or sharing (truly anonymous data are no longer considered personal data) - Consider pseudonymisation of personal data (the main difference with anonymisation is that pseudonymisation is reversible) - Consider encryption which is seen as a special case of pseudonymisation (the encryption key must be stored separately from the data, for instance by a trusted third party) - Explain whether there is a managed access procedure in place for authorised users of personal data **DCU Supports:** **DCU Research Ethics Committee (DCU REC)** provides support and advice, including one-to-one consultations, for researchers going through the ethics review process (see the REC webpages for information on Personal Data and the Research Ethics Process). **DCU Data Protection Unit (DCU DPU)** assists staff, students, members of the public and other interested parties in understanding DCU's approach in ensuring compliance with data protection legislation. In particular, DCU as a Data Controller, ensures that all staff, registered students, agents, contractors and its own data processors comply with data protection regulation when in relation to 1) the processing and confidentiality of any personal data held by DCU; and 2) the

[1] Science Europe 'Practical Guide to the International Alignment of Research Data Management' (2018)

		privacy rights of individuals under the legislation. See the DPU webpages for Personal Data Guidance and Procedures . DPU have summarised a number of issues for researchers to consider in relation to the retention of personal data (PD) in a research context (see here for more details). **DCU GDPR Advocates** assist with specific queries related to the management of personal data within a research proposal as well as all other matters relating to data protection generally. For a list of GDPR Advocates by Unit please click here . **Relevant policies and procedures at DCU:** • Code of Good Research Practice • DCU Codes and Policies on Research Integrity • DCU Data Privacy Policy • DCU Freedom of Information Office • Personal data: DCU Guidance and Procedures (DCU DPU web page) • DCU Data Classification Policy • DCU Data Handling Guidelines • DCU Information Systems Services (DCU ISS) Guide to Encrypting Laptops, Mobile Phones and Portable Storage Devices **Useful resources and further guidance:** • DCU DPU presentation on personal data law and research • DCU Personal data Protection help-sheet • Data Protection Commission of Ireland general guidance on data protection • Data Protection Commission of Ireland guidance note on anonymisation and pseudoanonymisation • European Commission guidelines on ethics and data protection • "Social Media and Research: 10 legal and ethical issues to consider" A reference guide produced by Synergies for Europe's Research Infrastructures in Social Sciences (SERISS) • McGeever, M., Whyte, A. & Molloy, L. (2015). '*Five Things You Need to Know About Research Data Management and the Law. DCC Checklist on Legal Aspects of RDM*'. Edinburgh: Digital Curation Centre. Available online: /resources/how-guides • Open AIRE Webinar "Legal issues in dealing with research data"

		• Open AIRE Guide for Researchers "How to deal with sensitive data"
	How will you manage copyright and Intellectual Property Rights issues?	**Intellectual property (IP)** is a general term for intangible property rights which are a result of intellectual effort. Intellectual Property Rights (IPR) are legal rights that aim to protect creations and inventions resulting from intellectual activity in the industrial, scientific, literary or artistic fields. An IPR is the right to possess or control the use of IP, such as trademarks, copyrights, patents and trade-secrets /know-how. Some research data created by researchers can be protected by copyright. In addition, whereas data as such are not protected by copyright, that does not mean data are not protected by other laws (e.g. confidential information or personal data). **Consider the following aspects:** • Who owns the data? • How will the data be licensed for reuse? • Are there any restrictions on the reuse of third-party data? • Will data sharing be postponed / restricted e.g. to publish or seek patents? State who will own the copyright and IPR of any data that you will collect or create, along with the licence(s) for its use and reuse. For multi-partner projects, IPR ownership may be worth covering in a consortium agreement. Consider any relevant funder, institutional, departmental or group policies on copyright or IPR. Also consider permissions to reuse third-party data and any restrictions needed on data sharing. **DCU Supports:** DCU INVENT is DCU's innovation and enterprise centre and the designated technology transfer office of the University. The DCU INVENT team are available to provide advice and support in relation to technology transfer, intellectual property, commercialisation and engagement with enterprise activities. Researchers should contact the team for assistance regarding IP considerations in their research proposals and projects. Seminars are provided regularly by external speakers covering subjects such as commercialisation of research, intellectual property agreements, and technology transfer and spin-off company development. In DCU all IP is managed in line with **the National IP Protocol (2019).** In a research project each party will own the Foreground IP it creates and Joint Ownership Membership Agreements (JOMAs) are usually put in place between the parties, as needed, for any jointly created IP.

		DCU Invent "Introduction to IP" Guide – see here for more details. **DCU Invent Template agreements** (including non-disclosure agreements and material transfer agreements) – see here for more details. **Relevant policies:** • DCU IP Policy • Ireland's National IP Protocol 2019 **Useful resources and further guidance:** • Knowledge Transfer Ireland "Introduction to IP" Guide • Knowledge Transfer Ireland "Practical guide to managing IP" • Digital Repository of Ireland Factsheet No.2 'Copyright, licensing and open access' • Open AIRE Guide "How do I license my research data" • Open AIRE Guide "How do I know if my research data is protected" • Open AIRE Guide "Can I reuse someone else's research data?" • Creative Common Licenses
Storage, Backup and Security	*How will the data be stored and backed up during the research?*	**Consider the following aspects:** • Do you have sufficient storage or will you need to include charges for additional services? • Consider how much storage is needed for the entire duration of the project • How will the data be backed up? • Who will be responsible for backup and recovery? • How will the data be recovered in the event of an incident? State how often the data will be backed up and to which locations. How many copies are being made? Storing data on laptops, computer hard drives or external storage devices alone is very risky. The use of robust, managed storage provided by university IT teams is preferable. Similarly, it is normally better to use automatic backup services provided by IT Services than rely on manual processes. If you choose to use a third-party service, you should ensure that this does not conflict with

		any funder, institutional, departmental or group policies, for example in terms of the legal jurisdiction in which data are held or the protection of sensitive data. **DCU ISS general advice:** Your DCU account gives you access to a number of different file storage and file sharing options. You can use these services to save your files, backup your data, and share files with your collaborators. There is also an automated backup option through DCU ISS Google Back Up & Sync. DCU ISS does not recommend storing data on laptops, hard drives, or other external storage devices such as USB sticks. Cloud storage (web based) of research data is recommended by DCU ISS. **Cloud based file storage options at DCU:** • Amazon Web Services • Microsoft Azure • Google Suite for Education The above service providers have special agreements with DCU and have been approved by the DCU Data Protection Unit. Note that other cloud systems such as Dropbox, personal Google accounts (@google.com), personal OneDrive accounts, Apple iCloud etc. should not be used. **Encryption options at DCU:** • DCU laptops are encrypted automatically by DCU ISS • Non-DCU laptops should also be encrypted if used for sensitive data • Microsoft Office Files • HEAnet Filesender • 7 Zip Note that even if your laptop is encrypted it is still not recommended to store data in the laptop and/or email sensitive files from the laptop when sharing data. The most secure option to share data is through cloud based storage options available in DCU (see above).

		DCU policies and guidelines: • DCU Data Classification Policy • DCU Data Handling Guidelines • DCU ICT Security Policy • DCU ISS Password Policy • DCU ISS Digital Systems and Cloud Services Policy • DCU ISS Guide to Encrypting Laptops, Mobile Telephones and Portable Storage Devices • DCU ISS Presentation: "Research Data Management: IT considerations" **Useful resources and further guidance:** • Open AIRE Guide "Raw data, backup and versioning" • Whyte, A. (2015). *'Where to keep research data: DCC checklist for evaluating data repositories'* v.1.1 Edinburgh: Digital Curation Centre. Available online: www.dcc.ac.uk/resources/how-guides
	How will you manage access and security?	**Consider the following aspects:** • What are the risks to data security and how will these be managed? • How will you control access to keep the data secure? • How will you ensure that collaborators can access your data securely? • How will you ensure that collaborators outside of the EU (e.g. where GDPR does not apply) adhere to the same data security requirements as you, members of your research team and EU-based partners? • Is an embargo period is needed for all or some of the data? • If creating or collecting data in the field how will you ensure its safe transfer into your main secured systems? You will need to identify the means and mechanisms you will employ for collecting, storing and processing of your research data. If your data is confidential (e.g. personal data not already in the public domain, confidential information or trade secrets), you should outline any appropriate security measures and note any formal standards that you will comply with e.g. ISO 27001. In particular, when dealing with sensitive data you must ensure:

		- The protection of research subjects from harm that might result from unintended disclosure or inappropriate use of confidential data - Uphold the researcher's assurance of confidentiality - Adhere to requirements specified in any restricted use agreements **Access control** Sensitive and confidential data can be protected by regulating or restricting access to and the use of the data. Access controls are usually proportionate to the kind of data and level of confidentiality involved. The access controls for your research data are guided by specific requirements in your chosen Archive or Repository, so it is important to familiarise yourself with data access requirements from the outset of your research project. There are different levels of access for data: 1. Open data (data can be accessed by any user for any reason, including commercial); 2. Safeguarded data (data that are available only under certain conditions e.g. the user should use the data for teaching or/and research purposes only); 3. Controlled data (suitable for data that may be disclosed, access to data is regulated by a special agreement) 4. Embargo (allows a temporary embargo on the actual data, only description of the dataset is published during the embargo period) **Useful resources and further guidance:** • Research Data Netherlands "Addressing a researcher's data sharing concerns" • Australian National Data Service: case study on data sharing "Benefiting women's health" • Central Statistics Office Ireland Guide "CSO Data for researchers" • Open AIRE Guide "How to Make Your Data Fair" • EU H2020 Guidelines on FAIR Data Management in Horizon 2020 • Open Access to publications and research data in Horizon 2020 • EU H2020 Guide "Ethics and Data Protection" (includes guidance on data transfers to non-EU countries, and collection of research data outside of the EU) • EU Commission's presentation on "Exploitation and Open Science in Horizon Europe" (2020)

		• European Commission IP Helpdesk: Open Access obligations in Horizon Europe: what are CC BY licences? (November 2021)
Selection & Preservation	*Which data are of long-term value and should be retained, shared, and/or preserved?*	You should start planning for long term preservation of your data from the outset of your project. You will need to build in preservation planning early on and adjust it to any research outcomes that emerge during the data collection and processing stages. **Consider the following aspects:** • What data must be retained/destroyed for contractual, legal, or regulatory purposes? • How will you decide what other data to keep? • What are the foreseeable research uses for the data? • How long will the data be retained and preserved? • How will you prepare the data for transfer to a trusted digital repository for a long term preservation? Consider how the data may be reused e.g. to validate your research findings, conduct new studies, or for teaching. Decide which data to keep and for how long. This could be based on any obligations to retain certain data, the potential reuse value, what is economically viable to keep, and any additional effort required to prepare the data for data sharing and preservation. Some national funders (e.g. Health Research Board (HRB) and Environmental Protection Agency (EPA)) require that research data resulting from research projects funded by them is to be deposited in funders' research data repositories. Remember to consider any additional effort required to prepare the data for sharing and preservation, such as changing file formats. **Useful resources and further guidance:** • HRB requirements for management and sharing of research data • EPA Research Data Archive (SAFER-Data) • Open AIRE Guide "Data formats for preservation" • Whyte, A. & Wilson, A. (2010). *"How to Appraise and Select Research Data for Curation".* DCC How-to Guides. Edinburgh: Digital Curation Centre. Available online: /resources/how-guides

	What is the long-term preservation plan for the dataset?	**Consider the following aspects:** • Where e.g. in which repository or archive will the data be held? • What costs if any will your selected data repository or archive charge? • Have you costed in time and effort to prepare the data for sharing / preservation? Consider how datasets that have long-term value will be preserved and curated beyond the lifetime of the grant. Also outline the plans for preparing and documenting data for sharing and archiving. If you do not propose to use an established repository, the data management plan should demonstrate that resources and systems will be in place to enable the data to be curated effectively beyond the lifetime of the grant. **Where to deposit research data** In general, to ensure a long term preservation of research data, it should be submitted to a discipline specific and a specific scientific community's recognised repository where possible, or to general, multidisciplinary repositories if no discipline-specific repository is available. When deciding where to archive your data consider what repository provides the best preservation services to allow the long-term reuse of the data. Make sure that your data will be associated with a persistent identifier that is available and managed over time and will not change even if the object of preservation is moved or renamed. Persistent Identifiers support reference reliability and readability for both humans and machines. **Useful resources and further guidance:** • Open AIRE Guide "How to find a trustworthy repository for your data" • Digital Repository of Ireland Core Trust Seal certification (2018) • Article in **Nature** on which repositories are most commonly used in various disciplines: "Data Repository Guidance" **DCU Supports:** • DCU Library Guide "Managing Research Data": Archiving Datasets
Data Sharing	*Why and how will you share the data?*	Sharing research data can benefit both the public and the research community. There are a number of reasons of why researchers should consider sharing their research data:

		1) Increased research impact - those who make use of your data and cite it in their own research will help to increase your impact within your field and beyond it; 2) Research integrity - publishing your data and citing its location in published research papers can allow your peers to replicate, validate, or correct your results, thereby improving the scientific record; 3) Long-term preservation of research data - by preparing your data for sharing with others, you will benefit by being able to identify, retrieve, preserve and understand the data yourself in the longer term (after you have lost familiarity with it). 4) Research and innovation – data created for a specific research project can be re-used and developed further for a different research project, and/or for multi-disciplinary and inter-disciplinary research projects that go beyond a specific discipline 5) Funder requirements – a growing number of funding bodies both at national and international levels have adopted research data policies and mandate researchers funded by them to share research data and outputs to avoid duplication of effort and reduce data collection costs 6) Publisher requirements – increasingly, publishers require data that supports research findings to be deposited in open access repositories when manuscripts are submitted **Consider the following aspects:** • How will potential users find out about your data? • With whom will you share the data, and under what conditions? • What are the contractual obligations (e.g. imposed by a research performing organisation, a funding organisation etc.) • What permissions will be needed to reuse the data? • Will you share data via a repository, handle requests directly or use another mechanism? • When will you make the data available? • Will you pursue getting a persistent identifier for your data? Consider where, how, and to whom data with acknowledged long-term value should be made available. The methods used to share data will be dependent on a number of factors such as the type, size, complexity and sensitivity of data. If possible, mention earlier examples to show a track record of effective data sharing. Consider how people might acknowledge the reuse of your data.

		Useful resources and further guidance: • "Data sharing and how it can benefit your research career" (by Gabriel Popkin, NATURE, 13 May 2019) • HRB Policy on Management and Sharing of Research Data • UK Data Service "Managing and sharing data: best practice for researchers" • Registry of research data repositories (re3data.org) • Zenodo (multidisciplinary repository) • Open Science Framework (multidisciplinary repository) • Figshare (multidisciplinary repository) • SFI Open Access Policy • EU Open Science Policy • Open Science principles in Horizon Europe • EU Open Science Monitor • European Commission's open access publishing platform: Open Research Europe (for publications and associated data) • Open Research Europe's research data guidelines • Enspire Science Guide to Open Access in Horizon Europe
	Are any restrictions on data sharing required?	**Consider the following aspects:** • What action will you take to overcome or minimise restrictions? • For how long do you need exclusive use of the data and why? • Will a data sharing agreement (or equivalent) be required? • Will a non-disclosure agreement give sufficient protection for confidential data? Outline any expected difficulties in sharing data with acknowledged long-term value, along with causes and possible measures to overcome these. There are a number of legitimate reasons for not being able to share some or all research data generated by the research project: 1) Data sharing is incompatible with the obligation to protect results that can reasonably be expected to be commercially or industrially exploited

		2) Data sharing is incompatible with the need for confidentiality in connection with security issues 3) Data sharing is incompatible with rules on protecting personal data 4) Data sharing would mean that the project's main aim might not be achieved 5) Data sharing is not possible because the project will not generate / collect any research data or 6) There are other legitimate reasons for not sharing data (you will need to provide more details on this either at proposal stage, or grant registration stages). The European Commission's approach in this regard is: "*Research data should be as open as possible, as closed as necessary*". **Useful resources and further guidance:** • EC Guidelines on Open Access to Scientific Publications and Research Data in H2020 • The Office of Research Integrity (US): "Introduction to data sharing"
Responsibilities and Resources	*Who will be responsible for data management?*	Your DMP should not be a static document but it should be updated and refined during the lifetime of the project. Funders usually require the submission of the DMP within the first 6 months of the project. Any changes to the initially submitted DMP should be reported in subsequent reports to the funder (e.g. interim report and/or final report). **Consider the following aspects:** • Who is responsible for implementing the DMP, and ensuring it is reviewed and revised? • How often will the plan be reviewed and updated? • Who will be responsible for each data management activity? • How will responsibilities be split across partner sites in collaborative research projects? • Will data ownership and responsibilities for RDM be part of any consortium agreement or contract agreed between partners? • What are my obligations if I am engaged in a project funded by a national or international funder? Outline the roles and responsibilities for all activities e.g. data capture, metadata production, data quality, storage and backup, data archiving & data sharing. Consider who will be responsible for ensuring relevant policies will be respected. Individuals should be named where possible. Depending on the size of your project consider hiring a project manager or appointing a specific person in the project who, alongside their main function, will also have the responsibility of data

		management in the project. It is also advisable to have a specific task in one of your project's Work Packages (usually included as part of the Project Management Work Package) dedicated to RDM activities. If you are collaborating with multiple partners, make sure to discuss and agree on who will have ownership of the data and how the data will be used and shared after the projects ends. **DCU Supports and guidance:** • DCU Library: Presentation on Data Management Planning • DCU Library: Writing Data Management Plans (guidance) • DCU ISS: Presentation on Data Storage and Data Security • DCU Research Support's guidance on Irish and international funders' data management requirements (including SFI, IRC, HRB, EPA, EU Horizon Europe and Wellcome). **Useful resources and further guidance:** • Open AIRE Guide "How to create a Data Management Plan in H2020 projects" • Jones, S. (2011) "How to develop a Data Management and Sharing Plan" DCC How-to-Guides. Edinburgh: Digital Curation Centre • DCC Checklist for a Data Management Plan • Horizon Europe Data Management Plan template
	What resources will you require to deliver your plan?	**Consider the following aspects:** • Is additional specialist expertise (or training for existing staff) required? • Do you require hardware or software which is additional or exceptional to existing institutional provision? • Will charges be applied by data repositories? • What resources (financial and time) are needed for effective data management? Carefully consider any resources needed to deliver the plan, e.g. software, hardware, technical expertise, etc. Where dedicated resources are needed, these should be outlined and justified. Data management costs should be justified and included in research proposals' budgets. These costs and their justification need to be written in at application stage and

		need to be considered at the beginning of the research project to ensure that any RDM costs are incurred within the time of the award. **Research Data Management costs** can include: • Hiring of relevant personnel, part time or full time (support for dedicated data managers and/or data scientists) • Training in RDM and/or software management • Storage and computation (dedicated hardware or software; costs to access supercomputers and shared facilities; routine data storage) • Creation and reuse of data (costs to access data; transcription, anonymization; obtaining informed consent) • Deposition and Preservation (preparation of data for deposit in an Archive or Repository e.g. transcription, data cleaning, creating metadata; deposition costs for Archives and Repositories; costs for curation and maintenance of data and associated materials beyond the lifetime of the research project and/or grant) **Research Data Management costing tools:** • DCC and Open AIRE Infographic "What will it cost to manage and share my data" • Open AIRE Guide "How to identify and assess research data management costs" • Utrecht University RDM costing tool • TU Delft RDM Costing Tool

ANNEX 1

Examples of Data Management Plans[2]

1. **"TANGO - Estimating Tipping points in habitability of ANtarctic benthic ecosystems under GlObal future climate change scenarios"**
   An ideal example of a comprehensive, yet concise DMP, using the base DCC (Digital Curation Centre) guidance and template.

2. **"The discovery of viable diagnostic biomarkers for Lewy body dementia using machine learning algorithms"**
   This DMP includes genetic data and machine learning techniques using the University of Nottingham guidance and template.

3. **"ACEP Geophysics and Mapping Platform"**
   This DMP covers geographical/geophysical and aping data using the Digital Curation Centre (DCC) guidance and template.

4. **"UNICA. Building a UNified theory for the development and resilience of Institutions for Collective Action for Europe"**
   This DMP covers geographical/geophysical and aping data using the Digital Curation Centre (DCC) guidance and template.

5. **"ECePS ERA Chair in e-Governance and Digital Public Services"**
   Horizon 2020 project DMP using the ERC guidance and template.

Please note that all Exemplar DMPs are provided openly by their authors and are made available via the Digital Curation Centre's DMPOnline tool.

[2] Source: Digital Curation Centre (DCC) "Example DMPs and guidance".