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Recommendations on Research Infrastructures in Humanities and Social Sciences

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Preamble

In the past few years, the German Council of Science and Humanities has issued several statements on large-scale facilities for basic research in the natural sciences. During this time, it has not lost sight of those disciplines and areas of scientific work where facilities and equipment are less extensive and cost intensive. The Council has therefore argued to regard besides large-scale research facilities knowledge resources, such as collections, archives, digital databases and data collections, as research infrastructures too – with the latter requiring separate attention and funding. Similar recommendations have been made at European level by actors such as the European Strategy Forum on Research Infrastructures (ESFRI).

In a letter dated 17 July 2007, the Federal Ministry of Education and Research (BMBF) asked the German Council of Science and Humanities to draw up recommendations on the developmental needs of research infrastructures in humanities and social sciences. The Council then included the topic “Infrastructure for Research in Humanities and Social Sciences” in its work programme in January 2008. The recommendations were intended to identify appropriate infrastructures and measures for their development and funding which offer humanities and social sciences in Germany the best conditions for research of international importance. Special consideration was to be given to the German Socio-Economic Panel Study (SOEP) and the Council for Social and Economic Data (RatSWD). As the future development and financing of the SOEP and RatSWD had to be decided in a timely manner, the German Council of Science and Humanities asked its Evaluation Committee to assess the status and development perspectives of these two institutions before adopting comprehensive recommendations on research infrastructures in humanities and social sciences.

The Evaluation Committee set up independent working groups in March 2009 to assess the SOEP and RatSWD. The German Council of Science and Humanities adopted the corresponding “Statement on the Status and Future Development of the German Socio-Economic Panel (SOEP), Berlin” and the “Statement on the Status and Future Development of the German Council for Social and Economic Data (RatSWD), Berlin” in Aachen on 13 November 2009.

The working group on the “Infrastructure for Research in Humanities and Social Sciences” commenced its work on 27 February 2009 with the aim of identifying the current infrastructures and their needs in humanities and social sciences and of making recommendations for their further development, funding, coordination and governance. Many experts – including foreign experts – cooperated in the working group who are not members of the German Council of Science and Humanities. The Council is particularly indebted to them.

Thanks are similarly due to the experts from German and European research funding institutions, universities, academic libraries, non-university research institutions, foundations and research data centres for their contributions to the hearings of the working group in Cologne on 1 and 2 July 2009 and in Berlin on 29 and 30 October 2009.

The German Council of Science and Humanities is further indebted to the scientific societies in humanities and social sciences which took part in the survey conducted by the Council’s headoffice among the societies. The survey asked for current infrastructure needs and awareness of infrastructures as an actual science policy topic in general. The results of the survey were available to the German Council of Science and Humanities at its meetings in Berlin on 26 to 28 January 2011.

In parallel to the working group “Infrastructure for Research in Humanities and Social Sciences”, two related working groups of the German Council of Science and Humanities have drawn up “*Empfehlungen zu wissenschaftlichen Sammlungen als Forschungsinfrastrukturen*” [Recommendations on Scientific Collections as Research Infrastructures] and “*Empfehlungen zur Zukunft des bibliothekarischen Verbundsystems in Deutschland*” [Recommendations on the Future of the Library Network System in Germany]. The Council has incorporated the results of these three working groups in “*Übergreifenden Empfehlungen zu Informationsinfrastrukturen*” [comprehensive recommendations on information infrastructures].

The German Council of Science and Humanities adopted these recommendations in Berlin on 28 January 2011.

Summary

Research infrastructures make important contributions in all scientific fields to the advancement of scientific knowledge, to the scientific answer to questions of social relevance and to the international compatibility of these efforts. This applies to humanities and social sciences as well as to natural, engineering or life sciences. Particularly in humanities and social sciences, it has been observed for well over a decade that their research infrastructures are undergoing a transformation: they are evolving from auxiliary institutions that nurture and store specialist information into incubators for new and innovative scientific questions based on research data that are produced by these very infrastructures themselves. This applies not only to the infrastructures driven by precise research questions but also to those providing access to specialist information. Digitally processed specialist information opens up completely new possibilities for the research-based utilisation of libraries, archives and collections through its linkage with metadata. Furthermore, a culture of international and increasingly interdisciplinary exchange is establishing itself in humanities and social sciences – in particular among young researchers – that requires fixed points of contact for meeting in scientific communities through virtual platforms, programmes for international scholarships and conferences.

It can be assumed that the

- _ importance of major surveys in social sciences and economics,
- _ digitisation of texts and historical artefacts in humanities,
- _ growing interest in research with laboratory equipment in parts of classical philology and ancient history, social sciences, linguistics and behavioural sciences, and
- _ growing scientific exchange beyond the boundaries of countries and subjects

will change work practices and international cooperation in humanities and social sciences on a global scale.

In order to remain internationally compatible, the German Council of Science and Humanities considers it necessary to devote more attention to the infrastructure development for humanities and social sciences in Germany. Commitment in particular to infrastructure developments driven by research ques-

tions has to come from scientific communities and corresponding project proposals must excel in a competitive call for ideas. Humanities and social sciences communities and the scientific associations and societies representing them must also play an active role in identifying and bundling relevant requirements for infrastructures focused on subjects as well as for those providing basic scientific supply for teaching and research. Furthermore, the German Council of Science and Humanities considers it necessary for public and private institutions to develop shared funding strategies and programmes in support of existing and future infrastructures for humanities and social sciences which go beyond their current status. Above all the special features of the financial support, organisation and legal regulation of infrastructures in the humanities and social sciences must be considered. These differ from the requirements in the natural sciences.

In humanities and social sciences, there is a need for research infrastructures from two points of view:

- _ On the one hand, scientists are hoping for facilitation of their practical work and generally improved working conditions, e.g. in terms of access to specialist scientific information, from research infrastructures. The “classic” infrastructures for providing specialist research information such as libraries, archives and collections have been confronted with chronic underfunding for years. Urgently required investments in the digitisation and retro-digitisation of specialist information cannot be met by most libraries from their basic budget which is in any case too low.
- _ On the other hand, the development of infrastructures is frequently a precondition for a response to forward-looking scientific and social issues through concrete research projects focused on specific topics. Examples of these are the panel studies in social sciences which reach an ever wider range of user groups beyond national borders and lead to a growing number of research publications. The German Council of Science and Humanities refers in this context to its “*Stellungnahme zum Status und der zukünftigen Entwicklung der SOEP-Studie*” [Statement on the Status and Future Development of the German Socio-Economic Panel (SOEP)]. | ¹

In view of the international compatibility and competitiveness of humanities and social sciences in Germany, the German Council of Science and Humanities believes it is a matter of urgency to support the development and expansion of research infrastructures through science policy. It makes recommendations in

|¹ Wissenschaftsrat: *Stellungnahme zum Status und der zukünftigen Entwicklung des Sozio-ökonomischen Panels (SOEP)*, Berlin, Drs. 9503-09, Aachen 2009.

this context on the development and funding of information infrastructures, social infrastructures as well as laboratory facilities and large scale equipment.

Information infrastructures include e.g. the major social and economic surveys. Compared with the situation worldwide, Germany is already well positioned here and has assumed e.g. within the ESFRI process the lead management of the Survey of Health, Ageing and Retirement in Europe (SHARE). The German Council of Science and Humanities recommends that the federal Government sustains this positive development and commits itself to leadership in further international infrastructure projects of relevance to humanities and social sciences.

In connection with the funding of infrastructures for processing and transferring data from official statistics, process-produced data and transaction data, the German Council of Science and Humanities recommends consolidating existing research data centres and establishing new ones. To do so, appropriate concepts must be developed for long-term economic stability of the centres. The respective business models should be designed to ensure that potential scientific users of data sets are not discouraged by prohibitive access fees.

For the long-term archiving of primary research data, the German Council of Science and Humanities recommends expanding the option of referring to and quoting data sets and including qualitative data and information from “volatile” data sources such as web sites and blogs (in certain areas) to a greater extent in archiving activities. In doing so, subject-specific forms of coordination and archiving strategies have to be found in order to maintain a reasonable ratio of expense and yield. Ethical and legal considerations should also be discussed jointly by scientific communities and funding institutions regarding central collection and provision of qualitative research data and other research data related to individual cases.

In the area of information infrastructures, digitisation is of special importance in humanities. The German Council of Science and Humanities recommends that public research funding institutions support long-term the expansion of digitisation which is suitable for research and the coordination of providers in the standardisation and networking of portals. Attention should be paid here to ensuring uniform standards, the cross-linking of digitised resources with meta-data and access to research information by the scientific community and students on a no-cost basis. The Council sees a need for the optimisation of coordination processes to create digital information infrastructures with a view to cross-linking and interoperability between specific information on offer and one-stop shopping options on specialist central portals – also with respect to funding instruments and their combination. In public academic libraries in particular, the development and expansion of digital information infrastructures must not compete with their functions to date but complement them.

Social research infrastructures such as institutes abroad, research colleges and centres of advanced studies are essential to humanities as permanent places for the exchange of personal communications and the development of new topics. In this context, the Council of Science and Humanities welcomes the funding of research colleges by the *Deutsche Forschungsgemeinschaft* [German Research Foundation] (DFG) and the *Bundesministerium für Bildung und Forschung* [Federal Ministry of Education and Research] (BMBF). It recommends that the scientific societies in humanities and dedicated research groups also mobilise private donors and sponsors to develop such infrastructures. The federal Government is asked to fund the humanities institutes abroad and the *Deutsches Archäologisches Institut* [German Archeological Institute] (DAI) as important social research infrastructures for their host countries as well and if possible to exclude them from cuts in the federal budget.

The German Council of Science and Humanities observes a growing importance of methods developed from research in the natural, medical and engineering sciences and corresponding large-scale facilities and laboratory equipment as necessary tools for humanities and social sciences research as well. The Council therefore recommends as a general rule intensifying interdisciplinary cooperation between these scientific fields, and explains this, using the example of neuroimaging equipment and archeometric laboratories. When accessing equipment and laboratories in the context of interdisciplinary cooperation and appropriately coordinated use of equipment resp. laboratories, scientific quality assurance should meet the respective specialist scientific criteria.

In order to fund research infrastructures on a competitive basis in humanities and social sciences specifically and in the longer term, the German Council of Science and Humanities recommends that the BMBF launches a national funding programme in agreement with the DFG. In contrast to funding instruments already in existence, a funding programme of this kind would have the functions both to create an explorative field for genuine infrastructure projects and for safeguarding them longer term with on-going quality assurance through peer review processes. Within the scope of this funding programme, successful infrastructure projects should create new fields of research for their respective disciplines and interdisciplinary cooperation. Appropriate evidence of this should be provided in intermediate evaluations and graded cycles of funding from the pilot phase to the established infrastructure.

In the medium-term, this could allow a national funding programme for infrastructure projects in German humanities and social sciences to incorporate some of the successful ongoing projects also on a national and/or European roadmap for research infrastructures. The national funding programme proposed by the German Council of Science and Humanities should be designed as a complementary instrument to existing funding instruments such as the DFG's

programme for long-term projects or the joint Academies' Programme by federal government and *Länder*.

The German Council of Science and Humanities expressly welcomes the federal government's intention to have a national roadmap for research infrastructures drawn up. This should ensure that such a process enhances the transparency of decision-making in infrastructure funding and lead to an extensive activation of specialist communities in humanities and social sciences as well. The Council advocates waiving *de minimus* limits for investment costs in humanities and social sciences in procedures for including projects on the roadmap.

The German Council of Science and Humanities welcomes the progress clearly emerging in the past years in organisation and governance, above all within social sciences and economics research infrastructures with the establishment of the German Council for Social and Economic Data (RatSWD).^{|2} It recommends expanding the number of disciplines represented in the RatSWD and in particular integrating the collection and use of qualitative data. The Council suggests that the scientific societies in humanities examine the establishment of an organisational form based on the example of the RatSWD to meet their specific infrastructure requirements. The Council also recommends that the BMBF supports a self-organisation process of this kind.

The German Council of Science and Humanities recommends that higher education institutions, non-university research institutions and scientific societies give greater recognition to the individual commitment of scientists in their development of infrastructures than was the case to date.

The German Council of Science and Humanities wishes to call the attention of actors and institutions in science policy to the use of research infrastructures in teaching. Granting management personnel and staff leave of absence for their own research in and with the infrastructures, and consideration of infrastructure projects in the performance-based allocation of funding in higher education institutions are still desiderata, which deserve attention in the near future.

Finally, the German Council of Science and Humanities calls for funding institutions and sponsors of research infrastructures in humanities and social sciences to link infrastructure funding and development in principle to training concepts for early career researchers. The Council believes that only by linking promising young scientists with research infrastructures can a dynamic development be advanced which is mutually beneficial to innovative methods and

^{|2} Wissenschaftsrat: Stellungnahme zum Status und der zukünftigen Entwicklung des Rates für Sozial- und Wirtschaftsdaten (RatSWD), Berlin, Drs. 9504-09, Aachen 2009.

new research topics. At the same time, funding concepts must consider that early career researchers do not lose contact with other fields of activity inside and outside research and teaching through their commitment to research infrastructures whose existence usually tend to be limited in time.

Since there is a lack of scientific staff with both specialist education in humanities or social sciences and IT qualifications for the targeted further development of research infrastructures, the German Council of Science and Humanities recommends, apart from extending further study programmes, introducing undergraduate programmes that provide a corresponding qualification.

A. Research infrastructures in humanities and social sciences

A.1 BACKGROUND AND OBJECTIVE OF THE RECOMMENDATIONS

Research infrastructures make important contributions in all scientific fields to the advancement of knowledge. Without the instruments and institutions that are available to all members of the respective scientific community to support their research, it is impossible to build on previous knowledge processes and their systematic further development in a decentralised academic world. This applies to humanities and social sciences as well as to natural sciences, engineering sciences or life sciences. Since ancient times, libraries have offered vital access to information, and in many disciplines a systematic advancement of knowledge would have been inconceivable without the existence of archives, museums and collections. In the 19th century, it was the German humanities that won worldwide reputation with their excellent scientific infrastructures such as the *Monumenta Germaniae Historica* (since 1819) or the editorial activities of the ‘*Kirchenväter-Kommission*’ [Commission of the Church Fathers] under Adolf von Harnack (since 1897).

Since the second half of the 20th century, a growing number of infrastructures originated which themselves generate new research data and act as incubators for scientific topics. Apart from large-scale research facilities in natural sciences, examples of these are the large international comparative studies in social sciences and economics. Furthermore, the research-driven projects for the digital use and processing of historical and contemporary texts and artefacts in humanities have been helping for well over a decade to focus research areas on cultural heritage.

The term “research infrastructure” has been linked with institutions such as libraries, archives, collections and experimental equipment only since the end

of the 20th century. The impetus for the creation of this term resulted from large-scale research in natural sciences. Large-scale research facilities have played an increasingly important role in scientific work since the 1920s, especially in chemistry, astronomy and particle physics as well as medical and military research. |³ At the latest since the beginnings of the Manhattan Project during the Second World War and the start-up of the first particle accelerator in Europe, CERN (*Conseil Européen pour la Recherche Nucléaire*), in 1954, large-scale research institutions have been focal points of research projects with international impact and are accordingly given public funding. These include e.g. particle accelerators, research reactors, research vessels, aircraft, telescopes, space stations and, in life sciences, large-scale laboratories and genetic databases. In contrast, research and project-driven infrastructures in humanities and social sciences – as well as libraries, collections, museums and archives – played a subordinate role until a few years ago.

Different parallel developments, however, in the last third of the 20th century led to an increased commitment in humanities and social sciences to the establishment of their own infrastructures. These included in particular the digital organisation and provision of information, the opening of official statistics for research purposes and the professionalisation of commercial survey research, with the resulting possibility of collecting comprehensive science-based data, made possible by the rapid development of modern information and communication technologies.

In Germany, such a trend has been observed in social sciences since the 1970s. Two major representative surveys driven by scientific excellence were launched within the scope of a Collaborative Research Programme (SFB 3) funded by the German Research Foundation (DFG) on the “Microanalytical Foundations of Social Policy” with the Socio-Economic Panel Study (SOEP) |⁴ and the German Life History Study (GLHS) |⁵. At the same time, several memoranda advocated better accessibility to data from official statistics in the 1970s to 1990s. |⁶

|³ P. L. Galison; B. W. Hevly: *Big Science. The Growth of Large-Scale Research*, Stanford 1999.

|⁴ H.-J. Krupp: *Das Sozio-oekonomische Panel (SOEP): Genese und Implementation*, in: *SOEPpapers on Multidisciplinary Panel Data Research*, 25 (2007), p. 1-16.

|⁵ K. U. Mayer: *Retrospective Longitudinal Research: The German Life History Study*, in: S. Menard (editor): *Handbook of Longitudinal Research: Design, Measurement and Analysis*, San Diego 2008, p. 85-106.

|⁶ H. Grohmann; G. Bürgin; H.-J. Krupp; W. Verbockett: *Podiumsdiskussion zum Thema: Vielseitige Nutzung statistischer Einzelangaben und Datenschutz*, in: *Allgemeines Statistisches Archiv*, 64 (1980), p. 39-75; R. Hauser; G. G. Wagner; K. F. Zimmermann: *Erfolgsbedingungen empirischer Wirtschaftsforschung und empirisch gestützter wirtschafts- und sozialpolitischer Beratung. Ein Memorandum*, in: *Allgemeines Statistisches Archiv*, 82 (1998), p. 369-379; H.-J. Krupp: *Möglichkeiten der Verbesserung der Einkommens- und Vermögensstatistik*. *Schriften der Kommission für wirtschaftlichen und sozialen Wandel*, 50 (1975); W. Zapf: *Me-*

Efforts to develop an agenda initiated by the scientific community were also reflected in relevant statements of science policy. For example, the US American Commission on Behavioural and Social Sciences and Education of the National Research Council presented a report in 1998 to fund research infrastructures in social sciences and behavioural sciences. |⁷ And the *Kommission zur Verbesserung der informationellen Infrastruktur zwischen Wissenschaft und Statistik* [Commission on the Improvement of the Informational Infrastructure between Research and Statistics] (KVI) established in 1999 by the Federal Ministry of Education and Research (BMBF) approved recommendations in 2001 for the further development of the data infrastructure |⁸ which resulted, inter alia, in the establishment of the Council for Social and Economic Data (RatSWD).

In humanities, development of the need for research infrastructures was accompanied above all by a trend towards the supply of digital scientific information. The role of the computer in the work of libraries was already discussed in the 1960s |⁹ but digitised information was firstly provided to a significant degree in the 1990s |¹⁰ and has been funded by the American National Science Foundation (NSF) since 1994 |¹¹, and by the *Deutsche Forschungsgemeinschaft* [German Research Foundation] (DFG) following two statements in 1995 |¹². The *Bund-Länder-Kommission für Bildungsplanung und Forschungsförderung* [Federal Government and Länder Commission for Educational Planning and Research Promotion] (BLK) and the German Council of Science and Humanities issued recommendations on the funding and further development of the supply of digital information through academic libraries in 2000 and 2001. |¹³

morandum zur Verbesserung der Zugangsmöglichkeiten zu Mikrodaten der amtlichen Statistik, in: ZUMA-Nachrichten, 39 (1996), p. 172-175.

|⁷ Commission on Behavioral and Social Sciences and Education; National Research Council: Investing in Research Infrastructure in the Behavioral and Social Sciences. Washington, DC 1998.

|⁸ Kommission zur Verbesserung der informationellen Infrastruktur zwischen Wissenschaft und Statistik (editor): Wege zu einer besseren informationellen Infrastruktur, Baden-Baden 2001.

|⁹ E.g. J. C. R. Licklider: Libraries of the Future, Cambridge, MA 1965.

|¹⁰ T. Saracevic: Digital Library Evaluation: Toward an Evolution of Concepts, in: Library Trends, 49 (2000), p. 350-369.

|¹¹ E. A. Fox: Digital Libraries Initiative (DLI) Projects 1994-1999, in: Bulletin of the American Society for Information Science, 26 (1999) (<http://www.asis.org/Bulletin/Oct-99/fox.html> of 19.10.2010).

|¹² DFG: Neue Informations-Infrastrukturen für Forschung und Lehre: Empfehlungen des Bibliotheksausschusses und der Kommission für Rechenanlagen, Bonn-Bad Godesberg 1995; DFG: Elektronische Publikationen im Literatur- und Informationsangebot wissenschaftlicher Bibliotheken, Bonn-Bad Godesberg 1995.

|¹³ BLK: Digitalisierung von wissenschaftlichen Bibliotheken, Materialien zur Bildungsplanung und Forschungsförderung, Heft 84, Bonn 2000; Wissenschaftsrat: Empfehlungen zur digitalen Informationsversorgung durch Hochschulbibliotheken, Cologne 2001.

In the course of the further development of grid technology financed by the BMBF |¹⁴, greater efforts have also recently been made – crucially from among linguistics and from the libraries themselves – to establish the concept of e-humanities. Their objective is to extend the term of research infrastructure in humanities as well as the supply of digital information to other web-based tools (e.g. linguistic corpora). |¹⁵

The need for research infrastructures in humanities and social sciences arises for two fundamental reasons that are frequently linked with each other. First, scientists need research infrastructures over the entire spectrum of disciplinary fields at a practical working level which opens up new work opportunities and specifically facilitates day-to-day work. This applies equally, for example, with regard to accessing scientific information, from specialist literature through to empirical research data, to research and teaching needs.

Apart from supplying work opportunities through infrastructures and specific “tools” for research and teaching over the spectrum of a discipline, research infrastructures are, secondly, seen as prerequisites for subject-related research projects which enable them to obtain research results that achieve international recognition. Infrastructures should make research data available in this context which allow new questions to be answered which previously could not be answered or only answered on the basis of insufficient information.

This can be exemplified e.g. by the national household panel studies in social sciences which reach ever larger user groups and are increasingly used as instruments of long-term monitoring of social and political change. An example of this in Germany is the SOEP study which, like the British Household Panel Study or the American Panel Study of Income Dynamics, generates numerous new research topics and results, and therefore promotes a higher degree of comparative research than was possible in the past.

In humanities, digitisation in particular plays an important role. In ancient oriental studies, over half a million cuneiform tablets have already been digitised. They are now available worldwide, including an innovative working environment, to all interested parties. The networking of text corpora e.g. in the

|¹⁴ Grid technologies are supposed to assist research in overcoming local dependence through text-based documents and digitised texts and virtual access to research data at different locations. The BMBF has funded the TextGRID joint research project since 2006 with EUR 1.6 million (<http://www.bmbf.de/press/1726.php> of 19.10.2010).

|¹⁵ See P. Gietz et al.: TextGrid and eHumanities, in: Proceedings of the Second IEEE International Conference on e-Science and Grid Computing E-SCIENCE 06, IEEE Computer Society 2006, Amsterdam 2006 and H. Neuroth; A. Aschenbrenner; F. Lohmeier: e-Humanities: Eine virtuelle Forschungsumgebung für die Geistes-, Kultur- und Sozialwissenschaften, in: Bibliothek. Forschung und Praxis, 3 (2007), p. 272-279.

Deutsches Textarchiv [German Text Archive] (DTA) enables any words to be compared through metadata in a language document with use of the same words in other sources.

The easy availability of digitised documents and objects including copies, translations, word lists and grammars as well as the existing annotation options and access to metadata represent fundamental changes in research and publication processes in humanities. Well-prepared and well-described digitised resources make histories of collections, hermeneutic complementarities and historic contexts between cultural artefacts visible, hitherto only available in different locations, which frequently remain hidden when presented in conventional forms. The possibility of including remote researchers in the preparation of metadata and the annotation of digitised objects often opens up new perspectives for these research subjects, and generates innovative questions already when preparing and commenting on data.

The growing importance of digital research infrastructures in humanities and social sciences will change their work practices and forms of cooperation in research and teaching at global level. These recommendations of the German Council of Science and Humanities are a response to this development. They intend to identify perspectives for the infrastructure development of research in humanities and social sciences in Germany. Following a fundamental definition of the term research infrastructure (A.II.) and a typology of infrastructures (A.III.). Chapter B. presents a discussion of the funding and coordination of research infrastructures in humanities and social sciences in Germany (B.I.) and Europe (B.II.). On this basis, the infrastructure landscape in humanities and social sciences in Germany, which is frequently embedded in a larger European context, will be reviewed and its needs analysed (C.). Chapter C. will also make recommendations for the further development of individual types of infrastructure and the handling of their specific problems. Finally, Chapter D. will give recommendations to fund, coordinate and govern infrastructures in humanities and social sciences and to combine them with the funding of early career researchers and higher education teaching.

A.II FUNDAMENTAL DEFINITION OF RESEARCH INFRASTRUCTURES

The neo-Latin neologism “infrastructure”, which originated in the French-speaking area, was first used to describe the bed of railway constructions, and is

deemed by etymologists to date back to 1875. |¹⁶ The term achieved lexical status in Germany in 1954 as a result of its use for NATO military installations. In the 1960s, the term infrastructure was extended to include an increasingly vast range of economic and social areas. |¹⁷

In a scientific context, the term infrastructure related to research with large-scale facilities in natural sciences. However, the term “research infrastructure” encompasses more than this and can be adapted easily to the specific requirements of different scientific disciplines.

In an evaluation of large-scale facilities in natural sciences |¹⁸ in 2006, the German Council of Science and Humanities argued close to the broad definition of the term “research infrastructure” developed by the European Strategy Forum on Research Infrastructures (ESFRI). |¹⁹ Research infrastructures are according to this “by nature unique facilities, resources and services” |²⁰ which can be distinguished according to three fundamental types:

- 1 – large-scale facilities (e.g. particle accelerators, telescopes, research vessels, large-scale laboratory equipment, satellites for remote sensing);
- 2 – research information infrastructures (collections, archives, structured information – e.g. acquisition and collection of data in social sciences – or digital databases);
- 3 – IT infrastructures or e-infrastructures (GRID, mainframe and high-performance computers, high-capacity and high-performance communica-

|¹⁶ D. van Laak: Der Begriff ‚Infrastruktur‘ und was er vor seiner Erfindung besagte, in: H.-G. Gadamer; K. Gründer; G. Scholtz, G.: Archiv für Begriffsgeschichte, Vol. 41, Bonn 1999, p. 280-299.

|¹⁷ D. van Laak: Der Begriff ‚Infrastruktur‘ und was er vor seiner Erfindung besagte, in: H.-G. Gadamer; K. Gründer; G. Scholtz: Archiv für Begriffsgeschichte, Vol. 41, Bonn 1999, p. 287.

|¹⁸ Wissenschaftsrat: Stellungnahme zu zwei Großgeräten der naturwissenschaftlichen Grundlagenforschung. Freie-Elektronen-Laser für weiche Röntgenstrahlung (BESSY FEL) und eisbrechendes Forschungsbohrschiff (AURORA BOREALIS), in: Wissenschaftsrat: Empfehlungen und Stellungnahmen 2006, Vol. III, Cologne 2007, p. 89-247.

|¹⁹ European Strategy Forum on Research Infrastructures: European Roadmap for Research Infrastructures. Report 2006 (ftp://ftp.cordis.europa.eu/pub/esfri/docs/esfri-roadmap-report-26092006_en.pdf of 19.10.2010) and European Strategy Forum on Research Infrastructures: European Roadmap for Research Infrastructures. Report 2008 (ftp://ftp.cordis.europa.eu/pub/esfri/docs/esfri_roadmap_update_2008.pdf of 19.10.2010).

|²⁰ European Strategy Forum on Research Infrastructures: European roadmap for research infrastructures. Report 2006, p. 16. The ESFRI definition limits the term research infrastructure further and relates solely to the comprehensive research infrastructures that are regarded by a European scientific community as being key to cutting-edge research in the respective field.

tion, and grid empowered infrastructures including the software and network connectivity required for them).

The ESFRI definition incorporates central research infrastructures, research infrastructures distributed over several locations, and also exclusively virtual ones without physical contact points.

In addition, the German Council of Science and Humanities emphasises the following features of research infrastructures: they allow or facilitate research by external users and are used by scientific communities and not only by individuals or groups. Only locally used facilities or equipment (personal computers, departmental libraries, local computer centres) are not research infrastructures in this sense. Research infrastructures are generally not only distinguished by a translocal character but, depending on the interest in the data they generate, coordinate and provide, by a transnational character. Their recipient group is potentially the global scientific community.

In order to be accessible to a wide range of users, research infrastructures usually involve norms, standards and regulations. Qualified staff to allow or facilitate the research of external users is part of an infrastructure. Sponsors of research infrastructures can be public institutions and private companies in the commercial or non-profit sector. Related to the planning, financing and governing on a time scale, research infrastructures tend to be medium to long-term entities. However, with regard to provision of basic scientific supply (e.g. libraries), they are often permanent institutions. In line with their character as translocal and often transnational commons of the scientific community, the governance of an infrastructure should be adapted to its specific tasks and the interests of users.

In the definition of research infrastructure proposed by the German Council of Science and Humanities, its function for external users is of central importance. The possibilities of access e.g. to research information and its conditions of use must be tailored to the needs and work practices of all potential scientific users, and allow unlimited access free from prohibitive charges. Universities and non-university research institutes that make their infrastructure available only to their local members accordingly could not be defined as research infrastructures. However, they can be sponsors and hosts of research infrastructures (perhaps in cooperation with partner institutions), for example, when generally accessible databases evolve in the course of longer term digitisation or data collection projects.

Infrastructures sponsored by one or several institutions in humanities and social sciences frequently assume service tasks in support of mainly external research. Services are usually complemented by own research activities, method

development, consultancy and further training of external users, and by the training of early career researchers.

A fourth type of infrastructure is also very relevant to humanities and social sciences. It is common to other scientific fields and its inclusion goes beyond the previous statements by the German Council of Science and Humanities on large-scale facilities in natural sciences and the ESFRI definition:

- 1 – the type of social research infrastructure (e.g. permanent places of meeting and discussion for the discursive exchange of current research questions and the development of new research topics).

Social infrastructures frequently evolve in natural sciences as a by-product to the installation of large-scale facilities and in the context of joint work on these. Apart from providing experimental set-ups and data, they also offer a collaborative field of work that allows disciplinary and interdisciplinary exchange. Independent of empirical research with large-scale facilities, however, there are also pure theory-related institutions such as the *Mathematisches Forschungsinstitut* [Mathematical Research Institute] Oberwolfach (MFO) and the *Internationales Begegnungs- und Forschungszentrum für Informatik* [International Centre and Research Centre for Computer Science] (IBFI), Schloss Dagstuhl, which serve as social infrastructures solely for exchange among researchers. Here, global specialist communities are given the opportunity of joint theoretical reflection and scientific discourse. Both of the institutions mentioned above were recommended by the German Council of Science and Humanities, emphasising their singular role on behalf of the respective discipline, for admission to joint funding by the federal government and *Länder* within the framework of the *Wissenschaftsgemeinschaft Gottfried Wilhelm Leibniz e. V.* [Gottfried Wilhelm Leibniz Association] (WGL). |²¹

The description of the MFO by the German Council of Science and Humanities characterises the prototype of a successful social research infrastructure: the institute “promotes scientific discourse on the subject, generates new ideas and initiates research by bringing together the best researchers in the world in a network for concentrated and intensive exchange, in this way provides the necessary ‘critical mass’ and in particular promotes early career researchers in the

|²¹ Wissenschaftsrat: Stellungnahme zum Aufnahmeantrag des Landes Baden-Württemberg für das Mathematische Forschungsinstitut Oberwolfach (MFO) in die Blaue Liste, in: Wissenschaftsrat: Stellungnahmen zu Instituten der Blauen Liste und zu Aufnahmeanträgen in die Blaue Liste, Vol. X, Cologne 2001, p. 347-368; Wissenschaftsrat: Stellungnahme zur Aufnahme des Internationalen Begegnungs- und Forschungszentrums für Informatik (IBFI), Schloss Dagstuhl, in: die gemeinsame Förderung durch Bund und Länder nach der Ausführungsvereinbarung Forschungseinrichtungen, in: Wissenschaftsrat: Empfehlungen und Stellungnahmen 2003, Vol. I, Cologne 2004, p. 103-124.

subject.” |²² These criteria must also be applied to social research infrastructures in humanities and social sciences which, however, in terms of composition of subjects, can also have a clear interdisciplinary character such as the *Wissenschaftskolleg Berlin* [Institute for Advanced Study Berlin]. |²³

A.III DISTINCTIVE FEATURES OF RESEARCH INFRASTRUCTURES

III.1 Basic scientific supply and subject-focused research

In terms of the purpose of research infrastructures in humanities and social sciences, three basic distinctions can be made:

- _ research infrastructures that are tailored to precise research topics and set up by a research project initially for own use by primary users;
- _ research infrastructures whose purpose from the outset is the collection, processing and provision of research data for external users; and
- _ research infrastructures that contribute to comprehensive basic scientific supply and therefore provide the same starting conditions for each member of a scientific community in delivering unlimited access to specialist research information and data.

The supply of scientific literature, for example, by libraries or digital services is basic supply. The aim is to allow research across the entire spectrum of a discipline and it must therefore be accessible to all scientists without restrictions. Institutions that coordinate and/or facilitate e.g. access to primary research data and specialist information of decentralised providers |²⁴ provide basic scientific informations as well.

|²² Wissenschaftsrat: Stellungnahme zum Aufnahmeantrag des Landes Baden-Württemberg für das Mathematische Forschungsinstitut Oberwolfach (MFO) in die Blaue Liste, in: Wissenschaftsrat: Stellungnahmen zu Instituten der Blauen Liste und zu Aufnahmeanträgen in die Blaue Liste, Vol. X, Cologne 2001, p. 347-368, here p. 349 (translated from German into English).

|²³ See Chapter C. IV for further examples.

|²⁴ Apart from library portals, these can be specialist scientific portals such as the CLIO-Online for history, which was funded by the DFG from 2002 to 2007 and is now sponsored by scientific association and large coordinating project networks such as the Council of European Social Science Data Archives (CESSDA) or the Common Language Resources and Technology Infrastructure Network (CLARIN) (see C.III.). Another important European initiative in this field is the platform European Cultural Heritage Online (ECHO) which has been operated jointly by the *Max-Planck-Institut (MPI) für Wissenschaftsgeschichte* [Max Planck Institute for the History of Science], the *Bibliotheca Hertziana*, the *MPI für Psycholinguistik* [Max Planck Institute for Psycholinguistics] and 13 other European humanities institutions since 2003. A common objective of all these portals and platforms is to make sources at different locations available to humanities research via central access.

Specific empirical data collection or digitisation and processing of collections devoted to certain topics are, however, research infrastructures that are intended to facilitate ambitious research in narrowly focused subject areas. In this case, access to the infrastructure can initially be limited to the research group which originally sets up the project.

Many infrastructure projects are between these two poles by generating research data for external groups of users from the outset. For a growing number of major survey projects in social sciences, access and service for a broad scientific community is integrated in the project design from the outset by the data producers.

The three basic distinctions of research infrastructures differ not least in the potential incentive structures for the actors who provide the service. Infrastructures providing basic scientific supply have hitherto offered very few possibilities of gaining a scientific reputation. They are primarily located in libraries or are mere service institutions or service portals. Infrastructures generating data with a broad use, however, definitely confer an independent reputation on their operators if they are successful. Research-driven infrastructures which first ensure exclusive access to their operators certainly do offer the engaged researchers the fastest opportunity of gaining a reputation because design and use of the infrastructure can be transferred immediately in their own publications.

Objectives of science policy connected with research infrastructures also differ. Infrastructures for the provision of basic scientific supply aim to improve general working conditions in research and teaching, not only but above all at higher education institutions. In contrast, infrastructures for research projects with a clearly defined subject focus are devoted to make a specialist impact in the respective scientific community. For a start, they promote the interests of a smaller group of specialised researchers.

Finally, infrastructures providing basic scientific supply differ, in terms of the permanent character they tend to have, from the infrastructures for subject-focused projects which are usually limited in time.

Many research infrastructures combine elements of providing basic scientific supply and subject-focused, frequently project-orientated research. Transitions are fluid. An infrastructure may also start as a special research project with comparatively few users and then expand into an infrastructure for broader groups of a specialist community. This is evident from a glance at the genesis of the successful research infrastructures in humanities and social sciences. Many of these institutions began as research projects limited in time and then developed over the years into institutions providing basic scientific supply in research and teaching that not only meet existing needs but create new needs by

increasingly incorporating other groups of users through methodological innovations and by generating interesting topics.

The basic orientation of a research infrastructure cannot therefore be established *a priori* once and for all time. It must preserve its ability to adapt to a dynamic research landscape. This is best assured through external evaluations by users and peers. The project-related creation of infrastructures in humanities and social sciences and their perpetuation over time in fact seems, based on positive results of evaluations and the competition for grants and subsidies, to be a frequent and proven way of assuring quality and relevance. Research-driven infrastructure projects can be terminated if evaluations are negative or applications for external funding fail. Such infrastructures should be terminated if they

- _ do not fulfil the expectations attached to them;
- _ lose their relevance in a changed environment of disciplinary and interdisciplinary topics; or
- _ lose their connection to the further development of research methods.

III.2 Size of investment and (inter)disciplinary importance

It makes sense to differentiate between research infrastructures according to size of investment and their (inter)disciplinary importance. The German Council of Science and Humanities has in the past developed a double criterion to define “extensive research infrastructures” in the field of large-scale facilities in natural sciences. The *de minimus* limit relevant to the evaluation is an investment volume of EUR 50.0 million. This limit can be waived if the investment in a research infrastructure is deemed to cause processes that form or change new and innovative scientific fields for one or more disciplines. |²⁵ Apart from the research infrastructures that are extensive in terms of cost, the focus of science policy is increasingly on medium-sized research infrastructures |²⁶ and small research infrastructures as well.

It must be considered that the usual differentiation in the evaluation of large-scale facilities between investment costs and operating costs is not taken into

|²⁵ See Wissenschaftsrat: Stellungnahme zu zwei Großgeräten der naturwissenschaftlichen Grundlagenforschung. Freie-Elektronen-Laser für weiche Röntgenstrahlung (BESSY FEL) und eisbrechendes Forschungsbohrschiff (AURORA BOREALIS), in: Wissenschaftsrat: Empfehlungen und Stellungnahmen, 2006, Vol. III, Cologne 2007, p. 126.

|²⁶ ESF, EUROHORCS: The EUROHORCS and ESF Vision on a Globally Competitive ERA and their Road Map for Actions to Help Build it, in: Science Policy Briefing, 33 (June 2008) (http://www.eurohorcs.org/SiteCollectionDocuments/EUROHORCS_ESF_ERA_RoadMap.pdf of 19.10.2010).

account in the humanities and social sciences in the same way as in natural sciences because research infrastructures in humanities and social sciences are characterised by decentralised and personnel-intensive structures as well as a usually low level of investment needs for research buildings and equipment. In a European survey on research infrastructures in humanities published in 2006, approx. three-quarters of all specified experimental research infrastructures generated total cumulative costs of below EUR 1.0 million. For digitisation infrastructures, the cumulative costs were below EUR 0.5 million in approx. 66 % of the cases. |²⁷ The German share of funding for the running costs of the five infrastructure projects in humanities and social sciences on the ESFRI Roadmap are below EUR 3.0 million for all projects, for two projects below EUR 1.0 million. |²⁸

It is clear that the respective investment limits from the review process of large-scale facilities for natural sciences cannot be transferred to the assessment of proposals for research infrastructures in humanities and social sciences. Statements or forecasts on effects creating or changing scientific fields would accordingly have to be consulted as evidence of (inter)disciplinary importance. It should be noted that important infrastructure projects in humanities and social sciences were started in the past on a very small scale and their innovative and field creating character has only been proven in the course of their later extensive use and expansion associated therewith.

III.3 Centralised and decentralised provision

In the infrastructures for humanities and social sciences, technical large-scale equipment is of rather marginal importance. Research data and digitised resources are usually provided through the same institutions which collect or generate these data. An essentially decentralised and in some cases primarily virtual distribution of research infrastructures in this area can therefore be assumed. This is not necessarily a disadvantage.

A lack of coordination between the institutions involved can have a detrimental effect if expensive duplication and incompatible parallel development occurs. This is an unsatisfactory situation both for external users and for infrastructure funding institutions above all when infrastructure operators are working with

|²⁷ Humanities in the European Research Area: The HERA Survey on Infrastructural Research Facilities and Practices for the Humanities in Europe, 2006

(http://www.heranet.info/Admin/Public/DWSDownload.aspx?File=Files%2fFiler%2fFinal+deliverables%2fd7.1.1_HERA_Survey_on_Humanities_Infrastructures.pdf of 20.10.2010).

|²⁸ Data compiled by the headoffice of the German Council of Science and Humanities.

different development and processing standards which impede or prevent the subsequent integration and migration of research data.

III.4 Criteria for relevance

In the case of subject-focused infrastructures which are mainly financed on a project basis, the question of scientific and social relevance arises with particular urgency already at the application stage for project funding. On the one hand, investment and operating costs are higher than in the case of “regular” research projects; on the other hand, infrastructures create path dependencies for directing subsequent funding. A reliable forecast based on relevance criteria prior to a funding decision is therefore necessary. The criteria for a forecast of this kind are basically no different from those used for the evaluation of infrastructures in natural sciences.

The scientific potential of a research infrastructure results from the state of research in the respective areas and from the effects creating or changing new and innovative fields. In this context, the opening up of new fields of research, the possibility of interdisciplinary cooperation and e.g. the possibility of contributing to the formation of new theories are important.

The potential of a research infrastructure to solve specific problems of social, cultural, political, technological and ecological change and their strategically importance for the further development of the national science and innovation system can also be regarded as indicators of relevance.

B. Funding and coordination of research infrastructures

B.1 NATIONAL FUNDING AND COORDINATION

Research infrastructures in humanities and social sciences are primarily organised in project form, using a widespread number of financial sources. This results in quite different conditions for the individual projects to get access to equipment and cooperation partners, which in the end has an impact on the sustainability of the infrastructure. In order to make precise recommendations for infrastructures regarding the adequacy, coordination and possible extension of financial support, it is useful to consider the relevant funding institutions and funding instruments separately.

1.1 Federal Government and *Länder*

The BMBF has been committed to the funding of research infrastructures in humanities and social sciences for over a decade. In this context, a memorandum by leading social scientists and economists |²⁹ on the “*Erfolgsbedingungen empirischer Wirtschaftsforschung und empirisch gestützter wirtschafts- und sozialpolitischer Beratung*” [Conditions for the Success of Empirical Economic Research and Empirically Aided Advice in Economic and Social Policy] was significant. The recommendations of the *Kommission zur Verbesserung der informationellen Infrastruktur zwischen Wissenschaft und Statistik* [Commission on the Improvement of

|²⁹ R. Hauser; G. G. Wagner; K. F. Zimmermann: Erfolgsbedingungen empirischer Wirtschaftsforschung und empirisch gestützter wirtschafts- und sozialpolitischer Beratung. Ein Memorandum, in: Allgemeines Statistisches Archiv, 82 (1998), p. 369-379.

the Informational Infrastructure between Research and Statistics] (KVI) subsequently set up have to a large extent been implemented. The BMBF is currently funding the social sciences infrastructure with approx. EUR 5.0 million and the humanities research infrastructure with approx. EUR 2.5 million per annum.

In social sciences and economics, three basic principles can be identified in research infrastructure funding by the BMBF:

- _ pilot projects in data access such as research data centres,
- _ methodology projects, and
- _ the creation of sustainable structures such as the Socio-Economic Panel Study (SOEP), the National Educational Panel Study (NEPS) and a coordinating body such as the Council for Social and Economic Data (RatSWD).

Federal government and *Länder* jointly provide institutional funding for the humanities and social sciences infrastructures within the framework of the *Wissenschaftsgemeinschaft Gottfried Wilhelm Leibniz e. V.* [Gottfried Wilhelm Leibniz Scientific Association] (WGL) and the Academies' Programme. 18 institutions operate in the WGL under the category of "research-based infrastructures" which provide mainly infrastructure services according to the criteria of the *Gemeinsame Wissenschaftskonferenz* [Joint Science Conference] (GWK). |³⁰ Eight of these are in the humanities and social sciences sections of the WGL. These eight institutions include the following institutes in humanities:

- _ *Deutsches Institut für Erwachsenenbildung – Leibniz-Zentrum für Lebenslanges Lernen e. V.* [German Institute for Adult Education – Leibniz Centre for Lifelong Learning] (DIE),
- _ *Deutsches Institut für Internationale Pädagogische Forschung* [German Institute for International Pedagogic Research] (DIPF),
- _ Herder Institut (HI),
- _ *Zentrum für Psychologische Information und Dokumentation* [Centre for Psychological Information and Documentation] (ZPID).

The following institutions of infrastructural character are found in social sciences and economics according to the *Ausführungsvereinbarung* [GWK Agreement] (AV)-WGL:

- _ *Akademie für Raumforschung und Landesplanung* [Academy for Spatial Research and Planning] (ARL),

|³⁰ Annex to the *Ausführungsvereinbarung* WGL (Liste gemäß § 1 Abs. 2), in: GWK: Grundlagen der GWK 2009, Bonn 2009, p. 47-53.

- _ Deutsche Zentralbibliothek für Wirtschaftswissenschaften – Leibniz-Informationszentrum Wirtschaft (ZBW) [German National Library of Economics – Leibniz Information Centre for Economics],
- _ Georg-Eckert-Institut für Internationale Schulbuchforschung [Institute for International Textbook Research] (GEI),
- _ Leibniz-Institut für Sozialwissenschaften [Leibniz Institute for the Social Sciences] (GESIS),
- _ Sozio-oekonomisches Panel [Socio-Economic Panel Study] (SOEP) within the Deutsches Institut für Wirtschaftsforschung [German Institute for Economic Research] (DIW).

Apart from their research tasks, many other Leibniz institutions have functions as operators of research infrastructures for humanities and social sciences. Some accommodate special libraries, collections, archives and research data centres, provide specialist portals, electronic services as well as advice and training and further education programmes for the scientific communities. For humanities, just one such example is the *Institut für Deutsche Sprache* [Institute of German Language] (IDS) in Mannheim which is e.g. a provider of archives, research databases, online dictionaries and web-aided tools for language analysis (see Chapter C.III.4.).

The Academies' Programme, which is funded in equal shares by the federal government and *Länder*, with a total EUR 50.0 million per annum, was established in 1979/1980 and has been coordinated by the *Union der deutschen Akademien der Wissenschaften* [Union of the German Academies of Sciences and Humanities] since 2001. It offers infrastructure projects in humanities, such as large editions and dictionaries, longer term funding over a period of 12 to 25 years. |³¹ 117 editions are currently being compiled in this context. Of the 34 new longer term projects added to the Academies' Programme from 2005 to 2010, 20 of these alone were edition projects. Editions therefore today make up about 70 % of the entire project portfolio of the Academies' Programme. The Academies involved in the Union in turn themselves operate a large number of other infrastructure projects funded externally.

Other non-university research organisations funded jointly by the federal government and the *Länder* are hosts and sponsors of infrastructures in humanities and social sciences, in particular the *Max-Planck-Gesellschaft* [Max Planck Society]

|³¹ Wissenschaftsrat: Stellungnahme zum Akademienprogramm, Drs. 9035-09, Saarbrücken 2009. The average processing time of an Academy project is approx. 17 years.

(MPG). |³² Research infrastructures in the institutions of the *Helmholtz-Gemeinschaft* [Helmholtz Association] (HGF) are gaining in importance in the course of the latest developments in health research – in particular at the interfaces of medical and life sciences to humanities and social sciences. In addition, there are other infrastructure institutions such as the *Wissenschaftskolleg Berlin* [Institute for Advanced Study Berlin] which is sponsored in equal shares by the federal government and the host *Land*. The *Länder* alone also function beyond the basic funding of higher education institutions and their libraries as sponsors of research infrastructures in humanities and social sciences like, for example, the *Land* Bavaria as main sponsor of the *Zentralinstitut für Kunstgeschichte* [Central Institute for the History of Arts] and the *Historisches Kolleg* [Institute for Advanced Study of History] in Munich.

The infrastructure funding of social sciences and economics in project form by the BMBF is clearly structured. With the German lead management of the Survey of Health, Ageing and Retirement in Europe (SHARE) and the lead management of the Council of European Social Science Data Archives (CESSDA) shared with Norway – both are on the ESFRI Roadmap – the BMBF is strengthening the international competitiveness of German research infrastructures in social sciences. In humanities, the projects TextGRID, D-Spin and eAQUA in particular are being funded, the parties involved here also play an active role in the ESFRI projects Common Language Resources and Technology Infrastructure Network (CLARIN) and Digital Research Infrastructure for the Arts and Humanities (DARIAH). With regard to the social research infrastructures, the BMBF has established the *Käte Hamburger Kollegs* [Käte Hamburger International Groups for Humanities Research], which are being funded for a period of six years (with an optional extension of a further six years) per college with up to EUR 2.0 million annually. These are part of the funding initiative *Freiraum für die Geisteswissenschaften* [Freedom for Research in the Humanities], following recommendations of the German Council of Science and Humanities |³³. A further field of activity of the BMBF that affects the information infrastructures of all disciplines lies in the establishment of information consortia of libraries since 2001 within the framework of “*Vascoda – Internetportal für wissenschaftliche Information*” [Vascoda –

|³² Examples are the Max-Planck-Digital-Library, the Max-Planck-Institut für Psycholinguistik [Max Planck Institute for Psycholinguistics] in Nijmegen and the Bibliotheca Hertziana in Rome, and the institutes for history of arts in Florence and Venice.

|³³ Wissenschaftsrat: Empfehlungen zur Entwicklung und Förderung der Geisteswissenschaften in Deutschland, Cologne 2006, p. 79-82.

Internet Portal for Scientific Information] in cooperation with the DFG (see I.2.). |³⁴

In the area of social research infrastructures in German humanities, basic funding of humanities institutes abroad is the responsibility of the BMBF, the basic funding of the *Deutsches Archäologisches Institut* [German Archeological Institute] (DAI) and its departments abroad is the responsibility of the Foreign Office.

The federal government has made the condition to establish a national roadmap for research infrastructures as a concern of its science policy in the current legislative period, also in response to the European ESFRI process. It is generally expected that infrastructure projects in humanities and social sciences as well will be incorporated at least medium-term on the national roadmap.

I.2 DFG

The objective of the DFG since 2003 has been to extend the definition of research infrastructure to incorporate knowledge resources of humanities and social sciences as well. It funds infrastructures providing scientific information such as special subject collections of libraries and national licences for access to literature. The special subject collections currently at 21 university libraries and twelve special libraries (six thereof funded by the DFG) primarily supply humanities and social sciences at supraregional level. |³⁵ Since 1998, the setting up of Virtual Subject Libraries has been the object of systematic DFG funding. The example of the *Virtuelle Fachbibliothek Ost- und Südostasien CrossAsia* [East Asian and Southeast Asian Virtual Subject Library CrossAsia] at the *Staatsbibliothek zu Berlin* [State Library Berlin] requires particular emphasis. According to the subject representatives, it has become an indispensable tool in Southeast Asian research which has given Germany a leading position in this field.

In parallel to this, the BMBF has funded the establishment of information networks. Both lines of funding had similar objectives and were bundled in 2001 within the framework of the *Vascoda Internetportal für wissenschaftliche Information* [Vascoda – Internet Portal for Scientific Information]. Over 40 academic libraries, providers of subject-related information and scientific institutions participate in Vascoda, including all libraries that operate a virtual subject library

|³⁴ See also the final report of the BLK: Neuausrichtung der öffentlich geförderten Informationseinrichtungen, Materialien zur Bildungsplanung und Forschungsförderung, Heft 138, Bonn 2006. The Commission “Zukunft der Informationsinfrastruktur” [Future of the Information Infrastructure] (KII) appointed by the GWK and established by the WGL is also currently considering this subject area among others.

|³⁵ DFG: Richtlinien zur überregionalen Literaturversorgung der Sondersammelgebiete und Virtuellen Fachbibliotheken. Status: 20.02.2010, Bonn 2010.

funded by the DFG. These are usually libraries with special subject collections. They also include the central subject libraries with their subject-related portals, the *Elektronische Zeitschriftenbibliothek* (EZB) [Electronic Journals Library], the *Zeitschriftendatenbank* (ZDB) [Journals Database] and different library networks. Vascoda's objective is to ensure comprehensive access to information provided at different locations by specialist information centres, academic libraries, higher education institutions and non-university research institutions, scientific societies and other providers of specialist information. In doing so, Vascoda focuses on cooperative work-sharing in designing subject-related portals and on their networking with the broadest possible overall information through a central access portal without wanting to replace existing individual services offered. |³⁶

Furthermore, the DFG funding measures to provide subject-related information aim to complement the system of special subject collections with digital resources. |³⁷ However, the DFG intends to continue the conventional print based parts of the special subject collections, and gives attention to the demand for full and comprehensive collections. |³⁸ To complement this, the DFG launched a new programme in 2010 "to fund excellent research libraries" which aims to raise the profile of libraries that are especially supportive of research and "to strengthen their character as centres of scientific work beyond their function as providers of literature". The definition of a research library clearly emphasises in this context its function as a "place of direct scientific work" and therefore its direct character as research infrastructure. |³⁹ The funding period in this programme does not exceed six years.

The DFG is further committed to strengthening electronic publishing through priority measures, and also promotes the indexing and digitisation of handwritten and printed records. In this context, it supports the creation of tools (e.g. service centres for digitisation) and the development of standards. With regard to the long-term archiving of primary research data, the DFG has imposed through its priority programmes the prompt transfer of such data to public repositories. |⁴⁰ Collaborative research programmes (SFB) and TransRegio projects

|³⁶ <http://www.vascoda.de/vascoda?SID=VASC:811991483&LOCATION> of 20.10.2010.

|³⁷ DFG: Merkblatt: Aktionslinie "Digitalisierung der DFG-Sondersammelgebiete". DFG-Vordruck 12.154-4/09.

|³⁸ DFG: Wissenschaftliche Literaturversorgungs- und Informationssysteme: Schwerpunkte der Förderung bis 2015. DFG-Positionspapier, adopted on 29.5.2006. Bonn 2006, p. 4.

|³⁹ DFG: Aufforderung zur Antragstellung. Ausschreibung "Förderung herausragender Forschungsbibliotheken" (31.05.2010), Bonn 2010, p. 1.

|⁴⁰ E. Kaemper; M. Niessen: Developing the Research Infrastructure in the Social Sciences: The Role and Contribution of the German Research Foundation, RatSWD Working Papers, 50 (2008), p. 2.

can apply to the DFG for so-called INF [information infrastructure] projects as sub-projects to manage their own information, knowledge transfer and preserve their research data long-term in repositories. |⁴¹

Examples of the DFG funding measures which are aimed at structuring entire fields of science are educational research and the humanities funding initiative. Taking up a recommendation of the German Council of Science and Humanities in 2006, |⁴² the DFG, in coordination with the BMBF, defines and funds research groups in humanities as social research infrastructures which, with a funding horizon of eight years, are linked to the success criteria of permanent social research infrastructures. |⁴³ The DFG funding instruments of scientific networks and academies for early career researchers also fall within the context of funding social research infrastructures in humanities and social sciences. Both funding instruments explicitly address the support of researchers during the doctoral and above all post-doctoral phase and are open to all scientific disciplines.

A further funding instrument that is relevant to the funding of research infrastructures is the programme for long-term projects (current volume approx. EUR 18.0 million per annum), in which humanities and social sciences projects can be funded for a term of seven to twelve years (e.g. editions, linguistic corpora, major social sciences surveys). The revised version of the programme specifies the central funding criterion for projects to be scientifically feasible as independent research projects within their funding term and irrespective of any further funding. |⁴⁴

Apart from its function to safeguard topics of research – which was previously the main focus and linked the programme for long-term projects very closely in terms of content to the Academies' Programme – today concrete problem-orientated topics are in the focus of DFG long term funding. Such topics include e.g. infrastructure projects with an emphasis on interesting new research desiderata. Relevant for a 'flagship project' funded in the long-term programme is its excellence in the eyes of the respective scientific communities.

|⁴¹ DFG: Merkblatt. Service-Projekte zu Informationsmanagement und Informationsinfrastruktur in Sonderforschungsbereichen INF. DFG-Vordruck 60.06-08/09.

|⁴² Wissenschaftsrat: Empfehlungen zur Entwicklung und Förderung der Geisteswissenschaften in Deutschland, Cologne 2006, p. 79-82.

|⁴³ DFG: DFG-Förderinitiative Geisteswissenschaften 2002 – 2007. Abschlussbericht, Bonn-Bad Godesberg 2007, p. 13-16.

|⁴⁴ DFG: DFG-Förderinitiative Geisteswissenschaften 2002 – 2007. Abschlussbericht, Bonn-Bad Godesberg 2007, p. 11-12.

In addition to the programme for long-term projects, the DFG Priority Programmes too support the establishment of research infrastructures – e.g. the Priority Programme “Education as a Lifelong Process. Analyzing Data of the National Educational Panel Study”, the purpose of which is the scientific use of data from the National Educational Panel Study (NEPS).

Interdisciplinary consideration of the national framework reveals a plurality of funding instruments which the DFG uses in different phases and for different purposes to fund research infrastructures in humanities and social sciences. |⁴⁵ This can be illustrated by five selected examples.

The data collection phases of the European Social Survey (ESS) are funded by the DFG as part of the programme for long-term projects, basic funding of this infrastructure being provided by the European Commission. While the German Longitudinal Election Study (GLES) is funded in full by the DFG long-term programme, the Panel Study of Intimate Relations and Family Members (PAIRFAM) is the object of priority programme funding during its four-year start-up phase. Before the first data collection phases began and after a positive interim evaluation, the DFG decided to give PAIRFAM a secure future perspective medium-term through the DFG long-term programme.

Special cases of the successive coordination of DFG own funding and external funding instruments are the Socio-Economic Panel Study (SOEP) and the National Educational Panel Study (NEPS).

NEPS was co-initiated from the outset by the DFG, supported by and also evaluated by the DFG on a work-sharing basis with the BMBF. While the BMBF took over the funding of the NEPS infrastructure following the DFG’s positive evaluation of the application, the DFG in turn launched a priority programme for the analyses of research data supplied by the NEPS.

The SOEP started initially as a collaborative research programme (SFB) and then stepped into a succession of DFG-‘normal term’ (three year) funded projects. To ensure the long-term stability of this social sciences research infrastructure, which was already very successful in its early stage, the SOEP was then taken over, after twelve years of continued project funding and based on a corresponding recommendation of the German Council of Science and Humanities in 2003, into permanent joint funding by the federal government and the *Länder* under the umbrella of the Leibniz Association (WGL).

|⁴⁵ E. Kaemper; M. Niessen: Developing the Research Infrastructure in the Social Sciences: The Role and Contribution of the German Research Foundation, RatSWD Working Papers, 50 (2008).

Major foundations with a strong capital base can play a role in the funding of research infrastructures, especially at an early stage. They generally regard themselves in this field in the function of key drivers that initiate infrastructure innovations but usually cannot and do not want to finance them on a permanent basis. Smaller foundations have in the past engaged above all in the funding of social infrastructures for research. Basically, however, the resource intensity and long-term nature of extensive research infrastructures, also in humanities and social sciences, is a major hurdle concerning permanent commitment for most foundations and potential private sponsors.

An example of research infrastructure funding by foundations is the *Volkswagen Stiftung* [Volkswagen Foundation] which has in the past funded the documentation of endangered languages (DoBeS) at the *Max-Planck-Institut für Psycholinguistik* [Max-Planck-Institute for Psycholinguistics]. It also supported research in museums which in a few cases also comprised digitisation projects. In e-humanities, the *Volkswagen Stiftung* makes funds available for networking and reciprocal exchange. The *Gerda Henkel Stiftung* [Gerda Henkel Foundation] does not itself fund more extensive infrastructure activities but established the interactive L.I.S.A. Science Portal in 2010, a specialist portal organised around the key themes of reading, informing, writing and exchanging for humanities scholars and a communication network for the foundation's scholarship holders and sponsoring partners. L.I.S.A.'s aim is to provide contributions from all fields of historical humanities. With regard to the funding of infrastructures for humanities, the *Fritz Thyssen Stiftung* [Fritz Thyssen Foundation] is traditionally committed to library subsidies. These are used to procure research material in support of scientific work within the scope of the foundation's funding portfolio. Grants usually go to libraries that have no access to public funding. Other foundations such as the *Stifterverband für die Deutsche Wissenschaft* [the business community's innovation agency for the German science system] or *Daimler-Chrysler-Fonds* [Daimler-Chrysler fund] are committed to scholarship schemes and stipends for working in social infrastructures such as the *Historisches Kolleg* [Institute for Advanced Study of History] in Munich.

1.4 Problems of national funding

Institutional funding of infrastructures for research in humanities and social sciences is provided in Germany primarily within the context of institutions whose basic financing is shared in equal parts by the federal government and the *Länder* with "research-based infrastructure"-institutes of the WGL and through the Academies' Programme in the Academies of Sciences and Humanities. There are also some institutes of the *Max-Planck-Gesellschaft* [Max Planck Society] (MPG), the *Helmholtz-Gemeinschaft* [Helmholtz Association] (HGF), financed

up to 90 per cent by the federal government, and the humanities institutes abroad, the latter being financed solely by the federal administration, the *Deutsches Archäologisches Institut* [German Archeological Institute] (DAI) as well as the relevant research institutes of the federal government's departments (*Resortforschungseinrichtungen*).

In addition, the *Länder* provide higher education institutions and their libraries with basic funding, through which subject-related and research information is obtained and supplied. However, this does not adequately cover basic requirements. Furthermore, the impression is increasingly growing that DFG funds for providing literature on a supraregional basis have to be used in some areas of state and university libraries to compensate for and not to supplement the basic subsidies of the *Länder*. The establishment of a DFG funding programme to support research libraries in 2010 accordingly caused a stir among institutional operators of special subject collections which had not hitherto regarded their core business in actively supporting research activities. They fear a general redistribution of resources for the special subject collections to the libraries that are successful in the new programme.

The necessary digitisation of research information and scientific collections in particular shows that higher education institutions and their libraries rely here on acquiring external funds unless they want to neglect their core functions. This has resulted so far in the inconsistent and heterogeneous establishment of fragmented infrastructure projects at different locations, applying different standards of indexing and with insufficient transparency and cooperation between the individual actors.

In the case of many small-scale digitisation projects, a direct link to scientific research was frequently not clear. This created the impression that pure service areas often responded ad hoc to opportunity structures of providers of external funding without having adequately coordinated their projects in advance with the requirements of the specialist branches of science. Coherent funding of infrastructures, with an emphasis on outstanding research topics at the interface of humanities and social sciences research with the information sciences – e.g. when generating metadata – remains, however, a desideratum.

A funding programme designed specifically to finance infrastructures for research in humanities and social sciences long-term as a complement to the basic financing of institutions is still missing in the German scientific landscape.

The necessary digitisation of research information and scientific collections for research in humanities in particular suffers from the fact that available funding instruments at national level are still insufficiently coordinated. Once digitised and processed with metadata, data sets lack the necessary resources to maintain their availability, regular updates, adaptations to new methodological standards

etc. If digital data sets cannot be seen to generate new research topics after the set-up and development phase, their existence is potentially threatened.

It is easier for infrastructures for subject-focused research to acquire external funds but they too often lack long-term predictable funding horizons. Successes of funding to date for research-driven ad hoc infrastructure projects in humanities and social sciences cannot conceal the fact that the fate of infrastructures and the respective forms of their funding resp. institutionalisation were often directly linked with the personal preferences and professional careers of the researchers who were crucial to their operation.

This has also exposed the development of infrastructures – with all the advantages of such bottom-up governance – to considerable randomness, imponderability and idiosyncrasy. Furthermore, the demand for data from research infrastructures in humanities and social sciences has today increased significantly. The demand is driven by growing efforts in parts of specialist communities and an enhanced need from politics and society which creates new challenges for the sustainability of funding programmes and their coordination.

In terms of the social research infrastructures, savings in particular with respect to humanities institutes abroad and above all the DAI are to be lamented. The latter, belongs as an institution to the Federal Foreign Office. Despite relevant recommendations of the German Council of Science and Humanities |⁴⁶, it is not in a position to avert the general financial cutbacks in the federal government by referring to its research activities. The DAI research infrastructures that are also important for the host countries of its institutes suffer from this in particular e.g. the equipment of libraries, photograph collections and laboratories.

Compared with other European and non-European countries, Germany has not to date had a roadmap for research infrastructures which would allow investment planning across disciplines within a national framework and support decisions on participating in infrastructures abroad financed multilaterally based on clearly defined national priorities (see B.II.). |⁴⁷

|⁴⁶ Wissenschaftsrat: Stellungnahme zum Deutschen Archäologischen Institut (DAI), Berlin, in: Wissenschaftsrat, Empfehlungen und Stellungnahmen 2008, Vol. III, Cologne 2009, p. 293-370.

|⁴⁷ Wissenschaftsrat: Empfehlungen zur deutschen Wissenschaftspolitik im europäischen Forschungsraum, Cologne 2010, p. 120-121.

II.1 European Strategy Forum on Research Infrastructures (ESFRI)

The European Strategy Forum on Research Infrastructures (ESFRI) was established in 2002, comprising representatives of member states and a representative of the EU Commission, supported by a Secretariat of the Commission. |⁴⁸ The background was a need for strategic planning in research infrastructures in Europe which takes account of the long-term binding effect for resource allocation of infrastructure related decisions. The ESFRI was established on the one hand because of recognition of the increasing complexity of research infrastructures, and on the other hand because of the conviction that the development of research infrastructures – also in the context of developing the European Research Area (ERA) – was to be considered rather as a responsibility of partnership than as a matter for national competition. |⁴⁹

In 2006, following a broad consultation process, the ESFRI presented a first European Roadmap for Research Infrastructures which included research infrastructure projects for the next 10 to 20 years. This Roadmap was updated in 2008, and a further update is expected in 2011. The infrastructure projects on the ESFRI Roadmap are not prioritised with respect to each other. The ESFRI Roadmap 2008 comprises a total of 44 infrastructure projects, five of which fall within humanities and social sciences.

The Roadmap provides the basis that allows the states represented in the ESFRI to make specific decisions to realise projects according to the principle of “variable geometry” i.e. in a joint approach by a group of interested EU member states. |⁵⁰ 32 of 35 infrastructure projects on the 2006 ESFRI Roadmap are meanwhile in the preparation phase which is financed mainly by funds from the Seventh Framework Programme of the European Commission. The five humanities and social sciences projects on the ESFRI Roadmap are also amongst the first to be funded in Europe.

|⁴⁸ The idea of forging a coordinated political approach to the field of research infrastructures in Europe took root in 2000 at the Strasbourg Conference on Research Infrastructures. At the request of the Council of Ministers, the EU Commission appointed a High Level Expert Group comprising representatives of all member states which recommended the creation of the ESFRI.

|⁴⁹ Wissenschaftsrat: Empfehlungen zur deutschen Wissenschaftspolitik im europäischen Forschungsraum, Cologne 2010, p. 64-65.

|⁵⁰ cf. the relevant overview in: European Commission: STC Key Figures Report 2008/2009 (2008), p. 111 et seq. (Table II.3.1.).

Driven by the ESFRI, a legal basis has meanwhile been created which aims to facilitate the operation of extensive European research infrastructures: the European Research Infrastructure Consortium (ERIC). |⁵¹ The objective in the establishment of ERICs by at least three member states and other qualified interested parties (countries associated with the EU, third countries as well as special international organisations) is to accelerate and facilitate the joint development of European research infrastructures. The respective legal instrument provides the ERICs with a legal personality recognised by all EU member states which is characterised in particular by the advantages of international organisations such as exemption from value-added tax (VAT). |⁵² It is not yet possible to judge whether and to what extent the legal form of ERIC will be appropriate in future, also for the generally decentralised European infrastructure projects in humanities and social sciences which are characterized by a low level of investment costs.

In view of the ESFRI process, many European states have meanwhile introduced transparent planning processes in the form of national roadmaps, some of which set clear priorities and serve the respective states as strategic orientation in the European processes of negotiation on the creation and development of research infrastructures.

II.2 EU Framework Programme

The EU Commission makes approx. EUR 1.7 billion available to research infrastructures in its Seventh Framework Programme (which runs 2007-2013). About EUR 1.0 billion will be invested in existing research infrastructures. The remainder is for new research infrastructures and the further development of funding policy. About EUR 687.0 million have been spent to date, thereof EUR 29.0 million for humanities and social sciences. The Integrating Activities of the Seventh Framework Programme (total of 13 projects) can be termed a funding instrument in existing research infrastructures, through which the projects Longitudinal Enhancement and Access Improvement of the SHARE Infrastructure (SHARE_LEAP) and Cultural Heritage Advanced Research Infrastructures (CHARISMA) in humanities and social sciences are funded. New research infrastructures in humanities and social sciences are funded in the context of design

|⁵¹ Council Regulation (EC) No 723/2009 of 25 June 2009 on the Community Legal Framework for a European Research Infrastructure Consortium (ERIC). ABl. L 206/1 of 8.8.2009 (http://www.euburo.de/arbeitsbereiche/infrastrukturen/neueinfrastrukturen/Download/dat_/fil_3385 of 19.10.2010).

|⁵² Wissenschaftsrat: Empfehlungen zur deutschen Wissenschaftspolitik im europäischen Forschungsraum, Cologne 2010, p. 64.

studies (three projects) and the financing of a preparatory phase (for the five projects represented on the ESFRI Roadmap). The access of national researchers to European research infrastructures that are also funded through the Integrating Activities are of rather marginal interest to humanities and social sciences as their infrastructures are primarily characterised in the European Research Area by decentralized access and virtual availability. |⁵³ Regarding the Eighth Framework Programme, the Commission plans to make its commitment to research infrastructures a central area of action for European research policy. Multilaterally planned research infrastructures should therefore be co-funded by the EU following an as yet unspecified selection process. |⁵⁴

II.3 European Science Foundation (ESF)

The European Science Foundation (ESF) has drawn up a roadmap together with the Association of European Heads of Research Councils (EUROHORCs) |⁵⁵ which intends e.g. to support the systematic funding of medium-sized research infrastructures. For this purpose, the ESF established a Member Organisation Forum on Medium-Sized Research Infrastructures in January 2010 which assists coordinated further development in this area throughout Europe. In this context, the existing portal on research infrastructures (www.riportal.eu) will be expanded. Furthermore, the ESF holds observer status in the ESFRI process and examines scientific collections as research infrastructures in the OECD Scientific Collections International group (SciColl).

The ESF itself has no specific instruments to create or fund new research infrastructures. Its role in this field is primarily advisory. The ESF Social Sciences Standing Committee, for example, is involved in the governance of the European Social Survey (ESS), advises on the development of a bibliometric database for humanities and social sciences in Europe and supports the further development of e-social sciences throughout Europe. The Standing Committee for the Humanities in the ESF is also examining questions of European infrastructure development.

|⁵³ D. Pasini: Twenty Years of Transnational Access to Research Infrastructures. Program Committee Meeting 9 October 2009

(http://www.eubuoero.de/arbeitbereiche/infrastrukturen/Zugang/Download/dat_/fil_5051 of 20.10.2010).

|⁵⁴ Wissenschaftsrat: Empfehlungen zur deutschen Wissenschaftspolitik im europäischen Forschungsraum, Cologne 2010, p. 64.

|⁵⁵ ESF, EUROHORCs: The EUROHORCs and ESF Vision on a Globally Competitive ERA and their Road Map for Actions to Help Build it, in: Science Policy Briefing, 33 (June 2008)

(http://www.eurohorcs.org/SiteCollectionDocuments/EUROHORCs_ESF_ERA_RoadMap.pdf) of 20.10.2010.

European humanities and social sciences had little time to focus on the ESFRI process. Projects for which concepts had already been prepared in other contexts and which just fitted in the preparatory time frame were included on the ESFRI Roadmap. With respect to the ESFRI Update 2008, there was only one new proposal for the inclusion of a European electoral study, which had been in existence since 1979, but this was rejected by the ESFRI-committee.

At present, there is no regulatory process to pass projects from a national level on to the European Roadmap and to transform them there into a transparent structure for multilateral realisation. |⁵⁶ Negotiations on multilateral financing and the actual organisation of the ERICS in particular are still open. According to deliberations to date, the ESFRI itself will not set priorities or decide on funding for European research infrastructure projects. Deliberations on European science policy are currently considering which actor could take such decisions in the future or whether a new body should be created with according regulatory power at European level.

|⁵⁶ Wissenschaftsrat: Empfehlungen zur deutschen Wissenschaftspolitik im europäischen Forschungsraum, Cologne 2010, p. 123.

C. Appraisal and recommendations on individual infrastructure areas

C.1 ATTEMPTS AT CATALOGUING

Several working groups which addressed questions about the research infrastructure in the past by comparison at international level lamented the unavailability of reliable data. |⁵⁷ Germany is no exception to this: a diverse research infrastructure landscape exists with a variety of funding possibilities. Infrastructures have not been catalogued to date.

An attempt to remedy the non existence of reliable infrastructure data at European level consisted in establishing an internet portal which is intended to identify European research infrastructures. |⁵⁸ The results of the survey of research funding institutions and operators of research infrastructures on which this portal is based are published in report form. |⁵⁹ However, the current overview only maps the existing infrastructures, especially in humanities and social sciences, to a very limited extent. |⁶⁰ In addition, databases have to be included

|⁵⁷ Commission on Behavioral and Social Sciences and Education; National Research Council: Investing in Research Infrastructure in the Behavioral and Social Sciences. Washington, DC 1998. See also: OECD, Global Science Forum: Report on Roadmapping of Large Research Infrastructures, 2008 (<http://www.oecd.org/dataoecd/49/36/41929340.pdf> of 20.10.2010).

|⁵⁸ European Commission: European Portal on Research Infrastructures (<http://www.riportal.eu> of 20.10.2010).

|⁵⁹ European Commission; European Science Foundation: Trends in European Research Infrastructures. Analysis of Data from the 2006/07 Survey, 2007 (http://ec.europa.eu/research/infrastructures/pdf/survey-report-july-2007_en.pdf of 20.10.2010).

|⁶⁰ At the time of writing this recommendation (20.10.2010), nine projects were allocated to German humanities, social sciences or behavioural sciences.

that are specially orientated at humanities and social sciences. The HERA Survey exists in humanities at European level (but without the participation of Germany), |⁶¹ the 235 research infrastructures it records being a random sample that allows an extrapolation on the situation in Germany. |⁶²

Although it is frequently difficult to classify the respective facilities distinctly, it is clear that the majority of databases of humanities infrastructures consist of digitised texts and objects, and linguistic corpora. As a whole it is apparent that these are digital resources in over 90 % of the facilities while technical or spatial resources for experimental research in this random sample account for less than 10 % of the infrastructures. Social research infrastructures in line with the recommendations made here were not taken into account. A further European survey which explicitly addresses electronic databases in humanities and social sciences was conducted by the European University Association under the acronym MORESS (Mapping of Research in European Social Sciences and Humanities). |⁶³

A more recent attempt to catalogue the German research infrastructure in e-humanities was presented by the *Staats- und Universitätsbibliothek Göttingen* [Göttingen State and University Library] within the scope of the DFG project “*Konzeptionelle Entwicklung einer Forschungsinfrastruktur für die e-Humanities in Deutschland*” [Design and Development of a Research Infrastructure for e-Humanities in Germany]. |⁶⁴ The 39 German and European centres, specialist organisations and programmes included in the project focus on technical developments (e.g. grid technology) and the opportunities to utilise them for humanities and social sciences.

Full cataloguing of the research infrastructure landscape in German and European humanities and social sciences which would differentiate the types of infrastructure and repeat their appraisals on a regular basis is expensive and is

|⁶¹ Infrastructures from Belgium, Estonia, Finland, Great Britain, Ireland, Iceland, Netherlands, Norway, Austria, Sweden, Slovenia and the Czech Republic took part. The response rate was 41 %.

|⁶² Humanities in the European Research Area: The HERA Survey on Infrastructural Research Facilities and Practices for the Humanities in Europe, 2006
(http://www.heranet.info/Admin/Public/DWSDownload.aspx?File=Files%2fFiler%2fFinal+deliverables%2fD7.1.1_HERA_Survey_on_Humanities_Infrastructures.pdf of 20.10.2010). 612 research infrastructure projects in humanities were contacted for the HERA Survey, 235 responded.

|⁶³ European University Association: MORESS. Mapping of Research in European Social Sciences and Humanities, Brussels 2006 (<http://www.moress.org/report.html> of 20.10.2010).

|⁶⁴ Niedersächsische Staats- und Universitätsbibliothek Göttingen: State-of-the-Art Analyse e-Humanities, Göttingen 2008.
(http://www.textgrid.de/fileadmin/TextGrid/konferenzen_vortraege/eHumanities_Juni08/SotAA_1.1.pdf of 20.10.2010).

still one of the desiderata of scientific research for advisory purposes in terms of science policy.

The recommendations of the German Council of Science and Humanities given here are no substitute for a comprehensive appraisal. They can, however, identify central research infrastructure complexes, based on available materials and by using a survey among scientific societies in humanities and social sciences. Inside the infrastructure complexes some prominent and well documented infrastructure projects are highlighted *pars pro toto*. The infrastructure complexes are summarised and characterised in C. III so that recommendations can be derived for respective infrastructure areas.

C.II SURVEY AMONG GERMAN SCIENTIFIC SOCIETIES

In order to gain an initial impression of existing research infrastructures and details of corresponding needs as well as criteria and procedural proposals for future infrastructures the German Council of Science and Humanities conducted a survey among 99 German scientific societies in humanities and social sciences. |⁶⁵ These scientific societies included all scientific associations which had the right to nominate candidates for the 2007 DFG-Review Board election in the subject areas humanities and social sciences. The survey asked about

- 1 – the importance of existing research infrastructures for members of the societies;
- 2 – the need for the creation or further development of research infrastructures;
- 3 – the central actors and processes for the development of research infrastructures available in Germany in the respective subject; and
- 4 – the prescribed role of the scientific societies in this process.

Of the 99 scientific societies approached, 36 answered the questionnaire – including 26 of the scientific associations that have the right to nominate candidates for the DFG. Three scientific societies (including one with a DFG nomination right) responded to the survey by other means. The results showed a partly diffuse and wide-ranging understanding of research infrastructures, expressing heterogeneous statements of needs and often not sufficiently clearly defined

|⁶⁵ The results of the survey have not been published but were available to the German Council of Science and Humanities at its meetings in Berlin on 26 to 28 January 2011 as annex to these recommendations.

ideas about central actors and processes as well as the role of the scientific societies themselves in potential planning processes.

II.1 Initial position

The survey by the German Council of Science and Humanities is an initial attempt to determine the use, needs and planning of infrastructures among the scientific societies in humanities and social sciences in Germany. It therefore also makes a significant contribution in increasing awareness in the scientific communities that infrastructures are an important field in the future, in which humanities and social sciences, represented by their scientific societies, should engage in.

Regarding the assessment by the scientific societies of their own role in the further development of the research infrastructure landscape, the survey clearly showed the hitherto very diverse organisational abilities and articulation skills of the different scientific societies in humanities and social sciences. It is clear that articulation of needs can be very heterogeneous, depending on the specialisation of the respective sections of the scientific societies, and the societies themselves have not to date developed any organisational structures which would place them in a position to bundle, coordinate or even prioritise the heterogeneous interests of the respective scientific community. The societies range from those which explicitly do not see their function in dealing with infrastructure questions for their subject to those which, in some cases initiated by the survey, set up corresponding working groups, and have entered into consultation processes with related scientific societies.

The results of the survey, however, also show that some scientific societies are having to struggle with other problems, which are regarded as being of vital significance, due to current financial redistributions in higher education institutions and in particular job losses, reallocation of chairs etc. at their expense. They see themselves as being impeded in the formulation of needs and development of infrastructures due to decreasing leeway to manoeuvre at all.

II.2 Recommendations on the activation of relevant actors

The German Council of Science and Humanities maintains that research projects and research-driven infrastructures as well have to develop on the basis of the interests and needs of researchers and prevail in the competition for the best ideas.

At the same time, it is necessary not to lose sight of asymmetrical developments between natural sciences on the one hand and humanities and social sciences on the other hand |⁶⁶ and also within the range of subjects in humanities and social sciences. Some disciplines or sub-disciplines already have effective research infrastructures and as a result attract further attention, resources and early career researchers. For others, this has not been the case to date. In relation to the latter in particular, the German Council of Science and Humanities recommends that the relevant scientific societies increase the awareness of their members with respect to the infrastructure problems and play an active role in the infrastructure discussion with funding organisations.

Scientific societies are institutions of scientific self-organisation and bodies of disciplinary communication internally and externally. They support e.g. the further development of their subject and also act as a lobby in articulating the interests of scientific communities with respect to public funding and sponsoring institutions. |⁶⁷ The German Council of Science and Humanities therefore recommends that public sponsors provide scientific societies in humanities and social sciences with more support than hitherto in articulating their actual needs and in explaining the social relevance of their projects e.g. through interdisciplinary workshops. The Council further points out that interdisciplinary collaborative research programmes (SFB), research associations and research groups in particular have in the past often proven to be the focal points or initiators for innovative research infrastructures. Research funding institutions should, therefore, outline the ways how successful researchers and research networks can open up longer term prospects for the infrastructures they develop e.g. digital databases, surveys etc.

The Council for Social and Economic Data (RatSWD) |⁶⁸ evaluated by the German Council of Science and Humanities in 2009 and funded by the BMBF is the institutional expression of a successful self-organisation of the disciplines involved from the standpoint of bundling infrastructural competence with regard to access to decentralised databases for quantitative social sciences and economics. As an independently elected panel of experts whose members (both data users and data providers) are appointed by the BMBF in agreement with the other

|⁶⁶ Regarding the articulation skills of the scientific communities in the European Research Area, see also: Wissenschaftsrat: Empfehlungen zur deutschen Wissenschaftspolitik im europäischen Forschungsraum, Cologne 2010, p. 67, 119-120.

|⁶⁷ Wissenschaftsrat: Empfehlungen zur deutschen Wissenschaftspolitik im europäischen Forschungsraum, Cologne 2010, p.104-105 and Wissenschaftsrat: Zur Förderung von Wissenschaft und Forschung durch wissenschaftliche Fachgesellschaften, Cologne 1992.

|⁶⁸ Wissenschaftsrat: Stellungnahme zum Status und der zukünftigen Entwicklung des Rates für Sozial- und Wirtschaftsdaten (RatSWD), Berlin, Drs. 9504-09, Aachen 2009.

federal ministries |⁶⁹, the activities of the RatSWD are primarily directed at the strategic planning of research infrastructures and the general improvement of the scientific disciplines' access to data.

The German Council of Science and Humanities recommends that the representatives and sections of the scientific societies working with qualitative methods of social research work together with the RatSWD and support its expansion in this respect. As long as the overwhelming majority of the scientific societies in humanities and social sciences – individually or in associations – do not succeed through self-organisation in creating actors like the RatSWD to develop an agenda of science policy for research infrastructures, funding institutions will lack firm contact partners beyond the level of single, highly committed individuals. The German Council of Science and Humanities believed it appropriate, therefore, for the scientific societies in the humanities to consider the establishment of an institution orientated at the example of the RatSWD for their specific infrastructure needs (see also Chapter D.III).

C.III RECOMMENDATIONS ON INFORMATION INFRASTRUCTURES

A total of 300 existing research infrastructures were specified by the scientific societies. Those specified can for the most part be allocated to the infrastructure complex of subject-related information in large-scale data collections (III.1), official statistics, process-produced data and transactions (III.2), primary research data (III.3) and the supply of scientific information through archives, libraries and collections. The German Council of Science and Humanities focuses on these last mentioned types of infrastructures in separate recommendations which also refer to collections' and libraries importance as infrastructures for research in humanities and social sciences. |⁷⁰ The problems involved in the relevant digitisation of archives and collections as well as indexing and providing linguistic resources, which are of particular relevance for humanities, are discussed in III.4 of this chapter.

|⁶⁹ The list of nominees for the scientific members of the RatSWD is determined by an electoral process which was developed on the basis of the DFG process to elect peer reviewers. The representatives of the data holders are proposed by the institutions producing the data. On this basis, the Council members are appointed by the BMBF.

|⁷⁰ Wissenschaftsrat: Empfehlungen zu wissenschaftlichen Sammlungen als Forschungsinfrastrukturen, Drs. 10464-11, Berlin 2011, Wissenschaftsrat: Empfehlungen zur Zukunft des bibliothekarischen Verbundsystems in Deutschland, Drs. 10463-11, Berlin 2011 and in a broad framework in Wissenschaftsrat: Übergreifende Empfehlungen zu Informationsinfrastrukturen, Drs. 10466-11, Berlin 2011.

III.1.a Initial position

Large-scale data collections in social sciences and economics also comprise, apart from surveys taking representative random samples of the population, other collections of data related to individuals (e.g. competence tests or school achievements tests). Such data collections have an increasingly important role in sub-areas of sociology, psychology, political science, economics and educational research. They contribute very significantly to the improvement of research opportunities and to the generation of innovative questions in these disciplines. The German Council of Science and Humanities has identified e.g. 34 data collections which have collected data in Germany and cover a wide range of topics in social sciences and economics. Apart from basic socio-demographic data, they provide e.g. other economic microdata (including data relating to work situations), health data, data on individual skills, political attitudes and on subjective values. Depending on the topics, the sponsorship and funding of these surveys is very varied.

Apart from the BMBF financing data collections, they are also financed by the Federal Ministry of the Interior (BMI), the Federal Ministry of Health (BMG), the Federal Ministry of Labour and Social Affairs (BMAS) and the Federal Ministry of Family Affairs, Senior Citizens, Women and Youth (BMFSFJ) within the framework of relevant departmental research establishments. The *Länder* also finance data collections, especially in the field of educational research.

Surveys continue to be financed by international organisations (e.g. the EU Commission) or are covered by institutional budgets of non-university research institutions, in particular the MPG and institutes of the WGL. One example is the *Gesellschaft Sozialwissenschaftlicher Infrastruktureinrichtungen* [German Social Science Infrastructure Services] (GESIS) |⁷¹ which was established in 1986 within the framework of the WGL as an operator and provider of several large-scale data collections.

The sector of large-scale longitudinal surveys is currently expanding. The DFG has been funding the German Longitudinal Election Study (GLES, under individual project funding from 2008-2020) since 2008 and the Panel Analysis of Intimate Relationships and Family Dynamics, (PAIRFAM, as a priority programme)

|⁷¹ The three formerly independent service institutes of the GESIS, the *Zentralarchiv für empirische Sozialforschung* [Central Archive for Empirical Social Research] (ZA), the *Informationszentrum Sozialwissenschaften* [Social Science Information Centre] (IZ), and the *Zentrum für Umfragen, Methoden und Analysen* [Centre for Survey Research and Methodology] (ZUMA) merged in 2008 under the umbrella of a new *Leibniz Institut für Sozialwissenschaften* [Leibniz Institute for the Social Sciences] – GESIS.

since 2004. The establishment of the National Educational Panel Study (NEPS), which is documenting and carrying out a theory-based examination of educational pathways over the entire human lifespan is being funded by the BMBF from 2009 to 2013 with EUR 68.0 million. The DFG is supporting analyses based on these data from 2010 to 2015 in the priority programme Education as a Life-long Process: Analyzing Data of the National Educational Panel Study. At the same time, the European Social Survey (ESS) and the Survey of Health, Ageing and Retirement in Europe (SHARE) is receiving both national funding and funding within the EU's Seventh Framework Programme.

The extension of the Socio-Economic Panel Study (SOEP) |⁷² recommended by the German Council of Science and Humanities in 2009 safeguards the status of this research infrastructure as one of the three most important household panels in the world. |⁷³ The creation of an innovation panel within the SOEP offers experimental cutting-edge research new opportunities for representative surveys.

In the area of commercial opinion research institutes, which can be entrusted with performing the field work for large-scale surveys, an oligopolistic provider structure currently exists. If the surveys are not carried out by the respective sponsor, as a rule only Infas and TNS Infratest are available as commercial providers for complex data collections.

III.1.b Recommendations

Large-scale data collections have a considerable and growing importance in social sciences and economics in terms of addressing current social questions. The German Council of Science and Humanities emphasises the great importance of increasing funding for large-scale surveys in recent years. They were necessary to develop the international competitiveness of German social sciences and economics.

In general, the German Council of Science and Humanities recommends that the BMBF in particular consolidates Germany's leading international position with respect to large-scale surveys. There are still desiderata in educational research where efforts have to be made to enable the lead management of consortia to be assumed in the context of Europe-wide surveys. The increasing coordination of the diverse large-scale data collections and the improvement of the

|⁷² Wissenschaftsrat: Stellungnahme zum Status und der zukünftigen Entwicklung des Sozio-oekonomischen Panels (SOEP), Berlin, Drs. 9503-09, Aachen 2009.

|⁷³ Together with the US American Panel Study of Income Dynamics (PSID) and the UK Household Longitudinal Study (UKHLS).

governance of existing undertakings should be to the fore in the efforts of funding institutions, sponsoring and hosting organisations and responsible scientists. The Council considers that this requires closer coordination of the funding instruments of the EU, BMBF and DFG.

It is the view of the German Council of Science and Humanities that cooperation between the operators and providers of large-scale data collections could be closer. In the light of the substantial investments in surveys, the Council recommends setting up a body to organise regular dialogue between the operators and providers. A sensible option would be to set up a standing committee of the RatSWD (parallel to the standing committee of research data centres) but also a consistent continuation of the ad hoc working group already established could prove practicable. The German Council of Science and Humanities sees the objectives of the dialogue taking place there to be the:

- _ establishment of connectivity between the different data collections by attempting to define common core variables;
- _ improvement of user-friendly access to the data, using web-based data portals;
- _ activation of new methodology development – e.g. linking survey data with geo-referenced or transaction data;
- _ discussion and clarification of ethical and legal questions on the use and evaluation of data from large-scale surveys – especially in view of the collection and linking of social, socio-geographical and biological data in terms of data protection; and
- _ strengthening of negotiation power towards commercial opinion research institutes that carry out the field work.

The German Council of Science and Humanities explicitly points out that institutional operators and providers of large-scale surveys are expected to play a 'leading role' regarding the exploration of new subject fields and in their investigation of useful research designs and methodologies. The inclusion e.g. of geo-referenced or biological data and collections, which to a large extent also include non-European societies, are among the desiderata which above all the operators of social sciences infrastructures that receive basic funding on a permanent basis should be focusing on. Furthermore, the Council believes it is vital that the design of such studies by the operators and providers incorporates a concept to fund training for early career researchers. Both measures guarantee connection to the international level of survey research and the application of current methods and survey designs. Furthermore, it would offer employees of infrastructure operating institutes direct contact to actual research questions.

Regarding research in the educational sciences, the German Council of Science and Humanities has observed a desideratum concerning access to longitudinal data collections in tertiary education, above all in terms of problems in higher education and vocational education and training. The Council recommends es-

establishing a research data centre for data of the tertiary education sector. This should consolidate and process the data which the individual higher education institutions, ministries of the *Länder* and statistical offices of the *Länder* and e.g. the *Hochschulinformationssysteme GmbH* [Higher Education Information System] (HIS), the International Centre for Higher Education Research (INCHER) at the University of Kassel or the *Institut für Forschungsinformation und Qualitätssicherung* [Institute for Research Information and Quality Assurance] (IFQ) have at their disposal and make these data available quickly for research purposes.

III.2 Official statistical data, process-produced data and transaction data

III.2.a Initial position

Official statistical data but above all process-produced data that are collected as part of administrative processes, e.g. collected by operators of social security institutions, were almost impossible to access in the past for the purposes of scientific research. Since the recommendations of the Commission to Improve the Informational Infrastructure by Cooperation of the Scientific Community and Official Statistics (KVI) |⁷⁴, access to such data in Germany has improved greatly. This is primarily due to a new institutional infrastructure established on the basis of the KVI recommendations which comprises the RatSWD, research data centres and data service centres.

The German Council of Science and Humanities appraised the status and future perspectives of the RatSWD in 2009 |⁷⁵ and concluded that the RatSWD had altogether exceeded the expectations placed upon it. In particular, it has considerably improved access to official statistical microdata long-term and assumed indispensable coordinating and platform functions in the further development of the research infrastructure landscape. The criteria developed by the RatSWD for the research data infrastructure |⁷⁶ and its advisory and quality assurance role in the development of research data centres are forward-looking, also for handling qualitative research data from humanities and social sciences. |⁷⁷ The

|⁷⁴ Kommission zur Verbesserung der informationellen Infrastruktur zwischen Wissenschaft und Statistik (ed.): *Wege zu einer besseren informationellen Infrastruktur*, Baden-Baden 2001.

|⁷⁵ Wissenschaftsrat: *Stellungnahme zum Status und der zukünftigen Entwicklung des Rates für Sozial- und Wirtschaftsdaten (RatSWD)*, Berlin, Drs. 9504-09, Aachen 2009.

|⁷⁶ Rat für Sozial- und Wirtschaftsdaten: *Kriterien des Rates für Sozial- und Wirtschaftsdaten (RatSWD) für die Forschungsdaten-Infrastruktur*, Berlin 2008
(http://www.ratswd.de/download/publikationen_rat/RatSWD_FDZKriterien.PDF of 20.10.2010).

|⁷⁷ In 2001, the introduction of the research data centres began initially with the establishment of the Federal Statistical Office. The *Forschungsdatenzentrum der Statistischen Landesämter* [Research Data Centre of the Statistical Offices of the *Länder*] followed – first as a pilot project – in 2002. The aim of these research data centres is to facilitate access to official statistical microdata and therefore their possibilities

latter in their entirety do not, however, by far cover the high demand for coordinated access to official statistical data and other interesting data collected by statistical offices and departmental research institutions for research purposes. The German Council of Science and Humanities has recommended establishing new research data centres for many departmental research institutions. |⁷⁸ Continued dynamic development is expected in this area in the years to come.

Apart from survey data, transaction data from administration, trade and industry are increasingly forming the focus of international empirical social and economic research. |⁷⁹ Besides financial transactions and telephony data, these meanwhile also include data from web-based social networks or geo-referenced data obtained on the use of mobile communication.

III.2.b Recommendations on official statistical data, process-produced data and transaction data

The German Council of Science and Humanities sees the core challenge in this area in the further development and expansion of research data centres and data service centres. Following the typology of research infrastructures introduced by the Council the centres belong to the sector of basic scientific supply. This makes a long-term financial perspective necessary which – in the case these are e.g. data centres within departmental research institutions of federal government or institutes of non-university research institutes – can also be achieved through the basic institutional funding of the host institutions. The Council asks public funding institutions – and especially the BMBF which has been active in this area since 2002 – to continue supporting the research data

of use for research purposes. In addition, the statistical offices of the *Länder* in particular, which collect, process and store 90 % of all microdata, have established a central database which facilitates scientific analyses that compare the data of the *Länder* or relate these to the entire federal framework. The *Forschungsdatenzentrum der Rentenversicherung* [Research Data Centre of the German Pension Insurance] and the *Forschungsdatenzentrum der Bundesagentur für Arbeit* [Research Data Centre of the German Federal Employment Agency] were established with the operators of social security institutions. By 2010, a total of 15 research data centres and data service centres had been accredited by the RatSWD. For development, see K. Habich; R. K. Himmelreicher; D. Huschka: Zur Entwicklung der Dateninfrastruktur in Deutschland. RatSWD Working Papers, 157 (2010), p. 4-8.

|⁷⁸ Wissenschaftsrat: Empfehlungen zur Rolle und künftigen Entwicklung der Bundeseinrichtungen mit FuE-Aufgaben, Cologne 2007. In particular recommendations were made in individual statements on the establishment of research data centres in the following institutions: *Bundesamt für Bauwesen und Raumordnung* (BBR) [Federal Institute for Research on Building, Urban Affairs and Spatial Development], *Bundesamt für Seeschifffahrt und Hydrographie* (BSH) [Federal Maritime and Hydrographic Agency], *Deutsches Jugendinstitut* (DJI) [German Youth Institute], *Deutscher Wetterdienst* (DWD) [German Meteorological Service], *Deutsches Zentrum für Altersfragen* (DZA) [German Centre of Gerontology].

|⁷⁹ J. Lane: Administrative Transaction Data, RatSWD Working Papers, 52 (2009).

centres on the way to long-term financial security. The Council explicitly welcomes the permanent establishment of the research data centre of the statistical offices of the *Länder* by resolution of the Standing Conference of the Ministers of the Interior. The Council, however, takes a critical view of the envisaged payment model which provides for half the financing of the research data centres from revenue in form of user fees. This could cause the conditions of access to the range of research infrastructures for humanities and social sciences in Germany to worsen again to the detriment of German researchers in terms of international competition. The Council urgently asks the federal government and the *Länder* ministries of science to implement a solution with the ministries of the interior that is not an additional financial burden on individual researchers and students when accessing data. The Council recommends striving for a solution medium-term which would give research and services interlinked with research purposes as a function of the statistical offices a legal basis.

The German Council of Science and Humanities declares that the system of research data centres has a positive effect on the international attractiveness of German social sciences. It should be actively developed, especially in the departmental research institutions of the federal government. It should be considered here that dual structures to data archives already in existence are not created by research data centres. Only data which cannot be distributed through data archives because of intensity of consultation should be accessible through the research data centres.

The German Council of Science and Humanities recommends strengthening further the role of the RatSWD in the formulation of standards for data provision and its function as a communication platform between the research data centres. The RatSWD should focus in future on strategic aspects of the further development of the data infrastructure and if necessary propose the establishment of other relevant research data centres. In interlinking different data sources for research purposes, such as the combination of scientific survey data with transaction and process data but also with geo-referenced data etc., any processes to trade off data protection issues and an interest in scientific discovery should be treated sensitively, and be clarified by the RatSWD.

III.3.a Initial position

A desideratum expressed by the scientific societies in the survey by the German Council of Science and Humanities is access to primary research data |⁸⁰ that originate from publicly funded projects. The Alliance of the German Science and Research Organisations is also asking for relevant data archiving and basic open access for scientific communities to primary research data. |⁸¹ This is seen as a contribution to securing good scientific practice and as a positive factor for a great diversity of opinion and analysis, new approaches to research, critical re-analyses and further analyses (also combined with other data sets) as well as methodological studies and the training of early career researchers. |⁸² The DFG published recommendations on the storage and provision of primary research data in 2009 |⁸³.

However, in social and behavioural sciences working with quantitative data, despite the existence of data archives |⁸⁴ and the urgent request for researchers to file their data after analysis and publication to the archives, the number of projects that actually do so is still relatively low. |⁸⁵ In a user survey of the Central Archive for Empirical Social Research of GESIS, only 28 % of active users stated that they had already archived a data set themselves, while 73 % of these users

|⁸⁰ The German Council of Science and Humanities understands 'primary research data' not only in terms of numerical data but also related to cultural objects, artefacts and textual data. The Council reserves the right to comment on copyright problems when using primary research data in later recommendations.

|⁸¹ Allianz der deutschen Wissenschaftsorganisationen: Grundsätze zum Umgang mit Forschungsdaten, RatSWD Working Papers, 156 (2010) and Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities, Berlin 2003 (http://oa.mpg.de/openaccess-berlin/berlin_declaration.pdf of 20.10.2010).

|⁸² OECD: OECD Principles and Guidelines for Access to Research Data from Public Funding, 2007 (<http://www.oecd.org/dataoecd/9/61/38500813.pdf> of 20.10.2010).

|⁸³ DFG, Ausschuss für Wissenschaftliche Bibliotheken und Informationssysteme: Empfehlungen zur gesicherten Aufbewahrung und Bereitstellung digitaler Forschungsprimärdaten, Bonn 2009 (http://www.dfg.de/forschungsfoerderung/wissenschaftliche_infrastruktur/lis/veroeffentlichungen/dokumentationen/download/ua_inf_empfehlungen_200901.pdf of 20.10.2010). The DFG already submitted recommendations to the scientific communities in its memorandum on "good scientific practice". See DFG: Sicherung guter wissenschaftlicher Praxis/Safeguarding Good Scientific Practice, Weinheim 1998, p. 12-13.

|⁸⁴ E.g. Central Archive for Empirical Social Research of GESIS (ZA) or PsychData-Archive of the Centre for Psychological Information and Documentation (ZPID).

|⁸⁵ E. Kämper; M. Niessen: Developing the Research Infrastructure in the Social Sciences. The Role and Contribution of the German Research Foundation, in: RatSWD Working Papers, 50 (2008).

had already acquired a data set once. |⁸⁶ However these acquired data sets are primarily data sets of large-scale surveys and not smaller collections of individual researchers.

There appears to be a rather considerable reluctance at present among scientists to archive their own data. There are different explanations for this:

- _ technical difficulties (e.g. lack of easy-to-use platforms);
- _ motivational obstacles (e.g. the wish to use own data exclusively and fear that errors and weaknesses of the data collection will be discovered);
- _ normative obstacles (e.g. data protection and copyright provisions);
- _ financial obstacles (e.g. lack of funds to digitise primary research data within the scope of research projects);
- _ unsolved issues of competence (e.g. problems of standardisation in linking primary research data with metadata).

The archiving of primary research data also involves expenditure of time and effort which is often not provided for in the narrow time frame of research projects and in view of the normal fluctuation of employees funded by third parties towards the end of project terms.

In the area of qualitative data (e.g. audio recordings, video recordings or transcripts of interviews), there is no nationwide service centre at present in Germany in existence which could provide user friendly archiving and the sustainable supply or subsequent use of qualitative primary research data for research and teaching in humanities and social sciences. Open access in particular to archived media (public and private broadcasting stations) – e.g. recordings of radio and television programmes – is an urgent desideratum for research. As a whole, it can be stated that there is a need for Germany to catch up in the archiving of qualitative research data compared with the situation worldwide e.g. in Great Britain |⁸⁷.

|⁸⁶ M. Stahl; W. Bandilla; G. Binder; H. Dülmer: GESIS-Arbeitsbericht Nr. 4: IZ, ZA, ZUMA im Urteil des akademischen Mittelbaus im Fach Soziologie, Bonn 2005 (http://www.gesis.org/fileadmin/upload/forschung/publikationen/gesis_reihen/gesis_arbeitsberichte/GESIS_AB_4.pdf of 20.10.2010).

|⁸⁷ In Great Britain, the Economic and Social Research Council (ESRC) requires the projects it funds in qualitative social research to deposit the data sets – ranging from narrative and semi-structured interviews to field notices and diary entries of the researchers – with the Economic and Social Data Service (ESDS). The ESDS is a specialised sub-section of the UK Data Archive at the University of Essex. Here qualitative research data from all over Great Britain are deposited in close cooperation with the collecting researchers and – where this appears useful for both parties – is processed for secondary use into “value-added products”. The ESDS is the curator of the most important collections of social sciences research data in Great

As it is not usually possible to replicate studies in qualitative research because of results being tied to historical and spatial contexts, the intersubjective traceability of scientific statements based on given primary research data is deemed a central quality criterion of qualitative research. |⁸⁸ Against this background, loss of the corresponding data is especially sensitive. However, there are important concerns with respect to data protection considerations, among parts of the community of social science researchers. Those who collect qualitative data, e.g. on the biographical life course of individuals, fear misuse of such data outside of the concrete project context.

In fact, the Data Archive for the Social Sciences of GESIS and the *Archiv für Lebenslauforschung* [Archive for Life Course Research] (ALLF) at the University of Bremen are currently cooperating with regard to developing the prerequisites for the realisation of a service centre which could contribute to the archiving of qualitative data.

At European level, 20 national data archives have joined together in the Council of European Social Science Data Archives (CESSDA). Its international component is funded within the EU's Seventh Framework Programme for Research under German and Norwegian lead management – with GESIS as a partner institution in Germany. CESSDA is also part of the ESFRI Roadmap. Its purpose is developing a European infrastructure to archive and pass on primary research data. This includes the data of the European Social Survey (ESS), the Eurobarometer and the International Social Survey Programme (ISSP).

The problem of long-term archiving digital scientific information (texts, images, film and audio recordings, primary research data, source codes for software) has not until now been comprehensively addressed at national level. Some institutions entrusted with the task of long-term archiving have therefore joined together in a competence network for long-term digital archiving (nestor) |⁸⁹ whose aims are the national and international networking of institutions, the

Britain and also offers advice and training both for researchers depositing and using data. See <http://www.esds.ac.uk/qualidata> of 20.10.2010.

|⁸⁸ I. Steinke: *Kriterien qualitativer Forschung: Ansätze zur Bewertung qualitativ-empirischer Sozialforschung*, Weinheim; Munich 1999.

|⁸⁹ Including the Bayerische Staatsbibliothek [Bavarian State Library], the Deutsche Nationalbibliothek [German National Library], the FernUniversität [Distance Learning University] in Hagen, the Georg-August-Universität Göttingen [Göttingen University] – Niedersächsische Staats- und Universitätsbibliothek Göttingen [Lower Saxon State and University Library Göttingen], Humboldt-Universität zu Berlin [Humboldt University Berlin], the Landesarchiv Baden-Württemberg [Archive of the *Land* Baden-Württemberg], the Stiftung Preußischer Kulturbesitz – Institut für Museumsforschung [Prussian Cultural Heritage Foundation – Institute for Museum Research], the Bibliothekservice-Zentrum Baden-Württemberg [Library Service Centre Baden-Württemberg] and the Institut für Deutsche Sprache [Institute of German Language].

consolidation of expertise on the subject of long-term archiving and long-term availability of digital sources and the bundling of standardisation efforts. Nestor began as a BMBF-funded project (duration from 2003 to 2009) and has been continued on an independent basis by the former project partners together with other organisations since 2009.

III.3.b Recommendations on primary research data and long-term archiving

The German Council of Science and Humanities agrees in principle with the provision of open access to primary research data because they are the basis for re-analyses, secondary analyses and meta-analyses, and deliver comparable data for replication studies. The free availability of primary research data also helps to ensure good scientific practice. Therefore the Council recommends to infrastructure operating research institution the comprehensive and long-term archiving of quality-tested data which are relevant for the respective scientific communities.

Regarding quantitative primary research data, the German Council of Science and Humanities recommends enhancing the user friendliness of the services in archiving and researching data even more intensively. Easy-to-operate user interfaces and portals would unquestionably increase the willingness of scientists to archive data. Within the context of the large-scale surveys, the Council welcomes the establishment of research data centres directly at the data producers e.g. the *Allgemeine Bevölkerungsumfrage der Sozialwissenschaften* [German General Social Survey] (ALLBUS), the Socio-Economic Panel Study (SOEP) or the Survey of Health, Ageing and Retirement in Europe (SHARE).

Regarding qualitative primary research data, the German Council of Science and Humanities recommends that the public research funding institutions DFG and BMBF initiate working groups with the aim of developing corresponding concepts for archiving and provision especially for qualitative research data. It would be worthwhile here to have recourse to the expertise already available in other countries e.g. of the British ESDS. In this context, entrusting the RatSWD with a review could be considered. Given the efforts currently being made to establish a nationwide service centre for qualitative primary research data by the Data Archive for the Social Sciences of GESIS in cooperation with the Archive for Life Course Research (ALLF) at the University of Bremen, the data protection concerns of critics should be considered in future concepts for the provision of qualitative data sets for external use. The German Council of Science and Humanities believes the incorporation of international expertise would also be helpful in this specific project.

The decision about archiving should in general aim to establish an appropriate balance between the effort for the individual researcher as a data provider and the outcome for the scientific community, making use the data. The German

Council of Science and Humanities asks the research funding institutions in particular to create incentives so that high-quality data are archived and preserved long-term. To do so, reference and corresponding citation possibilities for data sets should be developed. Persistent identifiers (PIs) or digital object identifiers (DOIs) allow data which are deposited digitally to be clearly identified and cited even when they change their storage locations (generally referenced through the uniform resource locator, URL).

The German Council of Science and Humanities welcomes the trend which is already obvious in certain natural sciences where international scientific journals are increasingly making the accessibility of primary research data a prerequisite of publication. This approach is an extremely valuable contribution in assuring the quality of the archived data and is an important indicator of which data sets are of interest long-term to the scientific community.

A desideratum of efforts to long-term digital archiving of research data is the collection and provision of online sources such as websites and blogs which are of major significance e.g. for hermeneutic analyses of what happens in societies with strong state control or media censorship. The German Council of Science and Humanities believes there is still a need here for clarification, research and coordination regarding the sources which should be archived.

The German Council of Science and Humanities recommends that the funding institutions and in particular the DFG, as the key organisation for basic research activities in humanities and social sciences, increase their project funding in two infrastructure-related areas. First, even greater incentives must be provided for data archiving in externally funded research projects and potential financial obstacles to data archiving must be resolved by funding personnel and material costs for that specific matter. Secondly, the use of already archived data should be promoted by making the performance of re-analyses, secondary analyses and meta-analyses eligible for funding. This requires the awareness of the review boards that innovative research or gaining new valuable insights does not necessarily require the collection of completely new data sets.

The German Council of Science and Humanities realises that the comprehensive public collection and provision of primary research data is also a satisfactory means of quality assurance in scientific practice which makes it easier to identify fraud and plagiarism because the origin of research data from repositories must in any case be disclosed and the “authors” of the data cited.

III.4.a Initial position

The great importance of digitisation efforts for permanent cultural reflection is documented e.g. by the UNESCO Charter for the preservation of digital heritage |⁹⁰ which requires the planned and reliable digital preservation and indexing of cultural objects for widespread public access. The *Interministerielle Bund-Länder-Arbeitsgruppe zu Europäischen Angelegenheiten für Bibliotheken, Archive, Museen und Denkmalpflege* [Interministerial Federal Government and Länder Working Group on European Matters for Libraries, Archives, Museums and the Preservation of Historic Monuments] (EUBAM) aims to provide a complete overview of digitisations that are in progress or already conducted in the German cultural sector by setting up the “www.kulturerbedigital.de” information platform. There are currently 903 digitisation projects and 52 funding programmes recorded in the database. |⁹¹ The aim of these projects and programmes is to provide a better basis for strategic decision-making processes and a digitisation strategy for the whole country.

Furthermore, a “*Bestandsaufnahme zur Digitalisierung von Kulturgut und Handlungsfelder[n]*” [appraisal on the digitisation of cultural artefacts and fields of action] taken by the *Fraunhofer Institut für Intelligente Analyse- und Informationssysteme* [Fraunhofer Institute for Intelligent Analysis and Information Systems] (AIS) gives an overview of the current status of digitisation efforts but also specifies the difficulties of full coverage as a result of the decentralised allocation of these activities. |⁹² The German Council of Science and Humanities shares the view expressed in the Fraunhofer study and in a previous evaluation report by the DFG |⁹³ that it is more a deficit in implementation than a deficit in knowledge that is to be lamented with respect to the digitisation of cultural artefacts in Germany. Until 2009 the widespread expertise already proven in a number of

|⁹⁰ UNESCO: Charter on the Preservation of Digital Heritage of 15. Oktober 2003 (http://portal.unesco.org/en/ev.php-URL_ID=17721&URL_DO=DO_TOPIC&URL_SECTION=201.html of 20.10.2010).

|⁹¹ <http://www.kulturerbe-digital.de/inex.php> of 20.10.2010.

|⁹² Fraunhofer Institut für Intelligente Analyse- und Informationssysteme: Bestandsaufnahme zur Digitalisierung von Kulturgut und Handlungsfelder, 2008 (http://www.iais.fraunhofer.de/uploads/media/BKM_End_01.pdf of 20.10.2010).

|⁹³ M. Thaller: Retrospektive Digitalisierung von Bibliotheksbeständen: Evaluierungsbericht über einen Förderschwerpunkt der DFG, Cologne 2005 (http://www.dfg.de/forschungsfoerderung/wissenschaftliche_infrastruktur/lis/download/retro_digitalisierung_eval_050406.pdf of 20.10.2010).

small local projects had not led to extensive digitisation measures coordinated between the organisations.

Taking into account the results of the two above mentioned studies, the *Deutsche Digitale Bibliothek* [German Digital Library] (DDB) was given a secure financial basis by an administrative and financial agreement between the federal government and the *Länder* |⁹⁴ as a national network of expertise for digitisation. EUR 2.6 million will be available for the project each year as of 2011 for the next five years. The milestones for this project which were adopted at the same time illustrate the specific measures and their objectives. |⁹⁵ According to these milestones, the DDB contributes to the promotion of the knowledge and information society, through which Germany has the opportunity to present its cultural and scientific wealth in all its diversity at national and international level. Furthermore, digitisation should fundamentally improve the conditions of information for research, teaching, trade and industry through the broad availability of data material which was hitherto only accessible in individual libraries, archives or museums. The DDB is the German contribution to the development of the *Europäische Digitale Bibliothek* [European Digital Library] (EDB) Europeana. |⁹⁶ The purpose of the EDB is not only of scientific nature, there are also opportunities of using the digitised resources outside research for commercial purposes.

The *Deutsches Textarchiv* [German Text Archive] (DTA) project at the *Berlin-Brandenburgische Akademie der Wissenschaften* [Berlin-Brandenburg Academy of Sciences and Humanities] (BAW) intends to digitise an interdisciplinary core inventory of German-language texts dating from about 1650 to 1900 from the first editions and make them available on the internet as linguistically annotated full text corpus including a virtual “lexicographical workplace”. |⁹⁷ The project

|⁹⁴ Verwaltungs- und Finanzabkommen – final version of 2 December 2009 – zwischen der Bundesrepublik Deutschland und den Ländern der Bundesrepublik Deutschland über die Errichtung und den Betrieb der Deutschen Digitalen Bibliothek [Administrative and Financial Agreement between the Federal Republic of Germany and the *Länder* of the Federal Republic of Germany concerning the Establishment and Operation of the German Digital Library] (DDB) (http://www.deutsche-digitale-bibliothek.de/pdf/verwaltungs_und_finanzabkommen_finale%20Fassung02122009.pdf of 20.10.2010).

|⁹⁵ Gemeinsame Eckpunkte von Bund, Ländern und Kommunen zur Errichtung der „Deutschen Digitalen Bibliothek (DDB)“ as a contribution to the “Europäische Digitale Bibliothek (EDB)”, final version of 2 December 2009 (http://www.deutsche-digitale-bibliothek.de/pdf/gemeinsame_eckpunkte_finale_fassung_02122009.pdf of 20.10.2010).

|⁹⁶ Commission of the European Communities: Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions [SEK(08) 2372], Brussels 11.8.2008 (http://ec.europa.eu/information_society/activities/digital_libraries/doc/communications/progress/communication_de.pdf of 20.10.2010).

|⁹⁷ DFG: Jahresbericht 2007 [Annual Report]. Aufgaben und Ergebnisse, Bonn 2007, p. 56.

is funded by the DFG in the programme for long-term projects. Other digitisation projects of this kind – for example the digital dictionary of 20th century German language – are funded by the federal government and the *Länder* within the scope of the Academies' Programme of the *Union der Deutschen Akademien der Wissenschaften* [Union of the German Academies of Sciences and Humanities].

A prime example of private support for the humanities research infrastructure in linguistic resources is the *Dokumentation bedrohter Sprachen* [Documentation of Endangered Languages] (DoBeS) |⁹⁸ which has been funded by the *Volkswagen Stiftung* [Volkswagen Foundation] since 2000. The DoBeS programme is coordinated by the *Max-Planck-Institut (MPI) für Psycholinguistik* [Max Planck Institute (MPI) for Psycholinguistics] in Nijmegen (Netherlands). Its aim is to collect from the some 6,000 documented languages spoken in the world those languages which are endangered, secure their long-term digital archiving in publicly accessible repositories and make them available to the general public. The MPI for Psycholinguistics also offers further education and training courses on questions of documentation and data use.

The *Institut für Deutsche Sprache* [Institute of German Language] (IDS) in Mannheim is a central service facility for language resources within the WGL. It houses e.g. the *Deutsche Spracharchiv* [German Language Archive] with a total of 28 corpora and offers research facilities through the *Datenbank Gesprochenes Deutsch* [Database of Spoken German] (GD), the online dictionary OWID, the electronic valency dictionary of German verbs (E-VALBU) etc. Web-based language analysis tools are also available (e.g. COSMAS II).

Concepts are also being developed at the IDS to deal with the problems due to research data in linguistics being generally subject to third-party rights. In the context of such problems, the IDS is developing e.g. models for licensing agreements and models for handling language data that are subject to data protection requirements.

The IDS is further involved in the concept and implementation of general registries for virtual collections of data resources across locations with the aim of improving the conditions for traceability and reproducibility in empirical linguistics. To this end, the IDS is working together with the MPI for Psycholinguistics in Nijmegen on the concept of an ISO standard for the persistent identification of language resources (ISO/DIS 24619). Ultimately the IDS is seeking to

|⁹⁸ See <http://www.mpi.nl/DOBES/> of 20.10.2010.

become a central connection point in German and European research infrastructure for language resources and language technologies. |⁹⁹

The creation of such central connection points is also the objective of the D-Spin-Initiative *Deutsche Sprachressourcen-Infrastruktur* [Infrastructure for German Language Resources] which, over a period from 2008 to 2011 and with BMBF funding of EUR 1.65 million, is promoting the development of basic principles for a sound and sustainable infrastructure in the field of language resources and language technologies. D-Spin is coordinated by the Department of Linguistics at the University of Tübingen and cooperates at national level with other projects such as the information portal LT-World, TextGrid, D-Grid, DoBeS and the *Deutsches Forschungsnetz* [German Research Network] (DFN). At European level, D-Spin is an independent part of the CLARIN infrastructure.

A specific research infrastructure for ancient studies is under development in the project “*Extraktion von strukturiertem Wissen aus antiken Quellen für die Altertumswissenschaften*” [Extraction of Structured Knowledge from Ancient Sources for Classical Studies] (eAQUA) which is being financed within the BMBF funding programme “*Wechselwirkungen zwischen Natur- und Geisteswissenschaften*” [Interactions between Natural Sciences and Humanities]. Implementation of the project is the responsibility of the Department of History and the Institute of Computer Science at the University of Leipzig. It is the aim of eAQUA to index systematically content from antique sources for ancient studies and to provide researchers via a web portal e.g. with sources, dictionary entries and referential context for sustainable use. |¹⁰⁰ To do so, the text mining technology was adapted in close cooperation with experts of automatic language processing to meet the needs and requirements of ancient studies. In addition, the ARACHNE object database is important for archeology. It has been under development since 2004 within the framework of a consortium agreement between the DAI and the University of Cologne at the Cologne Digital Archeology Laboratory (CoDArch-Lab).

Compliance with standards plays a central role in all digitisation efforts. The fact that no generally accepted standards existed for a long time contributed decisively to inefficiencies in the digitisation of German cultural heritage. It is therefore not always possible to make digitised resources available across multiple platforms. To remedy this situation, the DFG prepared new digitisation

|⁹⁹ See <http://www.ids-mannheim.de/fi/projekte/d-spin.html> of 20.10.2010.

|¹⁰⁰ See <http://www.eaqua.net/index.php> of 20.10.2010.

guidelines in 2009. |¹⁰¹ In the context of the D-Spin project referred to above, there is active cooperation with other national and international projects to avoid isolated solutions in standardisation. |¹⁰² In addition, German actors are currently developing corresponding standardisation guidelines for digitisation in humanities as part of European research infrastructures (especially in the context of the ESFRI Roadmap projects Digital Research Infrastructure for the Arts and Humanities, DARIAH, and the Common Language Resources and Technology Infrastructure Network, CLARIN). |¹⁰³

The principal objective of DARIAH is to improve the use of digital data in humanities and cultural sciences. In this context, DARIAH aims to digitise and archive research data and information from humanities and cultural sciences, and promote their presentation and publication. The project intends to coordinate the activities of the individual member organisations, exchange expertise and promote the joint development of ideas and methods, develop Europe-wide technical standards and through these standards and examples of best practice promote the interoperability of different national data repositories. German partner institutions are the Max-Planck-Digital-Library and the *Staats- und Universitätsbibliothek Göttingen* [Göttingen State and University Library].

CLARIN seeks to coordinate resources that are of linguistic relevance at European level, and make them available and useable in a simple way. Similar to CESSDA's role for the social sciences, CLARIN has the function of an infrastructure umbrella organisation that coordinates national institutions. It comprises 144 member organisations from 32 countries which make tools available to humanities and specifically linguistics for computer-aided language processing. The aim is to relate to all kinds of texts and multimedia content and simplify the analysis of language processing. In this context, further education and training programmes for established scientists, early career researchers and teachers are included. German partner institutions are the Department of Linguistics at the University of Tübingen, the Max Planck Society and the *Deutsches Forschungszentrum für künstliche Intelligenz* [German Research Centre for Artificial Intelligence] in Saarbrücken.

Apart from public sponsors, commercial providers also make attractive offers in the field of digitisation such as Google Books or the Open Book Alliance (Ama-

|¹⁰¹ DFG: DFG-Praxisregeln "Digitalisierung" (Stand April 2009)

(http://www.dfg.de/forschungsfoerderung/wissenschaftliche_infrastruktur/lis/download/praxisregeln_digitalisierung.pdf of 20.10.2010).

|¹⁰² See <http://weblicht.sfs.uni-tuebingen.de/dasProjekt.shtml> of 20.10.2010.

|¹⁰³ Romary, L.; Wittenburg, P.: Standardisation Roadmap for eHumanities Infrastructures, unpublished manuscript.

zon, Microsoft and Yahoo). The scientific use of this material – in some cases also in cooperation with the originators – is widespread but requires, given sporadic quality deficiencies, a high degree of critical examination of the methods of suitable data preparation used by the private providers. There is a risk that publicly funded science forfeits important key competences if the provision of infrastructures for scientific work is left entirely to commercial companies. Mechanisms of social closure exercised through market power are conceivable by forming provider oligopolies or monopolies. The latter could restrict access to the infrastructures by fees and copyright issues. Furthermore, private providers often lack the incentives for product innovations that are consistent with scientific needs.

Standardisations are a central desideratum in the design of digital research infrastructures for research in humanities and social sciences. The example of the Text Encoding Initiative (TEI) |¹⁰⁴ makes clear that standardisation is to be understood as a process of constant evaluation within the meaning of exchange between special branches of science that stipulate what is needed in terms of content, and the informatics that create the corresponding digital tools and working environments. In each case, problems in this field are less questions of technical feasibility or mobilisation of technical expertise for implementation. The problem is rather the fact that it is more difficult to find researchers which are open minded about the technological possibilities – especially in humanities – and who invest time together with IT specialists in developing solutions for collecting, processing and providing data.

III.4.b Recommendations on language resources and digitisation of cultural heritage

Digitisation is not only of great importance for the preservation and public presentation of cultural heritage but its central purpose is also the scientific use of the material in the future. A “21st century scientific workplace” must be assumed which links infrastructures available in physical form with digitally accessible resources in a flexible way. The German Council of Science and Humanities recommends taking account of the requirements of scientific users concerning the quality of the digitised resources from the outset and put them on an institutional basis. This goes beyond the involvement of scientific institu-

|¹⁰⁴ The TEI is a consortium established in 1987 and dedicated to the development and maintenance of the representation of texts in digital form. Its services include guidelines for encoding machine readable texts in humanities and social sciences. Members of the consortium are higher education institutions, scientific societies, research libraries, library networks, university and other non-profit publishers, and commercial providers of digital texts in humanities and social sciences. See <http://www.tei-c.org> of 20.10.2010.

tions such as libraries and collections and includes the involvement of the respective scientific communities.

The Council of Science and Humanities welcomes the financing of the *Deutsche Digitale Bibliothek* [German Digital Library] DDB which is guaranteed medium-term. The DDB as a strong actor should enforce the adoption of common standards together with the European infrastructures for humanities such as DARIAH and CLARIN and extend support for individual institutions in their digitisation efforts. The Council recommends that the management of the DDB also seeks dialogue with those state and university libraries that have their collections digitised by the commercial provider Google. The Council believes that cooperation focused on connectivity and interoperability of digitised information could also be investigated together with the afore mentioned actors.

The German Council of Science and Humanities welcomes the significant funding activities of the BMBF in digitisation to date which is evident in a wide range of national activities such as the D-Spin or eAQUA project. Other funding instruments provided by the DFG, the Academies' Programme or e.g. the Volkswagen Foundation (in the context of the DoBeS programme) have to date created a climate for competition and a range of temporary funding opportunities for infrastructure projects in language resources and the digitisation of cultural heritage. The Council is, however, critical of the fact that no funding programmes currently exist beyond the long-term projects of the DFG and Academies' Programme which would allow longer term stability especially for successful infrastructure projects at higher education institutions.

The German Council of Science and Humanities understands the process of standardisation and interoperability of digital information as a *conditio sine qua non* for the development of a European research infrastructure in humanities. Setting standards is not understood here to be a unique event but a permanent process of quality assurance and review of standards. In order to guarantee continuity in this process, the Council proposes that higher education institutions create new additional qualifications and training programmes for scientists. Such programmes should involve e.g. questions of standardisation and regulation of information infrastructures. This should be in close cooperation between humanities subjects and library and information sciences, and can use the expertise already available from non-university research institutions such as the IDS in Mannheim or the MPI for Psycholinguistics in Nijmegen.

The German Council of Science and Humanities further recommends increasing incentives for humanities scholars who invest time in such infrastructure projects and guaranteeing the training of early career researchers in the methods and operation of research infrastructures (maintaining databases, setting up portals, advising users etc.). Departments and working groups in the scientific societies can play an important role here. Higher education institutions and

non-university research institutions should as operators of infrastructures ensure that no purely service jobs come into being for highly qualified humanities or social sciences scholars.

The latest statements by the German Council of Science and Humanities on the Socio-Economic Panel Study (SOEP), the Council for Social and Economic Data (RatSWD) and on the departmental research institutes of the Federal Republic of Germany make clear that the quality of the service is positively related to the research work of the scientists actually providing the service. The Council therefore considers it desirable that those employees in infrastructure contexts, who take over tasks in design and methodology development as well as user support, are in continuous contact with actual research topics in humanities and social sciences. Where this is equally advantageous for the sponsoring body and the scientific employees, the latter should, depending on the nature of their employment relationship and level of qualification, be allowed to spend between 30 % and 50 % of their working hours for their own research.

Regarding the expansion of digital research infrastructures, the German Council of Science and Humanities advises the federal Government and the *Länder* not to rely, from a cost point of view, on commercial providers developing products that conform to scientific standards. There is a great risk that such offers do not permanently keep pace with the standards required for research e.g. in terms of object resolution or linkage with metadata and could impose prohibitive access costs on scientific use of data. The Council believes that such potential risks make the further commitment of public research funding institutions in this infrastructure area indispensable. If Public Private Partnerships (PPP) are introduced to this field, agreements with private service providers should be developed so that the representatives of science have the last say on questions of content structure and further development of the infrastructure, as well as on questions of open access.

C.IV RECOMMENDATIONS ON SOCIAL RESEARCH INFRASTRUCTURES

The specific character of social research infrastructures within the meaning explained in Chapter A.II. lies in the fact that they are usually initiated by scientific communities and frequently sponsored in the initial stages with the support of private donors and sponsors. Their functions lie e.g. in networking for international scientific communities, advisory services and providing relevant subject-specific information, in some cases providing laboratories as well. Different forms of financing and sponsorship have become possible over the course

of time. Accordingly, the humanities institutes abroad evaluated by the German Council of Science and Humanities in 1999 |¹⁰⁵, after starting as private scientific initiatives, have, with the constant expansion of their scientific activities, passed into the financing of the BMBF. The *Deutsches Archäologisches Institut* [German Archeological Institute] (DAI) with its offices abroad sponsored by the Foreign Office has similar origins |¹⁰⁶ as do certain institutions sponsored by the Max Planck Society.

Social infrastructures in humanities are places of interaction which encourage research ideas and solutions with their programmes. The programmes' outcomes usually become beneficial for scientific progress at the home institutions of the guest researchers in form of research results or groundbreaking publications some time after their stay or fellowship in the social research infrastructure. The special status of social research infrastructures as a protected place of research communication on all topics relating to subjects was recognised by the German Council of Science and Humanities as an independent value of this type of infrastructure and taken as an original model for recommending the introduction of "research colleges" in humanities. Interactive subject portals and online platforms for humanities and social sciences can also be regarded as virtual places for the circulation of expertise, suggestions and research ideas. They complement face-to-face exchange in social research infrastructures but do not replace it.

IV.1 Initial position

German institutions abroad provide an important range of services in humanities in the context of social research infrastructures which focus on communication between German and international branches of science. Particular mention should be made here to the humanities institutes abroad organised by the *Stiftung Deutsche Geisteswissenschaftliche Institute im Ausland* [Foundation of German Humanities Institutes Abroad] (DGIA) |¹⁰⁷. The German Council of Science and Humanities has placed their core tasks in research but they also perform "numerous services" which "result from their special role as institutional points of contact for communication between the German and host country's branches of

|¹⁰⁵ Wissenschaftsrat: Stellungnahme zu den geisteswissenschaftlichen Auslandsinstituten, Cologne 1999.

|¹⁰⁶ Wissenschaftsrat: Stellungnahme zum Deutschen Archäologischen Institut (DAI), Berlin, in: Wissenschaftsrat, Empfehlungen und Stellungnahmen 2008, Vol. III, Cologne 2009, p. 293-370.

|¹⁰⁷ *Deutsches Forum für Kunstgeschichte* [German Forum for Art History] Paris, *Deutsches Historisches Institut* [German Historical Institute] in Washington D.C., London, Paris, Rome, Moscow and Warsaw, *Deutsches Institut für Japanstudien* [German Institute for Japanese Studies] Tokyo, *Orient-Institut* [Oriental Institute] in Istanbul and Beirut.

science. This includes the promotion of scientific dialogue and exchange through publications, academic conferences and events” |¹⁰⁸, provision of comprehensive specialised libraries, photograph collections and – e.g. in the case of ancient studies – also laboratories for the indexing, dating and preservation of research artefacts. These services include advising and supporting users of the information and instruments provided. Such services are also performed by the German Archeological Institute (DAI) and the institutions sponsored by the Max-Planck Society, the *Bibliotheca Hertziana* (Rome) and *Kunsthistorisches Institut* [Institute for Art History] (Florence and Venice). Social research infrastructures sponsored by the *Länder* with a high level of international recognition include e.g. the *Zentralinstitut für Kunstgeschichte* [Central Centre for the History of Arts] and the *Historisches Kolleg* [Institute for Advanced Study of History] in Munich. |¹⁰⁹ Another example is the *Wissenschaftskolleg Berlin* [Institute for Advanced Study Berlin], an interdisciplinary institution since 1980, which complies with the above requirements of a social research infrastructure in humanities and social sciences. |¹¹⁰

As a complement to the permanent social research infrastructures in humanities and social sciences, the German Council of Science and Humanities recommended in 2006 the introduction of “research colleges”. |¹¹¹ The BMBF and DFG took up this recommendation. Based on a joint agreement, the BMBF established the *Käte Hamburger Kollegs* [Käte Hamburger Groups for Humanities Research] and the DFG introduced new funding instruments such as the *Forschungskollegs* [research groups]. The funding for both types of “Kolleg” is timely restricted. Furthermore, the DFG further specifically supports scientific networks and academies for early career researchers. While the scientific networks primarily promote the establishment of cooperation between German scientists and foreign partners, the academies for early career researchers are designed to provide focused coaching in Germany for young scientists in summer schools

|¹⁰⁸ Wissenschaftsrat: Stellungnahme zu den Geisteswissenschaftlichen Auslandsinstituten, Cologne 1999, p. 7 (translation from German to English).

|¹⁰⁹ In the case of the Institute for Advanced Study of History in Munich, the *Land* Bavaria funds the basic equipment while grants for the appointment of scholars are provided by private donors. The Kolleg is sponsored by the *Stiftung zur Förderung der Historischen Kommission bei der Bayerischen Akademie der Wissenschaften und des Historischen Kollegs* [Foundation for the Promotion of the Historic Commission at the Bavarian Academy of Sciences and Humanities and the Institute for Advanced Study of History]. See: <http://www.historischeskolleg.de/leitung/index.htm> of 20.10.2010.

|¹¹⁰ Institutional funding of the Institute for Advanced Study Berlin is provided by the federal government and the *Land* Berlin in equal shares.

|¹¹¹ Wissenschaftsrat: Empfehlungen zur Entwicklung und Förderung der Geisteswissenschaften in Deutschland, Cologne 2006, p. 79-82.

and colloquia, aimed at establishing a concept for their own research project. Both funding instruments are basically open to all scientific disciplines.

These social connections limited in time and other permanent institutions established in the form of colleges such as the *Kulturwissenschaftliches Institut* [Institute for Advanced Study in the Humanities] (KWI) in Essen, the *Zentrum für interdisziplinäre Forschung* [Centre for Interdisciplinary Research] (ZIF) in Bielefeld, the *Alfried-Krupp-Wissenschaftskolleg* [Alfried-Krupp-Institute for Advanced Study] Greifswald, the *Hanse-Wissenschaftskolleg* [Hanse-Institute for Advanced Study] (HWK) Delmenhorst or the Dahlem Workshops at the Free University Berlin differ from institutions that are not bound at all in terms of subject or discipline, such as the *Wissenschaftskolleg* [Institute for Advanced Study] in Berlin, by the fact that they are part of or attached to a university and their aim is – in many cases – to follow research profiles in the respective university departments.

IV.2 Recommendations

Social research infrastructures can provide a scientific community with a forum which allows or strengthens the process of exchange and in particular brings early career researchers into contact with leading international experts. They therefore play a material role in the academic process of understanding and are recognised in terms of this importance as research infrastructures also by funding organizations and respective sponsors. Individual social research infrastructures can assume a driving role and structural impact for scientific fields. This is especially true when favourable conditions attract top scientists from abroad and promising early career researchers. As innovative research questions today become apparent in many cases at the interfaces of subjects and disciplines, the German Council of Science and Humanities very much welcomes the openness of social infrastructures especially for interdisciplinary research in humanities and social sciences but also between humanities, social sciences and natural sciences.

The German Council of Science and Humanities sees it as the task of the relevant actors in specialist communities, which do not have a permanent social research infrastructure and consider this a disadvantage, to approach potential funding sources proactively. Foundations in particular have a tradition of contributing to the initial institutional equipment and profile of such institutions.

The German Council of Science and Humanities considers the Centres of Advanced Studies (CAS) which have recently come into being at many German universities, primarily within the scope of the Excellence Initiative to be potential *nuclei* for later social research infrastructures with permanent funding perspectives. Some CAS could definitely develop into permanent social infrastructures for humanities and social sciences if they prove long-term their relevance as places of exchange for specialist communities. The Council believes that a fur-

ther basic condition for development of this kind lies in the willingness of heads of higher education institutions and departments to dispense to a large extent with the exertion of local influences and determination of topics. The Council notes that an international orientation, which would be evident in an advisory body with international members, would be a *conditio sine qua non* for a permanent social research infrastructure. The Council considers a well prepared funding concept for early career researchers to be equally indispensable within the framework of social research infrastructures. The latter should focus on bringing newcomers into the discourse with leading scientists from their own and other disciplines.

The German Council of Science and Humanities believes that humanities institutes abroad, the DAI with its departments abroad and the MPG's complementary institutions abroad are indispensable social research infrastructures in German humanities. These institutions also have a high infrastructure value for their host countries, produce for the most part their own excellent research results and make an irreplaceable contribution to the foreign cultural policy of the Federal Republic of Germany. The Council advises the federal government not to cut back further the budgets of these institutions, especially their libraries, photograph collections and – in the case of the DAI – to continue equipping laboratories with the resources necessary for them to function. The Council confirms its recommendation of 2008 |¹¹² that the DAI should be supported in the development of an adequate IT network for its departments in Germany and abroad and in establishing a centre of excellence for archeology in Berlin.

C.V RECOMMENDATIONS ON LARGE-SCALE FACILITIES AND LABORATORY EQUIPMENT USING THE EXAMPLE OF NEUROIMAGING AND ARCHEOMETRICS

V.1 Initial position

Large-scale equipment plays a less prominent role in humanities and social sciences than in natural sciences. However, in certain areas such as experimental social and economic research (simulations) and linguistics (neurolinguistic and psycholinguistic laboratories), they form an indispensable integral part of research. New developments are emerging at the interface of social sciences and geography. In the medium-term, computer-aided remote sensing of urban and rural development structures, also of light sources and intensities, by satellites

|¹¹² Wissenschaftsrat: Stellungnahme zum Deutschen Archäologischen Institut (DAI), Berlin, in: Wissenschaftsrat, Empfehlungen und Stellungnahmen 2008, Vol. III, Cologne 2009, p. 293-370.

and aircraft could complement censuses and demographic estimates in social sciences. This is especially suitable where records in the population register are either incomplete or do not exist at all. |¹¹³

In other humanities and social sciences fields, large-scale medical research and care equipment meanwhile have an innovative and structure building character. For example, there is a growing need in psychology and linguistics to use equipment and procedures for the functional imaging of neuronal activity in the human brain. In ancient studies, laboratories and equipment have proven a necessary infrastructure for dating and localising, as well as for analysis, preservation and restoration of historical manuscripts and archeological objects. The German Council of Science and Humanities sets out below recommendations for neuroimaging and archeometrics. These highlight for the first time the use of large-scale facilities and laboratory equipment in humanities and social sciences.

V.2 Recommendations using the example of neuroimaging equipment and archeometric laboratories

In the light of the growing importance of scientific, technical and medical methods and relevant large-scale facilities and laboratory equipment for humanities and social sciences, the German Council of Science and Humanities in principle recommends intensifying interdisciplinary cooperation between these and the natural sciences. The Council advocates the same access to laboratories supported by the subject-specific quality of research project proposals for all disciplines interested in functional imaging techniques. In using the equipment for functional imaging, the Council believes that advanced training in methodology is a desideratum for interested researchers in humanities as well as social and behavioural sciences. Being on top of the methodological development is considered as necessary for handling facilities and equipment of functional imaging and interpreting the results produced properly.

In archeometrics, the German Council of Science and Humanities observes an increasing shift of corresponding analytical techniques from ancient studies to genuine scientific laboratories of public and private providers. Access to an external infrastructure is a logical complement to own capacities in ancient studies but cannot fully replace them. The Council advocates here a consolidation of interdisciplinary laboratories (including associated reference collections) at universities, in suitable research museums of the WGL, within the scope of the

|¹¹³ See: M. Wurm et al.: Menschen zählen aus dem All. Möglichkeiten und Grenzen von Satellitendaten zur Abschätzung der Bevölkerungsentwicklung und des Gebäudebestandes in deutschen Städten. RatSWD Working Papers, 155 (2010).

Stiftung Preußischer Kulturbesitz [Prussian Cultural Heritage Foundation] and the DAI at an internationally competitive technical and methodological level. Furthermore, the Council requests specialist communities, research funding institutions and operators of existing archeometrics institutes to reflect on an interdisciplinary concept for a central body on method development in archeometrics. An interdisciplinary focal point of national significance has been lacking here to date.

D. Recommendations on funding, coordination and governance

D.1 COORDINATION OF FUNDING INSTRUMENTS

The appraisal by the German Council of Science and Humanities in Chapter C shows various timely limited funding opportunities for research-driven infrastructure projects. The Council expressly welcomes the BMBF's wide range of activities in infrastructure funding for humanities and social sciences within the scope of its initiatives. The reorientation of the programme for long-term projects by the DFG, especially in conjunction with the Academies' Programme of the federal government and *Länder*, provides diverse opportunities to fund innovative research infrastructures in humanities and social sciences. The Council considers the federal government funding for the National Educational Panel Study (NEPS) in conjunction with a DFG appraisal and the launch of a complementary DFG priority programme to analyse the data generated by this infrastructure to be a successful funding innovation which should impact on other areas.

Nevertheless these positive developments cannot hide the fact that coordination between the individual funding institutions and coherence as well as sustainability of their instruments is one of the central desiderata of German infrastructure policy for humanities and social sciences. Funding instruments in particular for the basic provision of specialist research information such as the granting of national licences by the DFG, special DFG collections, the Academies' Programme and the infrastructure-related use of regular budget resources in higher education institutions, university libraries and specialised libraries in non-university research institutions still do not work closely enough together. Intensified coordination would make an important contribution in ensuring that German humanities and social sciences become leading in the world.

The German Council of Science and Humanities confirms the DFG's opinion that providing German research with digital media, in addition to print media, represents an additional financial challenge which can only be resolved through collective national effort. In this context, the Council also welcomes the DFG's commitment to a proactive build-up of inventory in the area of conventional special collections which is of essential importance in particular for humanities. These activities must not come under pressure through the funding of digitisation efforts. The Council believes that this requires that the term "research" in the DFG's new programme "funding of excellent research libraries" must not be interpreted too narrowly. The libraries should also have the opportunity to prove that they can offer above all external researchers optimum working conditions and fast and equally competent access to their special collections.

In relation to the planning time-frame of their financing and governance, the German Council of Science and Humanities considers infrastructures for subject-specific research to be medium-term to long-term endeavours. In humanities and social sciences, research infrastructures are also characterised by a low to average volume of investment costs, a heterogeneity among the committed partners, the often decentralised provision of data and a high intensity of personnel and communication processes as a result. As a rule there are no large-scale facilities in humanities and social sciences besides direct interfaces to the natural sciences. Measured by these features, Germany has hitherto lacked a funding instrument which would be necessary to establish, maintain and develop the specific research infrastructures in humanities and social sciences over a longer period of time from approx. 10 to 15 years in order to open up prospects of growth or consolidation for its infrastructure projects which are heterogeneous in their subject orientation and often at small-scale in their beginnings.

D.II RECOMMENDATION OF A NATIONAL FUNDING PROGRAMME

The German Council of Science and Humanities proposes a national funding programme specifically for research infrastructures in humanities and social sciences. The Council considers such a funding programme to be an opportunity for humanities and social sciences. It should enable them to position themselves with innovative ideas on infrastructure projects in a way which gives later stages of projects or follow-up projects a chance of being incorporated on a national roadmap for infrastructure projects and on the European ESFRI roadmap. Nevertheless, the scope of the programme proposed here must not automatically allow a situation where infrastructure projects supported by a national funding programme do not in turn have to compete with proposals from

otherwise funded projects in the selection processes for a national and European roadmap.

Below the target level of roadmap processes, a national funding programme would allow promising research infrastructures in humanities and social sciences to have the option of longer term funding prospects in this programme or open up possibilities for further development from other funding sources in the future.

The German Council of Science and Humanities considers the BMBF to be an appropriate sponsor for the national funding programme proposed here. This programme should not support the infrastructures of humanities and social sciences research from the outset for an unlimited period of time but certainly longer term i.e. over a period of approx. ten to 15 years. The Council sees the advantage of positioning such a programme with the BMBF in the fact that this is a chance for the longer term prospects required for the funding of infrastructure projects that initially also have an explorative nature. Infrastructure projects which, because of their pilot character, would have difficulties gaining acceptance in other medium-term to long-term funding programmes such as the DFG programme for long-term projects or the Academies' Programme should receive a realistic chance in the competition for funding sources within the proposed national programme. The Council believes that the added value of a national funding programme for research infrastructures in humanities and social sciences initiated by the BMBF would lie in linking

- _ low entry barriers for infrastructure projects of an initially explorative character
- _ with the prospect of safeguarding longer term those projects which would prove attractive for scientific communities beyond their pilot phase.

The programme could allow scope for different entry levels which would also allow established infrastructures e.g. a necessary upgrade. The Council regards it as essential for the quality assurance of the programme that the projects funded here have to prove the intensity and effects of their use in interim evaluations and different funding cycles. In any case, they should demonstrate after a reasonable pilot phase that their impact into the scientific communities is to develop or change subject structures by producing new and innovative research results. Apart from genuine information infrastructures, social infrastructures and large-scale facilities or laboratory equipment, coordinating projects such as interactive platforms and portals for scientific communities and larger research contexts can be taken into account in a national funding programme because these encourage for their part current research by linking and providing specialist information previously only distributed by a multiplicity of unconnected sources. This too can result in interesting research projects and the creation of innovative fields for the scientific communities in question.

The German Council of Science and Humanities believes that the national funding programme should be defined in close cooperation with the DFG, the Union of the Academies of Sciences and Humanities and the *Länder*. This should avoid any overlapping in terms of content and, with a view to perspectives of time frames and admission criteria for project proposals to allow the recommendation of a suitable funding for each project.

The German Council of Science and Humanities goes one step further by requesting actors in science policy to search for rules and institutional measures, in parallel to launching the national funding programme, on how successful infrastructure projects can be converted into permanently secure forms of financing, especially at higher education institutions. Where appropriate, the extent to which infrastructure approaches resulting from interdisciplinary collaborative research projects provide a prospect of sustainability could be reviewed in this context.

The German Council of Science and Humanities sees the BMBF, in its dual role as representative of German research in the ESFRI process and as funding institution for a national funding programme for humanities and social sciences research infrastructures, as currently being in an excellent position of lastingly making its voice heard about the infrastructure concerns of German humanities and social sciences in the European Research Area.

As successful research infrastructures are not just translocal but are generally used today transnationally and free of charge, they are subject to the logic of community assets. The latter are associated with the expectation of a widespread and long-term, and therefore not always measurable short-term, return on investment. For this reason they usually have to be made available through public funding. Research infrastructures are in this sense also part of a “foreign science policy” with which Germany presents itself to the world as an attractive centre of scientific research. |¹¹⁴ Also in this respect the German Council of Science and Humanities considers the BMBF to be an appropriate sponsor of a sustained national funding programme for research infrastructures in humanities and social sciences.

Meaningful indicators of acceptable size and importance of research infrastructures for humanities and social sciences can be forecasts of annual operating costs, above all statements about effects that are deemed to change or create new research fields in and across disciplines. The German Council of Science

|¹¹⁴ See Wissenschaftsrat: Empfehlungen zur deutschen Wissenschaftspolitik im europäischen Forschungsraum, Cologne 2010, p. 11 and G. Schütte (ed.), *Wettlauf ums Wissen. Außenwissenschaftspolitik im Zeitalter der Wissensrevolution*, Berlin 2008.

and Humanities focuses on further assessment criteria for the quality and relevance of a research infrastructure for humanities and social sciences, such as information about the range of users and intensity of use, unique characteristics or cooperation with complementary national and international infrastructures, access conditions and aspects of promoting early career researchers. The Council believes a well prepared concept for training and promoting early career researchers within the scope of infrastructure development is an essential core element of the infrastructure itself – in particular with regard to its long-term yield, its proximity to current research topics and adaptability to innovative methods as well as new requirements of application.

The German Council of Science and Humanities points out that research infrastructures in humanities and social sciences make a long-term contribution to the basic provision of teaching in these subjects. The Council therefore asks the federal government and the *Länder* to support the long-term perspective especially for those research infrastructures which in the course of their operation define a permanent and thus indispensable function for research and teaching in higher education institutions.

II.1 National roadmap process

The German Council of Science and Humanities welcomes the federal government's intention of establishing a national roadmap for research infrastructures. It considers such a move to be an important message that Germany wishes to preserve its attractiveness as a centre of outstanding international research infrastructures and strengthen its position in decision-making processes about new European infrastructure projects. The Council believes it is important to ensure here that a national roadmap process enhances the transparency of decision-making in infrastructure funding and that it is suitable to activate scientific communities in humanities and social sciences on a wide scale. Furthermore, criteria of relevance for scientific impact, science policy, and society at large should be appropriately balanced against each other. The Council expects that

- _ the national roadmap process will be designed in such an attractive way for humanities and social sciences that it is a driving force for additional efforts by the individual disciplines and associations of disciplines;
- _ it provides excellent infrastructure projects, which are supported by the national funding programme for humanities and social sciences proposed here, a sustainable perspective in competition with other proposed projects, and the prospect of inclusion on the European ESFRI roadmap;
- _ criteria that have no direct relevance for scientific impact, e.g. the contribution of an infrastructure to the scientific solution of global challenges, are communicated transparently and at an early stage; and that

_ Germany's ability to act and speak out at international level will on principle be strengthened, also in humanities and social sciences, by the launching of a national roadmap in the context of international coordination processes relating to research infrastructures (in particular in the ESFRI process).

Since research infrastructures in humanities and social sciences are mostly characterised by decentralisation and a high personnel intensity instead of e.g. by crucial investments in facilities and equipment, the German Council of Science and Humanities recommends waiving in principle *de minimus* limits in the national roadmap process for investment costs for these disciplines. The key criterion for inclusion on the roadmap should be reliable forecasts about the field creating or changing effects of the proposed infrastructures. These also include coordinating services in collecting, consolidating and providing data such as e.g. within the ESFRI projects CESSDA, CLARIN and DARIAH.

II.2 ESFRI process

The German Council of Science and Humanities assesses the political impact of the ESFRI process to be highly relevant to the development of research infrastructures in Germany and Europe. It has strengthened cooperation between EU member states and the Council finds this not only reasonable but also necessary given the high investments and increasingly international character of operating and using research infrastructures.

The German Council of Science and Humanities recommends that the BMBF – as representative of German academia in the ESFRI committee – promotes greater transparency in the selection process for the European roadmap process. Criteria for assessing the relevance of the projects in terms of science, science policy and society should be communicated to the scientific communities in advance. Apart from the humanities and social sciences projects on the ESFRI Roadmap, similar extensive and high-quality research infrastructures exist (e.g. in the area of large-scale data collections) that are not on the ESFRI Roadmap but are highly important for European and international specialist communities. The Council emphasises to keep in mind problems that could arise from an exclusive focus of national and European funding for the infrastructure projects on the ESFRI Roadmap. Such practise could create concentration effects which would be at the expense of the funding of smaller but perhaps more innovative (e.g. more experimental) research infrastructures with an international impact. | ¹¹⁵ Despite this, the Council believes infrastructure projects that become

| ¹¹⁵ See also Wissenschaftsrat: Empfehlungen zur deutschen Wissenschaftspolitik im europäischen Forschungsraum, Cologne 2010, p. 123.

selected for the future national roadmap should be, where possible, launched also onto the agenda for the ESFRI Roadmap to encourage in this way cooperation with European partners and allow further cofinancing by partner institutions and European funding institutions.

In terms of the structure of the EU's Eighth Research Framework Programme, the German Council of Science and Humanities recommends that the federal government encourages the coordination of project funding within the scope of the EU's Specific Programmes with the funding of research infrastructures promoted in the ESFRI context. Furthermore, other infrastructures in humanities and social sciences that are of relevance to the European Research Area should be examined in terms of whether it would be worthwhile linking them to the project funding of the Specific Programmes. The Council would welcome such interlocking of funding activities as a decisive impulse for establishing a research infrastructure in humanities and social sciences on a supranational level.

D.III COORDINATION AND GOVERNANCE

One important aspect in the coordination of research infrastructures is the ability of specialist communities to articulate their requirements and strategies concerning research infrastructures. In Germany, such humanities and social sciences branches, which apply qualitative methods in their research, have hitherto held back in this respect. This has resulted in public funding institutions having no organised contact partners for infrastructure issues apart from a few committed individuals. Compared directly, quantitative social research and economic research show a markedly stronger awareness of this problem. They have successfully established in the recent past an organisation with representative, advisory and monitoring capacities.

Recalling the results of the survey conducted (Chapter C.II), the German Council of Science and Humanities requests the scientific societies in humanities and social sciences to increase the awareness of their members regarding questions of infrastructure and therefore also future issues of the disciplines in an environment of science policy where resources for facilities and equipment are increasingly allocated according to competitive principles and in prioritisation processes. The Council suggests establishing a corresponding working group in those scientific societies which have not yet focused systematically on questions of the infrastructure development for their discipline and corresponding sub-disciplines. Additionally, a board member of the respective scientific society should take responsibility for infrastructure matters and should also be able to represent the scientific society with regard to infrastructure related issues.

The German Council of Science and Humanities regards a good example of successful mobilisation to lie in the area of quantitative social sciences and economics in the KVI [Commission to Improve the Informational Infrastructure by Cooperation of the Scientific Community and Official Statistics] process to improve data infrastructure. Quantitative social sciences and economics in Germany have not only covered accumulated needs here but have taken a leading position when compared internationally. This process was continuously developed with the establishment of the Council for Social and Economic Data (RatSWD) in the context of a project funded by the BMBF entitled Developing the Research Infrastructure for the Social, Economic and Behavioral Sciences in Germany and Beyond: Progress Since 2001, Current Situation, and Future Demands (working title: KVI reloaded). As part of this development several data centres and data service centres were founded. |¹¹⁶ The German Council of Science and Humanities recommends that the subject representatives of qualitative social sciences participate proactively in the work of the RatSWD e.g. in the context of an own body for qualitative data. Conversely, the RatSWD is requested to seek the integration of qualitative social sciences in its range of activities. |¹¹⁷ Furthermore the German Council of Science and Humanities regards the RatSWD as an appropriate body to discuss the many legal and ethical questions of principle that arise in compiling and using quantitative and qualitative research data together with bio- and georeferenced data, transaction data etc.

The German Council of Science and Humanities emphasises the importance of the RatSWD as an independent body and central contact partner for users from social sciences and economics. E.g. the RatSWD takes responsibility for the hosting and provision of data sets, which were until now not widely available for the scientific community. The RatSWD functions as a service and monitoring institution for its respective scientific communities. The competent support for the establishment and ongoing work in particular of the research data centres and data service centres by a Standing Committee of the RatSWD can be regarded as exemplary for related disciplines in humanities and social sciences. The German Council of Science and Humanities suggests that the scientific societies in hu-

|¹¹⁶ The RatSWD presented a new memorandum in 2010 for the future development of the social sciences research infrastructure with its recommendations entitled "Expanding the Research Infrastructure for the Social, Economic, and Behavioral Sciences". A summary of the outlines of the recommendations is given in RatSWD: Recommendations for Expanding the Research Infrastructure for the Social, Economic, and Behavioral Sciences, RatSWD Working Papers, 150 (2010).

|¹¹⁷ See also the corresponding recommendation of the German Council of Science and Humanities in: Stellungnahme zum Status und der zukünftigen Entwicklung des Rates für Sozial- und Wirtschaftsdaten (RatSWD), Berlin, Drs. 9504-09, Aachen 2009, p. 13.

manities consider jointly where it could be helpful to establish an institution based on the example of the RatSWD in order to focus and articulate their infrastructure needs and assure the quality of existing infrastructures (see also C.II.2). The BMBF could lend active support here as in the case of the KVI process.

The German Council of Science and Humanities welcomes the increase in the founding of research data centres at research institutions generating data driven by the RatSWD. It recommends that the federal government's departmental research institutions in particular join this founding process and also make data available for widespread scientific use.

The German Council of Science and Humanities recommends that infrastructure operating institutions coordinate data collections, data processing and data provision as efficiently as possible and as far as possible without redundancy with other national and international institutions right from the concept phase for new infrastructure projects in humanities and social sciences. In this context, the Council observes with great interest, for instance, the merger of three formerly independent institutions in the social sciences: the *Zentralarchiv für empirische Sozialforschung* [Central Archive for Empirical Social Research] (ZA), the *Informationszentrum Sozialwissenschaften* [Social Science Information Centre] (IZ), and the *Zentrum für Umfragen, Methoden und Analysen* [Centre for Survey Research and Methodology] (ZUMA) under the umbrella organisation of the *Leibniz-Institut für Sozialforschung* [Leibniz Institute for Social Research] – GESIS.

Regarding the provision and external use of data from already collected digitised resources, greater coordination is called for among the decentralised providers. The German Council of Science and Humanities strongly recommends that the sponsors of infrastructures agree, in the case of data which are related in terms of disciplines and subjects, on joint processing standards and a joint portal provided centrally by a lead institution that allows interested users a one-stop shopping option. This means that data collected, processed and provided on a decentralised basis should be made available to researchers via a joint central portal that they could easily access with their customary scientific terminology.

There is also an urgent need in the development of metadata for digitised data sets for a greater degree of national and international coordination. The German Council of Science and Humanities regards the research funding institutions too as being placed under the obligation of ensuring the use of uniform standards, and ensuring possibilities of networking with existing databases or databases developed complementarily.

Further need for coordination can also be identified in the area of large-scale surveys. There is too little integration between the individual panels with their collection tools and modules and in terms of options for data transfer.

The different data protection regulations of the German *Länder* present a significant problem for quantitative research in social sciences. For example, collections in the context of the National Education Panel (NEPS) encounter different legal restrictions in the 16 *Länder* as far as access to target groups is concerned. This hinders uniform nationwide procedure and the comparability of data across the *Länder* at a later stage. The German Council of Science and Humanities therefore calls for better coordination of data protection provisions in research among the *Länder* and furthermore asks the *Länder* to organise data access in a research-friendly manner within the scope of legal provisions.

In the governance of research infrastructures, the aim is to take due account of the needs of scientific users and ensure the research infrastructure's capacity for innovation and its relevance long-term to research and teaching. The self-interests of the respective institution (higher education institution or non-university research institute) operating an infrastructure should consider the interest of an infrastructure to open up to widespread groups of users, and should not unduly restrict this either in form or content. In particular, access for external users must not be limited. This includes ensuring continuity of access channels without any prohibitive effects for external users.

The German Council of Science and Humanities recommends an advisory board for all humanities and social sciences research infrastructures of a critical size. Enquiries to users and taking account of their results in periodic evaluations should be obligatory for research infrastructures. The Council considers the intensity of use – and here too the percentage of foreign researchers who work with the infrastructure – and satisfaction with the intensity of use of the data sets, processing tools, advice etc. provided to be decisive factors in the success of research infrastructures in humanities and social sciences. They also have to be included as decisive criteria in the appraisals and external evaluations under funding programmes, whereby the weighting of the criteria has to be varied depending on the type of infrastructure. E.g. evaluation according to frequency of use would be counterproductive in the case of the special subject collections of the libraries funded by the DFG. Here, an unlimited and comprehensive collection mandate for the purpose of providing basic supply for specialist communities is part of the core task (reservoir function) of the infrastructure.

A further central aspect of the governance of research infrastructures can be seen in providing motivational incentives for the production of these commons for research. The German Council of Science and Humanities recommends in this context that higher education institutions, non-university research institutions and scientific societies establish incentive structures to reward individual

commitment to infrastructure matters. Successful operators of a research infrastructure that inspire new research topics and whose data are used to achieve research results that win international recognition should not, in terms of reputation, be left behind the users of this infrastructure who are successful in research with these data. For instance, to creating academic prizes and awards for the promoters respectively operators of successful infrastructure projects in humanities and social sciences could be considered as appropriate incentives.

The German Council of Science and Humanities further recommends that *Länder* and higher education institutions take into account the establishment and operation of research infrastructures and the associated support of users in the allocation of performance-related resources. Otherwise there is a risk that commitment for research infrastructures, in humanities and social sciences in particular, will earn not only little recognition but on the contrary will suffer from obvious financial disadvantages compared with the procurement of external research funds. Third-party grants for infrastructure development should in any case be treated equally compared to other research funds in the performance-related allocation of resources. There should also be no differentiation or weighting between external infrastructure grants from DFG and grants of other funding institutions. In the follow-up of the development phase of a respective research infrastructure, the German Council of Science and Humanities recommends linking funds from the performance-related allocation of resources to proven research achievements that result from using the infrastructure.

Furthermore, the German Council of Science and Humanities suggests that the great amount of time and coordination involved in operating research infrastructures, especially in the development phase, should be taken into account by temporarily releasing successful applicants from their teaching duties. The proposed funding programmes should provide for compensatory means to employ substitute professors in the respective faculties and departments.

D.IV RESEARCH INFRASTRUCTURES IN TEACHING AND RESEARCH

Research infrastructures always relate to teaching questions and the funding of early career researchers. The German Council of Science and Humanities believes it is essential to make the provision, use and maintenance of research infrastructures in disciplinary fields, where this has not yet occurred, a regular part of higher education teaching. The Council regards the possibility of using so-called campus use files, which can be provided by research data centres and data service centres in social sciences and economics for higher education teaching, as an important step in this direction.

The German Council of Science and Humanities believes there is particular potential in methodological training for anchoring infrastructure-related research work in basic teaching of subjects and in workshops and summer schools. Additional new academic qualifications and further education programmes could also be created at the interface of computer science, communication technology and humanities and social sciences.

The German Council of Science and Humanities further suggests developing basic study programmes aimed at combining expertise in a humanities or social sciences subject with technical know-how which is required to operate and develop infrastructures. Further development of research infrastructures in humanities and social sciences in Germany is not least constrained by a lack of experts with relevant dual qualifications.

The German Council of Science and Humanities believes the anchoring of infrastructure problems in teaching is a basic condition for establishing an urgently needed culture among students of providing own research data for external users on a permanent basis.

Good services provided by scientific institutions with an infrastructure character are closely linked with own commitment to research. The German Council of Science and Humanities recommends making approx. 30 to 50 % of the working time of scientific staff in design and method development and/or user advice in particular available for their own research work where this is equally attractive for infrastructure operators and employees. This would also help to keep research infrastructures themselves innovative because further developments in this field only result from permanent interaction between collection, processing and use of data for research purposes. It is, however, necessary to ensure that early career researchers who are working at an infrastructure institution longer term but nevertheless for a limited period of time should always be given the qualifications by this institution for other fields of activity within and outside research and teaching. The German Council of Science and Humanities believes it would be fatal for incentives to establish research infrastructures in humanities and social sciences if a significant number of early career researchers linked to infrastructure projects have no future career prospects after the infrastructure comes to an end.

ALLBUS	German General Social Survey
ALLF	Archive for Life Course Research
ARL	Regional Studies and Planning Academy
BBAW	Berlin-Brandenburg Academy of Sciences and Humanities
BBR	Federal Institute for Research on Building, Urban Affairs and Spatial Development
BLK	Federal Government and <i>Länder</i> Commission for Educational Planning and Research Promotion
BMAS	Federal Ministry of Labour and Social Affairs
BMBF	Federal Ministry of Education and Research
BMFSFJ	Federal Ministry of Family Affairs, Senior Citizens, Women and Youth
BMG	Federal Ministry of Health
BMI	Federal Ministry of the Interior
BSH	Federal Maritime and Hydrographic Agency
CAS	Centres of Advanced Studies
CERN	Conseil Européen pour la Recherche Nucléaire
CESSDA	Council of European Social Science Data Archives
CHARISMA	Cultural Heritage Advanced Research Infrastructures
CLARIN	Common Language Resources and Technology Infrastructure Network
CoDArchLab	Cologne Digital Archeology Laboratory
COSMAS	Corpus-Search, Management and Analysis System
DAI	German Archeological Institute
DARIAH	Digital Research Infrastructure for the Arts and Humanities
DDB	German Digital Library
DFG	German Research Foundation

DFN	German Research Network
DGIA	Foundation of German Humanities Institutes Abroad
D-Grid	German Grid Project
DIE	German Institute for Adult Education – Leibniz Centre for Lifelong Learning
DIPF	German Institute for International Pedagogic Research
DIW	German Institute for Economic Research
DLI	Digital Libraries Initiative
DoBeS	Documentation of Endangered Languages
DOIs	digital object identifier
DTA	German Text Archive
DWD	German Meteorological Service
DZA	German Centre of Gerontology
eAQUA	Extraction from Structured Knowledge from Antique Sources for the Ancient Studies
ECHO	European Cultural Heritage Online
EDB	European Digital Library
e.g.	example given
ERA	European Research Area
ERIC	European Research Infrastructure Consortium
ESDS	Economic and Social Data Service (UK)
ESF	European Science Foundation
ESFRI	European Strategy Forum on Research Infrastructures
ESRC	Economic and Social Research Council
ESS	European Social Survey
EU	European Union
EUBAM	Interministerial Federal Government and <i>Länder</i> Working Group on European Matters for Libraries, Archives, Museums and the Preservation of Historic Monuments
EUROHORCS	Association of European Heads of Research Councils

87	E-VALBU	Electronic Valency Dictionary of German Verbs
	EZB	Electronic Journals Library
	GD	Database of Spoken German
	GEI	Institute for International Textbook Research
	CESSDA	Council of European Social Science Data Archives
	GESIS	Leibniz Institute for the Social Sciences
	GLES	German Longitudinal Election Study
	GLHS	German Life History Study
	GWK	Joint Science Conference of the Federal Government and the <i>Länder</i>
	HERA	Humanities in the European Research Area
	HGF	Helmholtz Association
	HI	Herder Institut
	HIS	Higher Education Information System
	IAIS	Institute for Intelligent Analysis and Information Systems
	IBFI	International Centre and Research Centre for Computer Science
	IDS	Institute of German Language
	IEEE	Institute of Electrical and Electronics Engineers
	IFQ	Institute for Research Information and Quality Assurance
	INCHER	International Centre for Higher Education Research
	INF	Information Infrastructure Funding
	ISO	International Organization for Standardization
	ISSP	International Social Survey Programme
	IZ	Social Science Information Centre
	KVI	Commission for the Improvement of the Informational Infrastructure between Research and Statistics
	L.I.S.A.	Read-Inform-Write-Exchange: The Science Portal of the Gerda Henkel Foundation
	LT-world	Language Technology World

MFO	Mathematical Research Institute Oberwolfach
MORESS	Mapping of Research in European Social Sciences and Humanities
MPG	Max Planck Society
MPI	Max Planck Institute
NATO	North Atlantic Treaty Organization
NEPS	National Educational Panel Study
nestor	Network for Long-term Digital Archiving
NSF	National Science Foundation (USA)
OECD	Organisation for Economic Co-operation and Development
OWID	Online Lexicon Information System of German Language
PAIRFAM	Panel Study of Intimate Relations and Family Members
PIs	persistent identifier
PPP	public private partnership
PSID	Panel Study of Income Dynamics
RatSWD	Council for Social and Economic Data
SciColl	Scientific Collections International group (OECD)
SOEP	German Socio-Economic Panel Study
SHARE	Survey of Health, Aging and Retirement in Europe
SHARE_LEAP	Longitudinal Enhancement and Access Improvement of the SHARE Infrastructure
SFB	Collaborative Research Programme (DFG)
TEI	Text Encoding Initiative
UKHLS	UK Household Longitudinal Study
UNESCO	United Nations Educational, Scientific and Cultural Organization
URL	uniform resource locator
Vascoda	Internet Portal for Scientific Information
VAT	value-added tax

89	WGL	Gottfried Wilhelm Leibniz Scientific Association
	WR	German Council of Science and Humanities
	ZA	Central Archive for Empirical Social Research
	ZBW	German National Library of Economics – Leibniz Information Centre for Economics
	ZDB	Journal Database
	ZPID	Centre for Psychological Information and Documentation
	ZUMA	Centre for Survey Research and Methodology