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Short Version

The relevance of population-based longitudinal studies for science and social policies

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Population-based longitudinal studies form the backbone of empirical research in the social, economic and behavioural sciences as well as in epidemiology and health research. As “large-scale instruments” in these fields of science, they serve to test theories and make new observations, while also constituting the basis for evidence-based policy advice.

Such large-scale instruments or indeed “research infrastructures” are extensive and complex research instruments with an at least national, if not international relevance for the respective fields of science. They are intended for long-term use (without striving to thwart scientific creativity), and are available to a large number of users, mainly for scientific purposes.

Germany has increasingly promoted population-based longitudinal studies in the past few years. Due to structural barriers in the research funding system and to the lack of harmonisation of data collection and analysis along with shortcomings in the necessary interdisciplinary education and training, Germany is nevertheless struggling to keep pace with global research excellence. Against this background and drawing on a stock-taking of the current situation as well as pioneering international expert knowledge, the present statement aims at providing recommendations for the structure of research funding and the harmonisation of future research efforts.

Population-based longitudinal studies are indispensable for the world of research and for society due to three major functions:

- Firstly, human societies are subject to constant change. Longitudinal studies enable the documentation of both stable patterns and changes over time as well as the identification of new trends and the analysis of links between socioeconomic and biomedical mechanisms.
- Secondly, population-based longitudinal studies that examine the same individuals repeatedly over time are, under clearly defined conditions, ideal to test hypotheses about cause-effect relationships. This is usually not possible with administrative and process-generated data (“big data”).
- Thirdly, model-based forecasts of potential future developments can be derived from many of these analyses. This prognostic knowledge provides important guidance in social, economic and health policy decisions.

The relevance of population-based longitudinal studies with multi- or interdisciplinary survey programmes in the above-mentioned fields of science results from the fact that the experimental methodology prevailing in the natural and life sciences is of very limited use for the study of processes at population level. Hence, the social, economic and behavioural sciences as well as epidemiology and health research (in short: social and health sciences) exploit the great variety of biomedical, personality-related and socioeconomic factors within a population and their changes over time. They use theory-based statistical analyses to identify causal relationships and to make projections. Examples are: the assessment of the care and nursing requirements of an ageing population; evidence on positive effects of educational investments on an individual’s lifelong health; the quantification of the influence of social class on life expectancy. The pioneering insights of birth cohort studies testify to the success of this research strategy. They allow for the analysis of biomedical and socioeconomic processes over an individual’s life course. These studies also show the importance of a long-term perspective, since the value of longitudinal data increases exponentially with the number of study waves.

On the one hand, the working group agrees that Germany as a research location is fortunate to have a diverse as well as intensely and widely used landscape of population-based longitudinal studies which also compares well internationally. This includes, for instance, the *Socio-Economic Panel* (SOEP), the *National Educational Panel Study* (NEPS), the *Panel Analysis of Intimate Relationships and Family Dynamics* (pairfam) as well as several epidemiological cohort studies along the lines of *Multinational Monitoring of Trends and Determinants in Cardiovascular Disease* (MONICA)/*Cooperative health research in the Augsburg region* (KORA) and, in particular, the recently initiated *National Cohort* (NAKO). Germany is also involved in a number of internationally comparative studies, such as the cross-sectionally replicative *European Social Survey* (ESS) and the longitudinal *Survey of Health, Ageing and Retirement in Europe* (SHARE). Finally, Germany has a considerable number of well-qualified graduates in the relevant fields of study as well as a large pool of academic staff.

On the other hand, the working group finds that this potential is currently not sufficiently exploited. Knowledge potentials remain untapped for three reasons: firstly, the existing financial and organisational infrastructures (e.g. funding instruments) suffer from contradictions and shortcomings that hamper the sustainability of population-based longitudinal studies. This also holds, secondly, for the intellectual infrastructure (for example, education and training). Thirdly, social science and biomedical research approaches are insufficiently linked and coordinated at virtually all levels.

Therefore, the central aim of this statement is to provide key elements of a long-term and coordinated promotion strategy for population-based longitudinal studies. This should complement and improve the currently prevailing short-term planning and ad hoc management in a number of financially and organisationally inadequately equipped institutions. In addition, biomedical and socioeconomic contents should be combined better in research and education.

A need for action is indicated first of all with regard to the funding instruments and the career opportunities for senior employees. The working group considers such measures to be primarily the responsibility of the German Federal Ministry of Education and Research (BMBWF) in cooperation with the non-university research institutions and the German Research Foundation (DFG). Similar to the large-scale facilities in the natural sciences, the research infrastructures in the social, behavioural and health sciences are dependent on long-term stable funding and supervision by senior staff members. However, in contrast to the natural sciences, this fact has hitherto been inadequately recognised in the social, behavioural and health sciences. Firstly, therefore, instruments should be created that will allow for long-term funding (e.g. scheduled funding extensions). Secondly, management staff of major research infrastructures should be able to acquire the relevant skills and to aspire to defined career paths (e.g. tenure track for senior study staff or jointly appointed S-Junior professorships, a German form of junior professorship). Currently, both are not the case for many population-based longitudinal studies.

The working group is aware of the inherent tension between creativity and stability. The group therefore continues to advocate a decentralised approach which restricts neither the creativity of new initiatives nor scientific innovations within already successful infrastructures. However, every already established population-based longitudinal study requires a stable financial base complete with relevant funding instruments, allowing for its continuation and further development on the basis of repeated evaluations (as has, for instance, been successfully established with the Leibniz Association's seven-year evaluation rhythm).

Action is likewise indicated with regard to universities and non-university research institutions. The current education and training programmes are deficient in several aspects. For one thing, only few locations offer a targeted training of methodological skills in the core subjects of this field of research; this is true both for undergraduate and postgraduate programmes. Furthermore, there exist no training programmes for transdisciplinary research cooperation, in particular for young researchers from the biomedical and the socioeconomic sciences who can be indispensable for obtaining innovative insights. There is also an appalling lack of coordination between the curricula of biomedical and socioeconomic studies, so that frequently, no comparable data can be generated and instructive synergies consequently remain unrealised. Finally, training opportunities in survey management are scarce.

Recommendations

1. National funding initiative for interdisciplinary longitudinal studies

1.1 Population-based longitudinal studies are national research infrastructures that constitute an essential basis for demographic, biomedical, socioeconomic and behavioural research projects (often conducted in an international context). Their financial and organisational support should therefore be a national responsibility.

1.2 The working group recommends a national funding initiative to strengthen interdisciplinary cooperation in the realisation of population-based longitudinal studies, in particular between the biomedical and socioeconomic sciences. It recommends that specific tenders are made for biomedical socioeconomic research cooperations, following the example of the US National Institute on Aging or that of the close cooperation between the Medical Research Council and the Economic and Social Research Council in the UK.

2. Long-term funding instruments

2.1 The working group recommends the expansion and creation of such support instruments as will provide for a funding of research infrastructures, the financing of which may be extended unlimitedly on the basis of periodic assessments and as long as the scientific relevance and quality exist. To this end, the ongoing planning for new admissions to the Leibniz Asso-

ciation should provide for the expansion of Leibniz Institutes as infrastructure facilities for longitudinal studies. In this context, use should be made of the new possibilities which the amendment of Art. 91b para. 1 of the German basic law (GG) opens up with regard to the establishment of the Leibniz Institutes as Leibniz University Research Centres.

2.2 However, establishing and founding an institute (whether non-university or associated with a university) with Federal and States' funds, is not always the right solution. As an alternative form of temporary institutionalisation, the working group therefore also recommends abolishing the existing twelve-year limit for DFG long-term projects: with regard to the longitudinal studies in question, this period is deemed inappropriate. Furthermore, the review period of three years is too short and collides with the interview cycles of many longitudinal studies. The procedure should hence be extended to 5-6 years in accordance with the standards of the US National Institutes of Health.

2.3 Within the DFG, the evaluation of such initiatives and research infrastructures should be "unsiloed"; rather, the specific potential of the German scientific community's comprehensive network should be tapped. In long-term projects, the respective cross-sectional expert committees should be proportionally composed of scientists from the research fields responsible for the development and operation of the respective research infrastructures, complemented by experts from existing infrastructures.

2.4 The currently applicable decision to classify all the costs for the preparation of population-based longitudinal studies as operating costs is likewise inappropriate. Both in substance and organisation, the establishment of such national research infrastructures is comparable to the creation of large-scale physical equipment. Expenditures for data survey, harmonisation and standardisation, quality assurance, certification for interviewers and setting up data management and data security should consequently be recognised both as operating and construction costs. This is particularly indicated since the development and operation of population-based longitudinal studies creates jobs just as well as, for example, the construction of large-scale physical equipment does. The working group therefore recommends the establishment of a budget item for biomedical socioeconomic research infrastructures in the Federal research budget, possibly by resorting to Art. 91b GG, which enables the extension of Federal funding to up to 90 percent.

3. Better coordination with the European level

3.1 The working group recommends a better coordination between the European and the German roadmaps for research infrastructures. This requires in particular that a German consent to a research infrastructure at the European level entails the creation of a funding mechanism to ensure that this research infrastructure can indeed be established or further developed. With a view to recommendation 2.4, this

particularly includes a dedicated budget for research infrastructures in the context of the ESFRI roadmap.

3.2 Furthermore, the existing national longitudinal studies (e.g. the National Cohort in Germany and the CONSTANCES study in France; the HLS study in the UK, SOEP and several associated and cooperating prospective cohort studies) require better cross-border harmonisation. Likewise, international data transfer systems fulfilling the relevant data protection requirements should be simplified (e.g. transfer office of the research association “Community Medicine” at the University of Greifswald).

4. Resources for data harmonisation, documentation and linkage

4.1 In order to intensify the interdisciplinary use of longitudinal studies, possible harmonisations between the individual studies should be identified and extended to include the pooling of data.

4.2 To enhance user-friendliness, the information on the design and data content of surveys should be consistently processed and made centrally available. This should be realised in accordance with the standardised procedures for a user-friendly provision of longitudinal metadata.

4.3 Data access should be simplified by a cross-survey web-based portal.

4.4 Legal and technical possibilities for linking survey and administrative data should be

extended (“data matching and linkage”); the same applies to the linkage of population-related data with geo-referenced environmental data. Data protection and ethical requirements regarding the interactions with respondents should also be ensured. All this requires additional resources that should be provided for in a study’s funding scheme.

5. Career paths for senior study employees

5.1 Whereas the academic directors of studies usually occupy permanent positions as (often jointly appointed) professors or directors of institutes, the senior employees at the second hierarchy level have no prospects of any career paths beyond the mostly temporary posts in the academic mid-tiers. So far, even in non-university institutes, where the conversion of a temporary contract into a permanent one is generally possible, no regular career paths have been developed for senior staff of longitudinal studies. However, these employees have an indispensable wealth of experience in the field of population-based longitudinal studies. The working group therefore recommends the creation of career paths analogous to tenure-track professorships, offering senior staff permanent employment as “laboratory directors” with remuneration up to the level of W2 professorships.

5.2 Relevant initial and advanced levels of qualification should be guaranteed in accordance with the following recommendations.

6. Advanced training programmes for senior study employees

6.1 Senior study employees should receive a structured advanced training in research and project management and this should be a precondition for advancing on the career paths proposed in recommendation 5. Although there are numerous training programmes for general research and project management, nothing appropriate exists for such complex, extensive and long-term projects as population-based longitudinal studies. Appropriate courses should be embedded in the structures proposed in recommendation 8.

6.2 The working group further recommends the establishment of an academic training scheme for senior study employees, especially in non-university research institutions. This would mainly imply a better integration into the respective universities and graduate schools, prospectively enabling them to take over the supervision of doctoral students with empirical focus. This requires a study funding which takes the necessary extra time for training into account.

7. University curricula

7.1 The university curricula for the relevant core disciplines should include a targeted knowledge and skills development scheme in their basic training units. This is necessary to meet the increasing need for qualification and to raise the German research efforts in the field of population-based longitudinal studies to a high-quality level that will ensure long-term competitiveness.

- 7.2 In sociology and economics, data-analytical education is generally sound; there are, however, deficiencies in the field of data-generating training. This could be remedied by establishing Master's programmes and specialised courses on survey methodology and data collection. This is likewise indicated in the fields of political sciences and psychology. In addition, appropriate Master's programmes with a thematic and methodological focus in the field of health and medical sociology should be developed at individual universities.
- 7.3 In the field of medical studies, methodological skills of data collection and analysis should be included in the existing curricula for epidemiology and Public Health. It is also recommended to promote pilot study programmes offering medical students the option of obtaining an additional qualification in a subject area relevant for population-based health research.
- 7.4 Medical practitioners interested in further research after their graduation from medical school should have easier access to post-graduate part-time training programmes (particularly Master of Science in Epidemiology, Master of Science in Public Health). The existing post-graduate degrees should be further developed so as to keep pace with leading international training programmes.
- ## 8. Capacity development through promotion of young scientists
- 8.1 The number of young scientists in the field of population-based longitudinal studies should be substantially increased and better supported by cross-regional doctoral programmes and post-doctoral training offers. A range of additional post-graduate qualifications and of national and international training courses does already exist but these do not provide a scientific qualification that will enable a researcher to address the specific scientific and methodological requirements arising in population-based longitudinal studies. This problem becomes especially apparent if social science aspects are to be connected with biomedical findings.
- 8.2 Suitable tailor-made qualification programmes should be developed for and within individual institutions as well as in cross-institutional cooperations. This could be realised either within the continuing education programmes of GESIS, or at the DFG-funded graduate schools or – in a joint approach with collaborating study centres – as a national funding initiative, modelled, for instance, analogous to the British CLOSER project.
- 8.3 In addition to supporting the development of scientific personnel, an appropriate national funding initiative should focus on strengthening interdisciplinary research cooperations.

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