

Foreword

Addressing the current and emerging economic, social and environmental challenges requires novel ideas, innovative approaches and greater levels of multilateral co-operation. Innovation and digitalisation are playing an increasingly important role in virtually all sectors and in the daily lives of citizens around the world. As such, policy makers are placing the “innovation imperative” at the centre of their policy agendas.

The design, development and implementation of policies, however, is fraught with difficulty – and even more so when international co-ordination is required. Innovation has often been regarded as ‘too fuzzy’ a concept to be measured and accounted for. The OECD *Frascati Manual* opened the way for measuring one key dimension of science, technology and innovation so that, nowadays, investment in research and development – R&D – is systematically encouraged and monitored around the world. However, policymaking today is still largely focused on what is easier to measure. There is, therefore, an urgent need to capture how ideas are developed and how they can become the tools that transform organisations, local markets, countries, the global economy and the very fabric of society.

In 1991, the city of Oslo witnessed the first agreement within the global community of practitioners in the OECD Working Party of National Experts on Science and Technology Indicators on how to conceptualise and measure business innovation. These guidelines became known as the *Oslo Manual*, which was published and put to the test with the support of the European Union. The fast adoption and diffusion of the manual’s proposals, both within and beyond the OECD and the EU, are a clear indication of the value of this initiative; in fact, innovation surveys covering more than 80 countries have been carried out thus far.

Moreover, the OECD and Eurostat have jointly led further revisions of the manual to extend the scope and increase the robustness of the data collected according to the Oslo guidelines. These revisions have been based on the experience gained from collecting data on innovation in OECD member and partner countries.

This fourth edition of the *Oslo Manual* takes account of major trends such as, the pervasive role of global value chains; the emergence of new information technologies and how they influence new business models; the growing importance of knowledge-based capital; as well as the progress made in understanding innovation processes and their economic impact. Its guidance seeks to contribute to measuring the process of digital transformation and thus supports the goals of the OECD’s Going Digital initiative.

The manual is a truly international resource benefitting from inputs by UNESCO, the World Bank and a number of regional development banks, who, like the OECD, are strongly committed to developing an evidence base to support investments in innovation and promote economic and social development. The 2018 edition is relevant for economies worldwide, regardless of their levels of economic development, and supports the assessment of the Sustainable Development Goals (SDGs). The manual rises to the challenges of being globally relevant – as set out by the G20 at its 2016 summit in

Hangzhou (China); and continuing to improve measurement systems to better capture the key features of science, technology and innovation – as stated in the Declaration of Science and Innovation Ministers Meeting in Daejeon (Korea) in 2015.

For the first time, the *Oslo Manual* provides a common framework for measuring innovation in a more inclusive manner across the economy, in government, in non-profit organisations and in households. This provides a path for realising many of the proposals put forward at the OECD Blue Sky Forum held in Ghent (Belgium) in 2016. For example, the inclusion of a new chapter in the manual focuses on the use of innovation data for constructing indicators and conducting analysis and evaluation.

The *Oslo Manual* has earned a pre-eminent place in the family of continuously evolving instruments devoted to the definition, collection, analysis and use of data related to science, technology and innovation. As a statistical manual, it represents a meeting point between users' needs for practical concepts, definitions and evidence on innovation, and the expert consensus on what can be robustly measured. Conceived as an open, voluntary standard, the *Oslo Manual* seeks to inspire dialogue, encourage new data collection efforts and experimentation.

As highlighted by the OECD Innovation Strategy, better measurement of innovation and its impact on economic growth, sustainability and inclusiveness is key to fulfilling the promise of better co-ordinated innovation policies in the digital era. The OECD has long argued for a whole-of-government approach to innovation policy and has stressed the importance of understanding the complex array of factors that influence innovation and the way it impacts our societies, anticipating and addressing their unintended outcomes. The *Oslo Manual* represents an extremely valuable additional tool for a wide range of innovation experts and policy practitioners worldwide.



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Acknowledgements

This joint publication of the OECD and Eurostat is the outcome of a collective effort of all national delegates and representatives from international organisations participating in the OECD Working Party of National Experts on Science and Technology Indicators (NESTI).

Several people invested considerable time and effort to help steer the revision process on behalf of the entire NESTI group. The present fourth edition came together thanks to the leadership and dedication of the members of the Oslo Manual revision steering group (OMSG). Chaired by the NESTI Chair Svein Olav Nås (Research Council, Norway), the OMSG was set up by OECD and Eurostat to steer the revision process from inception to publication. A diverse group of experts comprising Ales Capek (Eurostat), Alessandra Colecchia (OECD), Tomohiro Ijichi (NISTEP and Seijo University, Japan), John Jankowski (NSF/NCSES, United States), Carsten Olsson (Eurostat), Christian Rammer (ZEW, Germany), Monica Salazar (Inter-American Development Bank) and Martin Schaaper (ITU, formerly UNESCO Institute for Statistics) stepped up to the challenges set out in the revision's terms of reference. The OMSG deliberated frequently, using (and sometimes abusing) the opportunities provided by online remote communication across different time zones, to provide a collegial and effective interface between the working party and the drafting team. This allowed the work to progress in between meetings and fulfil the NESTI vision and agreements.

Anthony Arundel (University of Maastricht and consultant to the OECD secretariat), Fernando Galindo-Rueda (OECD) and Christian Rammer (ZEW) prepared, on request from the OMSG, a series of chapter outlines and drafts for discussion and review. These drafts represented the backbone of the present manual. Anthony Arundel took responsibility for editing the entire manual, ensuring consistency and the timely delivery of the manual for discussion and approval by delegates. Vladimir López-Bassols (consultant to the OECD secretariat) supported the OECD in the final copy and style editing of the manuscript and the preparation of the glossary of terms. Fred Gault (UNU-MERIT, TUT-IERI and consultant to the OECD secretariat) provided additional editorial support and assisted the NESTI Chair in outreach and liaison activities with other international organisations such as the International Organization for Standardization (ISO).

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Head of the EAS division. STI Director Andrew Wyckoff and Deputy Director Dirk Pilat provided guidance and comments on the drafts.

This edition would not have been possible without the financial and human resources provided by the following organisations: the United States' National Science Foundation/National Center for Science and Engineering Statistics, the German Federal Ministry for Research and Education, the Research Council of Norway, Eurostat, and the European Commission. These organisations supported work directly related to the revision as well as preparatory, exploratory and methodological work in the years preceding the revision.

Participants in four revision workshops (Oslo, December 2016; Ghent, September 2016; a NESTI meeting in Paris, March 2017; and a NESTI meeting in Madrid, December 2017) provided valuable insights to the discussions and contributed discussion documents and presentations. Additionally, webinars were carried out in June 2016 and October 2017. The December 2017 NESTI meeting was kindly hosted by the Spanish Foundation for Science and Technology (FECYT), during which the manual was agreed to in principle by delegates.

Workshops organised by the US National Academies of Science and Engineering in Washington DC (through a grant from NSF/NCSES), ZEW in Mannheim, RICYT in San José (Costa Rica), and the OECD Blue Sky Forum in Ghent, provided excellent opportunities to float ideas and proposals with members of the external academic and policy users community.

We would also like to gratefully acknowledge the input from individual and institutional submissions to the online stakeholder consultation process and the chairpersons and delegates of the OECD Committee for Scientific and Technological Policy (CSTP) and Committee for Statistics and Statistical Policy (CSSP), as well as their national teams, for the feedback provided up until declassification approval.

This work would not have been possible without the additional input of the NESTI Bureau and that of several other OECD and Eurostat colleagues, including IT, publications, communication and administrative support staff. They all contributed to the final printed and online (<http://oe.cd/oslomanual>) versions of this Manual.

Special gratitude is owed to the experts who initially conceived this manual and worked on it for nearly 30 years to enhance its relevance and quality, overcoming several challenges along the way. It is hoped that they will see this edition as a substantive and worthwhile “innovation” as it is implemented worldwide and inspires new measurement and analysis. The NESTI and STI WG communities, in partnership with experts from all over the world, will strive to make the Oslo Manual guidelines accessible and useful in the coming months and years.

Cover image

The cover image of this manual is part of a photographic reproduction of a fresco mural painting by Mexican artist Rufino Tamayo. He was commissioned in 1957 by the International Committee of Art Advisors of UNESCO to contribute to the artistic decoration of Room II upon the completion of the Fontenoy building at UNESCO Headquarters in Paris. The fresco was executed in situ and completed in 1958.

The subject portrayed, “Prometheus bringing the fire to mankind”, comes from the ancient Greek mythology and has been recurrent theme in the arts for centuries. The titan Prometheus disobeys the gods giving the human race the gift of fire and the skill of metalwork, an action for which both he and humankind are punished, albeit not fatally, ultimately being freed by another heroic character, Heracles.

As noted in the UNESCO Works of Art Collection website, “Tamayo’s fresco seems to be an exaltation of the red colour through its different tones: the carmines and the vermilions bring the fire to life”.

We would like to express our gratitude to María Eugenia Bermúdez Flores de Ferrer, representative of the heirs of Rufino Tamayo’s legacy, the “Fundación Olga y Rufino Tamayo”, and Ms. Tania Fernández de Toledo, Chief of Section at UNESCO, for kindly allowing us to reproduce this image that so well symbolises the essence of this publication and the meaning of innovation.

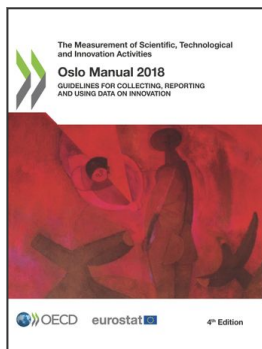


TAMAYO, Rufino (1899-1991)

PROMETHEUS BRINGING FIRE TO MANKIND, 1958

Fresco, signed lower right 'Tamayo 9-58', 500 x 450 cm

<http://www.unesco.org/artcollection/>



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