

**SWOV – INSTITUTE FOR ROAD SAFETY  
RESEARCH**

RESEARCH ASSESSMENT ON THE SCIENTIFIC QUALITY  
OF THE RESEARCH PERFORMED BY SWOV IN THE  
PERIOD 2013-2018

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## SUMMARY

On 5 and 6 September 2019 an international committee of peers was invited to The Hague to review the research of SWOV (Stichting Wetenschappelijk Onderzoek Verkeersveiligheid) according to the Standard Evaluation Protocol (SEP). The review is based on a self-evaluation report by SWOV, appendices and the interviews during the site visit. At the time of the site visit SWOV had just finalized a reorganization in which four themes were identified that are considered marketable and recognizable to the external world and reflect the research that is done at SWOV. The initiation of these four departments was too recent for the committee to be able to evaluate its effects. SWOV is not a regular research institute at a university, in addition to its scientific research programme, it helps to answer questions that policymakers and other road traffic professionals are confronted with. The balance of being a scientific institute and being supportive to policymaking was taken into consideration in the evaluation by the committee.

The main source for funding of SWOV research projects is the Ministry of Infrastructure and Water management, by way of one-year projects. SWOV succeeds in building thematic lines into successive projects. The publication of articles in peer-reviewed journals is fairly stable and the quality is good to very good. SWOV has no clear publication strategy nor does it measure impact of the publications. Having limited time for writing articles and one-year projects make it difficult for researchers to write scientific articles on a regular basis. The committee is convinced that sharing the results of research with the international scientific community is important and it stimulates SWOV to develop a publication strategy. At an international level the work by SWOV is well known, visible and reputable on a number of topics. In order to remain this high reputation, the committee recommends SWOV to develop a strategy on international reputation and networking, including collaborations with (inter)national universities.

Social impact and the national policy-making agenda are dominant objectives of SWOV. The committee establishes that SWOV is considered to be an important and trustworthy supplier of reliable information and facts on road safety. A large number of publications aimed at a non-scientific audience are being published, often concise, easy-to-read reports or fact sheets. The committee observes that SWOV is providing advice based on scientific facts, but refrains from steering the ministry in certain directions. In a world where the wealth of information can provide conflicting results, more steering by SWOV might be beneficial. Activities towards societal impact are often focused on the Dutch situation, many of the reports are also written in Dutch. Although the committee understands and appreciates this, it is also of the opinion that the European level is increasingly important in road safety policy.

Regarding the future the committee concludes that SWOV has talented researchers, a good and international academic reputation and a strong position in relation to the Ministry. The committee is positive regarding the continuation of the high quality work and impact. It has formulated some points of attention for SWOV. First, SWOV should formulate a SWOV wide strategy with respect to internationalization. Second, SWOV should try to exploit available data and knowledge bases with a longer-term vision despite the one-year projects.

With respect to the PhD training, the committee was positive about the fact that SWOV allows researchers to pursue a PhD at SWOV. It does recommend formalizing and align the framework and create a homogenous setting for PHDs within SWOV.

Research integrity has received a lot of attention over the evaluation period and the committee stimulates SWOV to continue the work of ECOS and the QA process.

# 1. FOREWORD BY COMMITTEE CHAIR

This report concerns an assessment of the scientific quality of the research conducted at SWOV Institute for Road Safety Research. It covers the period 2013-2018. The committee assessed the quality and relevance to society of the research conducted as well as the strategic targets and the extent to which SWOV is equipped to achieve them. For this purpose, the committee used the SEP assessment criteria with respect to research quality, relevance to society and viability.

As chairman of the Evaluation Committee I am very grateful that I could rely on a number of prominent colleagues from a variety of countries, with complementary expertise with respect to road safety research and policies. These different backgrounds did not withhold the committee to draw conclusions and provide recommendations based upon consensus. I am grateful for the open-minded attitude of the members and a loyal team spirit that developed during the evaluation period. At the same time, the different backgrounds and experiences guarantee a valid and reliable appreciation of the quality of the work carried out by SWOV. In our approach, we adopted high international research standards as terms of reference. In addition, the committee stresses the importance of adopting an international framework with respect to (policy) research, since a large part of safety work stems from international cooperation and decision making.

On behalf of all committee members I would like to thank dr. Meg van Bogaert for her excellent work in all phases of this assessment process. In addition, I would like to thank the research managers, management, supporting societal and scientific committees as well as other staff of SWOV for the informative Self Evaluation Report and the open, sincere and instructive interviews we could have with them.

As chairman I hope that our conclusions and recommendations will stimulate all people associated with SWOV as well as external stakeholders to continue investing in road safety research and communicate the outcomes to the scientific community as well as to policy makers.

Chairman of the Committee  
Henk Meurs



## 2. THE REVIEW COMMITTEE AND THE PROCEDURES

### **2.1. Scope of the review**

The review committee has been asked to perform a review of the scientific quality of the research performed by SWOV Institute for Road Safety Research in the period 2013-2018, its societal relevance, and its viability. In accordance with the Standard Evaluation Protocol 2015 – 2021 (SEP) for research reviews in the Netherlands, it was asked to assess the quality, the relevance to society, and the viability of the scientific research at the research institute as well as the strategic targets and the extent to which the institute is equipped to achieve these targets. Furthermore, a qualitative review of the PhD training programme, research integrity policy and diversity formed part of its assignment.

In all the interviews, the committee met with staff members who are enthusiastic, who seem to be working at SWOV with great pleasure, and who are proud of the organisation. In its opinion, this deserves a compliment. The retention rate of staff is also high, confirming the fact that people are happy to work at SWOV.

### **2.2. Composition of the committee**

The composition of the committee was as follows:

- Prof. H.J. (Henk) Meurs [chair], professor Mobility and Infrastructure at Radboud University Nijmegen and director of MuConsult;
- Dr. C. (Claude) Marin-Lamellet, deputy director European and International Affairs IFSTTAR (Institut Français des Sciences et Technologies des Transport, de l'Aménagement et des Réseaux);
- Prof. F. (Francesca) La Torre, professor of Roads, Railways and Airports at the Department of Civil Engineering, University of Florence;
- Prof. C. (Constantinos) Antoniou, professor in Transportation Systems Engineering at the Civil, Geo and Environmental department of the University of Munich;
- Prof. N. (Natasha) Merat, professor in Human Factors of Transport Systems, Institute for Transport Studies, University of Leeds.

The committee was supported by Dr. M.J.V. (Meg) van Bogaert, who acted as secretary on behalf of QANU.

### **2.3. Independence**

All members of the committee signed a statement of independence to guarantee an unbiased and independent assessment of the scientific quality of the research performed at SWOV in the period 2013-2018. Personal or professional relationships between committee members and the research institute under review were reported and discussed at the start of the site visit. The committee concluded that no specific risk in terms of bias or undue influence existed and that all members were sufficiently independent.

### **2.4. Data provided to the committee**

The committee received the self-evaluation report from the institute, including all the information required by the SEP.

The committee also received the following documents:

- the Terms of Reference;
- the SEP 2015-2021;
- lists of publications, consisting of five key scientific publications and five key societal publications.

Even though SWOV is not part of a university, it decided to use the SEP to have its research assessed by an international committee of peers. Although the committee understands the rationale of this decision, for example with respect to comparability with other research institutes it also concluded



that the structure of SWOV does not fully fits this protocol. The committee noticed that the structure of the self-evaluation report did not do justice to the SWOV ambition and that SWOV struggled with some of the SEP requirements. The self-evaluation report was rather long and sometimes redundant. For example, the way citations are calculated shows that this is not an important aspect for SWOV. The committee is of the opinion that these citation numbers are not representative and decided not to use them in its assessment. The committee recommends to SWOV for the next assessment to adjust the SEP to it specific organisation and requirements. Although it took the committee somewhat more time and effort to get a good understanding of SWOV, it managed to do so. The committee is convinced that the challenge of fitting SWOV within the SEP did not hinder the assessment.

### **2.5. Procedures followed by the committee**

The committee proceeded according to the SEP. Prior to the first meeting, all committee members independently formulated a preliminary assessment of the institute under review based on the written information that was provided prior to the site visit.

The final review is based on both the documentation provided by the institute and the information gathered during the interviews with management and representatives of the research institute during the site visit. The site visit took place on 5 and 6 September 2019 in The Hague (see the schedule in Appendix 2).

Preceding the interviews, the committee was briefed by QANU about research reviews according to the SEP. It discussed the preliminary assessments and decided upon a number of comments and questions. It agreed upon procedural matters and aspects of the review. After the interviews, it discussed its findings and comments in order to allow the chair to present the preliminary findings and to provide the secretary with argumentation to draft a first version of the review report.

The draft report by the committee and secretary was presented to SWOV for factual corrections and comments. In close consultation with the chair and other committee members, the comments were reviewed before drafting the final report. The final report was presented to SWOV's Supervisory Board and to the management of the research institute.

The committee used the criteria and categories of the Standard Evaluation Protocol 2015-2021 (SEP). For more information, see Appendix 1.

## 3. ASSESSMENT OF SWOV INSTITUTE FOR ROAD SAFETY RESEARCH

### 3.1. Introduction

SWOV (Stichting Wetenschappelijk Onderzoek Verkeersveiligheid) is the Dutch National Institute for Road Safety Research. SWOV is an independent scientific institute that is professionally involved in road safety in the Netherlands. Its mission is to contribute to road safety by means of knowledge from scientific research. The motto of SWOV is "Prevent crashes, reduce injuries and save lives". SWOV is a non-profit organisation and is mainly funded by the Ministry of Infrastructure and Water Management (hereafter: Ministry) to perform an annual research and knowledge dissemination programme. SWOV has a Scientific Advisory Board and a Programme Advisory Board. Both boards are involved in defining and supporting its annual research programme in order to guarantee its scientific and practical relevance. Additional funding (approximately 30%) comes from national and international contract research and EU research programmes.

In this report the committee reflects on a number of criteria that are part of the assessment protocol (SEP). SWOV decided to use the SEP for its assessment, despite not being a research unit of a university. The research is predominantly applied, and the Institute has a clear societal task. The committee used the broad scope of the protocol to assess SWOV, taking into account that academic research is not the primary objective and that it has other activities. Being an international committee of researchers, the focus was from an international and often academic perspective. This led to a number of findings and recommendations with which the committee wants to encourage SWOV to continue developing itself in the near and more distant future.

### 3.2. Profile, strategy and management of the institute

#### *Objectives and strategy, management and organisational structure*

SWOV aims to be a top international institute in the field of traffic safety. Its knowledge and research cover all major road safety topics, and its statements are evidence-based and of high scientific quality. In addition to its scientific research programme, it helps to answer the questions that policymakers and other road traffic professionals are confronted with. It has to pay careful attention to the balance of being a scientific institute in the field of road safety on the one hand and the ambition of being supportive to policymaking at the national and regional levels on the other. Although both objectives require high-quality scientific research, the products that are disseminated are aimed at different audiences. During the site visit the committee discussed this balance and the fluctuations that are observed over time.

The research strategy adopted in 2012 was developed to improve SWOV's viability after a substantial budget cut of its government funding by the Ministry. The strategy focused on consolidating the quality of the institute, to guarantee a gradual growth of external funding and strengthening of SWOV's top position (national and international) in the field of road safety research.

The Managing Director and Supervisory Board determine and maintain the strategy and position of SWOV. Based on proposals from the Managing Director, the Supervisory Board formally determines SWOV's research area, the relation to the Ministry and other institutes and, in general, types of cooperation. Over the period of this evaluation (2013-2018), SWOV has had two research departments: *Road Safety Assessment* and *Human Factors*. In July 2019, approximately two months before the site visit, a new organizational structure based on four research themes was introduced. The four themes are considered to be better marketable and more recognizable to the external world. Furthermore, the four smaller departments are more easily managed, while at the same time SWOV creates opportunities for talented staff to have a management position. Each researcher is part of a theme but is participating in projects that cross themes, making it a matrix organization. The four themes are:



*Data and Analysis for Policy:* This group works not only with data and information collected directly by SWOV, a wealth of data is obtained from other sources as well. Researchers from external organisations are asking for SWOV assistance in this field, which is an indication of the reputation of the group, and this is a significant value-added task. However, there is not sufficient capacity to support such tasks. To the committee this is the most cross-cutting theme at SWOV, as it obtains data from other SWOV groups and provides analytics advice and support. The relation of the group to the other groups (cross-sectional) could be better clarified. One example of data use is the national estimation of the real number of serious road injuries that is carried out by this group by combining data from the police and hospitals. Activities related to policy include the recalibration of the vision of Sustainable Safety (3rd edition released) and contributions to the new national Road Safety Strategic Plan (SPV 2030) of the Ministry of Infrastructure and Water Management. At a European level, the activities of this group include membership of IRTAD, the ETSC PIN Steering group, and the editorial committee of the OECD/ITF Working Group on Safe Systems, coordination of the SUSTAIN project and WP-leaderships in the European projects SafetyCube and SaferAfrica.

*Infrastructure and Traffic:* During the evaluation period SWOV developed several models to assess the safety of road infrastructure (PROMEV/PROMEV light and Network Safety Index) as well as on the safety of bicycle infrastructure (CycleRAP). A lot of resources were used to contribute to the new national Road Safety Strategic Plan (SPV 2030) of the Ministry of Infrastructure and Water Management. SWOV introduced several elements of the concepts around Sustainable Safety. For the near future, attention to implementation of these policies will be required. This approach reflects a focus on national and regional safety policies of this stream of work. The area of infrastructure is covered, since 2008, by the EU Directive on Road Safety Management (currently under revision). This implies the need to an increased internationalization of the research, as compared to the current situation. This theme also has to support the national Dutch government with their research findings in order to ensure that the future revisions of the directive consider them. An important area discussed during the meeting is Vulnerable Road Users, that is included in the revision of the Directive. Several projects have been performed in this area by SWOV although an increased dissemination is recommended. At a European level, the activities of this group included coordination of the CEDR PROGRess project on the development of recommendations for a standardized approach for the design and maintenance of safe roadsides on primary European roads.

*Road User Behaviour:* Several research topics are developed by this group: older drivers' fitness to drive and the effect of Alzheimer's disease (AD), education of young drivers and of the motorcyclist, naturalistic cycling studies, risk and use of alcohol and drugs, and impact of driver distraction on driving. Most of these topics are linked to the national level and are mostly published in Dutch reports. The work on AD and driving is done in collaboration with the University of Groningen and has regularly produced papers since 2016. Three PhD projects are on-going. The group is also regularly involved in European projects/proposals, such as the CEDR ADVERTS project, but seems less involved in other international activities.

*Human Factors and Vehicle Automation:* The work of this group includes coordination of the UDRIVE project, Levitate (coordinated by the University of Loughborough), MeBeSafe, and the newly awarded Mediator project. Research focusses on the interactions between users and vehicles and new technologies, which can also be road-based. A particular focus is the effect of connected and automated vehicles on road safety and user behaviour. This group is well known internationally, possibly due to its involvement in European projects. However, members of the group are also visible at important international fora, such as the TRB, and engaged in influential conferences, such as the HUMANIST, which was hosted in The Netherlands in 2018.

A separate line of work, in which people from all departments are involved, is in-depth research of road accidents. During the evaluation period, the SWOV-team for in-depth research has conducted thematic in-depth studies on accidents involving cyclists aged 50 and over, on light mopeds accidents that occurred on bicycle paths, on accidents involving mobility scooters and on accidents involving

speed-pedelects. At a European level, the in-depth team was involved in the SaferWheels project (coordinated by the University of Loughborough).

#### *Research staff and career development*

To conduct high-quality, independent and innovative scientific research, the quality of the research staff is of the utmost importance, as is that of the support staff and facilities. Over the evaluation period, approximately 35 research staff members were employed at SWOV, with a support staff of 19 people. About 40% of the support staff is working for the Communication Department, which is responsible for the dissemination of the research results. Young researchers (MSc) often start at SWOV to gain experience. A logical path for this is to pursue a PhD in order to acquire experience and expertise. SWOV facilitates PhD candidates within the framework of its research programmes and actively cooperates with universities (see also section 3.6 PhD programmes). A further step in career development is either in the direction of project management or becoming an internationally renowned road safety expert. During the site visit the committee learned that researchers are indeed supported in the development of this next step, based on their talents and interests. It was pleased to notice that these steps are considered equally important and valuable, and that SWOV values both as being essential in the Institute.

During the site visit the committee interviewed the management of the organisation and its researchers. Although the researchers are generally self-directed and independent, it believes that clearer frameworks would be valuable in a number of areas. For example, when it comes to claiming the average ten days per employee for training or writing an article, steering and coaching of staff should be offered. The possibilities for the use of these days, but also their exact number, was not clear to many of the employees with whom the committee met. The committee is of the opinion that an effort should be made to guide and encourage researchers to spend this time in a way that benefits both themselves and the organisation as a whole (e.g. by more frequent publication of research results in academic journals or conference proceedings). In its opinion, it is very important that all staff members use this available time for their personal and career development.

Recommendations on staff and career development:

- Although research staff are generally self-directed and independent, the committee recommends introducing clear frameworks, for example on the use of the days intended for training, writing papers, etc.

### **3.3. Research quality**

Total funding of SWOV has remained more or less stable throughout the period of evaluation. Approximately 70% of funding comes directly from the Ministry. This funding is granted on an annual basis for projects in an agreed research programme. The Ministry's decision-making is based on proposals suggested by SWOV and in general the suggestions by SWOV are agreed upon. In addition, SWOV has the freedom to determine the focus of research on a small proportion of this funding. Although the committee acknowledges and agrees that funding of one-year projects is not optimal, it appears that SWOV succeeds in building thematic lines into successive projects. The most important research products that SWOV produces for its peers are scientific articles in high-impact journals, scientific (technical) reports and conference papers. Scientific (technical) reports are mainly written in Dutch as Dutch road safety professionals are the main target group. Many of these reports include a summary in English. Only a minority of the committee was able to read these Dutch publications. Based on this small sample, its quality was nevertheless judged to be very good.

The average number of peer-reviewed journal articles over the past evaluation period was 17 publications per year. This number was fairly stable over the review period, and it had increased compared to the previous evaluation period. SWOV does not measure the impact of its scientific publications as that is not one of its objectives. Research staff informed the committee that for individual researchers, it remains a challenge to find the time to write a scientific article on the outcomes of a project. The priority lies on reports in Dutch and the Ministry as funding agent. At the



moment, finding the time to write the scientific article conflicts with the demand for work required on subsequent projects. With the exception of PhD students, who are often given time to write an article within a project, the researchers' 'slack' time to publish is very limited. Plus, this time is also dedicated to other activities, such as training. The absence of real incentives to publish in peer-reviewed journals dictates that only researchers with a strong internal drive as well as flexibility in their personal life actually manage to regularly publish articles. While the quality of the publications reviewed by the committee is good to very good, it is a shame that a large amount of valuable data is not shared with the international scientific community. Although SWOV is not a regular research unit of a university in which scientific papers are the dominant output, the committee is convinced of the importance of this activity to remain competitive and to maintain the high level of quality of the research, as well as the academic reputation of the Institute. This will also have a positive effect on the quality of the work SWOV does for the Ministry and municipalities in the Netherlands. The committee recommends that SWOV work on facilitating the writing of scientific papers. One way of doing this might be to start with writing a good scientific paper before continuing with the project deliverable. This approach has two advantages; the first is being able to write the article during the project, the second is that writing a good article will make it easier to write a good deliverable. Another option for sharing the results of the research with the international community is to invite PhD students who do not work for SWOV to use SWOV data in their research. This requires the creation of a strategic relationship with key relevant universities, and an annual discussion of key priorities for each partner, linking students to ongoing research, and establishing expectations from each (data and support from SWOV, paper from student). The internal kick-off meetings of projects should also be the occasion to list the different publication options for the results of such projects, including recent indexed open-access journals.

Between 2013 and 2018 SWOV has (co)organized a number of national and international conferences and symposia to disseminate its scientific research. SWOV researchers were also involved in several collaborations with national and international research institutes and universities. The committee discussed the international academic reputation and visibility of SWOV during the site visit. At an international level, the work by SWOV is well known, visible and reputable on a number of topics, for example policy for cycling, assessment of speed enforcement, road safety data collection and analysis, and macroscopic long-term forecasts. SWOV is also well regarded on vehicle technology and road user behaviour, as shown by the recent awarding of a new EU project (Mediator) that is being coordinated by SWOV. The committee did notice that the excellent international reputation of SWOV is to a great extent dependent on the impact and activities of individual researchers, and no clear SWOV strategy was visible. It recommends developing a SWOV-wide strategy on academic reputation and networking. This includes succession planning and investing in talented researchers to become international academic leaders. At a national level, SWOV researchers collaborate with a number of universities, including Delft, Groningen, Eindhoven and Twente, often including a PhD project. During the site visit the committee was informed about the developments in these collaborations, and both SWOV and the universities endorse the added value of cooperation and the complementary value they can bring to each other. The committee agrees that this is a sound basis for a very fruitful collaboration and encourages SWOV to develop cooperation with universities in a structural and organisation-wide manner.

#### Recommendations on research quality:

- Develop a SWOV-wide strategy on national and international reputation and networking. This should include the introduction of a SWOV publication strategy that facilitates research staff writing scientific papers and reporting in English.
- Develop cooperation with (inter/national) universities in a structural and organisation-wide manner, including internships, visiting professors and visiting post-docs.
- Existing data sets' exploitation could provide better visibility, and also additional sources of funding. Develop open data policies for students/researchers to exploit the resources obtained.

### **3.4. Relevance to society**

In the self-evaluation report a number of examples are provided that describe the impact SWOV has had on society, e.g. the study related to road safety and the design of 80 km/h roads provided input for new guidelines for road design. Another example was the work by SWOV researchers on the reduction in the number of road fatalities and serious road injuries. In the evaluation period a total of 190 publications aimed at a non-scientific audience were published. The majority are concise, easy-to-read reports describing the main results of a study, or fact sheets. A number of them received a lot of attention in the national media and were referred to in debates in Parliament. The current Managing Director was appointed around the start of the evaluation period. One of his key roles was to re-focus on national impact. One major change, in 2013, was to move SWOV premises closer to the Ministry, leading to a closer connection. The committee established that the connection to the Ministry seems indeed to have significantly improved in the past evaluation period.

From the interviews during the site visit, it became clear to the committee that societal impact and the national policy-making agenda are dominant objectives of the Institute. It established that SWOV has made huge progress in this respect, and it appears that the Institute is considered to be an important and trustworthy supplier of reliable information and facts on road safety in the Netherlands. The committee noticed that in their reports, the researchers are often careful in translating their interpretation of the results into subsequent preferred scenarios from a safety point of view. It is important that SWOV provides the Ministry with evidence-based research from well-regarded sources, such as peer-reviewed journal publications. Further increasing bench-marking exercises, providing evidence from other countries, will help to further strengthen any recommendations. To a certain extent, the committee understands and appreciates SWOV's caution in propagating 'the best option' in the reports. SWOV must prevent from becoming an activist organisation and the committee understands that other criteria are also taken into account in political decision-making. Nevertheless, the committee is of the opinion that, based on the knowledge and expertise it has, SWOV can even more strongly propagate what is best for society, from a road safety perspective. This might be considered helpful and acknowledged by Ministerial members, in a world where the wealth of information can provide conflicting results.

Although it is clear within SWOV that high-quality research is a prerequisite for having societal impact, the efforts in the past years have focussed more strongly on getting impact and tightening the connection to the Ministry rather than developing as an internationally renowned research institute. It was indicated during the site visit by researchers and the management that networking and a societal impact strategy at an international level are also important, but the committee established that in practice the opportunities for this are very limited. For example, the absence of an English summary in quite some Dutch reports prohibits international organisations and policy makers from making use of SWOV's research. The committee understands and appreciates the past focus on impact at the national level and confirms the positive effects of this effort. It does warn SWOV to hold on to the good connection and influence at an international level. Increasingly, road safety policy is being developed and determined at a European level, with the effects becoming visible and noticeable at the national level. In order to contribute to and influence these policies, SWOV must remain active in the international networks. According to the committee, this requires a SWOV-wide strategy on internationalisation.

Recommendations on relevance to society:

- Not wanting to steer the decision making of the ministry in an activist way is understandable, but the committee stimulates SWOV to become a participant in decision making and to provide clear policy-relevant information, informed recommendations, or possible scenarios in their reports from a safety point of view.
- Retain connection and influence at an international level, specifically since road safety policy is increasingly being developed and determined at a European level. Participation in working committees of the EU as part of the Dutch delegation is important. The committee suggests discussing this with the ministry management.



### **3.5. Viability**

In the first two criteria the committee provided a number of recommendations on research quality and societal relevance that also relate to the viability of the Institute. These recommendations will not be extensively repeated in this section, but they will be referred to when relevant.

After an internal reorganisation, SWOV started in July 2019 with four smaller research departments rather than two larger ones. As described in section 3.2, this reorganisation is considered to fit the ambitions of SWOV better and also allows for a better support and coaching of young, inexperienced researchers and researchers who are new in the field of road safety. The expectation is that by creating four departments, the visibility of SWOV's areas of work will improve. The committee is pleased to learn that SWOV will remain a matrix organisation with people from the various departments working together on projects to ensure a multidisciplinary input. As the reorganization has only recently been introduced, it is not able to comment on its effects. However, it emphasizes the importance of matching the organisational structure to the strategy for the upcoming period. In its opinion, it remains somewhat unclear how the three framing themes that were regularly mentioned during the site visit (automotive vehicles, the elderly and the city) are connected to the four new departments. It is important for the four departments to indicate how their strategy is linked to the themes, and how each project and output contribute to the themes and overall SWOV objectives. The committee noted that the website has different themes/groups, and it is not clear how the research conducted by the four departments relates to them. They might be externally facing themes, but somehow all of the different categorizations need to be linked.

Based on the assessment of research quality and societal relevance in this report, it is clear to the committee that SWOV is looking for a balance between the two. In the past evaluation period, the emphasis was on national impact and improving the connection to the Ministry, while doing sound academic research. From the interviews, the committee concluded that the commitment and emphasis regarding the national societal impact were necessary for SWOV to remain viable. The effort has had the intended effect; the relationship between SWOV and policymakers/the Ministry is currently good. Although the Ministry formally agrees which projects and research topics are funded on a yearly basis, it acknowledges SWOV's expertise and vision and, as a result, adopts SWOV's research programme. Therefore, SWOV is able to put themes on the agenda for a longer period of time, despite the restriction to one-year funded projects. According to the committee, the annual budget from the Ministry is great as a solid basis for good research and impact on Dutch road safety. Although the annually determined projects are a restriction and a challenge, it is of the opinion that at SWOV, there is a need for a medium-term strategy to continue doing research on certain topics and themes.

In the self-evaluation report, SWOV described its plans for the near future in order to maintain and further develop itself as a high-quality, effective and vital scientific research institute. In the strategy for 2017-2021, goals regarding scientific quality, societal impact and professional vitality are described. Specific attention is paid to maintaining – or even extending – external funding opportunities. Regarding the latter aspect, SWOV will focus on participation in larger national and international research programmes, enhancing knowledge and research potential through cooperation with national partners, and responding quickly and professionally to opportunities in the field. The committee agrees with the objective to extend external funding opportunities, specifically at an international level, and wants to mention the recent success of a major programme won by SWOV (Mediator). Increasing network activities will lead to opportunities, not only in funding of projects, but also in the impact of SWOV at an international level.

The committee is of the opinion that now is the time to broaden the focus, both on the scientific dissemination of the research and in the international field. SWOV was and still is one of the leading road safety research institutes worldwide. Its academic reputation is excellent, and many of its researchers are involved in international networks. Individual researchers go to international conferences, reach out and participate in national and international networks. Although the

committee concurs with the general strategy to increase national and international external funding and observes some successes, it did not identify a clear international ambition or strategy at the organisational level that would do justice to the reputation of SWOV and the quality of its research. Especially since a number of leading researchers have left SWOV in recent years, it believes it would be wise to take up academic ambition and internationalization at a central level. This includes a SWOV wide strategic approach towards internationalization, including more emphasis on the communication of the results at an international level, with adapted KPI's and more substantive activities like creating and maintaining international networks and participating in policy-making activities at the European level. Specific emphasis should be given towards Brussels and the European Union. There are not many institutions like SWOV in Europe and this position should be leveraged. International entities should know that they can approach SWOV for advice, and who the entry point is. The committee recommends SWOV to become the knowledge partner in Dutch delegations of European Union activities on road safety. The SWOV wide strategy will also allow the officer for international affairs to better coordinate, connect and centralize the different activities.

When it comes to disseminating knowledge and information outside the Dutch-speaking world, the by the fact that although summaries in English are a good first step. However, the committee is of the opinion that sometimes a summary alone is not enough. This clearly prevents a non-Dutch audience from getting any further information. The same goes for the website in English, which seems less informative compared to the Dutch website. SWOV will have to manage the challenge of the Dutch commissioner and audience preferring publications written in Dutch and the interest from outside the Netherlands for its research.

According to the committee, specific resources need to be set aside for attendance at key international conferences, and staff with the appropriate skills need to be identified for this. The presentation of key findings by SWOV members should be encouraged. The obvious one is the TRB meeting in January, but also the EU CAD organised by the commission for connected and automated driving. Other, more road safety-focussed conferences (e.g. ICTCT) and international cooperation (e.g. ETSC) should be mentioned as well. It would be good to have a SWOV wide strategy that encourages members to help with journal reviews, be on scientific committees, etc., and funds/time should be made available to them for this. The officer for international affairs is President of FERSI, which is very good. The committee stimulates SWOV to make explicit in what way this membership – and other positions – has impact and what strategy they contribute to.

Recommendations on viability:

- Match the organisational structure to the strategy for the upcoming period: themes, departments, projects and strategy are not easily connected.
- Formulate a strategy with respect to internationalisation, regarding scientific aspects, networking and outreach. This includes more emphasis on the communication of the results at an international level. Increase of the activities of the international affairs officer to support and coordinate. Introduce a process to monitor developments.
- Aim at follow-up projects on similar topics, which could provide additional benefits with low "cost" (core projects often end with low-hanging fruit results of the data/issue). Furthermore, try to exploit the available data and knowledge bases, with a longer-term vision (multi-year).
- SWOV could exploit its leading position in the international road safety scene to attract high-quality international consulting tasks and develop a funding scheme to get more invited researchers from outside the Netherlands.

### **3.6. PhD programmes**

SWOV provides opportunities to its research staff to conduct research for a PhD degree in cooperative alliances with several Dutch universities, including Delft, Groningen, Eindhoven and Twente. The precondition is that the research fits into the regular SWOV research programme. Candidates who work at SWOV and pursue a PhD participate in the graduate school and have a formal promotor at one of the universities. The PhD candidate also has an internal (SWOV) supervisor who coaches



him/her on a day-to-day basis. In addition to PhD candidates who work at SWOV, researchers from other institutes are facilitated to conduct part of their PhD research at SWOV. The committee did not assess the PhD training and supervision at the universities, as these are covered by the research assessment of those institutes or faculties. In the period of evaluation, one former SWOV researcher, four existing SWOV researchers and three part-time visiting researchers obtained their PhD. During the site visit, four SWOV researchers and one part-time visiting researcher were working on their PhD thesis.

From the interview with three SWOV PhD candidates, the general impression of the committee is that they are pleased with their supervision and the opportunities to work on their research. It did notice that a number of aspects differed between the departments. For example, the expectation that young researchers with an MSc would pursue a PhD appeared to vary. Also, there seems to be some difference between PhD candidates regarding the time provided for writing articles and the introduction and discussion of their PhD. Although in practice all PhD candidates manage to get the space and time to do their work, some had to be more inventive to find enough time than others. The design of the research proposal and support given to PhD candidates also seemed to vary between the departments. The committee understands that projects differ, as do the expectations and need for support of the candidates but emphasizes that the more formalized steps in the PhD trajectories should be clearly described and aligned.

Recommendations on PhD programme

- Formalise and align the framework and formalized steps in the PhD trajectories of SWOV PhD candidates in order to achieve a more homogenous setting for PhDs within SWOV.

### **3.7. Research integrity**

During the review period SWOV set up a quality assurance (QA) procedure that is intended to maintain and develop its reputation. This QA procedure is used as a support and guarantee for its quality, although the professional responsibility of the researchers and project leader remains the starting point. It includes a kick-off meeting, an assessment by the Research Ethics Committee SWOV (ECOS), an end-of-project meeting, an internal scientific review of the report (performed by a senior researcher), a final test carried out by the managing director with a special focus on the conclusions and recommendations and their consistency with previous SWOV statements, and finally a language edit and lay-out of the report.

ECOS was established in 2015, and all studies that plan to collect empirical data from either human beings or the traffic system are submitted to this committee. It consists of two senior SWOV scientists and the SWOV legal adviser. The procedure has two stages. In the first stage a short questionnaire is filled out. If the outcome of this questionnaire shows that relevant ethical issues are involved, the second stage is initiated that includes an extensive questionnaire and the requirement to include documentation such as the informed consent form. The majority of the proposals are approved, although many require minor adaptations. In a few cases ECOS led to substantial changes in the research design and method. Specific attention is paid to data security, regarding both processing and storage. SWOV aims to establish and host a Dutch "Road Safety Data Centre" which stores all data on road accidents, fatalities and serious injuries. It expects to be certified for this in 2019.

The committee is of the opinion that integrity, ethical issues and data management are all addressed very well. One point of attention it would like to raise is the fact that SWOV is a small organization, which could lead to conflicts of interest and independence of the ECOS members. It verified and established that the ECOS committee members are well aware of this potential issue but would like to recommend introducing an external officer who can meet with the ECOS committee once a year to support and improve the work of ECOS. It furthermore suggests that SWOV include feedback from the client as a normal part of the process.

Recommendation on integrity

- Introduce an external officer to the ECOS committee who can support its independent position.
- Introduce feedback from the client as a normal part of the QA process.

### **3.8. Diversity**

SWOV has no diversity policy, nor any targets to achieve besides legal obligations. In the self-evaluation report, it stated that there is ample diversity with respect to gender, age and seniority. Researchers at SWOV come from a variety of scientific backgrounds. Based on information it received in the interviews on this topic the committee noticed that the number of international staff members – though growing – is limited, as is the ethnic diversity. Both aspects deserve attention as a better-balanced staff will help SWOV in its national and international positioning. For example, as immigration increases, it is important that the needs of different ethnic groups and their effect on road safety are understood.

### **3.9. Conclusions**

In conclusion, SWOV is doing very well, and its challenge is to continue doing innovative research, share its wealth of data with the national and international community, and formulate SWOV-wide strategies on internationalisation and collaborations/networking.

### **3.10. Overview of the quantitative assessment of the research unit**

After having assessed the research quality, relevance to society and viability, and comparing that to the developments and standard in the field of road safety, the committee comes to the following quantitative assessments:

Research quality:	very good
Relevance to society:	very good
Viability:	very good





# APPENDICES



## APPENDIX 1: THE SEP CRITERIA AND CATEGORIES

There are three criteria that have to be assessed:

- Research quality:
  - Level of excellence in the international field;
  - Quality and Scientific relevance of research;
  - Contribution to body of scientific knowledge;
  - Academic reputation;
  - Scale of the unit's research results (scientific publications, instruments and infrastructure developed and other contributions).
  
- Relevance to society:
  - quality, scale and relevance of contributions targeting specific economic, social or cultural target groups;
  - advisory reports for policy;
  - contributions to public debates.

The point is to assess contributions in areas that the research unit has itself designated as target areas.

- Viability:
  - the strategy that the research unit intends to pursue in the years ahead and the extent to which it is capable of meeting its targets in research and society during this period;
  - the governance and leadership skills of the research unit's management.

Category	Meaning	Research quality	Relevance to society	Viability
1	World leading/excellent	The unit has been shown to be one of the most influential research groups in the world in its particular field.	The unit makes an outstanding contribution to society	The unit is excellently equipped for the future
2	Very good	The unit conducts very good, internationally recognised research	The unit makes a very good contribution to society	The unit is very well equipped for the future
3	Good	The unit conducts good research	The unit makes a good contribution to society	The unit makes responsible strategic decisions and is therefore well equipped for the future
4	Unsatisfactory	The unit does not achieve satisfactory results in its field	The unit does not make a satisfactory contribution to society	The unit is not adequately equipped for the future



## APPENDIX 2: PROGRAMME OF THE SITE VISIT

### **Thursday 5 Sep**

9.30	9.45	arrival and welcome
9.45	11.30	preparation committee
11.30	12.15	director and vice-director
12.15	13.00	lunch
13.00	13.45	theme 1: Data & Policy
13.45	14.30	theme 2: Infrastructure
14.30	15.00	break and committee meeting
15.00	15.45	theme 3: Traffic psychology (& in-depth study)
15.45	16.30	theme 4: Vehicle & technology (incl. naturalistic driving)
16.30	17.00	break and committee meeting
17.00	17.45	WAR (scientific advisory board), RVT (supervisory board), PAR (programme advisory board)

### **Friday 6 Sep**

9.00	9.30	preparation committee
9.30	10.15	ECOS/ communication/AVG
10.15	11.00	OR (works council)
11.00	12.15	preliminary findings/writing
12.15	13.15	lunch with PhD candidates
13.15	14.00	final meeting with director and theme-chairs
14.00	15.30	discussion of preliminary findings, assessment, scores and arguments by committee
15.30	15.45	oral presentation of preliminary findings committee chair.

## APPENDIX 3: QUANTITATIVE DATA

### Research staff

	2013	2014	2015	2016	2017	2018
<b>Research unit</b>						
Scientific staff	29 (29.2 FTE)	35 (29.1 FTE)	33 (30.7 FTE)	38 (33.6 FTE)	39 (34.2 FTE)	34 (32.4 FTE)
Post-docs	0	0	0	0	0	0
"PhD students"* (employees)	4	3	2	2	3	5 (0.4 FTE)
"PhD students"* (not being employees)	5 (0.5 FTE)	4 (0.4 FTE)	4 (0.4 FTE)	4 (0.4 FTE)	4 (0.4 FTE)	4 (0.9 FTE)
<b>Total research staff</b>	<b>38 (29.7 FTE)</b>	<b>42 (29.5 FTE)</b>	<b>39 (31.1 FTE)</b>	<b>44 (34 FTE)</b>	<b>46 (34.6 FTE)</b>	<b>43 (33.7 FTE)</b>
Support staff	20 (15.9 FTE)	18 (13.3 FTE)	19 (13 FTE)	17 (13.5 FTE)	20 (15.8 FTE)	20 (15.2 FTE)
Visiting fellows	0	1	0	0	0	0
<b>Total staff</b>	<b>58 (45.6 FTE)</b>	<b>60 (42.8 FTE)</b>	<b>58 (44.1 FTE)</b>	<b>61 (47.5 FTE)</b>	<b>66 (50.4 FTE)</b>	<b>63 (48.9 FTE)</b>

### Funding

	2013	2014	2015	2016	2017	2018
<i>Funding:</i>						
Direct funding (1)	4.276.536	3.726.905	3.741.588	3.794.784	3.867.831	3.956.357
<i>Research grants (2)</i>						
Contract research (3)	310.844	1.209.493	762.348	580.268	909.996	416.876
Other (4)	880.346	965.282	911.740	936.024	730.741	757.556
<b>Total funding</b>	<b>5.467.726</b>	<b>5.901.680</b>	<b>5.415.676</b>	<b>5.311.076</b>	<b>5.508.568</b>	<b>5.130.789</b>
<i>Expenditure:</i>						
Personnel costs	3.860.784	3.845.692	3.697.953	4.056.118	4.370.323	4.138.830
Other costs	1.420.704	1.738.241	1.275.093	1.110.798	1.204.553	1.130.634
<b>Total expenditure</b>	<b>5.281.488</b>	<b>5.583.933</b>	<b>4.973.046</b>	<b>5.166.916</b>	<b>5.574.876</b>	<b>5.269.464</b>



## Research output

Research unit	2013	2014	2015	2016	2017	2018	Total	Annual average
Refereed articles (peer-reviewed journal articles)	26	13	15	15	14	19	102	17
Non-refereed articles	4	3	3	3	2	3	18	3
Books	0	0	0	0	1	2	3	0.5
Book chapters	2	1	6	3	1	1	14	2.3
PhD Theses	3	1	0	0	0	4	8	1.3
Conference papers	8	15	7	5	5	9	49	8.2
Professional publications (technical reports)	46	53	38	53	61	49	300	50
Publications aimed at the general public (easy-to-read reports and fact sheets for non-scientific road safety professionals)	42	38	29	21	35	25	190	31.2
Other:			2		2	2	6	1
<b>Total</b>	<b>131</b>	<b>124</b>	<b>100</b>	<b>100</b>	<b>121</b>	<b>114</b>	<b>690</b>	<b>115</b>

## PhD candidates

Starting year	Enrolment			Success rates (graduated within x years, based on date of defense)					
	Male	Female	Total (M+F)	x ≤ 4	4 < x ≤ 5	5 < x ≤ 6	6 < x ≤ 7	Not yet finished	Discontinued
T-10	2	2	4		2 / 50%	1 / 25%		1* / 25%	
T-9									
T-8									
T-7									
T-6	1	2	3	1 / 33%		2 / 67%			
T-5	1		1		1 / 100%				
T-4									
<b>Total</b>	<b>4</b>	<b>4</b>	<b>8</b>	<b>1 / 13%</b>	<b>3 / 38%</b>	<b>3 / 38%</b>		<b>1 / 13%</b>	