Evaluation of the Maastricht School for Mental Health and Neuroscience MHeNs (2009-2014)

Report of the External Review Committee
March, 2016

I INTRODUCTION

This report presents the results of the research and educational programs' assessment of MHeNs, conducted in 2016 by an external review committee, over the period 2009-2014. The Maastricht School for Mental Health and Neuroscience (further to be mentioned MHeNs) is one of six research schools in the Faculty of Health, Medicine and Life Sciences embedded in the Maastricht University Medical Centre+ (organogram in Annex 3).

I.1 The External Review Committee

To assess the research and education (both at the Master's and PhD level) conducted at MHenNs, an international External Review Committee (further to be mentioned 'the Committee') was appointed by the Executive Board of Maastricht University on September 28th. The Committee consisted of the following members:

- Professor Marian Joëls (chair), Brain Center Rudolf Magnus, University Medical Center Utrecht, The Netherlands
- Professor Bill Deakin, Neuroscience and Psychiatry Unit, Institute of Brain Behaviour and Mental Health and Manchester Academic Health Science Centre, Manchester, United Kingdom
- Professor Michel Hamon, Centre de Psychiatrie et Neurosciences, INSERM-CPN, Paris, France
- Professor Andreas Monsch, Memory Clinic, University Center for Medicine of Aging, Felix Platter Hospital, Basel, Switzerland
- Professor Bart Nuttin, University Hospital Leuven, Belgium
- Petra Uittenbogaard, MSc, Surplace Advies, The Hague, The Netherlands, appointed secretary to the review committee.

Additional information on the committee members and their brief curriculum vitae can be found in Annex 1.

Professor Albert Scherpbier, Dean of the Faculty of Health, Medicine and Life Sciences (further to be mentioned as 'the Dean'), formally installed the Committee on January 18th 2016. The Committee used the methods described in the Standard Evaluation Protocol 2015-2021 (SEP)[1]. This protocol aims to ensure a transparent and independent assessment process. All members of the Committee signed a statement of impartiality and confidentiality.

I.2 Scope of the assessment and documentation

The Dean asked the Committee to provide a qualitative assessment of the school as a whole, as well as of its three research divisions, in accordance with the SEP guidelines. Moreover the Dean asked the Committee to pay special attention to the future strategy of the school, especially the intended development of the Center for Integrative Neuroscience (CIN) and the Neuro-Intervention Center (NIC). As part of the assessment, the following research divisions were presented to the ERC for evaluation:

1. Cognitive Neuropsychiatry and Clinical Neuroscience
2. Mental Health
3. Neuroscience

[1] The SEP protocol has been developed as an external evaluation system for all research conducted at Dutch universities, university medical centers, and NWO and Academy institutes. The Association of Universities in the Netherlands (VSNU), the Royal Netherlands Academy of Arts and Sciences (KNAW), and the Netherlands Organisation for Scientific Research (NWO) adopted the protocol.

I.3 Working procedure of the Committee

The Committee based its assessments on the Self-evaluation Report 2009-2014 presented by MHeNs, and on an extensive two-and-a-half day site visit containing presentations by and discussions with the Dean, the scientific director of the school, the division leaders, research group leaders, post-docs and PhD-students, and the program coordinators of the school's Research Masters and PhD program (full program in Annex 2). During the assessment program, the Committee decided to ask (and was provided with) additional details: a) an overview of all scientific publications in 2014 at the level of the divisions, 2) an overview of all running clinical trials within every division, 3) a list at division level of assigned projects and funding in 2015. In view of the extensive information provided in the Self-evaluation Report and during the program, the Committee did not see compelling reasons to make use of the possibility to have extra interviews with a selection of the research staff.

The Committee assessed and rated the above-mentioned three divisions and the school as a whole with regard to scientific quality, societal relevance and viability, both in a descriptive manner (text) and on a four-point scale[2] (Annex 5). The three criteria and especially the four-point scoring system, adhering to the latest version of the SEP, differ from those in prior SEPs and are therefore not directly comparable.

The two-and-a-half day visit was concluded with an oral feedback session of the findings and preliminary conclusions of the Committee, attended by the Dean and the scientific director of MHenNs, followed by a presentation to the scientific director and the three division leaders.

[2] 1 = World leading/excellent, 2 = Very good, 3 = Good and 4 = Unsatisfactory. For an explanation of the categories, please see annex 5.

II ASSESSMENT OF THE SCHOOL OF MHenNs

II.1 Brief description of the school's research strategy and targets

The principal focus of the School for Mental Health and Neuroscience (abbreviated as MHeNs) is to conduct high-impact translational neuroscience research on neurological and psychiatric illness as well as mental health and to provide state-of-the-art education to Master and PhD students. To this end, the school brings together basic and clinical neuroscience domains in translational focus areas and expert groups.
MHenNs focuses its research on 1) a basic understanding of brain function and disease mechanisms, 2) understanding the function of genes and proteins, cellular processes and neural and glial networks in relation to human health, and 3) establishing translational links between laboratory, clinic and vice versa. MHeNs has organized its research into three research divisions: 1) Cognitive Neuropsychiatry and Clinical Neuroscience, headed by Professor F. Verhey, 2) Mental Health, headed by Professor J. van Os and 3) Neuroscience, headed by Dr. B. Rutten.
For the years 2016-2021, the School intends to strengthen its three cornerstones, research, care and education, simultaneously to become a center of excellence that will comprise much more than 'just' a research institute. Major targets in this strategy are the implementation of the Neuro-Intervention Center (NIC), a clinically driven research unit, headed by Professor van Os (NIC will deal with all aspects of mental health related to research, patient care and education in the University hospital), and the Center of Integrative Neuroscience (CIN), a center which will combine all neuroscience related research and Master teaching from five Maastricht faculties. In research, the School aims to move towards a 'bench to bedside strategy', which could have consequences for the current division structure. There are advanced plans to start an independent department of translational neuroscience. In education, MHeNs wants to expand and strengthen its Research Master, PhD and postdoctoral activities. Related to viability, MHeNs wants to invest its surplus financial means to attract more postdocs and assistant professors. A planned international European Research Master in translational neuroscience will be incorporated in 2017.

II.2 Assessment of the School of MHeNs as a whole

II.2.1 General remarks

Self Evaluation Report

The Committee first would like to express her appreciation for the excellence and comprehensiveness of the Self Evaluation Report. The School of MHeNs needs to be congratulated with this report. Furthermore, there is surely a substantial growth visible in the 3 divisions compared to the last external review in 2009. There is no doubt that very good to excellent research is done within all 3 divisions. The observations and recommendations below should be read in the spirit of improving a School that is already performing at a very high level.

Organizational aspects and governance

In order to improve governance of the School of MHeNS, the organizational structure will benefit from simplification. If the organizational structure is not immediately clear to the Committee and, as we often heard, it takes months for employees to find their way, it is time to consider changing the structure. The university and the hospital are currently two different legal entities and there may be historical, financial and/or political reasons to keep the present structure. However, rethinking the structure of the hospital and university with regard to large clusters like the School of MHeNs may help to be better prepared for the future and make the school a better recognizable unit within and

outside of Maastricht. The Neuro-Intervention Center (NIC) - which starts soon - and the Center for Integrative Neuroscience (CIN) - may be necessary intermediate steps. Nevertheless, it is clear to the Committee that 'Integrative Neuroscience in Maastricht' should work towards one face and one label as soon as possible.
The MHeNs structure of divisions was slightly changed after the last ERC report, but the current logic is not immediately transparent and does not entirely reflect the strengths of Maastricht neuroscience. The committee advises a rethink of this structure, especially in light of the intended new department of neuroscience, which is to become the leading department within Division 3. If the Division and the department have the same name 'Neuroscience' this is bound to cause confusion.

Financial position
The Committee was pleased to see the stronger financial position of the School of MHeNs in recent years, due to a new allocation model of resources. The Dean is to be applauded that he abandoned an allocation system determined exclusively by historical reasons, to be replaced by a model that more correctly reflects scientific and educational impact. However, the Committee has concerns that a model based –with respect to the variable income- on the number of theses produced, though simple, may not sufficiently take scientific activities into the equation that are more applied and have a different type of impact on science and society. The current model is somewhat at odds with the general policy of the university and hospital (and many other parties in The Netherlands and Europe) and as such sends the wrong signal. External grant income is a more widely used and externally recognized key performance indicator than is the number of theses; adopting this KPI (too) should drive up the quality of scientific output.

Infrastructure
With regard to central facilities, the committee was very enthusiastic about the intended centralization of the imaging facility. This is a core facility and noticeable strength of Maastricht, from which both researchers and patients should fully benefit. The financial support of the Dean is also highly appreciated by the Committee.
The Committee has concerns about the animal facility. This is also an important core facility. A separate building for this purpose is essential and the fact that a decision to build has recently been taken, is seen as an important step. This is an urgent matter and currently hampers progress, particularly of Division 3 research.

II.2.2 Research Quality
The committee was positively impressed by the joint research effort of the School. Great enthusiasm and drive of individual junior and senior researchers was observed, despite their substantial clinical and teaching load: something to be cherished.
The research quality and output is very good to excellent (1-2 on the quantitative SEP-scale, see II.6). The research topics in general are relevant, but make a somewhat scattered impression. By giving all subjects the same weight and not making choices for specific topics, the total spectrum is broad and here and there lacks the critical mass necessary to reach international visibility, force and attractiveness to funders. There is a potential threat that efforts are diluted. Especially when the number of staff positions is limited, when individual researchers have multiple obligations and 'regular' funding sources are becoming more competitive, making choices may be necessary. The strongholds of Maastricht, i.e. i) the themes of dementia and psychotic disorders, ii) the approaches of neuromodulation and neuro-epigenetics and iii) the internationally oriented teaching program, can provide strong leads for international recognition.
Increasing the focus may also help to change the funding-ID of the school. While external funding (research grants, contracts) is adequate at the moment, the committee noticed shifts over time from

research grants towards contract research. To some extent this reflects a national trend, but the relatively low number of current MHeNs scientific members holding personal grants, certainly beyond the Veni level, shows that there still is room for improvement, also from traditional funds.

II.2.3 Relevance to society

The committee considers the societal relevance of the School's research area as a whole to be excellent (1). The questions touch on major health issues that have a big impact at the level of the Dutch economy and society. Subjects like dementia and mental health are at the heart of the challenges our society is facing. The MHeNs researchers ask relevant questions, reach out, work with many partners in the region and implement their findings in the health system. This approach is also extended to the level of teaching, exemplified by PhD theses containing a section on societal relevance of the results and a Research Master's track on Drug Development and Neurohealth that will be implemented soon. Considering that the School is situated in a Faculty of Health, Medicine and Life Sciences, the societal relevance is excellent and at the level that can and should be expected.

Still, the committee sees possibilities to bring the interaction with societal partners to an even higher level. The number of tangible products, spin-off companies and public-private partnerships can be increased. The incentive should not just come from this evaluation, but be a transparent part of university and hospital governance, reflected in the parameters determining the variable income. Difficulties in standardizing such parameters are acknowledged by the Committee, but should be a starting point of the discussion.

II.2.4 Viability

The Committee regards the viability of MHeNs in principle to be healthy (1-2). Certainly when the School brings more focus to its activities this will help to become an even more recognizable partner, within and outside of Maastricht. Anticipation of new funding sources, e.g. by active broker-activities with (pharmaceutical) industry partners – more pro-actively than the current practice - and more forcefully stimulating and facilitating knowledge transfer are recommended.

Talent management is also a vital element for the MHeNs viability. The Committee definitely noticed high-potentials, at all career levels. Yet, a more extensive and tailor-made talent support system would be helpful, thus optimally positioning in-house talented researchers for personal grants.

The Committee emphasizes that it is also important to attract talent from elsewhere, including in leading positions: people that bring expertise from other centers to Maastricht. This for instance may hold for the appointment of the head of the new department of Neuroscience. He or she should be a Neuroscience-profile oriented professor, who will really put effort to promote innovative strategies within the field of integrative neuroscience, in close coordination with other affiliated departments (neurosurgery, anesthesiology, urology, neurology and neurotoxicology). The Committee advises that the high profile neuroscientist with established credentials and knowledge of cutting–edge techniques in neuroscience who will head the department of Neuroscience should also serve as head of Division 3.

An open mind for external candidates also holds for the appointment of the new MHeNs director: scientific excellence, a record of effective leadership in complex organizations and dedication to the job should be the major considerations. This will guarantee continuation of the highly appreciated work by the current scientific director.

The committee was pleased to hear that the leadership of the faculty (up to the highest level) supports Neuroscience and Mental Health in Maastricht/Maastricht UMC+ and is even, as the committee heard, willing to further invest in it. This gives confidence in a healthy future of the School.

II.3 Evaluation of Division 1: Cognitive Neuropsychiatry and Clinical Neuroscience

II.3.1 General remarks

Division 1, under the lead of Professor Frans Verhey, has its main research focus in the field of neurodegenerative disorders, specifically regarding early diagnosis and biomarkers including neuroepidemiological studies, and psychosocial interventional aspects. Additional areas include epilepsy, neuromuscular disorders, and the sense of hearing and balance. These research groups have published consistently well and substantially – i.e., between 146 and 236 papers per year – over the reporting period. Division 1 has delivered 51 PhD theses, 5 of them with honors.
Direct funding has decreased from 40% in 2009 to 23% in 2014, while research grants and contract research have increased between 2009 and 2014 from 4% to 15% and from 25% to 44%, respectively.

II.3.2 Research Quality

Overall the research quality is very good to excellent (1-2, see II.6). Especially within the primary focus of Alzheimer's disease, the work of Division 1 is very innovative, comprehensive, and important studies have been carried out. Impressively, the whole spectrum from healthy aging (with projects aiming at preventing cognitive decline) to early diagnosis (including very sophisticated biomarkers), cost-effectiveness studies, and pharmacological interventions has been covered. The outcomes of these research projects clearly receive worldwide attention.
In the field of epilepsy, deep brain stimulation projects are producing promising results, while in the field of the sense of hearing and balance, world-leading interventional trials have been carried out. These are evidently smaller fields in Division 1.

II.3.3 Relevance to society

There is no doubt that the work produced in Division 1 is of the utmost relevance to society (1). These research groups not only collect and analyze data from Maastricht, but manage to sustain an extensive network within Europe and produce findings that are important for other non-Dutch societies as well. Great efforts are undertaken to communicate research findings to the community. Given the demographically driven increase of dementia, the relevance to society is excellent.

II.3.4 Viability

Income has remained quite stable over the years. The Committee noticed a shift, though, from direct funding to contract research.
Division 1 has lined up new and very important studies (e.g., Maastricht Study with 10,000 participants) that will allow the research groups to prosper and strive for even more relevant results in the future. Moreover, Maastricht has become one of the most important nodes within the European network in the field of Alzheimer's disease. Given the excellence, enthusiasm, and track record of the researchers in Division 1, the viability is considered as very good to excellent (1-2).

II.4 Evaluation of Division 2: Mental Health

II.4.1 Research quality

The research quality is world class in the area of genetic epidemiology of psychosis. The EU-GE grant to Van Os should yield many insights, even though funding is coming to an end. The embedded statistical support is excellent and the emphasis on design of studies and analysis is rigorous. The work on experience sampling has been highly influential; the benefits of feedback, self-monitoring and PsyMate seem to be emerging. One would like to see a full-blown placebo-controlled RCT of these interventions in patients with clinical psychosis. There did not seem to be substantial innovation in other forms of therapy. The N=1 paradigm is at early stage and it is hard to see how well results can be generalized or disseminated into treatment algorithms. It might be desirable to have more clinical psychology input into systematic psychological therapies and investigation of what the effective ingredients are.

The work on environmental factors such as social exclusion and childhood trauma has had a major influence on thinking. However, the population attributable risk is debated. There is a noticeable lack of emphasis on the brain mechanisms of vulnerability. This is addressed in part by neurobiological investigations such as the interesting work on stress, glutamate and dopamine interaction in psychosis proneness. The attempt to understand neurobiological mechanisms in adolescent at risk mental states (ARMS) in adolescents and their response to therapy is laudable in ambition and it is to be hoped that recruitment will be successful. The 22q11 studies and muscarinic M1 studies are interesting in their own right and collaboration with centers of imaging expertise should continue. Neurobiological publications are perhaps not as numerous as they could be. The future direction of these studies needs clarification. Overall, the Committee considered the quality as very good and in some areas world-leading (1-2).

There appears to be a considerable load of PhD supervision with few 'full-time equivalent' staff. However no problems with the quality of supervision have emerged.

II.4.2 Relevance to society

PsyMate is engaging the public and users in managing their psychological health. The User Research Centre is an excellent initiative in involving people with lived experience in defining their own research agenda and presumably the design and implementation of other studies. The Division lead has elicited a national and international debate on the nature of schizophrenia and psychosis. Overall the relevance is excellent (1).

II.4.3 Viability

The productivity and innovation of the division is undoubted in the areas mentioned. The committee had some concerns about trends regarding viability. Starting from a high baseline in 2009, i) FHML scientific staff within division 2 has declined from 7.2 to 4.3 fte and ii) research grant income has dropped by 60%. Over the same period, contract income has increased by 200%, so that overall income has remained stable. According to the information provided in annex 4 (on which the committee had to base its view), the contract income seems to be mostly made up of a series of very large grants to the head of Division 2, which raised some concerns about the earning power of other group members. The shift in income sources may reflect the explicit strategy to move away from competitive peer-reviewed grant income to health services funding, along with moving away from conventional biological psychiatry to the methodology of "embracing clinical pragmatism". What this means in practice is uncertain to the committee as are the implications for the translational neuroscience ethos of MHeNs. While assuring funding from multiple sources is a sensible strategy, the committee's view is that it is very important to sustain and increase individual peer-reviewed income for career development and scientific quality.

The Disruptive Innovation in Care project was hardly mentioned in the self-evaluation report, but from the oral presentation it appears to be an exciting and highly innovative proposal. Neither the report nor the presentation gave much detail about what kind of care would occur in the new services, how this would be evaluated in a research program and how the project will be funded. Nevertheless, the scientific proposals have been published in a book and the study is likely to take place. The outcome could be game changing and this would promote the viability of the Division, which currently is considered to be very good (2).

II.5 Evaluation of Division 3: Neuroscience

II.5.1 General remarks

Division 3 comprises a total research staff of ~80 senior scientists, post-docs, students, with Dr B. Rutten, a neuroscientist and part-time clinical psychiatrist, at its head since 2012. The Division is engaged in translational and back-translational neuroscience research, aimed at improving the understanding of normal and pathological functioning of the nervous system toward better prevention, diagnosis and treatment of severe neurological and psychiatric diseases. Indeed, several translational research lines of Division 3 have led to significant achievements for the clinics during the 2009-2014 period.

II.5.2 Research quality

Division 3 conducts very good, internationally recognized, translational, multidisciplinary research with an average number of publications in peer reviewed journals increasing from ~130 in 2009-2012 up to 218 in the most recent record. The quality of publications has also increased, and papers are regularly published in high-impact journals. The scientific activity is however very broad since it covers ten research lines. Of these, four have to be distinguished for their very good to excellent quality (1-2, see II.6): neuromodulation (DBS, neurostimulation), neuroepigenetics, neuro(psycho)immunology, and signal transduction. Indeed, these four themes are relevant for the general concept of Neuroplasticity, and they should be the priority research axes. The other themes seem more linked to clinical objectives of departments (neuro-urology, ophthalmology, neuro-otology) affiliated to division 3. Enhanced focus on the four mentioned themes should allow Division 3 to grow towards a world leading position.

II.5.3 Relevance to society

Scientists of Division 3 regularly participate in numerous workshops, meetings for societal target groups, frequently give lectures for public audiences and are invited by various media to inform the public about the progress in neuroscience research and relevant clinical applications. They also have continuous contact with family associations concerned by CNS diseases. Moreover, several innovative clinical tools have been developed, notably thanks to research progress in neuromodulation (neurostimulation), one of the priority translational research domains of the Neuroscience division.

The innovative research conducted by Division 3 (particularly in neuropsychopharmacology and neuro(psycho)immunology) led to 6 registered patents (3 in 2014), and 3 more are ready for registration soon. Valorization activity is therefore very good to excellent, supported by the appointment of a valorization officer within the division since 2013. However, no start-up companies have yet been created from any of these patents, and this should be envisaged for the coming years. Overall, quantity and quality of the societal implications of Division 3 have increased markedly over the last years, and Relevance to society is therefore close to excellent (1, see II.6).

II.5.4 Viability

The priority research domains of Division 3 (neuromodulation, neuroepigenetics, signal transduction, neuro(psycho)immunology) are at the neurosciences forefront, and further focus on them should strengthen the international leading position of the scientists involved. A reorganization of these four priority themes within a Department of Neuroscience - headed by a recognized neuroscientist to promote the continuous development of innovative approaches in close collaboration with world leading groups - should increase the international visibility of the basic and translational neurosciences in the MHeNs School for Mental Health and Neuroscience.

Although direct funding has significantly decreased during the most recent years (-18% in 2014 compared to 2012), numerous external contract research grants have been recently obtained from national and international sources (reaching a total of more than 3.7 ME for 2015) so that Division 3 has successfully preserved its research capacities. Nevertheless, continuous effort should be made not only to maintain but rather to increase external funding to further improve the international visibility of the excellent research carried out by Division 3. In particular, PIs should join European networks, apply to more EU calls, and establish further contacts with the industry. There is very good potential in terms of talent, and this should lead to more success in obtaining (personal) research grants.

Altogether, Division 3 is well equipped for the future (1-2, see II.6), but a more dynamic search of external funds has to be engaged for the maintenance of priority research activities at world leading level.

II.6 Overall quantitative assessment of the school and divisions, including the teaching program

	Quality	Relevance to society	Viability
School of MHeNs	2*	1	2*
Division 1	2*	1	2*
Division 2	2*	1	2
Division 3	2*	1	2*
Teaching program	1	1	1

* * According to the new SEP protocol, the Committee is only allowed to give whole numbers. As indicated in the main text, the Committee considers the scientific quality, societal relevance and viability of the School as a whole and the three divisions in nearly all cases (here indicated by the asterisk) to be very good to excellent (equivalent to 1.5).

II.7 Research training program

The committee considers both the Master's and PhD programs to be outstanding (1, on the scale of 1-4), a real stronghold of the School of MHeNs. The Master program in Cognitive and Clinical Neuroscience is embedded in several faculties and currently knows four very successful tracks and one track that was started in recent years and is rapidly expanding. There certainly is room for a new track in Drug development and Neurohealth. The selection (1 in 2 applicants is admitted) seems to be adequate.

The intended joint EMTN Master's program as a prequel to the EURON PhD program is a laudable effort.

The participation in the other Master's programs is relevant, although the balance between

internships in Maastricht of students from the Master in Biomedical Sciences and those from the Master in Cognitive and Clinical Neuroscience appears to be more biased towards the former than desirable: firstly, it seems preferable to particularly involve those Master students that have made a deliberate choice for Cognitive and Clinical Neuroscience in research projects of the labs; secondly, Master students in Cognitive and Clinical Neuroscience who have not carried out their internship in Maastricht may be at a disadvantage in the future if the intended 1+3 years PhD program materializes.
The Committee was very positively impressed by the education at the PhD level, as well as by the quality, dedication and enthusiasm of the PhD students with whom the Committee interacted. The mean PhD study duration and the low number of dropouts testify to the quality of the program and its students. The TRACK monitoring system is exemplary. The committee met great satisfaction among students with the training program. We noticed that the terms of a thesis (e.g. number of publications) are not always clear and vary from PI to PI. However, this was not perceived as a major problem. Hurdles in the form of ethical permission (both regarding human and animal research) can pose challenges and need attention. The duration of the PhD projects is considered to be short and this would certainly become a challenge in the intended 1+3 model.
The School of MHeNs makes optimally use of its unique location in the close environment of Belgium, Germany and Luxembourg. By joining forces in the EURON program, an international flavor is added to the teaching program that can really be seen as an added value. Due to this international collaboration, the consortium can also successfully compete for international funding. The leadership of the school of MHeNS has secured competitive funding from NWO and the EU.
The Committee is somewhat less enthusiastic about the extensive collaborations with other partners worldwide. While partnerships with universities in Japan, Korea, China and Brazil - to name a few countries - can expand the scientific possibilities of MHeNs and are sympathetic because excellent MHeNs practices are shared with partner institutions, the committee also became aware of potential downsides during discussions with group leaders, PhD students and postdocs. Having so many external PhD students also involves extra work for Maastricht research leaders, who already have a high workload. Furthermore the travel distance is sometimes an obstacle, and having PhD students who cannot speak Dutch can be a hurdle in more clinically oriented projects. Something even raised by the junior scientists is that there are also cultural differences that pose challenges. The committee advises that content-driven reasons should be the main if not only reason to start such international collaborations, rather than increasing the income of the School of MHeNs.

II.8 Research integrity

According to the Committee, the school of MHeNs adheres to the rules and regulations of scientific integrity. Scientists are informed of what is expected from them in this respect. No major issues have arisen over the past years. Students were aware of issues around scientific integrity and plagiarism. Electronic detection of plagiarism in master theses and PhD theses is used. The Committee proposes to let students use the fraud detection software themselves to test their own manuscripts, which will increase their awareness of the issue.

III RECOMMENDATIONS

Below the committee summarizes the most important recommendations. As mentioned before, these recommendations should be read in the spirit of improving a School that is already performing at a very high level.

Quality and research strategy

1. Aim at an integration of the neuroscience part of the Faculty of Psychology and Neuroscience with the MHeNs.
2. Simplify the organizational structure in order to improve governance of the School of MHeNS. This also refers to the naming, which will improve visibility.
3. Clearly focus on the strengths of Maastricht, i.e. i) the research in dementia and psychotic disorders, ii) the approaches of neuromodulation and neuro-epigenetics and iii) the international teaching program.
4. Appoint a full-time professor with a strong track record in integrative neuroscience to head the department of neuroscience. Such a person would also be a natural choice to head Division 3.
5. Ensure that every senior staff member is actively engaged in seeking grant support, especially looking at major personal grants, such as at the Vidi, Vici, and the ERC program.
6. Engage in clinical trials with regard to drug development and take advantage of new collaborations with pharma industry.
7. The number of tangible products, spin-off companies and public-private partnerships can be brought to a higher level.
8. Regarding the variable income of the School: Move from an incentive system based on the number of PhD theses to a system partially based on additional KPI's.
9. Motivate the Ethics Committees to substantially decrease their response time.
10. The animal facility building is on its way. This project should indeed be expedited.
11. Formally involve patients and care professionals in the design and implementation of research projects and specify their involvement in clinical grant applications.

MHeNs education and training of young researchers

12. Have organized discussions between promotor and PhD student or postdoc to talk about career plans.
13. Let students use the fraud detection software themselves to test their own manuscripts.

IV ANNEXES

Annex 1 - Short Curriculum Vitae Members ERC MHeNs

Professor Marian Joëls (Chair)

Since 2009, Professor Marian Joëls (1956), biologist, is (full) professor of neuroscience at the University Medical Center Utrecht, the Netherlands. Currently she is scientific director of the Brain Center Rudolf Magnus. Her research focuses on the effects of stress in the brain. With patch clamp technology, she studies how corticosteroid hormones change cellular function of limbic neurons. This is linked to the underlying molecular mechanism and the consequences at the circuit level. As a final step, the effects of stress on functional connectivity and behavioral outcome are studied, both in rodents and humans. In her work, she pays particular attention to the influence of stress during early life and the result of prolonged periods of stress in adulthood. The relevance of such critical periods of stress -in interaction with a vulnerable genetic background- for the development of brain disorders is investigated in various patient cohorts. Her work was published in >275 publications and to date has been cited >15,000 times. Marian Joëls was elected as a member of the Royal Netherlands Academy of Arts and Sciences in 2002. She served as President of the Federation of European Neuroscience Societies between 2012 and 2014.

Professor Bill Deakin

Professor Bill Deakin (1949) graduated in Medicine at Leeds University in 1973. He took an extra year in his training to obtain a 1st in Physiology and this excited his interest in neurobiology and the organization of behavior. He specialized in Psychiatry and joined the Clinical Research Centre at Northwick Park, London to further his training and worked on his PhD at the National Institute for Medical Research, Mill Hill. He was a MRC Training Fellow for 5 years. His PhD investigated how distinct 5-HT (serotonin) neurone pathways in the rat brain have different functions in regulating adaptive, coping responses to stress. Bill moved to the University of Manchester as Senior Lecturer in the early 1980s to continue 5-HT research but in clinical experimental medicine with volunteers and patients with depression, anxiety and antisocial behavior. Bill's group developed ideas about the role of glutamate in schizophrenia at first from studies in human post-mortem brain.
Bill Deakin heads Neuroscience Research in the Division of Psychiatry. An important focus of his group is to use modern imaging techniques to directly visualize 5-HT and glutamate working in the brain. Patients and volunteers lie in a magnetic resonance imaging scanner and the images show which parts of the brain respond to drugs chosen to probe 5-HT or glutamate functioning and how it performs mental tasks. The group can show, for example, that a single dose of an antidepressant drug lights up areas of the brain concerned with anxiety responses and turns off other areas concerned with memory in healthy volunteers. Professor Deakin is also the experimental medicine lead of the UK Mental Health Research Network, a National Institute for Health Research Senior Investigator and a Fellow of the Academy of Medical Sciences. He has over 200 refereed publications and an H-factor of 60.

Professor Michel Hamon

Michel Hamon (1946) is Professor (emeritus) of Neuropharmacology at the University Pierre and Marie Curie in Paris (France). He has created and directed for 24-years (1985-2008) an INSERM unit devoted to 'Neuropsychopharmacology' at the Faculty of Medicine Pitié-Salpetrière, and is now in the Center for Psychiatry and Neurosciences at Ste Anne psychiatry hospital. Professor Hamon's research interests and expertise include molecular and cellular mechanisms of action of psychotropic drugs and development of relevant preclinical models for their study. He is also involved in studies on

pathophysiological mechanisms underlying chronic neuropathic pain and sleep-wakefulness disorders. He is associate member of the French Academy of Medicine, past president of the French Société des Neurosciences (1999-2001) and of the French Association for Biological Psychiatry and Neuropsychopharmacology (2010-12), and acted as chair of the Scientific Program Committee of the European College of Neuropsychopharmacology (ECNP) in 2010-12. Professor Hamon contributed to editorial boards of several neuroscience and pharmacology journals, and is still in the boards of the World Journal of Biological Psychiatry, Clinical Neuropharmacology, L'Encéphale, European Journal of Pharmacology and Fundamental and Clinical Pharmacology. He has published over 600 original papers in neurosciences and neuropsychopharmacology and 230 review articles, edited 6 books and has an H-factor (ISI) of 85.

Professor Andreas Monsch

Professor Andreas Monsch (1958) is a neuropsychologist and heads the Memory Clinic at the University Center for Medicine of Aging, Felix Platter Hospital in Basel, Switzerland. He conducts research in the fields of 'Cognition, Emotion and Behavior', and 'Neurodegenerative Diseases'. His current research focuses on preclinical markers of Alzheimer's disease and other neurodegenerative disorders, with a focus on neuropsychological assessment. Andreas Monsch is president of the Alzheimer Forum Switzerland and vice-president of the Alzheimer Association Basel. Furthermore he is an associate editor of the Journal of Alzheimer's Disease and of the 'Zeitschrift für Neurogeriatrie'. Besides the research work at the University of Basel, Professor Monsch also serves as a board member of the Association of Swiss Memory Clinics and of the Swiss Association of Neuropsychologists. In addition, he is a member of several advisory boards of the pharmaceutical industry. Professor Monsch has published over 150 peer-reviewed scientific papers.

Professor Bart Nuttin

Since 2007, Professor Bart Nuttin (1959) is chief of clinic at the University Hospital in Leuven and is responsible for functional and stereotactic neurosurgery. He is or has been member of several national and international societies, currently chairman of the Committee for Neurosurgery for Psychiatric Disorders of the World Society for Stereotactic and Functional Neurosurgery, treasurer of the board of the European Society for Stereotactic and Functional Neurosurgery, president of the Belgian Society for Stereotactic and Functional Neurosurgery, president of the Benelux Neuromodulation Society and member of the Council of the "Europäische Akademie zur Erforschung von Folgen wissenschaftlich-technischer Entwicklungen Bad Neuenahr-Ahrweiler GmbH".
Besides his clinical activities, he is also Coordinator of Research of the Group of Biomedical Sciences, KU Leuven, starting Jan 1, 2013. He is professor ("buitengewoon hoogleraar") and teaches several courses in neuroscience in the faculties of Medicine and FaBeR. He heads the lab of Experimental Functional Neurosurgery, located within the Research Group of Neurosurgery and Neuroanatomy. He was coordinator of the Erasmus Mundus project EMMAPA. He was Ombudsman for PhD students in the Faculty of Medicine KU Leuven and headed the Research Group of Neurosurgery and Neuroanatomy, but stopped both positions when he became Coordinator of Research. He holds (together with Professor Loes Gabriëls) the chair 'Stereotactic Neurosurgery for Psychiatric Disorders', supported by Medtronic Inc. Professor Bart Nuttin has several research contracts with industry, the European Commission, the Research Council of the University, the Flemish Government (SBO) and the "Fonds voor Wetenschappelijk Onderzoek, Vlaanderen (FWO)". He is and has been leading a series of master degree theses and was promoter or co-promoter of 7 successfully finished doctoral theses. He was reviewer for several scientific papers and books. He received 2 awards from the "Koninklijke Academie voor Geneeskunde van België". He has published a series of papers in national and international high impact journals (e.g. Lancet), wrote 2 books and was interviewed 3 times by Nature. He owns or has applied for 4 patents.

Petra Uittenbogaard (Secretary)

In 2007, Petra Uittenbogaard (1974) received a Master's degree in Health Sciences at Maastricht University. After having worked as a quality manager in the St. Antonius Hospital in Nieuwegein from 1997 till 2000, Petra moved back to Maastricht and worked as a policy advisor and organisational consultant in a large organization for care for the elderly in Heerlen, and as a strategic consultant in various health care organizations. In 2002, she was contracted as an advisor to the Executive Board of the academic hospital in Maastricht (azM). Her project portfolio mainly consisted of projects in the field of strategic alliances, academic cooperation with other hospitals and care suppliers in the Maastricht region, organisational development, and projects shared by both hospital and the medical faculty (FHML). Petra has relevant experience in managing the process of (inter)national advisory boards and review committees. In December 2010, Petra was secretary to the External Review Committee on the 2004-2009 evaluation of CAPHRI School for Public health and Primary Care in Maastricht. In November 2008, she was secretary to the International Scientific Advisory Board of CARIM at Maastricht University. From July 2011, she uses her knowledge and experience within her own company.

Annex 2 Site visit program external review MHeNs 2016

Sunday the 17th of January 2016
Location: Kruisherenhotel, Kruisherengang 19-23 Maastricht

17.00 – 17.30 Closed meeting ERC members
17.30 – 18.30 Installation of the ERC by the Dean of the Faculty of Health, Medicine and Life Sciences by Prof. Dr. Albert Scherpbier

Introduction School for Mental Health & Neuroscience by Prof. Dr. Harry Steinbusch (Director)

Overview program ERC

18.30 Drinks and dinner with Dean FHML, Board School
Venue: Kruisherenhotel, Kruisherengang 19-23 Maastricht

Monday the 18th of January 2016
Location: UNS 50, Paarse Zaal, H 1.319 (open meeting for all MHeNs)

09.00 – 09.15 Introduction MHeNs research program by Prof. Dr. Harry Steinbusch

09.15 – 09.45 Presentation Division 1: Cognitive Neuropsychiatry and Clinical Neuroscience by Prof. Dr. Caroline Van Heugten

09.45 – 10.15 Discussion

10.15 – 10.45 Presentation Division 2: Mental Health by Prof. Dr. Jim van Os

10.45 – 11.15 Discussion

11.15 – 11.30 Coffee Break, UNS 50 room 1.142A (MPR)

11.30 – 12.00 Presentation Division 3: Neuroscience by Dr. Bart Rutten

12.00 – 12.30 Discussion

12.30 – 13.15 Lunch, AZM, Terrace middle 4th floor

13.15 – 14.15 Chairman: Prof. Dr. Carolin van Heugten
Division 1 presentations of staff members
Prof. Dr. Robert Stokroos, Dr. Martin van Boxel, Dr. Heidi Jacobs, Dr. Pieter-Jelle Visser, Dr. Rob Rouhl,

14.15 – 15.15 Chairman: Prof. Dr. Therese van Amelsvoort
Division 2 presentations of staff members
Prof. Dr. Therese van Amelsvoort, Prof. Dr. Philippe Delespaul, Dr. Wolfgang Viechtbauer, Dr. Koen Schruers

15.15 – 15.30 Coffee Break, UNS 50 room 1.142A (MPR)

15.30 – 16.30 Chairman: Dr. Jos Prickaerts
Division 3 presentations of staff members
Prof. Dr. Klaus-Peter Lesch/Dr. Daniel van den Hove, Dr. Pilar Martinez, Dr. Gommert van Koeveringe, Dr. Tos Berendschot /Prof. Rudy Nuijts, Prof. Dr. Boris Kramer

16.30 – 18.00 Elevator Pitches– Post-docs and PhD students

16.30 – 17.00 Division 1
Chairman: Prof. Dr. Caroline van Heugten
Marc van Hoof: "A hearing implant as part of the body - from the lab to randomized evaluation"
Stephanie Vos: "Biomarkers for early diagnosis of Alzheimer's disease"
Ron Handels: "Health-economics of Alzheimer's disease"
Willemijn Jansen: "Prevalence of cerebral amyloid pathology in persons without dementia"
Renske Uiterwijk: "Hypertension, cerebral small vessel disease and cognition"

17.00 – 17.30 Division 2
Chairman: Prof. Dr. Jim van Os
Dennis Hernaus: "Under pressure! Elucidating brain mechanisms behind stress-induced symptoms of mental illness"
Catherine van Zelst: "Stigma resilience in people with severe mental illness"
Steven Honings: "Psychotic experiences and violence in the general population"
Esther Van Duin: "22q11 deletion syndrome and neurobiological mechanisms for psychoses"
Uli Reininghaus: Childhood adversity, social stress sensitivity, and psychosis: an experience sampling study

17.30 – 18.00 Division 3
Chairman: Dr. Bart Rutten
Ali Jahanshahianvar: "Neuromodulation & neurotransmitter switching"
Nick van Goethem: "Divergent effects of biased 5HT1A receptor agonists in a novel translational task: Object Pattern Separation"
Mark van den Hurk: "Single human iPSC-cell derived neuron analyses by electrophysiology and RNAseq"
Jo Stevens: "Antibody approaches in neurodegeneration"
Sandra Schipper: "GABA dysregulation in epilepsy incl. In vivo LTP"

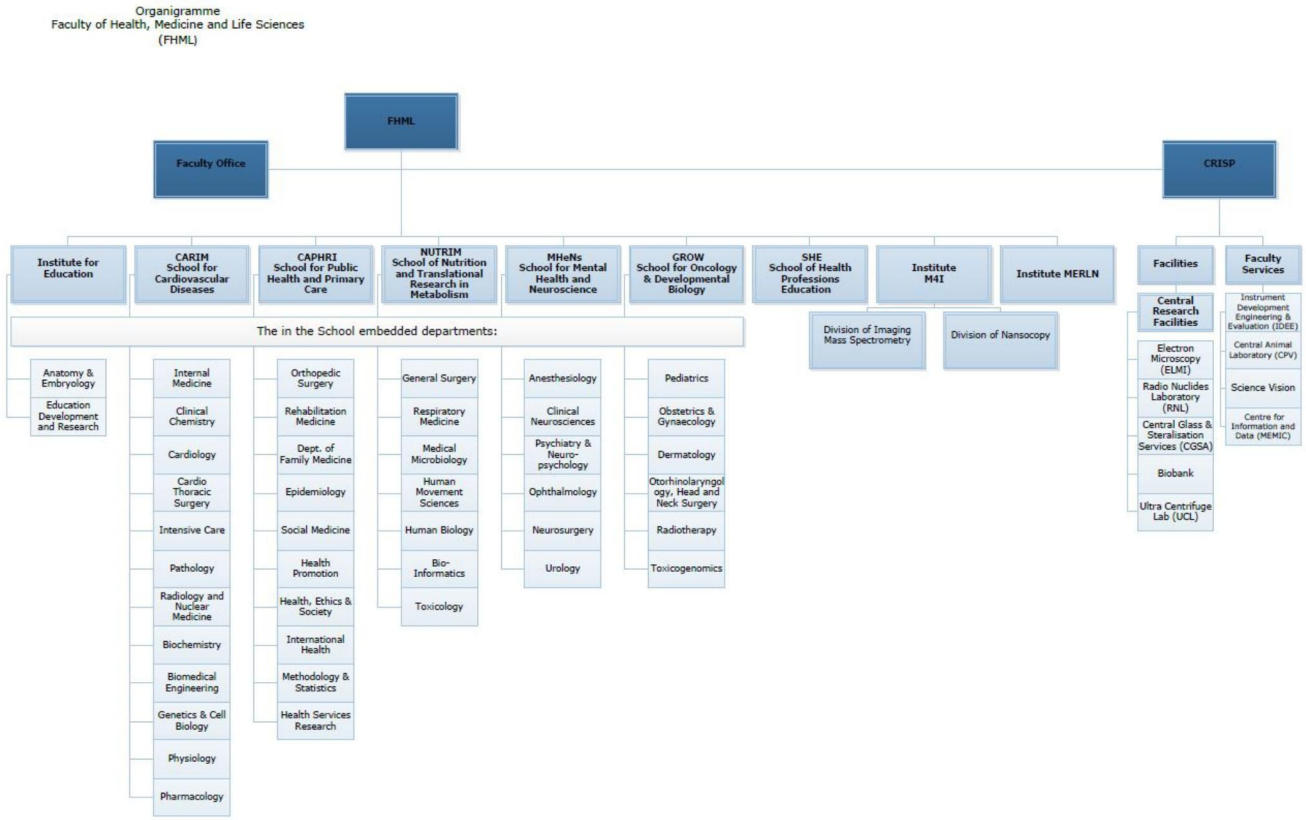
18.00 – 18.30 Closed meeting ERC

19.00 Diner
Venue: Crown Plaza Hotel, Ruiterij 1, Maastricht.

Tuesday the 19th of January 2016
Location: 2.N2.023 Lambert van Kleeftoren

09.00 – 09.50	Presentation MHeNs Master and PhD Education Master
09.00 – 09.10	Affective Neuroscience, Dr. Koen Schruers Research Master Cognitive and Clinical Neuroscience
09.10 – 09.20	Specialization: Psychopathology and Neuropsychology: Dr. Nancy Nicolson
09.20 – 09.30	Specialization: Fundamental Neuroscience: Dr. Jos Prickaerts
09.30 – 09.40	UM PhD program and Track System: Dr. Nancy Nicolson
09.40 – 09.50	International programs: Double and Joint PhD programs and EMTN: Dr. Nicole Senden
09.50 – 10.20	Coffee Break
10.20 – 11.20	Interviews: Staff members, selected by ERC board
11.20 – 12.20	Interviews: Representatives of post-docs/PhD students
12.20 – 13.20	Lunch
13.20 – 14.20	Embedding School MHeNs--> MUMC+ Prof. Dr. Albert Scherpbier, Dean of the Faculty FHML Prof. Dr. Harry Steinbusch
14.20 – 15.20	ERC members + Prof. Dr. Albert Scherpbier
15.20 – 17.20	Closed meeting ERC
17.20 – 18.00	Feedback to Board and Director School

Annex 3 Organogram Faculty of Health Medicine and Life Sciences and MHeNs



Annex 4 Composition (A) and financing (B)

A Composition: research staff at School level

	2009		2010		2011		2012		2013		2014	
MHeNs	#	fte	#	fte	#	fte	#	fte	#	fte	#	fte
Scientific staff FHML[1]	42,00	15,30	43,00	17,44	43,00	16,75	45,00	16,60	45,00	15,51	45,00	14,97
Scientific staff azM	21,00	4,20	14,00	2,73	36,00	7,22	36,00	7,22	32,00	6,53	32,00	6,53
Post-docs[2]	39,00	23,52	42,00	24,00	39,00	22,83	34,00	19,42	31,00	16,71	39,00	21,51
Internal PhD-students[3]	86,00	43,20	80,00	41,66	86,00	43,86	74,00	38,86	82,00	41,99	85,00	44,19
Total research staff	**188,00**	**86,22**	**179,00**	**85,83**	**204,00**	**90,66**	**189,00**	**82,11**	**190,00**	**80,73**	**201,00**	**87,21**
Support staff (research)[4]	44,00	22,87	48,00	26,37	51,00	27,20	52,00	28,64	48,00	26,77	40,00	20,42
Support staff (managerial)[5]	2,00	1,50	2,00	1,50	2,00	1,50	2,00	1,50	2,00	1,50	2,00	1,50
Total staff incl azM	**234,00**	**110,59**	**229,00**	**113,70**	**257,00**	**119,36**	**243,00**	**112,25**	**240,00**	**109,00**	**243,00**	**109,13**
Total staff excl azM	**213,00**	**106,39**	**215,00**	**110,97**	**221,00**	**112,14**	**207,00**	**105,03**	**208,00**	**102,47**	**211,00**	**102,60**
External PhD-students[6]	77,00	-	90,00	-	103,00	-	111,00	-	125,00	-	149,00	-
Visiting fellows[7]	9,00	-	9,00	-	8,00	-	9,00	-	10,00	-	9,00	-

#: Number of persons active on the School research activities, average MJE (Man-Year Equivalent)

fte: Sum of actual fte-factors (in fulltime equivalents) labeled on the School research activities on 31-dec on any year / average (1) Comparable with WOPI-categories HGL (Professor), UHD (Associate Professor) and UD (Assistant Professor); tenured and non-tenured staff.

(2) Comparable with WOPI-category 'Onderzoeker' (Researcher) (cat. 1,2,3,4), with completed PhD, not belonging to scientific staff

(3) Standard PhD (employed)

(4) All support staff working on research (research assistants, lab technicians, and other support staff not working at the management office)

(5) Support staff working at the School's management office including the scientific director

(6) External PhD (externally or internally funded but not employed)

(7) Visiting fellows are researchers/professors who visit the School for a period of typically one week up to three months to work with Schools staff members

B Financing: funding at School level

Table 2 presents information concerning funding and expenditures of the School. The funding has been described both as the number of fte and in percentages. The School depends financially on (1) direct funding as well as on the acquisition of (2) research grants (obtained in national and international scientific competitions), (3) contract research (EU framework, INTERREG, industry etc.) and (4) other funds from several sources such as sponsorships, revenues from course fees, workshops, training programs, the Health Foundation Limburg, and other industry-related revenues.

MHeNs		**2009**		**2010**		**2011**		**2012**		**2013**		**2014**
Funding	*fte(5)*	*%*	*fte*	*%*	*fte*	*%*	*fte*	*%*	*fte*	*%*	*fte*	*%*
Direct funding[(1)]	37,04	35%	42,40	38%	44,20	39%	43,71	42%	34,95	34%	31,72	31%
Research grants[(2)]	12,56	12%	12,80	12%	10,98	10%	7,89	8%	8,32	8%	10,85	11%
Contract research[(3)]	37,77	36%	42,97	39%	40,37	36%	41,04	39%	44,06	43%	43,25	42%
Other[(4)]	19,02	18%	12,81	12%	16,59	15%	12,40	12%	15,14	15%	16,78	16%
Total funding	**106,39**	**100%**	**110.97**	**100%**	**112,14**	**100%**	**105,03**	**100%**	**102,47**	**100%**	**102,60**	**100%**
Expenditure	*k*E	*%*	*k*E	*%*	*k*E	*%*	*k*E	*%*	*k*E	*%*	*k*E	*%*
Personnel costs	6.605	68%	7.214	75%	7.515	76%	6.639	71%	6.665	72%	6.984	74%
Other costs	3.172	32%	2.446	25%	2.383	24%	2.674	29%	2.560	28%	2.453	26%
Total expenditure	**9.777**	**100%**	**9.660**	**100%**	**9.897**	**100%**	**9.313**	**100%**	**9.225**	**100%**	**9.437**	**100%**

(1) Direct funding by FHML / Maastricht University ('basis financiering' / lump sum budget).
(2) Research grants obtained in national and international scientific competition (e.g. grants from NWO, ZonMw and KNAW).
(3) Research contracts for specific research projects obtained from external organisations, such as industry, governmental ministries, European organisations, including ERC, and charity organisations.
(4) Sponsorships and funds that do not fit the other categories'.
(5) The funding in fte includes the total research staff but excludes the azM-staff.

The table shows a slight shift in the overall funding of the School towards more contract research (42% in 2014 compared to 36% in 2009) and, over the last two years, less direct funding (42% in 2012 compared to 31% in 2014). The majority of the expenditure in the period 2009 – 2014 was related to personnel costs (74%).

Annex 5 Explanation of the categories utilized to review the School for MHeNS

Meaning of categories in SEP 2015-2021

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

Colophon

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