

PhD Success and Quality of Graduate and Research Schools in the Netherlands

Summary of three research projects

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Summary and highlights of three research projects

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Introduction: PhD Success and Quality of Graduate and Research Schools in the Netherlands

This publication summarizes the main findings of a three-year research project on Dutch PhD completion rates and qualitative aspects of Dutch Graduate and Research Schools. The highlights of each of the three sub-studies are conveyed in an account describing the research questions, main findings and observations.

Introduction

In the mid 1980s a few groups of professors and senior officials at the Ministry of Education and Science initiated the establishment of institutes intended to accommodate PhD research and serve PhD candidates in the Netherlands. These scholars and officials were concerned about the slow pace and low rate of PhD completion in several fields of scholarship. They also aimed to provide for the enormous increase in PhD candidates expected to result from the introduction of the new two-tier university structure and the new type of PhD candidates, known as trainee research assistants (AiOs).

This situation was not entirely new in all fields of scholarship. In engineering and natural sciences, for example, efforts to collectivize education and guidance for PhD candidates had already started. After a while these experimental institutes became officially accredited, established partnerships and obtained funding. From that point onward, these original PhD programmes and many subsequent initiatives became known as ‘research schools’.

In 2004, the network now comprised 109 schools that provide education to thousands of PhD candidates through thousands of advisors. The 109 schools average 110 ftes each.¹ Over 8,000 PhD candidates are enrolled altogether.² The schools also coordinate and promote scholarship and research in the Netherlands, involving 12,125 full-time researchers. Only a small share of the estimated number of research positions – about 1,500 ftes of academic staff – operates outside the framework of the schools.³

The study

Since 1987, huge amounts of funding, manpower, creativity and intelligence have been invested in the research schools. Over the course of about a decade, an entirely new educational curriculum was developed, based on models that had become traditions only in Anglo-Saxon environments. The research schools operated with a large measure of discretion, which meant that those running them and administering their funds totalling millions of euros shouldered a very heavy responsibility indeed. How was this freedom utilized, and how were the broadly formulated missions carried out? This question was central in the study started in 2003. That year, following a pilot study by one of the researchers (HS), an investigation was launched to assess the PhD success rate and added value of the research schools. The KNAW [Royal Netherlands Academy of Arts and Sciences]

¹ This average is based on the data for about three quarters of all research schools (N=75).

² We generalized the average we generated of 75 PhD candidates at 87 schools according to the total population of 109 schools: 8,175 PhD candidates.

³ VSNU-KUOZ places the total number of academic research staff at 13,637 ftes.

has assisted with this investigation, and the OC&W [Ministry of Education, Culture and Science] provided funding. The timing of the investigation was very favourable, as there had been enough cohorts to generate sufficient data for determining PhD completion rates and duration. We have calculated that determining an accurate PhD completion rate at most research schools requires waiting until seven or eight years after the start of a cohort, while a comprehensive impression of the results takes about a decade. In addition, balanced judgements could now be rendered regarding the ability of schools to innovate, and foreign evaluation committees – which have issued reports that deeply influenced our investigation – would have an adequate foundation for an internationally comparative judgement.

Formulation of the research question

The objectives examined include:

PhD completion rate

1. an evaluation of PhD success rates at the Dutch research schools
2. a tentative explanation of the PhD success rate described under 1
3. a chart based on the explanation under 2 listing promising measures to continue improving the quality of the research schools

Added value

1. an evaluation of whether the school structure adds value to the constituent parts

The research question in this study therefore comprised two main questions, of which the first concerned the objectives of the study of PhD success rates, while the second aimed to assess the added value:

1. Which factors boost or reduce PhD success at the Dutch research schools?
2. (At which specific points) do research schools and international advisory committees demonstrate in their reports that a research school adds value to its constituent parts?

Theoretical context

In this investigation we examined the PhD success at research schools from an educational and a policy perspective.

Educational perspective

The educational perspective relates PhD success to specific characteristics of the research school that concern the didactical quality of the PhD curriculum and the way this curriculum is accommodated within the research school and its organization, as well as the school's disciplinary background. The school's educational/didactical quality surfaces in the quality of the dissertations and theses, the output of the PhD programme (the percent-

age of incoming PhD candidates successfully completing the PhD programme) and the pace of PhD completion.

Not all educational aspects of the research schools have been covered in this study. Based in part on the material available (as explored in the preliminary study), we focussed on selected specific organizational, substantive and educational characteristics of the schools:

- *organizational characteristics*: organizational level, partnership, range of disciplines structure, student intake, scale, financing, centralization
- *substantive characteristics*: field of scholarship and substantive identity
- *programme characteristics*: educational orientation and programme and guidance structure

Policy perspective

The success of research schools depends both on PhD success and on their research quality and international reputation, as well as the value they add to the situation that existed before the school was established. We have based our examination of these three aspects on two secondary sources, which are of the reports from foreign evaluators about the schools (known as Peer Review Committee reports) and the qualitative evaluations issued about the research programmes at the schools following VSNU (Vereniging van Samenwerkende Nederlandse Universiteiten [Association of Universities in the Netherlands]) visitation procedures.

Sub-study I: PhD completion and time to PhD completion at Dutch research schools.

Oost, H., & Sonneveld, H., PhD completion and time to PhD completion at Dutch research schools.

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Introduction

The first stage of the study (and in this first report) revolved around the percentage of PhD candidates completing the PhD programme within the time allotted. In this first stage of the study, ‘PhD success’ was thus operationalized as an independent variable comprising two sub-variables:

- rate of PhDs completed
- average duration of the pursuit of a PhD

The scores on these two sub-variables could be inferred from the requests for accreditation and re-accreditation that research schools submit to the ECOS (research school accreditation committee). Preliminary research has indicated that while the majority of the schools makes the required data available as requested, in several cases the information is incomplete or gives rise to incorrect conclusions due to methodological omissions. The evaluation of PhD success was therefore preceded by an evaluation of the provision of information about duration and rate of completion. To examine PhD success at the different research schools (operationalized by the combination of the sub-variables ‘average duration of a PhD programme’ and ‘percentage of PhDs completed’), we initially grouped the schools according to several characteristic features (profile variables):

- field of scholarship
- incoming PhD candidates
- financing of PhD positions
- number of PhD positions (filled)
- research capacity

Within each group, we examined whether meaningful differences exist with respect to each characteristic.⁴

⁴ We label differences as ‘meaningful’ here, rather than as ‘significant’. The latter term denotes a statistical reference to the relationship of a random sample of an entire population. Because this study comprises the entire population, we have chosen the more neutral connotation of ‘meaningful’. Also see the technical justification in Annex 3.

Results

We analysed the documents to determine the extent to which PhD completion rates and durations at Dutch research schools correlate with school profile. To this end, we reviewed each school's most recent request for accreditation or re-accreditation, including the related correspondence between the research school accreditation committee (ECOS) and the school in question. In addition to more general and more specific figures on completion rates and duration, the documents analysed comprised data about the school's field of scholarship, the share of different funding sources in financing PhD positions, the number of PhD candidates in the programme and the research capacity. The latter variables (field of scholarship, funding sources and school size) were operationalized in the study as profile variables (with the school profile as the independent variable for the research question in this sub-study).

Although all these data are required by the accreditation committee for the accreditation procedure, schools often fail to supply core data. School size (number of PhD candidates in the programme), average PhD completion rate and average PhD duration were the only useful data that most of the schools supplied. The data that were gathered or missing were then presented to the schools to verify and elaborate. After processing the responses (approximately 30%), in addition to the primary database, we generated two simulated files with estimates for the missing values. We used a regression imputation procedure to generate the first file and an expectation maximization procedure for the other one. We then re-analysed primary data using the completed simulated files. The results presented in this first sub-study are based on the primary database. We have considered the findings based on the simulated files as well in our final evaluation of the research results.

The results from the document analysis indicate that 75 percent of the PhD candidates at Dutch research schools completes the programme and averages longer than five years. Preliminary comparison with the completion rates at Anglo-American institutions reveals that Dutch research schools compare very favourably in this respect, with reported average PhD completion rates among the highest in the world. Our search for factors explaining variances in PhD completion rates and durations at a school has revealed a rather close correlation between average completion rate and the school's field of scholarship. The correlation between average duration and field of scholarship is moderate. The research results also relate a school's PhD completion rate to the source of financing of PhD positions (through direct and indirect government funding and contract research) and school size (inflow, number of PhD positions, research capacity). Counterpoints make clear, however, that none of the variables examined at the Dutch research schools is ultimately decisive in PhD completion rates or durations. Additional investigation is indicated regarding variables that covary with field of scholarship, financing source for PhD candidates and research school size.

Concluding observations

Size: small schools are vulnerable

Fifty schools provided useful inflow data. At least nine accept fewer than ten PhD candidates per annum. These inflow data indicate nothing about the quality of these schools or

about the completion rate in terms of completed PhDs or the quality of the research. In the course of our study, we have reported on this subject based on the reports from the international advisory committees of the schools and the results of the VSNU visitations.

Presumably, however, these nine schools lack the means to offer the desired research and educational opportunities for young, talented scholars. They will certainly encounter problems with their PhD programme format. Lack of critical mass makes offering an affordable and sufficiently varied curriculum virtually impossible. Insufficient inflow will almost inevitably curtail options for PhD candidates or necessitate a highly individualized educational programme. This situation may, of course, change if adjacent faculties obtain accreditation for a two-year MA research programme. Such accreditation will open the door for advanced education offering more options for PhD candidates and will enable a small school to circumvent a few of the disadvantages of small programmes. Some schools have already embarked upon this course.

The nine schools stated above thus have an ominous rate of inflow. About twelve others, with inflows ranging between 10 and 14 PhD candidates, have reason to be concerned about their numbers of incoming PhD candidates over the years. Based solely on the schools for which we gathered information during the first round, only 45 percent of the schools has no reason to worry about the level of new enrolments.

While some schools are too small, others are too large. Completion rates at larger graduate schools in the United States are lower than the ones at their smaller counterparts. Some research schools in the Netherlands are roughly equal in size to the large American graduate schools. Note that these large Dutch schools nearly always avert the relative disadvantages of the large American schools. PhD candidates who enrol at a large Dutch research school are unlikely to become absorbed by a massive educational setting, in which they are forced to manage on their own.

Financing: the benefits of indirect government funding

The new enrolment issue is related to the sources of PhD research funding. In addition to becoming vulnerable because of a small or insufficient number of PhD candidates, schools may become too dependent on a single source of financing, especially direct government funding. In times of financial prosperity, there may be little cause for concern. Cutbacks, however, will jeopardize the inflow of PhD candidates. The risk increases when these cutbacks coincide with a collective bargaining agreement that improves financial arrangements for current PhD candidates.

A breakdown by discipline is useful here. All schools for humanities finance at least half their PhD positions through direct government funding. Two out of three schools for humanities even receive university funding for three quarters of their PhD positions. Schools for humanities are thus ill-equipped to withstand university cutbacks, lacking alternative sources of financing from NOW (the national science foundation) or private sector grants. An entirely different situation prevails in other disciplines. At most schools for natural sciences, engineering and medicine, no more than half the PhD positions are covered through direct government funding, whereas at all schools for humanities and 85 percent of the schools for social sciences, fifty percent is the minimum rather than the maximum level of direct government funding.

In addition to determining vulnerability and educational circumstances, financing affects what might be described as a research school's PhD culture. In our research plan we made a conjecture that the extent to which the PhD curriculum is structured might be an important factor in a school's PhD completion rate. Structuring may be operationalized in many different ways, as we will explain below. One indicator for a structured PhD environment is remarkable here: the extent to which thesis advisors at a school draft and outline PhD research. Our conjecture was that at schools where (future) thesis advisors plan and outline PhD research themselves, completion rates will be higher. Project-based PhD culture – and consequently structuring – thrives at schools that frequently apply for and obtain NWO grants. All applications for NWO grants require extremely detailed research proposals, of which most will be written by the project managers or thesis advisors (although this is not the case at all schools!).

We have also examined whether a school's completion rate corresponds with its sources of funding. More specifically, do schools that finance a larger share of their PhD positions through indirect government funding and contract research have higher completion rates than schools that depend primarily on direct government funding?

A positive correlation has indeed been identified between the share of PhD positions with indirect government funding and the average completion rate. Conversely, a negative correlation exists between the share of PhD positions with direct government funding and the average completion rate. Although the correlations identified are not very close, this observation is cause to examine how PhD research is organized at the respective schools. PhD positions funded as contract research hardly explain the variance in completion rates ($r^2 = .01$). Although contract research is highly project-based, the expectations of external principals might slow the course of PhD research. We have reconsidered this hypothesis later in the study.

Completion rates: schools make a difference

In this first report, PhD completion rate has been defined as the number of completed PhDs expressed as a percentage that reflects the ratio between incoming candidates and those departing with PhDs.

About 60 percent of the Dutch research schools discloses the average PhD completion rate; either because these schools report an average completion figure, or because they provide data for calculating this figure. We were unable to determine an average completion figure for 40 percent of the Dutch research schools.

The data available indicate that the average PhD completion rate at Dutch research schools varies widely, ranging from 30 percent to 97 percent. The average completion rate for Dutch research schools is about 75 percent.

Average PhD completion rates are final figures, as mentioned above: they reflect a percentage that will increase over the years, until the last successful PhD candidate in a cohort leaves the school. Changes in completion rates, however, should not be interpreted as final figures. Understanding the changes in completion rates requires examining annual growth figures, revealing both how many years elapse for a school to achieve the completion rate reported, and how this completion rate evolves over these years (gradually or by fits and starts, distributed or concentrated). At Dutch schools completion rates rise from an average of 43 percent after four years to an average of 77 percent after nine

years. After four years, the completion rate is still rather ‘premature’. Very few PhD candidates complete the PhD curriculum in the Netherlands within four years.

Based on the correlation between average completion rates and cohort-specific rates, we have concluded that – at least for the group examined – the completion rates after eight years (i.e. the completion rate for the cohort eight years ago), best indicates the average for the schools concerned. A valid assessment of a school’s PhD completion rate – to relativize potential extremes – requires considering the results for PhD candidates entering in three separate academic years at least eight years ago.

The initial research results reveal a clear profile of a research school with an above-average completion rate (Box I.1).

Research school with a completion rate of 90 percent or higher

Such a school could possibly be a school for social sciences or medicine but is more likely to be a school for natural sciences or engineering. The school finances about 45 percent of the available PhD positions through direct government funding, 35 percent through indirect government funding and the remaining 20 percent through contract research. Each year twenty new PhD candidates enrol to maintain the number at approximately 85 PhD candidates. The total research capacity exceeds 100 fte.

Box I.1. Profile of a research school with a completion rate of at least 90 percent.

With respect to the schools with the highest scores, counterpoints are inevitable. Some schools for social sciences perform better than average and some for natural sciences and engineering worse than average; some schools finance most of their PhD positions through direct government funding and only a small share through indirect government funding and are nevertheless among the top scorers; some small schools do well, and some large ones do not. The vast differences in completion rates for schools in a similar academic or social niche has made our central premise clear ‘that schools make a difference’, and that there is little cause to argue that changes in completion rates are determined by discipline.

PhD durations: continuous gains

Sixty-five percent of the Dutch research schools provided data about the average PhD duration at that school. Based on these data, the average duration ranges from 48 months (4 years) to 86 months (over 7 years). The time spans reported by the schools suggest that the average PhD candidate needs about 5 years to complete the programme in the Netherlands.

Compared with the average PhD duration reported ten years before the request for re-accreditation, schools have reduced the duration by about twenty percent in the course of six years: ten years prior to the request for re-accreditation the average PhD duration was nearly 75 months. This duration has been dropping steadily to an average of nearly 60 months four years before the request for re-accreditation.

While PhD duration correlates closely with the field of scholarship concerned, the average durations reported for a PhD in different fields of scholarship are within a year of each other. The schools for natural sciences report an average PhD duration of less than

five years (58 months). Next, in order of completion speed, are those pursuing PhDs in medicine (averaging 1 month longer than their counterparts in natural sciences), engineering (averaging 3 months longer), social sciences (averaging 8 months longer), and humanities (averaging nearly 12 months longer).

We also examined the correlation between PhD duration and – consecutively – inflow of PhD candidates (no correlation), financing source for PhD research (low positive correlation with direct government funding, low negative correlation with indirect government funding, no correlation with contract research funding), number of PhD candidates (low negative correlation) and research capacity (low negative correlation).

Research school with a PhD duration less than 4 ½ years

The school is specialized in natural sciences or possibly in medicine or engineering. The school finances about 55 percent of the available PhD positions through direct government funding, 25 percent through indirect government funding and the remaining 20 percent through contract research. Each year fifteen new PhD candidates enter to maintain the enrolment at about 90 PhD candidates. Total research capacity is approximately 140 fte.

Box I.2. Profile of a research school with an average duration of less than four and a half years.

In this study ‘PhD success’ is operationalized as a combination of completion rate (i.e. the percentage of PhDs completed) and duration (i.e. the number of months between start and completion). The question did arise as to whether the average duration reported correlates with the average completion rate reported. Such a correlation has indeed been identified: in the 47 requests for re-accreditation higher average PhD completion rates coincide more frequently with a shorter average PhD duration and vice versa. The correlation between these variables is rather close ($r = .50$).

Sub-study II: Foreign peer reviewers about the quality and added value of Dutch research schools. An analysis of Peer Review Committee reports

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Introduction

This report has conveyed the results of the second sub-study conducted for our research project on PhD completion rates and the added value of Dutch research schools.

This second progress report has been based on an analysis of eighty reports by international Peer Review Committees, evaluating 75 Dutch research schools. (Two reports were provided for five of the schools.) The eighty reports have been drafted as part of the request for re-accreditation that the schools submit to the Erkenningscommissie Onderzoekscholen [Research school accreditation committee] (ECOS) of the Royal Netherlands Academy of Arts and Sciences (KNAW). Peer reports are part of the material the schools submit to the ECOS once every five years. Peer Review Committees are therefore expected to substantiate their evaluations of:

1. quality of the research at the school
2. quality of the PhD programme (including PhD completion rate and PhD duration).

In the next step, based on the evaluations at 1 and 2, the committees advise about:

3. re-accreditation of the research school.

The material that the Peer Review Committees provide is truly exceptional. Over three hundred eminent scholars from 23 countries have generated over one thousand pages altogether, expressing carefully considered opinions about the attributes of Dutch research schools. In no other design would researchers have the courage to ask such a large, select group of known scholars to examine a Dutch research school in depth and subsequently write up their assessment of several quality aspects. Although the design was never formulated or developed in such a manner, this bold plan was indeed carried out. The ECOS gathered the data. The Ministry of Education, Culture and Science (OC&W) and the KNAW enabled us to process, analyse and interpret the data.

The objective of this policy-oriented study was to provide systematic disclosure of the opinions drafted by Peer Review Committees and to convey an integral impression of the quality and added value of Dutch research schools, as they are perceived by foreign evaluators. We were particularly interested in quality assessments, in which the foreign Peer Review Committees judge the research and the PhD programme of the Dutch research schools. In addition, we tried to gauge the potential added value that the Peer Review Committees attribute to the Dutch research schools (compared with the period before the schools existed).

In our presentations of – largely qualitative – analyses, we focused within the boundaries of our research question on the frequency of the subjects addressed by the committees. These aspects are listed in Table II.1.

Table II.1. Subjects and the number of Peer Review Committee reports in which they are addressed (N=80).

Subject	Freq	Perc
International status	72	90.0
Internal partnerships	69	86.2
Research quality	66	82.5
Research management	65	81.2
Interdisciplinary nature of school	60	75.0
Added value of school	58	72.5
PhD theses (total)	56	70.0
PhD support and evaluation	53	66.2
Inflow of PhD candidates	51	63.6
PhD education	50	62.5
Central administrative capacity	48	60.0
Career prospects for PhD candidates	30	37.5
PhD theses (quality)	26	32.5
Completion rate	24	30.0
PhD duration	24	30.0
PhD theses (output)	23	28.7
Completion rate / duration of PhDs (statement)	18	22.5
Completion rate / duration of PhDs (recommendation)	17	21.2
PhD theses (support and evaluation)	13	16.2

Overall, the Peer Review Committees focus primarily on matters concerning the organization of scholarship, the international status of the schools, their added value with respect to the previous situation and research quality. These Peer Review Committee reports, in addition to their vast wealth (and disorder) of data about the quality of the research and the PhD programme, address two broader issues: means for effectuating academic research and the persistence of old views and customs.

Results

Many Peer Review Committees assess the value that the schools add to the scholarly research and education of the PhD candidates. They compare the present situation with the one that existed before the schools were established.

The scores are highest in two areas: (1) the opportunities the schools have created for inter-disciplinary and in many cases national partnerships between researchers and (2) the role of schools in educating PhD candidates. The Peer Review Committees regard this national and interdisciplinary nature of the schools as one of the most important attributes

of the Dutch network of research schools. These attributes include, in their view, promoting interdisciplinary contacts (academic cross-fertilization), coordinating research nationally (averting research overlaps) and preserving Dutch scholarly expertise in specific fields through *economies of scale*.

The Peer Review Committees praise the quality of the research performed. This favourable evaluation coincides with a positive assessment of the international reputation.

Evaluations of the PhD programme are somewhat more varied. Here, the favourable evaluations range from satisfaction to enthusiasm. In addition to praising the quality of instructors and students, the ambience at the schools, the flexibility of the organization and the highly customized approach (tailoring the programme to match individual PhD curricula), the committees regularly expressed concern about the narrow scope of the course selection, the testing procedure, and the certification.

The foreign evaluators assigned the lowest scores to Dutch research schools for central administrative capacity. In over 85% of the reports, this field appears as an area of concern, criticism or in great need of reinforcement. A remarkably large share of the committees has recommended greater financial leverage for the schools to cultivate or support new lines of research. They advocate funding toward research investments and exploratory programmes, as well as for start-up and incentive grants.

Twenty-two percent of the reports state explicitly that the research school serves as an international model. The chief arguments have already been listed: national partnerships, interdisciplinary partnerships, generating sufficient critical mass and – one not previously mentioned – the strong integration between research by staff members and education of new talents.

Observations: The viability of graduate and research schools

This study has consistently been based on the premise that the research schools exist. This assumption is less obvious than it might appear, given the achievements described by the schools. The current situation is as follows:

- Some schools no longer exist.
- Some schools exist but no longer wish to undergo the ECOS accreditation procedures.
- Some schools exist but no longer wish to be accredited by the ECOS.
- Sections have seceded from some schools.
- Some schools are still being established.
- Some schools are the result of a merger between two pre-existing schools.

From this perspective, the system of research schools is highly dynamic. In the period 1999-2004 major changes occurred at 21 schools. Two schools changed from multi-university schools to mono-university schools. Nineteen schools lost their accreditation. Thirteen were multi-university schools, while six were mono-university schools (Table II.2).

Table II.2. Number of research schools losing accreditation in the period 1999 – 2004.

Structure	Subsequent operation	Freq
Multi-university	Continued ⁵	7
Multi-university	Discontinued	6
Mono-university	Merged with new school	2
Mono-university	Continued	1
Mono-university	Discontinued	3

Generally, the number of multi-university schools has declined slowly but steadily since 2000 (ca. 10%). The number of mono-university schools has remained virtually the same. (Table II.3)

Table II.3. Number of accredited research schools between 1999 and 2004, according to structure,

	Inter-university	Intra-university
1999	78	31
2000	82	32
2001	80	30
2002	76	31
2003	76	31
2004	74	31

Schools in jeopardy

The foundations of several schools have become tenuous. In our first report we discussed numbers of incoming PhD candidates and academic staff. Assuming that schools derive their primary *raison d'être* from the PhD programme they offer, then seventeen schools are below the critical enrolment of forty PhD candidate positions. At six schools, the research staff amounts to less than fifty ftes. In our view, the existence of these seventeen schools, especially the last six, is tenuous.

Factors other than the annual inflow of PhD candidates and academic manpower may jeopardize the survival of research schools. Based on the documents analysed, we have obtained the indicators stated in Table II.4.

Table II.4. Indicators of risks to the survival of a research school.

Variable	value
Annual inflow of PhD candidates	Too small
Research capacity	Insufficient
PhD completion rate	Too low
PhD duration	Too long
Financial base	Too shaky
Central administrative capacity	Insufficient
External support ⁶	Not enough
Financial leverage	Too little
PhD programme	Lack of structure
Internal partnerships	Insufficient
Involvement of academic staff	Insufficient
Visibility of the school as such	Insufficient

⁵ The PhD programme still exists at two of these schools.

⁶ Especially faculty deans and Executive Boards.

Based on the data from our first sub-study, combined with the remarks from the Peer Review Committees and our own observations, a few schools have insufficient incoming PhD candidates each year, need to counter scepticism and lack of support from faculty deans and Executive Boards, have insufficient administrative clout and lack financial leverage. In such cases member involvement is likely to dwindle rapidly (these schools are unable to reward excellence in research or safeguard the research time of academic staff), and the survival of these schools becomes tenuous.

Indications of viability

We have attempted to distil a draft review framework from the research results to determine the quality, health or viability of research schools (see Table II.5).

Table II.5. Review framework for evaluating the viability of research schools (draft).

Variable	Minimal value
Annual inflow of PhD candidates	10 PhD candidates
Research capacity	50 ftes (incl. PhD candidates)
PhD completion rate	75%
Average PhD duration	5 years
Source of funding	25% indirect government funding (with at most 50% through direct government funding)
Central administrative capacity	Administrative and financial resources to reward diligent, productive academic staff (incentives for new scholarship), to compensate academic staff involved in the PhD programme (count contribution as teaching credits) and to provide encouragement grants toward developing (PhD) research throughout the school. Standardize admission criteria and make applicable to academic staff; central, periodic evaluations of academic staff.
External support	Commitment and support, including financial assistance, of the faculties and universities that have teamed up to establish the school
Financial leverage	Budgetary support for 5 to 10 PhD positions a year (depending on school size), for which researchers working together from different parts of the school devise the contextual framework
PhD programme	Supported by instructors working together from the constituent parts of the school, broadly based, commitment-oriented, providing full certification and credentials. Recruitment and regular progress evaluations of PhD candidates, in which both the thesis advisor and involved co-workers at the school figure.
Internal partnerships	Serious partnerships of academic staff and subdivisions in education and research
Involvement of academic staff	Sufficient
School visibility	Sufficient

Our hypothesis is that the variables from the review framework generally correlate with the research school's continuity. As the score of a school drops (below the lower threshold value), its viability diminishes. Although we generally expect such cohesion, how the different variables need to be weighed is unclear. Some schools are very small, have few academic staff and do not meet the ECOS accreditation criteria (at least 10 new PhD can-

didates per annum). One might think, also with regard to the review framework, that these schools face serious risks, and that their continuity is questionable. Careful review indicates that several of these schools produce world-class research, while they also have excellent PhD completion rates and are a cohesive community. This teaches us to be cautious about basing our final assessment on a limited range of variables.

Sub-study III: PhD success at the Dutch research schools. Concluding a triptych.

Sonneveld, H., & Oost, H., PhD success at the Dutch research schools. Concluding a triptych.

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Introduction

This report is the provisional conclusion to a triptych about Dutch research schools.

In this third and final stage of the research, we have considered measures that might boost PhD completion rates at the research schools. To this end, we have tried to provide a tentative explanation for the PhD completion rates described and thus to extrapolate a few promising recommendations. As a result, the two most important questions arising from this concluding study are:

1. *Which factors have improved PhD completion rates at research schools?*
2. *What remains for research schools to do to increase the school's PhD output and to reduce the average PhD duration at the school?*

In answering these questions, we selected a group of schools from the population of Dutch research schools and asked the research directors at these schools to join us on our quest to determine how research schools accomplish their objectives. We concluded with intensive, candid conversations with nineteen research directors or their deputies about the success and failure of the research schools.

Results

Labour market and supply of suitable candidates

Before relating the PhD completion rates at a research school to specific characteristics of that school, we needed to investigate whether the output depended in part on external factors that the school was not in a position to influence. Two of these external factors appear in the surveys as well: the demand for PhD recipients on the job market and the supply of suitable prospective PhD candidates. The idea was that a lack of good candidates might lead to incoming PhD candidates who were less likely to succeed, while poor employment prospects for PhD recipients might extend the amount of time candidates spent in the programme and increase attrition rates.⁷

⁷ This last idea is inspired by Bowen & Rudenstine (1992), who attempt to explain a substantial drop in completion rates between two sets of PhD candidates (1962–1966 and 1967–1971): “It is surely no coinci-

Regarding the *supply of suitable candidates*, the data that the research schools have provided suggest that while the supply of PhD candidates may be cause for concern, the incoming foreign PhD candidates have not led to serious qualitative problems. While several schools report that in the past they tended to accept less suitable candidates when good ones were unavailable, they also admit that they have learned through trial and error and prefer not to accept any candidates than to accept inferior ones.

Otherwise, *labour market prospects for PhD recipients* in the Netherlands appear to be so good that a negative impact on the PhD output and the time required for completion is imperceptible virtually everywhere. The exception in this respect is History, where in a few sub-disciplines unfavourable labour market prospects have extended the time that candidates take to complete their PhDs. High labour market demand has a minor impact in cases where PhD candidates nearing the end of the programme try to combine completing their PhD thesis with a new job they have started. The process is often delayed as a result.

Labour market prospects are not to be confused with *career prospects*. While most fields of scholarship do not report unemployment among PhD recipients, it remains unclear how often PhD recipients progress to permanent research positions (via post-doc positions). Additional research will be necessary to shed greater light on these issues.

Central administrative capacity

After establishing that neither the labour market nor the supply of PhD candidates appears to have any noticeable impact on PhD completion rates at the research schools, we considered a hypothesis that has become increasingly prominent over the past two years: *the central administrative capacity hypothesis*. A school's central administrative capacity may be manifested, according to the Peer Review Committees (Sonneveld & Oost, 2005), through methods for directing PhD curricula, recruiting PhD candidates, monitoring progress toward the PhD and guaranteeing the quality and guidance of PhD candidates. The hypothesis was that a research school's central administrative capacity correlates directly with that school's PhD completion rate.

Reviewing the records and interviewing school administrators appears to confirm this general hypothesis. Scores are indeed higher at schools where PhD research is project-based and recruitment of PhD candidates centralized, and where the progress of PhD candidates is centrally monitored. (While central supervision of guidance quality would appear important as well, the schools with lower scores differ little in this respect from those with higher scores.)

Still, the central administrative capacity hypothesis clearly needed to be adjusted at least. In too many cases, schools with *superior scores* pursued a *laissez-faire* policy in the stated areas of direction. This unlikely combination of *laissez-faire* policy and PhD completion rates seems attributable to elements that exert *external pressure* on the quality and progress of the PhD curriculum. This pressure activates processes that compensate for the lack of central direction. Obliging PhD candidates and thesis advisors to come forward

dence that this rather abrupt drop in completion rates occurred at almost exactly the same time that labor market prospects for academics deteriorated markedly. As academics jobs became more difficult to obtain, some graduate students in the arts and sciences no doubt elected to change their career plans, thus increasing Attrition rates" (p.110).

and present their plans and findings to external evaluators appears to benefit the progress and quality of PhD work enormously. Likewise, the overall guidance improves when somebody looks over the shoulder of the PhD team to supervise progress. We observed such elements at all the schools with superior scores that maintained a *laissez-faire* policy. Projects were conducted on commissions from external grant providers and principals; colleagues and external reviewers evaluate the PhD plan; external members serve on recruitment and evaluation committees; the drive to publish is strong, and peer-reviewed articles provide the foundation for the PhD thesis; PhD candidates present their plans and results at platforms within and outside the school; independent PhD coaches and mentors support PhD candidates and oversee the PhD curriculum.

Based on these findings, we have rejected the central administrative capacity hypothesis and have replaced it with a new hypothesis: ‘a research school’s PhD completion rates correlate directly with a carefully devised combination of central administrative capacity and external pressure.’ Exactly what this mix should (or can) be remains to be elaborated.

Perception of PhD completion rates

The third theme in this investigation was how schools and their administrations perceived PhD completion rates. We wanted to know how the administrations of the schools interpreted the PhD completion rates achieved there. Which factors do they believe come into play? How important do they consider each of these factors to be? And do they agree with each other? Or do they express pronounced differences of opinion? If they do, how do they reach these different views? Do they relate to the disciplinary background of the schools? Or to the level of the output?

The survey results speak for themselves. Thirteen of the eighteen factors are described by the respondents as correlating largely or entirely with the PhD completion rates at their schools. These include *social context factors*, such as the supply of PhD candidates, *institutional context factors*, such as recruitment of staff and PhD candidates and quality control, *factors related to school culture*, such as research vision, the effective quality control and the commitment of staff members, *educational factors*, such as coordination of curriculum, ambience and education and, above all, *guidance-related factors*, such as agreements between advisor(s) and PhD candidates, timely and articulate formulation of the research problem, the nature of the guidance relationship and the amount of time that thesis advisors spend with PhD candidates.

Views on three factors are qualified: reputation, educational mission and didactical approach. These factors are believed to relate in some respects – but not in others – to PhD completion rates.

And the respondents believe that two factors correlate ‘more indirectly than directly’ with PhD completion rates: the number of PhD positions funded through research institutions (rather than through universities or contract research) and the alleged attractive force of the labour market.

Concluding observations: the Dutch PhD in international perspective

In the section below we consider the position of Dutch PhD candidates and PhD programmes from an internationally comparative perspective, based on four pioneering studies that disclose information about the PhD system at Anglo-Saxon institutions and, to a more limited degree, in several European countries: Bowen & Rudenstine (1992), Martin *et al.* (2001), Sinclair (2004) and Sadlak (2004).

Finances and status

Dutch trainee research assistants are doing very well, compared with their counterparts in several other countries. They are paid well, and PhD candidates receive several years of stable financial support and virtually always have access to the facilities associated with employment (e.g. a work station at the university) but to which their counterparts in the United States or the United Kingdom have no entitlement whatsoever. Unlike in the United States, for example, Dutch trainee research assistants need not engage in other revenue-generation activities that are part of the reason why PhD curricula take so long to complete.

Costs of pursuing a PhD

Conducting an international comparative study of the cost of the average Dutch PhD study is worthwhile. While PhD completion rates are good in the Netherlands, Dutch PhD candidates are probably among the most costly in the world (Euro 183,000 – Euro 194,000 per trainee research assistant, including reduced pay arrangements after their appointments lapse). One alternative is the English distinction between the stage of the PhD curriculum at which PhD candidates are primarily being educated and are therefore students (and eligible for funding for those being educated) and the stage at which PhD candidates publish and produce and thus contribute to university output (and as such become eligible for research funding).

Full-time versus part-time appointments

In the Netherlands trainee research assistants hold full-time appointments. Trainee research assistants appointed for less than 0.8 ftes are exceptional. Unlike in other countries, Dutch universities recruit (too) few PhD candidates interested in working part-time while they work on their PhD thesis. Using the present opportunities for flexible financing arrangements for this category might alleviate the concern on the part of the minister regarding the number of PhD candidates and PhDs (cf. the memorandum from the Ministry of Education, Culture and Science, *Onderzoekstalent op waarde geschat*, October 2005).

Educational scope

Compared with the Anglo-Saxon model, the Dutch PhD program focuses heavily on individual PhD research. While their American and Australian counterparts receive a wide range of compulsory coursework, Dutch PhD candidates take a far less broadly-based approach in pursuing their doctorates. As a result, their work is customized and reflects a relatively high output (strength) but also a restricted focus and limited professional ex-

perience (weakness). Aside from the limited scope of the programme, some Peer Review Committees have mentioned another problem with respect to professional experience. Dutch PhD candidates tend to have little teaching experience, compared with their American counterparts, who work extensively as *teaching assistants*. (This gap is easily filled through assigning PhD candidates to work in the MA and BA programs more frequently.)

Educational model

In the Netherlands, PhD education and research are integrated. In the Anglo-Saxon tradition, PhD research is undertaken after a two-year program. Especially in the United States, this linear, Anglo-Saxon model is regarded as a major cause of problems with yields. From this perspective, the integrated Dutch model may be regarded as a response to a suggestion from Bowen & Rudenstine (1992, p. 283) for resolving 'American' linearity problem:

[We] suggest seeking ways to encourage students to begin to engage the reality of serious dissertation-related research during their first and second years, so that the transition from traditional course-work to intensive original research is less abrupt and paralyzing for many students (p. 283).

Compared with their American counterparts, Dutch PhD candidates get off to a flying start. They often apply for projects that have already been outlined, and their education is dedicated to pursuing their own research from the outset.

Publication culture

One significant difference with respect to American and English PhD practices is that many Dutch PhD candidates are pressured by their surroundings and encouraged by their thesis advisors to publish in recognized, international journals while pursuing their PhD degree. To meet the prevailing publication standards, academic staff are heavily and increasingly dependent on the publications drafted in the course of PhD curricula. This pressure to publish and the corresponding culture are a structuring force and set standards that may guide the central direction of the PhD curriculum and benefit its quality and progress.

Research environment

Like the English, the Dutch aim to evaluate the quality of the research environment and the researchers with whom PhD candidates interact. Accreditation and re-accreditation procedures in the Netherlands presume that the education and research quality are inextricably linked within the program. Excellence in research is considered to be a *sine qua non* for young researchers to thrive. In England this view prevails as well, and according to the current trend only programs rated with a 4, a 5 or a 5* in national research evaluations are used for educating PhD candidates. The system in the Netherlands has not yet reached this stage.

Yield and duration

In reference to the summary above of the first sub-study, please note that Dutch research schools compare favourably with respect to *completion rates* at Anglo-American institu-

tions in international terms. Except for the yields from the schools for humanities (which conform to global trends), average yields within the field of scholarship of the schools concerned are among the highest PhD completion rates in the world. Comparing durations is more complicated. No differentiated figures have been presented to reflect candidates exceeding the time allotted for a PhD curriculum (excess : time available). In the Netherlands this rate varies depending on the discipline, averaging 20% at schools for natural sciences (9.8 months), 22% at schools for medicine (10.5 months), 27.5% at schools for technology (13.2 months), 37.5% at schools for social sciences (19.8 months) and 44% at schools for humanities (21.5 months). These excesses of the prescribed periods are rightly a subject of concern among policy makers, although a preliminary general review reveals that the average excesses in the Netherlands are certainly not greater causes for concern than in other countries.

Bibliography

- Bartelse, J. (1999). *Concentrating the minds. The institutionalisation of the graduate school innovation in Dutch and German higher education*. Dissertatie. Utrecht: Lemma.
- Berger, J., & Jonge, J. de (2005). *Rendement verkend*. Beleidsgerichte studies Hoger onderwijs en Wetenschappelijk onderzoek, nr. 116. Den Haag: SDU.
- Blume, S.S., Dijstelbloem, H., Spaapen, J.B., & Wamelink, F.J.M. (2000). *Balans en flexibiliteit. De functie van onderzoekscholen in het universitaire bestel: opleiding, onderzoek en organisatie*. Beleidsgerichte studies Hoger onderwijs en Wetenschappelijk onderzoek, nr. 71. Den Haag: SDU.
- Bowen, W.G., & Rudenstine, N.L. (1992). *In pursuit of the PhD*. Princeton: Princeton University Press.
- Budd, J. (2002). The long haul. *The Guardian*, September 3.
<http://education.guardian.co.uk>.
- Carnabuci, G. (2005). *A theory of knowledge growth. Network analysis of US patents, 1975-1999*. Dissertatie. Amsterdam: Amsterdam University Press.
- Dinham, S., & Scott, C. (1999). *The Doctorate: Talking about the Degree*. Sydney, University of Western Sydney.
- DOC Promovendi (2000). *Kengetallen Universitair Onderzoek*. Utrecht: VSNU.
<http://www.vsnu.nl>.
- Elgar, F. (2003). *PhD Degree Completion in Canadian Universities*. Halifax: Dalhousie University (Department of Psychology). <http://is2.dal.ca/~dts/research>.
- Goldberger, M.L., Maher, B.A., & Flattau, P.E. (Eds.) (1995). *Research Doctorate Programs in the United States: Continuity and Change*. Washington, DC: National Academy Press.
- Hazeu, C.A., & Spangenberg, J.F.A. (1991). *University Research Performance: Measurement, Management and Optimization*. Beleidsgerichte Studies Hoger Onderwijs en Wetenschappelijk Onderzoek, nr. 25. Den Haag: SDU.
- Hoffius, R., & Surachno, S. (2006). *Tussen wens en werkelijkheid: carrièreperspectieven van jonge onderzoeker. Eindrapport*. Leiden: Research voor Beleid.
- Hogan, T.D. (1981). Faculty research activity and the quality of graduate training. *Journal of Human Resources*, 16, 400–415.
- Hout, J.F.M.J. van (1988). *Onderzoekers in opleiding. Een verklaringsmodel voor problemen van promotie-assistenten en assistenten in opleiding*. Dissertatie. Nijmegen: IOWO.
- Hulshof, M., Verrijt, A., & Kruijthof, A. (1996) *Promoveren en de arbeidsmarkt: ervaringen van de 'lost generation'*, Beleidsgerichte Studies Hoger Onderwijs en Wetenschappelijk Onderzoek, nr. 43. Den Haag: SDU.
- Kehm, B.M. (2004). Developing doctoral degrees and qualifications in Europe: good practice and issues of concern – a comparative analysis. In: J. Sadlak (Ed.). *Doctoral Studies and Qualifications in Europe and the United States: Status and Prospects*.
- Kehrhahn M., Sheckley B. and Travers N. (1999) *Effectiveness and efficiency in graduate education*. Paper presented to the 39th Annual Forum of the Association for Institutional Research, Seattle WA, 30 May-3 June.

- Latona, K. & Browne, M. (2001). *Factors Associated with Completion of Research Higher Degrees*. Higher Education Series, 37. Sydney: University Graduate School.
- Martin, Y.M., Maclachlan, M., & Karmel, T. (2001). *Postgraduate Competition Rates*. Occasional Paper Series. Canberra: Department of Education, Training and Youth Affairs (Higher Education Division).
- Meijer, M. (2002). *Behoud Talent! Een rapportage over de verschillende aspecten die een rol spelen bij de begeleiding van promovendi*. Utrecht: LAIOO.
- Mintzberg, H. (1989). *Mintzberg on management. Inside our strange world of organizations*. New York: The Free Press.
- Moffat, L.K. (1978). Departmental characteristics and physics PhD production 1968-1973. *Sociology of Education*, 51, 124-132.
- Oost, H. (1999). De kwaliteit van probleemstellingen in dissertaties. Een evaluatie van de wijze waarop vormtechnische aspecten van probleemstellingen worden uitgewerkt. Dissertatie. Utrecht: WCC.
- Oost, H., & Sonneveld, H. (2002). *De Nederlandse Onderzoekscholen: analyse van promotierendement en meerwaarde*. Onderzoeksvorstel. Utrecht/Amsterdam: IVLOS/ASSR.
- Ostriker, J.P., & Kuh, C.V. (Eds.) (2003). *Assessing Research-Doctorate Programs: A Methodology Study*. Washington, DC: National Academy Press.
- Parry, S., & Hayden, M. (1994). *Supervising Higher Degree Research Students: An investigation of practices across a range of academic departments*. Canberra: Australian Government Publishing Service.
- Rupp, J. (1997). *Van oude en nieuwe universiteiten. De verdringing van Duitse door Amerikaanse invloeden op de wetenschapsbeoefening en het hoger onderwijs in Nederland, 1945 – 1995*. Den Haag: Sdu Uitgevers.
- Sadlak, J. (Ed.) (2004). *Doctoral Studies and Qualifications in Europe and the United States: Status and Prospects*. Bucharest: UNESCO/CEPES.
- Seagram, B., Gould, J., & Pyke S. (1998). An investigation of gender and other variables on time to completion of doctoral degrees. *Research in Higher Education*, 39 (3), 319-335.
- Sinclair, M. (2004). The Pedagogy of 'Good' PhD Supervision. A National Cross-Disciplinary Investigation of PhD Supervision. Canberra: Department of Education, Science and Training.
- Sonneveld, H. (1997). *Promotoren, promovendi en de academische selectie. De collectivisering van het Nederlandse promotiestelsel*. Amsterdam: Amsterdam University Press.
- Sonneveld, H., & Oost, H. (2005). *Buitenlandse beoordelaars over de kwaliteit en meerwaarde van de Nederlandse onderzoekscholen. Een analyse van Peer Review Committee rapporten*. Beleidsgerichte studies Hoger onderwijs en Wetenschappelijk onderzoek, nr. 112. Den Haag: SDU
- Sonneveld, H., & Oost, H. (2006). *Het promotiesucces van de Nederlandse onderzoekscholen. Afsluiting van een drieluik*. Beleidsgerichte studies Hoger onderwijs en Wetenschappelijk onderzoek, nr. 123. Den Haag: SDU

- Whittle, J. (1994). A model for the management of research degree supervision in a post-1987 university. In O. Zuber-Skerrit & R. Ryan (Eds.). *Quality in Postgraduate Education*. London: Kogan Page.
- Wright T., & Cochrane, R. (2000). Factors Influencing Successful Submission of PhD Theses. *Studies in Higher Education*, 25 (2), 181-195.
- Zuber-Skerrit, O. & Ryan, Y. (Eds.) (1994). *Quality in Postgraduate Education*. London: Kogan Page.
- Zuber-Skerritt, O., & Knight, N. (1986). Problem definition and thesis writing. *Higher Education*, 15, 89-103.