MASTERING RESEARCH

A STUDY ABOUT THE EFFECTIVENESS OF RESEARCH MASTER PROGRAMMES IN THE NETHERLANDS

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For Eva, Florian and Max

Preface

One day a comparative study might be conducted about *prefaces* of doctoral theses. I suspect that the words *road, long, hard,* and glad that it is over will stand out. This thesis is no exception. My initial interest in doing a Ph.D. began in my wonderful Leiden years. For example, in the dusty working room of Professor Willem Otterspeer in the attic of the old and beautiful academic building in Leiden where we met with only three other History of Universities students. My interest developed further during my internship at the University of Aarhus, but it took some time before I really started this project.

You cannot start a fire without a spark according to Bruce Springsteen. That spark came several years later when I started working for the new Dutch Accreditation Organisation (NAO), a melting pot of all types of higher education: from the academic world, universities, universities of applied sciences, the inspectorate of higher education and the private higher education sector. As a young professional this was a unique environment to learn more about the other 'species' and quality assurance in general, and after a couple of years I was assigned as a programme manager to coordinate the assessment of the new research masters. The board of NAO and especially its president, Dr. Karl Dittrich proposed that I should with his encouragement start a Ph.D. project about the effectiveness of these research masters. I am very grateful that they gave me this opportunity. I was introduced to Professor Marijk van der Wende of CHEPS and she asked Dr. Don Westerheijden to be the co-supervisor. Both of them, as only excellent Ph.D. supervisors do, made it possible for me to excel, not only because of the hours they spent on guiding me and discussing drafts and discussing about the wider world of higher education, but most of all by encouraging me to 'Keep Calm and Carry on'. Under their guidance I visited and presented papers at inspiring CHER conferences in Dublin, Pavia and Reykjavik and got to know Ph.D. peers at the CHEPS Ph.D. summer school in Vilnius. During the last half year of my part-time sabbatical, Don supervised me in a very polite and humorous yet decisive way to the end.

Working full-time and writing a Ph.D. is something that my beautiful wife would discourage anyone from doing. As in most cases she is right. After the Nederlandse Accreditatie Organisatie (NAO) (later the Nederlands Vlaamse

The final words are traditionally for my nearest and dearest. Although it deprived you of much quality time, it is thanks to your encouragement that I finished this thesis. In the evenings there was always some little man who came out of his bed to my desk to ask when they finally could buy the book in the Drvkkery (a wonderful bookstore in Middelburg). 'Cool dad, that you are writing a book, goodnight!', kept me going all through the night. And my wife Eva whom I've loved for more than a decade now: Danke schön für Alles, und ich hoffe, dass wir eine lange Zeit von unserem Haus am See genießen können, und *wenn ich so daran denke, kann ich es eigentlich kaum erwarten* (Fox, Peter, 2008).

Middelburg, June 2016.

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Chapter One *Introduction*

1.1 An innovation in research training: the research masters initiative

The introduction of the bachelor and master system, as part of the Bologna Process, at the beginning of the 21st century changed European higher education. This affected in particular the higher education systems that changed from a one-tier to a two-tier system of bachelor's and master's degree courses. In the Bologna Declaration a system was agreed upon based on two main cycles: undergraduate (1st cycle) and graduate (2nd cycle). The second cycle should lead to the master and/or doctorate degree as in many European Countries. After almost one and a half decades it has become clear that the speed of implementation differs between countries (Witte, 2006; McCoshan, Witte and Westerheijden, 2010). For the countries In some countries the operation was mostly cosmetic. In other countries, however it significantly changed the structure and the content of the programmes and placed the education task of higher education systems in the spotlight and created opportunities for new policy initiatives for the knowledge society as well. One of these initiatives, launched in 2003, is the research master's degree initiative in the Netherlands. The research master is a new type of two-year research-oriented programme aimed to prepare more students in a better way for the profession of researcher, both in academia as well as outside academia in public and private research institutions (Ministry of Education, 2003b). According to the assessment framework of the NVAO, research master programmes distinguish themselves from 'regular' academic master or taught master programmes by having a stronger orientation on research, a longer duration of two years (120 EC instead of 60 EC), selectivity (both faculty and students are selected on academic achievements and skills), and a greater emphasis in the curriculum on training of research skills. More precisely the document states that:

Research master's programmes differ from taught master's programmes on the following seven criteria (NVAO, 2011, p. 5) with some small improvements in the text:

> 1–Completion of the programme should qualify to enter a Ph.D. track and positions requiring research competences and experience beyond the level that can be expected on the basis of the usual link with research conducted within academic higher education.
>
> 2– The research nature of the curriculum can be demonstrated, for example through comparison with a regular master's programme and through comparative positioning in a national and international perspective.
>
> 3– The programme load represents 120 EC credits i.e. a course duration of two years.
>
> 4–Admission of students, in compliance with Article 7.30b of the Dutch Higher Education and Research Act, is based on criteria for required knowledge and skills that allow applicants to meet the high requirements of and successfully complete the programme.
>
> 5– Both years of the curriculum are characterised by a well-balanced coherence between acquiring knowledge in the academic subject and development of competences in research.
>
> 6– The academic programme context ensures proven quality in research (very good to excellent) and training at the level of advanced research degrees.
>
> 7– The programme is completed with a substantial test of research competence, which can be deemed of scientific value in the academic discipline concerned.

The emergence of the research masters has been framed in the context of the implementation of the Bologna Declaration (European Ministers Responsible for Higher Education, 1999). Another reason why the research master emerged at that particular moment of time in the Netherlands could be the need that was felt in academic and policy circles to reform the Dutch Ph.D. system (what came to be called in the Bologna process the 'third cycle'). Perhaps even more important than the Bologna Declaration for the emergence of the research masters, and its primary aim of providing more and better trained researchers for the knowledge society, is the Lisbon Agenda. European ambitions ran quite high at the turn of the century. The focus of the Lisbon Agenda in 2000 was that Europe would become 'the most

competitive and dynamic knowledge-based economy in the world capable of sustainable economic growth with more and better jobs and greater social cohesion by 2010' (EC, 2000). In order to achieve this goal countries of the EU were encouraged to invest 3% of their gross domestic product (GDP) in Research and Development, which would result in 700,000 extra research jobs in the European Union by 2010. According to the OECD, the Netherlands, like many other countries, did not achieve this goal (Economist, 2010). In 2012, 1.9% of the GDP was spent on R&D expenditures, which was below the OECD average of 2.5% of expenditures of the GDP on Research and Development (OECD, 2013). These high ambitions of the Lisbon Strategy were modified around 2005 and have evolved into the Horizon 2020/Grand Challenges agenda in which a connection between innovation and research was made. The call for more and better researchers, both within the universities and outside academia in corporate R&D institutes has been sounding for two decades now. The search for excellence in Dutch higher education was another reason for the introduction of the research master (Albrecht, Boer & Vervoort, 2004). The egalitarian tradition of the Dutch higher education system was critically discussed for example by members of the Royal Academy of Arts and Sciences (KNAW). A majority of the professors of the KNAW was in favour of selecting students on basis of knowledge, motivation, talent and analytical skills as opposed to simply admitting students because they completed a secondary education degree. Furthermore, less students should be admitted to an academic programme, more students should be deferred to universities of applied sciences and a general entrance exam should be initiated which will all and all lead to a stricter selection at the (academic) gate. Another reason that contributed heavily to the birth of the research master's degree was related to the high dropout rates and time to degree among Ph.D. students in the Netherlands. Finally, an important reason for the emergence of the research master was the policy position of the Dutch universities that master programmes were unequally funded. The Ministry of Education originally (since the academic year 2002-2003) only granted the master programmes in the natural sciences two years of state funding. The master programmes in the arts and humanities and the social sciences only received one year of state funding. With the research masters and some specific master programmes in the field of international law and in the humanities, the universities realized a part of their ambitions to receive two years of state funding for master programmes besides the natural sciences.

Among the countries that introduced bachelor and master programmes, the Netherlands was until recently the only country that differentiates between the taught masters and the research masters. In Flanders this distinction was introduced only in 2013, inspired by the Dutch example. In the UK and the USA there has been a functional difference between taught masters and research masters for much longer. Just like many research masters programmes in the UK and the US, the Dutch research master is highly selective. Whether the introduction of the research master did increase the number and quality of researchers, the intended goals of the Ministry of Education (Ministry of Education, 2003b), is the focus of this study.

1.2 Objectives of this study

The formal departure of the research master can be found in the letter of the Junior Minister of Education, mrs. Nijs, on the 15th of April 2003. The Junior Minister pointed out that research masters would be a new type of academic programmes in the Netherlands that should prepare students for research oriented professions. She stated that research masters would be programmes 'in which the emphasis on doing academic research would be more pronounced than in regular academic master programmes' (Ministry of Education, 2003b, pp.2-3).[1] The intended goals of the research master were 'to train more and better knowledge workers, for both within academia and in the public and private research sector (ibid., p.1). So the intended goals were both to have more knowledge workers as well as better-trained knowledge workers. And not only in the university sector (Ph.D.), but research jobs in het private and public research sector were to be targeted as well.

In past years four research reports have been published to gauge the initial effects of the research master (KNAW, 2007 and 2011; Snijder & David, 2007; NVAO, 2011). The first signs of the reception of research masters in the academic landscape by the university leaders, auditors and faculty were positive. The first round of applications for research programme accreditation showed that ten out of the fourteen Dutch research universities had chosen to introduce this new type of programme, though only in the humanities, life sciences and the social sciences.

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[1] All translations from Dutch-language sources are by the author.

Not many natural science programmes applied for accreditation of research master programmes, the exception being earth sciences. The reason for this was that the natural science departments already had longer master programmes (two years) which already included research-based components. In total 110 out of 155 research masters programmes were initially (2003) approved by the Accreditation Organisation (NVAO). At this time (2015) there are 123 programmes that have been accredited as research master programmes. The Accreditation Organisation and the universities are positive about the high academic standards of the programmes (NVAO, 2011). Professors and students of research masters programmes also have positive reactions about the academic quality of the faculty and the obtained academic skills of the programmes (Visscher, 2011; NVAO, 2011; NSE, 2014). In fact, all reports that have hitherto been produced under the auspices of the various stakeholders involved, generally demonstrate a 'general tone' of comment on the introduction of this policy instrument that is very enthusiastic. Faculty and students are especially positive about the academic quality and the added value of the programmes. However, also some concerns have been expressed in these reports (Snijder & David, 2007; NVAO, 2011; KNAW, 2007; Visscher, 2011):

- The percentage of research master programmes (just over 100) remains small compared to the total number of taught masters (more than 1500).
- The total number of research master students per programme is relatively low compared with the taught master programmes. Data from the Central Bureau of Statistics (CBS) in the Netherlands and the Association of universities in the Netherlands (VSNU) show that the percentage of Research Masters entrants between 2005-2013 was between 3-4% of the total masters population.
- Some argue that the research master programmes are mostly seen as a stepping-stone to the Ph.D. and have the image of a 'proto-Ph.D.-class'. The objectives of the research master are in some cases too narrowly focused on leading to a Ph.D. compared with the need for more researchers in all sectors of the emerging 'knowledge economy'.
- As mentioned before, the absence of natural science research masters (with the exception of programmes in the earth sciences), and only research masters

> in the fields of the arts and humanities, social sciences and life sciences makes the introduction of the research masters incomplete.

Although these reports provided a first overview of the introduction of the research master, there was still much 'unknown territory'. Little was known yet about the immediate effects of this policy instrument to enhance excellence in research training. Also the KNAW criticised the fact that too little information was available about the research master to evaluate whether the introduction of the research master had changed the route to the Ph.D. (Visscher, 2011). Although the focus of the KNAW's report was on success and achievement in the Ph.D. phase, the relationship with the research masters was addressed. It was observed that there was still too little information to answer the question: 'What are the effects of the implementation of the two-year research masters programmes linked to a three-year Ph.D.-programme as compared to the system of a one-year masters programme linked to a four-year Ph.D. programme?' (KNAW, 2007, p. 3).

So the questions that did arise were: To what extent do research master programmes attain their objectives? Do they increase the quantity and quality of young researchers? Do they indeed provide a better preparation for a career in research than taught master programmes do? What are the opinions of the Ph.D. supervisors about the effects of the research master on the first stage of the Ph.D.? And does the research master meet the expectations of R&D -intensive companies and public research institutions outside academia?

This study was undertaken to address exactly these questions. Its main objective is thus to evaluate the effectiveness of the research master. By *effectiveness* is meant (as a temporary working definition) the extent to which the policy instrument was successful in attaining the original goals which were formulated by government authorities or in other words 'did the policy instrument do what it is supposed to do'? (Howlett and Ramesh, 2009, p.171).

A second aim is to contribute to the policy debate about the effectiveness of policy instruments in Dutch higher education and particularly to the debate on excellence and differentiation that emerged at the beginning of the current century, as will be discussed in chapter two. Policy instruments are defined here as (Bemelmans-Videc, Rist & Vedung, 2011, p. 21): 'the set of techniques by which government

authorities wield their power in attempting to ensure support and effect or prevent social change'. Some of the stakeholders see the research master as one of the more successful innovations in Dutch higher education. Is this indeed the case?

1.3 Central research question and research expectations

To evaluate the effectiveness of the research master as a higher education policy instrument, the central research question of this study can be formulated as follows: Do research master programmes reach their intended goals of preparing more students in a better way for research careers?

There are three sub-questions in this central research question.
1) Do research master programmes attract more students to pursue a research career?
2) Are the students that pursue a research masters programme better prepared for a research career compared to students of a taught master programme?
3) Do research master graduates pursue their research careers mostly in academia (Ph.D. programmes) or outside academia in private and public research companies and institutions as well?

The policy context for this research question will be studied in chapter two and three, both in terms of Dutch higher education policy and in an international comparative perspective. The theoretical framework for assessing the effectiveness of the research master as a policy instrument will be discussed in chapter four. In chapter five the research design will be described in terms of a conceptual model including independent and dependent variables.

1.4 The structure of the study

In chapter two the research master in the Dutch higher education policy context will be presented. How does higher education policy in the Netherlands come about? What is the European context of the Dutch higher education policy and what were the most relevant policy initiatives regarding excellence and differentiation?

Chapter three describes what the developments are in research training in the master and Ph.D. level in an international comparative perspective. Chapter four explains the theoretical aspects of researching the effectiveness of policy instruments and agenda-setting in higher education. First the concepts of policy evaluation, effectiveness, policy instruments and agenda-setting will be described. Special attention will be paid to programme evaluation theory which will be of use in the sixth chapter for analysing the introduction of the research master and the assumptions of the various stakeholders. A conceptual model for this study and methodological considerations such as research design, research instruments, data collection and data analysis will be presented in chapter five. In chapter six and chapter seven the empirical findings will be presented. Chapter six analyses the surveys carried out among alumni and a comparison of research orientation of the curricula of the research masters programmes and taught masters programmes. Chapter seven analyses the survey carried out on professorial staff and the perception of research and development managers. Finally, in chapter eight conclusions are drawn and the outcomes of the study are presented, as well as the reflections on the theory and methodology. The chapter ends in the epilogue, where some reflections on the current debate on excellence will be given.

Chapter Two *The Research Masters in the Dutch Higher Education Policy Context*

2.1 Introduction

In this chapter the launch and development of the research masters (RM) will be described and placed in the Dutch higher education policy context. The first section describes how higher education policy in the Netherlands comes about and how the Dutch research system is organised (2.2). In this section the concept of steering is discussed for the first time because it is important to examine the relationship between policy evaluation and the type of policy in terms of the instruments used for policy implementation (steering). The choice of a model of evaluation is related to the type of policy and will therefore be discussed in this section and in chapter four. In the following section the international context of graduate education will be described (2.3). Furthermore, the most recent policy initiatives aiming at excellence and differentiation will be discussed in section 2.4. In the penultimate section of this chapter (2.5) a chronology of the development of the research master will be given, and finally the main quantitative and qualitative developments of the research masters will be discussed in the final section (2.6).

2.2 Higher education policy making in the Netherlands

The relationship between policy innovations and policy instruments used for steering in the higher education subsystem has been studied by several scholars (early examples: Van Vught, 1995; Maassen, 1998). Two main steering models in higher education can be distinguished: the state control model and the state supervising model. According to these scholars, other policy models were interesting variations or combinations of these two fundamental models.

It is important to digress into policy making and models at this juncture, because policy models are associated with the choice of policy instruments (e.g. more regulation in the state control model, or more evaluation and incentives in the supervision model). The type of policy and the instruments may have consequences when we come to choosing the evaluation model (in chapter 4). Moreover, the change of policy models was an issue in Dutch higher education policy since the 1980s, when the ministry consciously started to revise its relationships with the higher education institutions after critical reception of shortening university curricula to four years (Bijleveld, 1989) and budget reduction operations TVC and SKG (De Groot & van der Sluis, 1986; Grondsma, 1988; Maassen & van Vught, 1989), concentrated in the policy paper entitled HOAK, *Higher education: Autonomy and Quality* (Ministry of Education, 1985). With that policy paper, the Ministry of Education endeavoured to move from a state control model to a new approach. In the following section, we will trace the change and put it into the context of policy analysis discussions from the 1980s to the 2000s, i.e. the period studied in this dissertation.

The state control model is related to the rational planning and control model. In its most normative ideal the basic assumptions of this model are that policy making is a rational process in which the objectives can be clearly identified; there is complete knowledge about all policy alternatives and their consequences, and these alternatives are available for the decision makers who make the selection to maximise the attainment of their objectives (Stone, 2012). The probable founding fathers of the model, Banfield and Meyerson, saw it as a theoretically sound model, but one which could not be completely realised in practice (Maassen, 1998). Probably Banfield and Meyers were inspired by the work of Herbert Simon who introduced the bounded rationality theory (Simon, 1957). The decision-making process according to the rational planning and control mechanism (Maassen, 1998, p.4-5):

> also implies the centralisation of decision making and a large amount of control both over the actual choice to be made and over the implementation of the chosen policy (..). The model of rational planning is an approach to governmental steering in which much confidence is put in the capabilities of governmental actors and agencies to acquire comprehensive and true knowledge, and to make the best

decisions (..). When government designs and implements operational policies on the basis of the general model of rational planning and control, it sees itself as an omniscient and omnipotent actor able to rightfully steer a part of society to its own objectives.

The complete opposite of the state control model as described above is the state supervising model. Rather than the state being an omnipotent actor, in this model the state is related to the policy model of self-regulation that has its roots in the cybernetic perspective on decision making. This cybernetic approach to decision making has the basic assumption that all social systems are faced with a great degree of uncertainty concerning possible interfering influences from their environment. Policy makers should not have the control modus as in the rational planning and control model but focus mainly on critical variables within tolerable ranges. 'The state sees itself as a supervisor, steering from a distance and using broad terms of regulation' (Maassen, 1998, p.9). In short, there is much trust that decentralized units can regulate themselves.

The governmental organisations see themselves as referees that allow teams to play (societal groups) as long as they obey the rules of the game. Furthermore, government agencies monitor the system as a whole and evaluate adherence to the key variables that have been agreed upon. Compared to the state control model, the state supervising model is characterized by more trust between government, societal groups and individuals, and is generally more modest in its ambitions. It acknowledges the limits of centralised knowledge and policy alternatives in favour of the steering of decentralized units.

In the world of higher education policy some scholars see aspects of the state control model mainly in higher education systems in continental Europe and the state supervising model in the higher education systems in the Anglo-Saxon world. The main reason for this distinction lies in the creation and public funding of higher education institutions. Historically higher education systems in continental Europe such as those in Germany, the Netherlands and France for example are created and funded by the State (Jongbloed, 2008). Alternatively, in the Anglo-Saxon countries like the United States and the United Kingdom, the role of the state in creating and especially in funding institutes of higher education is much more limited. In the last

few decades many countries from continental Europe have moved more in the direction of the state supervising model, Van Vught argued (1995).

More recent studies about governance and steering in higher education draw on a public management approach to explain steering of higher education systems (Ferlie, Musselin & Andresani, 2009). These scholars argue that the literature on higher education on the one hand is focussed on reforms and decision making of public policies and on the other hand is studying the policy networks (or political regimes) producing these policies. 'Both of these approaches tend to look at higher education as a specific field (..) by contrast the authors state that the transformations experienced in higher education are similar to those experienced by other key public services and can be understood as a redefinition of the role of the nation state in the public generally' (Ferlie Musselin & Andresani, 2008, p. 325). Two narratives can be distinguished to explain the steering patterns in higher education: the New Public Management (NPM) narrative and the Network Governance (NG) narrative. The New Public Management seeks to produce a smaller, more efficient and result-oriented public sector. In the higher education sector some of the following signs might occur:

1) Market-based reforms by stimulating competition for students and research funding between higher education institutions.
2) Development of real prices for teaching fees and research contracts on which trading can take place.
3) Hardening of soft budgetary constraints.
4) Introduction of higher student fees to empower students as consumers.
5) Development of audit and checking systems in research and teaching.
6) Concentration of funds in the highest performing education institutions.
7) Performance contracts between the Ministry and its agencies and the higher education institutions.

NPM was a reaction to the failing of the state control model. The state has control over the higher education institutes but NPM differs by relying more on the market than on state planning and stimulating competition and entrepreneurship amongst higher education institutions.

In the Network Governance Narrative (NG), the state is even less involved. It is more a facilitator, playing more of an influencing and less of a directing role (Ferlie et al., 2009). This narrative corresponds to other aspects of the supervising model. Pollitt and Bouckaert (2011) argue that the contrast between NG and NPM is not that substantial and that there is another 'big model' to explain steering in society by governments, the Neo-Weberian State (NWS). According to Pollitt and Bouckaert, NPM makes government more efficient and 'consumer-responsive' by implementing business-like methods. The core claim of the NWS is 'to modernize the traditional state apparatus so it becomes more professional, more efficient, and more responsive to citizens. In this model 'businesslike methods can play a role but the state remains a distinctive actor with its own rules, methods, and culture' (Pollitt and Bouckaert 2011, p. 22). The third model is New Public Governance (NPG) is which the core claim is not 'business' or the 'state' but that societies nowadays can only be governed effectively 'through complex networks of actors, drawn from government itself, the market sector, and civil society. The emphasis is on networks, partnerships, and negotiated but ultimately voluntary cooperation, not on competition (like the NPM) or enlightened and professional hierarchies (like the NWS), (Pollitt and Boukaert 2011).

For the purpose of this thesis I will stick to the basic distinction as described in the beginning of this section. While these authors show that the reality of public policy-making is more complex, for most of our purposes a simple dichotomy will suffice and in the following I shall therefore focus mostly on the Neo-Weberian model as the opposite of the NPM approach. It is the classical opposition of state and rational planning on the one hand versus market, self-regulation and evaluation on the other. This broad distinction will be sufficient for the link we need to policy instruments. When discussing policy instruments, Van Vught (1995) argues that specific policy instruments have a better fit with a specific policy model. According to him it may be expected that the instruments that are highly restrictive are more easily applied in the policy model of rational planning and control, while the less restrictive instruments are more appropriate in the policy model of self-regulation.

This can be explained by examining the characteristics of the policy subsystem of higher education and specifically the characteristics of higher education institutes

(Clark, 1998). Particularly, four characteristics of the higher education institutions can be distinguished:

1) Higher education institutes are old and have hardly changed during the last centuries. 'The most intriguing and fascinating aspect of the university as an institution is that it still bears the marks of its genetic code. It has rumbled through some eight centuries of history retaining fundamental traits present at its birth. It is the second oldest institution in the western world with a continuous and unbroken history. Only the Roman Catholic Church is older' (Rothblatt, 2006).
2) High level of professional autonomy.
3) The large degree of organisational fragmentation.
4) The large diffusion of the decision-making power. Cohen (1989) states that universities are 'a loose collection of ideas rather than a coherent structure; it discovers preferences through action more than it acts on the basis of preferences'.

The state-supervising model fits better into the context of higher education because its fundamental organisational characteristics are more familiar to this model. The same goes for policy instruments, according to Van Vught (1995, p.42):

> A combination of mildly restrictive policy instruments will be more successful in stimulating innovations in higher education than a combination of extreme compulsive instruments. Compulsive instruments will restrict over the behaviour r of the professional scholars in higher education institutions and, by doing so, create disillusion and apathy, rather than enthusiasm and innovativeness (..) it may be concluded that the instruments of information (responses and messages), the mildly restrictive instruments of authority (certificates and approvals) and the 'give it away' instruments of treasure (transfer and bearer-directed payments) may be expected to be the most effective in the context of higher education.

By enlarging the autonomy of the higher education institutions and by limiting itself to monitoring some 'critical' system variables and to (not too often and not too drastically) adapting some general 'rules of the game', government may find in this model an important approach which may both stimulate the innovativeness of a higher education system and secure its basic values and practices.

From a bird's eye view, the Dutch experience can be identified as a mixture of elements of New Public Management and Network Governance. These two are not to be seen as alternative models underlying efforts to change the modes of coordination, but rather as complementary models or narratives. This means that we will contend that reform was inspired by a NPM narrative mainly, while the 'Dutch polder model' of NG, as it plays out in higher education, still has a role to play, though partly with different parties at the table. At the same time, Rechtsstaat principles have been maintained and were coupled more closely to stakeholder guidance. In other words, the path dependency of the Rechtsstaat and neo-corporatist traditions in the Netherlands deflected and constricted the possibilities to change toward hard NPM– if that was the aim. Whenever the academics had to retreat a few steps from their academic self-management, they found a new manner to maintain some of their influence. In the same way, when the state retreated from traditional forms of control in favour of self-regulation of the higher education sector, it stepped back towards control through different steering manners. There certainly was not a linear movement, but rather an Echternach-like procession, with two steps forward and one step back, or a reverse variant with two steps back and one ahead, and most probably there were side-steps to the left and right as well for each of the parties involved. It remains to be seen whether this reflects an intermediary state of affairs leading to a more or less pure model situation, or whether hybrids of national-specific configurations with NPM, NG and traditional elements will continue to step in this and that direction as a path-dependent procession of reforms (Westerheijden, de Boer & Enders, 2009, p. 125).

Building on this type of insights, a more refined typology of the relation between the state and higher education institutions distinguished five dimensions (de Boer, Enders & Leisyte, 2007):
- State regulation
- Stakeholder guidance
- Academic self-governance
- Managerial self-governance
- Competition for scarce resources.

De Boer *et al.* assume that in each country a configuration of governance is made up of a specific mixture of one or more of these dimensions. In the case of the

Netherlands state regulation did not disappear but a shift has taken place from strong direct regulation towards softer forms of hierarchical control. The state has devolved several tasks to intermediary organisations like the NVAO (Dutch and Flemish accreditation organization), or the committee of *macro-doelmatigheid (macro efficiency)* in higher education (CDHO). At the same time the higher education institutions have received more discretionary room in certain important issues through lump-sum budgeting, ownership over property and buildings etc.

On the other hand, diverse forms of financial incentives were introduced like performance-based funding (completed degrees and funding per student) and more recently (2012) 5% of the macro budget was combined with performance agreements between the Ministry and the institutions and 2% of the macro-budget was allocated to profiling. Competition in especially the research sector was already common ground at the time. Nowadays, the competition for grants from the Dutch Science Foundation (NWO) and European Science Foundation (ESF) is becoming more and more important.

The managerial self-governance has strengthened. The positions of executives and managers have become more and more important. The number of responsibilities and competencies of the central level of the higher education institutions have grown. The Ministry has delegated many tasks to the boards of the higher education institutions but at the same time decisions about academic matters have been centralised as well, like the accreditation system that was set up in 2003.

Academic self-governance has weakened within universities. Representative bodies changed from decision-making bodies to advisory bodies. On the other hand, the academic community plays an important role through educational evaluation boards and the national research programmes (de Boer 2003).

In her dissertation about the adaptations of European higher educational systems in the context of the Bologna process, Johanna Witte describes the Dutch bottom up fashion of policy change. According to Witte (2006), the Ministry of Education has relatively strong capabilities to steer national policy formulation. These steering capacities are tempered for example in the Bologna process because the national problem pressure was low and informal constraints like the egalitarian values in

education. In the Netherlands the Ministry of Education has the authority to launch these policy initiatives but always in close cooperation with the higher education institutes, especially through the associations of universities (VSNU) and universities of applied sciences (VH).

Academic Research structure in the Netherlands

The research master initiative can be better understood if we consider it in the context of the Dutch (academic) research structure. This structure is a complex system of actors, funding mechanisms and interrelations in which one can distinguish actors on four different levels (Jongbloed, 2010). The first level is the Government. The second level are the Ministries. The third level are policy development/funding/intermediary organisations. The fourth level are the R&D performers.

At the governmental level the cabinet is advised by several institutions (KNAW, Scientific Council for Government Policy (WRR), the Advisory council for science, technology and innovation (AWTI) and sector councils. One recently established council at the governmental level, the RWTI (Council on Science, Technology and Information Policy) prepares the decisions to be taken by the cabinet. This advice is based on the work of the high-level council, the CWTI (Committee on Science, Technology and Information Policy) that coordinates the various R&D-related policy agendas of the seven Ministries (Education, Culture and Science; Economic Affairs; Health, Welfare and Sport; Infrastructure and the Environment; Defence). All these Ministries represent the second level of Ministerial mission-oriented co-ordination. The Ministry of Education, Culture and Science for example has for many years two different policy plans and corresponding budgets: one for higher education and one for science (the so-called *wetenschapsbudget*).

On the third level, where detailed policy developments and/or coordination takes place, there is a special role for the Dutch Research Council (the Netherlands Organisation for Scientific Research: NWO). The NWO has an important intermediate role in funding fundamental and strategic research. With an annual budget of approximately 683 million euro in 2014, the NWO is a significant actor in the Dutch Academic Research Enterprise. Other intermediate organisations

between the second level of the Ministries and the fourth level of the research and innovation performers are for example the Royal Academy of Sciences (KNAW). The KNAW is a learned society since 1808 that advises the Government on scientific matters, and oversees a range of national-level research institutes.

The fourth level of research and innovation performers are the Research Universities (14); the universities of applied sciences (39); KNAW institutes (18); NWO institutes (9); and various other institutes (Jongbloed, 2010, adapted from OECD 2005).

In this complex and multi-layered system every actor has its own role to play. The ministries of education and economic affairs set the broad goals of the academic research systems. In past years the Ministry of Economic Affairs and in the background the VNO-NCW (organisation of employers) gained more influence on the academic research agenda. This was something that had been the territory of the Ministry of Education, Culture and Science for many years.

According to Jongbloed two things stand out when analysing the Dutch Academic Research Enterprise over the last 25 years. 'The first is the increased attention being paid over the years to research quality, beginning in the 1980s. Second, in the 1990s there was an increased emphasis on relevance and valorisation. (…) In short, performance has become the key goal in the academic research enterprise, although the meaning of this concept currently is vastly different from its meaning twenty-five years ago' (Jongbloed, 2010, p. 328-329).

An important part of the academic research enterprise is done by Ph.D. trainees (Assistant in Opleiding, AiO's). Approximately 3000 students begin with a paid Ph.D. every year. Besides these paid Ph.D. trajectories there are Ph.D. students without a contract at a University (*buitenpromovendi*). The exact amount of these external PhD candidates is unclear but in 2012 there were 4163 Ph.D. defences and in 2013, 4467, so there must be at least 1,000 to 1,500 external Ph.D. candidates defending their theses every year. In the Netherlands there are 6.6 persons who hold a Ph.D. out of 1000 persons. With that figure, the Netherlands is below the European Union average of 7.5 out of 1000 persons; in the Scandinavian countries this is even 12 out of 1000 (VSNU, 2014). The doctoral system in the Netherlands has been part of a silent revolution for the last three decades (Sonneveld, 2010).

The first stage of the modernisation of the doctoral system took place between 1987-2009 and consisted of the introduction of a system of national and local research schools and graduate schools. According to Bartelse (1999) graduate schools have developed quite diversely across disciplines and countries. Bartelse describes several patterns of acceptance of research schools in various disciplinary areas in the Netherlands. The chemistry research schools in the Netherlands have been established widely (diffusion). On the other hand, he highlights the discipline of law where research schools have been established at a number of locations and not as the expected (re-socialisation). In general, the training programme of Ph.D. students became more structured and supervision became less individualised. On a modest scale external and internal quality assurance was introduced for the research schools (ECOS, 2011). The second stage as Sonneveld calls it took place around 2005, three years after the bachelor-master structure was implemented, with the introduction of local graduate schools embedded in all Dutch universities (VSNU, 2014). These local graduate schools exist alongside the national research schools. 'The essential hallmark of the silent revolution is the sliding of the first phase of the Ph.D. trajectory into the final stage of the master programme, mainly by having (research) master students prepare a proposal for a Ph.D. project (..) This development is supported considerably by NWO (Dutch Research Funding Agency) who started a special subsidy programme for graduate schools who want their potential doctoral candidates to lay the foundation for a Ph.D. in their master programme' (Sonneveld, 2010, p. 2-4).

In 2007 there were 7400 doctoral students who are affiliated with one of the 14 universities in the Netherlands that can award Ph.D. degrees (Bartelse, Oost & Sonneveld, 2007). The number of Ph.D. theses that were successfully defended increased from 2500 in the academic year 2000-2001 to 4163 in the academic year 2011-2012 (VSNU, 2015). While the formal duration of a Ph.D. trajectory is four years, full-time, the completion time is on average 60 months, or five years, for Ph.D. students with an employee status (VSNU, 2015) and the success rate is on average (after seven years) 75% (VSNU, 2015; Oost & Sonneveld, 2004). A strong feminisation of the Ph.D. system has now taken place. After it had been dominated by males for many years, in 2014 there were 52% male and 48% female Ph.D. students (VSNU, 2015). Almost 50% of all Ph.D. students in the Netherlands have a none-Dutch background (Centraal Bureau voor de Statistiek, 2014).

2.3 International context

In the literature on graduate education and especially the connection between the second and the third cycles the body of knowledge on the Ph.D. phase is overwhelming but the master phase is rather poorly represented (Conrad, Duren & Haworth, 1998; Drennan & Clarke, 2009). Finding the actual connection between the second and the third cycles is like looking for a needle in a haystack. For that reason, in this overview, first the state of affairs of the Ph.D. phase will be examined, because most of the literature can be found here and subsequently the masters phase will be discussed, and finally, the connection between the two and especially the role of the master degree in the preparation for a Ph.D. will be looked into.

The Ph.D.
The call for more knowledge workers in the light of the various European and national ambitions (e.g. the Lisbon Strategy) has been one of the focal points of the Dutch government for some time now. The *Philosophiae Doctor* (Ph.D.), seen in many countries and for less than a decade in the Bologna process, as the highest academic degree or even 'the pinnacle of most and any large and complex higher education system' (Altbach, 2007, p. 65), enjoys increasing attention in the debate on the knowledge economy as well, as will be discussed in chapter three. The third cycle has been included in the European higher education area and the qualification frameworks of the European Commission. The specific attention in the Netherlands for the Ph.D. arises from several motives, varying from increasing the number of researchers, or changing the structural embedding, form and content of the research programme, to increasing governmental influence and accreditation, to preventing drop-out and increasing the output of doctorate degrees. Having been an exclusively academic affair for a long time, the Ph.D. now earns great interest from national and supranational governments.

The European ministers' communiqués from Berlin (2003), Bergen (2005) and by the EUA (2005) on doctoral degrees have contributed to the fact that the doctoral degree had become a focus of interest and placed high on to the international agenda (Kottmann, 2011). Studies of CEPES (Sadlak, 2004) and CIRGE (Nerad, 2010a) provide a good overview of the state of affairs of the Ph.D. According to Enders

(2002) the following themes can be derived from these studies: quality assurance, character of the degree, unattractiveness of an academic career, the problem of brain drain, the overspecialised nature of the doctoral phase, the absence of interdisciplinary training and the rise of graduate schools. (Enders, 2002). These themes are partly confirmed by Kehm (2007, p. 308) when she summarizes 'what is generally thought to be wrong with traditional forms of doctoral education and training. Doctoral students are believed to be:

- too narrowly educated and trained;
- lacking key professional, organisational and managerial skills;
- ill-prepared to teach;
- taking too long to complete their doctoral studies or not completing them at all;
- ill-informed about employment opportunities outside academia;
- having too long a transition period between Ph.D. completion and stable employment'.

Even if only half of the problems mentioned by these authors would exist in reality, there is a reason for postgraduate education to be reformed, including, perhaps, the master cycle.

The master's degree

The master's degree is almost as old as the universities themselves (Katz, 2005). The degree was awarded in the Middle Ages as a teaching qualification and awarded in the fields of theology, law, medicine and philosophy. Katz states that the master degree in the beginning of the 20th century has expanded into all areas of education. A special committee of the Association of American Universities described the master degree in 1936 as a research degree, a professional degree, a teacher's degree and a cultural degree (Katz, 2005, p.15). The function of the American master degree in the 1940s was, according to the committee, to serve all four of these objectives.

Today a master degree has to serve two main objectives: first, to prepare the candidate for a career in research. Viewing the Ph.D. as the ultimate research degree, this resonates with the view in the Netherlands, where the former title of the master degree was drs., meaning *doctorandus:* he who will become a doctor. The second objective is to continue professional academic education. In the US

context the second objective is becoming increasingly important, though it is overshadowed by the view of university administrators and faculty that it serves as a consolation prize for not getting a Ph.D., or that it is a second-rate degree (the Ph.D. being the real research degree). Conrad, Haworth and Millar (1993) stipulate that the development of the master degree is, contrary to the view of university administrators and faculty, a 'silent success'. In their view the master degree has experienced a massive change in purpose, content and structure in the US, more specifically, from being a stopping place *en route* to the Ph.D. to a degree of social and cultural distinction. They distinguish three types of master degrees: stand-alone masters; en route to the Ph.D.-masters; and the professional masters. In Europe, this American model, the Y-model, which after the bachelor phase allows the choice of either a masters or a Ph.D. programme, was part of the Sorbonne and Bologna declarations. In the Bologna Declaration the second cycle should lead to the 'master and/or doctorate degree as in many European countries'. The Berlin Declaration (really) has changed the Bologna structure: first a bachelors, then a masters programme and finally a Ph.D. programme (European Ministers Responsible for Higher Education, 2003). With that re-ordering into three subsequent cycles, the US experience is not directly applicable in Europe.

The literature on the masters degree programmes in the United States suffers from at least two limitations (Conrad, Duren & Haworth, 1998). First of all, Conrad et al. state that there is no literature about how students experience their masters programme and secondly, in general, the literature does not award much attention to student perspectives. In their study 'student perspectives on master degrees' Conrad et al. interviewed 800 faculty members and employers of students. They concluded that students' views on master experiences are contrary to the conventional wisdom that it is a consolation prize for not getting the Ph.D. It should not be seen as a consolation prize because 'the majority of students and program graduates viewed their experiences in a much different light than that of the conventional wisdom. (..) Interviewees characterized their master's degree experiences as highly beneficial as learning experiences, as professional development experience, and as leadership experiences' (Conrad et al., 1998, p. 66). Stewart agrees with this statement by arguing that master programmes should be seen as 'the nascent entry degree for employment' (Stewart, 2010). The

master degree has gained recognition in academia as professional education with clear programme outcomes.

In the European context the master degree has been an object of study as well. In a report of the European University Association (EUA) in 2009 the first decade of the second cycle was analysed (Davies, 2009, p.8):

> Master-level provision takes three principal forms. First, taught Master courses with a strong professional development application, available in full-time, part-time, distance and mixed modes. Second, research-intensive Master programmes, many of which are integrated into innovation and knowledge transfer activities and function as pre-doctoral studies for the career researcher. Third, Master-level courses of varying duration delivered mainly to returning learners on in-service, executive release or self-referral bases. There is no reason to assume that patterns of demand will become less varied'.

The more research oriented or intensive master programmes were distinguished by the EUA from other types of master programmes without really describing the differences.

In the European Qualification Framework of 2005 the following qualifications were used for the master level or second cycle degree:

> Qualifications that signify completion of the second cycle are awarded to students who:
> - have demonstrated knowledge and understanding that is founded upon and extends and/or enhances that typically associated with the first cycle, and that provides a basis or opportunity for originality in developing and/or applying ideas, often within a research context;
> - can apply their knowledge and understanding, and problem solving abilities in new or unfamiliar environments within broader (or multidisciplinary) contexts related to their field of study;
> - have the ability to integrate knowledge and handle complexity, and formulate judgments with incomplete or limited information, but that include reflecting on social and ethical responsibilities linked to the application of their knowledge and judgments;

- can communicate their conclusions, and the knowledge and rationale underpinning these, to specialist and non- specialist audiences clearly and unambiguously;
- have the learning skills to allow them to continue to study in a manner that may be largely self-directed or autonomous.

The qualifications of candidates for masters degrees have in common that those who have obtained a master degree are able to develop and apply original ideas, are able to integrate knowledge and can handle complexity, can form judgements on the basis of incomplete ideas and have an ethical attitude. In chapter five these qualifications will be referred to again when Bloom's taxonomy (Bloom, 1956) is utilised to operationalise the different levels achieved between taught master programmes and research master programmes.

2.4 Recent policy initiatives: excellence and differentiation

Just like the proverbial flat Dutch landscape, until the end of the nineties the offer of higher education was based on the equality principle, with access for many and little to no vertical differentiation within the undergraduate or postgraduate cycles. With this, the Netherlands were in step with a number of other countries in Europe (e.g. in Scandinavia, Germany, Central Europe), though not with e.g. France and the United Kingdom, where selection and vertical differentiation have been important principles in higher education for a (very) long time (ITS, ROA & CHEPS, 2015).

Over the last fifty years the participation of students in higher education has increased fivefold in Europe. Fifty-odd years ago, five per cent of the students in an age group had access to higher education, the last decade it has become twenty-five per cent or more (Enders, 2004). Recent OECD data show that 'while some 60% of young adults in OECD countries are expected to enter tertiary-type A (largely theory-based) programmes over their lifetimes, only 3% are expected to enter advanced research programmes. Almost half of young adults in OECD countries will enter tertiary-type A programmes before the age of 25.' (OECD, 2013, p. 290). The results of the massive enrolment are far-reaching. The student population has become not only larger, but more heterogeneous as well, because of

different age, social background etc. This has changed the methods of education, which were mostly based on research-related, individual guidance, into other, more mass-oriented methods. A side-effect was that the opportunities for talented and ambitious students to stand out were inadvertently reduced.

The times are changing. Dutch politicians presently do not just speak of 'higher education for the masses' ('HOVV', minister OCW around 1978). Currently they are of the opinion that encouraging top talent to excel in education and research is a necessary condition for innovation and growth (Ministry of Education, 2003a and 2010). The excellence or differentiation movement in the Dutch higher education can be illustrated with the three peaks that have appeared on the flat landscape (this metaphor was first introduced by professor Reneman when he chaired the committee Topmasters in 2002 saying that Dutch university education stands on a high plateau without any real peaks) over the past ten years: the honours programme, the university college and finally the research master.

The first peaks in the landscape came into existence in the early nineties with the introduction of the honours programmes (Wolfensberger, 2012). Honours programmes are specially developed programmes for high performing students who can and want to do more than required by the regular programme (Wijfels & Wolfensberger, 2004). Usually, they are additional courses, of on average 30 European Credits (EC), on top of the existing programmes of 180 EC. The selection takes mostly place in the first year of undergraduate study on the basis of grades, study progress and motivation. The first informal honours programme was probably created in the 1980s by the Leiden professor of law, Prof. Schermers, which was called 'Mordenate' (more than eight), implying that only students with an average score of eight or higher (on the Dutch scale from 1 to 10) could enter this special programme. Later the honours programmes became more institutionalised. From three honours programmes in the early nineties, the number rose to over 30 in 2003 and by 2012 almost all Dutch higher education institutions and almost all study programmes within them offered some type of additional education for excellent students, often giving about half a year (30 EC) of supplementary credits. The accessibility of the honours programmes remains a focal point. In the Netherlands the selection for honours programmes does not go too much against the 'access for all' axiom because motivation is at least as important as the grades obtained and the pace of study (Wolfensberger *et al.*, 2004).

The Ministry of Education has made agreements with the higher education sector that the number of honours students should be doubled in two years' time from 3.3% to 7% in 2015 (Sirius Programme, 2013). In her dissertation about the impact of honours programmes (Wolfensberger, 2012) professors of honours programmes argue that an important success factor is an involved community of faculty and students, in which academic competencies can be stimulated and in which students have freedom within boundaries. This is different for regular students, who need more structure.

The university colleges are the second hill to appear in the egalitarian landscape. Some respondents saw this as the most important innovation in Dutch higher education of the last twenty years. More specifically university colleges comprise an undergraduate college of liberal arts and sciences, and were the first institution in the Netherlands to select students before they could enter college. This was different compared to the honours programmes where students could join on a voluntarily basis. The concept of university colleges was designed and successfully implemented by professor Adriaansens and is based on selection of gifted and motivated students before admission into higher education, followed by a broad and intensive interdisciplinary and international bachelor's degree programme combined with a collegiate study experience, e.g. with the students living in dorms (van der Wende, 2011 and 2012; UCDN, 2014). The high proportion of international students (30-60%) combined with a 100% English programme was a new phenomenon in the Dutch higher education scene. Adriaansens based the university college concept on his experiences in the United States and had the vision that a collegiate liberal arts and sciences concept would challenge the educational concepts of the Universities (more emphasis on research than on education; lack of context such as class size, contact hours with real professors and guidance in which students could flourish; overspecialisation etc.). University College Utrecht was founded in 1998. Up until 2014, six other colleges have come into being. One is in Maastricht (University College Maastricht), one in Middelburg (Roosevelt Academy), one in Amsterdam (Amsterdam University College), one in The Hague (Leiden University) and one in Rotterdam (Erasmus University College) and University College Twente (University of Twente).

Accreditation reports show far above average study results for the university colleges compared to regular programmes. For example, more than 85% of all students who started the programme completed the bachelors programme in three years as opposed to only some 45% after four years in the university sector in general – excluding, to compensate for the lack of selecting students at entry, students who dropped out in the first year. The university colleges present an effective response to the weaknesses (like high dropout rates), identified at a system level (Reumer and van der Wende, 2010; van der Wende 2012), and by the *Commissie Veerman* in whose report on the further differentiation of the Dutch higher education system, the university colleges were set as an example of good practice (Veerman, 2010).

The rise of the university colleges is to be related to two main dimensions of differentiation (vertical and horizontal). 'The term differentiation signifies a process in which structures or functions develop from a formerly integrated whole' (Huisman, 1995, p.18). Vertical differentiation can be seen as varying degrees of prestige or performance within an integrated higher education system (national or international) and horizontal differentiation can be seen as differences in institutional missions and profiles in institutional missions and profiles (Teichler, 2007; Van Vught & Ziegele, 2012).

The rise of the research master's programmes in 2003, the third peak, also can be seen in the context of the increasing vertical differentiation of the Dutch higher education. As opposed to the other two hills, the research master comprises from the start a large number of programmes across all areas of science and is implemented in ten out of thirteen universities. This development must of course be placed within the current timeframe in which signals of selection and differentiation are emerging throughout society. A survey among a large number of Dutch professors shows that selection and differentiation have gained a more important position within the Dutch academic world (Albrecht, Boer & Vervoort, 2004).

There are many similarities between the honours programmes, the university colleges and research master programmes. All of these innovations select their students, have small classes and dedicated faculty and create a context in which

students can excel. The students rate these programmes more highly (NSE, 2012) than regular master or bachelor programmes. Differences can be seen as well. Although the Ministry of Education has the authority to launch policy initiatives, the excellence initiatives of the university colleges and honours programmes as described above were all taken by the universities (and more specifically by policy entrepreneurs), This was done in a rather bottom-up fashion and were later followed by (provisional) regulation and eventually by (a proposed) adjustment of legislation. The research master was introduced more top-down by the Ministry of Education.

A formalisation of the honours courses and university colleges took place in 2008 when the Sirius programme for the development of excellence in higher education was launched by the Ministry of Education. With an initial budget of € 50 million almost all institutions applied for funding to initiate or extend their Honours programmes (or other excellence tracks) and in two cases to create new liberal arts colleges. Also in 2008 the research universities made an agreement with the Junior Minister of Education to enrol 7% of all students in excellence programmes (Sirius subsidized and others).

With support from the Sirius programme, local policy initiatives did receive wider acceptation because they were recognised by national policies of the Ministry of Education.

One year later the 'Minister stated that the differentiation of the Dutch higher education system had now to be taken seriously, while referring explicitly to the Californian Model as an example' (Reumer and Van der Wende, 2010, p. 4). The committee chaired by Veerman reported in 2010 that the Dutch higher education system needed to be differentiated in three ways: differentiation of the higher education system as a whole; differentiation between institutions; and finally differentiation within the programmes (Veerman, 2010).

Has there been a paradigm shift? We propose that the peaks can be seen as three small steps moving away from the egalitarian higher education paradigm that has been prevalent in the Dutch higher education since at least the 1970s. In any case it is becoming increasingly clear that thanks to differentiation more room has been created to take into account the specific wishes and possibilities in the varied student population.

Compared to the other innovations like the honours programmes and the university colleges, the research master is the first policy instrument to promote excellence and diversity in Dutch higher education initiated by the Ministry itself.

Innovations such as the university colleges were bottom up initiated and were an uphill battle before it became a downhill ride (Tak & Oomen, 2011). The strong resistance at the end of 1990s has even changed into a strong tendency towards a collegiate structure of undergraduate education. For example, the Technical University of Eindhoven has placed all its bachelor programmes in one Bachelor's College (undergraduate college). Other universities and faculties have plans to transform their bachelor programmes into a collegial undergraduate structure. The Americanisation of Dutch higher education (the Dutch academic world and even the intellectual debate has shifted from seeing the German universities as the model to follow towards the Anglo-American universities after the Second World War) as described by Rupp (1997) has come into a next phase. A further phase would be that universities reform all their bachelor programmes into liberal arts programmes, although a lot of water goes under the bridge and resistance will have to be overcome (for example from the humanities).

In the next section the chronology of the research master will be be described.

2.5 Chronology of the development of the research masters

When the discussion about the research masters emerged, the higher education system in the Netherlands was described as a high plain with no peaks (Committee Reneman, 2002). Since that moment one of the debates in the higher education policy subsystem has been how excellence can be stimulated. The following questions will be addressed in the following section: How did the research master come into being? What and why were the reasons for the introduction of the RM?

We present this overview at the beginning of the book to give readers the necessary context. It was, however, an integral part of our research as will be explained in

chapter 4, based on a study of the available literature and reports[2], complemented by five interviews in 2014 and 2015 with stakeholders and observations when I was involved with the implementation of the research masters as a staff member of the NVAO, in the period 2003 till 2008.

Policy context and reasons for the introduction of the research masters

No international treaty has influenced Dutch higher education as much as the Bologna declaration of 1999 (Dittrich, Frederiks & Luwel, 2004; Huisman & van der Wende, 2004). The then Minister of Education signed this declaration with far-reaching consequences (Witte, 2006). The Dutch higher educational system was quickly reformed from a one-cycle system to a two-cycle system. Within the next two years the declaration was turned into legislation and 2002 saw the start of the first bachelors programmes (Witte, van der Wende & Huisman, 2008). This was merely three years after the declaration was signed. Since then, a continuing change is taking place in higher education. Where there were 835 programmes before, by 2013 this had changed into 409 bachelor and 791 master programmes. The transition to the bachelor-master system turned out to be more than a cosmetic change. Programme accreditation was set up to guard the quality of study programmes. A discussion arose about the separation in the binary system between universities and universities of professional education, which eventually took shape in a system of three-year bachelor's (180 ECTS) followed by one- or two-year master (60 to 120 ECTS) at the universities and four-year bachelor (240 ECTS) in some cases followed by a one-year professional master (60 ECTS) at universities of applied sciences.

The introduction of the bachelor-master system in the Netherlands gave rise to research into and recommendations for the variety and length of the academic master programmes in the Netherlands. Within the universities four kinds of master programmes were distinguished: the profession-oriented masters, the domain master, the research master and the 'top master' (Huisman & van der Wende, 2003). The profession-oriented master related to the need in society for professionals with

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[2] Republished with permission from the report the author and colleagues published previously as the *Research Master Review 2007* of the NVAO (Snijder and David, 2007). Some adjustments and modifications are made in the current text.

clear, application-oriented, academic background, such as doctors, lawyers and teachers. The domain master could be a disciplinary or a multi-disciplinary programme that met the demand for academics trained in a specific domain or with a specific direction, for example within the studies of law and economics. The domain master was neither directly profession-oriented, nor was it specifically research-oriented. The research master was introduced by the Ministry of Education as a master programme preparing students for a career in research, both within the university (where the research master functioned as a preliminary stage to the Ph.D.) and outside the university, for example in the research sector of profit and non-profit organisations that required solid research training. Evaluating whether this goal of the Ministry of Education (Ministry of Education, 2003b) of more and better researchers was realised is the main goal of this study. Finally, some universities distinguished between their master programmes by labelling some, selected master programmes for example 'top master', 'prestige master' or 'star master'. The difference between research master and top master was that the former were acknowledged by the Ministry of Education, because they were independently examined by the Accreditation Organisation of the Netherlands and Flanders (NVAO), while the latter were labels applied by the universities themselves. The criteria that the NVAO applied for accrediting research masters were nearly identical to what universities designated as their 'top masters' etc. Both assumed a quality difference in academic level. Eventually in 2010 almost all universities stopped their self-labelled 'top' master programmes because those programmes failed to gain external legitimacy.

Towards the end of the 1990s, discussions started in the Netherlands on the need to incorporate a preparatory track towards Ph.D. within the old 'doctoraal' programmes (which led to an academic qualification equivalent to MA or MSc). One of the first times this issue was explicitly addressed was in the so-called sciences or beta-covenant (agreement on the natural life sciences) of May 1998 (Tweede Kamer, 1998), i.e. a year before the Bologna declaration. In this covenant, agreements were made between the government and six universities (Leiden University, Utrecht University, the University of Groningen, the University of Amsterdam, the VU University Amsterdam and the Catholic University of Nijmegen, which is now known as the Radboud University Nijmegen) on the rationalisation of the number of the natural sciences and mathematics programmes

offered; the need to broaden the enrolment and the need to give more attention to the training of researchers in these areas.

The mathematics and natural sciences programmes – mainly physics and chemistry – were threatened by a constantly decreasing number of students, which created several problems. The costs incurred to maintain all programmes per institution versus the limited number of students were considered too high, the demand of the labour market in strong need of graduates with a science degree could not be supplied, the average age of the teachers in secondary education in these crucial sciences subjects was increasing and it became increasingly difficult to find native candidates for Ph.D. programmes, threatening academic research within these fields. Five years before, a very detailed international comparison of the curricula of physics programmes conducted by the Sengers committee (chaired by prof. dr. J. Sengers), pointed out that Dutch programmes were structurally a year too short (Goedegebuure et al., 1993). It appeared that Dutch students had four years to process the same amount of subject material for which students in the rest of Europe had five years.

The sciences covenant included a proposal to differentiate within the 'doctoraal' programmes between a social track (for general application purposes), a communicational/educational track (mainly aimed at jobs in media and in education) and a research track (a preparatory programme for future Ph.D. students). For the universities and their programmes, it was of utmost importance that the government should agree to extending the length of these sciences programmes by a fifth year, though this last year would not be publicly funded.

After the 1999 Bologna declaration, when the transition to a bachelor-master structure became generally accepted in the Netherlands, discussions resumed on the subject of differentiation within masters programmes, and especially on research tracks. These discussions were boosted and ran parallel with the discussions on the length of the future master's programmes. As far back as February 2000, the KNAW Council for the humanities made a call for the implementation of a 18 months' to two years' research track in academic higher education. Almost at the same time, the then Minister of Education, Hermans, requested the Education Council of the Netherlands to advise him on the

consequences for the Netherlands regarding the European development to implement a two-cycle system in higher education. For this purpose, the Education Council set up an advisory committee headed by Dr A.H.G. Rinnooy Kan. The commission presented its report on 23 June 2000, which was published by the Education Council on 5 July 2000. One of the proposals put forward by the commission was that in many disciplines a differentiation should be created at the master's level between a more professionally oriented track and a more research oriented track. The commission considered the latter as an intermediate step between a master's degree and a Ph.D. and found it only reasonable that this would result in these programmes having a two-year track. During the legal process that led to the general introduction of the bachelor-master structure in higher education, one main issue that had to be tackled was whether the transition of academic programmes into a three-year bachelor and a one-year master would be considered equivalent to international developments in Europe, where it was thought to be more common to have a two-year master (Westerheijden et al., 2010).

Within the Association of Universities in the Netherlands (VSNU) this was also the main theme of the discussion and it installed a committee to advise on this issue as well. A committee chaired by the former Rector Magnificus of the University of Maastricht and Junior Minister of Justice, Prof. mr. dr. dr.h.c. M.J. Cohen, published an advisory document on the 30th October 2001. The Cohen-committee differentiated between three types of orientation of a master's degree: a social track, an educational track and a research track. The commission was in favour of a two-year master where the last two tracks were concerned, but deemed a one-year master sufficient for the social track, with the exception of some programmes in oriental languages and programmes in comparative international law. The advice on the educational track was adopted by the Cabinet, but on the further differentiation within master's programmes yet another external commission was asked by the government to produce an advisory report. This request for advice was in accordance with Minister Hermans's political viewpoint to create more room within university education in the Netherlands for qualitative differentiation. To use a well-established metaphor: among the 'high plains' of higher education more 'mountain tops' would have to stick out.

The 'Topmasters working group' was established by the Ministry of Education and was chaired by the former president of the Royal Netherlands Academy of Arts and Sciences prof.dr. R.S. Reneman. Their advice report entitled 'Over de top: Duidelijkheid door differentiatie' [Top notes: Transparency through differentiation] was published in October 2002. In this report a new distinction was made between discipline-oriented masters and profession-oriented masters (the latter being programmes preparing for professions such as physician, lawyer and pharmacist). Apart from these two, another category of research master was created after the introduction of the bachelor and master system in The Netherlands. According to the Reneman working group, it would be up to the labour market and the students to decide which master's programmes belonging to the first two categories would be considered top-level masters. With regards to the Research Master's, the Reneman working group opted for the Netherlands Accreditation Organisation to assess whether these master's programmes were indeed top-level and thus required a two-year curriculum (Huisman & van der Wende, 2003).

Reneman aimed high in the context of the Dutch higher education system that still followed an egalitarian tradition. This was clear from the definition of the research masters. (Committee Reneman, 2002, p.10):

> a programme that meets the demand for scientific researchers in a large number of disciplines (including interdisciplinary and multidisciplinary fields of study) and that prepares for a Ph.D. in those disciplines. The contents of a research master's programme should be linked to the thematically/disciplinarily structured, top-quality level scientific research carried out by the organisational unit that is also responsible for drawing up the curriculum.

Elsewhere in the report additional specific criteria were described which were required for a Research Master's programme: close links with research groups with a proven, continuous and high level of quality applying a certain critical mass, with demonstrable added value to the instructional process (for example tutoring, top courses, application of high standards) and graduates that would gain access to renowned Ph.D. programmes (Committee Reneman, 2002, pp. 16-17). Although the working group considered the research master as an intermediate stage leading to a Ph.D., the working group pointed out that graduates would also qualify to enter the labour market, for example in research jobs for which no specific specialisation

was required (Committee Reneman, 2002, p. 11). The report of the Topmasters working group confirmed the already previously mentioned need to offer research master's programmes, as there was a strong demand for it.

In a letter dated 15 April 2003, the Secretary of State for Education, requested the Netherlands Accreditation Organisation (NAO) to develop a procedure to assess applications for extending the length of some specific programme categories, along the lines of the report of the Reneman Committee and specifically the Cohen Committee regarding exceptions to the one-year duration and the exceptional case of the research-oriented masters. The Secretary of State pointed out that the research masters programmes should explicitly prepare students for research-oriented professions (Ministry of Education, 2003b, pp. 2-3):

> in which the emphasis on doing scientific research would be more outspoken than in a regular academic master's programme. I consider the Research Master's as a new type of academic programmes in higher education for which the standards still need to be defined.' […] As it concerns a new type of programmes, I urge you to advise which requirements such a programme should meet.

The NAO was very keen on having these new master's assessed, because as early as 23 April 2003, the NAO submitted the requested protocol to the Junior Minister's office. In its protocol, the NAO strongly emphasized the 'academic context' in the application procedure for research masters. In this respect, the NAO stated: 'If this [academic context] does not attain the required quality level, it cannot be assumed that the programme will attain the desired level required by the international context, even if the programme has a two-year duration. This is indeed a prerequisite, but is in itself insufficient.'

It was argued that high demands should therefore be set for the selection of students, the intended learning outcomes and the research environment. When assessing a research master programme, much attention should be given to the capacity of the available research infrastructure, the quality of staff and researchers involved in the programme and the reputation of the research group(s) involved. The NAO informed the Junior Minister that the protocol had been resolved on 22 April 2003. For the assessment of research master's programmes, NAO entered into an agreement with the KNAW. The assessment as to the contents of the

programme would in the first instance be carried out by two KNAW commissions (arts and humanities and social and behavioural sciences), but later on by several more (biomedical sciences, earth sciences and two separate commissions). The social and behavioural sciences committee was split because of practical considerations. The biomedical and earth sciences committees were installed because universities applied for new research master programmes in these research fields as well. The master programmes of the natural sciences did not apply for research masters because these master programmes had already two-year programmes. The students of accredited research masters were entitled to two years of study grants. Later the universities' funding of the research masters (two instead of one year) themselves was adjusted as well as of 2011.

Reasons for the introduction of research master's programmes

During the discussions on the need to have research masters, a large number of arguments in favour of the introduction of this new type of programme were presented. In the following overview, these arguments have been structured. The following seven arguments were mentioned in the debates:

1. There are not enough researchers in the Netherlands

Graduates in the Netherlands have relatively little interest in research jobs. This can be attributed, on the one hand, to the enormous competition from all commercial and public sectors in society, and, on the other hand, to the lack of career opportunities within research environments (Dittrich *et al.*, 2004).

2. There are not enough Ph.Ds. in the Netherlands

Another important aim concerning the training of young researchers is increasing the output of doctoral degrees and decreasing the dropout of Ph.D. students (European Commission, 2003b). At the end of the nineties, 2,483 people took their doctoral degree in the Netherlands (Moguérou, 2005). Out of every 1,000 citizens 1.1 hold a doctoral degree (Ministry of Education, 2005). This proportion was about the same as in Denmark, Ireland and France. In comparison, there were as many as 4 doctoral degree holders per 1,000 citizens in the United Kingdom, 2.1 in Germany, 2.4 in the United States and 1.5 in Japan. Although these numbers should always be seen in a national context, in which the Ph.Ds. can differ in type, duration and function, it is illustrative of the Dutch case that the profession of researcher did

not enjoy much attraction. A large proportion of excellent students choose a career outside the academic world following their master's degree (KNAW, 2000). The reasons for this can be found in the lack of career possibilities, image and pay. If students do choose to do a doctoral degree, there is continuingly concern about drop-out and the long study period required for many Ph.D. students. However, the completion rates of Ph.D. students attending research schools (see below) were showing encouraging results (Sonneveld & Oost, 2005). The main reasons for dropping out, in traditional Ph.D. trajectories outside research schools, are poor guidance of the students, the lack of a stimulating research environment, lack of career perspective and, finally, personal circumstances (Berger & Jonge, 2005, LAIOO, 2002). Several measures such as the research master were being suggested (Committee Cohen, 2001; Committee Reneman, 2002), in order to shape the research training route in such a way that students would not only be better prepared for the Ph.D. trajectory through research skills and techniques, but also that they would get a taste of the profession of researcher. Some might then decide that a career in research was not for them, thus decreasing drop-out at the Ph.D. stage through better self-selection. Those who continued to the Ph.D. would be better prepared, so that they could make better use of their time during their Ph.D.

Embedding of the research master and Ph.D. programmes has gradually been taking shape in the form of *graduate schools* (Bartelse & Breimer, 2005). The goal of this organisational integration is to strengthen the coherence of the research training. It also gives master students a chance to become acquainted with doctoral research and researchers. The trend is that graduate schools are shaped per university. The graduate school concept puts the 1990s concept of the research schools under pressure. The research schools have played a central role in the training of young researchers between 1987 and 2009 (Sonneveld, 2010). In total there are 102 research schools with both multi- or mono-disciplinary research fields. While there may be several research schools within a single university, one of the policy aims was to pool the best researchers in a field nationally, for the benefit of the Ph.D. trainees as well as to increase the quality and quantity of research output. The graduate school arrangements on the other hand, can differ concerning level (university, faculty, disciplinary area) and the extent to which all master programmes or only the research master are included.

The duration of the Ph.D. is becoming a topic of discussion thanks to the integration of the masters and the Ph.D. As a rule, the duration of a Ph.D. course is four years. For the natural sciences the standard length of the total research track with a Ph.D. at the end is nine years from the moment of a student's first entry into the university. This is broken down into three years for the bachelors, two years for the masters (this used to be five-year single cycle under the pre-Bologna degree structure) and four years for the Ph.D. For the humanities and social and behavioural sciences the standard length was eight years in total before the switch to the bachelor-master system. This was broken down into four years for the first degree and four years for the Ph.D. Under the bachelor-master structure this would be three years for the bachelor's degree, one for the masters, and four for the Ph.D. With the introduction of the two-year research master in these areas of studies, the duration of the total course time including the Ph.D. has been lengthened to nine years. Especially in the field of economics and business studies the combination of the research master and the Ph.D. is used to integrate third-cycle course work into the second cycle (de Ranitz, 2005). In this way, the Ph.D. course has been shortened to three years and the total duration of the course is brought back to eight years.

The education system for Ph.D. students (both via the research schools and the graduate schools) was greatly appreciated and is successful, but the returns are low and the average time to finish a Ph.D. dissertation is too long. A research master's programme would offer a good preparation before starting a Ph.D. and would increase returns from research programmes during the Ph.D. phase (Committee Reneman, 2002).

3. Research contributes to economic growth

In the Netherlands, ever more voices are heard (van Steen, 2014 and Centraal Bureau voor de Statistiek, 2014) that warn of the weak link between research and productivity. It has become generally accepted that research is the most important prerequisite for innovation and creativity. Hence, the emphasis on research is becoming ever more important (Enders, 2004). Good research requires advanced skills and research master's programmes can contribute to training these skills. This point will be further elaborated in the next two paragraphs (competition between Europe and the rest of the world and competition between EU members).

4. Competition between Europe and the rest of the world

This argument originates from the Lisbon objectives. In 2010, Europe should be as competitive as the USA and major Asian nations. A prerequisite for attaining this is the availability of a high-level research structure (Huisman & van der Wende, 2004). Research master's programmes could contribute considerably to the training of good researchers. In this perspective, the Netherlands are playing a cooperative role in Europe.

5. Competition between the Netherlands and the other countries in Europe

In complement and contrast to the previous point, from a Dutch perspective, it is not only necessary to view the situation from the position of Europe compared to the rest of the world, but also from the national position of the Netherlands compared to the other countries in Europe. The Netherlands is not self-sufficient and should therefore make use of its assets, such as creativity and innovation (European Commission, 2003a). National research capacity can play a major part in this.

6. High-quality programmes attract international talent

The bachelor-master structure could and should, according to the Bologna declaration, stimulate student mobility. It is expected that mobility is mainly stimulated by delivering salient quality. As a beacon of high quality, the research master would attract more potential researchers from abroad. This would entail that the available Ph.D. positions would be better occupied with better qualified students (Ministry of Education and Sciences, 2005). Furthermore, there was a discussion about the length of master programmes outside the Netherlands being two years and that one-year master programmes in the Netherlands could be seen as less valuable in international perspective.

7. Demographic developments in the Netherlands

The population in the Netherlands is ageing and the number of young people is decreasing. Eventually, this could lead to research environments at universities, research institutions and companies losing their vitality. Programmes offered in the Netherlands that create opportunities for Dutch and foreign students to become researchers should therefore be stimulated.

2.6 Quantitative and qualitative developments of the research masters 2003-2013

In this section some quantitative and qualitative developments of the research master will be presented. The first research masters were approved by the NVAO in 2003 and started in the same year. Two years later the first students of these programmes graduated.

Quantitative Developments

In the first table (table 2.1) the numbers of research master entrants between 2005 and 2013 are presented. The number of entrants almost doubled between 2005 and 2013 from 836 students in 2005 to 1558 students in 2013. The percentage of Research Master students of all masters students in these years was between 3% (in 2006, 2007 and 2012) and 4% (in 2005, 2008, 2009, 2010, 2011 and 2013). On the one hand this is only a small percentage but on the other hand it shows the selective character of the RM. Furthermore, this percentage appears to remain relatively constant.

Field of Study	2005	2006	2007	2008	2009	2010	2011	2012	2013	Total
Biomedical Sciences	75	115	171	190	217	312	356	331	316	**768**
Behavioural and Social Sciences	412	469	577	657	623	639	632	644	692	**1538**
Earth Sciences	6	7	26	8	7	11	7	1	1	**54**
Humanities	343	371	414	507	522	588	568	608	549	**2157**
Total	**836**	**962**	**1188**	**1362**	**1369**	**1550**	**1563**	**1584**	**1558**	**5876**
% of the MA population	4%	3%	3%	4%	4%	4%	4%	3%	4%	**4%**

Table 2.1. Number of research master entrants 2005-2013.
Source NVAO 2011, VSNU 2014.

In table 2.2 the number of RM that actually enrolled students in the years 2005-2013 are presented. In general, the number of programmes grew in five years from 94 programmes in 2005 that were awarded accreditation by the Dutch and Flemish Accreditation organisation to 123 programmes in 2009 and stabilized between 2010-2013 to around 115 programmes. The reduction after 2009 was mainly caused

by a decrease of active research master programmes in the humanities. But still almost half of all the programmes are in the humanities.

Field of Study	2005	2006	2007	2008	2009	2010	2011	2012	2013
Biomedical Sciences	6	8	10	12	15	17	15	15	15
Behavioural and Social Sciences	37	41	44	46	46	43	45	42	42
Earth Sciences	1	1	2	2	2	2	2	2	2
Humanities	50	55	56	57	60	55	53	55	56
Total	**94**	**105**	**112**	**117**	**123**	**117**	**115**	**114**	**115**

Table 2.2. Number of research master programmes with student intake in 2005-2013

In the third table the average number of students enrolling annually per programme in a certain field of study are presented. Over the years the research masters in the biomedical sciences attracted the most students per programme (on average 17.7 enrolling students per programme between 2005-2013). The research master programmes in the fields of earth sciences and humanities attracted fewer students between 2005 and 2013 (4.8 and 9.0). The average number of entering students of research masters in the behavioural and social sciences was on average 14.9 students per programme between 2005-2013. Within some faculties of the behavioural and social sciences and the humanities there was a debate going on to combine certain research masters to have a critical mass in the research master programmes (KNAW, 2007, pp. 17-18). This debate has not led to a significant decrease of research master programmes in the Netherlands yet. The number of programmes in the humanities remained quite high even after some reductions took place since 2009, compared with the relatively small student population in the humanities (compared to social sciences and behavioural sciences, for example).

The average graduation rates are positive. Out of 100 students that start with a research master programme on average 11 students drop out in their first year and 8 students leave in a later year. About 60 students finish their degree in the given time of 24 months and 16 students graduate between 25-36 months after they started. The last 5 students graduate between 37 or more months after they started their research master programme (NVAO, 2011, p. 25). The time to degree over the years 2005-2009 of 2788 research master students was on average 23.7 months with a standard deviation of 7.5 months (NVAO, 2011, p. 24). That the time to

degree was less than 24 months can be explained by 'lateral entry' in the second year of the programme. It is possible for students to enter the second year of the research master with a completed (taught) master's degree. The selection committee of the research master programmes can put forward special conditions.

Field of Study	2005	2006	2007	2008	2009	2010	2011	2012	2013	Average
Biomedical Sciences	12.5	14.4	17.1	15.8	14.5	18.4	23,7	22.1	21.1	17.7
Behavioural and Social Sciences	12.3	12.8	14.1	15.7	18.4	14.9	14.0	15.3	16.5	14.9
Earth Sciences	6.0	7.0	13.0	4.0	3.5	5.5	3.5	0.5	0.5	4.8
Humanities	6.9	6.7	7.4	8.9	8.7	10.7	10.7	11.1	9.8	9.0
Total	**8.9**	**9.2**	**10.6**	**11.6**	**12.4**	**13.4**	**13.7**	**14.0**	**13.7**	

Table 2.3. Average number of entrants per research master programme 2005-2013.
Source NVAO 2011 and VSNU 2014.

Finally, the percentage of international students that enrolled in all research master programmes in 2005-2009 was 31%, against 15% of international students in all master programmes (NVAO, 2011, p. 23).

Qualitative Developments

Both the Dutch and Flemish Accreditation Organization (NVAO) and the Royal Academy of Arts and Sciences (KNAW) monitored the quality of the research master programmes from the start. In 2007 both the NVAO and the Social Science Council (*Sociaal Wetenschappelijke Raad, SWR*) of the KNAW discussed the first experiences with all stakeholders during a conference held in The Hague by the NVAO and published reports about the first results of the RM. In the NVAO report, the *Research Master Review 2007, the exploration of a new domain* (Snijder and David, 2007), the main conclusion was that research masters according to the past president of the NVAO, Karl Dittrich: 'are regarded as enriching the landscape of university programmes. Familiarity with the research masters programmes should be stimulated and they can present talented students with an additional challenge' (Snijder and David, 2007, p.3). The focus of this report was on the intended quality of the research masters and the way the assessment of the research masters by the committees of the KNAW took place. The committees of the KNAW advised the NVAO about the intended quality of the programmes. The surveys conducted by

the NVAO among professors, assessors and administrators were quite positive about the assessment process. The major concern of all stakeholders was the low level of enrolment figures. One of the recommendations of the report is to give more publicity to the research masters and present them as programmes with an orientation towards research rather than as a definite choice of a profession as a researcher and especially of becoming a Ph.D. student. This was seen as a possible explanation for the low enrolment numbers (Snijder and David, 2007).

Finally, in the study the question was raised as to whether the title of M.Phil. should be reserved for accredited research masters (to give research masters more recognition and international profile). 60% of the respondents were positive about this suggestion. But some were worried that the negative connotation of the English M.Phil. (consolation prize for not attaining a Ph.D.) could have a negative effect on the M.Phil. for the Dutch research masters (Snijder and David, 2007).

The KNAW too published a report, *Research Master's programmes in the Social Sciences: First Experiences (Onderzoeksmasters in de Sociale Wetenschappen: eerste ervaringen)* (KNAW, 2007). This was done by its Social Scientific Council (SWR), which conducted a survey among 47 coordinators of research masters in the social and behavioural sciences (of which 39 responded, a response rate of 83%) and 9 out of 23 research institutes that had been recognised by the Research School Accreditation Committee (ECOS) of the KNAW. The main conclusion of this report on the research masters was summarised by Prof. Andeweg (Snijder and David, 2007, p. 42):

> [the research master programmes] are quite clearly in a class of their own. When comparing them with the 'ordinary' master's programmes on aspects like the composition of the curriculum, the qualifications of the teaching staff, the demands on the master's thesis and the completion rates, it becomes quite apparent that we are dealing with a genuine educational innovation, and not with a way to escape the cursed (also by this author) one-year programme length of most master's programmes. To the extent that concerns about such an escape route are behind the lack of financial resources provided for Research Master's, these concerns are clearly unfounded.

In the SWR report two positive developments of the research master are mentioned. First, the coordinators stress that there was a great need for research masters in the

light of *nachwuchs*. The coordinators expect that in the future Ph.D. students will be recruited mainly from these research masters. Second, there is a high quality and level of ambition that characterises these research masters. The brightest students and faculty are brought together and this creates an inspiring academic context. The focus of the SWR was mainly on the research master as a stepping stone to the Ph.D. The research master as a stepping stone to research careers outside academia is not discussed here.

At the same time, on the basis of the perceptions of the RM coordinators in the social sciences the SWR has formulated three threats: diversity, local character and financing. The diversity amongst the programmes in the social sciences is enormous and this can be an obstacle for the continuity of the Ph.D. training programmes. The local character of the research master programmes (most research masters were organised by individual universities) and the interuniversity character of the Ph.D. programmes (which were organised largely by research schools across the universities) were asymmetrical. The research masters were sometimes used to strengthen the position of the university graduate schools in preference to the interuniversity research schools. Till 2011 the financing of the RM was problematic because there was no extra funding from the Ministry of Education. Only the students received one more year of support. Some universities reallocate money from regular programmes to the research masters and sometimes experienced faculty members invest personally in these programmes by spending more time than they officially have for the RM. The SWR wonders if this could be viable in the long run.

Four years later both the NVAO and the KNAW published new reports that contained observations about the research masters. The NVAO published its second *Research Master Review 2011: Peaks in Sight* and the KNAW contributed the report *Reflections on success factors for Ph.D. programmes (Reflecties op succesfactoren promotieopleidingen)*. In the previous section some of the quantitative developments of the research masters from the Research Master Review 2011 were discussed. The qualitative developments of research masters are perhaps best described in the same Research Master Review 2011 in which a separate study assessing theses was published. In this study a group of international experts were asked to compare the theses of research master graduates with the

theses of graduates from regular master programmes. The hypothesis of this study was that the theses of research master graduates are of a higher quality than the theses of regular master programmes and are compatible with international standards of excellence. The assessments were performed 'double-blind'. This means that neither panel members nor secretaries of the NVAO who assisted the panel knew which were the research master or the regular master theses. And they did not know how the supervisors graded the theses. The outcome of the study was that a large proportion of the research master theses that the panel assessed were of top international level and the international panel rated the research master theses higher than taught master theses (NVAO, 2011). Some of the recommendations of the Research Master Review 2011 repeated those of the Research Master Review 2007: Enrolment in some research masters is too low and more publicity, for example by the Nuffic, should be given to these 'unique selling points' of the Dutch higher education system and government and policy makers should display the research master as a shining example for future system reforms (NVAO, 2011, p. 75).

As I mentioned, also in 2011 the KNAW produced a short report with *Reflections on the success elements of Ph.D.-programmes.* Although the focus was on the elements of success of the Ph.D. phase, the interaction with the research masters was pointed out and especially the observation that there still was too little information to answer the question: what are the effects of the implementation of the two-year research master programmes linked with a three-year Ph.D. programme as opposed to the system of a one-year masters programme linked with a four-year Ph.D. programme? (Visscher, 2011, p. 3)

To summarise, the first signs about the reception of research masters in the academic landscape by the university leaders, auditors and faculty are positive and promising. But as stipulated by the KNAW there is still little information. Questions that remain are: How is the research master to be seen in the broader academic context and outside the Netherlands? Before our exploration of possible research masters in other countries the research system in the Netherlands will firstly be outlined.

2.7 Conclusion

The chapter began by describing how higher education policy in the Netherlands comes about using the state supervising and state control models as two extremes. Furthermore, the European influences on Dutch higher education policies and two specific policy initiatives of excellence and differentiation were discussed. As was argued the excellence initiatives of the university colleges and honours programmes were all taken by the universities (and more specific academic pioneers) in a rather bottom-up fashion and were later followed by (provisional) regulation and eventually by (a proposed) adjustment of legislation. The research master was introduced more top-down by the Ministry of Education. The three initiatives were seen in the light of increasing differentiation in Dutch higher education, both horizontally and vertically.

The Bologna process may have been an important driver or policy window for changing structures in Dutch higher education, and for sensitising Dutch academic circles for possibilities, perhaps needs, and certainly for seeing positive elements in increasing differentiation. It took some time after the first initiatives, but types of education showing excellence are much more accepted at the time of writing, in 2015, and are even getting fashionable. The spread of excellence programmes and university colleges bears witness to that change of trends.

Furthermore, the chronology and the quantitative and qualitative developments were described. It was shown that the RM also spread quickly: it was adopted by higher education institutions rapidly. The resistance against differentiation was over, or the RM was at least seen as an advantageous addition even if funding lagged behind. In apparent contrast to excellence being a fashion in undergraduate education, the percentage of postgraduate students in research masters remains limited to 3–4 per cent, although the absolute number of research master students has grown rapidly.

One, fairly small effort has been made to assess the relative quality of RM students, in the assessment of final theses that the NVAO reported upon. However, stakeholders agree that not enough is known about the added quality of research masters. There is room for empirical study, and I will take up this challenge. But

first, let us look at international examples, to investigate whether the Dutch research master development is in line with international good practices of educating a broad pool of research capacity inside and outside of higher education (in partial response to research question number one).

Chapter Three *International Comparative Perspective*
Experiences in the United States, the United Kingdom and Austria

3.1 Introduction

In this chapter an international comparative perspective will be described. How and to what extent does the Dutch research master differ from research training programmes in other countries and what are the similarities? The research master as a policy instrument will be compared with policy initiatives to increase and improve research training in three other countries: Austria; the United States and the United Kingdom. To this end, section 3.2 will position the research master in the context of research training in the Netherlands and introduce the international comparative perspective on graduate education and especially research-oriented master programmes. An an explanation of the choice of the three countries (3.3 United States; 3.4 United Kingdom and 3.5 Austria) will be part of the next section as well.

3.2 The comparative policy perspective and current issues in research training

In this section the comparative policy perspective will be discussed and the reasons for choosing the selected countries will be explained. There may be different types of comparative studies, and comparative studies can be done for different reasons. Summarising methodological debates on this issue, Goedegebuure and Van Vught stated:

> Comparative higher education policy studies often are not undertaken to analyse causal relationships (..) Comparative policy studies in the field of higher education appear to be undertaken to find, discuss and interpret diverse experiences in higher education systems in different countries. In some cases, these studies are used to

pinpoint patterns of constant association and sometimes comparative studies appear to contribute to the developments of theoretical frameworks. (Goedegebuure and van Vught, 1994, p. 19).

Qualitative analysis is seen as the most appropriate methodology to gain understanding of policy initiatives, how and why they are connected to their environment. Qualitative comparison between two or three countries, particularly if they are adjacent, can be done by a single researcher. We adopt, therefore, the approach of comparative case study (Yin, 2003) for this section.

In this international comparative section, the question will be addressed how and to what extent the research masters in the Netherlands compares and contrasts with research training approaches in other countries: is preparation for a research career perceived to need specialised master tracks in those countries, and if so, how are they organised and recognised? Besides the Netherlands three other countries have been selected, as we mentioned: the USA; the UK; and Austria. This choice can be motivated as follows. Two of these countries, the UK and the USA, have already had an undergraduate (bachelor) – graduate (master and doctoral) degree system since centuries, and thus allow us to understand the position of an advanced research degree, such as the research master, in the system. In contrast, the other two countries, Austria and the Netherlands, implemented the three-cycle structure much more recently, in the course of the Bologna Process. The Netherlands being an early post-Bologna adopter and Austria more of a follower in the Bologna process in many respects (EACEA *et al.*, 2012), we expect Austria to be a contrasting case to the UK and the USA with regard to research training study programmes. The general purpose of this section is to understand the introduction and implementation of the research master in the Netherlands from an international comparative perspective and to explore whether or to what extent the research master is peculiar to the Netherlands.

Current issues in research training
With the following questions we will try to find answers about current issues in research training:
1. What are the characteristics of the higher education system in the selected countries? What are the developments in terms of student numbers,

graduates and the transition between different levels of higher education relevant for this study (master, Ph.D.)? Is the master level selective and is this selection based on research competencies (GPA etc.)?

2. Are there research master programmes offered in the selected countries? If yes, is the concept in these countries comparable to the Dutch one? If not, what are specific arrangements to train future researchers, if any?

It is important for the sake of comparison to define doctoral education and more specifically the research doctorate. The CIRGE (Centre for Innovation and Research in Graduate Education) network 'Forces and Forms of Change in Doctoral Education'–refers to three components (CIRGE, 2007). First of all, a Ph.D., according to the network, is a degree that contributes through original research to knowledge. Second, people who hold a Ph.D. are expected to have substantial knowledge in their field of study. Third, and lastly, a doctoral education should include the development of transferable skills and competencies. This last feature is becoming more and more important worldwide not least because of pressures from the employment sector outside academia. In the EHEA qualification framework the qualifications that signify completion of the third cycle are formulated as follows (Bologna Working Group, 2005):

- have demonstrated a systematic understanding of a field of study and mastery of the skills and methods of research associated with that field;
- have demonstrated the ability to conceive, design, implement and adapt a substantial process of research with scholarly integrity;
- have made a contribution through original research that extends the frontier of knowledge by developing a substantial body of work, some of which merits national or international refereed publication;
- are capable of critical analysis, evaluation and synthesis of new and complex ideas;
- can communicate with their peers, the larger scholarly community and with society in general about their areas of expertise;
- can be expected to be able to promote, within academic and professional contexts, technological, social or cultural advancement in a knowledge based society.

The EHEA qualification framework is more comprehensive than the CIRGE criteria because there is more emphasis on research competencies and enables us to assess the second cycle.

3.3 United States

Characteristics of graduate education

'Higher Education in the United States is strikingly large, decentralized, diversified, competitive, and entrepreneurial' (Clark, 1993, p. 223). The Ph.D. training is just as fragmented and market driven as the rest of U.S. higher education, as described by Nerad et al. (Nerad, Rudd, Morrison & Homer, 2009):

1) a decentralized graduate education;
2) a market-driven higher education system;
3) a structured process with a Developmental Curriculum;
4) quality assurance in United States of America (USA) doctoral education.

These four characteristics will be described briefly before the numbers of those involved in doctoral education in the USA will be presented.

First, the decentralized character of the USA graduate system means that there is no ministry responsible for doctoral programmes. The drivers of change are the norms and traditions of the disciplines and, if applicable, their professional organisations. The faculty (the American term for university teachers and researchers) has a high degree of autonomy within the context of university- and graduate school-wide standards and procedures.

Second, the market-driven higher education system characteristically influences the enrolment of students for master and doctoral programmes. The large competition to attract the most talented students and employment perspectives also influence the size of the graduate programmes. The national funding agencies have an important role in determining the research direction of faculties and their Ph.D. programmes. The funding for doctoral studies in the USA is rather complex. Most of the time it is a mixture of revenues: the state where the university is located, the Federal government, tuition and other fees paid by students, university

endowments, philanthropic foundations, and businesses of various kinds. The mix of funding varies by field, type of institution, and even programme within a university.

Third, the structured process with developmental curriculum entails that each doctoral programme has its own curriculum. Most changes in doctoral education occur in these departmentally structured programmes. Although this may vary by field or discipline and institution, in general the doctoral programmes have course work, a set of (oral and written) examinations and a dissertation (Altbach, 2007; Nerad 2010a). The course work in the doctoral programme is different from the European tradition where course work is required for the master programme. In most cases the course work in the USA is followed by an examination. If a student fails, this examination in the end after several attempts the student is dropped from the graduate programme and often given a master's degree (in some cases the M.Phil. is awarded). There is also an informal category of doctoral students who passed the coursework and the doctoral research but were not able to finish the dissertation. This category is called All But Dissertation (ABD). The length, scale and quality of the curriculum differs per discipline, supervisors, university etc. Transferable professional skills are becoming more and more important (Nerad, 2007).

Fourth, the mechanisms of quality assurance of doctoral programmes in the USA are diverse. There are institutional or programme accreditation (non-governmental, decentralised); cycles of university programme reviews; national assessment of doctoral programmes by the National Research Council and surveys of the career outcomes of alumni by research institutes. Most of the time, programme accreditation focuses on undergraduate and master level education, while Ph.D. training is not a major issue in it. In institutional accreditation, Ph.D. training as an element of a university's educational provision may be looked at, but it is rarely a crucial element in the decision to award (or not) accredited status to an institution. The periodic assessments by the National Research Council are, however, seen as very influential. In this assessment the quality and characteristics of research-doctorate programs at institutions in the United States are assessed and characteristics are compared as: faculty publications, grants, and awards; student GRE scores, financial support, and employment outcomes; and program size, time to degree, and faculty composition (Ostriker, Kuh & Vojtuk., 2011).

The size is of U.S. Graduate education is overwhelming, 14 million students are enrolled in post-secondary institutions (OECD, 2012). According to Altbach (2007, p. 67), it is likely that around 400,000 students are working at the doctoral level.
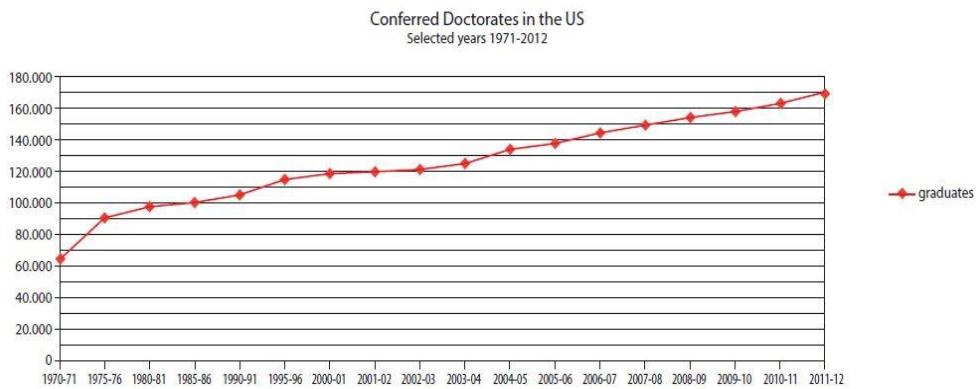
Figure 3.1. Number of Conferred Doctoral Degrees, Academic Years 1970-1971 and 2011-2012, (Snyder & Dillow, 2015).

In figure 3.1 it can be seen that compared to 1970 (almost 70,000 conferred doctoral degrees) the amount of conferred doctoral degrees had almost tripled in the academic year 2011-2012. In Chart 3.3 a projection is made that approximately 200.000 doctorate degrees will be awarded in 2021-2022. The gender balance is fifty-fifty (Snyder & Dillow, 2015).

The doctorate and, in particular, the Doctor of Philosophy (Ph.D.) is the most important degree in the higher education system of the USA. Distinction can be made between two types of doctorates. First of all, there is the research oriented doctorate, is the Ph.D. degree. Second, there are the degrees Doctor of Business Administration (DBA), the Doctor of Law (JD), the Doctor of Education (EdD), et cetera. These doctorates have a more professional orientation than the Ph.D. Professional doctoral study programmes can vary in duration and the themes of the dissertations are more practical All these doctorates have different modes of delivery. Ph.D. programmes are in general full-time programmes while 'executive' (professional) doctorates exist in applied fields, such as school administration, can be finished in three years, including a dissertation. The time-to-degree in the traditional arts and sciences fields has been increasing – to almost nine years in the

humanities and six years in the life sciences. In some fields and at some universities, students are admitted to doctoral study directly after completion of the bachelor's degree, while in other cases, a master's degree is required for admission to doctoral programmes (Nerad, 2008).

Position of research master programmes

In the academic year 2009-2010, more than 693.000 master degrees were awarded (see figure 3.2). This is almost 50% more than ten years earlier in the academic year in 1999-2000. In the graph below the projection of the total master degrees (academic year 2021-2022) will be more than 900.000 master degrees in 2022. With more than 550.000 female master graduates (61%) and approximately 350.000 male master graduates (39%).

The role of the master degree as a pre-condition for Ph.D.-entry has been a point of discussion since the 1960s (Berelson, 1960). The traditional pattern of American post-secondary education includes three degrees, the four-year Bachelor's degree, a Master's degree, which is typically one to two years in duration, and the Doctorate. As mentioned above there has been a long discussion about the role of a master degree as an adequate stepping stone towards the Ph.D.-phase. Fife, introducing Glazer's report on the master degree, writes:

> The master degree is going through an identity crisis. In an era of increased specialization, employer demands, student expectations for practicality, and external calls for accountability, academe cannot afford to let this state of affairs continue. Some hard questions must be asked. What's the primary function of a master degree? How can it best serve the demands of students, employers, and governing bodies? (Glazer, 2001, p. 13)

Interestingly, Fife does not mention preparation for the Ph.D. Apparently there is little attention for preparation of research careers. What kind of master programmes are there?
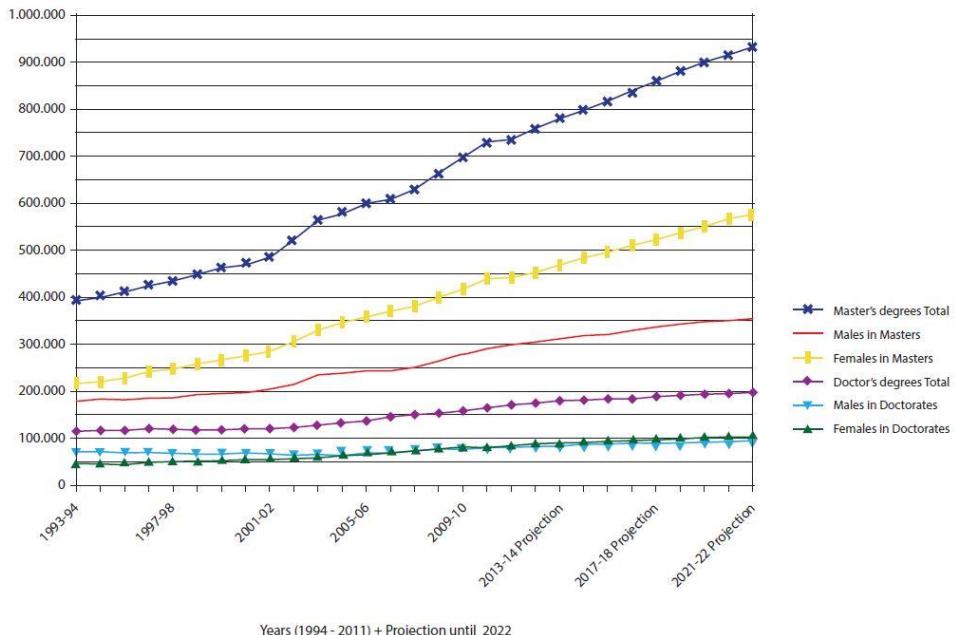
Figure 3.2. Number of Conferred Master's and Doctoral Degrees, Academic Years 1993-1994 and 2012-2022 (Projection). (Snyder & Dillow, 2015)

Three different categories of master degrees can be distinguished in the United States. A typical example can be found in the State University of Florida (University of Florida, 2008). It distinguishes the research master, professional master and the terminal master degrees. Research masters can be course-based or research-based and in most cases it is a mixture. A master thesis with independent research may be required depending on the discipline. Research masters are typically the Master of Arts or the Master of Science in certain disciplines. Professional Masters provide advanced training for further employment in a specific occupation. For example, the master in social work, the master in public administration or the master in business administration. A capstone project is frequently one of the conditions implemented to test if the candidate possesses all the required qualifications of the programme. Finally, terminal masters ('terminal' because in the field further degrees do not exist) are small subsets of professional master degrees that have more credits incorporated in the degree and have a higher

level of proficiency than professional masters. The Master of Fine Arts is an example of a terminal master.

This crisis in the 1980s led to discussion regarding the status of the master degree. Particularly the preparation for a successful Ph.D.-career was a central element. Harvard University tried in the 1980s to replace the Master of Arts (MA) or the Master of Science (MSc) with the Master of Philosophy (M.Phil.). The idea behind this change was to put the coursework into the master phase, in order to decrease the 'time to degree'-period in the Ph.D. phase. The M.Phil. idea gained little support, although there are some examples of institutions that award M.Phil. degrees. In most cases, however, these are degrees that are offered to doctoral students who passed the coursework and the dissertation research but did not complete the dissertation (ABD).

Policy discussions surrounding graduate education

'Plus ça change, plus c'est la même chose' stated Berelson in the 1960s when he described graduate education in the U.S. This same quip was cited by Nerad in 1996 when she and others looked back in *Graduate Education in the U.S., some Forty years later*. Questions about graduate education like what does the Ph.D. mean? What is the place of the master's degree? How can standards be maintained under the pressure of numbers?, remained the same (Nerad & Miller, 1996).

According to Nerad one of the success elements of the U.S. doctoral education model is that it changes incrementally. This is being caused by the above mentioned specific nature of the U.S. model (highly decentralized, market driven etc.). Nerad questions, however, if this U.S. model will be most successful in the years to come because it lacks a central reform mechanism (Nerad, 2010b). The incremental changes affect the following five areas, which are derived from Altbach (2007) and Nerad & Cerny (2002):

1) the research enterprise and doctoral education
2) narrowness and limited relevance of doctoral education
3) growing irrelevance in a changing job market
4) time to degree and degree completion
5) recruiting the best and the brightest

1. More applied research is demanded by society and companies. This creates a tension between research sponsors focusing on applied research and traditional academic values which stress fundamental research.

2. As knowledge has expanded, there has been a trend toward increased specialization in doctoral training, producing doctoral-graduates whose skills are very focused on their specialization and who, as a result, have limited opportunities for employment. Employers in industry and many students and recent graduates complain that their training was too narrow and that graduates were ill-prepared for a rapidly changing job market. The doctoral *curriculum* and the philosophy of doctoral studies are mainly in the hands of professors who are, in general, insulated from the job market. A related complaint, perhaps most widespread in the humanities and social sciences, is that doctoral-degree holders are not well trained to teach.

3. Obtaining an academic job, still a goal for many doctoral students and the predominant desire in many fields, is difficult and ever more complex. It is taking longer for a Ph.D. holder to secure a tenure-track academic position. The growth of post-doctoral studies/training in the sciences lengthens the time period for obtaining a 'regular' academic position in those disciplines, leading to an increasing number of academics in temporary post-doc positions, the 'academic nomads'.

4. The time to degree and degree completion are important issues. Time-to-degree continues to be a common concern related to Ph.D. program quality (Nerad, 2004). Although time-to-degree is frequently tracked and documented, much less attention has been given to the factors affecting time-to-degree and to the influence of time-to-degree on career outcomes (Picciano, Rudd, Morrison & Nerad, 2008, p. 8): Time-to-degree is associated with several factors, including measures of PhD program quality, quality of mentoring by the dissertation chair, quality of skills training, and career outcomes. These findings consistently support the correlation between shorter TTD and higher quality of training and mentoring. Respondents who rated academic and non-academic aspects of their programs as 'excellent' had shorter TTD.

5. The universities are competing on a global market to attract the brightest students and scholars. It is becoming a reputation race to attract the brightest students partly caused by the rankings like Shanghai-ranking, Times higher world university rankings etc. (Van Vught, 2006).

3.4 The United Kingdom

Interestingly enough, the United States and the United Kingdom borrowed the concept of doctoral education from Germany in the 19th century. They combined it with structured graduate school processes before it was successfully adopted in 1917 in Oxford and, in three years' time, in the departments of all British universities. Yet graduate education in the U.K. differs from the U.S. model.

3.4.1. Characteristics of graduate education

The United Kingdom has had a unitary higher education system since 1992 when the polytechnics became universities. Most of the universities (89) are in England (72), followed by Scotland (13) and Northern Ireland. Universities in the UK were established in four 'waves' (Leišytė, 2007). The Universities of Oxford and Cambridge formed the first wave around the year 1200. Thereafter, in the nineteenth century during the Industrial Revolution the Redbrick Universities were founded (the second wave). The third wave materialized in the 1960s in which 'massification' of higher education institutions took place. The fourth and final wave was in 1992 when the higher education system changed from a binary system to a unitary system including all previous polytechnics." 'Thirty-two polytechnics and two higher education colleges gained university status and the right to award their own degrees'" (Leišytė, 2007, p.92).

Because of the relative size of England compared to the other regions in the U.K., conferred degrees in England in the academic year 2012-2013 will be presented. The first degree is the biggest category with 51% of all conferred degrees being first degrees. First degrees include traditional first degrees (i.e. Bachelor of Arts and Bachelor of Science), first degrees with Qualified Teacher Status, enhanced first degrees and first degrees obtained concurrently with a diploma.

The first degrees are mainly three-year or four-year programs (Nuffic, 2013). 'First degrees have the title of Bachelor of Science (B.Sc.) or Bachelor of Arts (BA); special qualifications are sometimes awarded for bachelor's degrees in engineering (B.Eng.) and education (B.Ed.). Upon completion of an undergraduate program, three types of programs with different qualifications can be followed: postgraduate diplomas and certificates, master's degrees, and doctorate degrees (Leišytė, 2007, p. 19).

The graduate programmes can be divided in are the (post)graduate research (3%) and the (post)graduate taught (27%) groups of all obtained qualifications in England. The (post)graduate research includes doctorates, master degrees and postgraduate diplomas or certificates.
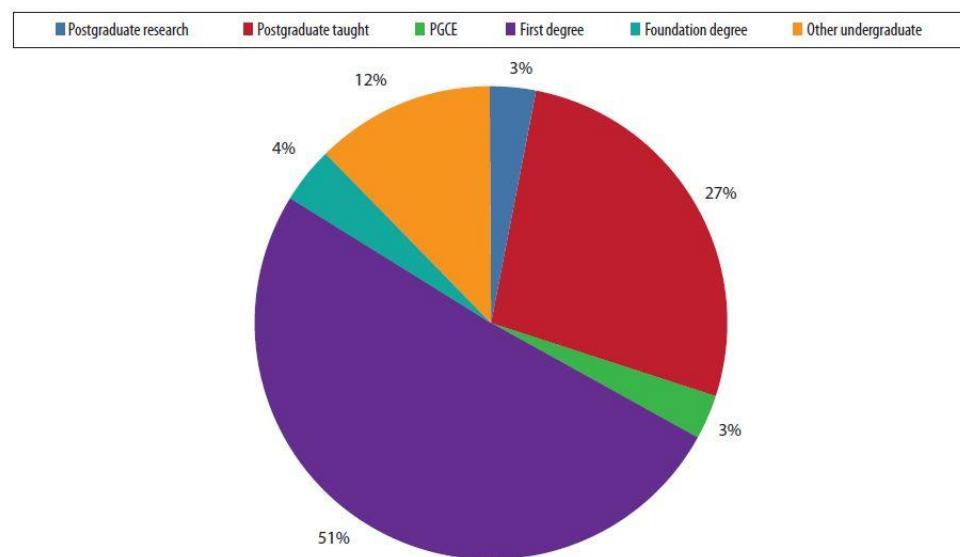
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Figure 3.3. Qualifications obtained at higher education institutions in England in 2012/2013
Source: HESA, 2014

(Post)graduate taught degrees includes doctorate, and masters degrees, postgraduate bachelors degrees at master's and postgraduate diplomas or certificates not studied primarily through research, including Postgraduate Certificate in Education (PGCE) at master's level, masters in teaching and learning,

land some other programmes in the lifelong learning sector, and professional qualifications.

3.4.2 Position of Research Master programmes

In the United Kingdom there is a distinction between taught masters, research masters and professional masters. The difference between the three is the proportion of structured learning and independent study (research) of the programmes. There are no uniform, agreed standards in the UK so different combinations between research and coursework/taught elements in the curriculum are possible. Most research masters will devote more EC on research and research skills than taught master's and professional master's. Research master students conduct a research project through independent research.

Research master programmes have the following programme characteristics, purposes and expected entrants (QAA, 2010, p. 11):

> *Programme characteristics:*
> - the student normally conducts a research project through independent study
> - they may include a smaller 'taught' element, for example, research methods modules, which may or may not be credit-bearing
> - they are typically of 12 to 24 months' duration, with 24 months being most common, based on a full-time mode of study
> - they normally fulfil the definition of research degrees given in Section 1 of the *Code of practice* on postgraduate research programmes, that is, 'research master's degrees where the research component (including a requirement to produce original work) is larger than the taught component when measured by student effort'
> - assessment in these programmes is often specific to the individual and is likely to be via oral examination that involves discussion/defence of a thesis, dissertation or other output such as an artefact, performance or musical composition. Where credit-bearing 'taught' modules are part of a research master's degree, the assessment of those components is usually separate from the overall assessment.

The purpose

- to prepare students for the next stage in their careers, whether pursuing further research or entering employment of different kinds

- to enable those undertaking the programme to contribute towards research in the discipline.

Intended entrants

Intended entrants Requirements for entry to a research master's programme (including the circumstances in which accreditation of prior knowledge, understanding and skills may be used) will be defined by the institution. However, programmes in this category often attract:
- entrants with a bachelor's degree with honours in a cognate or closely related subject
- entrants who have acquired experience through work or other means that enables staff responsible for admissions to be confident of the candidate's ability to succeed in the programme

The difference between a taught master and a professional master is that in a professional master time is spent partially in practice as well. The length of the research master is in most cases two years and is sometimes awarded with a M.Phil. The M.Phil. has a negative connotation in the UK as well, as it is sometimes used for Ph.D. students that have not completed their Ph.D. thesis (QAA, 2010).

So, research masters involve learning through research, and are viewed as valuable preparation for students who wish to undertake Ph.D. studies, especially with many funding bodies only awarding money to Ph.D. students who have completed research master programmes. The assessment of the research master programmes is done differently in the U.K. compared to the Netherlands. The research master in the Netherlands is assessed by the KNAW and NVAO according to a specific assessment protocol. The assessment of the research master programmes in the UK is done by the institutions themselves, with the protocol of the QAA as indicative but not as definitive prescriptions.

3.4.3 Policy discussions surrounding graduate education

The traditional model of the Ph.D. is being challenged by various types of new doctoral degrees like the Ph.D. by publication, the new route doctorates and professional doctorates (Kehm, 2007). The Ph.D. is still, just as in the Netherlands and in the U.S., seen as the highest academic degree that universities can award.

According to Park (2005) there is a growing emphasis on skills and training in graduate education and especially in the Ph.D., on submission and completion rates, the quality of supervision, changes in the examination of the thesis and the introduction of benchmarking. It seems that the research master is well accepted in the UK and there is not much debate about these kind of master programmes.

3.5 Austria

3.5.1 Characteristics of graduate education

The Austrian system of higher education consists of three sectors: (1) the university sector with 22 institutions, comprising research universities, schools of music and arts (Hochschulen künstlerischer Richtung); (2) the university of applied sciences, sector, comprising 21 vocational colleges (Fachhochschulen); (3) the private university sector, comprising of twelve institutions (Bundesministerium für Wissenschaft, Forschung und Wirtschaft, 2015).

The oldest University is the one from Vienna that was founded by Duke Rudolf IV in 1365. Three other universities were founded in the 16th century (University of Graz in 1585) and in the 17th century (University of Salzburg in 1622 and the University of Innsbruck in 1669). In the 17th and 18th centuries 'there were thus four universities on the territory of present-day Austria, universities which had no autonomy with regard to their organization or curriculum but were under church influence and thus excluded from the development of modern science. As a growing number of students came from aristocracy, academic life became "militarized" ' (Wadsack & Kasparovsky, 2004, p.7). Some specialized universities (for example in the field of Technology and Veterinary medicine were founded in the 19th century. The university of Salzburg was closed under Bavarian rule in 1810. It took more than 150 years to reopen the University of Salzburg again

in 1962, and other cities like Linz and Klagenfurt obtained their universities in 1966 and 1970, respectively.

The universities of applied sciences (Fachhochschulen) are from a more recent date. As a reaction to the massification of higher education and to give an alternative to university programmes the Austrian parliament approved the *Bundesgezetz ueber Fachhochschule-Studiengang in 1993* and the first programmes were launched in 1994. The *Fachhochschule* programmes differ from university study programmes by their vocational character; clearer orientation on the labour market and more practical training skills (Kottmann, 2008). For research training, their role is negligible.

As becomes clear from figure 3.4 the number of students at Austrian universities will continue to rise in the years ahead. Furthermore, the vast majority of these students are studying at research universities and colleges of art. The number of upper secondary school graduates will decline but at the same time an increased influx of foreign students to Austrian universities is expected (Statistics Austria, 2012). There were almost 280,000 students at research universities and the Austrian Statistics Agency estimates that this amount will increase to approximately 320,000 students in 2030. The number of students at universities of applied sciences is a little more than 10% of the students at research universities. At the moment there are about 37,000 students at the university of applied sciences and this will increase according to the statistics agency to 45,000 in 2030. The other two categories (pedagogical and private universities) will have approximately 10,000 students. This situation is estimated to be the same the next twenty years by the agency.
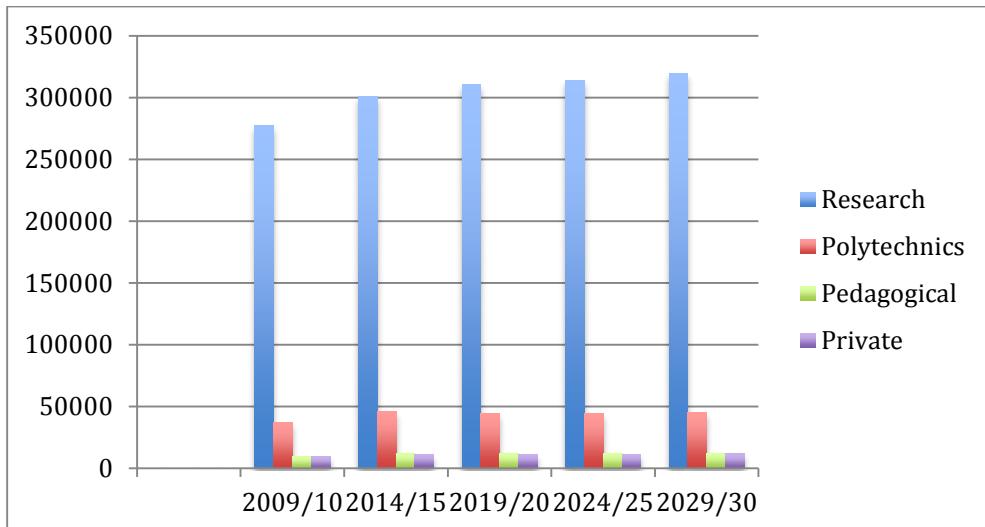
Figure 3.4. Number of students at universities (research, pedagogical, private) and universities of applied sciences. Current number of students and forecasts.

Source: Statistics Austria 2012.

3.5.2 Position of research master programmes

From the literature review in the Austrian higher education sector it became clear that there are no research master programmes offered at Austrian universities. The Bologna treaty resulted in a three-tier system (bachelor-master-Ph.D.). Master programmes are associated with a workload of at least 120 ECTS and the general prerequisite is a bachelor degree of 180 ECTS (Kottmann, 2008). In 2006 the doctoral programmes were reformed. Doctoral programmes have to last at least three years in contrast to some of the old programmes where doctoral programmes consisted of 120 ECTS. These short programmes have to be terminated by 2017. Doctoral programmes are accessible with a completed master programme. The implementation of the three-tier system did not run smoothly and according to Pechar (2012) the Austrian government used the Bologna policy window to reduce the duration of studies up to the master level and a minimum of the length of a Ph.D. programme was introduced.

> It should be no surprise, that implementation of a policy is likely to fail when those who are in charge reject that policy – in many cases the content of the former 4 years course was squeezed into a 3 years Bachelor course. The opponents were

quite successful to assimilate the new degree to the traditional one tier framework. In many cases the reform was implemented in a way that contradicts the spirit of the Bologna declaration. In some cases, Bachelor's programs are set up by simply dividing a 'Diplomstudiengang' (the old type of one tier master's program, taken after completion of secondary school) into two parts. The curriculum of the Bachelor's program is not shaped by the logic of a two tier system, but remains rooted in one tier logic (..) it is qualified by academics and students (..) as an intermediate degree (Pechar, 2012, p. 621).

Despite Pechar's critical remarks, the master's degree is seen in Austria as the (academic) start qualification in the job market and to pursue a doctorate. Most of the bachelor students continue with a master programme (Kretschmer, 2012). Complying with the German tradition, the *habilitation* is still the gatekeeper of an academic career and not like the doctorate in the Netherlands, the UK, the European qualifications frameworks and the USA. The habilitation is the highest academic achievement or qualification a scholar can achieve in Austria. The habilitation thesis is based on independent scholarship and the level is considerably higher than the Ph.D. thesis in terms of quality and quantity. It is an independent achievement without guidance or supervision of other faculty members. In contrast, for the doctorate thesis the apprentice model (in German the Doktorvater model) usually applies, which has the characteristics of being less formalised and standardised than Ph.D. programmes in the U.S. or U.K., and includes the relationship between professor and the doctoral student as its central element.

3.5.3 Policy discussions surrounding graduate education

The introduction of the Bologna Process did not run smoothly and was even a key target of criticism in Austria (and Germany).

Pechar sees as one of the reasons for this antagonist attitude towards the reform that the tensions between Bologna and the Humboldtian values (teaching and research are combined in the search for impartial truth) in the higher education debate in the Germanic countries. There are two conflicting groups of academia. The older cohorts of academics are opposed to these reforms and are defending their view on the Humboldtian legacy (Pechar calls them the last Humboldtion warriors). The second group consists of young academics that have experiences abroad (e.g. post

docs) and know the North-American system of higher education. They have on average a more positive attitude to Bologna and are less in favour of the Humboldt myth. For example, Ph.D. rights for higher education institutions are now associated with accreditation of Ph.D. programmes. More structure of the 3rd cycle is becoming accepted in Austria. Although it still can vary how structured the new Ph.D. programmes are compared to the Doktorvater model, something seems to be shifting. As the attitudes of students are strongly influenced by their academic teachers, one might expect that the impact of the Humboldtian legacy on higher education policy will decline in the years to come. The new generation of Academic Leaders will play an important role as well in this transition period. The research master is not explicitly mentioned in the Austrian debates. The Austrian ministry will probably be hesitant to come up with new reforms after Bologna. The modernization of the next generation of academics will likely to be incremental and it still has to be seen what the effects of their experiences from the United States will be.

3.6 Conclusions

Is the research master a programme unique to the Netherlands or are there similar policy initiatives or programmes in the other countries examined?

In the previous sections it became clear that, in the USA, three types of master degrees can be distinguished, often (but not uniformly) designated as research masters, professional masters and terminal masters. Research masters often are a mixture of course-based and research-based education. A final thesis with independent research may be required. Professional masters provide advanced training for further employment in a (regulated) profession or specific occupation. A capstone project but not necessarily independent research is frequently one of the graduation conditions. Terminal masters may be described as the highest degree in their area, with longer programmes leading to a higher level of proficiency than other professional masters (University of Florida, 2008). In the USA, M.Phil. degrees mostly are offered to doctoral students who passed the coursework but did not complete the dissertation ('ABD'). In the UK, taught masters, research masters and professional masters are distinguished. The main differences among them

concern the proportion of structured learning and independent research. However, in the UK like in the USA, there are no uniform, agreed standards. Most research masters devote more time of their two-year programme to research and research skills than taught master's and professional master's. Sometimes an M.Phil. is awarded. However, again like in the USA, the M.Phil. has a negative connotation in the UK as it is sometimes used for Ph.D. students that have not completed their Ph.D. thesis.

In the case of Austria, we did not find any evidence of such a system at all. This probably has to do with Austria's resilience towards the Bologna process and its approach towards research training, with the role of the Doctorate training and the Habilitation in general.

From the analysis of various countries regarding the second and the third cycle in this chapter and chapter two, it has become clear that there are two contradicting models for training of researchers (Clark 1998; Kehm, 2006). Although the European University Association is very active in harmonising the third cycle in Europe (EUA- Council of Doctorate Education) there is still much variation in doctoral training models. On the one hand there is the apprenticeship model originally dominant in continental Europe; and on the other hand, the more structured Ph.D. model that has its roots in the United States and now has common ground with the whole Anglo-Saxon world (Pechar, Ates & Andres, 2012). In the Ph.D. model there is a collective responsibility for the graduate schools and the departments for the research training, and this is more structured and formalised.

The Ph.D. model has become more dominant in the last decade. Stimulated by the Bologna and the Lisbon declarations 'policy makers have begun to scrutinize doctoral education and training, and as a result universities have been requested to develop institutional strategies to improve it [Doctoral training, JS] rather than leaving it in the hands of individual professors and departments' (Kehm, 2006). In the Netherlands graduate school reforms were undertaken also (VSNU, 2014). In Austria there is more resilience towards 'Eine Amerkanisierung der Doctorsarbeit' (Pechar, 2012) although reforms are launched to professionalize the third cycle. The most recent discussions about doctoral education, globalisation and

discussions about over-capacity of doctoral students were addressed as well (Nerad, 2010a; Nerad & Heggelund, 2011).

The question posed is, therefore, to be answered largely in the affirmative: although specific degree programmes to educate researchers have been known for a long time now in countries such as the USA and the UK, the research master is peculiar to the Netherlands, at least as a system-wide, specifically accredited degree programme intended to prepare the next generation of researchers both in universities and in other research occupations.

In the next chapter, we will prepare to analyse the extent to which these intentions were realised by discussing potentially relevant models of policy evaluation.

Chapter Four *Measuring the Effectiveness of Research Masters and Agenda Setting*

4.1 Introduction

In this chapter we will focus on the concepts of policy effectiveness, policy instruments and agenda setting in higher education. There are different ways to look at policy aims, processes, and their results. In the end and for the purpose of this thesis the question 'what works', i.e. policy effectiveness, is crucial. Several evaluation models require knowledge of the state of affairs before the new policy was introduced. However, there is not a simple, binary difference between before and after the research master policy. The policy process is influenced by the type of issues that may come to the political agenda and the perspective in which they may be interpreted or get connected to other issues. In other words, what were the context and perspective in which the research master appeared, and which problems was it supposed to solve? Hence we need to know something about how the research master made its appearance on the policy agenda in the Netherlands, a question we will address from a specific theoretical perspective. First, however, concepts of evaluation and the measurement of the effectiveness of policy instruments in more general terms will be discussed in section (4.2). In the next section (4.3) agenda-setting theory will be presented. In the last section (4.4) conclusions will be drawn regarding the usefulness of these insights for answering our central research question.

4.2 Measuring the effectiveness of research masters

Public policy could be seen as an attempt by governments to solve or reduce society's problems (Parsons, 1995). The scope of the problems governments have to deal with is variable from time to time. In the nineteenth century the main task

of governments was to strive for order and organize the country's defence. At the present time the tasks governments face have increased remarkably. The problems that fall into the public domain vary, for example, from fighting obesity to terrorist attacks. Added to that increase of tasks is the fact that, due to democratisation and individualism in combination with the impact of (social) media, societal pressure calls for swift action and this gives the debate on the effectiveness of public intervention some urgency. People demand value for money and want it 'right here and now'. Governments on the other hand are continually confronted with unexpected developments and problems, with the awareness that the number of possible of solutions is limited. Although governmental interventions have been successful (de Vries, 2001) it is questionable whether the increase in policy initiatives by the state has exhibited a similar increase in effectiveness? An attempt to answer these questions will be given in this section by first, in (4.2.1), touching upon the measurement of the effectiveness of public policy, and second, presenting the definitions and scope of policy instruments (4.2.2). Third, the question of when a policy instrument is effective will be addressed (4.2.3). Fourth, there will be some further elaboration on the theme of responsive evaluation (4.2.4).

4.2.1 Measuring the effectiveness of public policy

Before we touch upon the subject of policy effectiveness it is important to place it in the context of policy evaluation.

Since the 1970s, several evaluation studies have emerged to justify the actions of the state (Fischer, 1995). But evaluation and evaluation research are more than a validation. They involve learning about the consequences of public policy as well. Thomas Dye states that policy evaluation research 'is the objective, systematic, empirical examination of the effects ongoing policies and public programs have on their targets in terms of the goals they are meant to achieve' (Dye, 2002, p. 345). This *learning effect* could perhaps be seen as the greatest benefit of public policy evaluation. Policy agents constantly learn from formal and informal evaluations. Dye's definition is a rational approach to the evaluation process. Howlett, Ramesh & Perl (2009) argue that policy evaluation, like other stages of the policy process, is a political process. Some political agents have different agendas which could be enhanced by evaluation activities. Selected problems appear to have been hidden while others are intentionally pushed to the fore. Although policy analysis is not a

completely irrational or politicised activity there is a limited amount of rationality, which has to be recognized when dealing with policy evaluation.

Three types of evaluation research can be distinguished: product evaluation, process evaluation and plan evaluation (Swanborn, 2004). Product evaluation is an evaluation in which the effectiveness of the intervention is the key element. Process evaluation is a type of evaluation research where the implementation of an intervention is tracked and if necessary adjusted. The key element in this kind of evaluation research is the exact operation of the intervention via social processes. Plan evaluation is a form of research in which the intervention is designed and where finally alternative interventions are recommended as well. Product evaluation is the most relevant for this study, because the research masters policy initiative can be seen as an intervention to prepare more and better researchers. Furthermore, we are interested more in the results than in the exact operations, which are in the area of authority of academics anyway, not of the state, although through accreditation requirements and funding arrangements it does influence the implementation processes.

Besides this distinction there are three critical elements to be taken into account regarding evaluation analysis: the choice of the evaluation subject, the observation of the subject, and the criteria for the evaluation (Bressers, 1983). The choice of the evaluation subject is important because different policy sub-disciplines have different evaluation routines. Another choice pertaining to the evaluation subject is whether evaluation takes place in advance (*ex ante)* or whether evaluation is part of a policy that is in progress or has ended (*ex post).*

Yet another distinction can be made when choosing the evaluation, namely, focus on the process, the content or the effects of evaluation. Most evaluation studies focus on the effects, including process and content aspects. Furthermore, the 'process' is usually the central subject of evaluations when limited data is available (Swanborn, 2004). Finally, with regard to the aim of evaluation, a distinction should be made between summative evaluation and formative evaluation. Both are evaluations of the effects of policy. The former is designed to make up the balance and pass a final judgement, whilst the latter enables the policymakers to adjust the policy and its implementation to suit the situation.

The observation of the subject can be done in a qualitative or a quantitative fashion. Although the ideal typical forms of both approaches have fundamental starting-points (logic positivistic and phenomenological), in practice both quantitative and qualitative approaches are used.

Besides the subject of evaluation and the observation of the subject, the criteria used for evaluation research is relevant as well. First of all, there is *goal attainment research*. Goal attainment is predominantly about the accomplishment of goals, including the official governmental goals as well as the informal or hidden goals. It should be noted here that for goal-attainment research, not the policy itself but the formulated goals are the central unit of analysis. Subsequently, *evaluation of effectiveness* is defined as the degree to which the implementation of a policy contributes to the attainment of goals intended by a policy maker in question to be attained by this policy. Furthermore, *efficiency-research* not only concerns the effects of a policy but also the cost involved in obtaining these effects. In the next section the differences in typology of four practical-oriented evaluation approaches will be described.

A more practical evaluation research distinction could be of use. In the following table 4.1 a basic typology of the evaluation of policy instruments is presented to explain the place of effectiveness in the spectrum of practical evaluation research.

► approach ▼ valuation principle	Emphasis on before-after	Emphasis on with-without
'no specific goals or expectations'	1. Situation Research	3. Effect Research
'specific goals or expectations'	2. Efficacy Research	4. Effectiveness Research

Table 4.1. Basic Typology Evaluation of Policy Instruments.

Source: Graaf and Hoppe, 1992, p. 412

The horizontal axis of the table shows two approaches of the evaluation research. In the first approach the emphasis is on comparing the situation before and after introduction of the policy (same case/location, different moments in time). In the second the emphasis is on comparing cases with or without the policy instrument (same time, different locations/cases). The vertical axis is the valuation principle

of the policy instrument. This can take two values as well. With the first principle, there are no specific goals or expectations of the policy instrument on which the evaluation is based, whereas with the second one there are specific goals or expectations of the policy instrument. The two axes combined make four types of practical evaluation research: Situation Research, Efficacy Research, Effect Research and Effectiveness Research. These four types will be discussed in the next paragraphs.

First, Situation Research, which is a goal-free analysis of changes before and after the introduction of a policy. This form of practical evaluation research is useful for understanding current changes. It is a relatively quick and low-cost research tool, used mostly in political decision-making. 'This research strategy offers no empirical substantiation that the observed changes could be caused by other factors' (van de Graaf & Hoppe, 1992, p.414). Only when an evaluator can prove, using theoretical principles, that the policy instrument employed is the only factor of influence and that the influence of other factors remains the same or is negligible, can this method be used. The lack of concrete goals or expectations of the policy instrument is a shortcoming of this practical evaluation approach.

The second approach is Efficacy Research. The difference between Efficacy Research and Situation Research is the formulation of concrete goals or expectations of the policy instrument used. The common factor between these two is that the situation before and after the introduction of policy instrument constitutes the design of the evaluation study. A shortcoming of this approach is the possible modification of the original goals during the implementation process. In an Efficacy analysis it is important that this notion is considered, for example, if the target level is reached too easily. Furthermore, the emphasis on before and after raises the problem of attribution of the chosen policy instrument as the decisive factor, just as we have seen with Situation Research.

The third practical evaluation approach discussed is Effect Research. In comparison to the approaches above, Effect Research focuses on the added value of the policy instrument with regard to the changes which have occurred. Other factors which may be of influence, could be responsible for the changes, which have occurred as well. To measure the effect of a certain policy instrument, the added value of the

instrument must be isolated from other explanatory factors. The inadequacy of this kind of research is the lack of initial clearly defined goals or expectations. The extent to which the policy problem has been solved from the perspective of the policy maker is concerned is untraceable, for that reason.

Fourth, we discuss Effectiveness Research. Together with Effect Research it has the added value of the situation in which the policy instrument is present being compared to the situation without presence of the policy instrument. This enables the measurement of the concrete effect of the policy instrument in otherwise similar situations. Together with Efficacy Research this evaluation research shares the direct connection with the original goals of the policy makers. The predicted situation with the use of the instrument is compared with the situation without the use of the policy instrument. This may lead to knowledge of the predicted effects. Effectiveness Research is only useful when there is enough information of *ex ante* research available. Another shortcoming is that not all actual effects are studied; only those effects that are predicted are part of the research.

Of these four models the effectiveness approach is the most appropriate to answer the research question. The with versus the without policy design enables the measurement of the concrete effect of the policy instrument. Together with Efficacy Research this evaluation research shares the direct connection with the original goals of the policy makers. The predicted situation with the use of the instrument at T1 (A1) is compared with the situation at T1 without the use of the policy instrument (B1). This may lead to knowledge of the predicted effects.

4.2.2 Policy instruments

So far the evaluation of policies in general has been described. In this section policy instruments will be discussed, because we are interested in learning more about the specific mechanisms of the research master as a policy instrument; for in any policy model, the mechanisms or instruments through which it is implemented may affect its outcomes. 'With policy instruments we mean the sets of techniques by which governmental authorities wield their power in attempting to ensure support and effect or prevent social change' (Bemelmans-Videc, Rist & Vedung, 2011, p. 21).

Effectiveness

Developments in
the policy field

A

A1

actual

Predicted

B

B

X

Time

T0   T1
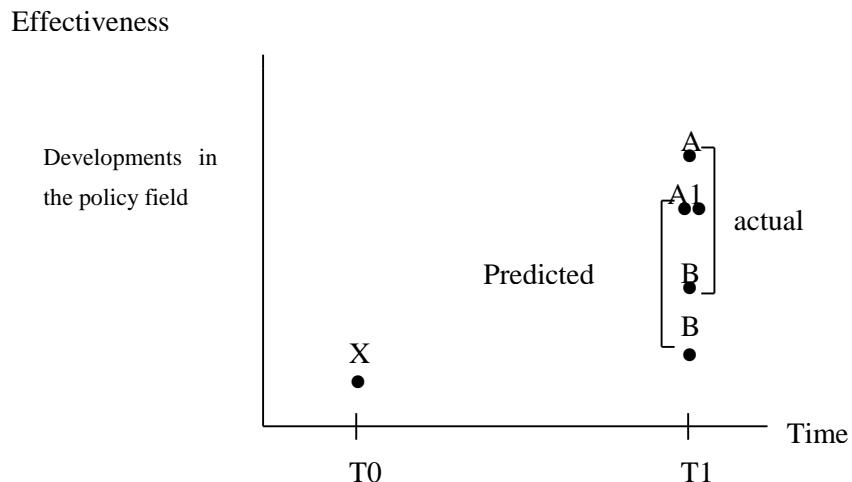
Figure 4.1. Effectiveness model by Graaf and Hoppe, *Beleid en Politiek,* p. 415

Two of the classical categorisations of policy instruments are those of Mitnick (1980) and Hood (1983). Before these categorisations came into fashion in the eighties, policy instruments had already been studied by some of the great political scientists such as Dahl, Lindblom and Etzioni in the fifties and in the sixties (Van Vught, 1995).

The level of restriction is the primary criterion that Mitnick uses in his categorisation. Directives are more restrictive than incentives and of the incentives, tax incentives are more restrictive then subsidies and promotion campaigns. In Hood's *The Tools of Government* (1983) at a first glance a more fully developed categorisation is developed, although there is no dimension (the extent to which the tools are used) as in Mitnick's categorization. Four types of instruments are mentioned: instruments of information, of treasure, of authority and of action are described. The instruments of information are for example responses and messages; the instruments of treasure are contracts, bounties, transfers, bearer-directed payments; the instruments of authority are for example certificates, approvals, conditions, enablements, constraints; instruments of action are for example operational activities. A final categorisation is 'the carrot, the stick and the sermon' as used by Bemelmans-Videc et al. (2011), or in other words the financial, legal and communicative policy instruments respectively. The way restriction is used or other behavioural incentives are given varies. Van der Doelen (1989) makes a

distinction between more directive or constituent policy instruments; he draws a second distinction between more individual or general instruments and a third and final distinction between those which are more restrictive or expansive.

After listing the various categorisations, it becomes clear that the level of restraint of behaviour of societal actors varies and is in all categorisations an important criterion. In the Public Administration discourse on policy instruments the emphasis is mainly put on incentives and disincentives of a financial and legal nature. Prestige (positive and negative) could be an important reason for an incentive or disincentive as well. Furthermore, the policy instruments are mostly a combination of different instruments: 'public policy instruments come in packages rather than in isolation' (Bemelmans, Rist and Vedung, 2011, p. 257). Moreover, the context of a country and policy field is of importance to assess the results of the effectiveness of a policy instrument. 'One of the most crucial questions in present-day public sector regulation is how governmental policy models and instruments can be matched to the circumstances in which they are applied' (Van Vught, 1995, p. 25). For our study on the 'Research Masters policy instrument' it is important to understand the specific Dutch education policy field in order to understand the choices of this policy instrument better.

In the Dutch education policy field (not specific to the higher education policy subsystem) Putters (2007) argues that an adequate toolbox for education policy, which is able to respond to the complex information society and its rapidly changing needs, benefits from consistent political choices with a clear vision of a flexible knowledge infrastructure. According to Putters, this requires higher awareness and the combination of legal, financial and communication policy instruments, rather than one perspective; in other words, it is an acquired skill to be able to choose the right mix of instruments at the right time. The mix of the policy instruments is an improvement above the discussion of only individual instruments, because in most cases, policy instruments are not stand alone measures. The potential question could be whether the choice of the Research Masters as a specific policy instrument is the right choice at the right time.

4.2.3 When is a policy instrument effective?

There have been few attempts to theorise about the evaluation of effectiveness in research. Most of the research has attempted to define effectiveness. In fact, few theories of effectiveness are useful in explaining or predicting effectiveness. As Kraan puts it regarding the state of the art in effectiveness literature a coherent structure within which the insights can be ordered is lacking (Kraan-Jetten, 1991). Kraan tries to solve this 'hole' by constructing two central factors in her theoretical framework: the quality of the intervention hypotheses on the one hand and the mode of implementation on the other hand. By combining these two facets she attempts to determine policy effectiveness. Another prominent theory pertinent to the literature on effectiveness is the instrument theory, originally posited by Bressers and Klok (1988). This theory consists of two central parts, or processes. The first being the *process to be regulated*, also called the decision process. The second is the *implementation process*, which is subdivided into two processes, namely: *retention of form* and change of sanction. Bressers used the theoretical approach of *interaction processes* to study the concept of policy effectiveness. According to Bressers, '…in analysing such a process, one may more or less abstract from the "real life" concept of the process. The one extreme is to leave the process of a black box: and to compute only the statistical correlations of inputs and outputs of the process. The other is to describe and analyse the course of the process with the help of characteristics of the actors concerned.' (Bressers & Hoogerwerf, 1991, p. 291). He utilised both methods in his study.

Swanborn (2004) disagrees with the instrument theory although he calls it '…a laudable Dutch attempt to rationalize policy process modelling' (Swanborn, 2004, p.131). His main criticisms are the excess of suppositions in the model and unnecessary emphasis on the rational choice theory. But why did the attempts to rationalise effectiveness evaluation fail? Perhaps it has something to do with the complexity of the concept effectiveness (Kraan-Jetten, 1991). First, if one regards effectiveness as a characteristic feature it is hard to determine to whom or what it belongs. For example, is effectiveness in the eyes of the 'public', the government, or perhaps interest groups? Second, others state that effectiveness should be seen as a feature of a means (Hoogerwerf, 1984). However, if one follows the line of effectiveness as a feature of a means, then there is a distinction between formal and informal means, and a choice between these two means has to be made. Third,

perhaps the transfer of private sector models (like effectiveness models) to the public sector is not so much related to the public reality in which accountability and more value orientation are crucial elements (de Vries & van Dam, 1998). In other words, adequate policy evaluation does not only consider the achieved effects or the appreciation of the main stakeholders resulting from the policy. Rather, good policy evaluation accomplishes both of these aims and simultaneously searches for explanations for the results witnessed or lack of effectiveness and appreciation.

Having these criticisms in mind, now we return to our original question: When is a policy instrument effective? There are two important elements that are important in determining to what degree a policy instrument is effective (Kraan-Jetten, 1991). First, to what extent is the total change of the goal variable to be attributed to the policy pursued? Second, to what extent does the effect of the policy correspond to the change intended to be brought about by that policy? Thus, attribution and causality are the main elements in determining effectiveness. Is the initiated policy instrument responsible for the changes occurring in the policy? Is there enough evidence to rule out other factors that could have caused the change? Could the policy instrument cause other effects? According to Sabatier (1986) a major fault in Effectiveness Research is that it awards credit for a policy change entirely to the policy instrument, ignoring other field variables. In this respect there is always a tension between methodological demands and practical feasibility. Due to favourable developments in the field, a policy could be considered effective when there is no actual effect, or even if a negative effect is caused by the used policy instrument. Following Hoppe and Van de Graaf, effectiveness research is designed precisely to counter that error by comparing the gain in goal achievement between cases with and cases without the policy instrument being employed. The policy effect, associated with the difference between these two categories of cases, will be determined/measured/visible? even if, for instance, everybody has made some degree of gain due to changed circumstances. This is exactly the reason why the effectiveness research model will be used in this study, i.e. to distinguish effects caused by the intervention of the research master policy instrument from other (policy or educational) effects.

4.2.4 Responsive evaluation

The problems with the effectiveness model could be best explained by one of the debates in the world of evaluation research. Although the rational analytical approach to policy evaluation has been strongly criticized in the last twenty years, it has strong roots. Policies and governments are imbued with *'causality-if-then reasoning'*. According to Guba & Lincoln (1989) there are three main criticisms to this (what they call) quantitative approach. First, within this approach there is a clear tendency towards managerialism. Second, the approach suffers from a failure to accommodate value-pluralism. Third, there is an over-commitment to the scientific paradigm of inquiry. Although they do not make exactly clear why, for example, managerialism is a negative aspect, Guba & Lincoln plead for a more constructivist, more responsive form of policy evaluation, in which evaluation is an interactive learning process whereby the researcher, principal and other stakeholders come to new views about problems and policy alternatives on the basis of debate and argumentation (Abma, 1996). The responsive policy evaluation has been criticized as well, however, for its alleged 'permissiveness' and weak methodological basis (Sanderson, 2002; van der Knaap, 2006). Still the responsive evaluation approach produces the interesting insights that a policy theory is not the product of one rationality of one (central) actor, and that emphasis on existing policy instruments and policy goals can lead to tunnel vision.

According to Van der Knaap (2006) rational and responsive policy evaluation can be summarized by four elements:

1) There is no universal validity to be expected of policy theories; effectiveness of policy programmes is strongly dependent on their context.
2) It is of vital importance that all stakeholders are involved.
3) More and more a combination of assessment and explorative evaluations should be used.
4) Apart from the measurement of the effectiveness of policy instruments other examination criteria will be used (positive and negative side-effects and the appreciation of the implementation by the stakeholders).

These four points may be very useful for our evaluation study of the effectiveness of the Research Masters. The first point is valuable in that it stresses the importance of being open to more perspectives on the Research Master policy instrument. Van

der Knaap's second point will be addressed via research on the mutual perspectives of important stakeholders. Given my position in this study, as a researcher after the fact and not directly connected with policymaking, summative evaluation is appropriate here. Explorative and formative evaluation is more appropriate for stakeholders of higher education institutes themselves. Finally, other examination criteria will be used as well to measure the positive and negative side-effects of the policy instrument and appreciation of the implementation by the stakeholders.

To summarise, policy evaluations not only deal with the way effects are reached and the appreciation of the policy by its stakeholders but also try to seek explanations (or the lack of these) for their effectiveness and appreciation. Evaluation is after all useful even when it has not been used directly. 'Evaluation has real consequences: it challenges old ideas, provides new perspectives and helps to re-order the policy agenda … any channels bring evaluation results to the attention of policy makers, and they listen not only because they want direction but also to justify policies, to show their knowledge and modernity, and as a counterweight to other information' (Weiss, 1999, p. 468). Whilst Weiss emphasises the importance of evaluation in changing the policy agenda, the agenda process itself also merits attention. Let us first study the agenda setting processes to gain a better understanding.

4.3 Agenda-setting processes

While our evaluation of policy in the first instance takes the policy and the goals against which it will be evaluated as a given, understanding of a policy and of the official goals is deepened if the policy's context is understood better, especially in terms of the social 'problem' that the policy was intended to solve and of how stakeholders perceived that social 'problem'. While this is may be a general principle, it is the more applicable in higher education policy, and certainly in the case of the research master in the Netherlands, because much of its implementation depends on cooperation by stakeholders: do academics share the minister's view of the problem situation, or is the policy a compromise serving different goals for different parties in the policy-making process? In the latter case, the policy may become 'translated' in the course of implementation (Czarniawska & Sevón, 1996),

leading to 'mixed performance' (Cerych & Sabatier, 1986) or worse. Understanding how the issue of research masters came to the policy agenda is, therefore, instrumental to our evaluation of the policy.

Accordingly, in this section we address the question: How did the research masters policy initiative arrive on the higher education policy agenda? We sketched the chronology already in chapter 2 based on published reports and our own interviews, and want to justify that overview, because as every observation is infused by theory, we should make our theoretical assumptions explicit. To analyse the rise of the research masters on the higher education policy agenda, the models for analysing agenda-setting processes described by Kingdon (1984) and May (1991) can be of use.

Kingdon argues that policy processes should not be divided into rational and empirically clearly separated steps (agenda setting, policy formulation, implementation, evaluation), because the actual processes of policy making cannot be grasped by a rational stage-sequential model. Societal and political events, stakeholders and pressure group activities make policy making not a rational process but more a black box. Furthermore, there is not such a thing as a comprehensively rational actor with full access and availability of information. Rather, policy processes consist of three streams that operate (relatively) independently of each other and exist beside each other: one stream of policy problems; one policy stream; and one stream of political developments. A moment of choice exists when policy problems and policy alternatives come together and are connected by political developments. Let us elaborate further on these three streams.

First, the problem stream will be considered. There are multiple problems that contend for the attention of politicians and policy makers and because political attention is scarce and volatile, there is a constant battle between problems to get access or remain on the policy agenda (Edelenbos & Twist, 1997, p. 29). The identification and the definition of problems are arguably the most important features in the agenda-setting process. Kingdon describes this part of the policy process as: '… problems come to the attention of governmental decision makers not through some sort of political pressure. Conditions become defined as problems

when we come to believe that we should do something about them' (Kingdon, 1984, p 96). To identify a problem indicators are needed, which gauge the severity and urgency of the problem. Sometimes a crisis, and Kingdon uses this as an all-inclusive term for events which are the focus of attention, can unexpectedly help us to recognize a problem. Stone (2012) adds that the identification of problems is often not done in an objective manner. More specifically, problems are regularly defined through a strategic process which is influenced by the vested interests of the political actors involved, in an attempt to get support for their vision or ideology.

Second, the policy stream consists of experts and analysts examining problems and proposing solutions for them. There is competition between policy alternatives to the stated problems due to time, manpower, logic and money constraints. Diverse stakeholders try to put their policy solution into the limelight or have it accepted. Kingdon stipulates that there is an incubation time for policy alternatives. That is, it takes some time and habituation for decision makers before they become adjusted to certain policy alternatives.

Third, the political stream 'is composed of factors such as swings of national mood, administrative or legislative turnover, and interest group pressure campaign. Potential agenda items that are congruent with the current national mood, that enjoy interest group support or lack organized opposition, and that fit the orientations of the prevailing coalitions or current administration are more likely to rise to the agenda prominence than items that do not meet such conditions' (Kingdon, 1984, p. 20). These political developments can generate or undermine support.

When the first two streams (problems and policies) come together through political developments, a policy window opens. Such a policy window enables the possibility for a policy change in a limited time-frame. Furthermore, Kingdon especially points out the role of policy entrepreneurs who have a special talent for making use of, or even contributing to the opening of a policy window. He defines 'policy entrepreneurs' as actors who use their knowledge of the process to further their own policy ends. They 'lie in wait in and around government with their solutions at hand, waiting for problems to float by to which they can attach their

solutions, waiting for a development in the political stream they can use to their advantage' (Kingdon, 1984: 1656).

Critics argue that Kingdon's streams theory is limited by its contingent nature:

> it suggests that the timing in which items emerge on the agenda is set by a host of unpredictable items such as the behaviour of 'policy entrepreneurs' and various sorts of exogenous and endogenous crises or shocks. While this may be true of specific issues, it ignores the observation of Cobb and others that certain issues tend to emerge on the institutional agenda in only a relatively limited numbers of ways (Howlett, Ramesh & Perl, 2009, p. 115).

According to Howlett, Ramesh & Perl it is more fruitful to conceptualize the agenda-setting process in terms of interaction of the nature of the policy subsystem involved in the issue area and the nature of the policy itself.

Other scholars (Cobb, Ross and Ross, 1976; May, 1991) argue that the nature of the policy subsystem dealing with the problem and the nature of public support for its resolution can explain agenda-setting processes. Four different models can be distinguished (Table 4.2.): outside initiation, inside initiation, consolidation and mobilisation. All four patterns of agenda setting will be described below.

Initiator of Debate	Nature of Public Support	
	High	Low
Societal Actors	Outside Initiation	Inside Initiation
State	Consolidation	Mobilization

Table 4.2. Patterns of agenda setting by policy type (from Howlett, Ramesh & Perl, 2009, p. 116)

First, the outside initiation pattern: a certain non-governmental group (societal actors) get support for their problems, and sometimes team up with other groups and are successful in putting the problem on the public agenda and force decision makers to put it on the formal agenda as well for consideration. Second, the pattern of inside initiation: some governmental groups (or groups close to the government) initiate a problem and a policy (solution) without having it discussed out in the open, i.e. public debates about it. These groups have access to the decision makers and have knowledge and expertise about the policy issue concerned. Third, the

consolidation pattern: here there is already much public involvement and the decision makers (state) initiate the process of solving the problem. Fourth, the mobilisation pattern was originally designed as a model for totalitarian regimes but proved to be useful for other (democratic) regimes (Howlett, Ramesh & Perl, 2009) as well. In this pattern, the extent of the public support is low and decision makers want to transfer something that they see as a problem and have put on the formal agenda to the public agenda as well because they foresee problems with the acceptance and implementation of an issue.

What do these characteristics of higher education institutes tell us about agenda-setting processes? When we compare the characteristics of higher education institutes with the agenda setting models of Cob, Ross and Ross and May, it is most likely that the patterns of agenda setting in the higher education policy subsystem that are likely to be the most successful are the inside initiation model or the outside initiation model. The societal groups in the higher education policy subsystem (students and faculty) are strong). These groups can either make use of 'voice' (Hirschman, 1970) to put certain problems and policy suggestions to the public and afterwards onto the formal agenda of the decision makers or make use of informal channels outside the public limelight to put certain policies not only on the agenda but to set it. Access to policy makers is often through informal channels and networks in the relatively small world of steering a higher education system, although there are also many formal channels, such as permanent and ad hoc advisory committees—as discussed in chapter three regarding the chronology of the research master development.

4.4 Conclusions

The theme of this dissertation is the effectiveness of the research masters. In this chapter we have explored the debates in public administration about the effectiveness of policy instruments. There are methodological concerns related to effectiveness research (as discussed in 4.2), nevertheless this model has been chosen as it also holds important advantages for this particular study. Such as as the specific goals and expectations of the policy instrument (more and better researchers) and the because of the introduction of the bachelor and master system

and the differentiation at the master's level (research master and taught master) as the predicted situation with and without could be measured. In the research design the predicted effects with and without the research masters at the same moment in time will be taken into account. In the literature we have found that the perception of the relevant stakeholders before and after the introduction of a policy are important to examine, because that is the level where policy effects will be felt ultimately.

To put the survey findings on stakeholders' perceptions into context, in the next chapter the instrument of RM will be described in more detail. This is also important because its framing during the design and decision-making phases of the policy making process may influence the goals set for the policy as well as its implementation, the public support, etc. Following the same stakeholder-centred logic, the perceptions of the relevant stakeholders in the making of the policy/instrument before and after the introduction of the research master will be analysed. In this chapter the concepts of agenda setting have been introduced as well, because these models (Kingdon and May) will be used in chapter six when the stakeholder perspectives, before and after the introduction of the research master will be studied.

Chapter Five *Operationalising the Connection between the Second and Third Cycles*

Variables and Methodological Considerations

5.1 Introduction

In this chapter the body of knowledge regarding the connection between the Second and Third cycles will be presented (5.2) after which we will select the dependent and independent variables of this study (5.3). Furthermore, some Methodological Considerations will be drawn in section (5.4). The results achieved in the analyses of the different bodies of literature in the previous chapters play an important role in some of the choices in this chapter. In chapter two we concluded after an analysis of the relevant stakeholders that faculty and students were the main stakeholders and beneficiaries in the development of the research master in the Dutch higher education system. In chapter three it appeared that the research master is peculiar to the Netherlands, at least as a system-wide innovation intended to prepare the next generation of researchers both in universities and in other research occupations. In chapter four we explained the choice of the effectiveness model for our study of the research master. We also found that policies are always operative in a certain, unique context. Together chapters three and four set the stage for an operationalisation of our study as one into the intended effects of the research master policy reform. As a specifically Dutch policy, and a study of its effects on the faculty and students needs to take that specific Dutch context into account.

5.2 Variables in the Connection between the Second and Third Cycles

Given the shortcomings in the Ph.D. training the question arises which skills, characteristics, or factors are lacking in the master degree to best prepare students

for the Ph.D.? In answering this question, it is useful to examine the potential independent variables to measure the progress or success of Ph.D. students in the postgraduate research literature. In general, two categories of independent variables are mentioned to explain success in the Ph.D. phase: structural and individual variables (Vassil and Solvak, 2012). Vassil and Solvak did not use the specification of individual variables that already had been introduced by Wright and Cochrane (2000) who suggested the following three main independent variables by making a distinction between two categories of individual variables. In their view there are:

(1) institutional and structural issues;
(2) individual, non-psychological characteristics (such as age and funding);
(3) individual factors intrinsic to the student such as motivation, ego strength (Wright and Cochrane, 2000, p. 184).

But for the sake of simplicity in the rest of this section the distinction between structural/institutional and individual (psychological and others) independent variables as described by Vassil and Solvak (2012) will be used.

As the literature is focused on the Ph.D. training, we will first review the potential independent variables found to be empirically relevant in studies about the Ph.D. level. Afterwards, we will reconsider the potential variables for their usefulness in studying the Dutch research master programmes and students.

Structural/institutional independent variables

When examining structural and institutional variables of success of the Ph.D., according to McAlpine and Norton (2006), an integrative and systematic perspective with student experience of learning at its core should be used. The student–supervisor experience is embedded in a departmental context, which itself is housed within an institutional context, which is finally embedded in a societal and super societal context (not only a national context but an international context which includes, for example, the Bologna process and the European Research Council). All contexts have influence on the student–supervisor experience. The three contexts can be found if we are looking more specifically at structural and institutional variables in the Netherlands. Two studies will be examined in which independent variables that explain success in the Ph.D. and predictors of Ph.D.

delay are studied. The first study is that of Sonneveld and Oost about the success of Ph.D. studies at Dutch research schools (2006) and Van der Schoot, Mouw and Sonneveld about Ph.D. delays among Dutch doctoral candidates (2013). These studies are worthy of mention as they list variables relevant in this perspective.

In the first Dutch study about Ph.D. success the following independent variables were used: (1) social context factors; (2) institutional context factors; (3) factors related to research school culture; (4) educational factors and finally (5) guidance-related factors. The social context factors include the reputation of the research group and its faculty, the demand for Ph.D. recipients, and the supply of suitable Ph.D. candidates. The institutional context factors include the selection (procedure) of new faculty, the selection (procedure) of Ph.D. candidates, the central administrative capacity of the research school board, quality control of the research school and the number of Ph.D. positions financed via different sources. The research school culture factors consist of the variables, research vision, quality control of the programme and the supervision, and finally the commitment of the faculty and Ph.D. candidates. The educational factors consist of the mission of the programme, the didactics of the programme, the coordination of the curriculum, ambience and education. Finally, the guidance-related factors consist of expectations and agreements between supervisor(s) and the Ph.D. candidates, timely and articulate formulation of the research problem, the nature of the guidance relationship and the amount of time that supervisors spend with their Ph.D. candidates (Sonneveld and Oost, 2006, p. 24). These five factors are comparable with the three factors of McAlpine and Norton. The first two variables are roughly the same although McAlpine and Norton use supra-national factors and Sonneveld and Oost do not explicitly. The difference is that the departmental factor of McAlpine and Norton is divided by Sonneveld and Oost into three factors, i.e. research school culture factors; educational; and guidance-related factors, because Sonneveld and Oost describe the specific research school situation in the Netherlands. Although the research school culture factor is not that relevant for our study because almost all research master programmes are conducted within a university or departmental context and not in an inter-university context like the research schools, some of their independent variables such as supervision and commitment may be useful for this study.

In the second Dutch study, aptly named: *What took them so long? Explaining Ph.D. delays among doctoral candidates*, the structural or institutional variables as mentioned in the factors of Sonneveld and Oost were stipulated as well and generalised into two categories: (1) institutional or environmental factors; (2) the nature and quality of supervision. The institutional or environmental factors include: field of study, departmental research climate, and resources and facilities available to the project. The nature and quality of supervision category includes the frequency of meetings and the support of research colleagues.

After our overviews of variables above, some structural/institutional variables will be discussed in more depth in the sections which follow because this could be useful for the further exploration of relevant independent variables of our study. After this the personal and individual factors will be discussed and particular attention will be paid to institutional or structural variables that might possibly explain the successful preparation for the Ph.D. These variables are: the field of study; previous education and funding; the apprentice model and the selection of Ph.D. candidates.

Field of Study - One independent variable for explaining success in the Ph.D. that is often mentioned in the literature on the success or failure of Ph.D. students is the field of study or the discipline. Wright and Cochrane (2000) argue that science students are more likely to complete their thesis on time, or even to complete it, than students from the social sciences and the humanities. This probably has to do with the research modus of the humanities and social sciences which have a more individual approach towards research than the natural or medical sciences. In the sciences research is more team oriented and provides greater incentive for students to complete their theses on time (Nerad and Miller, 1996). For this study the independent variable discipline or field of study is of less importance because research masters are not found in all disciplines, most RMs are found in the social sciences and humanities.

Previous education and funding - Other independent variables to explain the success in completing a Ph.D. in four years are, according to Wright and Cochrane's study in the UK: having a. previous high academic degree; being in possession of research council funding; studying part-time; and being an international student (Wright & Cochrane, 2000). A previous master education,

therefore, is one of the important determinants of success during the Ph.D. For our study the previous education is relevant, the funding aspects are less relevant because students of research master programmes receive study grants or loans for the additional year they study. The influence of international background of students will be treated in the next section, on individual characteristics.

Apprenticeship model - Regarding the preparation for the Ph.D., various variables are prevalent in the literature. An important theme in the literature of the third cycle is the transition from the classic apprenticeship model that is quite common in Europe to a more professional model of doctorate training (Park, 2005; Pechar 2012) whilst at the same time ensuring more transparency in the admission and selection of candidates and quality assessment (Kehm, 2007, p. 315). In this professional model a substantial educational component has been added to doctoral training in many countries, with course work and emphasis on research training. This training includes all kinds of research skills, varying from action research (McAlpine and Norton, 2006) to thorough command of literature review and academic writing (Boote & Beile, 2005) which are important in the discipline or field of study, as well as the generic personal and 'transferable' professional skills that are being offered. There is a shift from the apprentice model or 'the secret-garden model', as labelled by Park (2005; 2007), in which the student and supervisor worked closely together without a great deal of scrutiny and accountability, to the professional model, which is supposed to have the positive effect of increasing completion rates and decreasing the time to degree. In the professional model the Ph.D. students are less dependent on their supervisors, and institutions take more responsibility by giving more structured and explicit research training (Bartelse, 1999). Since much important research takes place on the intersection of the various disciplines, improvement of interdisciplinary training is high on the agenda. The question is whether researchers should be trained in an interdisciplinary manner to be able to work in such a way themselves. But this interesting question is beyond the scope of this thesis.

Selection of Ph.D. students- Sadowski, Schneider & Thaller (2008) suggested that the selection of Ph.D. candidates in unstructured programmes in Germany is done often on the basis of their visibility and academic achievements in the bachelor or master phase in most cases at the same institutions. The selection is furthermore

based on whether they are perceived to be suitable to become future co-researchers and the attitude of the individual professors. In structured programmes the selection is more based on international recruitment where candidates are selected on an anonymous and individual basis, making use of formal selection criteria such as language and mathematical test results (*ibid*. 319). Peter Schneider and others (Schneider, Thaller & Sadowski, 2010) link organisational characteristics to Ph.D. education. They detect several organisational independent variables to explain success in the Ph.D. such as: sufficient time to supervise Ph.D. students: a critical mass of motivated faculty; large number of supervisors (more than five supervisors) in case the match between the Ph.D. student and the supervisor is not successful; experience of Ph.D. supervisors with research competences to teach Ph.D. students important scientific skills; and the financial funding of Ph.D. programmes. Although this study is limited to Germany, these findings could be relevant in the Dutch context as well.

Most of the aforementioned factors were also seen as major influences on Ph.D. success in the Salzburg II recommendations (European University Association, 2010). According to Kottmann (2011) these factors and practices determining the success of doctoral programmes include the following as set out in the Salzburg recommendations: recruitment, admission, and status of doctoral students or the organisation of supervision.

Individual independent variables
Independent variables at the level of a student that influence the success of a student negatively are according to McAlpine and Norton (2006) increasing debt, competition for research funding, overwhelming programme requirements, isolation, competing demands, and uncertainty about career opportunities. These were partly confirmed and expanded by Van der Schoot *et al.* (2013). In their view the characteristics of the Ph.D. candidate in literature studies that could explain any delay during the writing of the Ph.D., include gender (Seagram, Gould & Pyke, 1998), ethnicity, age, having children, marital status, satisfaction with the project, academic achievement, and expectations about the project. The authors excluded personality traits such as patience, motivation, self-confidence, willingness to work hard, etc. (Van der Schoot *et al.,* 2013, p.2). Schneider *et al.* (2010) disagree and stipulate that it is important to attract Ph.D. students who are interested in serious

research and to impart the necessary skills to them. For our study the previous education and academic achievements are important. The personal traits are of less importance because to select bachelor students for research master programmes only quantitative selection criteria may be used (GPA bachelor, grade bachelor thesis etc.).

Variables such as having children, marital status etc. are not particularly relevant in this study because most research master students are about 21 year old at graduation and these issues, on average, play a less significant role in this age group. The literature on the professional model or the more structural approach to doctoral training can apply to the contribution of the research masters to the preparation for the Ph.D. as well. In the case of the research master programmes the academic achievements in the bachelors phase are important, just as a probable switch during their previous academic programme. Other individual variables such as nationality and gender are important but can be seen as control variables because we see no evidence in the literature that they have a direct effect on the successful completion of a research degree.

Intermediate conclusion and translation to master level

The question that was raised at the beginning of this section concerned the skills or characteristics/factors lacking in the masters degree to prepare students best for the Ph.D. From the literature on the success factors or failure of Ph.D. programmes it is clear that in most cases a combination of variables and different levels play a role (McAlpine & Norton, 2006). Nevertheless, a distinction between the two sorts of independent variables is often made in the literature for the sake of clarity: structural or institutional and individual variables.

Independent variables on an institutional level that recur in the literature are numerous and perhaps best summed up by McAlpine and Norton (2006): the organisational level of research schools and graduate schools funding, allocating human and financial resources, selection and admission, programme requirements, academic climate and disciplinary mode of research. In the light of the two Dutch studies and the specific characteristics of the research master the independent variables that describe the characteristics of the research master programmes that appear to be the most relevant for the further design of this study include the

selectiveness of the programme for faculty and students, the quality and frequency of the supervision, and the content of the programme, including research training (Schneider *et al.*, 2010).

Individual independent variables were found as well but not all of them were suitable for our specific theme of the effectiveness of the research masters because in general the age and background of masters students in the Netherlands is different from that of Ph.D. students. Perhaps it would be better to focus on the characteristics of the students that are relevant for this study, i.e. academic achievements in their previous education and satisfaction with the RM programme. Other individual variables such as gender, ethnicity (nationality), and age are important as well but we expect, based on the literature quoted, that they produce a lesser impact.

Although we have to be careful and modest, according to Enders (2002) 'in our belief that certain specific measures like supervision and integration in team work, time to degree and age at degree or grade of the doctoral exam have a dramatic impact on further employment and career' (p. 515-516), the above-mentioned variables will be important building blocks in the further design of this study.

In connecting the second and third cycles, three issues play a major role in the Dutch context. These are (1) the influx, (2) the level of drop-out and (3) the embedding of the programme in a research environment (Bartelse & Huisman, 2005). In the Netherlands, the master degree is crucial for entering the Ph.D. stage as was discussed in chapter three. Legislation states that, in order to gain access to the Ph.D. stage, one must have finished an accredited master programme. One of the themes of this thesis is to find out whether and to what extent the research master is the preparatory stage of choice. Some universities already set additional demands for entry to the Ph.D. for students who do not hold a research masters degree, and the funding agency NWO only accepts Ph.D. candidates for certain programmes if they have completed a research master successfully.

With the implementation initially of a two-cycle (bachelor-master) structure and now a three-cycle one (with the addition of the Ph.D. phase) throughout Europe (Westerheijden *et al.*, 2010), it is becoming increasingly clear that there is no

consensus yet on a systematic differentiation between master programmes with a taught profile and master programmes that are more research-oriented (Reichert & Tauch, 2005). The ambitions of the European Research Area (ERA) and the European Higher Education Area (EHEA) converge in the research training.

Kehm argues that the transition from the apprentice model to a professional supervision model of Ph.D. students will have consequences for the master-Ph.D. link as well. 'It can be assumed that the explicit distinction between professional and research degrees, as well as the fast track will become more widespread.' (2007, p. 315).

Academic context – The main distinction between research master and taught master programmes lies in the emphasis on research skills. For this reason, the academic context is of crucial importance. The idea was that only in good or excellent faculties one could teach these research masters students to do research in the best possible way (van Ours & Ridder, 2005). Within a good or excellent academic context, the quality of research groups and individual supervisors are important elements. But in such a context students are also selected and their academic achievements during their bachelor programmes would play a major role. Finally, in the aims of the programme and in the programme itself which is offered, the emphasis should be very strictly on research skills and actually completing a 'research cycle'. So, when the effectiveness of the research master programmes is examined, a large number of distinctive elements, drawn from the literature treated in this section, should certainly be represented.

5.3 Independent variables and their constituent indicators

In this study the focus is on the relationship between the second and the third cycles. The effectiveness of the research master is the central element of the research question (the dependent variable). In this study the characteristics of students and the characteristics of the master programmes are the independent variables, the input variables. The output variables are the dependent variables, such as the graduate's further study or jobs (within universities, Ph.D. or research and non-research jobs outside the universities) that alumni obtain after their master

programmes. Another dependent variable focusses on the research training in universities and, in particular, the performance in the first part of the Ph.D. From a quasi-experimental research design, the characteristics of the master programmes (research master or academic master) could also be seen as an intervention between input and output variables, and labelled as specific intermediate variables. For the analysis these process indicators will not be clustered as independent variables but as a specific form of input that has to result in the desired output: more research-oriented jobs and better preparation for these jobs via the research master programmes. Each dependent variable may be affected (differently) by different independent variables.

Operationalisation of variables

The indicators will be operationalised in this section. Going through the indicators for each variable in this place will connect the indicators with the chosen research methods. Moreover, caveats will be added to indicate possible limitations to our findings, as well as ways to overcome them—or at least to mitigate their effects by raising awareness about their potential pernicious influence.

Characteristics of the student

First, the independent variable *characteristics of the student* consists of the following indicators: GPA bachelor, grade of the bachelor thesis and possible switch during the bachelor. The first two indicators point to the academic capacities of the student upon entering the master programme and they are measured by questions in the alumni survey about the GPA during the bachelor programme and the grade of the bachelor thesis. Of course there is a possible problem of self-reporting of students; it would not be expected, however, that over-reporting grades would affect research master graduates more than graduates of taught master programmes. Nevertheless, in the analysis we have to be critical about possible bias. Finally, we ask the question whether there was a switch during the bachelor programme. If so, it may indicate several things, e.g. problematic level of achievement in one bachelor programme, or it may indicate uncertainty about the chosen path of study which in turn may imply issues of motivation. In either case, it is seen as an indication of students' lower chances of success in the master programme.

Characteristics of the research master
For the variable *characteristics of the research master programme* the following indicators will be operationalised: selectiveness, quality and accessibility of supervisors and staff, contact hours and actual workload, research orientation of the programme, proportion of the programme dedicated to research, methodology and thesis, time to degree and delay, students' opinion of the programme and master performance, and skills acquired.

The indicator for selectiveness consisted of asking questions in the alumni survey regarding the selection criteria that were used to control entry to the programme: did they include students' previous academic performance, an assessment of their motivation and/or other elements? To measure the quality and the accessibility of the supervisors and staff, and the overall opinion of the master programme, questions were asked to the alumni to give a grade (0–10) for the accessibility and perceived quality of faculty and staff members and overall opinion of the master programme. The indicators for contact hours and actual workload were again measured by questions in the alumni survey about the average workload and contact hours per week.

The indicators for research orientation of the programme and proportion of the programme dedicated to research was partly measured by questioning alumni about their experiences with writing the thesis and partly by analysing curricula of both research master programmes and comparable taught master programmes. A sample was drawn from the research masters found on the list of the Research Master Review 2007. Special attention was paid in the analysis of the curricula to the method of measuring the differences between learning outcomes between research masters and taught master programmes. In this respect, Bloom's classical Taxonomy of Learning Outcomes (1956) was used. In the pedagogical world of classifications of learning and thinking skills, the taxonomy of Bloom is very influential. The most important contribution of Bloom's taxonomy is that his framework is a way of classifying educational goals in terms of complexity (Moseley *et al.*, 2004). The six levels are basic knowledge, and proceeding through comprehension, application, analysis, synthesis to arrive finally at evaluation. Bloom categorized the first three levels as lower-level learning activities and the last three as the upper level learning activities. Although his framework has been

important for many other scholars, two attempts to refine his work should be mentioned. First, Anderson *et al.* (2001) developed a two-dimensional framework with on the one hand six cognitive processes (remember, understand, apply, analyse, evaluate and create) that are almost similar to Bloom's taxonomy and four knowledge categories. In their framework there is an emphasis on the connection between learning objectives and assessment. Second, Marzano (2001) defines a hierarchy of three levels: the self-system level, the meta-cognitive system and the cognitive system. According to Marzano the main differences are his addition of the meta-cognitive and self-systems and his replacement of complexity with flow of information as an organizing principle. In this thesis, emphasis will be placed on the cognitive processes and less on self-system and assessment. Therefore, Bloom's original taxonomy is quite suitable for analysing the differences in learning outcomes between taught masters and research masters. More details can be found in annex D.

Characteristics of the job

To measure the dependent variable, i.e. character of the graduates' current job, questions were asked in the alumni survey about their job's general character. Had they obtained a research job or a non-research job? More detailed questions were asked of alumni who had obtained a Ph.D. position. Furthermore, questions were asked about whether their master programme had prepared them sufficiently for their current jobs.

Characteristics of the preparation for the Ph.D.

The last dependent variable is the *preparation for the Ph.D.* The variable is made up of: readiness for the Ph.D., performance during the Ph.D., and programme set-up. Preparation for Ph.D. is measured by questions in the alumni survey about the percentage of time that they spent on research skills during their master programme. Performance during Ph.D. is operationalised by questions in the survey of the professors about their opinion of their Ph.D. students with a research master background and an academic master background. Finally, the role of the research master for the recruitment policy of *(corporate) R&D managers* was examined by using semi-structured interviews as can be seen in Appendix E.

5.4 Methodological considerations

In this section the methodological considerations of this thesis will be presented. First, the aim of the study, the research questions and the populations will be described in section (5.4.1) Second, the research design and the operationalisation of the variables will be drawn up in section (5.4.2). Third, the research instruments, surveys and interviews are portrayed in section (5.4.3).

5.4.1 Research design

The research expectations are the basis for the research design concerned with the effectiveness of the research masters, which is presented below (figure 5.1). According to this figure a student with a bachelor degree has a choice, either to pursue a taught master or a research master programme. After completing a master programme of any type they can further pursue one of three kinds of career: A non-research-oriented career, a Ph.D. position, or a research-oriented career (not a Ph.D. position). As pointed out in the previous section the first research expectation is that graduates from research masters are more likely than those from taught masters to pursue research-oriented and Ph.D. careers.

1) We decided to collect observations about the following three elements:
   a) Characteristics of students
   b) Characteristics of research masters and taught masters
   c) Characteristics of the beginning of their (research) careers

2) Then, because we needed personal data (about GPA, gender, age etc.) and their perception of their enjoyed education, a choice was made for a survey. The decision to use a survey rather than, e.g. interviews, was made because there are many variables and many students.

3) Furthermore, using the effectiveness research logic, a choice was made for a cross sectoral design between two samples (amongst alumni of research masters and taught masters). The main reasons for this were:

- Expectation of changes over time as the RM were new and as innovations they might show development towards a more definitive model and/or a more generally shared understanding of what an RM ought to be
- Increase N of response to allow for better statistical analysis e.g. of disciplinary differences and that this does not make the design longitudinal

in the sense of measuring before–after, because all measurements are after the introduction of the 'experimental condition', i.e. the RM.

4) Finally the opinions of the Ph.D. supervisors and employers of Research and Development (R&D) institutes are important additional sources. The Ph.D. supervisors were surveyed (because of their large number) and the R&D employers were interviewed (a small number and needing more individualised questioning as they represented very different companies/organisations).
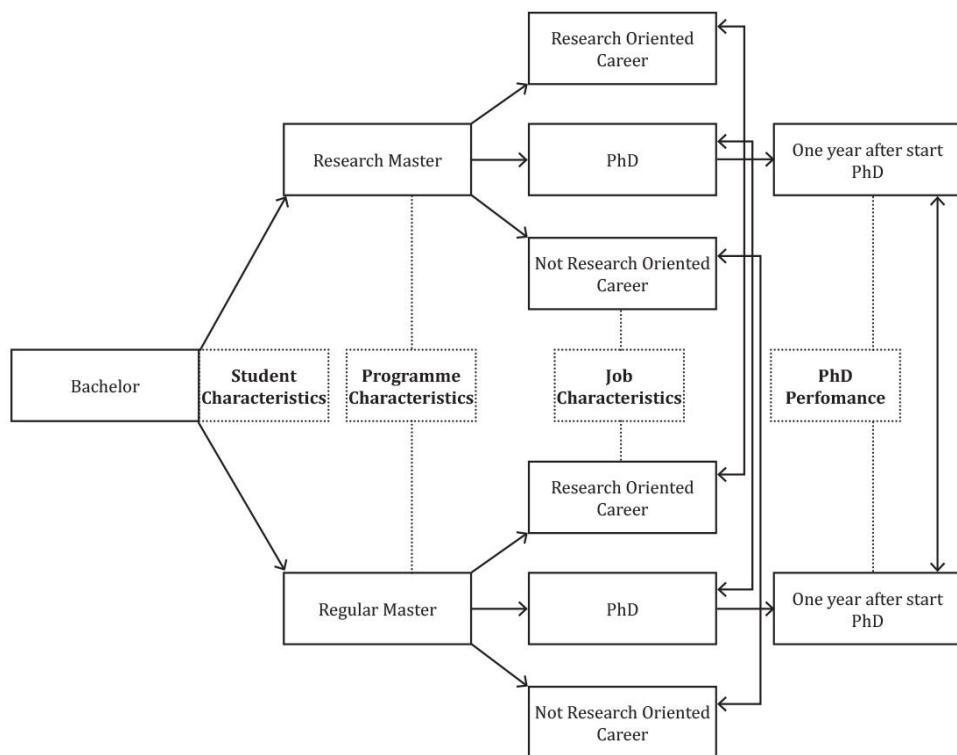
Figure 5.1. research design of the effectiveness of research master

Student survey	Student characteristics after Bachelor
	GPA
	BA Thesis grade
	Switch during bachelor?
	Master Programme characteristics (RM vs. TM)
	Selectiveness of programme
	Quality and accessibility of faculty and staff
	Contact hours
	Workload
	Research orientation
	Proportion of the programme dedicated to research, methodology and thesis
	Time to degree / delay
	Students' opinion on the programme and master performance
	Skills gained during master programme
	Job characteristics
	Type of employment
	Performance in Ph.D. programme
	Skills gained during Ph.D. programme
	Expected time to Ph.D.
Supervisors' survey	Supervisor's characteristics (control variables)
	University, discipline, age, gender, nationality

Table 5.1. Overall scheme of variables and indicators, and data sources

5.4.2 Research questions, research expectations and populations

The main objective of this study, as presented in more detail in section 1.3, is to evaluate the effectiveness of the research master as a policy instrument. The concepts of policy instruments and policy effectiveness were discussed in chapter two and a choice was made for the efficacy model in chapter four. A second and broader aim of this thesis is to contribute to the policy debate about effectiveness of policy instruments in Dutch higher education and particularly about the debate about excellence and differentiation in higher education. Some of the stakeholders see the research master as one of the rare successful innovations in Dutch Higher Education. Is this indeed the case? This will be addressed in chapter seven.

It may be useful to recapitulate the research questions and hypotheses when discussing the study's design. To study the effectiveness of this policy instrument, the central research question was formulated as: Do research master programmes reach their intended goals of preparing more students in a better way for research careers?

There are three sub-questions in this central research question.

1) Do research master programmes attract more students to pursue a research career?

2) Are the students that pursue a research masters programme better prepared for a research career compared to students of a taught master programme?

3) Do research master graduates pursue their research careers mostly in academia (Ph.D. programmes) or outside academia in private and public research companies and institutions as well?

Three research expectations were formulated corresponding with these three sub questions:

I : research master students are more likely to end up in research-oriented occupations than taught master students.

II : research masters programmes prepare students better for a career in research than taught master programmes.

III : research master programmes prepare mainly for Ph.D. studies and less so for research careers outside academia

These expectations relate to several aspects and actors/stakeholders that should all be studied independently for improved validity.

As was concluded in chapter three, the primary population of study are alumni and Ph.D. supervisors. As it is rather difficult to prove the direct effect of this policy instrument on the number of researchers, for answering the first question the focus

will be on the number of Ph.D. students before and after the introduction of the research master as described in chapter three. Furthermore, the career development (and especially the research character of their jobs) of both academic and research master students will be compared at around 1.5 to 2 years after graduation. The job destination for example is better to establish after 1.5 to 2 years than directly after graduation. Graduates have had more time to reflect on the effects or impact of their master programmes on their (research) jobs.

For increased validity and reliability, and to discover possible trends and developments we opted for studying several cohorts. With only one cohort it would have been difficult to analyse, for example, the effects per discipline. Furthermore, the research master was a new programme and in 2003 we had to plan for the possibility that changes could be made (selection criteria for example of students and faculty) on the basis of the experiences with the first cohorts.

- First, the master programme alumni.
    - Student characteristics and their experiences with research master (RM) and academic master (TM) programmes were studied through surveys.
    - The sample consists of RM alumni as well as a (control) group of TM alumni in the same fields as where the RM were selected, to enable us to study actual experiences with both RM and TM while monitoring effects of the specific academic discipline.
    - The sample was drawn from eight universities.
    - Because the number of research master graduates in the first cohort (2005) was rather low, two cohorts were added (2006 and 2007). Unfortunately, because the response rate of the 2007 cohort was below expectations (as will be described in the fourth section of this chapter), an additional cohort was added (2008).
    - Timing: 1.5 to 2 years after graduation of each cohort.
- Second, Ph.D. supervisors were surveyed as well.
    - The choice was made for a single cross-section instead of 4 cohorts. The reason for this is that there is more stability in the group of Ph.D. supervisors compared with the students/alumni.

- o The sample consists of all the professors from these eight universities. No distinction was made between full professors and professors with a part-time position. The main criterion was, after all, whether they had (the right to) supervise Ph.D. students. Emeritus professors were excluded from the survey, as their experience would most probably involve Ph.D. candidates from before the RM reform.
  - o The sample was obtained from private addresses to get the attention of the professors directly and to avoid getting the surveys lost in departmental post.
  - o The survey was conducted in 2010.
- Third, the non-academic researchers' employers were not surveyed but interviewed. Because this group is less standardised (i.e. with more diverse experiences and expectations regarding RM graduates) there was a smaller set of respondents than for Ph.D. supervisors and questions had to be customised to the individual, both of which made a survey approach less efficient than (semi-structured) interviews.
- Fourth, to assess the policy context of the research masters, interviews were conducted and already used in chapter two. Former and current stakeholders of relevant organisations at the systems level of higher education (Ministry, NVAO, VSNU, KNAW) were interviewed. See annex E.
- Fifth, statistics of the CBS on the possible quantitative research master and destinations were already used in chapter two.

Collection of the alumni addresses for inclusion in the surveys did not prove to be an easy process. This had to do with the databases of the alumni organisations and the actual approval of the participating universities. Eventually, there was only one University with research master programmes that did not want to participate in the survey for reasons of principle. From the remaining universities in the Netherlands, two technical universities and the Open University were not selected for participation due to the fact that they did not have research master programs. In fact, one other technical universities did have research master students, but there were only three graduates in 2006 and therefore this particular research master programme was not included in our study. The code of ethical conduct of the Royal

Academy of Arts and Sciences on personal data (KNAW, 2003) was followed in treating the data confidentially.

Of the 2006 cohort, the control group of taught master alumni was much larger than in the following three cohorts (see chapter six). In these latter cohorts the ratio of the sample we took of academic masters to research masters was two to one. The main consideration for this change was the substantial cost of conducting a census survey of all academic master graduates in the relevant programmes; this change however did not compromise the validity of the sample, as will be discussed in chapter six. The selected academic master alumni and all research master alumni received both a paper version of the survey and a web-based version of the survey. In chapter six the response rates will be discussed in more detail.

The second population comprises the Ph.D. supervisors. Collection of their addresses was done in almost the same way as the alumni survey, i.e. through the participating universities. No distinction was made between full professors, honorary professors, part-time professors etc. as all of these professors have the right to supervise Ph.Ds. From all the 4243 addresses the universities provided, a random sample of 1100 was drawn. The private addresses of the professors were provided by the universities. We expected that the response rate would be higher if we contacted the professors directly instead of via the departments, especially with respect to the part-time professors.

Interviews were conducted to gather data for the implementation of the research master (chapter three) and the perceptions of employers in the field of research outside academia, R&D, research institutes in the public sector and private sector. The following criteria were used to select the respondents. Employers from the corporate research and development companies in the food industry, high tech and industry were selected. From the service sector two consultancy companies were chosen, one small and one larger company, and a public research institute. For the Humanities sector a humanities professor was interviewed and a director of a research department of a museum. In Annex E the list of interviews is presented.

5.4.3 Research instruments: conducting surveys and interviews

To collect the data for this study, two surveys were designed and interviews were conducted with relevant stakeholders. The first survey was designed for the alumni of research master and academic master programmes. The second survey was designed for the Ph.D. supervisors. Both surveys were piloted. The alumni survey was tested among eight alumni and four survey experts, which led to minor adaptations in the questionnaires. The supervisors' survey was piloted with four professors, who also proposed minor adaptations.

Both surveys also were designed according to the four principles of Dillman's (2000) Total Design Method (TDM). This TDM has its theoretical roots in social exchange theory (Nederhof, 1981). According to this social exchange theory there are three conditions for maximising the response rate of surveys. First, the (psychological) costs of answering the questions have to be limited as much as possible for the respondent. Second, the rewards for answering the questions have to be as high as possible. Third, the respondent has to have the confidence that he or she will receive rewards as well. We tried to incorporate this in the survey by addressing the alumni as experts in the cover letter and with the first question about choosing the same programme again. This was done to get them to reflect on their master program so that they would activate their memories about that programme before continuing with the survey.

The TDM is very detailed. The most important steps are described below: the format of the questionnaire, the structure of the questionnaire, the front page of the questionnaire, the first question, the implementation of the post survey and the web-based survey.

To get the highest response rate possible the choice was made for a combination of a postal survey and a web-based survey for the alumni survey. The TDM steps of this survey are described below, first for the alumni and then for the Ph.D. supervisors (professors). For the postal survey the Dillman principles were followed as closely as possible. The survey was printed as a small A5- booklet and consisted of fourteen pages (see annex A.) of which twelve pages were for questions. This is two pages more than Dillman proposes as the maximum.

However, the test panel argued that printing the 55 questions on twelve pages made the lay out too crowded.

In Dillman's TDM there are four principles for the structure of a survey. First, the questions have to be structured according to social relevance or to declining social purpose. First a question has to be asked covering the central subject of the research project. Second, questions have to be refined to the content, and should have the same response categories. Third, questions should be fluently ranked in such a way that the respondents are not aware of the transitions. Finally, questions of a difficult nature have to be positioned at the end of the questionnaire. For the draft of the alumni survey the structure of the *Arbeidmarktmonitor 2006* from the Research Centre for Education and the Labour Market (ROA) of the University of Maastricht was followed which corresponded largely with the Dillman method. However, it should be noted that the methodological members of the test panels advised changing the order of a few categories, which was implemented in the final version of the survey. Questions of a personal character were moved to the back of the survey (such as gender, age, nationality and the question of whether they would participate in a possible follow-up study ten years after their graduation, 2016-2019).

According to Dillman the front page of the survey should be designed in such a way that it immediately elicits a positive reaction from the respondent. On the front page there should be a clear and attractive title of the survey, some graphical illustration, some guidelines and the name and address of the research institute (not the name of the author). The main title that was approved by the test panel was *Effectiveness of Masters Education in The Netherlands* and the panel suggested as subtitle: *A study on the effectiveness of the Dutch Masters programmes*. As the aim was to attract both the research master alumni and academic master alumni to respond to the survey, too much emphasis on the research master was avoided in the title. The postal address and an international reply business number were on the front page as well as a unique respondent's code. The illustration, which also is used at the cover of this book, was made by Loet van Mol and depicted how alumni who had successfully completed their masters programmes were moving up in the world, but all at their own speed and direction. It is noteworthy that there are different ways of moving up (two are using the stairs, two the escalator, and one is

really moving up in the world by using an elevator). The reactions of the test panel to the illustration were positive.

Also following the TDM, the implementation of the postal and internet survey was conducted in the following way. First, a letter in which the survey was announced was sent (the pre-letter). In this introductory letter, the purpose of the research was explained and the respondents were asked to participate in the study. Exactly one week later the survey with an accompanying letter was sent. Both in the introductory letter and in the letter with the survey, the name of the respondent and the address were included. Additionally, the letter and survey contained both the date and a genuine signature of the researcher in blue ink, written on a soft background demonstrating clearly that it was a handwritten signature. There is a clear respondent's number so the respondents know that they are unique and that they can trust the researcher that their response will be treated confidentially. In these letters a reference to the Royal Academy of Arts and Sciences, and the Social Scientific Council code of conduct for social science surveys was made. After exactly three weeks a small postcard was sent to the respondents to thank them for their cooperation or to encourage them to complete the survey and to return it. A response envelope was added to the survey with an international response number so the respondents were not charged any costs for returning the postal surveys.

In all the letters, the postcards and on the front page of the survey, the web-based survey-address was mentioned (www.roac.nl/eom). This web-based survey was first designed in Lime Survey and later, because the licence was not renewed by the University, the survey was re-designed in Survey Monkey. In the transition there was no bias effect, and the lay-out remained the same.

For the 2008 cohort, the ICT department of the university where this thesis was defended, decided after two complaints from respondents to block the access to the web-based version without any notice to the researcher. It took more than a week before access was granted again and this unfortunately affected the response rate very negatively. In chapter six the response rates will be further discussed.

The TDM was largely followed for the Ph.D. supervisors' survey as well. The format of the questionnaire was the same as for the alumni survey. However, in the

introduction for the Ph.D. supervisors, the purpose of the survey was described in more detail than in the alumni survey: *This study concerns the relationship between (research) master programmes and Ph.D. programmes. It is part of a Ph.D. study on the effectiveness of (research) masters in the Netherlands and will be conducted under the supervision of the Center for Higher Education Policy Studies (CHEPS) of the University of Twente.* The assumption for this was that professors would be more willing to participate in this study knowing that it was part of a Ph.D. project, compared to master alumni who would possibly be less enthusiastic about participating in the study knowing that it was a Ph.D. project.

Questions were asked in the survey about the experience of the Ph.D. supervisors and background of their Ph.D., and these were followed by questions comparing Ph.D. students with a Research Master and an academic master background. These were followed in turn by questions about the way the Ph.D. programs were institutionally embedded and whether there were programmatic connections and joint activities between the Ph.D. programmes and Research Masters programmes. The perception about expected time to degree and the possible shortening of the length of Ph.D. followed as the next two questions. Subsequently, questions about supervisors' contact with their Ph.D. students were then asked (frequencies of meeting, day-to-day contact, length of meetings). Finally, there were some questions about the background of the supervisors. Again these types of questions were posed at the end of the survey to stimulate a higher response rate.

Compared with the alumni survey the front page of the questionnaire was almost the same (illustration and lay-out). The main title was different however: PREPARING FOR THE Ph.D. was chosen (annex B.) and as a subtitle: a study on the relationship between (research) masters programmes and Ph.D. programmes. This title was used to emphasize the connection between the second and the third cycles and the purpose of this survey. The contact address remained the same. Furthermore, a respondent's number was included in the top right-hand corner.

The Ph.D. supervisors' survey was tested by four full professors of three different universities. All four professors had experience with both Ph.D. students who had completed a Research Master and Ph.D. students who had completed an academic

master. The comments of the professors were taken into account in the final version of the survey (structure, additional questions).

The first question of the Ph.D. supervisors' survey was: How many Ph.D. students have completed their *Ph.D.* under your direct supervision? The reason for using this question was to stimulate professors to think about the Ph.Ds. they had supervised (and their backgrounds). It is a neutral question, relevant and easy to answer.

The implementation of the postal survey was different as well. Deliberately a choice was made not to work with a web-based survey. A random sample was drawn, not only of full professors but amongst part-time professors and emeriti as well. The chance of getting a high response rate was more likely with a paper version that was sent to their home addresses than with a web-based version. The reason for this is that not all professors check their pigeon holes on a regular basis and that older professors (emeriti) might not always be familiar with web-based surveys. The introductory letter was written by my promoter and explained the aims of the study. Two Universities requested that a recommendation letter by their Rector Magnificus be added, which was done.

The interviews with directors from R&D, and public and private institutions were mainly conducted to find data to test the second hypothesis. A semi-structured approach was followed, with the researcher using a list of topics to be addressed during the interviews (annex E.), starting with a standard opening question, but then leaving it to the flow of the interview to determine emphasis and order of topics. Most interviews were done face-to-face, some via skype and email. The respondents can be grouped in three categories. Higher Education Experts, Research and Development experts, Service Industry Experts.

5.5 Conclusions

In this chapter the focus was placed on the main beneficiaries and stakeholders: the students and the Ph.D. supervisors and on how to study their experiences with the research master programmes. Three main categories of variables came out of the

discussion of the literature on the connection between the second and third cycles: input variables, process variables and output variables and their indicators. Literature was mainly available for the Ph.D. phase. That is why some ingenuity was necessary to deduce the demand of the research masters and masters students. In any case, access to and success in the Ph.D. and in other research jobs is the main goal of this thesis.

Furthermore, in this chapter the methodological considerations were presented. The aim of the study, the research questions, research expectations and the populations were described and led to the research design and the operationalisation of the variables. Furthermore, the research instruments, surveys and interviews were described.

Surveys are the main research instruments. Four cohorts of alumni were surveyed and the Ph.D. supervisors were surveyed once. Furthermore, interviews were conducted amongst stakeholders of the introduction of the research masters and employers of research institutes of both academic as none academic institutions. So, all research careers were examined in this study.

Some methodological considerations are not discussed in this chapter such as the response rates, the non-respondents analysis and the data analysis. These considerations will be addressed in the next chapter, which focuses on the empirical findings.

Chapter Six *Empirical Findings: Survey of Alumni and Curricula Analysis*

6.1 Introduction

In this chapter the empirical findings will be presented of the survey that has been conducted amongst, in total, 8154 alumni of both research master and regular master programmes. To gauge the first outcomes, we surveyed four cohorts of alumni from research masters (RM) and taught masters (TM) programmes from eight Dutch universities, between 1.5 and 2 years after their graduation. Besides the surveys a document analysis of the curricula of the RM and TM was conducted to learn more about the research orientation of the curricula. In the final section (6.3) conclusions will be drawn.

6.2 Alumni

6.2.1 Population

From table 6.1 about the response rates over the four years it appears that from the 8154 alumni of master programmes that were approached, 2749 responded, resulting in a response rate of 34%. Due to incidental non-response to certain questions, around 2500–2700 responses could be used in different parts of the analyses. The first cohort conformed to the initial expectation that RM alumni would be more motivated and willing to respond (67%) to a questionnaire than TM alumni (29%), but in subsequent years this effect did not appear and on the whole the response rate of RM alumni was only marginally larger than that of TM alumni, at 35 percent and 33 percent respectively. This can be considered a satisfactory rate of response.

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The response rate of the 2008 cohort was much less than the other three cohorts (17% response rate of the academic master's and a 21% response rate of the RM alumni). This was caused by a server problem at the University after which the web-based questionnaire was not accessible for a long time. Conducting the same analyses without the 2008 cohort did not change the significance level of any of the results. Therefore, the 2008 cohort was kept in the group (see appendix for the analysis without the 2008 cohort).

While the response rate improved again with the 2009 cohort, and no further incidents occurred, with in total 561 responses the 2009 study resulted in a significantly smaller sample than those of the first two years. That, together with the fairly constant results over the years, convinced us that saturation was reached in different methodological meanings of the word: one is that we did not find new patterns of responses, the other that later cohorts of respondents apparently were getting their fill of surveys and became less willing to cooperate in our study. Further extension of data collection clearly was not going to add to our explanatory power and the empirical study was ended.

Year	Master type	Questionnaires sent	Responses	Response rate
2006	Taught	2100	609	29%
	Research	280	187	67%
	Total	2380	796	
2007	Taught	1182	745	63%
	Research	560	253	45%
	Total	1742	998	
2008	Taught	1417	241	17%
	Research	728	153	21%
	Total	2145	394	
2009	Taught	1258	377	30%
	Research	629	184	29%
	Total	1887	**561**	
2006-2009	Taught	5957	1972	33%
	Research	2197	777	35%
	Total	8154	2749	

Table 6.1. Overview of the response rate

The survey of the four years of cohorts involved 2749 master students who had graduated in 2006, 2007, 2008 and 2009 from 88 research master programmes and more than 400 'regular' taught master programmes (control group) across the Netherlands. In total eight out of nine universities that offer research master programmes joined the study.

	Male	Female	Total
Taught Master	759 (40%)	1152 (60%)	1911
Research Master	323 (43%)	424 (57%)	747
Total	1082	1576	2658

Table 6.2. Overview of the total response by gender and response rate

The total response of research master students was 777 and of the taught master students 1972. The gender division of the regular master group was 40% males and 60% females. Within the total population of the research master group the gender division was similar with 43% males and 57% females.

Field of Study	Research Master Sample	Population	Taught Master Sample	Population	Total Sample	Population
Arts & Humanities	183 (24%)	2157 (37%)	307 (16%)	22060 (12%)	490 (18%)	24217 (13%)
Social Science	244 (32%)	2897 (49%)	1276 (66%)	106307 (60%)	1520 (56%)	109204 (60%)
Science	273 (36%)	822 (14%)	114 (6%)	48385 (27%)	387 (14%)	49207 (27%)
Other	66 (9%)	–	249 (13%)	-	315 (12%)	-
Total	766	5876	1946	176752	2712	182628

Table 6.3. Overview of the population by field of study and master type

From table 6.3 it is clear that the largest part of the sample consisted of social science alumni (56%). Of the TM programmes, social science comprised 66%, which fairly mirrors the proportion of social science RM programmes in the sample

(60%); among the RM there were relatively fewer (32%) than in the population (49%). It is also interesting to note that science made up a larger proportion among RM respondents (36%) than in TM (6%). Finally, there were very few science TM in the sample (5%). The *Other* category contained a large range of different fields of study ranging from spatial planning to theology. In general, one could say that the RM in our sample was more evenly split between fields of study than the TM, in which social science was prominent, representing more than half of the programmes. When looking at the total population of students in the Netherlands one can conclude that our sample is generally representative of the total population (VSNU, 2012). Furthermore, the distribution of our sample across fields of study for the TM programmes was generally more representative than for the RM programmes.

Variable	Research Master	Taught Master	Total
Average age of respondents	27.2	26.3	26.5
Dutch nationality	146 (47%)	1705 (76%)	1851 (73%)
Non-Dutch nationality	168 (53%)	528 (24%)	696 (27%)

Table 6.4. Overview of the population by demographics and master type

The average age of the total group of respondents is 26.5 years old with a standard deviation of 3.8. The majority of the whole population had Dutch nationality (73%), and about 27% of the respondents came from other countries varying from Mexico to South Africa and Dubai to Japan. The average age of the RM alumni was 27.2 which is almost 1 year older than the average age of the TM alumni (26.3). This finding is not surprising considering that research masters generally last one year longer than academic master programmes. Furthermore, the alumni of the RM were more international than the alumni of the TM. 53% of the RM alumni were from outside the Netherlands compared to 24% of the TM alumni. This is an indication that RM programmes have a stronger international orientation than TM programmes.

6.2.2 Variable Creation

Before discussing the results of the alumni survey it is important to note that a few variables were created on the basis of Bloom's taxonomy, see appendix three. The Cronbach's alpha for the variables *Understanding, application, quality of lecturers,*

supervisors rating, and *teaching staff rating* are high (none below 0.70) indicating relatively good internal consistency, so that the scales for the variables can be used with confidence.

6.2.3 Results

In this section we discuss the results of the students who completed a master programme in 2006-2009. All alumni were surveyed 1.5 to 2 years after they had graduated from a Dutch university. The current employment and perception about their programmes of students who completed a research master were compared to their colleagues who completed a regular master. The following themes will be addressed:

1. Input Characteristics
   a. Selectiveness of the programme
   b. Quality and accessibility of supervisors and staff
   c. Bachelor performance
2. Process Characteristics
   a. Contact hours, actual workload
   b. Research orientation of the programme
   c. Proportion of programme dedicated to research, methodology and thesis
3. Output Characteristics
   a. Time to degree, master delay
   b. Students' opinion of the programme and master performance
   c. Skills gained during master degree
   d. Employment

It should be noted that for all tests the alpha level of .05 is used.

1. Input Characteristics

a. Selectiveness of the programme

Research masters are supposed to be more selective than taught masters. Both the faculty and the students were selected on the basis of their research achievements. The difference between RM and TM programmes in selectiveness of the programme was measured with a chi-square test. Table 6a shows the difference in whether there are selection criteria for admission between research and regular

master programs. Students much more often encountered selection if they opted for a research master programme than if they chose regular master programmes. Of the regular master students, the majority (66%) did not have to meet additional criteria for entrance into the masters programme besides a bachelor degree. With the research master group, it is the opposite, and with an even larger majority. At least five out of six (83%) of the students had to meet additional criteria for entrance into their research masters programme (Table 6.5.). Evidently, this difference is statistically significant.

	Taught Master		Research Master		TOTAL	
No Selection	1226	66%	122	17%	1348	53%
Selection	636	34%	577	83%	1213	47%
TOTAL	1862	100%	699	100%	2561	100%

Table 6.5. Selective entrance criteria besides bachelor degree. Difference is significant at ,000 level.

The break-down of the selection criteria for entrance into the master programmes is summarised in table 6.5b. The most frequently encountered selection criteria are motivation (30%) and English skills (25%), selection on basis of the GPA of the bachelor phase (17%) and grade of the bachelor thesis (13%). It is interesting that not the GPA but motivation is the most used selection criterion.

b. Quality and availability of supervisors and staff
To measure the differences in rating of supervisors, staff and lecturers between RM and TM students, independent sample *t*-tests were conducted. In table 7 the graduates' perception of the accessibility and quality of the lecturers and supervisors is presented. RM students were significantly more satisfied about their lecturers on a scale from one to ten (mean difference = .6 on a 10-point scale, $p <$ .05). Additionally, RM students were significantly more satisfied with their supervisors than TM students (mean difference = .6 on a 10-point scale, $p < .05$). RM master students rated the quality and accessibility of their supervisors and teaching staff at 4.1 and 3.9 on a 7-point scale respectively, which is significantly higher than TM students' ratings (3.9 and 3.6 respectively, $p < .05$).

Variable	Masters Type	N	Mean	Std. Deviation	Sig.
Quality of lecturers	Taught	1929	7.4	1.2	.000
	Research	755	8.0	1.2	
Supervisors Rating (accessibility & quality)	Taught	1927	3.9	0.9	.000
	Research	752	4.1	0.9	
Teaching Staff Rating (accessibility & quality)	Taught	1925	3.6	0.7	.000
	Research	753	3.9	0.7	
Overall grade supervisors	Taught	1793	7.3	1.8	.000
	Research	719	7.9	1.7	

Table 6.6. Quality and accessibility of supervisors and staff.

c. Bachelor performance

The difference in bachelor performance between RM and TM master students was measured with an independent *t*-test (see table 6.7). Regarding the performance of the bachelor students comprising the overall GPA and the GPA of the bachelor thesis, the RM students performed significantly better than the TM students (mean difference = .4 & .5 respectively on a scale of 6-10, $p < .05$). This is a possible indication that students who wish to pursue a RM are more talented or work harder during their bachelor programme. The stringent selection criteria might be one of many factors which stimulates RM students to perform better in the bachelor programme.

Variable	Masters Type	N	Mean	Std. Deviation	Sig.
GPA Bachelor	Taught	1476	7.5	.6	.000
	Research	555	7.9	.7	
Bachelor Thesis	Taught	1374	7.8	.8	.000
	Research	483	8.3	.8	

Table 6.7. Performance during the Bachelors

2. Process Characteristics

a. Contact hours, actual workload

The difference in the nature of the RM and TM master programmes was measured with an independent *t*-test and displayed in table 6.8. Concerning the programme there are differences between RM and TM students along all observed variables. Research master students have a few more contact hours a week and the actual workload is almost six hours longer. The students of research masters programmes appreciate their whole programme more than the regular master students. The overall grade they have given to the whole programme is 7.84 compared to 7.25 on a scale from one to ten.

Variable	Masters Type	N	Mean	Std. Deviation	Sig.
Contact Hours	Taught	1927	11.2	7.4	.000
	Research	755	15.0	10.5	
Actual Workload	Taught	1934	30.4	10.5	.000
	Research	747	37.2	10.9	

Table 6.8. The programme by contact hours and actual workload.

b. The research orientation of the programme

An important element of any academic master (and bachelor) programme is the emphasis it places on research. One would expect that research master's programmes place even more emphasis on research. Table 6.9 provides an indication of the orientation of each type of master program. Differences between the master types in this regard were measured with an independent *t*-test. From the table we can indeed conclude that the research master's programmes are more research-oriented. Students of RM participated more directly in the research of their lecturers (8.0 against 6.6). They find themselves more capable of completing a Ph.D. in time and writing an article in a peer-reviewed article.

Variable	Masters Type	N	Mean	Std. Deviation	Sig.
Direct participation in research	Taught	1924	6.6	2.0	.000
	Research	753	8.0	1.8	
Provided a solid theoretical basis	Taught	1930	7.3	1.4	.000
	Research	755	7.7	1.6	
Insight into cutting-edge developments in the field	Taught	1920	6.6	1.7	.000
	Research	751	7.6	1.6	
Development of research skills	Taught	1926	7.2	1.6	.000
	Research	753	8.2	1.5	
Preparation for professional practice	Taught	1925	6.0	2.0	.000
	Research	754	7.0	2.0	
Information about study and career opportunities	Taught	1928	5.2	2.0	.000
	Research	753	5.8	2.2	
Coherence between programme elements	Taught	1930	6.6	1.6	.001
	Research	751	6.9	1.8	
International focus	Taught	1925	6.2	2.4	.000
	Research	755	7.4	2.0	

Table 6.9. Research orientation of the programme.

c. Proportion of programme dedicated to research, methodology and thesis

Table 6.10. provides a comparison of various similar RM and TM programmes based on their content. More specifically, the programmes listed below were randomly selected from a list of 115 research masters of the NVAO and compared with regard to four aspects: the proportion of ECTS the thesis comprised, the proportion of the programme made up of methods and statistics courses, the proportion of the programme comprised of research-oriented courses, and the proportion of the programme made up of non-research-oriented courses.

Methods and Statistics: Looking at the table there is a general trend in that RM master programmes place more emphasis on methods and statistics courses and research-oriented courses than TM programmes. Regarding methods and statistics the RM programme with the lowest proportion of ECTS in this regard is *arts & humanities II RM* (12.5%), which is higher than all TM programmes except *arts &*

humanities II TM which is the highest TM programme in this regard (15%). It should be remembered, though, that TM programmes are only half the size of RMs, meaning that in absolute numbers of ECs, RMs far outstrip all TM programmes regarding methods and statistics courses. *Social science I RM* places the most emphasis on methods and statistics of all the programmes in the sample (30%).

Research-Oriented Courses: *Social science I RM* places the lowest emphasis on research-oriented courses out of all the RM programmes (10%), though this proportion of the total programme of ECTS is higher than all TM programmes except *science II TM* which is the highest TM programme in this regard (30%). *Social science II RM* is the RM with the largest emphasis on research-oriented courses out of the sample with 35% of the total programme of ECTS in this focus.

Masters Thesis: Interestingly, the master thesis in the TM programmes comprises a higher proportion of ECTS of the total programme of ECTS than the RM programmes. This is the case for almost all programmes in the sample. Only the highest RM in this regard, *arts and humanities I RM,* has a larger proportional emphasis on the thesis (33%) than the lowest TM in this regard: *arts and humanities II TM* and *science I TM* (30%). This is possibly because the RM programmes generally have a greater emphasis on research throughout the whole programme which means that there is less weight on the thesis, whereas in the TM programmes, the thesis constitutes a large proportion of the research focus. Additionally, due to the lower number of total ECTS in the AMs the thesis would be particularly small had it accounted for a similar proportion to what it does in the RMs.

Non-Research-Oriented Courses: In the same vein, in general, TM programmes comprise proportionally more focus on non-research-oriented courses than RM programmes. This is the case for all programmes in the sample except the highest scoring RM programme for this aspect: *arts and humanities I RM*, which has proportionally 41% focus on non-research-oriented courses; this is higher than the lowest scoring TM in this regard: *science II TM* (30%).

Masters type	Masters name	Thesis	Methods & statistics	Research-oriented	Non-research-oriented	Total
Research	Social Science I RM	40 (33%)	36 (30%)	12 (10%)	32 (27%)	120 (100%)
Taught	Social Science I TM	24 (40%)	9 (15%)	0 (0%)	27 (45%)	60 (100%)
Research	Social Science II RM	24 (20%)	21 (18%)	42 (35%)	33 (27%)	120 (100%)
Taught	Social Science II TM	30 (50%)	5 (8%)	5 (8%)	20 (34%)	60 (100%)
Research	Arts & Humanities I RM	30 (25%)	20 (17%)	20 (17%)	50 (41%)	120 (100%)
Taught	Arts & Humanities I TM	20 (33%)	0 (0%)	0 (0%)	40 (67%)	60 (100%)
Research	Arts & Humanities II RM	30 (25%)	15 (12.5%)	30 (25%)	15 (12.5%)	120 (100%)
Taught	Arts & Humanities II TM	18 (30%)	9 (15%)	6 (10%)	27 (45%)	60 (100%)
Research	Science I RM	50 (42%)	20 (16%)	23 (19%)	27 (23%)	120 (100%)
Taught	Science I TM	18 (30%)	7 (12%)	10 (16%)	25 (42%)	60 (100%)
Research	Science II RM	68 (57%)	20 (17%)	16 (13%)	16 (13%)	120 (100%)
Taught	Science II TM	24 (40%)	0 (0%)	18 (30%)	18 (30%)	60 (100%)

Table 6.10. Comparison of content of various programmes

3. Output Characteristics

a. Time to degree, master delay

The difference between whether RM and TM master students have delays in achieving graduation was measured with a chi-square test. Table 6.11. depicts whether students have had a delay in finishing their master programme. From the table it is clear that fewer RM students have a delay (32%) than TM students (42%) and this difference is significant (p<.05). The table below provides a more fine-tuned indication of the duration of this delay in months.

	Taught Masters		Research Masters		Total	
No Delay	1122	58%	514	68%	1636	68%
Delay	797	42%	237	32%	1034	32%
Total	1919	100%	751	100%	2670	100%

Table 6.11. Delay in the Masters programme. Difference is significant at .05 level.

The difference between RM and TM master students as regards the time it took them to graduate, and the duration of their delay was measured with an independent

t-test. Table 6.12. illustrates how long students took to get their degree, and the duration of the delay for those students that did have a delay. Again it is noticeable that RM students do have a significantly shorter delay in general than TM students (mean difference = 1.1, p < .05). Additionally, as expected RM students take longer to obtain their degree than TM students as most RM programmes are two years and most TM programmes only one. This difference is significant (mean difference = 7.8, p < .05).

Variable	Masters Type	N	Mean	Std. Deviation	Sig.
Time to degree (months)	Taught	1948	16.6	7.8	.000
	Research	762	24.4	6.3	
Master delay (months)	Taught	774	7.2	6.8	.007
	Research	225	6.1	5.0	

Table 6.12. Time to degree and duration of the delay.

b. Overall judgement of the programme and Masters performance

The overall judgement among TM students about the study programme that they just completed is 7.2, which is 'quite reasonable' in the Dutch understanding of exam grades, while the RM score of 7.8 comes close to 'good'. The difference in the overall judgement of the master programme between RM and TM master students was measured with an independent *t*-test. Table 6.13. shows the opinion of the master students about their programme. The table indicates that RM students significantly rate their master programme higher than TM students, (mean difference = .6 on a scale of 1-10, p < .05).

	Masters Type	N	Mean	Std. Deviation	Sig.
Overall Grade for Programme	Taught	1909	7.2	1.1	.000
	Research	751	7.8	1.2	

Table 6.13. Students' opinions of their master programme.

The difference in master performance between RM and TM master students was measured with an independent *t*-test. It should be noted that the GPAs from the different programmes are not always measured on the same scale, though, in the

questionnaire the GPA was asked for on a scale of 6-10. Table 6.14 displays the performance of the master students. The TM students did not do badly with an average of 7.6, but RM students scored 8.0 on average, which is 'good'. The master theses were awarded slightly higher grades than the average for both TM and RM students. From the table it becomes clear that RM students performed significantly better on both the overall master GPA (mean difference = .4 on a scale of 6-10, p < .05), and on the GPA of the master thesis (mean difference = .5 on a scale of 6-10, p < .05).

	Masters Type	N	Mean	Std. Deviation	Sig.
GPA Masters	Taught	1569	7.6	.6	.000
	Research	574	8.0	.6	
Masters Thesis	Taught	1574	7.7	.7	.000
	Research	581	8.2	.7	

Table 6.14. Performance during the master.

c. Skills gained during the master

Table 6.15. shows the different skills that the master students have gained during the study, these six skills are based on Bloom's Taxonomy of learning. On a five-point scale, both categories of graduates responded positively about the skills they felt they had gained. No score is lower than 3.5, well above the 3.0 midpoint of the scale, apart from evaluative skills, which TM graduates graded at 3.1. RM graduates also scored lowest for evaluative skills, but their score of 3.8 is clearly higher. The difference in the skills gained during the master programme between RM and TM master students was measured with an independent *t*-test. Again RM students report that they have gained significantly more knowledge, understanding, application, analysis, synthesis, and evaluation skills than TM students (mean difference ranges between .2 and .7 on a 5-point scale, p < .05). Looking more closely at the two groups, the largest differences appear to be in synthesis and evaluation skills. Given that Bloom's Taxonomy is ranked from lower to upper learning activities it is interesting to see that the difference between research master and academic students are higher in the upper learning activities than in the lower learning activities. So, the two top hierarchical levels of Bloom have the highest differences, indicating that alumni of research masters compared to alumni of

taught masters indicate that the skills in the upper learning activities (synthesis and evaluation) were more manifest in their master programmes.

Variable	Masters Type	N	Mean	Std. Deviation	Sig.
Knowledge	Taught	1930	4.0	.74	.000
	Research	754	4.2	.73	
Understanding	Taught	1928	3.7	.74	.000
	Research	754	4.1	.72	
Application	Taught	1928	3.7	.70	.000
	Research	754	4.1	.70	
Analysis	Taught	1928	3.5	.93	.000
	Research	752	3.9	.91	
Synthesis	Taught	1936	4.4	.92	.000
	Research	757	4.9	.87	
Evaluation	Taught	1926	3.1	.82	.000
	Research	755	3.8	.83	

Table 6.15. Skills developed in the master program (scale from 1 (lowest) to 5 (highest))

d. Employment

In table 6.16 we compared the job character with the completed master programme. The character of the job one and a half to two years after graduation could be a non-research job, a research job or a mixed job, with both research and non-research elements. Differences in this regard between RM and TM students were measured with a chi-square test. There is a significant difference between these two groups. In table 6.16 it becomes clear that most of the graduates of an academic masters programme have a non-research job one and a half to two years after they graduate (65%). Most of the alumni from research masters programmes have a research job (81%).

	Taught Master		Research Master		Total	
Non-Research	1140	66%	140	20%	1280	53%
Research	320	18%	506	72%	826	34%
Mixed	276	16%	54	8%	330	13%
Total	1736	100%	700	100%	2436	100%

Table 6.16. Job character compared to completed master programme. Difference significant at the ,000 level.

If we take a more specific look at the exact research whereabouts of the master graduates (table 6.17.) we can learn that admission to Ph.D. programmes will be almost only possible for research master graduates. Differences between RM and TM students regarding employment were measured with a chi-square test. The hypothesis of the former President of the Royal Academy of Arts and Sciences Prof. van Oostrom that the RM will be mainly a 'proto-Ph.D.-classroom' can be confirmed. At a conference about research masters in 2007 he stated: 'the research master will be an exclusive stepping-stone to a Ph.D.-position'. Although there are some (professor Andeweg of the SWR for example) who would argue that this would be a positive sign because of the improvement of the connection between the second and the third cycle (Snijder and David, 2007), van Oostrom saw it as a weak point. He felt that if there was too much emphasis on the Ph.D. prospective this could scare away young students who have a research interest, but who do not want to have an academic career for life.

	Non-Research	Ph.D.	Research Private	Research Public	Research University	Other Job	Total
Research	110	311	43	33	17	35	549
	(20%)	(57%)	(8%)	(6%)	(3%)	(6%)	(100%)
Taught	977	82	79	85	43	224	1490
	(66%)	(6%)	(5%)	(6%)	(3%)	(15%)	(100%)
Total	1087	393	122	118	60	259	2039

Table 6.17. Character of the research jobs (specified). Difference is significant for non-research profession, Ph.D., research profession in the private sector, and other job at the 0.05 level.

	Taught Masters		Research Masters		Total	
Science	44	29%	183	41%	227	38%
Arts & Humanities	21	13%	75	17%	96	16%
Social Science	88	58%	184	42%	272	46%
Total	153	100%	442	100%	595	100%

Table 6.18. Fields of study for Ph.D. research. Difference is significant at the ,05 level.

Table 6.18. indicates comparatively in which field of study RM students and TM students do their Ph.Ds. From the table it is clear that there are in total more RM students doing a Ph.D. than TM students. This too is an indication of the 'proto-promovendi' character of the RM programme. Furthermore, there are more RM Ph.D. candidates than TM Ph.D. candidates in all three fields of study with the largest difference being 139 students in the Sciences. The field of study with the most Ph.D. students in total is social sciences (272 Ph.D. students). This field of study also contains proportionally the highest number of Ph.D. students (41%) who previously followed a RM programme and the highest proportion of Ph.D. candidates who previously followed and TM programme (58%). It is interesting to note that more than half of the TM Ph.D. candidates pursue their Ph.D. within the social Sciences field, whilst the RM candidates are more evenly spread over the fields of study. In general Arts and Humanities is the field of study which has considerably the lowest number of Ph.D. candidates (96) of all the fields of study. Finally, table 6.19 reveals that there are significant differences between the fields of study within which the Ph.D. candidates do their Ph.Ds. (p<.05).

	Same uni same research group	Same uni different research group	Other uni in NL	Other uni outside NL	Dutch research institute	Foreign research institute	Total
Research	163 (37%)	83 (19%)	111 (25%)	56 (13%)	21 (5%)	4 (1%)	438 (100%)
Taught	41 (30%)	27 (20%)	33 (24%)	27 (20%)	8 (6%)	1 (1%)	137 (100%)
Total	204 (33%)	110 (19%)	144 (25%)	83 (14%)	29 (5%)	5 (1%)	575 (100%)

Table 6.19. Where Ph.D. students do their research. Difference is significant at the .05 level.

Table 6.19. provides an overview of where the various Ph.D. candidates, both from the RM programmes and the TM programmes, end up. From the table it immediately becomes apparent that most Ph.D. candidates end up doing their Ph.D. in the same university in and in the same research group as where they did their master (204). In contrast, the fewest of candidates pursued their Ph.D. at a foreign research institute (5). Interestingly more Ph.D. candidates do their Ph.D. at a different university in the Netherlands (144) than those who do their Ph.D. at the same university but in a different research group (110). Perhaps this is an indication that the research group (discipline) focus is more important than the university in determining where to pursue a Ph.D. Once again in total there are more Ph.D. students from RM programmes (338) than from TM programmes (137). This trend also holds true for the numbers of Ph.D. students for all locations. The differences between the locations chosen by students do their Ph.D. are significant (p<.05): RM students more often remain in the same department, while TM students more often go to another university in the Netherlands for their PhD.

6.3 Time Trend Analysis

In this section the four cohorts are compared with each other to determine whether the trends observed in the data change significantly over time. Given the make-up of the RM and TM programmes one would expect to see the same trend in Bloom's Taxonomy over the time period. However, taking into consideration the financial crisis since 2008, one might expect a break in the trends related to the master degree and employment. Additionally, it is interesting to examine the differences over time in the rating of supervisors and teaching staff. In order to conduct this analysis a two-factor ANOVA was used; this enables the comparison of the different cohort means over time for the whole sample. Additionally, the interaction between the cohort and the type of master programme, i.e. RM or TM can also be examined.

The analysis reveals that the Bloom's Taxonomy variables i.e. knowledge, understanding, application, analysis, synthesis and evaluation do not vary significantly with the cohort. This confirms the expectation that the TM and RM programmes are designed specifically to - endow students with the same skills and knowledge year in and year out. Additionally, there are no significant interactions

between the cohort and the masters type for any of these variables across the cohorts (see appendix F). In the same vein, there are no significant differences over time regarding the rating of teaching staff and supervisors between the different cohorts. Also there are no significant interactions between the cohort and master type for these two variables (see appendix F). In addition, table 6.20 shows no significant differences between cohorts (greatest mean difference 0.2 on a 5-point scale, p>.05) but, there is a significant interaction between the cohort that answered the survey and whether the master was a RM or an TM programme (p<.05). This is illustrated in the graph below table 6.20.

Table 6.21. shows whether there have been yearly differences between students' assessment of whether their job offers good opportunities or not. From the table it is clear that there is a significant difference between cohorts (greatest mean difference 0.3 on a 5-point scale, p<.05). One possible explanation of this finding is the global economic crisis which had a prominent impact on the labour market since 2008. Already in 2009 one can observe the respondents' scores drop in whether they believe their jobs offer good opportunities. Additionally, there is a significant interaction between the cohort that answered the survey and whether the master was a RM or an TM programme (p<.05). This is illustrated in table 6.22.

Regarding job satisfaction, table 6.22 shows that there is a significant difference between cohorts (greatest mean difference 0.2 on a 10-point scale, p<.05): satisfaction significantly reduced in 2009. Additionally, there is a significant interaction between the cohort that answered the survey and whether the master was a RM or an TM programme (p<.05). More specifically RM students dramatically decreased in job satisfaction in 2008 (See Table 6.22). One possible explanation for this was the economic crisis and the career opportunities in academia.

Variable	Cohort	N	Mean	Std. Deviation	Sig.
	2006	793	7.5	1.20	
Quality of	2007	988	7.5	1.24	
Lecturers	2008	368	7.6	1.11	.798
	2009	535	7.7	1.18	

Cohort*Master Type Interaction	.006
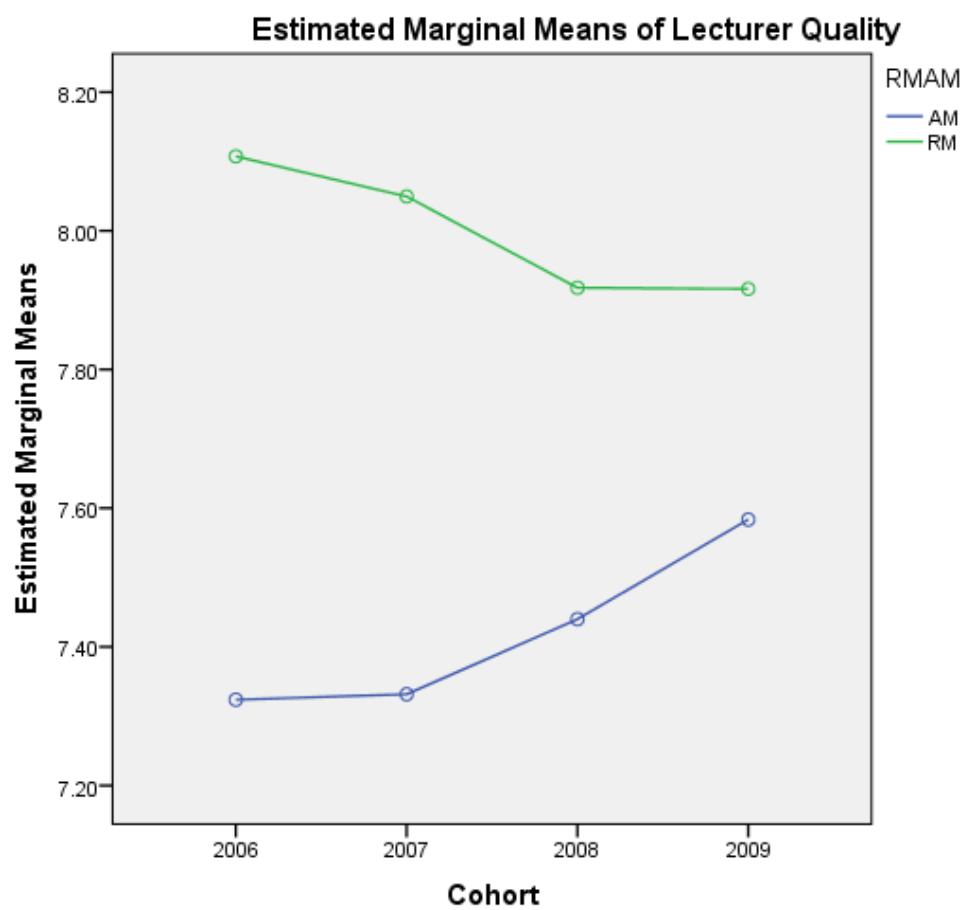
Table 6.20. Quality of lecturers during the master programme: cohort differences

Variable	Cohort	N	Mean	Std. Deviation	Sig.
Good opportunities offered by current job	2006	706	3.9	1.19	
	2007	902	3.9	1.17	.000
	2008	342	3.8	1.12	
	2009	512	3.6	1.31	
Cohort*Masters Type Interaction					.015
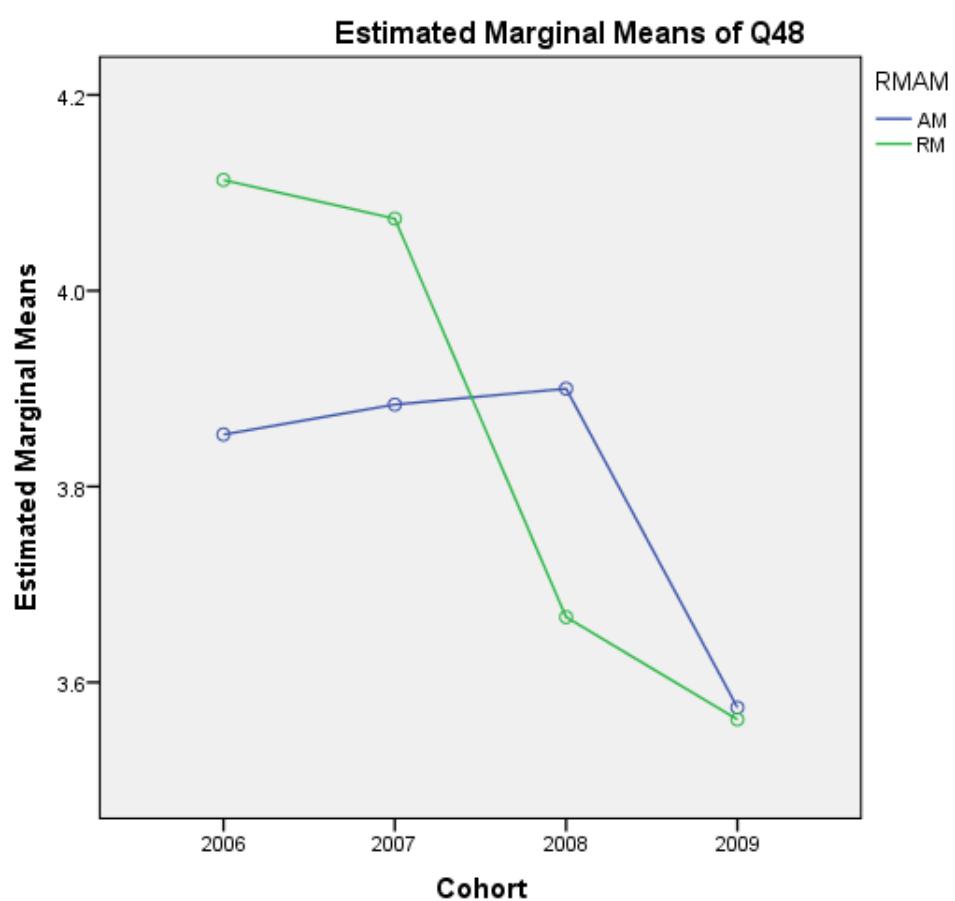
Table 6.21. Assessment of whether the current job offers good opportunities: cohort differences

Variable	Cohort	N	Mean	Std. Deviation	Sig.
Job satisfaction	2006	702	7.5	1.90	.001
	2007	898	7.5	1.90	
	2008	341	7.5	1.90	
	2009	511	7.3	2.00	
Cohort*Master Type Interaction					.000
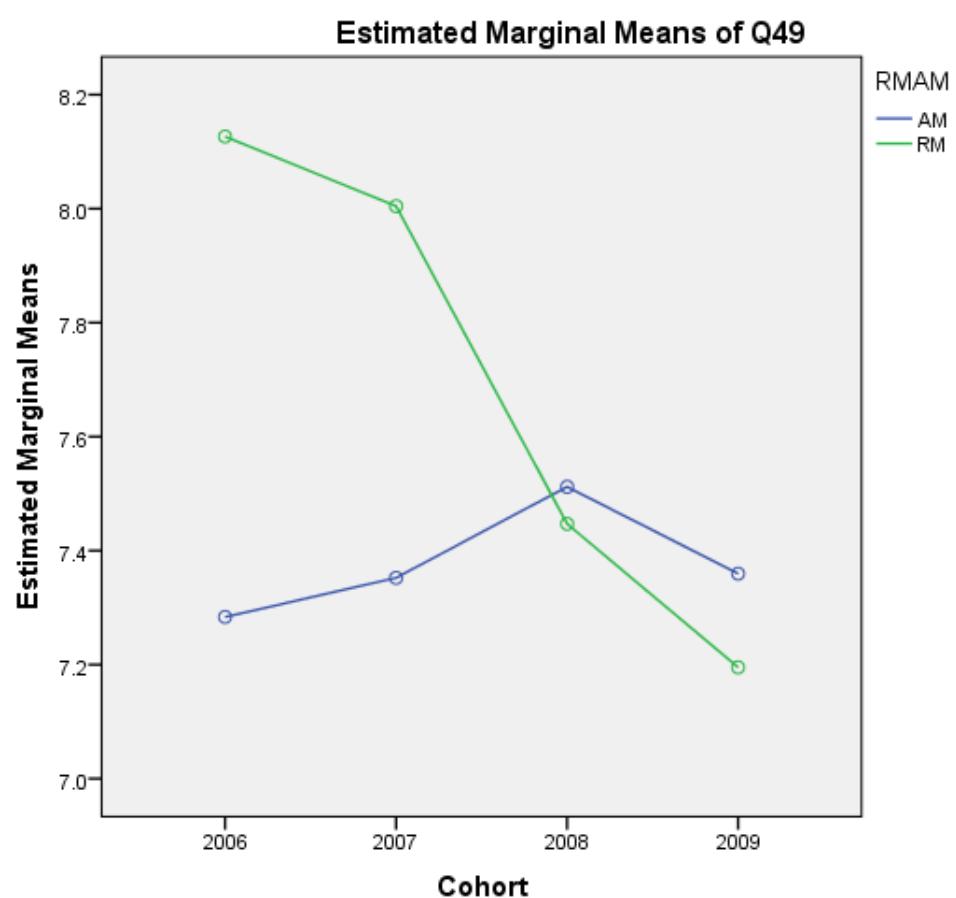
Table 6.22. Job satisfaction of current job: cohort differences

6.4 Conclusions

In the first part of this chapter the response rates were described. With the exception of one cohort these were all good response rates. Besides this the time trends showed, in general, that there were constant results over time. The few exceptions to this statement about constancy mostly had to do with the worsening of the economic context, rather than with characteristics of the research master and taught master study programmes.

In summary, the main results of the alumni surveys will be compared. First the input variables, the process variables and finally the output variables of the alumni survey will be described.

The input characteristics indicate that research master programmes are clearly more selective than academic master programmes and that alumni of research master programmes are more satisfied with the quality and availability of the teaching staff and thesis supervisors. The process characteristics indicate that research master alumni are more satisfied with research-related aspects of their study programme, have more instruction time, with more focus on research-related courses (methodology, statistics, etc.) and a higher workload. The output characteristics or variables indicate that the research master alumni had fewer delays, and shorter delays if they had any, during the master thesis. The overall judgement of the RM alumni about their programme was more favourable and the study results were higher (both the GPA of the MA and the GPA of the master thesis). Finally, the research master alumni were more satisfied with the extent to which their programme prepared them for professional practice, and more frequently, to have a research-oriented job. More than half of all the RM alumni in our sample had enrolled in a Ph.D. programme. They were less often attracted by research jobs outside academia.

To conclude, the outcomes of the alumni cohorts show that research master programmes do what they intend to do: prepare students for the *metier of researcher*. Alumni of research masters mostly end up in research positions within academia and especially in Ph.D. programmes. The *proto-promovendi-character* of the research masters can be confirmed.

Chapter Seven *Empirical Findings: Survey of Professors and Interviews with R&D Managers*

7.1 Introduction

In this second empirical chapter the survey that has been conducted amongst 1100 professors of Dutch Universities will be discussed. To gauge the first outcomes of the RM programmes, a survey was held amongst professors who supervised Ph.D. students to learn more about the impact of the research master on students in the first stage of the Ph.D. programmes. The Ph.D. supervisors' perceptions will be presented in section (7.2.) The interviews with stakeholders and R&D managers will be described in section (7.3.) In the final section (7.4) some conclusions will be drawn.

7.2 Professors' survey

The professors' survey was conducted in 2010 to glean a valuable perspective on the differences between Ph.D. students with a RM and TM background. The survey was sent out to 1100 professors (a random sample out of 4253 addresses of full professors) from seven universities that offered both research and regular master programmes, culminating in a total of 396 respondents (36% response rate). The seven universities comprised the University of Groningen, the Erasmus University, the Vrije Universiteit Amsterdam, the University of Amsterdam, Leiden University, Utrecht University and the University of Maastricht.

7.2.1 Variable Creation
Before analysis could start, various new variables were created from the multiple-item scales of question 3 based on Bloom's Taxonomy (Bloom, 1956). Additionally, a variable was created from the multiple-item scale of question 4

concerning the readiness for the Ph.D. This was done in order to create scale level variables from multiple ordinal level variables. The method used was the average combination method in which an average score is calculated from all the items. This is preferable to the total score method as there was substantial missing data for certain items. A reliability analysis was carried out to determine the suitability of combining the various items based on their internal consistency. The results of this analysis are displayed in the appendix F.

In appendix F it shows adequately high internal consistency for the creation of the variables analysis, synthesis, evaluation, and readiness for the Ph.D. respectively. This level of internal consistency indicates that the variables can be used in the analysis to follow.

Second, the fields of study categories were combined into three broad fields, namely arts and humanities, social sciences, and sciences; there was also a category for other fields of study. This was done because when conducting cross-tabulations using the original fields of study categories there were certain cell counts below 5, which is insufficient for reliable analysis. The fields of study were combined in the following manner: arts and humanities contained only one category; social sciences comprised behavioural sciences, economics, education, law, and social sciences; sciences comprised engineering, manufacturing and construction, medical and life sciences, and natural sciences; the other category comprised agriculture, and other categories.

Third, descriptive statistics were computed for all variables generating the mean, standard deviation and minimum and maximum values. Such analysis made it possible to detect possible outliers in the sample data set of professors. This process did not lead to the removal of outliers.

Finally, outliers were screened for by generating box plots of key variables and removing any extreme values indicated of more than 2 standard deviations from the mean. This process as well did not lead to the removal of outliers. Furthermore, the number of Ph.D. students supervised was examined in detail and it was found that from the sample one professor had not yet started supervising Ph.D. students, nor did this professor have any experience with Ph.D. students completing their Ph.D. This respondent was therefore removed to avoid biasing the results.

In order to analyse differences in perception between professors who have experience with both research and regular master students and professors who have only experience with regular master students, two groups were created from the respondents.

Next, independent samples t-tests (due to scale variables and two groups) were conducted on the variables of interest to check for between-groups effects/differences.

Finally, an analysis was done by generating cross-tabs of various categorical variables with the fields of study to see if there were differences or interesting findings within the set-up of the Ph.D.-(research) master for each field of study.

7.2.2 Results

1 Population

The tables 1a through 1e describe the population of the professors' survey. Note that it was difficult to measure the representativeness of the sample compared to the Dutch population of professors due to the difficulty of obtaining the data to measure the latter. Thus we can only assume that the sample is representative. The professors' survey dataset comprises the responses of 391 professors from 7 universities in the Netherlands (table 1d). Of the 391 professors 116 indicated that they had had experience with at least one research master student between 2005 and 2009, and 152 indicated that they had had no experience with research master students during the same time period. The average number of Ph.D. students supervised was 9.4 with a standard deviation of 10.0 (Table 1a). Furthermore, looking at table 7.1a it is interesting to note that 75% of professors had only supervised up to 12 Ph.D. students, meaning that the minority of professors have supervised large numbers of Ph.D. students. Looking at the time period 2005-2009 the average number of Ph.D. students that started under each professor was 5.2 with a standard deviation of 3.7. The maximum number that started under a single professor in this time period was 20 students. Furthermore, in the same time period the maximum number of Ph.D. students that completed a research master supervised by any professor was 17 with a mean of 1.6 and a standard deviation of 2.4. In all cases the minimum number of Ph.D. students supervised is 0.

Variable	Mean	Std. Deviation	Minimum	Maximum
Number of Ph.D. students supervised	9.4	10.0	0	90
Number of Ph.D. students started under prof. 2005-2009	5.2	3.7	0	20
Number of Ph.D. students 2005-2009 did a Research Master	1.6	2.4	0	17

Table 7.1a. Overview of the sample I

The highest number of Ph.D. students supervised by any one professor is 90, a life sciences professor (table 7.1a).

Table 7.1b below shows that programmes which are embedded in inter-university research schools recognised by the ECOS of the KNAW comprise the largest category of Ph.D. programmes. in which respondents participated. (41%).

Ph.D. programme institutionally embedded in...	Number	Percentage
Inter-university research school recognised by ECOS of KNAW	185	41%
Locally organized research school recognised by ECOS of KNAW	134	29%
Locally organized graduate school not recognised by ECOS of KNAW	86	19%
Other	13	2.8%
I don't know	39	8.5%
Total	457	100.0%

Table 7.1b. Overview of the sample III

Table 7.1c indicates that from the total sample, 9 professors did not start supervising any Ph.D. students between 2005 and 2009, and 36 professors did not finish supervising any Ph.D. students.

		Number of Ph.D. students started supervising (2005-2009)		
		None	One or more	Total
Number of Ph.D. students completed supervising	None	0	36	36
	One or more	9	345	354
	Total	9	381	390

Table 7.1c. Overview of the sample IV

Table 1d below depicts the sample as split per field of study in which the professors supervise Ph.D. students. It should be noted first that respondents were allowed to indicate multiple fields of study for which they supervise Ph.D. students thus the total of all the responses exceeds the number of respondents to the questionnaire. From the table below it is seen that the largest number of professors supervised Ph.D. students in the medical and life sciences (28.7%). The second largest represented field of study is social sciences (13.8%) followed by arts and humanities (11.6%) and natural sciences (11.2%). The two fields of study that had the fewest professors supervising Ph.D. students were engineering, manufacturing and construction and agriculture with representations of 1.1% and 1.3% respectively of the total sample.

Field of Study	Number of Students	Percentage
Arts & Humanities	43	11%
Social Sciences	126	33%
Sciences	169	44%
Other	44	12%
Total	382 [472]	100%

Table 7.1d. Overview of the sample V
NOTE the total (472) is greater than the total of respondents because respondents could select more than one field of study per programme.

2. Descriptive statistics

Table 2 juxtaposes the opinions of the whole sample, of professors who have only had RM students, and of professors who have never had RM students on the variables: Ph.D. performance, readiness for the Ph.D., and meeting frequency. From the total sample, more professors agreed that they would prefer research

master graduates over taught master graduates in their Ph.D. programme in the future (mean = 3.5 on a 5-point scale). Additionally, from the total sample, professors in general rated RM students' performance better than TM students during the Ph.D. (mean = 2.3 on a scale of 1-5 with 1 being much better performance and 5 being much worse performance).

More interesting than the total sample, is a comparison between professors who have worked with RM PhD-students versus those who had not. To maximize contrast, we only compare professors who had only had RM PhD-students with those who had no experience at all with RM Ph.D. students. Their opinions are presented in the middle and right hand columns of table 7.2, respectively. The top three variables in table 7.2 indicate the opinions of professors on whether the RM provides a better basis than the TM for the development of analysis, synthesis and evaluation skills. One can see that on average professors with 100% RM experience have higher ratings than professors with 0% RM experience (difference ranges between 0.3 and 0.5 on a 5-point scale). This might be a consequence of positive experiences with RM students, but—turning the causality around—could equally be explained as being in line with the theory of cognitive dissonance, which states that people alter their behaviour or attitudes to align them with one another. In this case the attitude of professors towards RM students is aligned with their behaviour: i.e. because they pick 100% RM students they therefore believe that RM programmes are better for the development of learning skills than TM programmes. However, on average even professors with 0% RM experience indicated that RM programmes provide a better basis for analysis, synthesis and evaluation than TM programmes as the mean scores are all above 2.5 on a 5-point scale. This is an interesting finding in that it seems to falsify the theory of cognitive dissonance as explanation in this case; this gives additional trust that RM really prepares students better for Ph.D. programmes. Furthermore, on average, professors with 100% RM experience and professors with 0% RM experience indicate that RM students are better prepared for a Ph.D. than TM students (means > 2.5 on a 5-point scale), with professors with 100% RM experience giving a higher rating (difference = .7 on a 5-point scale). Interestingly professors with 0% RM experience on average meet with their students more often than professors with 100% RM experience.

Variable	Whole Sample			Professors with 100% RM Experience			Professors with 0% RM Experience		
	N	Mean	Std. Deviation	N	Mean	Std. Deviation	N	Mean	Std. Deviation
Analysis	196	3.7	.8	22	3.9	.8	46	3.6	.9
Synthesis	196	3.6	.9	22	3.9	.8	46	3.4	.9
Evaluation	196	3.5	.9	22	3.9	.8	46	3.4	.9
General performance (reversed scale)	196	2.3	1.3	22	2.7	1.5	46	2.3	1.3
Readiness for the Ph.D.	196	3.6	1.1	22	4.0	.9	46	3.3	1.0
I prefer RM to TM students in my programme	196	3.5	1.2	22	4.0	.9	46	3.3	1.2
RM finish thesis quicker than RA	196	.3	.5	22	.4	.5	46	.2	.4
How often do you meet your students	196	3.3	.8	22	3.2	.9	46	3.3	.8
Day-to-day contact with your students	196	.5	.5	22	.6	.5	46	.5	.5

Table 7.2. Differences between opinions of professors with 100% RM students experience between 2005 and 2009; and those with 0% RM students experience in the same time period

3. Results

In this section we discuss the results of the professors' survey. First the results will be presented to show to what extent the students from the different master programmes are ready for the Ph.D. Thereafter, we will examine the difference in the first one to two years of Ph.D. performance between RM and TM students. Subsequently the control variables will be presented and the set-up of the Ph.D. programme will be elaborated upon with regard to whether and how it is connected to the master programmes. The rest of the results section will be laid out as follows:

1. Readiness for the Ph.D.

    2.   Performance during the Ph.D.
          a.   Skills gained during the programme
          b.   Time to finish the thesis
    3.   Control variables
          a.   Frequency of meetings between professors and students
    4.   Programme set-up
          a.   Joint activities between master students and Ph.D. programmes
          b.   Connections between master and Ph.D. programmes

1. Readiness for the Ph.D.

Table 3 shows the difference in opinion of professors who have had experience with RM students and professors who have had no experience with RM students with respect to whether RM students are better prepared for the Ph.D. From the table one can immediately see that on average both groups of professors rate RM students better prepared for the Ph.D. than TM students (mean > 2.5 on a 5-point scale). Furthermore, professors with RM experience significantly rate RM students as better prepared for the Ph.D. than professors without RM experience (mean difference = .4, p<.05).

Variable	Group	N	Mean	Std. Deviation	Sig.
	No experience	97	3.3	1.1	.002
	Experience	181	3.7	1.0	

Table 7.3. Professors' opinions on whether RM students are better prepared for the Ph.D. than TM students

2. Performance during the Ph.D.

a. Skills gained during the programme

Table 7.4 presents the perception of the professors about whether RM programmes provide a better basis for the development of knowledge, understanding, application, analysis, synthesis and evaluation skills than TM programmes.

In general, both groups of professors answered that research master programmes compared to regular master programmes provided the Ph.D. students with a better basis for the development of knowledge, understanding, application, analysis, synthesis and evaluation skills (all mean scores > 2.5 on a 5-point scale). There is also a significant difference in the ratings between the two groups of professors for

knowledge, understanding, analysis, and evaluation skills with professors with RM experience giving significantly higher ratings (mean differences range from .2 to .3 on a 1-5 scale, p<.05). Otherwise, there are no significant differences in professors' ratings on the synthesis and application skills gained by master students whether they had experience with both RM and TM students or only experience with TM students.

Variable	Group	N	Mean	Std. Deviation	Sig.
Knowledge	No experience	92	3.4	1.00	.003
	Experience	173	3.7	.83	
Understanding	No experience	92	3.6	9.4	.033
	Experience	173	3.9	7.9	
Application	No experience	92	3.4	9.5	.064
	Experience	173	3.6	7.7	
Analysis	No experience	92	3.3	1.01	.048
	Experience	173	3.5	.95	
Synthesis	No experience	92	3.2	.85	.096
	Experience	173	3.4	.80	
Evaluation	No experience	92	3.3	.87	.041
	Experience	172	3.5	.83	

Table 7.4. Professors' opinions on skills gained during the master programme

From tables 7.3 and 7.4 we can conclude that there is indeed a significant difference between professors with at least one research master student and professors with no research master students. The difference lies in their evaluation of certain skills gained in the master programme and readiness for the Ph.D. when comparing research master students and regular master students. In order to examine this effect further, i.e. to see if having an increasing number of research master students has significant effect on this evaluation we conducted a Pearson correlation between the number of research master students supervised and the skills gained i.e. knowledge, understanding, application, analysis, synthesis, and evaluation as well as the readiness for the Ph.D. From this analysis all professors with zero research master students were excluded. Table X, appendix XX describes the outcome of this analysis. Stated briefly, there is no significant effect resulting from having an

increasing number of research master students on professors' evaluation of whether RM provides a better basis for the development of knowledge, understanding, application, analysis, synthesis and evaluation skills than the TM, or whether RM students are better prepared for a Ph.D. than TM students.

b. Time taken to finish the thesis

Table 7.5 below shows professors' opinions on whether RM students finish their Ph.D. thesis more quickly than TM students. In general, only a minority of professors in both groups believe that RM master students finish their thesis faster than TM students. Looking at the differences between the groups, a higher proportion of professors with RM experience believe that RM students finish their thesis faster than TM students (34%) than the group without RM experience (21%). However, this difference is not significant and we are left with the finding that RM graduates are not getting to their Ph.D. faster than TM graduates.

	No experience with RM		Experience with RM	
Do not finish thesis quicker	41	79%	96	66%
Finish thesis quicker	11	21%	50	34%
Total	52	100%	146	100%

Table 7.5. Professors' opinions on whether RM students finish their thesis more quickly than TM students. Difference not significant at the 0.05 level

3. Control variables

To check for the possible explanation of our results coming from the amount of contact professors have had with their students, we asked about the day-to-day contact between professors and their students, as well as the number of contact hours between professors and their students for both professors with RM student experience and those without. Additionally, we examined the relative proportion of professors with experience with RM student experience and those without RM student experience per field of study. Tables 7.6 through 7.10 provide an overview of these findings.

a. Frequency of meeting between supervisors and students

Table 7.6 shows how often the two groups of professors, those with RM experience and those without RM experience, meet with their students per year. There is no

significant difference between the two groups of professors on this dimension. Within both groups of professors, the majority have more than 20 hours of meeting with their students per year (no RM experience 81%, RM experience 83%). The differences between the two groups are minimal.

	No experience with RM		Experience with RM	
Up to 20 hours	28	19%	34	17%
More than 20 hours	119	81%	163	83%
Total	147	100%	197	100%

Table 7.6. How often professors meet with their students. Difference not significant at the .05 level

Table 7.7 indicates whether there is day-to-day contact between professors and their students. There are no significant differences between professors with RM experience and professors without RM experience in whether they have day-to-day contact with their students. Roughly half of the professors in both groups have day-to-day contact with their students (no RM experience = 47%, RM experience = 48%). Slightly more professors in each group do not have day-to-day contact with their students than those that do; in other words, fewer see their students on a daily basis.

	No experience with RM		Experience with RM	
Daily Contact	70	47%	97	48%
Not Daily Contact	79	53%	105	52%
Total	149	100%	202	100%

Table 7.7. Occurrence of day-to-day contact between professors and their students. Difference not significant at the .05 level

Table 7.8 shows per field of study how often professors meet with their students per year. Generally, it can be seen that in all fields of study, the majority of professors meet more than 20 hours per year with their students. In Arts and Humanities (A&H), the percentage of professors meeting more than 20 hours per year with their students is noticeably lower (63%) than the other fields of study: social science (81%) science (87%), other (82%). There is a significant difference between fields of study in this regard.

	Up to 20 hours		More than 20 hours		Total	
A&H	16	37%	27	63%	43	100%
Social Science	22	19%	97	81%	119	100%
Science	22	13%	144	87%	166	100%
Other	6	18%	37	82%	44	100%

Table 7.8. How often professors meet (in hours) with their students per field of study. Difference is significant at the .05 level

Aside from their personal supervisor, Ph.D. students often communicate and meet with professors who are not their direct supervisors. Table 7.9 indicates how many hours per year Ph.D. students meet with other supervisors. There is a significant difference per field of study and how often Ph.D. students meet with their supervisors in this metric between fields of study. In social science, science and the other category, a larger proportion of Ph.D. students spend more than 20 hours meeting with other supervisors (65%, 80% & 82% respectively) as compared to those who meet less than 20 hours with other supervisors. In arts and humanities, a larger proportion of Ph.D. students spend less than 20 hours meeting other supervisors (62%) as compared to those that meet more than 20 hours with other supervisors. For a comparison of how often Ph.D. students meet their supervisors compared to other supervisors per field of study see the appendix.

	Up to 20 hours		More than 20 hours		Total	
A&H	23	62%	14	38%	37	100%
Social Science	40	35%	75	65%	115	100%
Science	32	20%	130	80%	162	100%
Other	8	18%	36	82%	44	100%

Table 7.9. How often students meet ($\leq$20 or >20 hours) with other supervisors per field of study. Difference is significant at the .05 level

Table 7.10 shows that there are no significant differences among the professors with RM experience and those without RM experience across field of study. This

is an indication that our results cannot be attributed to differences in relative sample size across fields of study.

	No experience with RM		Experience with RM	
Arts & Humanities	17	11%	23	11%
Social Science	57	38%	62	31%
Science	58	39%	94	47%
Other	18	12%	23	11%
Total	150	100%	202	100%

Table 7.10. Professors' experience with RM students across field of study. Difference is not significant at the 0.05 level

4. Programme set-up

a. Joint activities between Masters and Ph.D. programmes

Table 7.11 shows per field of study whether there are joint activities, such as methodology courses, research seminars etc., between the Ph.D. and master programmes. In general, for all fields of study more than 50% of the time there are joint activities between the master and the Ph.D. programme. This is an indication that there is exposure to Ph.D. students for master students and vice versa. Moreover, there is not a big difference between fields of study in this regard; the lowest percentage of joint activities is in the arts and humanities with 58% and the highest is in the Other category with 68%.

	No joint activities		Joint activities		TOTAL	
A&H	16	42%	22	58%	38	100%
Social Science	37	34%	73	66%	110	100%
Science	55	36%	97	64%	152	100%
Other	13	32%	28	68%	41	100%

Table 7.11. Presence of joint activities between Masters and Ph.D. students per field of study. Difference not significant at the 0.05 level

b. Connections between master and Ph.D. programmes

Table 7.12 shows per field of study whether there is a formal connection between the research master and the Ph.D. programme. From the table it can be seen that in all fields of study, the majority of RM programmes are not formally connected to the Ph.D. (arts and humanities 75%, social science 55%, science 66%, Other 66%). Social science has the most formal programmatic connections between the RM and the Ph.D. This might imply that the field of social science is more oriented towards bridging the gap between the research master and the Ph.D. than arts and humanities or science. However, there are no significant differences between the fields of study in this regard.

	Not connected		Connected		TOTAL	
A&H	30	75%	10	25%	40	100%
Social Science	64	55%	53	45%	117	100%
Science	99	66%	50	34%	149	100%
Other	27	66%	14	34%	41	100%

Table 7.12. Formal connections between the RM and the Ph.D. per field of study. Difference not significant at the 0.05 level

Table 7.13 shows per field of study whether the Ph.D. programme is going to be shortened due to the introduction of the RM, from four to three years. From the table one can see that the majority of Ph.D. programmes in arts and humanities, social science and other category are planned to be shortened (arts and humanities 54%, social sciences 51%, other61%). Science has the fewest programmes for which there are plans to shorten the course due to the introduction of the RM (41%). There are no significant differences between the fields of study in terms of whether there are plans to shorten the Ph.D. programmes due to the introduction of the RM.

	Not shortened		Shortened		Total	
	Count	%	Count	%	Count	%
A&H	16	46%	19	54%	35	100%
Social Science	47	49%	49	51%	96	100%
Science	68	59%	48	41%	116	100%
Other	10	39%	116	61%	26	100%

Table 7.13. Whether there are plans to shorten the Ph.D. due to the introduction of the RM per field of study. Difference not significant at the 0.05 level

7.3 Interviews R&D managers and stakeholders

In this section first the interviews with the research and development managers, and second, the relevant external stakeholders of the research master are described. The interviews with the research and development managers are important to learn more about the preparation of research masters for jobs outside academia, in the private research sector. Are (corporate) research and development managers aware of the existence of the research master programmes? Do they select students with a research master background?

The interviews with the stakeholders are important to learn more about the positions of the relevant stakeholders before and after the launch of the research master and especially about their views on the preparation of the research master for a career in academia.

7.3.1 Population

In total seven interviews were conducted with research and development managers (see annex E). Four interviews were conducted with managers of corporate companies (multinationals) and two interviews with consultancy firms, of which one in the public sector. Finally, I interviewed a former director of a governmental research institute.

The main external stakeholders that will be described below are: Ministry of Education, NVAO, KNAW, Universities (VSNU), VNO-NCW. In total seven interviews were conducted with (former) decision makers.

For both the (corporate) research and development managers and the stakeholders semi-structured interview protocols (see annex E.) were used and the conversations were audio recorded.

7.3.2 Results

Research and Development managers

None of the interviewed corporate Research and Development (R&D) managers in my study knew about the existence of the research masters. One respondent of a public research institute did know of the existence of the research master because he previously worked at a research school and had set up a research master.

The interviewed corporate R&D managers mentioned various backgrounds of their research employees. One company worked with Ph.Ds. as team-leaders and graduates of universities of applied sciences as R&D employees, another company worked with only Ph.D.'s and again another with mainly master graduates and Ph.D.'s for specific positions. None of the interviewed corporate R&D departments kept track of the specific master programmes of their employees or made a distinction between research masters or taught master programmes. One respondent said: 'this is irrelevant, our assessment tests select (in order of importance): (1) teamwork, (2) creativity, (3) intercultural competencies and finally (4) disciplinary knowledge'.

The selection processes of R&D employees differed across the interviewees' organisations as well. All employers had their own selection procedures and trainee programmes. Due to the international character of the R&D departments the companies, besides the interviewed consultancy firms, recruited students from universities all over the world. In the Netherlands, graduates of the technical universities were especially in high demand, because of their analytical skills. One former R&D manager argued that policy instruments of the government to improve research degrees should focus on preparing graduates who are better qualified than graduates of foreign universities. Another R&D manager added that 'if the research master could play a role in the improvement of research quality of the graduates this would be a good achievement'

The organisation of Dutch Employers (VNO-NCW) was positive about the implementation of the research masters because only a small amount of master students would pursue an academic career: 'a certain amount of streaming is important for those who want to obtain a job outside academia and for those who want to pursue a career in the academic world and especially the Ph.D.' (interview former educational secretary VNO-NCW). So, the pre-destination of the research master for academia was expected by the companies' umbrella organisation as well.

Stakeholders
From the interviews with relevant stakeholders it became clear that most of them saw the research master as a successful innovation in the higher education system. As one of them argued: 'The sheer fact that the research master still exists speaks for itself that it is a success'. On the other hand, the corporate R&D employers, as stated previously, were in most cases not familiar with existence of the research master.

The Ministry of Education saw the research masters at first as a solution. As we have seen in previous chapters, many committees had published reports about the implementation of the Masters cycle, the *top masters* and especially the discussion about the appropriate length of the programmes in the social sciences and the humanities (and corresponding funding and study grants). With this research master (and a special protocol for two-year master programmes in international law and oriental languages) there was a solution for the problem (extended duration of these specific master programmes with one year), the interviewed civil servant[s] said. From a financial point of view this was interesting as well because only the study grants for students were expanded from one year to two years and not the funding of the universities for the second year. This was changed in 2011, when universities were given additional means for each student in RM programmes.

The newly appointed accreditation organisation (NAO) was a catalyst in this process, according to the Ministry. As a commentator observed: 'the NAO has changed the research master from a means (award specific master programmes with a two-year programme) to an end in itself (excellent research programme)'. The Ministry saw that the research master was adopted by the universities and students quite quickly. Attempts by the NVAO to reward the recognised research masters

with the M.Phil. title were rejected by the Ministry because of the negative connotation it has in some countries as a consolation prize for not completing the Ph.D. and because of the fact that the universities had not opted for research masters in the natural sciences because they already had two years of funding. So it was not accepted in all academic disciplines and across all the universities. All and all this was reason enough for the Ministry of Education not to grant the title M.Phil. to certified research master programmes, according to one interviewee.

The NAO saw a unique opportunity to put their newly founded organisation on the higher education map. Besides the accreditation of the basic quality of bachelor and master programmes of universities and universities of applied sciences the NAO now had to change to play a role in the assessment of 'excellent programmes'. The founding president Vredevoogd took the initiative and convinced the Junior Minister of Education Nijs that the NVAO should assess these research masters. According to the NAO board members the Junior Minister welcomed the idea of assessment of excellent programmes as well. Being a Junior Minister from the Liberal Party (VVD) and having to deal with a parliament and coalition party (Christian Democrats) which still advocated an egalitarian higher education system, the assessment of these excellent research masters, some interviewees suggested that separate assessment of the RM might have been on Nijs' hidden agenda. The NAO saw the assessment of the research master as a test case as well. If successful, this would have an effect on the assessment of all the regular programmes as well and could serve as a first training for the assessment of all other accreditation activities. In the first round there were some programmes which received negative commentary which had an effect on the reputation of the NAO as well, as one spokesperson argued. They were not only giving the official stamp but showed to be a watchdog guarding quality that could bite if necessary. The NAO asked the KNAW to set up committees to do the assessments. This gave the procedure academic legitimacy as regards the universities and the Ministry, and acceptance of the research groups that applied for the research master programmes as well. The Research Master Review reports of 2007 and 2011 (Snijder & Davids, 2007; NVAO 2011) showed that the NVAO remained positive about the research master, perhaps even proud. As another interviewee said about the NVAO 'they treated the research master as their baby'.

The KNAW too was positive about the research master initiative. The former president professor Rob Reneman was the chair of the committee top-masters and the idea of a research master had the potential to strengthen the position of the inter university research schools. The NAO asked the KNAW to advise them about the quality of the research masters, which they did. The KNAW remained positive about the research master (KNAW, 2007 and 2011) although the former president Van Oostrom argued in 2007 that it would turn into a proto-promovendi class.

The Universities and their association, the VSNU, were divided at first. The majority of the universities and the VSNU were in favour of the research master initiative because it would result in two years of study funding for master programmes in the humanities and social sciences. One university, however, argued that the assessment of excellence was against the mission of the NAO to undertake accreditation of basic quality (Universiteit Utrecht, 2003). But this was a minor resistance. Two technical universities (Delft and Eindhoven) did not disapprove of the research masters, because their science master programmes had already two years of funding and study grants, but did not submit their master programmes either for the additional evaluation. After the introduction of the research master, the support only increased because faculty and students were in general very positive about the programmes. One respondent said that even the most stubborn research professor of his department became enthusiastic about teaching because 'he finally taught students who were interested in the same thing as he did, namely research ' (interview research professor). This positive attitude of faculty was confirmed in the reports of the KNAW (2007 and 2011) and the interviews with the former presidents of the KNAW in the Research Master Reviews of the NVAO (Snijder & Davids, 2007; NVAO, 2011).

The role of the policy entrepreneur was important as well. From the interviews it became clear that the founding president of the NAO played a crucial role in using the policy window. He saw the problems, the solutions and the policy window (new accreditation framework and changing climate of excellence of higher education). He had much support from the then Junior Minister of higher education. The ministry saw the emergence of the research master as a chance to resolve the debate about study grants of two years in a satisfactory way for the ministry. They

successfully countered further institutionalising attempts of the NAO to introduce the master of philosophy (M.Phil.) for research masters.

7.4 Conclusions

At the end of this chapter, we summarise the main findings from the professors' surveys and from the interviews, in order to draw conclusions about the acceptance and functioning of the RM.

The readiness for the Ph.D. variable indicates that professors rate RM students better prepared for the Ph.D. than TM students. Furthermore, professors with RM experience significantly rate RM students as better prepared for the Ph.D. than professors without RM experience, implying that this judgment is not a matter of reputation, but of experience.

The variable performance during the Ph.D. shows that professors are convinced that RM programmes provide a better basis for the development of analysis, synthesis and evaluation skills than TM programmes. Both groups of professors with and without experience with research master students answered that research master programmes compared to regular master programmes provided the Ph.D. students with a better basis for the development of analysis, synthesis and evaluation skills. The professors on the whole do not expect that Ph.D. students with a research master background will finish their Ph.Ds. sooner than Ph.D. students without a research master background, although professors who had experience with Ph.D. students who completed a research master are more positive about the chance that these students complete their Ph.D. faster. In this sense, the RM graduates' performance may be better than their reputation.

The control variables show that there are no significant differences between the two groups of professors with regard to the frequency of meetings between professors and students and there are no significant differences either between professors with RM experience and professors without RM experience in whether they have day-to-day contact with their students. Furthermore, in all fields of study, the majority of professors meet more than 20 hours per year with their students. In the arts and

humanities (A&H), the percentage of professors meeting more than 20 hours per year with their students is notably lower. There is a significant difference between fields of study in this regard.

The programme set-up variable shows that professors indicate that the majority of Ph.D. programmes in arts and humanities, social science and other category are likely to be shortened if they are combined with RM programmes. In general, for all fields of study in more than 50% of cases there are joint activities between the RM and the Ph.D. programme.

A remarkable conclusion of the interviews with the corporate R&D managers was that none of them knew about the existence of the research master. In their recruitment of new R&D personnel, the difference between RM and TM accordingly did not play any role at all.

In the interviews with stakeholders, the introduction of the RM appeared to have been a crucial episode in the development of the RM, in which ad hoc choices were made regarding accreditation (separate for RM) and degree titles (no M.Phil.) by a relatively small coalition of actors (NAO, Junior Minister for higher education, KNAW) who were in favour of showing the RM to be distinctive, perhaps even elite, while the majority were only lukewarm about it and followed later.

Chapter Eight *Conclusions and Epilogue*

8.1 Introduction

In this chapter the conclusions of the study will be presented in section (8.2). This will be followed by some reflections on the theory and the methodology used in this study (8.3). Finally in the epilogue a contribution to the debate on excellence, innovation and the future direction of Dutch higher education will be made (8.4).

8.2 Outcomes of the study

Starting chronologically, the study showed first of all that the introduction of the research master can be explained by using the Kingdon policy window approach. At the introduction of the bachelor and master system in the Netherlands only master programmes in the sciences obtained financial support from the government for a two-year programme. Students received state grants for the entire duration of their master programme. The master programmes in the humanities and the social sciences, on the other hand, received only one year of funding and the students of these master programmes also only received one year of government support. Many committees came with answers for the perceived problem of unequal length of the master programmes (amongst other committees, the most relevant were: Committee Cohen, 2001 and Committee Reneman, 2002) among which the two-year research master was one of the solutions. Its emergence was contextualized by three important developments that occurred around the introduction of Bologna in 2002/2003.

(1) A policy shift towards more excellence in Dutch higher education instead of the egalitarian approach that had dominated the higher education policy subsystem for many years (Albrecht, Boer & Vervoort, 2004).

(2) The introduction of the Dutch accreditation organisation (NAO) in 2003. The NAO wanted to put itself on the map of the higher education sector. The accreditation of the research masters was a unique opportunity not only to accredit 'basic quality of higher education programmes' (as it was required to do for the newly-introduced bachelor and master programmes) but 'excellence programmes' as well. The coalition with the assessment panels of the KNAW (section 2.6) was a strategic move to obtain legitimacy in the field of research and credibility as regards the Ministry of Education and universities.

(3) The expected possibility of two-year funding of these programmes by the Ministry of Education was an attractive option for the universities to enhance the resource basis of master programmes in the humanities and social sciences.

Thus, with the introducing of the research master the diverse actors killed many birds with one stone: the universities could ensure funding for the second masters year in the humanities and social sciences; the Junior Minister could promote excellence in higher education; the Ministry had a solution for the pressure to fund two-year master programmes, without changing the funding base for master programmes across the board; the NAO gained legitimacy.

So the RM policy initiative served all the different stakeholders' interests. There was a policy window (a new accreditation organisation that wanted to put itself on the map) in which the problems (unequal length of the master programmes, need to promote excellence, high dropout rates in the Ph.D., Lisbon agenda etc.) could all be solved together with the solution of introducing a research master programme. The type of coalition that was formed can best be described as May's inside initiation, as described in section 4.3. Some governmental groups (or groups close to the government) formulated a problem and a policy (solution) without having necessarily discussed it in public debates. These groups had access to the decision makers and had knowledge and expertise about the policy issues concerned. The NAO was the governmental agency that put the problem on the agenda on the basis of various reports, advocated the solution and convinced the Junior Minister that it would, as said before, kill many birds with one stone.

The research master is a mixture of financial, legal and communication types of policy instruments. The financial type was first of all embraced by the universities, while the Ministry was unhappy that more research masters were accredited than expected. This increase of numbers of programmes was caused by the NAO and the KNAW accreditation committees which required that the programmes should be connected to very specific research themes, resulting in proliferation. Notwithstanding the higher than expected number of programmes, the percentage of research master students compared to the total master student population remained between three to four per cent, which convinced the Ministry that the research masters were selective and fairly small. This enabled the Minister to adjust the funding for the universities from one to two years. The communicative instrument was mainly used by NVAO and KNAW to promote this policy innovation. Some of the universities that were at first quite sceptical about the NAO-accredited research masters and about creating a new type of masters programme in the higher education system at all, launched their own 'top masters' and 'prestige masters', but did in the end acknowledge the research master as a superior policy instrument. They mainly did so because faculty members in research groups and graduate schools accepted this policy instrument, and because the students preferred the accredited master programmes over the self-labelled prestige and top masters. Most top master and prestige master programmes were closed after a few years.

One of the positive effects, and perhaps one of the main reasons why the research master was accepted and still exists, was that the academic community (research institutes, faculty and students) embraced this policy innovation, although the higher education institutions did not get extra funding until 2011 (only students got longer study grants) and had to invest (sometimes on a voluntary basis) extra time in the project. Excellence itself was rewarding: to work with small and dedicated groups of students interested in their professor's research. On a faculty and institutional level, the research master programmes were seen as an ideal instrument to stimulate *Nachwuchs* and to prepare prospective Ph.D. students as efficiently as possible (KNAW, 2007).

Because students and faculty were the main beneficiaries and stakeholders in making this policy experiment a success, further exploration of their perceptions about the effectiveness has been undertaken in the current study.

The central question of this dissertation was: Do research master programmes reach their intended goals of preparing more students in a better way for research careers?

There were three sub-questions in the central research question.

1) Do research master programmes attract more students to pursue a research career?

2) Are the students that pursue a research masters programme better prepared for a research career compared to students of a taught master programme?

3) Do research master graduates pursue their research careers mostly in academia (Ph.D. programmes) or outside academia in private and public research companies and institutions as well?

Three research expectations were formulated corresponding with these three sub questions:

I   : research master students are more likely to end up in research-oriented occupations than taught master students.

II   : research master programmes prepare students better for a career in research than taught master programmes.

III   : research master programmes prepare mainly for Ph.D. studies and less so for research careers outside academia

The extent to which the outcomes of this study confirm these expectations will be summarized below.

Ad. I.

The outcomes of the survey of four alumni cohorts were highly consistent over time and confirmed that research master programmes already from their introduction in 2003 prepared students for the 'profession of researcher' more effectively than alumni of taught master programmes. Graduates of research masters continue in research positions within academia and especially in Ph.D. programmes significantly more often than taught master graduates. Although Ph.D. programmes is not the same as research-oriented occupation as stated in the research expectation, empirically it is the best possible proxy.

Ad. II.

The research master characteristics indicate that they are clearly more selective than taught master programmes. At the same time, graduates of research master programmes are more satisfied with the quality and availability of the faculty and thesis supervisors. Regarding the process, research master graduates are also significantly more satisfied with research-related aspects of their study programme, report more instruction time and a higher workload than students in taught master programmes. In terms of output, the research master graduates had a significantly shorter time to degree (related to the duration of the master programme) and had fewer delays during the master thesis than taught master alumni. The average grade points and the grades of the master thesis are significantly higher for research master students than for taught master students. Furthermore, the overall assessment of the research master graduates about their programme is significantly more favourable. Finally, the research master graduates were significantly more satisfied with the extent to which their programme prepared them for professional practice and they significantly more frequently have a research-oriented job.

The results of the comparative analysis between curricula of research masters and taught masters show that research master programmes place more emphasis on methods and statistics courses and research-oriented courses than taught master programmes.

The professor survey showed that professors evaluate research master graduates as significantly better prepared for the Ph.D. than those that graduated from taught master programmes. Professors are convinced that research master programmes provide a better basis for the development of knowledge, understanding, application, analysis, synthesis and evaluation skills than taught master programmes. However, they generally do not expect that Ph.D. students with a research master background will finish their Ph.D. sooner than Ph.D. students without a research master background, although professors who had experience with Ph.D. students who completed a research master seem to be more positive about the chance that these students complete their Ph.D. faster than Ph.Ds. who graduated from a taught master.

Ad. III.

More than half of all the research master graduates in our sample were enrolled in a Ph.D. programme. The move to research jobs outside academia was less popular. From the interviews with stakeholders and R&D managers as well as from the alumni surveys it became clear that the research master prepares mainly for the Ph.D. This was only one part of the original aim of the Ministry, because the research master should prepare students for research-oriented jobs outside academia as well. The 'proto-promovendi-character' of the research masters can thus be confirmed.

The interviews with R&D managers had some remarkable outcomes. None of the corporate R&D managers were familiar with the research master. This could be partly explained by the fact that there are no research masters in the natural sciences (which mainly cater to corporate R&D positions) but on the other hand the corporate R&D managers recruit students from other academic areas as well and most of them are involved in the Dutch higher education sector debate. So, why is the research master an intra-academia affair? Graduates of research masters continue to pursue a Ph.D. career more often than contributing their research skills to the private and public research sector outside academia. This does not necessarily indicate a preference, as such, but may be the result of a lack of broader career orientation and/or training in a broader set of skills that would equip the graduates better for a research career outside academia.

Till now, however, the research master mainly generates graduates as 'university *Nachwuchs*'.

The interviews with corporate R&D officers conveyed the impression that there is quite a gap between the corporate R&D sector and the university sector, apart from some cooperation with the technical universities. Multinationals recruit the best candidates possible, from universities all around the world, without considering whether recruitees came from research master programmes. As one of the R&D managers said: 'If the research master could contribute to prepare the best researchers, then it would be a successful instrument'. In other words, the corporate world is hardly aware of the existence of research master.

Thus all three research expectations can be confirmed on the basis of the outcomes of the alumni and professors' surveys, the interviews and the analysis of research master and taught master curricula. What does this all mean for answering the central research question? The central research question is: Do research masters programmes reach their intended goals of preparing more students in a better way for research careers?

Let us first consider the second part of the central research question, i.e., are research master alumni better prepared for research careers than taught master alumni? Most of the research master graduates, as has been discussed above, continue their research careers with a Ph.D. It is difficult to establish if these students have chosen a Ph.D. career because of their completing a research master. What is very clear is that a research master is less likely to be a stepping stone for a career in the corporate R&D sector. Only a few graduates see this as a next step, and the corporate R&D world is not (yet) aware of the research master initiative. One of the policy recommendations for the Ministry of Education, Universities (VSNU), but also for Nuffic and the NVAO, is to promote the research master more in the corporate R&D and consultancy sectors. In some of the interviews it became clear that there is potentially a great interest in research master alumni, and it could perhaps serve as a quality impulse for the consultancy sector as well.

The study confirmed that research masters prepares students (qualitatively) better for a research career than taught master programmes; the research master has its

intended contribution in that respect. The second part of the central research question can therefore be answered in the affirmative. Not only the graduates and professors confirm this finding from our analysis of the curricula in the surveys, but also experts from the NVAO International review committee who assessed the theses of research masters (NVAO, 2011). The curriculum, as was assessed in this thesis, devotes more attention to methods and statistics courses and research-oriented courses in research master programmes than is the case in curricula of taught master programmes.

The first part of the research question, i.e. whether more students are being prepared for research careers thanks to research master, remains difficult to answer. The percentage of students who pursue a research master is relatively small. In the last ten years the amount of research master students was between three to four per cent of the total population of master students. This percentage remained constant over the years included in this study (NVAO, 2011). While the research master graduates do seem to pursue research-oriented careers more than those from taught masters, the total numbers remain small and therefore the research master's contribution to the total number of researchers in the Dutch economy also remains marginal. The amount of Ph.Ds. in the Netherlands is marginal as well. According to *Education at a Glance 2013* out of 1000 people of the Dutch labour force only 6.6 obtained a Ph.D. This is lower than the European Union 15 average (7.5 Ph.Ds. per 1000) and much lower than the Scandinavian reference group (12.0 Ph.Ds. per 1000). Although the amount of completed Ph.Ds. has almost been doubled since 2000 (VSNU, 2015) the Dutch universities argue that many more Ph.D. students are needed for the Dutch labour market with such indicators as the OECD presents in mind. It remains a question if this indeed the case. Do we really need more Ph.Ds.? Or do we train Ph.D. students as overqualified professionals?

The findings on the research master programmes show that the crucial issue is to create relatively small and selective degree programmes where students and teachers develop an intensive master-apprentice relationship. This small scale and dedicated academic community has its advantages, although much of the success at the system level of the research masters programmes will depend on the universities' ability in the long run to maintain these small-scale programmes in a context with many of the government's financial and educational measures

designed to achieve economies of scale. For instance, the future of these small scale programmes is not certain with the recent reform of the student grants into study loans, as will be discussed in the Epilogue (section 8.4).

8.3 Reflections on theory and methodology

In this section some reflections on theory and methodology will be described. First some reflections on the used agenda setting theory will be given. Second, I will reflect on the chosen effectiveness policy approach. Third, on the methodological considerations.

In the literature on higher education the role of the state is mainly concerned with two types of issues. The first type of issues concentrates on the reforms and the decision making and the second type of issue focuses on the examination of the policy networks or regimes that are producing these decisions (Ferlie, 2009). In chapter two we have elaborated on this. Our discussion started from Ferlie's finding that '… few studies carefully reconstruct how such policies arrive on the agenda, the political entrepreneurs and interest groups involved, the way the problems are defined and constructed, how solutions are developed and the narratives attached to them' (Ferlie, Musselin & Andresani, 2008, p.328-329).

In this thesis a contribution to this debate was made. In chapter four the introduction of the research master was explained by using Kingdon's policy window approach and the agenda-setting model of May. As mentioned in chapter four some critics argued that Kingdon's streams theory is limited by its contingency nature:

> it suggests that the timing in which items emerge on the agenda is set by a host of unpredictable items such as the behaviour of 'policy entrepreneurs' and various sorts of exogenous and endogenous crises or shocks. While this may be true of specific issues, it ignores the observation [..] that certain issues tend to emerge on the institutional agenda in only a relatively limited numbers of ways (Howlett, Ramesh & Perl, 2009, p.115).

According to Howlett, Ramesh & Perl it is more fruitful to conceptualise the agenda setting process in terms of interaction of the nature of the policy subsystem involved in the issue area and the nature of the policy itself.

The critics made a useful point (the character of the higher education network and policy as co-produced by the stakeholders' implementation, certainly was important) but they can be proven at least partly wrong in the case of the research master initiative. The role of the policy entrepreneur was indeed very important. Not only did the policy entrepreneur, the founding president of the NAO, put the research master on the agenda but he set the policy agenda as well. The policy entrepreneur combined problems (no second year of study financing in the social sciences and arts and humanities; high dropout rates of Ph.Ds.; a raison d'etre of the new accreditation organisation), with solutions (many reports of leading experts in which something like a research master was proposed) and political momentum (introduction of the bachelor and master system, a new accreditation organisation and a Junior Minister who wanted to initiate excellence programmes but felt blocked by parliament). So, Kingdon's approach to analyse the new and unexpected perspectives of agenda setting was useful to understand the policy implementation, which was our research focus.

May's model has proven useful as well by detecting the initiator of the policy more precisely and by taking into account the support which existed among relevant stakeholders. In the case of the research master the inside initiation model is most appropriate for explaining the agenda-setting process. The initiator of the debate was not the Ministry but the NAO, and especially the founding chairman, who convinced the Junior Minister that establishing research master study programmes was a cunning plan. The attitude amongst the universities was at first somewhat negative when they discovered that the Ministry tasked the NAO with accrediting the research master. Some universities saw this as a violation of the agreement that the NAO would only assess the basic quality of bachelor and master programmes and would not pass judgements of excellence. However, universities became rather more positive when it was announced that students of approved research masters would obtain a second year of study grants. When the professors and the students embraced the research master initiative the university boards became more positive towards the research master.

These findings, especially the reception of the RM in the universities, could support the analysis of Kogan and Hanney (2000) on the reforms of the British Higher Education system when they explained policy change in terms of the 'co-opted elite'. A group of influential persons, mostly academics, who could be recognised as so-called 'interlocutors' (in Kingdon's terms policy entrepreneurs) by the political and ministerial actors, contributed to the definition of forthcoming reforms. In our study, University leadership became more positive towards the research master in combination with pressure from 'above' (NAO and Ministry) as well as 'below' (professors and students); these actors all formed a coalition which was necessary to implement the research master quickly and wholeheartedly at all levels. The constancy of our time trends in the surveys—or lack of development across the cohorts of alumni—testifies to the rapid full-scale implementation of the research master.

Turning to our second topic, we already discussed in chapter four that effectiveness research is only useful if sufficient information on the *ex ante* situation is available. Another potential shortcoming of this evaluation research design is that not all actual effects are studied; only those effects that are predicted are part of the research. Thus, attribution and causality are the main elements of critique in determining effectiveness. Is the initiated policy instrument responsible for the changes occurring in the policy? Is there enough evidence to rule out other factors that could have caused the change? Could the policy instrument have caused other effects? According to Sabatier (1986) a major fault in effectiveness research is that it awards credit for a change entirely to the policy instrument, ignoring other field variables. Our study, with its comparison of research master and taught master graduates and curricula, could rule out some 'other' variables: we could establish that RM graduates are better prepared than taught master graduates for an academic research career, i.e. the Ph.D. Many professors in Dutch universities have had experience with research master graduates and are quite positive about those graduates' qualities. We could also establish that even if the total amount of researchers in the Dutch economy may have risen in the last decade (OECD, 2014) then it cannot have been a success of the research master, because R&D officers in the private economy were not even aware of the existence of the research master and they did not, therefore, take it into account in their recruitment policy. The total amount of researchers may have been indirectly affected, by more students opting

for a research-oriented master programme and thus making more research-ready graduates available for the labour market, but such an interpretation would only be convincing if much larger proportions of students took part in research masters than the three to four per cent we see in reality. Through such measures, we could overcome some of the potential shortcomings of effectiveness research and hence justify our choice to make a study according to that model.

Finally, let us turn to the methodology. In this study the combination of surveys and interviews was a most appropriate method to collect data to answer the research questions. The alumni surveys allowed approaching a large number of research master and taught master graduates, even extending it over the years by studying four cohorts with the same questionnaire. In advance, we did not anticipate that there would be such complete implementation of the research master that developments over the years hardly appeared across the four cohorts. The only statistically significant changes over the years (2006-2009) had to do with the economic downturn, which affected alumni job satisfaction and job prospects in 2009. Had we known, this study could have been completed several years earlier. The professors' survey equally allowed eliciting responses from a large number of professors across almost all of the universities that were significantly involved in the implementation of research masters. In both surveys, response rates were satisfactory after intense communication with respondents. The response rates and numbers allow a high level of trust in the findings.

The interviews with managers responsible for personnel in companies heavy in R&D were necessary to get insight into the non-academic research positions. Many studies on academic careers seem to ignore this—according to politicians essential—part of the knowledge economy. Putting in the additional effort to approach and interview about a dozen of these decision-makers was an interesting yet sobering experience: it showed how all kinds of fine distinctions which would have been made in questionnaires would not be recognised outside academia—not even the distinction between taught master and research master was recognised. Without conducting these interviews, this might not have been detected except through a high rate of non-response to a survey.

What was, maybe, lacking in this study, was the possibility to trace where research master graduates worked outside academia, and in the longer run. I would recommend more statistical monitoring of the CBS and ROA to study this interesting phenomenon of the research masters' careers in the knowledge economy.

8.4 Epilogue: debate on excellence and steering in Dutch Higher Education

At the time of writing this Epilogue (Fall 2015) there is a lot of uncertainty about the future of the research master. The policy reforms of student grants into student loans (Studiebevoorschotting), may affect the future of the research masters (Scienceguide, 2014). A research report about the effects of this study grant on specific master programmes was requested by the Minister. This report was published in September 2014 (Heyma *et al.*, 2014) and stated that the future prospects of graduates of research master programmes is unclear. In this study we saw the same in the time trend analysis; probably caused by the economic crisis the *Job Expectations* decreased after 2008. One could argue, on the one hand, that after 2015 the research master programmes will become less attractive because students have to pay back the money that they borrowed while there is a limited chance of finding a job in academia (only twenty percent of all Ph.Ds. pursue their careers in academia). On the other hand, the fact that research master programmes are becoming a pre-requisite for some Ph.D. programmes in the social and behavioural sciences funded by the Dutch Science Foundation (NWO), for example, will make research master programmes more attractive. Besides this argument, most of the students of research master students want to pursue a Ph.D. programme afterwards. These students are intrinsically motivated and may be less affected by financial disincentives.

As described in chapter one, the second goal of this thesis is to contribute to the policy debate about the effectiveness of policy instruments and particularly to the debate about enhancing excellence and differentiation in the higher education system as a policy goal. Do stakeholders see research masters as one of the more successful innovations in Dutch higher education in this respect?

This question can be confirmed. First, the research master has become accepted and institutionalised very rapidly across all Dutch universities especially among the humanities and social sciences, showing the commitment of academics as well as institutional leadership (who had to invest money before getting full compensation only in 2011). Second, several interviewees indicated that the research master can be seen as one of the more successful innovations in Dutch higher education. At the same time these interviewees did see university colleges and honours programmes besides research masters as successful innovations in Dutch higher education as well. As we have seen in chapter two there are many similarities between the honours programmes, the university colleges and research master programmes. All of these innovations select their students, have small classes and dedicated faculty and create a context in which students can excel. The students rate these programmes more highly (NSE, 2014) than regular master or bachelor programmes. In this respect the research masters can be considered to have successfully contributed to the search for excellence and further differentiation of the Dutch higher education system.

Differences between the honours programmes, the university colleges and research master programmes can be seen as well. As for instance one of the interviewees argued that the excellence initiatives of the university colleges and honours programmes as described above were all taken by the universities (and more specific academic pioneers) in a rather bottom-up fashion and were later followed by (provisional) regulation, start-up funding (in the case of honours programmes, e.g. the Sirius programme) and eventually by formal adjustment of legislation. The research masters as we have seen in chapter two and seven were introduced more top-down. They were introduced by the Ministry of Education and initiated by the Accreditation Organisation and especially its founding president.

What does this tell us about policy innovation, and more specifically about policy innovations to evoke excellence, and steering, in general, in Dutch higher education? Additionally, which lessons can be learned to stimulate an excellent quality environment for the whole higher education sector?

The theme of this dissertation is time-bound, dating from the period when for the first time a differentiation between the bachelor and the master phase was made

and a distinction between a research master and a general or taught master was established. The latter is the focal point of this dissertation, but it must be noted that this distinction is marked by half-hearted conceptualization of the bachelor/master differentiation and the then prevalent notion that the 'real' work or only goal of the university is the creation of a university-level 'Nachwuchs' and that everything unrelated to this goal is of secondary importance. This explains why the research master had such an immediate, wide reception within academe and such a limited connection within the business world.

By now however, this image has been subject to change; we are slowly moving towards a notion that is increasingly in agreement with the distinction between the bachelor and master and that is in closer harmony with the practice of Anglo- Saxon universities where the consequences of this differentiation have been accepted for a long time, perhaps centuries. Hans Adriaansens in a letter to the *Volkskrant* (Adriaansens, 2014) outlined a model of B (Bildung), N (Nachwuchs) and P (Professionals) as the three main objectives of university education; the former takes shape during the bachelor phase while the latter two develop more during the master phase. Both N and P are (academic) vocational trainings and ought the be valued equally. In this view, any type of master without N or P as an objective would disappear, according to Adriaansens. Although in my view, (terminal) bachelor programmes with a strong professional character and masters programmes with a strong Bildung character are possible as well.

When considering the one-sided emphasis on 'Nachwuchs' as the main objective of the university (and the neglect of B and P) it is understandable that the research master could be viewed as an excellent education or an honours trajectory that distinguishes itself from all the other master programs. With the gradual implementation of the bachelor/master distinction however, B and P sectors of university-level excellence and honours programs have also been established, such as the university colleges that mostly focus on B and the vocational trajectories centred around P (Summa, law school, MBA etc.). In the terminology of the dissertation this could be considered as an emancipation for B and P, following the example of the research master. In the future this might lead to a notion in which the three main objectives of university education (B, N and P) will come into balance at a higher level than it has been in the past.

As discussed in the previous section one of the positive effects, and perhaps one of the main reasons why the research master was accepted and still exists, was that the academic community (faculty and research groups) embraced this policy innovation, despite funding problems at the start of the research master initiative. On a faculty and institutional level, the research masters were seen as an ideal instrument to stimulate *Nachwuchs* and to prepare prospective Ph.D. students as efficiently as possible (KNAW, 2007). The Dutch Research Funding Organisation (NWO) in some research fields only accepts students with a research master degree for certain Ph.D. programmes.

The excellence innovations as mentioned above illustrate that slowly but surely a mixture of state control and supervising models (Pollitt & Bouckart, 2011) are visible in the Dutch higher education landscape, namely a model in which the state and its agents and programmes (NVAO, SIRIUS) provide higher education institutes with broad quality incentives, forcing these institutions to make choices but also giving them freedom to develop further a quality assurance and excellence culture. I will call this model: 'bounded autonomy'. It is a model in which students and their professors can excel—getting the best out of themselves—whilst possessing academic freedom within boundaries. The boundaries have to do with the structure of the system: the three cycles of bachelor, master and doctorate are given at the level of the Dutch higher education system and even at the level of the European Higher Education Area. There are also boundaries in terms of quality levels: the minimum threshold to pass accreditation remains in place, also in the changes contemplated (and piloted) in accreditation '3.0', after 2016. The increased academics autonomy has to do with academics and students regaining some freedom to thrive and be creative above and beyond the minimum, and to distinguish themselves from the mass higher education that seemed to become the unavoidable norm since the 1980s. We stress academics and students for two reasons. First, some of the initiatives were developed bottom-up; we already mentioned this in relation to the university colleges and honours tracks. The trend towards increased managerial autonomy (de Boer et al., 2009) seems to get some counterbalance in this way. Second, only if sufficient amounts of students are willing to engage in excellence tracks, colleges or research masters, i.e. when they make certain choices in what economists call 'consumer sovereignty' will these initiatives become successful. For university colleges and honours tracks, the

student demand seems to be quite large. For research masters, we already noted that student demand might be a bottle neck, because the percentages remained low, at about three or four per cent of all master students.

Perhaps we should conclude with the analysis of Kogan and Hanney when they analysed the British higher education system over the last 50 years: 'We can offer no clearly schematic picture of how policies emerged and ideologies were sponsored. Intentions were forged partly by belief systems, partly by the power of circumstances, and partly by opportunistic reactions to what might not have been planned or even rationally contemplated' (Kogan and Hanney, 2000, pp. 236–237). The challenges ahead for the higher education sector in the Netherlands are largely related to balancing the state control and the supervising model and to encouraging policy innovations that make both students and professors excel, like the research masters and university colleges, within clear boundaries.

Nederlandstalige samenvatting
Mastering research: Een studie naar de effectiviteit van de onderzoekmasterprogramma's in Nederland

In 2003 werden in Nederland onderzoekmasters als aparte categorie van tweejarige masteropleidingen geïntroduceerd. Deze dissertatie onderzoekt een evaluatievraag, namelijk:

Hebben de onderzoekmasterprogramma's de beleidsdoelstelling behaald om meer studenten beter voor te bereiden op een onderzoekloopbaan?

Deze hoofdvraag is onderzocht via drie deelvragen:

1) Trekken onderzoekmasters meer studenten aan om een onderzoekloopbaan te volgen?
2) Zijn studenten die een onderzoekmaster volgen beter voorbereid op een onderzoekloopbaan?
3) Starten afgestudeerden van onderzoekmasteropleidingen hun onderzoekloopbaan vooral in de academische wereld (doctoraalprogramma's) of ook buiten de academische wereld in private en publieke onderzoeksinstellingen?

Voor elk van deze deelvragen werd een verwachting geformuleerd:
I. Studenten van onderzoekmasters maken een grotere kans om in op onderzoek georiënteerde banen terecht te komen dan studenten van andere masteropleidingen
II. Onderzoekmasters bereiden studenten beter voor op een onderzoekloopbaan dan andere masteropleidingen
III. Onderzoekmasters bereiden studenten vooral voor op een doctoraatstraject en minder op onderzoekloopbaans buiten de academische wereld

Voordat we op deze verwachtingen ingaan, beschrijven we wat onderzoekmasters zijn en reflecteren we op de vraag hoe, via welke theorieën en methodologieën, een dergelijke vraag naar evaluatie van beleid kan worden onderzocht, en tijdens die reflectie bleek het van belang om ook de totstandkoming van het beleid rond de onderzoekmaster in deze dissertatie te betrekken.

Deze studie heeft twee doelstellingen. Ten eerste om de effectiviteit van de onderzoeksmaster te analyseren. Ten tweede om een bijdrage te leveren aan het beleidsdebat over effectiviteit van beleidsinstrumenten in het hoger onderwijs en in het bijzonder om een bijdrage te leveren aan het debat over excellentie en differentiatie in het Nederlandse hoger onderwijs. De vraag of belanghebbenden de research master als een van de succesvolle innovaties van het Nederlands hoger onderwijs zien staat daarbij centraal.

Onderzoekmasters zijn tweejarige masterprogramma's (120 EC) die een aparte erkenning behoeven van de accreditatieorganisatie NVAO, voor studenten om twee jaar studiefinanciering (inmiddels omgezet in een leenstelsel) te kunnen verkrijgen, en voor universiteiten om in aanmerking te komen voor de bekostiging van het tweede studiejaar. De standaard is in de meeste disciplines in Nederland immers één jaar (60 EC). In de natuur- en technische wetenschappen geldt echter sinds de jaren '90 een studieduur van twee jaar (120 EC) voor alle masterprogramma's.

Ingevoerd in—zoals gesteld—2003, groeide het aantal onderzoekmasters snel en sinds 2007 is het aantal ervan min of meer constant 115 (zie Table 2.2). Bijna de helft van alle onderzoekmasters (56 studies in 2013) zijn opleidingen in de geesteswetenschappen; de overige zijn vooral te vinden in de sociale wetenschappen (42), biomedische wetenschappen (15) en enkele in de aardwetenschappen (2). Sinds 2010 stromen er jaarlijks ruim 1500 studenten in; dat komt overeen met ongeveer 4% van alle masterstudenten in Nederland.

In de literatuur over het hoger onderwijs wordt de rol van de staat vooral bezien in relatie tot twee soorten vraagstukken. Het eerste soort betreft hervormingen en besluitvorming; het tweede soort betreft onderzoek naar de beleidsnetwerken of regimes die deze beslissingen tot gevolg hebben (Ferlie et al., 2009). In hoofdstuk 2 werkten we dit uit en vonden dat voor onze beperkte doelstellingen de reeds in de jaren 80 geïntroduceerde tegenstelling tussen 'state control' en 'state supervision'-modellen voldeed, met enige correctie op grond van latere inzichten met name verwoord in de vijf dimensies betreffende de relatie tussen overheid en hogeronderwijsinstellingen (De Boer et al., 2007). Daarmee konden de relaties tussen de diverse stakeholders in Nederland ten tijde van de invoering van de onderzoekmaster geschetst worden.

In hoofdstuk 3 vergeleken we de academische situatie rond voorbereiding op onderzoeksloopbanen met die in andere landen, om te bezien of de onderzoekmaster een uniek Nederlands initiatief is. Vooraf constateerden we dat er veel meer literatuur bestaat over de Ph.D.-fase dan over (specifiek onderzoeksgerichte) masteropleidingen. Ter vergelijking betrokken we twee landen met researchmasterachtige opleidingen, Groot-Brittannië en de Verenigde Staten, terwijl als contrast gekeken werd naar Oostenrijk. Hoewel Oostenrijk en Nederland beide op grond van het Bologna-proces geacht zouden kunnen worden vergelijkbare druk te ervaren om doctoraatsopleidingen te ontwikkelen en daarop ook in de masterfase studenten voor te bereiden, bleek Oostenrijk in hoofdzaak vast te houden aan traditionele opleidingsmodellen, terwijl Nederland wel innoveerde. Is Nederland daarmee gaan lijken op landen als Groot-Brittannië en de VS, die al lang speciale opleidingen voor onderzoekers kenden op masterniveau? Het antwoord is ontkennend. Noch in Groot-Brittannië, noch in de VS zijn de M.Phil. en dergelijke opleidingen (de naamgeving van opleidingen en graden ligt er niet vast) systeembreed ingevoerd maar initiatieven van afzonderlijke universiteiten en evenmin kent men daar specifieke accreditatie van dergelijke op onderzoek gerichte masterstudies.

In hoofdstuk 4 beredeneerden we dat om vast te stellen of de beleidsdoelstellingen behaald zijn, het model van effectiviteitsstudie ondanks beperkingen ervan het beste onderzoeksontwerp opleverde. In dat model is kennis van de situatie voordat het nieuwe beleid werd geïntroduceerd een cruciaal onderdeel. Uit een eerste chronologische beschouwing van de totstandkoming van het beleid rond de onderzoekmaster (in hoofdstuk 2) was al gebleken dat er een voorgeschiedenis van jaren was geweest, met vele enigszins van elkaar verschillende rapporten en voorstellen was geweest. Dat deed vermoeden dat de uiteindelijke vorm waarin de onderzoekmaster op de politieke agenda terecht kwam niet willekeurig was. Ferlie bekritiseerde dat slechts weinig beleidsstudies met zorg reconstrueren hoe beleid op de agenda terecht komt, welke beleidsondernemers en belangengroepen erbij betrokken zijn, hoe problemen worden gedefinieerd en geconstrueerd, hoe oplossingen ontworpen worden en welke *narratieven* eraan verboden worden (Ferlie et al., 2008, p. 328-329), terwijl dat wel de doelstellingen en uitvoering van het beleid kan beïnvloeden. Een analyse van het agendavormingsproces leek daarom van groot belang. Daartoe hanteerden we de conceptuele lenzen van

Kingdons 'policy window' benadering bestaande uit verschillende stromen, en het agendabepalingsmodel van May.

Weliswaar wordt Kingdon erom bekritiseerd dat de timing waarmee onderwerpen op de agenda verschijnen vrij willekeurig is en afhankelijk is van 'beleidsondernemers' alsmede van exogene en endogene crises en schokken. Dit veronachtzaamt dat vele onderwerpen de neiging hebben om via slechts een beperkt aantal manieren op de institutionele agenda verschijnen (Howlett en Ramesh, 1995). Volgens deze critici is het vruchtbaarder om processen van agendabepaling te bezien in termen val interactie tussen de aard van het beleidssubsysteem dat betrokken is bij het onderwerp en de aard van het onderwerp zelf. De kritiek snijdt in dit geval in zoverre geen hout, dat de rol van de beleidsondernemer van groot belang bleek te zijn. De eerste voorzitter van de NAO (later NVAO) zette niet alleen de onderzoekmaster op de agenda, maar bepaalde bovendien de beleidsagenda als geheel. Hij combineerde problemen (geen bekostiging voor tweejarige masters in de geestes- en sociale wetenschappen, hoge uitval onder promovendi, en het vinden van een *raison d'être* voor de nieuwe NAO) met oplossingen (varianten van onderzoekmasters waren aangedragen in vele rapporten van commissies van experts) en met beleidsvensters (introductie van het bachelor–masterstelsel, oprichting van de NAO, en een staatssecretaris die excellentie wilde benadrukken maar zich tegengewerkt voelde door het parlement).

Ook May's model bleek van nut, omdat het een preciezere identificatie van de initiator van het beleid opleverde en omdat het de aandacht richtte op de steun die er voor de onderzoekmasters bestond onder stakeholders. In dit geval bleek May's 'inside initiation' model het meest toepasselijk voor het proces van de agendavorming. De initiator van het beleid bleek niet het ministerie van OCW te zijn, maar de NAO en vooral de eerste voorzitter daarvan, die de staatssecretaris ervan overtuigde dat invoering van onderzoekmasters een slim plan was. De houding onder de universiteiten was oorspronkelijk wat afhoudend, toen ze ontdekten dat de staatssecretaris de NAO de opdracht zou geven die nieuwe studieprogramma's te accrediteren. Enkele universiteiten zagen dit als schending van de afspraak dat de NAO alleen de basiskwaliteit van bachelor- en masteropleidingen zou beoordelen. Toen werd aangekondigd dat studenten van geaccrediteerde onderzoekmasters een tweede jaar studiefinanciering zouden

krijgen, werden zij al positiever gestemd. Nog positiever werden zij toen professoren en studenten de onderzoekmaster bleken te omarmen.

Deze bevindingen, vooral die met betrekking tot de ontvangst van de onderzoekmaster in de universiteiten, ondersteunen de analyse die Kogan en Hanney (2000) maakte van de hervormingen van het Britse hogeronderwijsbeleid als 'gecoöpteerde elite'. Een groep van invloedrijke personen, meest academici, die gezien kunnen worden als 'gesprekpartners' (in Kingdons termen beleidsondernemers) van de politieke en ministeriële actoren, droeg daar bij aan de beleidswijzigingen. In onze studie waren het de universiteitsbestuurders die een positievere houding aannamen tegenover de onderzoekmaster onder druk van 'boven' (NAO en ministerie) en van 'onderen' (professoren en studenten). Al deze actoren vormden een coalitie op alle niveaus om de onderzoekmaster snel en van ganser harte in te voeren. De constante trend—of gebrek aan ontwikkeling in de tijd—die zichtbaar was in onze surveys wijzen eveneens op de snelle, volledige invoering van de onderzoekmaster.

Voor wat betreft ons tweede onderwerp bespraken we in hoofdstuk 4 dat voor evaluatie van de effectiviteit van beleid kennis van de *ex ante* situatie nodig is. Een ander nadeel van het model van effectiviteitsonderzoek is dat niet alle optredende effecten onderzocht worden, maar alleen de in het beleid bedoelde effecten. Is het beleid echter wel de oorzaak van eventueel optredende veranderingen, en zijn er ook andere, onbedoelde gevolgen van het beleid? Dit waren kritische vragen die Sabatier (1986) al stelde bij dit model. Onze studie kon sommige 'overige' factoren uitsluiten door de onderzoekmaster met zowel curricula als afgestudeerden van reguliere masters te vergelijken (zie onder). Resultaat is dat onderzoekmasters inderdaad hun studenten beter voorbereiden op een academische onderzoekloopbaan, dat wil zeggen op een promotietraject. Vele professoren hebben ervaring opgedaan met onderzoekmasterstudenten en zijn zeer positief over de kenmerken van die studenten in vergelijking met die van reguliere studieprogramma's.

We stelden tevens vast dat alhoewel het totaal aantal onderzoekers in de Nederlandse economie gestegen is in de afgelopen tien jaar (OECD, 2014), dit geen gevolg van het beleid rond de onderzoekmaster kan zijn, omdat R&D managers in

het private bedrijfsleven nog nooit van onderzoekmasters gehoord hadden en bijgevolg met deze kwaliteit in hun recruteringsbeleid geen rekening hielden. Het aantal onderzoekers kan wel indirect door de onderzoekmaster beïnvloed zijn, doordat meer studenten dan voorheen een op onderzoek georiënteerde master kozen, zodat meer onderzoekgerichte afgestudeerden op de arbeidsmarkt kwamen. Zo een interpretatie zou echter alleen geldig kunnen zijn als een veel groter aandeel studenten in de onderzoekmasters zou instromen dan de drie tot vier procent die dat daadwerkelijk doen. Door onze interviews onder R&D managers en de simpele getalsmatige redenering konden we ook voor dit deel van onderzoeksvraag 1, die naar voorbereiding van meer studenten, tekortkomingen van het effectiviteitsmodel van beleidsevaluatie ondervangen.

De andere kant van onderzoeksvraag 1, verwoord in verwachting I, kon wel bevestigd worden. Dit werd onderzocht via een survey van vier cohorten afgestudeerden van onderzoekmasters en een controlegroep van reguliere masters. Het onderzoek vond plaats in de jaren 2008-2011 en betrof de cohorten afgestudeerden van de jaren 2006–2009 van acht universiteiten; in totaal ontvingen we 2749 antwoorden (34%). Op die basis toonden we in hoofdstuk 6 aan dat al van het begin af aan afgestudeerden van onderzoekmasters vaker doorstroomden naar een onderzoekloopbaan in universiteiten (vooral in aio-posities of andere promotietrajecten) dan die van reguliere masters.

Ten aanzien van verwachting II bleek dat onderzoekmasters op alle onderzochte aspecten anders zijn dan reguliere masters. Ze waren selectiever in de instroom. De surveys lieten zien dat afgestudeerden ervan tevredener waren over de algehele kwaliteit van de studie, over de kwaliteit en bereikbaarheid van docenten en scriptiebegeleiders. Ook waren ze tevredener over de onderzoek gerelateerde aspecten van hun studieprogramma, en rapporteerden ze meer onderwijsuren en een hogere werklast dan studenten in reguliere masters. Voor wat betreft de output studeerden studenten van onderzoekmasters sneller af (in vergelijking met de nominale duur van hun programma's) en ze ervoeren minder vertraging tijdens de afstudeerfase. De gemiddelde cijfers en de cijfers voor afstudeerscripties waren significant hoger voor studenten van onderzoekmasters dan aan reguliere masters. Ten slotte waren studenten van onderzoekmasters tevredener over de voorbereiding

die hun studie hen gaf op de praktijk van onderzoek en startten ze significant vaker een onderzoeksloopbaan.

Vergelijking van de curricula tussen onderzoekmasters en gerelateerde reguliere masters (een ander onderdeel van ons onderzoek) toonde eveneens aan dat onderzoekmasters meer tijd spenderen aan onderzoekmethoden en statistiek en aan andere onderzoek georiënteerde vakken dan reguliere masters.

Ook de derde onderzoeksbron voor deze vraag (een survey onder 1100 professoren van op een na alle universiteiten met research masters) over hun ervaringen met promovendi) liet zien dat afgestudeerden van onderzoekmasters significant beter voorbereid waren op het promotietraject dan afgestudeerden van reguliere masters. De professoren waren van mening dat onderzoekmasters een betere basis vormden voor de ontwikkeling van deskundigheid met betrekking tot kennis, begrip, toepassing, analyse, synthese en evaluatie (dat wil zeggen alle niveaus van Blooms taxonomie) dan reguliere masters. Ze verwachtten niet dat afgestudeerden van onderzoekmasters hun promotie sneller zouden behalen dan afgestudeerden van reguliere masters, al waren professoren die ervaring hadden met begeleiding van afgestudeerden van onderzoekmasters daar wel wat positiever over.

Verwachting III, dat de onderzoekmasters vooral voorbereiden op een academische onderzoekloopbaan, werd eveneens onderzocht via de cohortensurvey. Meer dan de helft van de afgestudeerden van onderzoekmasters in onze steekproef bevonden zich ten tijde van hun enquêtering in een promotietraject. Banen in onderzoek buiten de universiteit kwamen veel minder vaak voor.

Ook uit interviews met stakeholders betrokken bij invoering en uitvoering van de onderzoekmasters en met R&D managers kwam naar voren dat de onderzoekmasters voornamelijk een voorbereiding zijn op promotietrajecten binnen universiteiten. Dit was slechts een van de doelen van het ministerie bij de invoering van de onderzoekmaster; voorbereiding op niet-academische onderzoekloopbanen was het andere deel van het beleidsdoel. Het 'proto-promovendi'-karakter van de onderzoekmaster wordt al met al bevestigd door ons onderzoek.

De interviews met de R&D managers van buiten de universiteiten (bedrijfsleven, consultancy) vertoonden enkele opmerkelijke uitkomsten, die wij hier willen

vermelden. Geen van de R&D managers uit het bedrijfsleven was op de hoogte van het bestaan van onderzoekmasters, zoals we eerder al aangaven. Deels is dat misschien te verklaren doordat in de R&D sector in het bedrijfsleven vooral bèta-afgestudeerden gerekruteerd worden, terwijl er in de bètasector vrijwel geen onderzoekmasters zijn. De geïnterviewde R&D managers nemen echter ook wel afgestudeerden uit andere kennisgebieden aan en diversen onder hen waren betrokken bij beleidsdebatten rond het hoger onderwijs; ze hadden dus wel eens van onderzoekmasters gehoord kunnen hebben. Waarom is de onderzoekmaster dan een intra-universitaire zaak? Dat afgestudeerden van onderzoekmasters nog steeds vooral verdergaan met een universitaire promotie kan een kwestie van hun preferenties kan zijn, is het tevens mogelijk dat het een gevolg is van gebrek aan bredere carrière-oriëntatie en aan onderwijs in de onderzoekmaster dat breder georiënteerde kennis en kunde ontbeert die nodig zou zijn voor een succesvolle onderzoekloopbaan buiten de universiteit.

De interviews met R&D managers uit het bedrijfsleven lieten verder zien dat er een opmerkelijke kloof gaapt tussen de private R&D sector en de universiteiten, afgezien van wat samenwerking met de technische universiteiten. Multinationals rekruteren de beste afgestudeerden wereldwijd, van universiteiten wereldwijd, zonder zich af te vragen of die studenten een onderzoekmaster gevolgd hebben.

Alle drie de verwachtingen die we aan het begin van het onderzoek formuleerden, werden bevestigd. Wat betekent dit voor de totale onderzoeksvraag: zijn er meer op onderzoek georiënteerde masters en zijn die beter voorbereid op een onderzoekloopbaan?

De drie verwachtingen betroffen het tweede deel van de onderzoekvraag, het deel over betere voorbereiding. We stelden vast dat de grootste categorie afgestudeerden van onderzoekmasters degenen betreft die een promotietraject aanvangen. Het is niet vast te stellen of zij een promotietraject starten puur omdat ze een onderzoekmaster voltooid hebben. Het is in elk geval wel duidelijk dat de onderzoekmaster meer voorbereidt op een promotietraject dan op een onderzoekloopbaan in de R&D in het bedrijfsleven. Slechts weinige afgestudeerden zien dit als hun volgende carrièrestap en de R&D wereld in het bedrijfsleven is zich (nog) niet van de onderzoekmaster bewust. Een

beleidsaanbeveling voortkomend uit dit onderzoek aan het Ministerie van OCW, aan de universiteiten (en de VSNU), maar ook aan bijvoorbeeld de Nuffic en de NVAO, is dat aan de onderzoekmaster in de sectoren van R&D en consultancy in het bedrijfsleven meer bekendheid gegeven dient te worden. In enkele interviews bleek dat er potentieel belangstelling bestaat voor afgestudeerden van onderzoekmasters en het zou misschien tegelijkertijd een kwaliteitsimpuls voor de consultancysector kunnen betekenen.

De studie bevestigde dat onderzoekmasters hun studenten beter voorbereiden op een onderzoekloopbaan dan reguliere masters; dat beleidsdoel wordt inderdaad behaald. Het tweede deel van de onderzoeksvraag kan dan ook positief beatwoord worden. Niet alleen in dit onderzoek bleek dat uit drie bronnen (surveys onder afgestudeerden, onder professoren en curriculumvergelijking) maar ook de internationale experts die afstudeerscripties van onderzoekmasters beoordeelden, bevestigden dat (NVAO, 2011).

Het eerste deel van de onderzoeksvraag, dat wil zeggen of er ook méér studenten worden voorbereid op een onderzoekloopbaan, blijft moeilijk te beantwoorden. Het percentage studenten in onderzoekmasters is vrij klein. De laatste tien jaar betrof het constant drie tot vier procent van alle masterstudenten in Nederland (NVAO, 2011). Hoewel zij meer dan afgestudeerden van reguliere masters onderzoekloopbanen aanvangen, zijn hun aantallen te klein om een substantiële bijdrage te leveren aan het aantal onderzoekers in de Nederlandse economie. In internationale vergelijking blijft daardoor het aandeel onderzoekers in de beroepsbevolking laag. Dat geldt voor masters maar ook voor doctors (VSNU, 2014): per 1000 personen in de beroepsbevolking hebben er 6,6 een doctorsgraad. Dat is lager dan het gemiddelde van de EU-15 (7,5 per 1000). Wijzend op dit soort indicatoren menen de Nederlandse universiteiten dat er meer promotieplaatsen nodig zijn voor de arbeidsmarkt, hoewel het aantal behaalde doctorsgraden sinds 2000 bijna verdubbeld is (VSNU, 2015). Ons onderzoek kan op deze vraag geen antwoord geven.

De bevindingen van ons onderzoek tonen aan dat het essentieel is om relatief kleinschalige en selectieve studieprogramma's te creëren waarin studenten en docenten een intensieve meester–gezelrelatie kunnen ontwikkelen. De kleine

schaal en de hoge mate van toewijding leiden tot successen per opleiding, maar op systeemniveau zijn er twee vragen: naast de reeds gemaakte constatering dat met kleine aantallen studenten per opleiding slechts een beperkte bijdrage aan het totale aantal onderzoekers gemaakt kan worden, is het de vraag of universiteiten op de lange duur in staat zullen zijn om zulke kleinschalige opleidingen in stand te houden onder de huidige bekostigingscondities van de overheid. De tweede doelstelling van deze studie en de daarbij gepaard gaande vraag of de research master door belanghebbenden gezien wordt als een beleidsinnovatie kan positief worden beantwoord.

References

Adriaansens, H.M. (2014), Opkomst 'liberal arts colleges' is pas het begin. *Volkskrant, Opinie en Debat 22 augustus 2014, p.25.*

Abma, T.A. (1996). *Responsief evalueren*. Delft: Eburon. Dissertatie.

Albrecht, Y., Boer, T. & Vervoort, H., (2004), Onder Professoren, *Vrij Nederland 1 mei 2004, nummer 14,* Amsterdam.

Altbach, P. G. (2007). Doctoral Education: Present Realities and Future Trends, *International handbook of higher education*, volume 18, 65-81.

Anderson, L. W., Krathwohl, D. R., Airasian, P. W., Cruikshank, K.A., Mayer, R.E., Pintrich, P.R., Raths, J., & Wittrock, M.C. (eds.) (2001). *A taxonomy for learning, teaching, and assessing: A revision of Bloom's Taxonomy of Educational Objectives (Complete edition)*. New York: Longman.

Bartelse, J. (1999) *Concentrating the minds.* Utrecht: Uitgeverij Lemma.
Bartelse, J. A. & Breimer, D. D. (2005). Beter Promoveren. Vernieuwing in het Nederlandse promotiestelsel. *Tijdschrift voor Hoger Onderwijs & Management 5*, 28-31.

Bartelse, J. A. & Huisman, J. (2005). Over de kracht van nietszeggende communiqués: de promotieopleiding in Europees perspectief. *Tijdschrift voor Hoger Onderwijs & Management 5,* 23-26.

Bartelse, J. A., Oost, H. & Sonneveld H. (2007), Doctoral education in the Netherlands in: Powell, S. & Green, H. (eds.). *The Doctorate Worldwide*, Maidenhead: Open University Press/McGraw Hill.

Berelson, B. (1960). *Graduate Education in the United States*. New York: McGraw-Hill, 1960.

Bemelmans-Videc, M. L., Rist, R. C., & Vedung, E. O. (Eds.). (2011). *Carrots, sticks, and sermons: Policy instruments and their evaluation*. New Brunswick and London: Transaction Publishers.

Berger, J. H. J., & Jonge, J. F. M. (2005). *Rendement verkend: succes-en faalfactoren van promotietrajecten aan Nederlandse universiteiten*. Ministerie van Onderwijs, Cultuur en Wetenschap.

Bijleveld, R. J. (1989). "The Two Tier Structure in University Education: An evaluation of a major restructuring operation", in P. A. M. Maassen and F. A. van Vught, (eds.), *Dutch Higher Education in Transition: Policy issues in higher education in the Netherlands*. Culemborg: Lemma, pp. 31-47.

Bloom, B. S. (1956). Taxonomy of educational objectives: the classification of educational goals. Handbook 1: Cognitive domain. New York: McKay.

Boer, H. F. de (2003). Institutionele verandering en professionele autonomie. Enschede: CHEPS/UT.

Boer, H. F. de, Enders, J. and Leisyte, L. (2007). Public sector reform in Dutch higher education: the organizational transformation of the university. *Public Administration*, 85 (1). pp. 27-46.

Boer, H. F. de, Enders, J. & Leisyte, L. (2009). *New Public Management and the Academic Profession,*. Enschede: CHEPS/UT.

Bologna Working Group. (2005) *A Framework for Qualifications of the European Higher Education Area*. Bologna Working Group Report on Qualifications Frameworks (Copenhagen, Danish Ministry of Science, Technology and Innovation).

Boote, D. N., & Beile, P. (2005). Scholars before researchers: On the centrality of the dissertation literature review in research preparation. *Educational researcher*, *34*(6), 3-15.

Bressers, H. & Klok, P.-J. (1988). Fundamentals for a theory of policy instruments. *International journal of social economics*, 15(3/4), pp.22 - 41

Bressers, J. T. A. (1983), *Beleidseffektiviteit en waterkwaliteitsbeleid: Een bestuurskundig onderzoek.* Enschede, Universiteit Twente.

Bressers, J. Th. A. and Hoogerwerf, A. (1991) *Beleidsevaluatie.* Alphen aan den Rijn: Samsom HD Tjeenk Willink.

Bundesministerium für Wissenschaft, Forschung und Wirtschaft (2015), *Statistisches Taschenbuch 2015.*

Centraal Bureau voor de Statistiek (2014), *Jaarboek Onderwijs 2013.*

Cerych, L., & Sabatier, P. (1986). *Great Expectations and Mixed Performance: The Implementation of Higher Education Reforms in Europe*. Stoke-on-Trent: Trentham.

CIRGE (2007). *The Melbourne Declaration.* http://www.education.uw.edu/cirge/forces-and-forms-ii/.

Clark, B. R. (Ed.). (1993). *The Research Foundations of Graduate Education: Germany, Britain, France, United States, Japan*. Oakland: University of California Press.

Clark, B. R. (1998). *Creating Entrepreneurial Universities: Organizational Pathways of Transformation. (*2nd ed.). Kidlington, Oxford: Elsevier Science Ltd.

Cobb, R., Ross, J. K., & Ross, M. H. (1976). Agenda building as a comparative political process. *American political science review*, *70*(01), 126-138.

Committee Cohen (2001). *Cursusduur Masteropleidingen, Adviesopdracht VSNU.* Letter to the VSNU, 30 October 2001.

Committee Reneman (2002). *Over de Top. Duidelijkheid door Differentiatie.* The Hague: Ministry of Education and Sciences.

Conrad, C. F., Duren, K. M., & Haworth, J. G. (1998). Students' perspectives on their master's degree experiences: Disturbing the conventional wisdom. *New Directions for Higher Education*, *1998*(101), 65-76.

Conrad, C. F., Haworth, J. G. & Millar, S. B. (1993). *A silent success: Master's education in the United States.* Baltimore MD: The Johns Hopkins University Press.

Czarniawska, B., & Sevón, G. (Eds.). (1996). *Translating Organisational Change*. New York: de Gruyter.

Davies, H. (2009). Survey of master degrees in Europe. Brussels: European University Association.

Dillman, D. A. (2000). *Mail and internet surveys: The tailored design method.* (1st ed.). Hoboken, New Jersey: John Wiley & Sons, Inc.

Dittrich, K.L.L.M., Frederiks, M.M.H. & Luwel, M. (2004). The implementation of Bologna in Flanders and the Netherlands. *European Journal of Education*, *39*(3), 299-316.

Doelen, F.C.J. van der (1989). *Beleidsinstrumenten en energiebesparing*. Enschede: Universiteit Twente.

Drennan, J., & Clarke, M. (2009). Coursework master's programmes: the student's experience of research and research supervision. *Studies in Higher Education*, *34*(5), 483-500.

Dye, T. R. (2002). *Understanding Public Policy*. Englewood Cliffs, NJ: Prentice Hall.

EACEA, Eurydice, Eurostat, & Eurostudent. (2012). The European Higher Education Area in 2012: Bologna Process Implementation Report Brussels: Eurydice.

EC. (2000). "Lisbon European Council 23 and 24 March 2000: Presidency Conclusions". http://www.europarl.europa.eu/summits/lis1_en.htm

Economist (2010), *Do Europeans want a dynamic economy?,* 08-01-2010.

ECOS (2011). Visscher F., *Reflecties op succesfactoren promotieopleidingen.* ECOS/SV/2461. Amsterdam: Konkinklijke Nederlandse Academie van Wetenschappen.

Edelenbos, J., & Twist, M. J. W. (1997). *Beeldbepalende bestuurskundigen: een kennismaking met kernfiguren in de bestuurskunde*. Alphen a/d Rijn: Samsom HD Tjeenk Willink.

Enders, J. (2002). Serving many masters: The Ph.D. on the labour market, the everlasting need of inequality, and the premature death of Humboldt. *Higher Education*, *44*(3-4), 493-517.

Enders, J. (2004). Research training and careers in transition: a European perspective on the many faces of the Ph. D. *Studies in Continuing Education*,26(3), 419-429.

European Commission (2003a). *Communication from the Commission: The role of universities in the Europe of knowledge* (Brussels (COM(2003) 58 final)).

European Commission (2003b). *Communication for the Commission to the Council and the European Parliament: Researchers in the European Research Area: One profession, multiple careers* (Brussels (COM(2003) 436 final)).

European Ministers Responsible for Higher Education. (1999). "Joint declaration of the European Ministers of Education Convened in Bologna on the 19th of June 1999". http://www.esib.org/prague/documents/bologna_declaration.htm

European Ministers Responsible for Higher Education. (2003). "Realising the European Higher Education Area: Communiqué of the Conference of European Ministers Responsible for Higher Education in Berlin, 19 September 2003" http://www.ehea.info/Uploads/Declarations/Berlin_Communique1.pdf

European Ministers Responsible for Higher Education. (2005). "The European Higher Education Area - Achieving the Goals: Communiqué of the Conference of European Ministers Responsible for Higher Education, Bergen, 19-20 May 2005". Bergen.

European University Association (2005). *Doctoral Programmes for the European Knowledge Society*. Brussels. http://www.eua.be/eua/jsp/en/upload/Doctoral_ Programmes_Project_Report.1129278878120.pdf.

European University Association. (2010). *Salzburg II Recommendations. European universities' achievements since 2005 in implementing the Salzburg Principles.* Brussels: EUA.

Ferlie, E., Musselin, C., & Andresani, G. (2008). The steering of higher education systems: A public management perspective. *Higher education*, *56*(3), 325-348.

Ferlie, E., Musselin, C., & Andresani, G. (2009). The governance of higher education systems: A public management perspective. In: Paradeise, C. et al. (eds.) *University Governance* (pp. 1-19). Dordrecht: Springer.

Fischer, F. (1995), *Evaluating Public Policy*, Chicago: Nelson Hall Publishers.

Glazer, J. S. (1986). *The Master's Degree. Tradition, Diversity, Innovation*. ASHE-ERIC Higher Education Report No. 6. Washington DC: Association for the Study of Higher Education.

Goedegebuure, Leo C.J., Maassen, Peter A.M., Phillips, Tom, & Smits, Martino. (1993). *Dutch Engineering Programs in a European Context, Volume I: Peer Review Report and Major Conclusions*. Zoetermeer: Ministry of Education and Science.

Goedegebuure, L. C., & Van Vught, F. (1994). *Comparative policy studies in higher education*. Utrecht: Uitgeverij Lemma.

Graaf H. van de & Hoppe, R. (1992). *Beleid en Politiek. Een inleiding tot de beleidswetenschap en de beleidskunde*. Muiderberg: Coutinho.

Grondsma, T. (1988). Sturen op afstand via de onderhandelingsarena? *Beleidswetenschap, 2*, 360-369.

Groot, H. de, & van der Sluis, J. (1986). *Bestuurlijke reacties op bezuinigingen: een economisch model*. Rotterdam: Erasmus Universteit Rotterdam.

Guba, E. G., & Lincoln, Y. S. (1989). *Fourth generation evaluation*. Los Angeles: Sage.

HESA (2014). *Higher Education Student Enrolments and Qualifications Obtained at Higher Education Institutions in the United Kingdom for the Academic Year 2012/13*. Higher Education Statistics Agency. https://www.hesa.ac.uk/content/view/3103/

Heyma, A., Bisschop, P., Werff, S., & Imandt, M. (2014). *Verkenning effect studievoorschot op instroom meerjarige masters tekortsectoren* (No. 2014-45). SEO-Economisch Onderzoek.

Hirschman, A. O. (1970). *Exit, Voice, and Loyalty: Responses to Decline in Firms, Organizations, and States*. Cambridge, Ma.: Harvard University Press.

Hood, C. (1983). *The Tools of Government*, London: Macmillan.

Hoogerwerf, A. 1984. Het ontwerpen van overheidsbeleid: een handleiding met toelichting. *Bestuurswetenschappen* 38, (1): 4-23.

Howlett, M., Ramesh, M. & Perl, A. (2009). *Studying public policy*: *policy cycles and policy subsystems*. (3rd ed.) Oxford: Oxford University Press.

Huisman, J. (1995). *Differentiation, diversity and dependency in higher education: A theoretical and empirical analysis*. Utrecht: Uitgeverij Lemma.

Huisman, J. & M.C. van der Wende (2003). Gedifferentieerde masters in het universitair onderwijs. *Th&ma*, no 2. pp. 25-29.

Huisman, J., & van der Wende, M. (2004). The EU and Bologna: are supra- and international initiatives threatening domestic agendas?. *European Journal of Education*, *39*(3), 349-357.

ITS, ROA and CHEPS (2015), *'Het beste uit studenten', Onderzoek naar de werking van het Sirius Programma om excellentie in het hoger onderwijs te bevorderen*, Nijmegen: Radboud Universiteit Nijmegen.

Jongbloed, B. (2008). *Funding higher education: a view from Europe*. Enschede: Center for Higher Education Policy Studies, University of Twente.

Jongbloed, B. (2012). The Netherlands. In: Dill, D. D. and van Vught, F. A. (Eds.). *National Innovation and the Academic Research Enterprise*, pp. 328-329. Baltimore, Ma: Johns Hopkins University Press.

Katz, P. (2005). *Retrieving the Master's Degree from the dustbin of history: a report to the members of the American Historical Association, prepared for the AHA Committee on the Master's Degree in History*. s.l. [Washington D.C.]: American Historical Association.

Kehm, B. M. (2006). *Doctoral education in Europe and North America: a comparative analysis*. London: Portland Press.

Kehm, B. M. (2007). Quo vadis doctoral education? New European approaches in the context of global changes. *European Journal of Education*, *42*(3), 307-319.

Kingdon, J. W (1984). *Agendas, alternatives, and public policies*. Boston: Little, Brown.

Knaap, P. van der (2006). Responsive Evaluation and Performance Management Overcoming the Downsides of Policy Objectives and Performance Indicators. *Evaluation*, *12*(3), 278-293.

KNAW (2000). *Rijzende sterren. Om de kwaliteit van de onderzoekersopleiding*. Amsterdam: Koninklijke Nederlandse Academie van Wetenschappen.

KNAW (2003). *Gedragscode voor gebruik van persoonsgegevens in wetenschappelijk onderzoek. April 2003*. Amsterdam: Koninklijke Nederlandse Akademie van Wetenschappen, Sociaal Wetenschappelijke Raad. https://www.knaw.nl/nl/actueel/publicaties/gedragscode-voor-gebruik-van-persoonsgegevens-in-wetenschappelijk-onderzoek.

KNAW (2007). *Onderzoeksmasters in de sociale wetenschappen. Eerste ervaringen*. Amsterdam: Koninklijke Nederlandse Akademie van Wetenschappen, Sociaal Wetenschappelijke Raad. https://www.knaw.nl/nl/ actueel/ publicaties/ onderzoeksmasters.../20071081.pdf.

Kogan, M., & Hanney, S. (2000). *Reforming higher education*. London: Jessica Kingsley.

Kottmann, A. (2008): *Higher Education in Austria. Country report*. Enschede: CHEPS.

Kottmann, A. (2011). Reform of Doctoral Training in Europe. In: Enders, J., Boer, H.F. de, and Westerheijden, D.F. (eds.). *Reform of higher education in Europe* (pp. 29-43). Rotterdam: SensePublishers.

Kraan-Jetten, A. (1991). *Effectiviteit van overheidsbeleid: systematisering van inzichten getoetst aan het beleid ter bevordering van het eigen-woningbezit*. Utrecht: Rijksuniversiteit te Utrecht.

Kretschmer, F. (2012). Bachelor ist wenig wert, Master bleibt Nonplusultra, *der Standard 1 June 2012*: http://derstandard.at/1336698528484/Arbeitsmarkt-Bachelor-ist-wenig-wert-Master-bleibt-Nonplusultra.

LAIOO (2002). *Behoud Talent! Een rapportage over de verschillende aspecten die een rol spelen bij de begeleiding van promovendi.* Utrecht: Landelijk AiO Overleg

Leišytė, L. (2007). *Higher Education in the United Kingdom*. Enschede: Center for Higher Education Policy Studies, University of Twente.

Maassen, P. (1998). Governmental Steering and Higher Education. In: Rip, A. (Ed.), *Steering and Effectiveness in Developing Knowledge Society,* Utrecht: Lemma.

Maassen, P. A. M., and van Vught, F. A. (1989). Is Government Really Stepping Back? An analysis of the governmental strategy towards higher education since 1985. In: P. A. M. Maassen and F. A. van Vught, (eds.), *Dutch Higher Education in Transition: Policy-issues in Higher Education in the Netherlands*. Culemborg: Lemma, pp. 113-127.

Marzano, R. J. (2001). *Designing a New Taxonomy of Educational Objectives. Experts in Assessment*. Newbury Park, Ca: Corwin Press.

May, P. J. (1991). Reconsidering policy design: policies and publics. *Journal of Public Policy*, *11*(02), 187-206.

McAlpine, L., & Norton, J. (2006). Reframing our approach to doctoral programs: an integrative framework for action and research. *Higher Education Research & Development*, *25*(1), 3-17.

McCoshan, A., Witte, J., & Westerheijden, D. (2010). Ten years of Bologna: what has changed for learners? Paper presented at the EAIR 32nd Annual Forum, Valencia (ES).

Ministry of Education (1985). *Hoger Onderwijs: Autonomie en Kwaliteit*: Tweede Kamer, vergaderjaar 1985-1986, 19253, nr. 2.

Ministry of Education (2003a). *Kabinetsnotitie Ruim baan voor Talent.* Den Haag: Ministery OCW.

Ministry of Education (2003b). Letter of the Dutch Junior Minister for Education, Culture and Science, April 15th, 2003. Den Haag: Ministery OCW.

Ministry of Education (2005). *Onderzoekstalent op waarde geschat*. Den Haag: Ministry OCW.

Ministry of Education (2010). Regeling van de Staatssecretaris van Onderwijs, Cultuur en Wetenschap van 11 maart 2010, nr. HO&S/2010/190238. Den Haag: Ministery OCW.

Mitnick, B. M. (1980). *The political economy of regulation: Creating, designing, and removing regulatory forms*. New York: Columbia University Press.

Moguérou, P. (2005). Doctoral and Postdoctoral Education in Science and Engineering: Europe in the international competition. *European Journal of Education* 40(4), 367-392.

Moseley, David; Baumfield, Viv; Higgins, Steve; Lin, Mei; Miller, Jen; Newton, Doug; Robson, Sue; Elliott, Joe; Gregson, Maggie (2004). *Thinking Skill Frameworks for Post-16 Learners: An Evaluation. A Research Report for the Learning and Skills Research Centre*. Guildford: Learning and Skills Research Centre.

Nederhof, A. J. (1981). *Beter onderzoek: bestrijding van foutenbronnen in sociaalwetenschappelijk onderzoek*. Den Haag: Vuga.

Nerad, M. (2004). The Ph.D. in the US: Criticisms, facts, and remedies. *Higher Education Policy,* 17(2), 183-199.

Nerad, M. (2008). *Graduate Education and its Changes in the US: an Evolving Process* (*Powerpoint presentation)*, Hiroshima: Hiroshima University.

Nerad, M. (2010a). Globalization and the internationalization of graduate education: A macro and micro view. *Canadian Journal of Higher Education*, *40*(1), 1-12.

Nerad, M. (2010b). Increase in Ph.D. production and reform of doctoral education worldwide. *Research Institute for Higher Education Hiroshima University*, *7*, 769.

Nerad, M., & Cerny, J. (2002). Postdoctoral appointments and employment patterns of science and engineering doctoral recipients ten-plus years after Ph. D. completion. *Communicator, VXXXV*, *7*, 1-6.

Nerad, M., & Heggelund, M. (2011). *Toward a global Ph.D.?: Forces and forms in doctoral education worldwide.* Seattle: University of Washington Press.

Nerad, M. & Miller, D. S. (1996). 'Increasing student retention in graduate and professional programs' in: J. Haworth (ed.), *Assessment in Graduate and Professional Programs: Demand, Processes, Outcomes*. San Francsico: Jossey-Bass.

Nerad, M., Rudd, E., Morrison, E., & Homer, L. (2009). 'Confronting common assumptions: Designing future-oriented doctoral education.' In: Ehrenberg, R.G. and Kuh, C. V. (eds.). *Doctoral education and the faculty of the future*. Ithaca NY,: Cornell University Press, pp. 80-92.

NSE (2012). Nationale Studentenenquête. https://www.studiekeuze123.nl/nse

NSE (2014). Nationale Studentenenquête. https://www.studiekeuze123.nl/nse

NUFFIC (2013): Verenigd Koninkrijk. http://www.nuffic.nl/bibliotheek/landenmodule-verenigd-koninkrijk.pdf.

NVAO (2011), *Research Master Review 2011*. Den Haag: NVAO.

OECD (2013). "Expenditure on R&D", in OECD Factbook 2013: Economic, Environmental and Social Statistics. Paris: OECD Publishing.

OECD. (2014). *Education at a Glance 2014; OECD Indicators*. OECD Publishing.

Ostriker, J. P., Kuh, C. V., & Voytuk, J. A. (eds.). (2011). *A Data-based Assessment of Research-Doctorate Programs in the United States.* Washington, DC: National Academies Press, Committee on an Assessment of Research-Doctorate Programs.

Ours, J.C. van & Ridder, G. (2003), Fast track or failure: a study of the graduation and dropout rates of Ph.D students in economics, *Economics of Education Review*. (22) 2, pp. 157-166.

Park, C. (2005). New variant Ph.D.: The changing nature of the doctorate in the UK. *Journal of Higher Education Policy and Management*, *27*(2), 189-207.

Park, C. (2007). *Redefining the doctorate, Discussion paper,* York: Higher Education Academy.

Parsons, W. (1995). *Public policy: An introduction to the theory and practice of policy analysis.* Cheltenham: Edward Elgar Publishing.

Pechar, H. (2012). The Decline of an Academic Oligarchy. The Bologna Process and 'Humboldt's Last Warriors'. In: Curaj, A., Scott, P., Vlasceanu, L., & Wilson, L. (Eds.). *European Higher Education at the Crossroads* (pp. 613-630). Dordrecht: Springer.

Pechar, H., Ates, G., & Andres, L. (2012). The "New Doctorate" in Austria: Progress toward a Professional Model or Status Quo?. *CEPS Journal*, *2*(4).

Picciano, J., Rudd, E., Morrison, E., & Nerad, M. (2008). *Does Time-to-Degree Matter?* Seattle: CIRGE: University of Washington.

Pollitt, C., & Bouckaert, G. (2011). *Public management reform: A comparative analysis: New public management, governance, and the neo-Weberian state* (3rd rev. and upd. ed.). Oxford: Oxford University Press.

Putters, K. (2007). 'Passende sturingsinstrumenten voor onderwijsbeleid.' In: Onderwijsraad, *Essays over beleidsinstrumenten in het onderwijs*, pp. 11-28. Den Haag: Onderwijsraad.

QAA (2010). *Master's degree characteristics*. Gloucester: Quality Assurance Association for Higher Education. http://www.qaa.ac.uk/en/Publications/ Documents/Masters-degree-characteristics.pdf

Ranitz, J. de (2005). *The Dutch Research Master: integrating third cycle course work into the second cycle*. (Conference presentation) London: European University Association.

Reichert, S., & Tauch, C. (2005). *Trends IV: European Universities Implementing Bologna*. Brussels: European University Association.

Reumer, C., & van der Wende, M. (2010). *Excellence and Diversity: The Emergence of Selective Admission Policies in Dutch Higher Education-A Case Study on Amsterdam University College.* Berkeley: University of California Berkeley, Centre for Studies in Higher Education.

Rothblatt, S. (2006) in Breimer, D. and Saris, F. (Eds), *Whose University Is It? Proceedings of a Symposium Held on the Occasion of the 430th Anniversary of Leiden University*. Amsterdam: Amsterdam University Press.

Rupp, J. C. C. (1997). *Van oude en nieuwe universiteiten. De verdringing van Duitse door Amerikaanse invloeden op de wetenschapsbeoefening en het hoger onderwijs in Nederland, 1945-1995.* The Hague: Sdu Uitgevers.

Sabatier, P. A. (1986). Top-down and bottom-up approaches to implementation research: a critical analysis and suggested synthesis. *Journal of public policy*,*6*(1), 21-48.

Sadlak, J. (Ed) (2004) *Doctoral Studies and Qualifications in Europe and the United States: Status and Prospects.:* UNESCO-CEPES.

Sadowski, D., Schneider, P., & Thaller, N. (2008). Do we need incentives for Ph.D. Supervisors? *European Journal of Education, 43*(3), 315-329.

Sanderson, I. (2002). Evaluation, policy learning and evidence-based policy making. *Public administration*, 80(1), 1-22.

Schneider, P., Thaller, N., & Sadowski, D. (2010). Success and Failure of Ph.D. Programmes: An Empirical Study of the Interplay Between Interests, Resources and Organisation. In *Governance and performance in the German public research sector* (pp. 107-123). Dordrecht: Springer.

Schoot, R. van der, Yerkes, M. A., Mouw, J. M., & Sonneveld, H. (2013). What Took Them So Long? Explaining Ph.D. Delays among Doctoral Candidates. *PloS one*, *8*(7), e68839.

Scienceguide (2014). Beta's worden niet ontzien. *Scienceguide* 1 October 2014: http://www.scienceguide.nl/201410/b%C3%A8ta%E2%80%99s-worden-niet-ontzien.aspx

Seagram, B. C., Gould, J., & Pyke, S. W. (1998). An investigation of gender and other variables on time to completion of doctoral degrees. *Research in higher education,* 39(3), 319-335.

Simon, H. A. (1957). *Models of man; social and rational*. New York: Wiley.

Sirius Programma (2013). *Sirius Programma overall auditrapport 2012: Excellentie in het hoger onderwijs: een cultuuromslag in gang gezet*. Den Haag: Sirius. Progrmma. https://www.siriusprogramma.nl/media/files/publicaties/2012%20overall%20auditrapport%20Sirius%20Programma.pdf.

Snijder, J.K. & David, S.A.D. (eds.) (2007), *Research Master Review 2007,* The Hague: NVAO.

Snyder, T. D. & Dillow, S. A.. (2015). *Digest of Educational Statistics 2013*. Washington, D.C.: National Center for Education Statistics, http://nces.ed.gov/pubs2015/2015011.pdf.

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Sonneveld, H. (2010). Doctoral Education in the Netherlands , 2010 – A brief history and a silent revolution. *EUA- Council for Doctoral Education -News, December 2010,* Issue 10, pp. 2-4.

Sonneveld, H., & Oost, H. (2005). *Buitenlandse beoordelaars over de kwaliteit en meerwaarde van de Nederlandse onderzoekscholen. Een analyse van Peer Review Committee rapporten.* The Hague: Ministerie van Onderwijs, Cultuur en Wetenschap.

Sonneveld, H., & Oost, H. (2006). *Het promotiesucces van de Nederlandse onderzoekscholen. Afsluiting van een drieluik*. Utrecht/Amsterdam: IVLOS/ASSR

Statistics Austria (2012). *Statistical year book 2012*.

Steen, J. van (2014). Totale Investeringen in Wetenschap en Innovatie 2012-2018. *Feiten & Cijfers*, *11*.

Stewart, D.W., (2010) "Important, if True": Graduate Education will Drive America's Future Prosperity, *Change,* 42(1). 36-44.

Stone, D. (2012). *Policy Paradox: The art of political decision making.* (3rd ed.). London: W. W. Norton & Company Ltd.

Swanborn, P. G. (2004). *Evalueren*, Amsterdam: Boom.

Tak, H. & Oomen B. (ed.) (2011). *De disciplines voorbij – De colleges van Hans Adriaansens, Liber Amicorum voor Hans Adriaansens*. Middelburg: Roosevelt Academy Middelburg.

Teichler, U. (2007). *Higher education systems: Conceptual frameworks, comparative perspectives, empirical findings*. Rotterdam: Sense Publishers.

Tweede Kamer (1998). Hoger Onderwijs en onderzoek Plan 1998, brief van de Minister van Onderwijs, Cultuur en Wetenschappen aan de Voorzitter van de Tweede Kamer der Staten-Generaal, TK 25615, nr. 23.

UCDN (2014), Statement on the Role, Characteristics, and Cooperation of Liberal Arts and Sciences Colleges in the Netherlands. Retrieved from: https://www.universitycolleges.info/.

University of Florida (2008), Masters' Degrees in the State University System of Florida, *Florida Board of Governors information brief, 7th of April 2008.*

Vassil, C., & Solvak, M. (2012). When failing is the only option: explaining failure to finish Ph.Ds. in Estonia. *Higher Educaion, 64,* 503-516.

Veerman, C. (2010). *Differentiëren in drievoud. Advies van de Commissie Toekomstbestendig Hoger Onderwijs Stelsel*. S.l. [The Hague]: Ministry of Education, culture and Science.

Visscher, S. (2011). Reflecties op succesfactoren promotieopleidingen. Intern ECOS-rapport

Vries, J. de, & van Dam, M. (1998). *Politiek-bestuurlijk management*. Alphen aan den Rijn: Samsom.

Vries, J. de (2001). *Lege staat of lege bestuurskunde. Naar een herwaardering van de politiek en de politicologie*. Oratie. Leiden: Universiteit Leiden.

VSNU (2014). Gepromoveerden van belang voor Nederland. *Factsheet september: http://www.vsnu.nl/files/documenten/Factsheets/18_Factsheet%20Gepromoveerd en.pdf.*

VSNU (2015). Factsheet Promovendi. http://www.vsnu.nl/f_c_promovendi.html.

Vught, F. A. van (1995). Policy models and policy instruments in higher education. The effects of governmental policy-making on the innovative behaviour of higher education institutions. IHS Political Science Series 26, October 1995.

Vught, F. A. van (2006). Reputation, market and deregulation. Unfolding the future of Dutch higher education. In: Breimer, D. & Saris, F. (eds.). *Whose University is*

it?: Proceedings of A Symposium Held, 8 June 2005, on the Occasion of the 430th Anniversary of Leiden University. Amsterdam: Amsterdam University Press.

Vught, F. A. van, & Ziegele, F. (Eds.). (2012). *Multidimensional Ranking: The Design and Development of U-Multirank*. Dordrecht etc.: Springer.
Wadsack, I., and Kasparovsky, H. (2004). *Higher Education in Austria*, Vienna: Federal Ministry of Education, Science and Culture, 2004.

Weiss, C. H. (1999). The Interface between Evaluation and Public Policy. *Evaluation*, 5(4), 468-486.

Wende, M.C. van der (2011). The Emergence of Liberal Arts and Sciences Education in Europe: A Comparative Perspective. *Higher Education Policy*, 24, pp. 233–253.

Wende, M.C. van der (2012). *Trends towards global excellence in undergraduate education: taking the liberal arts experience into the 21st century.* Berkeley: University of California Berkeley: Centre for Studies in Higher Education.

Westerheijden, D. F., de Boer, H. F., & Enders, J. (2009). The Netherlands: An 'Echternach' Procession in Different Directions: Oscillating Steps towards Reform. In: C. Paradeise, E. Reale, I. Bleiklie & E. Ferlie (Eds.), *University Governance: Western European Comparative Perspectives* (pp. 123-151). Dordrecht etc.: Springer.

Westerheijden, D. F., Beerkens, E., Cremonini, L., Huisman, J., Kehm, B., Kovac, A. & Yagci, Y. (2010). *The first decade of working on the European Higher Education Area. The Bologna process independent assessment.: Volumes 1, 2*. s.l. [Brussels]: European Commission, Directorate-General for Education and Culture.

Wijfels, H., & Wolfensberger, M.C.V. (2004). Wat vraagt de samenleving van talent? Hoe universiteiten daar op in kunnen spelen. *Thema, 11*(1), 51-54.

Witte, J. (2006). *Change of degrees and degrees of change: Comparing adaptations of European higher education systems in the context of the Bologna Process.* Enschede: CHEPS/UT.

Witte, J., Van der Wende, M., & Huisman, J. (2008). Blurring boundaries: How the Bologna process changes the relationship between university and non-university higher education in Germany, the Netherlands and France. *Studies in Higher Education*, *33*(3), 217-231.

Wolfensberger, M.V.C. (2012). *Teaching for Excellence. Honors pedagogies revealed*. Münster: Waxmann.

Wolfensberger, M.V.C., van Eijl, P.J., van der Vaart, R.J.F.M., & Pilot, A. (2004). *De student in Honours Programma's: kenmerken, ambities en resultaten. Een pilotstudie.* Amsterdam: Landelijk plusnetwerk.

Wright, T., & Cochrane, R. (2000). Factors influencing successful submission of Ph.D. theses. *Studies in higher education*, *25*(2), 181-195.

Yin, Robert K. (2003). *Case Study Research: Design and Methods* (3rd ed.). Thousand Oaks: Sage.

Appendices

Appendix A **List of abbreviations**

AWTI	Advisory Council for Science, Technology and Innovation
BA	Bachelor of Arts
CROHO	Central Register of Higher Education Programmes
ECOS	Research School Accreditation Committee
EC	European Credits
ECTS	European Credit Transfer System
ESF	European Science Foundation
EUR	Erasmus University Rotterdam
GDP	Gross Domestic Product
HBO	higher professional education / universities of applied sciences
KNAW	Royal Netherlands Academy of Arts and Sciences
MA	Master of Arts
MPhil	Master of Philosophy
MSc	Master of Science
NAO	Accreditation Organisation of the Netherlands
NVAO	Accreditation Association of the Netherlands and Flanders
NWO	Netherlands Organisation for Scientific Research
OUNL	Netherlands Open University
PhD	Doctor of Philosophy
R&D	Research and Development
RM	Research master
RWTI	Council of Science, Technology and Information Policy
SIRIUS	Excellence Programme of the Ministry of Education
SWR	Social Sciences Council (of the KNAW)
TNO	Netherlands Organisation for Applied Scientific Research
TM	Taught master
TOEFL	Test of English as a Foreign Language
TUD	Delft University of Technology
TUE	Technichal University of Eindhoven
UL	Leiden University
UM	University of Maastricht
UT	University of Twente
UU	Utrecht University
UvA	University of Amsterdam

VH	Netherlands Association of Universities of Applied Sciences
VNO-NCW	Confederation of Netherlands Industry and Employers
VSNU	Association of Universities in the Netherlands
VU	VU University Amsterdam
WO	academic higher education
WRR	Scientific Council for Government Policy
WUR	Wageningen University and Research Centre

Appendix B **ALUMNI SURVEY**

Respondent's number: _____

EFFECTIVENESS OF MASTER EDUCATION
IN THE NETHERLANDS

A study on the effectiveness of Dutch master's programmes
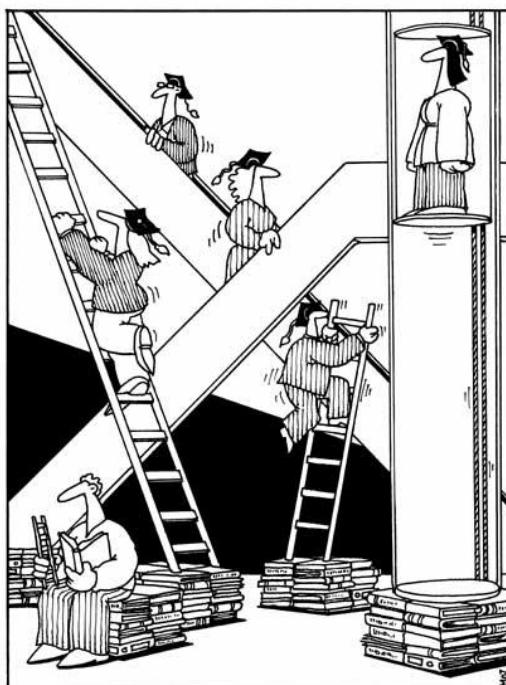
Contact address:
Center for Higher Education Policy Studies
P/A Roosevelt Academy, Jorrit Snijder
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I.B.R.S. / C.C.R.I. Numéro 245
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THE NETHERLANDS
WEB VERSION: www.roac.nl/eom

Introduction

A few remarks may help you to complete the survey:

-Most questions have only one possible reply. If more answers are possible it will be made explicit in the question, e.g. by "(multiple replies possible)".

-If questions refer to 'master's programmes', this includes Dutch old-style 'doctoraal' (resulting in the title of drs., mr., or ir.) programmes as well.

1) Characteristics of your educational career

The following questions refer to characteristics of your master's and bachelor's programme

01.   In retrospect, would you choose the same master's programme again?

      (please circle your answer)

      1 Yes, same programme at the same university

      2 Yes, same programme, but at another university

      3 No, a different programme.:……………………

      4 No, I would not study at all

02.   When did you graduate at master's level?

      … month … year

03.   What kind of master's programme was this?

      1 Academic master

      2 Master in Teaching (secondary school subjects)

      3 Research master

      4 'Top'-master, 'Prestige'-master etc.

      5 "old style" programme (resulting in the title of drs., ir. or mr.)

04.   Name of your master's programme

         Name:...........................

05.   Name of the university of your master's programme

         Name:...........................

06.   What was the duration of your master's programme?

         1 One year
         2 Two years
         3 Other:… months

07.   Discipline(s)/Field(s) of your master's programme (multiple replies possible)

         1   Agriculture
         2   Arts and Humanities
         3   Behavioural Sciences (including: psychology, pedagogy etc.)
         4   Economics (including: finance, accountancy, MBA etc.)
         5   Education
         6   Engineering, Manufacturing and Construction
         7   Medical and Life Sciences (including: biology
         8   Law
         9   Natural Sciences
         10 Social Sciences
         11 Other:………….

08.   How long did it take you to complete your master's degree?

         ….months after starting the master's programme

09.   What was your Grade Point Average (GPA) over the whole of your <u>master's programme</u>
        (approximately)?

        1   6   or equivalent 'sufficient'
        2   6 ½
        3   7   or equivalent 'quite sufficient'
        4   7 ½
        5   8   or equivalent 'good'
        6   8 ½
        7   9   or equivalent 'very good'
        8   9 ½
        9   10   or equivalent 'exceptionally excellent'
        10   Do not know

10.   What was your grade of the <u>master's thesis</u> (or equivalent 'old style' programmes-thesis)?

        1   6   or equivalent 'sufficient'
        2   6 ½
        3   7   or equivalent 'quite sufficient'
        4   7 ½
        5   8   or equivalent 'good'
        6   8 ½
        7   9   or equivalent 'very good'
        8   9 ½
        9   10   or equivalent 'exceptionally excellent'
        10   Do not know

11.   On average over the whole of your <u>master's programme</u>, how many contact hours did you
        (approximately) have per week (including all courses, tutoring, thesis guidance, etc)?

        … hours per week

12.   On average over the whole of your <u>master's programme</u>, what was your actual workload per week (including preparing classes, following courses, taking exams/writing thesis, etc.)?

  ... hours per week

13.   Were there additional criteria for entrance into your master's programme besides your bachelor degree?

1   no
2   yes, namely (multiple replies possible)

        1 GPA Bachelor
        2 Grade Bachelor thesis
        3 English skills
        4 Motivation
        5 Other, namely….

14.   What was the discipline of your <u>bachelor's programme?</u>

1   Agriculture
2   Arts and Humanities
3   Behavioural Sciences
4   Economics
5   Education
6   Engineering, Manufacturing and Construction
7   Health Care
8   Law
9   Natural Sciences
10 Social Sciences
11 Other, namely:………….
12 n/a: old-style Dutch 'doctoraal' programme (drs., ir., mr.)

15. Grade Point Average <u>total bachelor period</u> (approximately, excluding your thesis)?

1	6	or equivalent 'sufficient'
2	6 ½	
3	7	or equivalent 'quite sufficient'
4	7 ½	
5	8	or equivalent 'good'
6	8 ½	
7	9	or equivalent 'very good'
8	9 ½	
9	10	or equivalent 'exceptionally excellent'
10	Do not know	
11	n/a: old-style Dutch 'doctoraal' programme (drs., ir., mr.)	

16. Grade of your <u>bachelor's thesis</u>

1	6	or equivalent 'sufficient'
2	6 ½	
3	7	or equivalent 'quite sufficient'
4	7 ½	
5	8	or equivalent 'good'
6	8 ½	
7	9	or equivalent 'very good'
8	9 ½	
9	10	or equivalent 'exceptionally excellent'
10	Do not know	
11	n/a: old-style Dutch 'doctoraal' programme (drs., ir., mr.)	

17. Date of your <u>bachelor's graduation</u>

1. month ....………year:……….. ..…..
2. n/a: old-style Dutch 'doctoraal' programme (drs., ir., mr.)

18.   Did you switch <u>bachelor's programmes</u> during your studies?

    1. no

    2. yes

    3. n/a: old-style Dutch 'doctoraal' programme (drs., ir., mr.)

19.   Did you switch <u>institutions</u> during your <u>bachelor's studies</u>?

    1. no

    2. yes

    3. n/a: old-style Dutch 'doctoraal' programme (drs., ir., mr.)

20.   What type of education did you follow before your enrolment in a university (multiple replies possible)?

1. NL: pre-university education (VWO)
2. NL: higher professional education (HBO)
3. NL: senior general secondary education (HAVO)
4. NL: upper secondary vocational education (MBO)
5. NL: Colloqium Doctum
6. Pre-university education outside NL

21. What kind of additional experience did you have during your <u>bachelor's programme</u>?

	no	yes
a. Internship/work placement	1	2
b. Internship/work placement abroad	1	2
c. Other work experience relevant to your field	1	2
d. Study abroad	1	2
e. Position in student or other voluntary organization	1	2

22. What kind of additional experience did you have during your
master's programme?

	no	yes
a. Internship/work placement	1	2
b. Internship/work placement abroad	1	2
c. Other work experience relevant to your field	1	2
d. Study abroad	1	2
e. Position in student or other voluntary organization	1	2

2) Your opinion about your master's programme

23. Please give your opinion about your master's programme:

	strongly disagree	somewhat disagree	neither disagree nor agree	somewhat agree	strongly agree
a. The programme stimulated your willingness to (re)consider arguments and conclusions in light of empirical results or valid counter argumentation	1	2	3	4	5
b. The programme stimulated your awareness of own restrictions and knowing when to call for expertise of others	1	2	3	4	5
c. The lecturers were strict in the assessment of students	1	2	3	4	5
d. The study programme was challenging in terms of level	1	2	3	4	5
e. Exams/assignments were usually very tough	1	2	3	4	5
f. Some students obtained a diploma even though they did not deserve it	1	2	3	4	5
g. It was easy for students to free-ride during group assignments.	1	2	3	4	5
h. During the programme insight was tested adequately	1	2	3	4	5

i. The programme stimulated your awareness of ethical aspects of professional interaction with others (co-researchers, clients and subjects), including the broader consequences of your own research results and the professional practice	1	2	3	4	5

24. Please give your opinion about your master's programme in terms of:

	much too narrow		neutral		much too broad
a. scope	1	2	3	4	5

	much too shallow		neutral		much too deep
b. depth	1	2	3	4	5

	much too low		neutral		much too high
c. difficulty	1	2	3	4	5

	much too theoretical		neutral		much too practice-based
d. relationship between theory and practice	1	2	3	4	5

	much too little		neutral		much too many
e. your obtained English oral and writing skills	1	2	3	4	5

25. Please mark the following aspects of the master's programme you completed. Provide in round figures a grade from 1 (lowest) to 10 (highest).

	Lowest									Highest
a. Direct participation in research	1	2	3	4	5	6	7	8	9	10
b. Provided a solid theoretical basis	1	2	3	4	5	6	7	8	9	10
c. Insight in cutting edge developments in the field	1	2	3	4	5	6	7	8	9	10

d. Development of research skills	1	2	3	4	5	6	7	8	9	10
e. Preparation for professional practice	1	2	3	4	5	6	7	8	9	10
f. Information about study and career opportunities	1	2	3	4	5	6	7	8	9	10
g. Coherence between programme elements	1	2	3	4	5	6	7	8	9	10
h. International focus	1	2	3	4	5	6	7	8	9	10
i. Research qualities of lecturers	1	2	3	4	5	6	7	8	9	10
j. Availability of lecturers	1	2	3	4	5	6	7	8	9	10
k. Theoretical knowledge of lecturers	1	2	3	4	5	6	7	8	9	10
l. Didactical skills of lecturers	1	2	3	4	5	6	7	8	9	10
m. Field experiences	1	2	3	4	5	6	7	8	9	10

26. My master's programme provided a good basis for:

	strongly disagree	somewhat disagree	neither disagree nor agree	somewhat agree	strongly agree
a. doing a comprehensive literature search	1	2	3	4	5
b. obtaining a broad theoretical knowledge of the studied field	1	2	3	4	5

c. obtaining a thorough command of research methods and techniques	1	2	3	4	5
d. critically judging the quality of the various literature sources	1	2	3	4	5
e. critically evaluating, interpreting and discussing research results	1	2	3	4	5
f. formulating original and innovative research questions based on a solid understanding of the state of the art of research in the field	1	2	3	4	5
g. selecting the appropriate scientific approach for a given research question	1	2	3	4	5
h. independently designing, executing and reporting research	1	2	3	4	5
i. further developing knowledge and skills, for a lifelong learning attitude	1	2	3	4	5
j. evaluating cutting-edge research by others and contributing to improve it theoretically and methodologically	1	2	3	4	5

k. cooperating with individuals
or in teams to plan, decide and
take responsibility in
professional situations   1   2   3   4   5

l. finalizing a high quality
Ph.D.- dissertation within a
four-year period   1   2   3   4   5

m. writing a publishable article
in a respected academic journal
in the field of study   1   2   3   4   5

27.   What grade would you give the master's programme overall (scale 1-10)?

Lowest   Highest
    1   2   3   4   5   6   7   8   9   10

3) Completing your master's degree

The following questions refer to aspects of the realisation of your master's thesis and the workload of the master's programme

28. Please give your opinion about your master's programme:	strongly disagree	somewhat disagree	neither disagree nor agree	somewhat agree	strongly agree
a. In finding a subject for my thesis I experienced difficulty	1	2	3	4	5
b. In finding a supervisor for my thesis I experienced difficulty	1	2	3	4	5

29. How many hours of supervision (direct interaction with supervisors) did you have during your master's thesis project in total?

1. less than 1 hour
2. 1 till 4 hours
3. 5 till 9 hours
4. 10 till 14 hours
5. 15 till 19 hours
6. more than 19 hours

30. How would you describe the:	very bad	bad	sufficient	good	very good
a. accessibility of your thesis supervisors?	1	2	3	4	5

b. the academic quality of your thesis supervision?	1	2	3	4	5
c. accessibility of the whole teaching staff?	1	2	3	4	5
d. quality of the whole teaching staff?	1	2	3	4	5

31.   Did you have any (unintended) delays during your master's programme?

    1 No (skip to question 34)
    2 Yes, during the completion of my master thesis
    3 Yes, in the courses before the master thesis
    4 Yes, both during the master thesis and courses before the master thesis

32.   How long was your delay?

    …. Months

33.   The delay in <u>the thesis project</u> was caused by. (multiple replies possible)

    1 Finding a supervisor
    2 Changing the topic of your thesis
    3 Problems with facilities, no available data etc.
    4 Lack of guidance from my supervisors
    5 Personal problems
    6 Other, namely………

34.   On a scale from 1 to 10, which grade would you give your thesis supervisors for their
       guidance?

       Lowest   Highest
           1   2   3   4   5   6   7   8   9   10

4) The period after your master programme

35. Are you participating in any other formal education or training since completing your master's degree?

    1. yes, namely a Ph.D. programme
    2. yes, postgraduate teacher training
    3. yes, other postgraduate professional training, namely: ……….
    4. yes, other education or training, namely: ……………
    5. no

36. Are you currently in paid employment (including self employment)?

    1 . yes
    2. no

37. Are you currently looking for (other) paid employment?

    1 . yes
    2. no

38. *These two questions (38a and 38b) are only for Ph.D.-students. Others can skip to question 39.*

38a. What is the field of your Ph.D.-project? (several fields are possible in case of multi-disciplinary projects).

    1. Agriculture
    2. Arts and Humanities
    3. Behavioural Sciences
    4. Economics

5. Education
6. Engineering, Manufacturing and Construction
7. Medical and Life Sciences
8. Law
9. Natural Sciences
10. Social Sciences

38b.   Where are you pursuing your Ph.D?

1.   Same university, same research group as master's programme
2.   Same university, different research group,
3.   Other university in The Netherlands
4.   Other university in Europe
5.   Other university in USA, Canada or Australia
6.   Dutch research institute
7.   Foreign research institute
8.   Industry, i.e…………………
9.   Other, i.e……………………

5)   Current job (also to be completed if you are engaged in a PhD-traineeship (e.g. "AIO"))

39.   Starting date

        month :……………. year: ………….

40.   Character of your job/ occupation (multiple replies possible)

        a.   Non-research profession
        b.   Research profession within the university, not a Ph.D.
        c.   Ph.D.-programme
        d.   Research profession in the private sector
        e.   Research profession in the public sector (not a university)
        f.   Other…

41.   Job/occupation title: ………………………

42.   What was the minimum required level of education set by your employer for your current
         job?

        1   University master's programme
        2   University bachelor's programme
        3   Higher Vocational Education (HBO)
        4   pre-university education (VWO), senior general secondary education (HAVO) or
              upper secondary vocational education (MBO)
        5   pre-vocational secondary education (VMBO) or a lower level
        6   Other:……….

43.   Did you have the required qualifications in the appropriate discipline?

        1   yes (skip to question 45)
        2   no

44. Which discipline was required by your employer? (multiple replies possible)

1 Agriculture
2 Arts and Humanities
3 Behavioural Sciences
4 Economics
5 Education
6 Engineering, Manufacturing and Construction
7 Medical and Life Sciences
8 Law
9 Natural Sciences
10 Social Sciences
11 Other:..…

6) **Your opinion about your current job (also to be completed if you are engaged in a PhD-traineeship (e.g. "AIO"))**

45. Without this master's programme you would not have obtained this job

		neither disagree		
strongly disagree	somewhat disagree	nor agree	somewhat agree	agree
1	2	3	4	5

46. To what extent can you put your competencies into practice in your current job?

		neither		
very little nor	to a large	very little	to a large extent	extent
1	2	3	4	5

47. Which competencies did you expect to gain during your master-studies but did not sufficiently? (multiple replies possible)

1. Effectively searching for data, information etc.
2. Theoretical knowledge of the field
3. Formulating innovative research questions
4. Thorough command of research methods and techniques
5. Independently designing, executing and reporting of research
6. Cooperating with others in a team
7. English oral and written skills
8. Professional skills (presentation, debating etc.)
9. I gained all expected competencies
10. Other:……..

48.   Your job provides good career opportunities

		neither		
strongly disagree	somewhat disagree	disagree nor agree	somewhat agree	agree
1	2	3	4	5
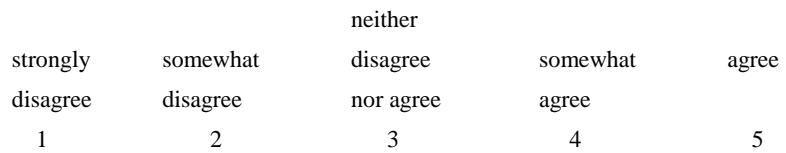
49.   On a scale from 1 to 10, how satisfied are you with your current job?

Lowest   Highest

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

50.   What kind of job do you want to have in the next three to four years?

1.   The job you have at the moment
2.   A management position
3.   A Ph.D position
4.   A post-graduate position
5.   A more research oriented job
6.   No job at all

7) Background questions

51.   Gender

      1 male
      2 female

52.   Nationality

      1   Dutch (go further to question 54)
      2   EU (excluding The Netherlands)
      3   United States, Canada, Australia
      4   Other, …………..

53.   Did you come to the Netherlands especially for the master's programme?

      1 yes
      2 no

54.   Age

      ……years

55a.   Are you willing to take part in a follow-up research project of The Center for Higher
Education Policy Studies on the effectiveness of master- and research master's
programmes? This study will follow the first master students, ten years after their
graduation to find out where the alumni are working and in retrospect, to what extent they
appreciated their master education.

1   yes
2   no (you have completed the questionnaire).

55b.   Please fill in your name and contact addresses.

Name:…………………………………………………….……………………….

Private e-mail address:...…..................................…

Home address:………………………………………………………………………….

……………………………………………………………………..……………..

………………………………………………………………………………………

Adress parents:…………………….……………………………………………………..…

………………………………………………………………………………………

You have completed the questionaire. If you have further questions or remarks, please state them below:

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Thank you very much for your participation!
Jorrit Snijder

ANNEX C **PROFESSORS SURVEY**

Respondent's number:

PREPARING FOR THE PhD

A study on the relationship between (research) master programmes and PhD programmes
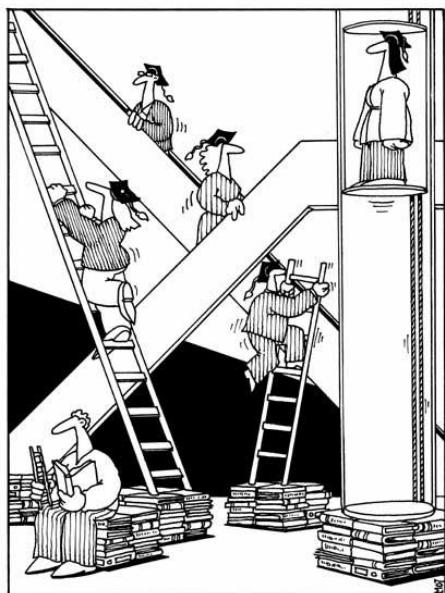
Contact address:

Center for Higher Education Policy Studies

P/A Roosevelt Academy, Jorrit Snijder

International Business Reply Service

I.B.R.S. / C.C.R.I. Numéro 245

4330 VB MIDDELBURG

THE NETHERLANDS

Introduction

This study concerns the relationship between (research) master programmes and PhD programmes. It is part of a PhD study on the effectiveness of (research) masters in the Netherlands and will be conducted under the supervision of the Center for Higher Education Policy Studies (CHEPS) of the University of Twente.

A few remarks may help you to complete the survey:

- Most questions have only one possible reply. If more answers are possible it will be made explicit in the question, e.g. by "(multiple replies possible)".
- If questions refer to 'master's programmes', this includes Dutch old-style 'doctoraal' (resulting in the title of drs., mr., or ir.) programmes as well.
- If questions refer to 'PhD-students', this includes 'AiO's', 'OiO's', 'buitenpromovendi' etc.
- With 'research master programmes' we mean only the two-year selective master programmes that have been accredited by NVAO and the special KNAW committees.

1a) How many PhD students have *completed their PhD* under your direct supervision?

1b) How many PhD students are you supervising at the moment?

2. Background and selection of PhD-candidates under your direct supervision that started in 2005-2009

2005-2009	
a. How many master students apply for a single PhD-position?	
b. How many PhD students <u>started</u> in 2005 till 2009 under your direct supervision?	
c. How many students quit their PhD traineeship per year?	
d. How many of your PhD students that started between 2005-2009 have completed a <u>research master's programme</u>?	
e. How many of your PhD students that started between 2005-2009 have completed their (research) master programmes in your own research group?	
f. How many of your PhD students have completed their (research) master programmes <u>at another university?</u>	
g. How did your PhD students with a research masters background perform compared to students with a regular master background after the go-no-go decision (for example the '7, 12 or 18 months' decisions) in the years 2005 till 2009?	1) much better 2) better 3) same 4) worse 5) much worse 6) not applicable (no experience with research master students) 7) there is no go-no-go decision

3. Now we should like to ask you about different aspects of research master programmes that may explain differences in performance of graduates between research master and regular master programmes.

Compared to regular master programmes, research master programmes provide a better basis for:	Strongly disagree	somewhat disagree	neither disagree nor agree	Somewhat agree	Strongly agree
a. doing a comprehensive literature search	1	2	3	4	5
b. having a broad theoretical knowledge of the studied field	1	2	3	4	5
c. having a thorough command of research methods and techniques	1	2	3	4	5
d. critically judging the quality of the various literature sources	1	2	3	4	5
e. critically evaluating, interpreting and discussing research results	1	2	3	4	5
f. formulating original and innovative research questions.	1	2	3	4	5
g. selecting the appropriate methodological approach for a given research question	1	2	3	4	5
h. independently executing and reporting research	1	2	3	4	5

i. further developing knowledge and skills, for a lifelong learning attitude	1	2	3	4	5
j. evaluating cutting-edge research by others and contributing to improve it theoretically and methodologically	1	2	3	4	5
k. cooperating with individuals or in teams to plan, decide and take responsibility in professional situations	1	2	3	4	5
l. finalizing a high quality PhD- dissertation within the given amount of time (in your perception)	1	2	3	4	5
m. writing a publishable article in a respected academic journal in the field of study	1	2	3	4	5

4.					
Please circle the option that best represents your opinion about the following propositions:	Strongly disagree	somewhat disagree	neither disagree nor agree	Somewhat agree	Strongly agree
a. In general research master graduates are better prepared for a PhD-programme than graduates from a regular master programme in my field	1	2	3	4	5
b. In general, research master graduates are better equipped to complete the PhD-thesis in my field within the given amount of time	1	2	3	4	5
c. I would prefer research master graduates over graduates from regular academic master programmes (one year master programmes as well) to enrol in the PhD-programmes in which I am involved.	1	2	3	4	5

5. Is the PhD-programme institutionally embedded (multiple replies possible) in..
   a) an inter-university research school (onderzoekschool) recognised by ECOS of the KNAW
   b) a locally organised research school (onderzoekschool) recognised by ECOS of the KNAW
   c) a locally organised graduate school, not recognised by ECOS of the KNAW
   d) other……
   e) I don't know

6a. Is there any formal programmatic connection between (research) master programmes and the PhD programme?

   a) Yes
   b) No

6b. Are there joint activities (methodology classes, summerschools, 'peer-coaching' etc.), where (research) master students and PhD students participate together?

   a) yes, with students from regular as well as research master programmes
   b) yes but only with student in research master programmes
   c) no

7a. In your experience, do PhD students in your experience with a research master background 'de facto' finish their thesis sooner than PhD students with a regular master background?

   a) yes
   b) no

7b. Is it the (formal or informal) aim of your university to shorten the total length of the PhD due to the introduction of research master programmes?

   a) yes
   b) no

8a) How often do you and your PhD-students meet (hours per student)?

   a) 1 hour or less
   b) 2 to 20 hours
   c) 21 to 40 hours
   d) more than 41 hours

8b) How often do other supervisors (co-promotor/supervisor) and your PhD students meet (hours per year)?

  a) 1 hour or less
  b) 2 to 20 hours
  c) 21 to 40 hours
  d) more than 41 hours

8c) Is there day to day contact between you and your PhD students?

  a) yes
  b) no

8d) Is there day to day contact between other supervisors and your PhD students?

  a) yes
  b) no

9) Are the PhD-students engaged in any form of group-activity (multiple replies possible)?

  a) joint methodology or other seminars
  b) summer schools
  c) conferences
  d) 'peer-coaching'-activities
  e) year-group of PhD students
  f) other…..
  g) no

10) What is/are the Discipline(s)/Field(s) of your PhD trainee programme (multiple replies possible)?

  a) Agriculture
  b) Arts and Humanities
  c) Behavioural Sciences
  d) Economics
  e) Education
  f) Engineering, Manufacturing and Construction
  g) Medical and Life Sciences
  h) Law
  i) Natural Sciences
  j) Social Sciences
  k) Other:………….

11) At the beginning of 2011 I would like to contact you with a few update-questions to find out if the relationship between the (research) master programmes and the PhD-traineeship has changed.

    a)   Yes, you may contact me again:

        e-mail: …………………………………………………….……………………

        If yes, would you please keep track of the performances of your PhD-students during the '7, 12 or 18 months go-no-go' evaluations (as has been done in question 2 and 3)?

    b)   No thank you.

You have completed the questionnaire. If you have any further questions or remarks, please state them below

_____

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Thank you very much for your participation!
Jorrit Snijder

Annex D **Bloom's taxonomy**

Professor Benjamin Bloom published his taxonomy of learning activities in 1953. This was the outcome of a series of educational psychology conferences about education and learning outcomes. This hierarchical classification consists of six levels: starting with basic knowledge, and proceeding through comprehension, application, analysis, synthesis to arrive finally at evaluation. Bloom categorized the first three levels as lower-level learning activities and the last three as the upper level learning activities. The lower-level learning activities pertain to the student's ability to recall, translate, interpret and apply factual information. The upper-level learning activities pertain to the student's ability to engage in higher-order thinking and reasoning skills. It is interesting to analyse if especially in the upper level of learning outcomes the regular master programmes are different from the academic master programmes.

At the **analysis level** the student or learner as Bloom defines them 'demonstrates an ability to break down material into its parts, make inferences, and final evidence to support generalizations' (source). The demonstrated skills consist of finding the underlying components of a whole. Furthermore the student sees and recognizes patterns. Bloom uses descriptive verbs like: analyse, bread down, categorize, correlate and differentiate.

The second upper-level learning activity is the **synthesis level**. At this level de student 'demonstrates an ability to continue ideas to create or produce a whole product. (source)' The learner creates new ideas from old ones, makes generalizations from facts and predicts and draws conclusions. The descriptive verbs Bloom uses for this level are: build, collaborate, create design, propose, validate.

The final upper level is the **evaluation level**. At this level the student or learner 'demonstrates an ability to make judgments or express or defends opinions based on reasoning. The demonstrated skills of the students are those of assessing values of theories and making choices based on reasoning and finally verifying value of evidence'. The descriptive verbs for this final level are: appraise, assess, critique, debate, defend, disprove, recommend and value.

As a part of the third hypothesis it may be expected that students of research master programmes do better in the upper level of learning activities than academic master programmes. In the alumni survey, question XX was formulated for respondents to make self-assessments in this regard (see annex XX [=the survey]).

*Annex E **Semi structured interviews***

1) Openings question about experiences with bachelor and master system.
2) How many of your employees have a completed master degree?
3) How many of these employees that have a master degree, had a research master degree?
4) Why is balance of research master and academic master graduates?
5) Are there different experiences with employees that have a research master background or an academic master background?

List of Interviews

-prof. dr. Hans Clevers, president of the Royal Academy of Arts and Sciences and academic director of Huygens Institute of Utrecht University.

-dr. Karl Dittrich, president of the Dutch Association of Universities (VSNU) and former president of the Dutch and Flemish Accreditation Organisation (NVAO).

-dr. Hans Dröge, National Manager Unilever and former Senior Vice President Unilever R&D Operations.

-drs. Peter van Grinsven, partner Boer & Croon.

- Nicole Mølby – Bueters, Senior Director Human Resources Philips Research.

-prof. dr. Werner Raub, dean of Social Sciences Faculty and former chairman of the KNAW assessment committee Research Master's of the Social Sciences.

-drs. Chiel Renique, former secretaris onderwijszaken, 1986-2011 of VNO-NCW.

-dr. Marieke Spee, Global HR, Communications and Change Lead AKZO nobel.

-prof. dr. Martin Stokhof, full professor in philosophy of language, Department of Philosophy, Faculty of Humanities, Universiteit van Amsterdam, and chairman of the chairman of the KNAW assessment committee Reasearch Master's of the Humanities.

-prof. dr. Coen Teulings, former director of the Dutch Central Planning buro (CPB).

-mr. Irma van den Tillaart, head of the policy department of the Ministry of Education.

-drs. Loek Vredevoogd, former president of the Dutch Accreditation Organisation (NAO) and the Dutch and Flemish Accreditation Organisation (NVAO).

-dr. Leo Aarts, partner at Aarts, de Jong, Wilms and Goudriaan, Public Economics.

-dr. Marja Zonnevylle, General Manager Gas Processing Shell, and former Site Manager of Shell Technology Centre Amsterdam and member Economic Development Board Amsterdam.

APPENDIX F
Variable Creation: Alumni Survey

Variable	Master Type	N	Mean	Std. Deviation	Sig.
Quality of lecturers	Academic	1704	7.4	1.18	.000
	Research	612	8.0	1.20	
Supervisors Rating (accessibility & quality)	Academic	1706	3.9	.89	.000
	Research	612	4.1	.84	
Teaching Staff Rating (accessibility & quality)	Academic	1704	3.6	.66	.000
	Research	613	3.9	.70	
Overall Grade Supervisors	Academic	1578	7.3	1.77	.000
	Research	585	7.9	1.75	
GPA Bachelor	Academic	1264	7.5	.61	.000
	Research	420	7.9	.69	
Bachelor Thesis	Academic	1182	7.8	.82	.000
	Research	363	8.2	.79	
Contact Hours	Academic	1701	11.0	7.20	.000
	Research	612	15.4	10.67	
Actual Workload	Academic	1705	30.6	10.54	.000
	Research	604	37.5	10.65	
Direct participation in research	Academic	1700	6.6	2.00	.000
	Research	610	8.1	1.76	
Provided a solid theoretical basis	Academic	1705	7.4	1.37	.000
	Research	612	7.7	1.57	
Insight in cutting edge developments in the field	Academic	1695	6.6	1.65	.000
	Research	608	7.6	1.66	
Development of research skills	Academic	1701	7.2	1.59	.000
	Research	610	8.2	1.46	
Preparation for professional practice	Academic	1700	6.0	2.00	.000
	Research	611	7.0	2.01	
Information about study and career opportunities	Academic	1703	5.2	2.04	.000
	Research	610	5.9	2.22	
Coherence between programme elements	Academic	1705	6.7	1.56	.001
	Research	608	6.9	1.80	
International focus	Academic	1701	6.3	2.38	.000
	Research	612	7.4	2.00	
Time to degree (months)	Academic	1719	16.4	7.70	.000
	Research	615	24.1	6.34	

Master delay (months)	Academic	691	7.3	6.92	.001
	Research	185	5.8	5.09	
Overall Grade Programme	Academic	1688	7.2	1.13	.000
	Research	610	7.8	1.28	
GPA Master	Academic	1341	7.6	.57	.000
	Research	434	8.0	.57	
Master Thesis	Academic	1342	7.7	.70	.000
	Research	436	8.2	.69	
Analysis	Academic	1711	4.6	.74	.000
	Research	614	4.9	.82	
Synthesis	Academic	1711	4.4	.91	.000
	Research	614	4.9	.87	
Evaluation	Academic	1704	3.1	.82	.000
	Research	614	3.8	.83	

Variable Creation: Professors Survey

New Variable	Questionnaire items that comprise the variable	Cronbach's Alpha
Knowledge	Doing a comprehensive literature search Obtaining a broad theoretical knowledge of the studied field	0.79
Understanding	Obtaining a thorough command of research methods and techniques Critically judging the quality of the various literature sources Critically evaluating, interpreting and discussing research results	0.88
Application	Selecting the appropriate scientific approach for a given research question Independently designing, executing and reporting research Further developing knowledge and skills, for a lifelong learning attitude	0.82
Analysis	Formulating original and innovative research questions based on a solid understanding of the state of art of research in the field	
Synthesis	Cooperating with individuals or in teams to plan, decide and take responsibility in professional situations Writing a publishable article in a respected academic journal in the field of study	0.70
Evaluation	Evaluating cutting-edge research by others and contributing to improve it theoretically and methodologically	0.76

	Finalizing a high quality PhD-dissertation within a four-year period
Readiness for the PhD	Research master graduates are better prepared for a PhD programme than graduates of a regular master programme in my field
	Research master graduates are better equipped to complete the PhD thesis in my field in the given amount of time
	In the future I would prefer research master graduates above graduates from regular academic master programmes (one year master programmes as well) to enrol in the PhD programmes in which I am involved

The readiness value **0.93** appears aligned with the Readiness for the PhD row.

Table 1. Internal consistency and variable creation

		Knowledge	Understanding	Application	Analysis	Synthesis	Evaluation	Readiness for the PhD
Number RM students	Corr.	-.103	.096	.023	.080	.047	.047	.016
	Sig.	.089	.104	.381	.148	.269	.270	.418
	N	173	173	173	173	173	172	179

Table 5. Correlation between number of RM students and Professors' opinion on skills gained during the master and readiness for the PhD

Time Trends

Variable	Master Type	N	Mean	Std. Deviation	Sig.
Quality of lecturers	2006	797	7.5	1.20	
	2007	998	7.5	1.24	.019
	2009	538	7.7	1.18	
	2008	370	7.6	1.12	
Supervisors Rating (accessibility & quality)	2006	797	3.9	.88	
	2007	1000	3.9	.91	.823
	2009	538	4.0	.85	
	2008	363	3.9	.87	

Teaching Staff Rating (accessibility & quality)	2006	796	3.7	.68	
	2007	1000	3.7	.70	.906
	2009	538	3.7	.67	
	2008	363	3.7	.70	
Overall Grade Supervisors	2006	747	7.5	1.78	
	2007	926	7.4	1.87	.364
	2009	505	7.5	1.61	
	2008	351	7.4	1.70	
GPA Bachelor	2006	755	7.6	.65	
	2007	941	7.6	.67	.057
	2009	0	.	.	
	2008	349	7.7	.66	
Bachelor Thesis	2006	696	7.9	.83	
	2007	862	7.9	.83	.063
	2009	0	.	.	
	2008	314	8.0	.81	
Contact Hours	2006	788	11.8	7.62	
	2007	984	12.0	8.53	.009
	2009	555	13.0	9.47	
	2008	370	13.2	9.11	
Actual Workload	2006	787	32.0	10.75	
	2007	981	31.8	11.01	.005
	2009	556	33.8	11.18	
	2008	374	31.9	11.41	
Direct participation in research	2006	794	6.9	2.02	
	2007	995	6.9	2.08	.016
	2009	538	7.3	2.00	
	2008	369	7.0	2.12	
Provided a solid theoretical basis	2006	797	7.5	1.42	
	2007	999	7.4	1.47	.407
	2009	538	7.5	1.37	
	2008	370	7.4	1.48	
Insight in cutting edge developments in the field	2006	792	6.9	1.71	
	2007	993	6.8	1.72	.503
	2009	535	7.0	1.68	
	2008	370	7.0	1.71	
Development of research skills	2006	794	7.4	1.61	.010
	2007	996	7.4	1.66	

	2009	538	7.7	1.51
	2008	370	7.5	1.61
Preparation for professional practice	2006	795	6.2	2.02
	2007	995	6.2	2.06
	2009	538	6.4	2.07
	2008	370	6.3	2.04
Information about study and career opportunities	2006	795	5.3	2.12
	2007	997	5.4	2.10
	2009	538	5.5	2.13
	2008	370	5.3	1.94
Coherence between programme elements	2006	795	6.7	1.63
	2007	997	6.7	1.63
	2009	538	6.8	1.63
	2008	370	6.6	1.63
International focus	2006	796	6.7	2.32
	2007	997	6.5	2.36
	2009	537	6.5	2.31
	2008	369	6.5	2.21
Time to degree (months)	2006	793	17.2	6.85
	2007	991	17.7	7.25
	2009	564	21.4	10.21
	2008	377	21.1	8.17
Master delay (months)	2006	274	6.4	6.06
	2007	373	6.2	5.99
	2009	234	8.7	7.72
	2008	148	6.8	4.95
Overall Grade Programme	2006	786	7.4	1.11
	2007	993	7.3	1.23
	2009	536	7.4	1.24
	2008	364	7.4	1.24
GPA Master	2006	794	7.7	.59
	2007	991	7.7	.60
	2009	0	.	.
	2008	369	7.8	.65
Master Thesis	2006	795	7.8	.73
	2007	994	7.8	.74
	2009	0	.	.
	2008	378	7.5	.85

Significance values (right column):
- Preparation for professional practice: .146
- Information about study and career opportunities: .630
- Coherence between programme elements: .259
- International focus: .344
- Time to degree (months): .000
- Master delay (months): .000
- Overall Grade Programme: .350
- GPA Master: .165
- Master Thesis: .004

Analysis	2006	799	4.6	.76	
	2007	1003	4.6	.80	.074
	2009	540	4.7	.74	
	2008	370	4.7	.82	
Synthesis	2006	799	4.5	.93	
	2007	1003	4.5	.95	.577
	2009	540	4.6	.91	
	2008	370	4.5	.97	
Evaluation	2006	796	3.3	.87	
	2007	1000	3.3	.89	.807
	2009	539	3.3	.90	
	2008	365	3.3	.89	

Knowledge

Variable	Cohort	N	Mean	Std. Deviation	Sig.
	2006	794	4.1	.73	
Knowledge	2007	991	4.0	.78	.753
	2008	363	4.1	.75	
	2009	536	4.1	.70	
Cohort*Master Type Interaction					.330

Table 19. Development of knowledge during the master programme: cohort differences

Table 19 shows whether there have been yearly differences between students' assessment of their knowledge accumulation during the master programme. From the table it is clear that there are no significant differences between cohorts (mean difference 0.1 on a 5 point scale, p>.05). Additionally there is no significant interaction between the cohort that answered the survey and whether the master was a RM or an AM programme (p>.05). This is illustrated on graph 1 below.
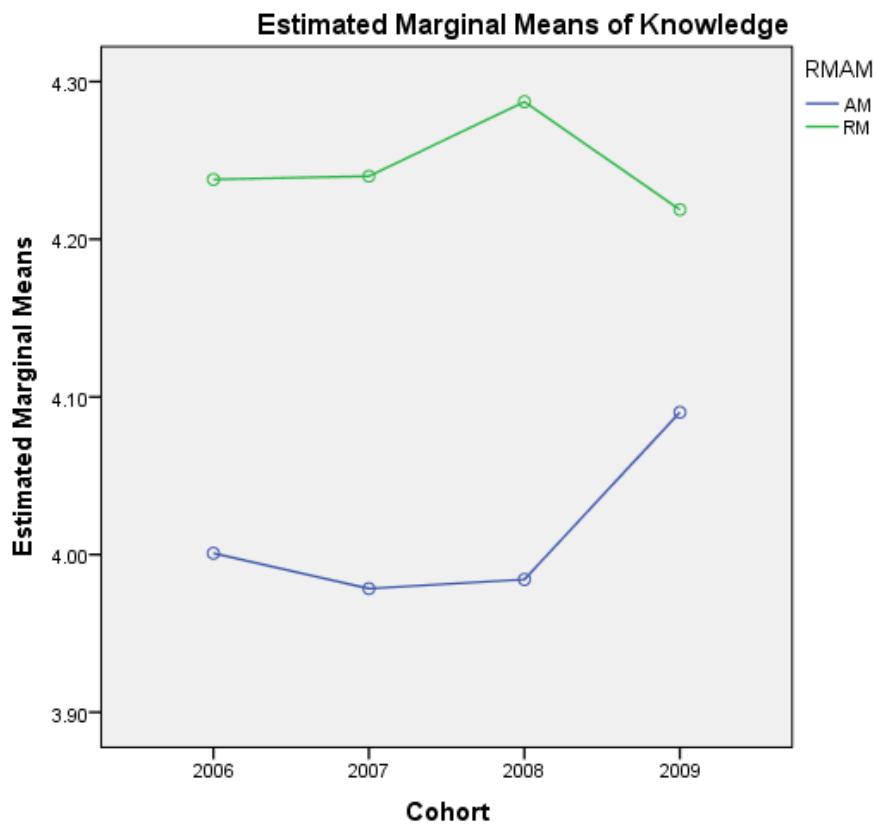
Graph 1. Development of knowledge during the master programme: cohort differences

Understanding

Variable	Cohort	N	Mean	Std. Deviation	Sig.
	2006	793	3.9	.75	
	2007	990	3.8	.77	
Understanding	2008	363	3.9	.78	.155
	2009	536	4.0	.72	
Cohort*Master Type Interaction					.639

Table 20. Development of understanding during the master programme: cohort differences

As was shown before in table 20 it shows whether there have been yearly differences between students' assessment of their development of understanding during the master programme. There are no significant differences between cohorts (greatest mean difference 0.2 on a 5 point scale, p>.05) and there is no significant interaction between the cohort that answered the survey and whether the master was a RM or an AM programme (p>.05). This is illustrated on graph 2 below.
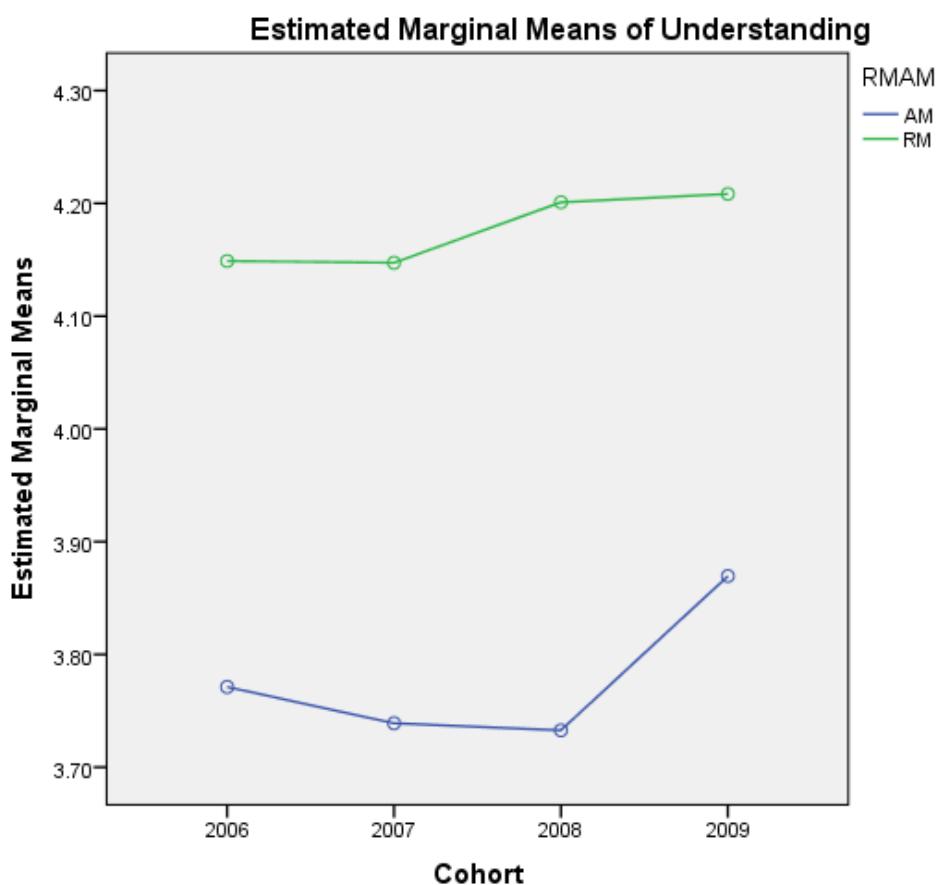

Graph 2. Development of understanding during the master programme: cohort differences

Application

Variable	Cohort	N	Mean	Std. Deviation	Sig.
	2006	793	3.8	.71	
Application	2007	990	3.8	.73	.443
	2008	363	3.8	.70	
	2009	536	3.9	.72	
Cohort*Master Type Interaction					.820

Table 21. Development of application skills during the master programme: cohort differences

Table 21 shows whether there have been yearly differences between students' assessment of their development of application skills during the master programme. From the table it is clear that there are no significant differences between cohorts (greatest mean difference 0.1 on a 5 point scale, p>.05). Additionally there is no significant interaction between the cohort that answered the survey and whether the master was a RM or an AM programme (p>.05). This is illustrated on graph 3 below.
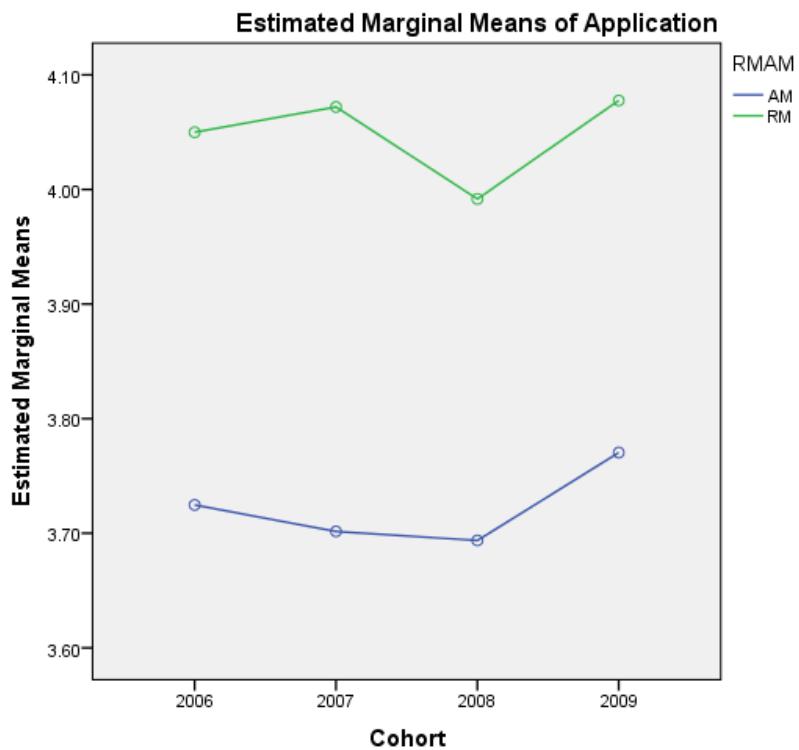
Graph 3. Development of application skills during the master programme: cohort differences

Synthesis

Variable	Cohort	N	Mean	Std. Deviation	Sig.
Synthesis	2006	795	4.5	.93	
	2007	993	4.5	.96	.420
	2008	368	4.5	.97	
	2009	537	4.6	.91	
Cohort*Master Type Interaction					.942

Table 22. Development of synthesis skills during the master programme: cohort differences

Table 22 shows whether there have been yearly differences between students' assessment of their development of synthesis skills during the master programme. From the table it is clear that there are no significant differences between cohorts (greatest mean difference 0.1 on a 5 point scale, p>.05). Additionally there is no significant interaction between the cohort that answered the survey and whether the master was a RM or an AM programme (p>.05). This is illustrated on graph 4 below.
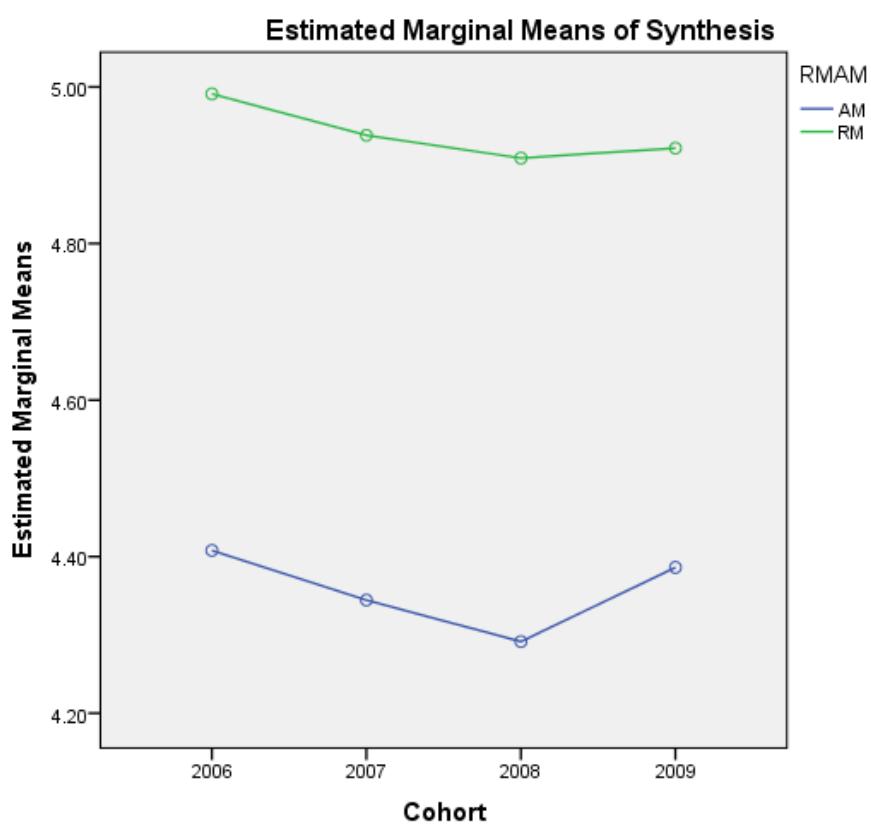

Graph 4. Development of synthesis skills during the master programme: cohort differences

Evaluation

Variable	Cohort	N	Mean	Std. Deviation	Sig.
	2006	792	3.3	.87	
Evaluation	2007	990	3.3	.89	.643
	2008	363	3.3	.89	
	2009	536	3.3	.90	
Cohort*Master Type Interaction					.634

Table 23. Development of evaluation skills during the master programme: cohort differences

Table 23 shows whether there have been yearly differences between students' assessment of their development of evaluation skills during the master programme. From the table it is clear that there are no significant differences between cohorts (greatest mean difference 0.0 on a 5 point scale, p>.05). Additionally there is no significant interaction between the cohort that answered the survey and whether the master was a RM or an AM programme (p>.05). This is illustrated on graph 5 below.
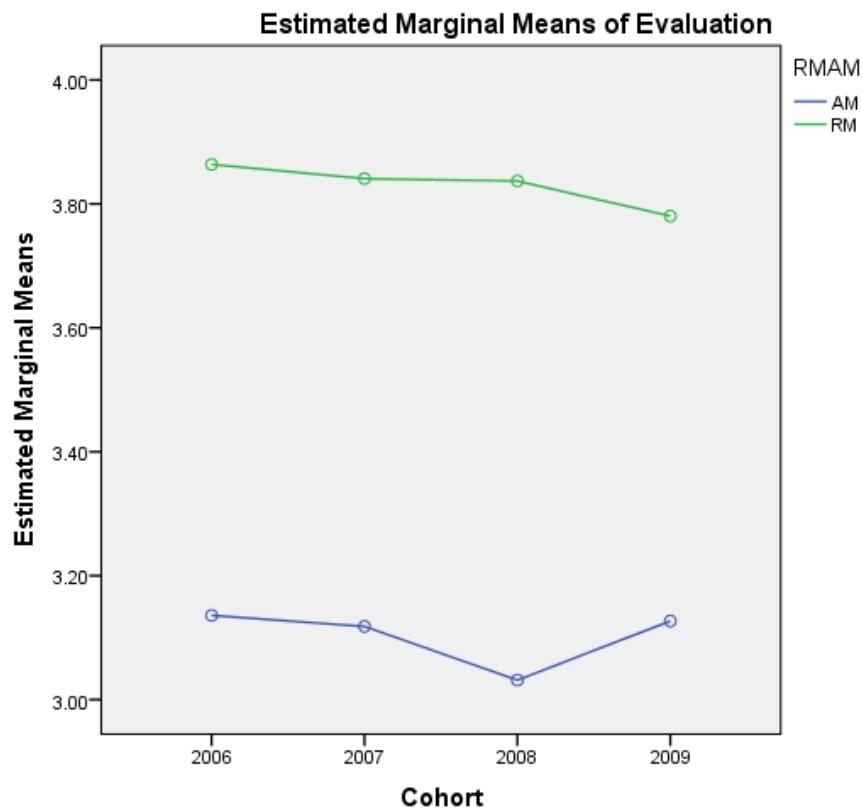
Graph 5. Development of evaluation skills during the master programme: cohort differences

Supervisors Rating

Variable	Cohort	N	Mean	Std. Deviation	Sig.
Supervisors Rating	2006	793	3.9	.88	
	2007	990	3.9	.91	.800
	2008	361	3.9	.87	
	2009	535	4.0	.85	
Cohort*Master Type Interaction					.141

Table 25. Supervisors rating during the master programme: cohort differences

Table 25 shows whether there have been yearly differences between students' rating of their supervisors during the master programme. From the table it is clear that there are no significant differences between cohorts (greatest mean difference 0.1 on a 5 point scale, p>.05). Additionally there is no significant interaction between the cohort that answered the survey and whether the master was a RM or an AM programme (p>.05). This is illustrated on graph 7 below.
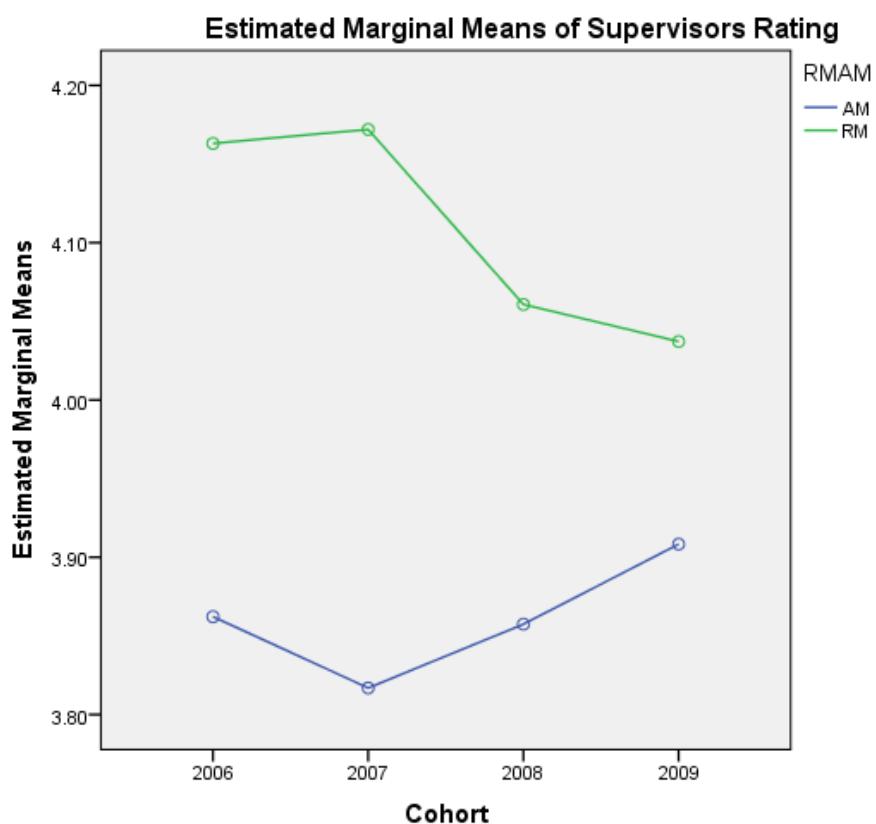

Graph 7. Supervisors rating during the master programme: cohort differences

Teaching Staff Rating

Variable		Cohort	N	Mean	Std. Deviation	Sig.
Teaching Rating	Staff	2006	792	3.7	.68	.501
		2007	990	3.7	.70	
		2008	361	3.7	.70	
		2009	535	3.7	.67	
Cohort*Master Type Interaction						.447

Table 26. Teaching staff rating during the master programme: cohort differences

Table 26 shows whether there have been yearly differences between students' rating of their teaching staff during the master programme. From the table it is clear that there are no significant differences between cohorts (greatest mean difference 0.0 on a 5 point scale, p>.05). Additionally there is no significant interaction between the cohort that answered the survey and whether the master was a RM or an AM programme (p>.05). This is illustrated on graph 8 below.
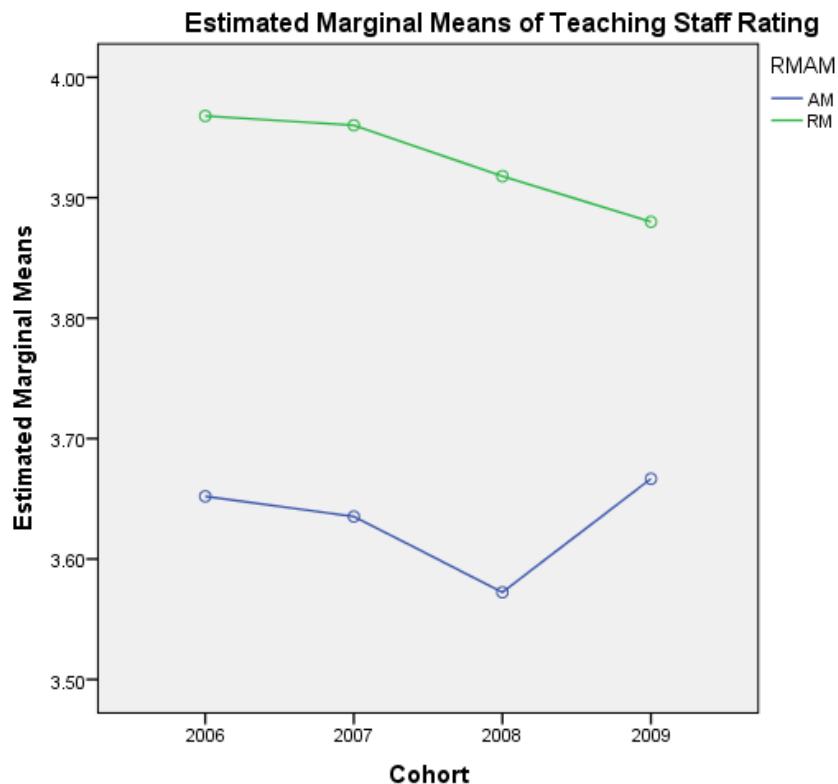
Graph 8. Teaching staff rating during the master programme: cohort differences