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Contract Research: Openness, Quality, Accountability

Secretariat of the National Committees for Research Ethics in Norway
(NEM, NENT, NESH)

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Foreword

In 1997, a proposal was submitted in the Storting (the Norwegian Parliament) to appoint a commission to assess the conditions of contract research in relation to independence, openness and freedom (Document 8:58). The recommendation from the Parliamentary Committee emphasized that the question concerned all types of contract research, and that the individual researcher's independence should also be investigated (Recommendation No. 221 (1996–97)). In addition, it was clearly emphasized that contract research must be accessible to the general public and take place openly, and that 'ethical questions … should be discussed continuously in scientific institutions, in arenas of research politics, by users and in the institutions that educate researchers'. The Standing Committee on Education, Research and Church Affairs requested that the matter be discussed in the white paper on research. The questions at hand were comprehensively discussed in Report to The Storting No. 39 (1998–99), *Research At The Beginning Of A New Era*. The National Committee for Research Ethics in the Social Sciences and the Humanities (NESH) had worked out a checklist for research ethics in contract research, something that was commented on in the report. Among other things, the report emphasized that the principle of free access to official records entails that research reports that are commissioned by a public client should as a rule be published, unless there is a genuine and relevant need for exempting the document. It was also pointed out that there was not much 'general knowledge about contract research' (p. 117). The Report to The Storting maintained furthermore that the questions at hand lie within the mandate of the National Committees for Research Ethics in Norway. The report did therefore not advise that a special commission be appointed, but rather that the National Committees for Research Ethics should study the questions further (p. 117). The primary objective of the proposed study was 'to contribute to a constructive discussion in research environments and in the general public about contract research and the independence of research' (p. 118).

In light of the parliamentary discussion and the subsequent debate, the secretariat of the Committees submitted several project proposals for how to study Norwegian contract research, and the Research Council of Norway (NFR) was asked to partially fund the study. The topic is difficult to investigate, however, and several project proposals were rejected, because they either

failed to meet the Research Council's expectations or because technical weaknesses were pointed out. While the initial project proposals were based on in-depth analyses of a few select examples of contract research, the revised proposals were more based on the need to map out the full range of contract research in Norway. In February 2001 the parties finally agreed on a project description, and the Research Council allocated funds to carry out the project.

The project's primary objective is described as follows: 'The project (study) shall contribute to a public debate on contract research by examining empirical facts, bringing to light relevant conflicts in the research environments, discussing the contract systems and problematizing dependent relationships.' Four intermediate objectives were formulated for the study:

1. The project shall provide a systematic overview of the scope of policy-relevant contract research, business-relevant contract research, and programme-generated contract research (with user participation); this will include an overview of clients that commission contract research, institutions that undertake contract research, how the funds are distributed between different sectors and research areas, as well as contract frameworks and project administration.
2. The project shall identify relevant problems that were experienced in various research environments in connection with provisions from the client(s) or user group(s).
3. The project shall review the standard contract systems that currently exist, or conversely the lack of such systems, and point out relevant differences in practice and form.
4. The project shall identify potentially longstanding relationships of dependency that may exist between powerful clients and certain research environments, and discuss general problems (in anonymized form).

In the course of the project, it transpired that some of the intermediate objectives could not be achieved within the framework of the project. Among other things, the first intermediate objective, concerning the scope of contract research, depended on the relevant data being provided by other research institutions, as was also presupposed in the project description. We requested the Norwegian Institute for Studies in Research and Higher Education (NIFU) to help provide such data as part of the report. In the course of the project, however, it proved difficult to procure the relevant data. The secretariat of the Committees does not itself have access to such

data and lacks the competence to generate them. The project management decided therefore to complete the report without achieving this objective. The third objective was also only partially achieved, given that the secretariat of the Committees lacks the necessary judicial competence to comprehensively review the existing contract systems.

A preliminary draft of the report was distributed to the reference group in October 2002, with the opportunity for final comments to be made. The Division for Strategic Priorities at the Research Council was very critical of the draft. Their objections were partly formal and partly substantive. The formal objections centred on our failure to achieve all the intermediate objectives of the study, in particular regarding the scope of contract research. The substantive objections were primarily on the grounds that potential measures could not be directly derived from the empirical material. We were asked to delay publishing the report pending a more thorough evaluation by the Research Council.

Two meetings were held between the secretariat of the Committees and the Division for Strategic Priorities at the Research Council, without any agreement being reached. We accepted that the draft exhibited certain weaknesses and that both the method and the conclusions were open to debate. We considered the Research Council's input to be a demand for final approval of the report, something which we could not accept. In the course of doing this study, we experienced a difficulty that is typical in contract research, namely differences in opinion on process and content. During the final phase, however, the Research Council has made it clear that they did not presuppose that they should have final approval. We were prepared to consider substantive objections and decided therefore, in agreement with the Research Council, to complete a draft and subject it to criticism by arranging an open hearing, with an eye towards modifying and improving the final report. The hearing was held in Oslo on November 21 2002, with the draft also being posted on the Committees' web page.

We invited relevant professionals and environments to the open hearing, including those who we assumed would be our staunchest critics. The general topic and the draft of the report were addressed by three speakers: philosopher of science Professor Ragnar Fjelland from the University of Bergen, Professor and Director of Research Hans Skoie from NIFU (the Norwegian

Institute for Studies in Research and Higher Education) and Senior Economist Per Schreiner from ECON (Centre for Economic Analysis). A panel was also convened, broadly comprising various representatives from those who commission and those who undertake contract research: Professor Kirsti Koch Christensen, Rector at the University of Bergen; Professor Jens Erik Fenstad from the University of Oslo; Medical Director Henrik Lund from AstraZeneca; Department Head Randi Helene Søgnen from NIFU; and Department Head Jan Dietz from the Research Council. We would also like to thank in particular Jan Døderlein, Stein Knardahl and Egil Kallerud for their constructive criticism via e-mail.

We benefited greatly from the open hearing. The report has been extensively reworked, even though we deliberately refrained from following up on all the criticism. Our main impression from the meeting was that there were few substantive objections to our proposed measures, even though, predictably enough, not everyone was keen on the ideas of supervision or the formalized teaching of ethics. On the other hand, criticism was expressed concerning the empirical investigations and the coherence between the investigations and the proposed measures. The draft of the report was, however, also commended for its thoroughness and innovative thinking, as well as for its specific proposals on how to improve the quality of contract research and make it more open.

In the following, we will briefly comment upon certain areas that were strongly criticized by Hans Skoie and Per Schreiner, respectively.

Hans Skoie concluded that the report failed to provide any new knowledge on contract research, maintaining that what was really needed were case studies within sensitive areas. Though we agree with the need for case studies, it must be recalled that the Research Council did not favour an investigation based on such studies. We support Skoie in that it will nonetheless be useful and important to carry out such a project, in regard to among others the group of research institutes that Skoie referred to as ‘royal purveyors’ and which we refer to as niche institutes in the report. We do not agree, however, that our chosen investigations have failed to produce new knowledge. Our normative investigation of research ethics in regard to contract research is, in our opinion, both innovative and critical. We also believe that the empirical investigations provide new

knowledge about the actual problem areas within contract research, and we are unaware of any similar studies that have been done. The investigations are, of course, limited in scope and have their weaknesses, but our fundamental position is that the empirical investigations form a new and satisfactory basis for an informed debate on the conditions of contract research in Norway. An advantage of our chosen approach is that it does not unilaterally focus on problematic instances, as case studies would have done, but provides rather a more overall picture of contract research.

Skoie also sharply criticized the fact that the investigations almost exclusively use researchers as informants. He believed that such a method is tantamount to asking car drivers to decide whether they themselves are good drivers, and that informants should also be selected from among passengers, pedestrians and the general public. He asserted therefore that the report is of little interest. However, Skoie's analogy is in our opinion at best beside the point. Through focus group interviews, we have actualized processes where researchers are allowed to comprehensively discuss viewpoints and where disagreements on 'the rules of the road' are brought to light. In the survey we emphasized that what should be reported were the actual experiences and routines of contract research – aspects that were previously little known. The part of the survey that asks researchers about their attitudes to contract research is relatively limited, and also includes the attitudes of researchers who do not themselves undertake contract research. All in all, such investigations provide the basis for a critical examination. We believe in principle that the research community is at the outset the most competent party to comment on the standards of good research and on whether such standards are under pressure in certain research enterprises. Unlike traffic, which is fully politically regulated, research is largely self-regulatory, and from experience it is precisely researchers who are the staunchest critics of other research. We also consider it to be important that the general public's confidence in research, which is largely based on the scientific obligation to the truth and the systematic attempts at objective presentations, does not become compromised by external factors. We maintain therefore that the information generated by our investigations enables a critical examination and is well-suited for capturing interesting trends.

Per Schreiner asserted that the report distinguishes too sharply between research and other types of knowledge production, such as analyses, studies and consultancy. Schreiner believed that the report should not be limited to what is known as research, even though it is correct to say that different demands are made on different types of knowledge products, such as consultancy, studies and research. As will be clarified below, this report differentiates between the terms 'research' and '(expert) consultancy'. On the other hand, we do not draw a sharp line between the terms 'research' and 'studies'. Research and studies are two areas that overlap, and it will not always be known in advance to what extent innovative research will be needed to study a given question. Even though typical studies provide another type of knowledge than typical works of research, they still as a rule require expert knowledge of the relevant branch of science in order to critically examine the question at hand. The results of studies do not always contribute to research, but the projects themselves presuppose that they are firmly grounded in the relevant research method. Studies will in certain cases result in new and relevant premises for further research. We therefore consider it to be more problematic to define a clear-cut border between research and studies than to treat the two components as a whole.

Per Schreiner also defended the view that the client should decide whether or not to publicly disclose certain knowledge that is in demand. He asserted for instance that the client must be allowed to buy knowledge for internal use, in order to be prepared to meet objections raised in public, and also maintained that independent contractors depend on the clients' level of confidence in the knowledge production market. We fundamentally disagree with both of these premises. Consultancy may be procured for internal use, but not for research. We understand that independent contractors depend upon market confidence, but in our opinion this is not the most important issue in this context. The most important issue is whether the general public has confidence in the research that is conducted in this market. Schreiner defended the clients' right to dispose the research results, because alternative knowledge would be accessible due to the manifold production of knowledge, something that entails that the interests of the general public are not adversely affected. We contend, however, that such diversity does not characterize Norwegian research, but rather that several key areas have become dependent upon the contract research market.

We also acknowledge, as Ragnar Fjelland underscored, that the report does not include any critical discussion of one of the largest areas of contract research, namely the development of weapons technology. He maintained that such a discussion could be significant because such research has been extremely confident in the ability of science to solve all problems, a notion that has gradually been realized to be illusory (Sarewitz 1996). This insight may be applied to contract research in general. Such research as well must acknowledge that not all problems can be solved by science or, as Fjelland emphasized, should be solved by science. In addition, there are important insights regarding scientific uncertainty, but the research community is reluctant to accept such uncertainty and obscures therefore this issue. We agree here with Fjelland's criticism and aim. An independent contractor will be anxious about disclosing results that may be deemed uncertain, because such results will be used far less. We believe that Fjelland's point undermines Schreiner's contention that it must be up to the client whether results should be made public. Only knowledge that is publicly accessible can be subjected to criticism, and it is only when the general public is made aware of research projects that an evaluation can be made as to whether science should solve the given problem.

In the preparation of this report, the project group has consisted of the following people:
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This report has come into being on the basis of many substantive discussions, primarily within the reference group. This group has consisted of:
Professor Bent Natvig (Chairman), Department of Mathematics, University of Oslo; Chairman of NENT
Research Coordinator Tore Abrahamsen, BI Norwegian School of Management
Special Adviser Jan Dietz, Division for Strategic Priorities, Research Council of Norway

Senior Researcher Egil Kallerud, Norwegian Institute for Studies in Research and Higher Education (NIFU)
Professor Helge Reinertsen, Norwegian University of Science and Technology; member of NENT
Research Director Hege Torp, Institute for Social Research

We would like to thank the reference group for their considerable input.

The project group has also benefited from discussions in the National Committees for Research Ethics in Norway (NEM, NESH and NENT). The Committees have followed this study with interest and given professional advice. We would like to thank the Committees for their contributions to and comments on this report. The report's electronic survey was conducted by the Norwegian Market and Media Institute (MMI). We thank the institute for its very competent handling of our project. In the course of working on the statistical material, the project group availed itself of the invaluable consultant work of Håkon Kavli. Large parts of Chapter 5 came into being on the basis of his text proposals and comments. We would like to thank him for the work he has done on the report.

Furthermore, we would like to thank the focus group participants, both for the time they spent on our investigation and for the enthusiastic comments and suggestions they made. Many times it was precisely the focus group discussions that helped us understand the problems that are faced in contract research. Thanks also to the survey respondents for their time and willingness to participate.

Finally, we would like to thank our co-workers in the secretariat, Lillian Eriksen, Lise Ekern and Sigrid Skavlid, for their competent assistance in carrying out and finishing the report.

We stress that the authors alone are responsible for the contents of this report.

Oslo, March 2003

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1 Introduction

The aim of this report is to contribute to an open and constructive debate on contract research in the research environments and also among the general public. Contract research is normally understood as research that is funded by an external party – a client. In this report, we operate with a definition of the term contract research that consists of four elements:

(i) The research project is mainly funded by one or more external sources.
(ii) It is the client who determines the project's research questions.
(iii) The research questions are linked to an anticipated benefit for the client or another user group associated with or specified by the client.
(iv) Certain user rights to the research results are transferred to the client upon completion of the project.

This definition is broad enough to include both research that is linked to the innovation and marketing needs of business and industry, as well as research that is linked to policy questions in the context of society in general.

The report is based on two investigations: a qualitative focus group study and a quantitative survey. Both investigations focus on the researchers' own experiences with, perceptions of and attitudes towards contract research, and provide in tandem a basis for answering the research question of this report:

Are there grounds for having confidence in research even though its results stem from contract research, where an interested party funds the research with the intent of using the research for its own purposes?

We concentrate mainly on the question of how researchers themselves perceive contract research. Are the researchers who conduct contract research pressured to tailor their professional conclusions to suit their client? Do researchers experience that clients intervene in questions of data and method? Are contract researchers from a certain professional background particularly

exposed to clients attempting to influence the scientific content? To what degree do researchers undertake contract research despite lacking the relevant competence? In addition to the question of the researchers' own experiences, the survey catalogues how contract research is organized. How widespread are standard contracts for contract research? How are routines for quality control practiced? What sort of contact with the client is usual, and how frequent is such contact?

1.1 Confidence in research

Both public and private enterprises increasingly request scientific knowledge. At the same time, there are many indications that the research community has become increasingly dependent upon research funding from both private and public sources. Colleges and universities base their operations on result-oriented research and activity-based funding, which to a lager degree than before presupposes that the centres of higher education are reimbursed for their operations from sources other than public ones (NOU 2000:14 *Freedom With Responsibility).* Various parties claim that contract research – and research in general – is undergoing a crisis of confidence. Research in areas such as biotechnology, climate changes and food safety has shown that it may be problematic to separate the purely 'professional' aspects from the political and ethical ones. The general populace often beholds more or less conflicting 'truths' on complex relations in various matters. It is therefore even more imperative that research qua research is deemed to be trustworthy.

When research projects are conducted for a client, unfortunate ties may be formed between client and researcher. Such unfortunate ties may be formed, for example, because a client wants to control the research results or because a researcher wants to ensure future projects. There is a widespread concern that researchers who conduct contract research are subject to unfortunate provisions, something that may lower the confidence in research results that stem from contract research. At the same time, it is important to emphasize that contract research is in itself not disconcerting or ethically problematic, but is on the contrary both inspirational for research itself and desirable from the perspective of society. Our starting point is therefore open-minded: Is it the case that there is less reason to have confidence in contract research than in other types of research? And if so, why?

A report such as this one must take into consideration that contract research is a term that normally comprises many and widely differing research projects. Instead of making sweeping generalizations, emphasis will therefore be placed on illuminating relevant differences – between disciplines, between different types of contract research and between different research institutions. Our starting point is that there is reason to have confidence in contract research that does not radically break with the fundamental norms of research ethics. The next section will clarify which norms of research ethics this report has selected as its basis.

1.2 Contract research in relation to the fundamental norms of research ethics

Science produces *quality assured knowledge*. In modern societies, science has different welfare functions and framework conditions. In order to maintain legitimate social interests, *openness* and *accountability* in the research process are crucial conditions. *Quality, openness* and *accountability* are principal norms (or regulatory ideals) that may in practice be undermined or threatened by various factors. The specific content of these norms will be discussed in Chapter 3. The main point here is that we must, if we are to conduct a critical and principled examination of the conditions of contract research in Norway, inevitably clarify our own normative position on science. All normative criticism rests on certain normative assumptions. The challenge lies in choosing assumptions that are both appropriate for the given activity and that may potentially achieve a certain degree of intersubjective support.

Given that this project is itself an example of contract research, we have an obligation in regard to the fundamental questions that the client wanted to illuminate through this project. In the Storting document, in the further debate and in the white paper on research (Report to The Storting No. 39 (1998-99)), the terms *freedom, openness* and *independence* are clearly paramount. Questions have been raised as to whether these values are threatened in today's research, in particular in contract research. Particular emphasis shall be placed in this context on the aspects relating to research ethics. The abovementioned terms are immediately appealing and are therefore often used in speeches and documents on research policy. The problem, however, is

that the terms that are used in this context seem to hinge on several more or less implicit assumptions that upon closer inspection may turn out to be fairly problematic. The following are examples of such problematic assumptions (we shall discuss these more thoroughly in Chapter 3):

1. The use of the terms freedom, openness and independence in regard to research seemingly implies that they are elementary conditions in all research. This potentially disregards that society might also make supplementary demands on research and that such demands may normatively conflict with the abovementioned norms. An example here is the demand for relevance and usefulness (innovation). It is not unreasonable to maintain that an unresolved conflict of research policy lies behind such demands on research.

2. The use of the terms freedom, openness and independence in regard to research seemingly implies that they are historical constants in the normative basis of research. This potentially disregards that modern science, from the scientific revolution and until the present time, has undergone an institutional and normative transformation where such values are linked to special forms of organization for the production of scientific knowledge. One example here would be the significant normative development that took place at the beginning of the 19th century when, inspired by the ideals of Wilhelm von Humboldt, modern research universities were created. We can also point to more recent analyses that assert that much of today's knowledge is produced according to a qualitatively different pattern (so-called mode 2 or post-academic science, see Chapter 3).

3. Freedom, openness and independence, when used in particular as requirements in contract research, seem to imply that research which is not contract research, such as e.g. academic basic research at universities, almost per definition fulfils these requirements. This involves several critical assumptions. Firstly, it is not necessarily given that the respective terms 'basic research' and 'applied research' are precise enough to provide a worthwhile classification of current research. Secondly, it is not self-evident that current university research is conducted under conditions of freedom, openness and independence. Thirdly, it is not necessarily the case that the

dissimilar normative foundation of academic basic research and contract research, respectively, must be categorically classified as a negative.

In light of the above, the intentions of our client – the Storting – must be interpreted within a different conceptual framework while simultaneously preserving the most important elements of the expressed concerns. The client's question must be reformulated to a researchable question that does not at the outset presuppose problematic assumptions. Our interpretation of the fundamental concerns of the Storting can be expressed as a simple research question that does not include freedom, openness and independence as primary analytical tools:

Are there grounds for having confidence in research even though its results stem from contract research, where an interested party funds the research with the intent of using it for its own purposes?

We believe this formulation captures the prevalent concerns in the Norwegian debate on contract research, and which also lay behind the initiative. Can one 'buy a researcher' and 'place an order for' the desired results? The research question contains a (socio-)psychological concept, namely confidence. It will be readily admitted that confidence in a social context obviously comprises numerous dimensions, and that many of these dimensions will be subjective. On the other hand, it may be reasonably claimed that the concept of confidence primarily represents, within the present context, knowledge production that is intersubjectively acceptable. If this element is ensured, an essential condition will in our opinion exist for having confidence in research. We believe that the fundamental normative concepts of quality, openness and accountability can, with the necessary specifications – which we will discuss in greater detail in Chapter 3 – serve as a suitable basis for a critical discussion of the given mandate. On this basis we will later on specify what can be signified by the norms of freedom and independence in connection with contract research, without resulting in the abovementioned problematic assumptions. Specifically, the report will identify possible factors that may obstruct ethically acceptable contract research. We will in the following specify the key analytical dimensions that we will employ in the investigation. Firstly, we will presuppose that the different phases of the research process will confront both the client and the researcher with different ethical challenges. Secondly, there may

be different ethical challenges linked to *specific disciplines*, to *specific types of contract research* and to *specific types of institutions*.

1.3 The different phases of contract research

We have differentiated between different phases of the research process in order to investigate when in the research process (and in what manner) ties may potentially be formed that may threaten the ethical norms of research. Contract research may be roughly divided into three important phases: initiation, execution and publication. In the following we will briefly examine these three phases.

1.3.1 The initiation phase

A client will not always have a definite project and on that basis approach a research institute to carry out the project. It is arguably more common for the parties to negotiate before eventually formulating a specific project, writing a project description and issuing a contract. In some cases the client and the independent contractor will be previously unacquainted, but there will often be a form of preparatory contact between the parties.

From a client's perspective, an *ad hoc* need will sometimes arise for researching or studying certain problems. The client will then often initiate a process of examining how this need can be met, and may actively seek out certain research environments in order to investigate their possibility of undertaking such a project. The client may also decide to invite tenders in order to fulfil their research needs. In some cases a close collaboration with one or more research institutions will already be so well established that the client will routinely approach these institutions. A client may also be contacted by a research institute that wishes to realize a certain idea, something that will instigate further negotiations and discussions where the nature of the project is specified. Researchers are in such cases often asked to submit a project description, which the client can then evaluate whether they want to support.

The situation may appear differently from an independent contractor's perspective, depending on whether the research institution has contract research as its main activity, or, as is the case at colleges and universities, whether it considers contract research to be a supplementary activity. Such research institutions will often gradually acquire a certain disciplinary profile based on the special competence of their employees, something that forms the basis for the institution's particular 'marketing advantage' in the contract research market. It seems at the outset likely that autonomous contract research institutes search more continuously for new projects than for example the universities do, since the employees' wages are linked to such external projects. There are, however, also examples where certain positions at institutions of higher education are almost exclusively funded by contract work.

It is as a rule the independent contractor's task to create a detailed project description. The project description will in such a case be an appendix to the agreed upon contract. There are, however, important exceptions to this rule – especially in connection with international 'Big Science' – for example in the clinical trials of new pharmaceuticals, where the research protocol is often determined by the client (i.e. a pharmaceutical company).

1.3.2 The execution phase

By the execution phase we refer to the actual research activity. Many different activities are included in this phase, for example reading the relevant literature, conducting experiments, gathering data, analyzing the data, developing computer models, participating in conferences, drafting partial reports and publications, etc. Part of the work in user science consists of potential meetings with reference groups and steering committees, in networking, in posting up-to-date information about the project on web sites or mailing lists, and other types of contact with user groups. With larger projects involving numerous researchers, a certain amount of time will also be spent on administration, budgeting and internal coordination meetings between researchers.

Researchers are in principle left to their own devices during this phase, even though there will in practice be more or less regular contact with the client and potential users. As a guiding principle, however, researchers should control the professional activity during this phase. Even though researchers are usually reluctant to make tentative conclusions prior to the completion of a

project, it is nonetheless usual during the execution phase, in particular for long-term research projects, to deliver intermediate or partial reports or make an oral presentation of the partial results. In larger projects, such partial reports may comprise independent publications.

1.3.3 The publication phase

Upon the completion of a project the results are reported to the client, though this may occur in various forms. The simplest form is for the researchers to write a report, which is then dispatched to the client. In some cases this report will be presented at an internal seminar, larger conference, press conference or other type of social gathering. In other cases the project results will be published in national and/or international scientific journals. Such publications may either replace or supplement the scientific report to the client. When other types of publishing exist, such reports will often take the shape of popularized or simplified presentations that are more user friendly than the purely scientific reports. Research activity may also lead to patentable results, in which case a potentially long-term judicial process is commonly instigated, something that may prevent the patentable results from being presented to the general public prior to a patent being granted.

Assuming that the research results are in fact reported, it is in principle the exclusive responsibility of the researchers or the project manager to carry out such reporting. The client has in principle no substantive influence on the reporting, though there will in practice usually be an ongoing discussion between the researchers and the client in regard to how the report is formulated. The client may have certain wishes regarding the format, presentation, lay-out, writing style, etc., which the researchers will normally try to accommodate. A more serious matter is when the client’s wishes relate to issues of content, something that might be a source of conflict between the researchers and the client. In principle it is quite clear, however, that the final responsibility for the reports, in regard to both content and form, rests exclusively on either the researchers or the project manager.

When research results are published in national or international scientific journals, they are per definition publicly accessible, albeit in most cases for a professional audience only. At the same

time, quality control takes place in the form of peer review.[1] It is not always the case, however, that the results of contract research are made public in this manner. The nature of the project may be so particular that it would hardly be suitable for a scientific journal. The institutes themselves, however, might have their own publication series where the reports can be made public, though such institutional publications are normally published without peer review. It sometimes occurs that the client does not want the research results to be published, but expects instead that the report remains their own property and at their own disposal, something that may even be stipulated in the contract. Another solution consists of the results being sent to the client prior to publication, upon which the client decides whether public disclosure is desirable. Sometimes the client may dispose the research results and the report for a limited duration, and that they are thereafter made public. We will return to the question of public disclosure later on, when we discuss our empirical results, but at the outset there is reason to believe that we are dealing with a wide range of practices, from public disclosure in acclaimed scientific journals and popular reports to no disclosure at all.

1.4 Contract research within different disciplines

The abovementioned and disputed distinction between basic research and applied research originates from the natural sciences, and only later has it been applied to the social sciences. Contract research is commonly associated with applied research, and it can therefore be expected that contract research is to be found within the more practical disciplines. It is a fact, however, that contract research exists within most university disciplines. Contract research is usually problem-oriented, and these problems usually encompass many different disciplines. User interests are not necessarily limited to technical or administrative circumstances, but may vary considerably and in part also concern cultural or historical aspects.

It is not easy to adequately delineate the relevant fields. Given that contract research is primarily problem-oriented, it may be tempting to delineate the fields on the basis of typical problem areas

[1] Peer review in research is commonly understood to mean that competent professionals from within the same discipline evaluate a given scientific article, prior to it being accepted by a scientific journal. The peers are appointed by the editors and are as a rule anonymous. The purpose is to assure the quality of the scientific work.

(for example climate research). We believe, however, that this would in practice be difficult to carry out systematically without gaps and overlaps arising. We will therefore use an approximate division into three disciplinary fields that corresponds with the division that The National Committees for Research Ethics is based upon: the natural sciences and technology, including agricultural and aquacultural research; medicine; and, finally, the social sciences and the humanities, including judicial and theological research.

The differing modes of operation and methodology may entail that certain disciplines are more exposed to attempts of substantive influence. Furthermore, it would at the outset seem probable that perspectives on utility and benefit will vary among the different disciplines, something that may for example influence what type of contract research is done and thereby which clients are typically served. At the same time, there is no reason to believe that the ethical demands should vary from one discipline to the next. In the following, such disciplinary differences will be brought to light and discussed in the degree that they are covered in our material.

1.5 Types of contract research and institutional affiliation

All research requires resources. Most research today requires access to material resources beyond the basic grants to research institutions. Such resources are acquired either as project funds that the researcher applies to from the Research Council of Norway (or from the EU's framework programmes or independent foundations), or as funds granted from external clients and linked to specific project objectives, or as mixed funding from research councils (or similar entities) and select user groups. A tentative definition of contract research would therefore be, to simplify a bit, projects that are externally funded and whose research objectives are determined and controlled by external clients (rather than being initiated and controlled by researchers). This pertains as a rule to what is traditionally termed 'applied research' or a research-based 'study' (as opposed to basic research).

In the climate of today's research politics, however, the situation is more complicated. Firstly, in certain disciplines the distance between basic research and potential application has shrunk considerably. In the USA this has entailed, among other things, that large industrial companies

have acquired the user rights to entire basic research institutes at certain universities. Secondly, research policy has begun to view basic research as an integral part of targeted commitments in fields where, based on political criteria, an increase in knowledge is desired; the EU speaks for instance of ‘targeted basic research’. Thirdly, a fundamental reorganization of the entire research process is currently taking place in selected fields and across traditional institutional and disciplinary boundaries. Certain philosophers of science speak in this context of ‘mode 2-science’ (Gibbons et al. 1994) or ‘post-academic science’ (Ziman 1978, 1984, 1994, 1996). All these tendencies apparently contribute to blurring the assumed clear-cut differences between researcher-controlled (basic) research and contract research. In today’s research, therefore, there are often a number of parties besides the researcher that steer, or want to steer, the research more or less directly towards their own practical objectives and interests.

Though these tendencies can only to a certain extent be seen in Norwegian research, the situation here is also relatively complicated. In addition to the college and university sector, which has research as a primary task, Norway has a relatively large institute sector. There are also innovations such as research centres and regional and local research foundations, as well as international agreements on cooperation. A significant part of Norwegian research includes participation in international projects and programmes. The so-called unrestricted grants from the Research Council have been considerably reduced in favour of programme funds and funds for projects with user participation.

In addition to business and industry, the public sector, represented by ministries, directorates and local authorities, has become an important instigator and funding source for research projects at institutes, colleges and universities. In pace with the increasing importance of research aimed towards commercial and social development, ever more powerful interests are linked to research projects, and research grants are allocated that presuppose either short-term or long-term contributions to interest-based research objectives. At the same time, Norwegian research is characterized by commercial interests being more prevalent in research environments than has previously been customary.

This impression is further reinforced when reviewing the Research Council's draft for a strategy document, *Commitment To Research* (The Research Council of Norway 2002), which catalogues numerous challenges for today's research in Norway. The primary ambitions for the future development of Norwegian research are clearly linked to areas where the need for innovation in Norwegian business and industry is anticipated. Much attention is given to increased research-based value adding and renewal within various sectors. The focus is on applied research, and an important task that is highlighted is how to activate the various user groups' research investments. The utility of research is strongly associated with its potential for innovation. There is less focus on the critical potential of research as a correctional factor in wider social developments and on its utility to the general public. To the extent that the Research Council's strategy may provide some indication of the future development of Norwegian research, we may therefore reasonably expect that commercial interests will represent an even more powerful factor in day-to-day research.

It should be noted that these tendencies also reflect the increasing complexity of society and business, as well the desire to fully exploit the potential of research for the common good. These tendencies represent therefore noble aspirations and admirable interests. In Norwegian research policy, it may therefore seem as though the term 'contract research' is no longer clearly delimited. The composite organizational forms of research render it nigh impossible to find a satisfactory and clear-cut definition, one that is both operational and that captures the focus in contract research towards 'external' interests. The term plays nonetheless an important part in the public debate on the conditions of research in Norway. It is evident that some of the general public believe that research is becoming ever more instrumentalized and is turning into a servant for powerful interests external to the research community. There is also a certain uncertainty regarding the boundary between genuine research (including applied research) and what may be called research-based consultancy that is done for clients (with apparently less demands to objectivity). At times the term 'research' is used as a buzzword in order to conceal the modest scope of knowledge and empirical data. In our opinion, there is an important distinction between research and studies, on the one hand, and consultancy on the other. While it is normal to assume that research and studies are types of knowledge production that enjoy particular acclaim, this is not the case for consultancy. Consultancy does not give scientific credit, whereas both research

and studies are subject to a special form of quality assurance. Public disclosure, especially in acclaimed journals, is one such form of academic quality assurance.

We have in this report chosen to conceptually distinguish between three types of contract research: policy-relevant research, business-relevant research and programme-generated research. By business-relevant contract research we mean research that primarily provides knowledge that is geared towards improving commercial products or processes. By policy-relevant contract research we mean research that primarily takes aim at supporting decision processes related to political decision-making. By programme-generated research we mean research funds that are pledged in connection with research programmes orchestrated by the Research Council of Norway, granted to research environments at institutes, colleges, universities or research centres, and where specific research objectives (beyond general demands to relevance) are specified by a programme committee.

This report limits itself at the outset to the first two types of contract research. However, some programme research conducted under the auspices of the Research Council, with such provisions as are specified in the programmes with regard to both content and the relevant user groups, may be borderline cases of contract research such as we have defined the term. Since we considered it to be difficult to obtain relevant information about such programme research, we have nonetheless chosen not to include this directly in our survey and have instead specified that we expressly exclude it from the definition. At the same time it will emerge that both the qualitative part of the focus group discussions and certain claims in the survey touch upon this theme. We choose in other words to deliberately treat programme research as an adjacent question.

1.6 Structure of the report

Since questions concerning the conditions of contract research have previously been little studied, the approach in this report will be exploratory. Contract research has admittedly been much discussed and debated, but there are as far as we know no systematic studies on the fundamental questions covered by this report.

An important element in the exploratory approach has been the use of group discussions. In brief, this type of investigation entails that a handful of people, with insights into and experiences from contract research, are gathered together for a structured discussion. The groups were assembled in such a manner that the participants had identical or similar professional backgrounds. The purpose of this was to gain a more detailed insight into what may be the problematic traits of contract research within various disciplinary fields, and the insights from the group discussions provided the basis for working out a survey. The finds from the group discussions will be presented in this report.

The purpose of doing the survey was primarily to catalogue how contract research is organized in relation to the individual researcher, as well as to catalogue the experiences of researchers who conduct contract research. The survey was organized so as to correspond with the research process, from initiation through to execution and publication. This was done in order to capture specific elements of the research, such as for example the routines and elements of publishing. At the beginning of the survey we mapped out the respondents' experience with contract research. Among other things, we asked whether the researchers had experience with contract research and how large a percentage this type of research comprised of their total research activity. Researchers were also questioned about whether their experience with contract research was primarily related to what we have called policy-relevant or business-relevant contract research.

The empirical investigations are placed in a normative context where the fundamental norms of research ethics are problematized.

The outline of the report is as follows. Chapter 2 discusses various definitions and delimitations of the term contract research. In Chapter 3 the three norms of research ethics, namely quality, openness and accountability, are elaborated and specified. Chapter 4 relates the insights culled from the group discussions, while Chapter 5 presents the results of the survey. Chapter 6 summarizes the main conclusions and discusses possible measures concerning various parties.

2 What is contract research?

In this chapter we will first discuss the term contract research, with the intent of obtaining an operational term to be used in the further report. We will also refer to some of the public debate on contract research and show how concerns about contract research have been expressed.

2.1 Clarification of terms

Every investigation should operate with precise terms that are unambiguously defined and delimited. At times this ambition may, however, conflict with other considerations, for example the regard for common usage, which does not always possess the necessary level of precision. The challenge lies then in finding a good balance between common usage and the necessary level of precision. This is also the case with the main topic of this report, namely contract research. The term contract research is, as mentioned above, not unambiguous and clear-cut, and it is difficult to clarify the exact meaning of the term.

Despite this complexity, the term contract research, such as it is used in the public debate, would seem as though it were relatively unproblematic. In such a context, contract research is usually defined as being a project funded by an external client who wishes to examine a certain problem. The term contract research entails in this fashion a collaborative relationship between at least two parties, where the client defines the research question while the independent contractor does the actual research. A well-known problem in such collaborations is that they may create a dependent relationship between the client and the independent contractor, as well as lay down provisions for the final result.

A large part of research is externally funded, either in part or in whole. Nonetheless, researchers will often be able to define the research questions themselves, something that for example applies to projects that are funded by the Research Council of Norway. But even though researchers often choose the research question themselves, the research funds are partially tied up in special topics or areas of commitment. Therefore, the Research Council’s funding of research projects

cannot be said to be without any strings attached, since the Council often stipulates which topics, disciplines and geographical areas that research grants should be allocated to.

If we chose to define contract research based on the allocation of external funds for specific, externally defined research questions, this will include every project where the funding is completely or partially done by external sources, and where topical stipulations – for example in the form of prioritized target areas or programmes – exist for the allocation of funds. A problem with this notion of the term contract research is that nearly all research activity must be termed contract research. This understanding of the term will also include research projects that (i) only have a loose or purely formal connection to the funders, (ii) have research objectives that do not have any direct utility to the funders (for example so-called basic research), (iii) presuppose that researchers themselves develop subsidiary research questions, objectives and plans within the general area of research, something that closely resembles the situation in 'pure research', or (iv) receive funds from scientific councils on the basis of scientific criteria for contract research.

In our opinion, the key to a better understanding of the term contract research lies in the constellation of interests between the client and the independent contractor. The assumption is that research institutions have research and knowledge interests. Externally funded research may also be largely motivated by such interests, however, for example when an attempt is made to raise the national level of knowledge within a certain field. But the funding of research may also be motivated by specific application interests, independent of the more purely scientific significance of such knowledge. Such application interests are also called instrumental interests, i.e. interests where knowledge becomes a mean to other ends than the development of knowledge as such; technological interests may be an example of this. We believe that the use of the term contract research usually presupposes that the independent contractor is mainly interested in knowledge, while the client mainly has instrumental application interests in the collaboration.

However, such a characterization is also somewhat imprecise. Interests are first of all hard to define. A given party may have several interests, something that applies to institutions as well. Secondly, it is not given that the interests are mutually exclusive. For example, the Research Council's concept of strategic basic research stems from a combination of application interests

and knowledge interests. Thirdly, it may be debatable how large a part of research is actually based on out-and-out knowledge interests. We will return to this question in the next chapter.

Contract research seems in any case to be motivated by application interests. The client will for example usually want to acquire the rights of use to the research results. In this manner, the client is given co-determination over the further use of the results at the end of the project period. This may specifically manifest itself in the client being involved in deciding both the form and the forum of publication. The client may also demand that general publication be postponed so that the user (either the client or another party designated by the client) can exploit the knowledge advantage before others gain access to the material. A definition of contract research that includes such motivation will entail that funding by the Research Council of Norway via the so-called Strategic Institute Programme, or via several other research programmes, could not be termed contract research. Many funding models within the EU system would also fall outside such a definition.

It remains an open question, however, to what degree that research funding via so-called user-controlled programmes, with clearly substantive stipulations, should be considered to be contract research. There are several reasons for why such funding should remain segregated from the category of contract research, for example the fact that the funds are publicly advertised and that potential users may comprise a very mixed group. There are, however, also certain factors that suggest that this type of research should be included in the category of contract research, for example the fact that specific user interests play a prominent role in the project portfolio and that the allocation of funds is administered by composite boards.

In our opinion, the term contract research is what may be called a ‘fuzzy concept’. This does not necessarily have to be a great difficulty, however, in regard to examining certain problematic aspects of contract research. It is important to ensure that a working definition covers the instances that comprise a core activity. Borderline instances may then be discussed separately if so desired.

We envision two types of research that form the typical activities of contract research. The first is what we may call policy-relevant contract research, the other business-relevant contract research.

Policy-relevant contract research is research that primarily takes aim at supporting decision processes related to political decision-making.

Business-relevant contract research is research that primarily provides knowledge that is geared towards improving commercial products or processes.

By *policy-relevant* contract research we mean research funds allocated by public authorities (ministries, directorates, local authorities or similar bodies) to autonomous institutes or research centres (colleges/universities) in connection with research or study objectives that form an integral part of a political agenda (in a broad sense), defined and partially controlled by or in collaboration with the clients and/or users designated by the client. Other types of clients may also potentially assign policy-relevant contract research, for example autonomous organizations or international parties.

By *business-relevant* contract research we mean research funds allocated by national, foreign or multinational companies to autonomous institutes or research centres (colleges/universities) in connection with research or study objectives linked to an existing product or to the specified development of a product under the auspices of the company. Market surveys within the private sector may also be termed business-relevant research.

We believe that the above specifications of the term contract research will capture the most significant characteristics of contract research:

(i) external funding
(ii) the client defines the research question
(iii) the client's application interests are central
(iv) the transferral of certain user rights to the client upon the completion of the project.

A third research category does exist, however, on the blurred outskirts of the term, namely programme-generated research. By programme-generated research we mean research funds that are granted to application-oriented research programmes under the auspices of the Research Council of Norway, allocated to research environments at institutes, colleges, universities or research centres, under the prerequisite of a significant amount of user participation, and where specific research objectives (beyond general demands to relevance) are specified by a programme committee. In our investigation we choose to not include this type of research in our working definition of contract research. It is worth noting, however, that a certain arbitrariness lies behind this decision. Based on the data in this report, we will later on provide supplementary comments to programme-related research.

For the further discussion we suggest the following definition of the term contract research:

- Contract research is an externally funded research project featuring research questions that are usually linked to the project's utility.
- The client has this utility as their primary objective.
- Certain user rights are transferred to the clients and any associated users upon the completion of the project.
- Programme research within the Research Council of Norway falls outside of what we consider to be contract research.

We would like to specify that consultancy falls outside the definition. This might, however, also be a marginal case on the outskirts of the term's delimitation. We take as our basis that consultancy, as compared to what is presented as scientific research, is subject to other norms concerning execution, provisions and presentation. There are many interesting questions regarding the division between consultancy and research. For example, consultancy will often use the consultant's research competence in order to make the consultant more attractive to potential clients. At the same time, there is usually no particular research project in connection with the activity, and no claims are made that the activity has entailed independent research. Nor does such activity give scientific credit. However, we will not discuss such problems in this report. We have undertaken a pragmatic clarification so as to concentrate on the particular problems of contract research.

2.2 Studies that have thematized contract research

The public debate has revealed widespread concern about the conditions of contract research, and the perceived dubious sides of this type of research have undermined the standing and credibility of research in general. Such political and ethical concerns have naturally enough not gone unnoticed. In this section we will review various public studies that relate directly to the problematic aspects of contract research.

One of the earliest Norwegian discussions on the ethical problems associated with contract research is to be found in a report published in 1981 by the Central Committee for Norwegian Research. The report, entitled *Research and Ethical Responsibility*, was presented by a commission chaired by Professor of Philosophy Knut Erik Tranøy. The report discusses 'structural transformations in the way scientific work is conducted' and whether these transformations lead to ethical conflicts. The report comprehensively examines the question of the publication of research results, and shows foresight in other areas as well. An example would be its discussion of the relationship between a steering committee and the team of researchers. Among other things, the report states:

> 'Large research projects or programmes that are to be conducted by institutes are increasingly organized with a "steering committee" that represents the appropriating party. It has often been unclear what authority such a committee has in relation to the institute, especially with regard to results and conclusions. The committee often misconstrues its mission to be that *it* should be responsible for the work, with the institute acting as secretariat. It is now broadly agreed that the steering committee has a supervisory right to keep the case "on track", and a right to give criticism and advice to the given institute, also in regard to lines of attack and conclusions; but it is the institute itself that must be fully responsible for the project and must also have the right to formulate its results and conclusions. In return, the steering committee must be able to express its reservations and criticism to the appropriating body or – if necessary – to the general public.' (Central Committee 1981: 122)

The concerns of research ethics that are formulated here are no less important today. The National Committees for Research Ethics, and not least the Regional Committees for Medical Research Ethics, have shown an ever increasing interest in the aspects of contract research that seem to conflict with the norms of research ethics. This has among other things resulted in the implementation of requirements that a project's scientific benefits, financial interests and conflicts of interest should be accounted for, as well as a requirement that the results should be published.[2]

A few official studies have also put contract research on the agenda. This refers in particular to the Report to The Storting No. 39, *Research At The Beginning Of A New Era* (1998–99), which was published in June 1999. It is interesting to note that the report presupposes the structural transformations that the Central Committee mentioned. The stated ambition is that the scope of research in Norway should increase to the OECD level, something that entails an increase in both private and public funding of research. In regard to public funding, the report recommends the establishment of a Research Fund and an increase in the regular appropriations to research institutions and programme-generated research (mainly through the Research Council of Norway) in order to ensure a necessary knowledge base in key areas. At the same time, it seems the ambition will necessarily lead to an expectation that both the public and the private sectors will increase their funding of contract research. What additionally characterizes the report is that it is very aware of the ethical dilemmas that may arise from the structural transformations in research and the increased use of contract research, not least in the public sector. An entire chapter on freedom, openness and responsibility shows how strongly the report emphasizes the importance of the work on research ethics. In the report, the National Committees for Research Ethics are encouraged to study the ethical problems related to contract research and propose measures for improving its conditions and reputation. The political problems that may result from an increase in contract research are less mentioned in the report. Some point out that the manifest lack of unrestricted grants, in the form of regular appropriations, may entail that college and university researchers and research groups will consider themselves better served by switching to

[2] See for example the application form and guidelines from the Regional Committees for Medical Research Ethics, www.etikkom.no.

more commercialized work forms, and that public research institutions will have to increasingly commercialize their activity.

The so-called Mjøs Commission was appointed in 1998 with the mandate of studying higher education (NOU 2000:14 *Freedom With Responsibility: On Higher Education and Research In Norway*). The final report takes as its basis that research at colleges and universities should be more closely linked to business and industry. Several commentators maintained, however, that the proposal for business-relevant contract research at colleges and universities was not sufficiently thought through.

One of the consequences that contract research may have for the workings of colleges and universities was studied by the so-called Bernt Commission, which was appointed in the spring of 1999 to evaluate the commercialization of research results at colleges and universities (NOU 2001:11 *From Insight To Industry*). The commission delivered its recommendation in the spring of 2001. It proposed that the colleges and universities should make conditions more favourable for the commercial exploitation of research results, albeit without specifically proposing amendments to the existing legislature. The commission lists several principles on which the adjustment to commercialization should be based. What is lacking, however, is a clarification of the proprietary rights to the research results, and the principles in themselves do little to resolve the difficult mediations (and conflicts of interest) that may arise from increased commercialization. This pertains among other things to mediating between the interests of researchers and institutions (regarding property, publication, etc.) and taking into consideration that research results should be publicly accessible and increase the common welfare. When the study's intention is that universities should be transformed into more attractive partners for contract research, in particular from business and industry, there can be little doubt that the mediations will be even more difficult and that conflicts will intensify. Cases from countries where universities base part of their activities on external funding, and where research results are commercialized, show with all clarity that the 'mediations' are exceedingly difficult and rife with conflict, to the extent that they at times end up in court (see e.g. the cases regarding Nancy Olivieri and James Kern, cf. Ruyter 2003). There is therefore reason to believe that conflicts will increase as a result of increased business-relevant contract research at the universities. In addition

to the difficulties of finding adequate methods for regulating such mediations, many point out that disciplines that do not easily lend themselves to commercialization might suffer. In regard to employment (e.g. externally funded scientific positions), research efforts and teaching, commercialization will necessarily favour areas where results can be commercialized (such as biology, chemistry, pharmaceutics and medicine). The public debate and the abovementioned studies reflect concerns about the credibility of contract research, at the same time as the studies clearly presuppose the structural transformations that this type of research entails, and recommends that external funding should be developed and accommodated also in new areas, such as at universities. How this shall be done, and what is needed to reduce the possibility of research losing further credibility, remains unresolved.

2.3 Public debate on contract research

At the beginning of the previous section, we stated that the public debate has revealed widespread concern about the conditions of contract research, and that the standing and credibility of research in general has been undermined by what people regard as the dubious sides of such contract research. To illustrate this, we will shed light on certain cases that gained widespread attention in the general public and the media. The cases are not referred to here because they are particularly grave or reproachable, but because the circumstances of the cases are typical of the criticism that is levelled at contract research. We will first recount the so-called REIN project, which we are intimately familiar with since The National Committee for Research Ethics in Science and Technology (NENT) invited the concerned parties to a hearing on the issue. We will subsequently discuss examples taken from the media. We must emphasize that we do not take a position on the substantive issues in these examples. It is also important to be aware that the media coverage may be somewhat biased and also simplify the actual circumstances of a case. We do not want to leave the impression that certain research institutions or clients that are identified in these media reports stand out as particularly problematic.

The Norwegian Water Resources and Energy Directorate (NVE) and Statnett, the Norwegian transmission system operator, initiated the so-called REIN project in connection with the development of the Øvre Otta watercourse. The Directorate for Nature Management (DN) and

the Research Council of Norway were partners in this project. The main research objective was to discover whether the expansion of power lines could inadvertently affect the wild reindeer in the area. The task was assigned to research groups from the Norwegian Institute for Nature Research (NINA), the Norwegian College of Agriculture and the University of Oslo. The project spanned several years and was completed in 2001, with the final report being published in 2002.

The first disagreement between the researchers and the clients arose when the Storting discussed the development of Øvre Otta in 1999, and the research manager from NINA was encouraged by the Standing Committee on Energy and the Environment to present the preliminary research results. The research manager informed the steering committee of this and met at the Storting with an interim report. A few days later, members of the steering committee, which has only administrative and not professional functions, sent a letter to the Storting. In the letter, the interim report is presented as being unauthorized by the research manager and its contents are disavowed. The case made headlines in the newspapers, and the research institutions in question responded with a letter of their own to the Storting, with a copy sent to NVE and Statnett, where they upheld the results that were presented to the Storting. They also felt very strongly about the fact that members of the steering committee had presented themselves as the project manager, something the researchers considered as being contrary to the organizational model of the project. The debate continued in the newspapers, where the researchers, among others, were accused of unethical behaviour. The result was that the Storting received vague and confusing information about the preliminary research results. The dispute was subsequently resolved through internal meetings between the researchers and the steering committee, and the project continued with greater clarification regarding the division of responsibility.

Another dispute broke out in the final phase of the project. Several results had in the meanwhile been published in international scientific journals. In connection with concession applications concerning the development of Øvre Otta, a letter from NVE to the Ministry of Petroleum and Energy stated that no ‘conclusive results from the REIN project’ existed. Following protests from among others NINA, NVE later clarified that what was meant was that the *Norwegian* final report was not yet published. The researchers reacted because the final report did in fact exist at the time in manuscript from, though the printing of the report was still in the waiting.

Furthermore, the purely technical results had long since been published internationally. They considered the client's hesitation to refer to the published results as being governed by self-interest. Protests against the development plans from the county governor in Oppland seemed to touch upon the results from the project. In 2002 another heated newspaper debate erupted, with fairly serious accusations from both parties. NENT invited the concerned parties to a hearing on the case in the spring of 2002, and later issued a public statement on the matter, where criticism was levelled at the organization and execution of the project, and where the abovementioned disputes were characterized as detrimental to the decision-making processes of the Storting and the authorities.

In 1996 the Institute for Research in Economics and Business Administration (SNF) was asked by the Ministry of Trade and Energy to assess the possibilities and limitations of establishing an inner market for gas in Norway. Towards the end of the project, the Ministry changed the given mandate and contended that certain of the completed chapters were irrelevant to the project and that these should be excluded from the final report. In the chapters in question, SNF concludes that large operators would dominate a Norwegian gas market and that there would in reality be little competition. SNF clarifies in the report's introduction that the research group had been requested by the Ministry to omit certain parts of the study. Gas power and the use of this type of energy has for several years been a controversial issue in Norwegian politics. The sitting government (Labour Party) was the prime mover for making conditions favourable for both the extraction and the trade of gas. In light of the widespread coverage the case received, it seems a natural conclusion that certain parts of SNF's report would have created negative publicity for the government's policies and that this was why the chapters in question were omitted.

Another case that contributed to the discussion on contract research in 1996 involved private parties. A report from the Norwegian Trade Union Centre for Social Science and Research (FAFO), commissioned by the Norwegian National Union of Food, Drink and Tobacco Workers, concluded that grocery retailers were too powerful and that this damaged the industry. After these conclusions became known, the Hakon Group, one of Norway's largest food retail chains, reacted by annulling all their contracts with Stabburet, one of Norway's largest food manufacturers. The reason for doing so was not immediately evident, but it turned out to be connected with rival

company Orkla's ownership of Stabburet and financial support to FAFO's research. The Hakon Group's reasoning was that the meat industry, represented by Stabburet, felt threatened by the food retailers' power and that they saw the research project as an opportunity for calling attention to this problem. The Hakon Group, however, considered the various ties between Orkla, Stabburet and FAFO to be suspicious and reacted in the manner described above.

In the spring of 2001, Professor Ivar Aursnes from the University of Oslo publicly addressed his difficulties with gaining access to pharmaceutical data regarding the use of seroxat, with the intent of making an independent assessment of the results, etc. It was not only pharmaceutical companies that denied him access, but also the Norwegian Medicines Agency and the Ministry of Social Affairs and Health as well. One reason why it would be beneficial to gain access to the data was the underreporting of studies that show a negative, nonexistent or marginal effect. The problem concerns among other things the demand for openness in research. In the public debate it was claimed that researchers have an ethical obligation to present all sides of a case, including the negative ones (*Aftenposten* 27.04.2001). The lack of access and openness regarding such research makes it difficult for others to do studies that attempt to verify the producers' depiction of the health benefits. Recent studies show that medical research projects funded by an industrial client are more positive to interventions than comparable studies of researchers without this connection (e.g. Kjaergard & Als-Nielsen 2002).

In the summer of 2001, the City Government in Oslo expressed its lack of confidence in conclusions from a report issued by NIBR (the Norwegian Institute for Urban and Regional Research). The misgiving was based on an assumption that the researchers had a political outlook that led to certain conclusions. Political adviser Daniel Siraj from the liberal-conservative City Government claimed that NIBR's conclusions on the city's strategies for housing shortage were based on 'left-wing research' (*Dagsavisen* 26.07.2001). Researcher Ivar Brevik from NIBR replied: 'We're only describing the consequences of the housing policy in Oslo' (*Dagsavisen* 26.07.2001).

During the autumn of 2002 several issues regarding contract research were also debated on Norwegian television. The editorial staff of NRK's documentary programme 'Brennpunkt'

claimed in a programme in September that they could document that studies done by ECON (the Centre for Economic Analysis) are of a low professional quality, and that their clients by and large receive the answers that best suit their arguments. The editorial staff also claimed that there are close ties between the Labour Party and the institute, and that a network of satisfied customers among large business companies and powerful public institutions has made ECON an important player in Norwegian politics. We would also add a statement issued by Ingjerd Schou, Minister for Social Affairs, in a programme on TV2 about Norwegian alcohol policies and research, where the Minister stated that she 'expects research to be supportive of the Government's alcohol policies'. In our opinion, this statement illustrates an attitude to and perception of research that gives cause for concern. When research, for example in the form of contract research, is reduced to providing arguments for predetermined objectives, the ideal of objectivity is waived. In any research activity, regardless of whether or not it is funded by a client, there must be room for being proven wrong and for reality to be different from what was anticipated. When the client's expectations are too narrow, it may quickly lead to pressure on the research institutions conducting the research. NENT has previously heard researchers from niche institutes, i.e. institutions with very few clients, who have stated that the client's expectations become gradually internalized by the researchers themselves. The result will often be that certain questions are not posed, that certain methods are not used and that the conclusions are accommodated to meet the client's expectations. The Minister's statement may in other words suggest that there is a need for clients to critically examine their own outlook on what research is and what it can be used for.

3 Three norms of research ethics: Openness, quality and accountability

3.1 The normative basis of science

We mentioned at the outset that a project that investigates how research ethics norms are adhered to will necessarily be confronted by a dilemma: the ethical criteria that are used to make judgements in research may in themselves be open to debate, and it is therefore essential that each individual takes a position in this debate. This does not have to be a problem, however, if the preconditions of such a debate are clarified and contemplated. If there should be any disagreement about our final conclusions, it is important that we can determine whether this is due to differing interpretations of the data itself, or whether the disagreement concerns rather the theoretical basis we are working from. We therefore recognize that we must provide an outline of our theoretical arguments concerning the normative basis of science. These arguments are partly built on historical and partly on systematic considerations. We will begin by reviewing those norms that pertain to the inner social organization of science. We will then move on to methodological norms, before finally considering those norms that relate to science's interaction with society and science's basis of justification. It is this last type of norm that has the clearest implications for research policies. The discussion will be summarized at the very end of the chapter, and those readers who feel they do not need a comprehensive theoretical justification can skip directly to the summary.

3.2 The social organization of science

Modern science arose during what is called the scientific revolution. It is not entirely clear-cut how to characterize the underlying ideas and norms of this revolution, but there is much to suggest that the establishment of scientific academies, particularly in England, France and Italy, was a watershed of sorts. This starting point does not ignore the significance of individual contributions (such as those from Galileo and Newton), but highlights rather that scientific activity must necessarily be conducted within a socially organized and systematic framework.

While many philosophers of science (such as Karl Popper et al.) characterize science on the basis of purely epistemological grounds, recent studies in the philosophy of science have underlined the social and institutional dimension of scientific activity. In Norway there is a tradition for such thinking. As early as 1986, Knut Erik Tranøy defined scientific activity as 'the systematic and socially organized a) search for, b) appropriation and production of, and c) administration and communication of knowledge and insight' (Tranøy 1986:59). Later works have followed this tradition of associating systematic approaches with social organization (Kaiser 2000:152).

It was the scientific academies that, in this initial and important stage of modern science (so-called amateur science), administered the normative basis for scientific activity. It is not easy to unambiguously characterize the prevailing norms. One important element was the experimental method and its underlying view of nature, something that was somewhat cryptically referred to as 'Natural Philosophy' or 'Natural Knowledge'. Another important element concerned linguistic standards and the role that mathematics can play in attempting to describe the laws and regularities of nature. A universal canon of such methodological rules was not formulated, however. Theorists such as Francis Bacon and René Descartes made influential suggestions regarding methodology and scientific policy, but without achieving the same paradigmatic effect as practical examples of successful science. How systematically or methodologically grounded this science in fact was has been debated for years, though we may assume, with certain caveats, that the underlying base was the concept of the *intersubjective verifiability* of results. Other basic norms were, on the other hand, successfully institutionalized. One such norm was the demand for *public knowledge*, which specifically entails that all scientific insights are to be included in a common arsenal of knowledge. Secrecy is disavowed and the personal possession of knowledge is rejected. The justification for such a norm lay in the assumption that the common benefit is greater when knowledge is publicly disclosed than when knowledge is considered to be private property. This was simultaneously the basis for scientific journals. The second norm that was institutionalized is a direct consequence of the first, and can be described as institutionalized and systematic *criticism*. When knowledge becomes public, either through lectures or publication, it is the task of the scientific community to critically examine the argumentation in order to detect potential mistakes. Bacon, in particular, had pointed

out the danger of becoming the victim of wishful thinking and other ‘Idols of the Marketplace’, as he named them.

In the practice of the scientific academies lay also the seeds of yet another research norm, namely *universalism*. Bacon had vigorously argued that the affairs of science required the greatest minds of every country. The reality was that the tiny scientific community of the initial phase consisted of a few thousand scholars, who kept in constant touch with one another across national borders.

In 1942 the American sociologist Robert K. Merton formulated what he considered to be the basic *ethos* of science, i.e. its normative foundation (Merton 1973). His four primary norms are:

1. Communalism (the demand for communal possession of scientific knowledge; public knowledge).
2. Universalism (the rejection of any preferential rights to science; everyone has an equal opportunity irrespective of social background, nationality, etc).
3. Disinterestedness (independence from special interests).
4. Organized scepticism (the demand for systematic criticism of scientific claims).

Later on he added a fifth norm:
5. Originality (rewards in the form of special recognition are awarded to those who first bring to light new knowledge).

In light of the preceding comments regarding the scientific academies and the scientific revolution, it is easy to see that Merton’s 1st, 2nd and 4th norms are inspired by this history. It is, however, a slightly different case with the 3rd and 5th norms, and at the outset there is reason to believe that they stem from more recent times. The norm of disinterestedness seems to be clearly inspired by Max Weber’s (1864–1920) postulate of value neutrality.

Weber’s starting point was what we today label the project of *modernity*, namely that society was undergoing a process of increasing rationalization and bureaucratization. He wrote two influential treatises (Weber 1936), where he clarifies what he means by science and politics, respectively.

The primary domain of science is everything that ‘is’, i.e. actual reality and its consequences, while politics mediates values and indicates what ‘should’ be. The strict separation between the descriptive and the normative that is found in Weber probably originates from the tradition of moral philosophy that stretches from David Hume to Friedrich Nietzsche. Some also claim that Weber’s defence of science’s value independence and neutrality arises from a desire to protect science from the rationality and logic of modernity, where all activity is subject to political mechanisms of governance.

Merton’s addition of a fifth norm, originality, is probably first and foremost due to his own research on the sociology of science. His name is associated with two controversial theories concerning the sociology of science. One of these theories is the Matthew effect of science: ‘For to everyone who has will more be given, and he will have an abundance’ (Matt. 25:29). The theory states that science rewards researchers on the basis of previous research, and that researchers who have previously distinguished themselves will more readily receive support for new projects than those who have not achieved such distinctions. The other theory that Merton became famous for concerned simultaneous discoveries within science. Scientific research develops a certain social dynamic, where it is often on the cards – at least within more specialized fields – where the next scientific breakthrough can be expected. This often results in a race among the leading researchers to reach a given objective. A well-known example here is the discovery of DNA and Watson’s description of the journey to get there (Watson 1968). The existence of more or less simultaneous, yet mutually independent discoveries is a natural by-product of such races. Merton’s norm of originality serves to remind us that an adequate understanding of the social dynamics of science must include the established system of scientific credit. We find the norm of originality explicitly expressed in the PhD regulations at most universities; when we expand our perspective to include applied research and contract research, however, it immediately becomes less clear whether this norm may be considered to be universal for *all* research.

Merton’s science ethos has been criticized by many quarters (Mulkay 1979, Ziman 1984). Part of the criticism is that the norms lack a descriptive value in regard to the research that is actually being conducted. As tools in the sociology of science, their usefulness can therefore be severely

limited. Other critics question the assumption that objective criteria exist for assessing the value of research independent of subjective factors. It seems likely that Merton himself would not greatly disagree with this, and that he would consider the strength of his proposal to reside on a purely normative level. Our understanding is that Merton justifies his norms on the basis of two parallel arguments: firstly, the historic argument that norms can be deduced from the institutional arrangements that have encompassed modern science since the scientific revolution; and secondly, a functionalistic argument that the norms, in tandem, enable the production and quality assurance of knowledge that society expects science to provide – an argument that many consider to be problematic.

At the same time, it is important to remember that the proposed norms are primarily meant to characterize basic research within academia. Should research be organized in ways that differ significantly from this, there may be grounds for questioning several other assumptions, something we will return to later on.

Before we attempt to make a tentative conclusion regarding the normative basis of science, we will expand upon certain systematic and methodological aspects that are also considered to be part of the normative base of science.

3.3 The methodological norms of science

We mentioned that the scientific revolution entailed a new, but implicit form of system and method. The contributions from Galileo and Newton in particular seem to have functioned as a sort of paradigmatic source for norms of methodical procedure. It was much more difficult, however, to explicitly state what this methodology actually involved. Bacon formulated a sort of methodological canon, based on what he described as an induction from specific, singular phenomena to universal relations and laws. Descartes advanced an alternative viewpoint, based on deduction from initial, intuitively true premises, and he provided specific methodological rules for the analysis and synthesis of empirical material. Neither Bacon nor Descartes were experimental scientists, however, and their methodology fell short in regard to the science of both Galileo and Newton; all in all, they inspired philosophers more than they did scientists.

From the very beginnings of modern science, theorists have therefore been determined to formulate a set of rules for scientific methodology. The first secretary of the French Academy of Sciences, Bernard de Fontenelle, formulated a view that clearly resembles what would later be called the hypothetico-deductive method. But the debate on methodology continued, with various contributions from among others Condorcet, William Whewell, John Stuart Mill and Ernst Mach. An implicit assumption in this debate was the possibility of formulating a methodology that could serve as *the* scientific method, to be used by all the empirical sciences. The first challenge to this view of science came in the 19th century, in connection with the humanities and the claim that such disciplines used a *hermeneutical* rather than an *explanatory* method. Hermeneutics was proposed as a rival method, and a methodological dispute arose among university professors in Germany regarding the question of whether – to simplify a bit – science essentially comprised one or two basic forms of method.

This debate on the inner methodology of science accelerated in the 20th century. The so-called logical empiricists, with Herbert Feigl, Moritz Schlick and Rudolf Carnap at the forefront, formulated a programme based on a unified scientific method. Taking up the tradition of the Enlightenment, they attempted to formulate a standard where scientific insights could appear as logical and empirically based. Around the same time, Karl Popper commenced his work on this topic, but taking Hume's criticism of the inductive method as his starting point. While the logical empiricists sought to realize their project of unified science through an inductive logic based on simple empirical statements, Popper advanced a deductive basis founded on the opportunity for a systematic and rational criticism of proposed hypotheses (falsificationism). Concurrent with both of these directions within the philosophy of science, there emerged a critical theory of social science that was partly inspired by Marxism, namely the so-called Frankfurt School. Theorists such as Horkheimer, Marcuse and Adorno attempted here to formulate a programme and method for a social theory that had liberated itself from the Enlightenment ideals of the natural sciences. The stage was thus set for a new methodology dispute between different branches of science (the positivism debate), a dispute that thanks to several more recent contributions endured far into the 1980s.

In 1962 the physicist Thomas Kuhn published *The Structure of Scientific Revolutions*, a book which soon became a bestseller. It caused a stir not only among philosophers of science and other scholars, but also among active researchers. Based on studies of history, Kuhn sought to demonstrate that the history of science shows far less unity and continuity than theorists from the different schools had envisioned. If one could at all talk about a method that linked every researcher, it was locked into given paradigms, and paradigms are replaced during scientific revolutions. The philosopher Paul Feyerabend seemingly took the argument even further in the book *Against Method* (1975), where he argued for a fundamentally liberal view of method: choose the method that works for you – 'anything goes'.

It is not easy to derive any type of final answer from these debates. Most of the debates appear to be abandoned by now, and it is not clear what has replaced them. It is in any case remarkable that at the tail end of the 1990s, more and more leading philosophers of science argue for a pluralistic viewpoint and reject the old project of unified science. Nancy Cartwright, who holds Popper's former chair at the London School of Economics, can be cited as a prominent example (see for instance Cartwright 1999). It would therefore appear that the prevailing tendency is to consider the system and method of science as a sort of toolbox with many different tools, which must be assessed individually with regard to how expedient they are in solving specific tasks. Such methodological tools are associated with different fields of expertise and specific problems, and they are continuously being refined. It is generally agreed that such tools are found in every discipline, and the potential for debate lies rather in whether these individual tools are an expression of one or several overarching methodologies that define science as such.

How, then, is this discussion on methodology relevant to our project? We believe that some of the concerns are related to the fear that the terms 'research' and 'science' are abused in contract research in order to increase the legitimacy of its results. Measured against strict, scientific quality criteria, much of this 'research' might possibly not hold water. In this respect, methodological norms are clearly relevant to research ethics, given that it would be misrepresentative to promote something as scientific research when it is not.

The problem, however, lies precisely in the fact that this demarcation between ‘scientific’ and ‘non-scientific’, or between ‘research’ and ‘study’ versus for example ‘consultancy’, is not clear-cut. In many cases this will lead to a debate, also within the scientific community and among philosophers of science. By adhering to the abovementioned pluralistic viewpoint, however, it would be possible to state a sort of minimal answer to the problem: ‘scientific’ is that which competently uses the tools that at any given time are to be found in the scientific toolbox. Thus, the choice of method does not have to be decisive, as long as a) a method is used at all, b) this method is suitable for solving problems of the given type, and c) the method is used competently.

The entire point of using a method is that it serves as a *quality assurance* of the knowledge and insights that research produces. Methods should not only provide results, they should also, based on given preconditions, enable the systematic and intersubjective verifiability/ quality control of the results. When knowledge is presented as being scientific or research-based, the conditions must be such that peers can review the fundamental data and, based on a certain method, assess whether the conclusions are valid. This is the most important prerequisite for scientific quality assurance.

Some brief comments are in order here. First of all, one must guard against the fallacy that competent use of a method will automatically lead to definite and clear-cut results that will gain universal acknowledgement. Many, if not all, scientific methods presuppose significant elements of professional deliberation and interpretation. So even though a given method has been competently applied, and even though this method is suitable for illuminating the given problem, it does not necessarily follow that other peers will concur with the given conclusion. In some cases critics will argue that other methods would have been more suitable to the given problem, while in the other cases the disagreement will concern the universality of the conclusion, given the data at hand. There is in other words a great potential for professional differences in scientific methodology as well. But these differences are not in regard to whether a work of research is, in a reasonable sense, scientific or not, but rather to whether the given conclusions are valid, all things considered. Agreement (or disagreement) about the conclusions is therefore neither a necessary nor a sufficient indicator for whether a work of research is scientifically defensible (or not).

Secondly, so-called peer review takes place in various parts of science: when judging a PhD candidate, hiring someone for a scientific position, assessing a project application, publishing an article in a scientific journal, publishing a book or evaluating a research environment (see for example Cole 1992, Chubin & Hackett 1990). When a research project is concluded, the most important quality assurance takes place in the form of publication in international journals that practice peer review. Within applied research, and perhaps within contract research in particular, it is not always the case that the results are publicly disclosed in such forums. Internal work reports or book publications may be end documents that are not subject to peer review. One should be aware that certain research results might be too specialized to find suitable forums for scientific publication. In such cases the quality assurance is unsatisfactory, and it becomes even more important that the body of research strives to maintain a high methodological standard, and that this is evident from the reports. In lack of normal peer review, the competent reader should have the possibility of following the analysis and the given arguments. We will return later on to the question of quality assurance in contract research; for the time being, though, we will tentatively conclude that the normative basis of research and scientific activity includes, as a necessary prerequisite for scientific quality assurance, the reflective and visible use of a method.

3.4 The justification and autonomy of science

It is one thing to become fascinated by the underlying method of science and the inherent rules and regulations of the scientific community, but it is something quite else to explain to others why scientific activity is valuable. The latter aspect is what is normally called the justification of science. Justification pertains to the external aspects of science, and it has become customary to discern between two fundamental forms of justification. Aristotelian justification takes as its starting point the inherent worth of knowledge as a sort of project of self-actualization for mankind; Baconian justification, on the other hand, takes as its starting point the utility of knowledge, where the utility is assessed in regard to people other than those who produce the knowledge (see Tranøy 1986, Kaiser 2000: chap. 2). Tranøy has introduced the general concept of welfare functions and welfare effects to take into account ‘the different ways in which insight, and in particular systematic scientific insight, affect the individual and social welfare of human

beings, for good or for bad' (Tranøy 1986: 78). Seen in relation to the problems of modern research policies, the two abovementioned traditions of justification provide only a sketchy blueprint, but it is not unreasonable to imagine that also later ideas of justification will tend towards one of these two basic forms.

The Aristotelian tradition of justification is, as implied by the name, associated with the philosophy of Aristotle. We shall not delve into details, but the essential point here is that Aristotle considered the quest for knowledge to be a part of human nature. Knowledge becomes therefore an objective in itself. Achieving new insights and knowledge can be a very enriching experience for a person, and may thus affect their quality of life. Aristotle discerns between the practical world, the productive world and the theoretical world. Knowledge belongs in his view to the latter category; though the practical-technical mind was useful, in importance it was subordinate to the rational mind.

It was not unusual in Ancient Greece to depreciate the practical-technical world in favour of theoretical knowledge. Part of the explanation lies no doubt in the structure of society, where slaves and women tended to the practical matters of life, while free citizens (i.e. men) could devote themselves to philosophy. It was not deemed necessary for a citizen to demonstrate that his activities were of use to anyone but oneself.

It is otherwise worth mentioning that elements of this Aristotelian philosophy resurfaced in the Enlightenment's classical ideal of formative education. The education of students had as its purpose the development of their personalities. Education in the schools and universities was not primarily oriented towards the practical application of imparted knowledge, but towards this knowledge helping to produce enlightened and responsible citizens. Even though the ideal of formative education is largely absent in modern educational systems, it is interesting to note that debates on such ideals keep arising. In Norway, the discussion surrounding the universities' preparatory tests (the Examen Philosophicum) has certain features that refer back to the ideal of formative education and Aristotelian epistemology, and there are also those who claim that the arts and humanities should primarily be understood from such a perspective.

The Baconian tradition of justification originates from an entirely different social reality. Francis Bacon (1561–1626) refers to inventions such as the compass, the printing press and gunpowder, all of which revolutionized his day and age. Of decisive importance for the intrinsic value of knowledge is its utility. Bacon emphasized that new knowledge entails technological change over the course of time. Knowledge thus becomes a useful tool for purposes external to science, and it is people other than those who produce the knowledge who shall benefit the most from it. His oft-quoted maxim 'knowledge is power' refers to the ability to manipulate nature to suit the purposes of mankind.

Bacon's importance lay first and foremost in the sphere of scientific policy. His form of justification achieved a breakthrough in the new, empirical science that organized itself in the academies during the scientific revolution. The Royal Society ratified statutes that entailed that 'studies are to be applied to further promoting by the authority of experiments the sciences of natural things and of useful arts' (First Charter 1662, as quoted in Tranøy 1986:82). Later amendments state: 'In order to the propounding and making of Experiments for the Society, consideration shall be had of the importance of any Experiment, to the discovery of any truth or axiom in nature, or to the use and benefit of mankind' (Second Charter 1663, as quoted in Tranøy 1986: 82). The emphasis on utility and practicality are quite apparent here. It is otherwise interesting to supplement this with Robert Hooke's draft for the statutes. He writes among other things the following: 'the business and design of the Royal Society [is] to improve the knowledge of natural things, and all useful Arts, Manufactures, Mechanick practices, Engynes, and Inventions by Experiments, – not meddling with Divinity, Metaphysics, Moralls, Politics, Grammar, Rhetorick, or Logick' (as quoted in Mason 1962: 259).

In our context, it is interesting to read the above quotes as research strategy documents. By highlighting benefit and utility, the new science ensured that other powers in society, primarily the King (Charles II), but also the merchants, could take a positive interest in science and consider it to be worthy of support. The demarcation of science from other fields of knowledge that were administered by other power centres, mainly the Church and the universities, bought the relative freedom and independence that were necessary to conduct science. The non-involvement of external parties in the inner workings of science was thereby assured.

In regard to research ethics, it is furthermore relevant to assert that science up to the 19th century fell short of the defined goals of both the Aristotelian and the Baconian traditions. New research did not lead to new technological breakthroughs of any great significance, and any practical benefits failed to materialize as well. Technological inventions and advancements were chiefly made by craftsmen who were not directly associated with the scientific communities. It is first later on in the 19th century that the situation starts to change, and that independent research environments and institutes for applied research emerge. Nor does the new type of research eschew the spheres of politics, philosophy, ethics or theology. It is here (rather than in technology) that science achieves its perhaps greatest importance, especially during the Enlightenment, when scientific rationality begins to take shape as a particular world view or way of life. When Charles Darwin published his finds in 1859 (*On the Origin of Species by Means of Natural Selection*), the new science was in open competition with the Church and the established belief systems.

This early history of science does not, in our opinion, give much reason to claim that the norms of research ethics, such as freedom and independence, were considered to be important. The academies were very much aware that they needed support or at least acceptance from the established centres of power. Alliances were therefore sought with kings and others, and 'enlightened princes' were fairly important for a number of scientists. All such alliances demand a certain degree of adaptation, however, and every alliance limits the freedom of the involved parties. Furthermore, such support did not as yet entail that scientists were paid salaries for their research activity. It was merely a matter of idealistic support for, and acceptance, of the scientific institutions – income was derived elsewhere and from other activities.

One could possibly argue that the demarcation of science in regard to the Church, the universities, politics, etc, was meant to create the necessary independence for research: outside parties were not to decide the topics of research, the methods of research or which results were to be deemed 'acceptable' (the worst-case scenario here being Galileo's conflict with the Church). But in that case, such independence was not absolute. Most scientists from that era considered themselves to be loyal servants of both King and Country, and most felt that they advanced

Christianity with their activities; some were concerned with improving the accuracy of military weapons. Idealistic dependency probably did exist. As long as science remained amateur science, however, formal dependency (in the shape of financial means and institutional affiliation) was held within certain limits. This was to change during the second phase of science, the so-called *professional science*.

3.4.1 Professional science

Modern research universities were established at the beginning of the 19th century. The prime architect behind this development was arguably Wilhelm von Humboldt. The fundamental idea was to combine notions about the utility of research with notions about schooling and formative education, especially for future civil servants. University education was now to be research-based, and the universities were to serve society indirectly, both by providing new knowledge and by affording future civil servants a necessary and comprehensive primary and higher education. These new universities were to be responsible for knowledge, which was incidentally considered to be a cultural good. The universities expanded their freedom in this manner, and autonomy (right to self-determination) with regard to research and teaching became a part of their constitutional framework. In return, university employees tended to the needs of the State for schooling and formative education. Modern science could henceforth be conducted in salaried positions.

Even though modern science after the scientific revolution was governed by the Baconian philosophy of justifying research on the grounds of its utility, and even though it was precisely this new empirical science that gained entry to the universities, it was in fact Aristotelian thought that was at the forefront of the new universities. Scientific knowledge became at that point in time a part of public culture. Its usefulness lay in the perspective of formative education, while (basic) research was more or less valuable in itself. Freedom of research was thereby also linked to the notion that research primarily led to an increase in knowledge rather than new technology. As a result, there were no interest groups that were directly involved in this knowledge.

3.4.2 Industrial science

At the end of the 19th century and the beginning of the 20th century, however, the situation had changed. Certain disciplines, in particular physics and chemistry, had made great epistemological advances that soon proved to be immediately relevant to technology. The industrial revolution brought about so-called *industrial science*. Fundamental to such science was the division between basic research (a.k.a. 'fundamental' or 'pure' research) and applied research. In the traditional model of innovation, there is a linear development from basic research through to applied research and product development. Industrial science met these challenges by a division of labour: the universities focused on basic research, while separate and newly founded research institutes dealt with matters of application. Basic research at the universities could keep its autonomy and research freedom, while the various institutes became subject to governmental and industrial control. Max Weber's division between the spheres of politics and science encouraged such an organizational structure. As a result, there emerged a mixed model for the justification of science: basic research at the universities served the ideal of formative education, and was also indirectly useful by laying the foundation for applied science, while applied science was in nature purely utilitarian.

3.4.3 Bernalism: Functional science

This model for the justification of research did not go unchallenged. From the 1930's on, in England in particular, there emerged a group of Marxist-inspired theorists who viewed Soviet science as an ideal. In their history and sociology of science, the production of scientific knowledge was situated within a framework of social class divisions and industrial production conditions, in line with Marx' teachings on superstructure and base. This had clear implications for research policy. John Desmond Bernal not only wrote an influential history of science within this school of thought, he also composed a work on research policy that had at its core the social function of science (Bernal 1967). Øyvind Såtvedt summarizes Bernal's programme of research policy in four points (Skoie and Såtvedt 1998: 33):

> The principle that research must be systematically organized and that priority must be given to applied research that is beneficial to society.

The principle that all researchers are ethically obligated to fight against any misuse of the knowledge that science has produced. There is no moral boundary between the production of knowledge on the one hand, and the application of this knowledge on the other.

The principle that science is an instrument for social transformation (emancipation) and is rooted in practical life.

A set of historiographical theses to be employed when describing the history of science.

There are many noteworthy aspects of this model (sometimes referred to as 'Bernalism'): (i) all science is justified by its utility, (ii) freedom and self-determination are limited by governmental research policy, (iii) value neutrality and disinterestedness are replaced by a comprehensive ethical obligation towards the production and application of knowledge that is beneficial to society, and (iv) when the ethical basis of science is linked to social transformation and practical activities, then it is natural for science to forge close alliances with varying user groups in society.

Considering the reality of research policy today, it is striking how close it is to Bernalism, and how far removed it is from the ideals of Humboldt and Weber. Referring to Eirikur Baldursson, Såtvedt states that it is 'a paradox that while Communism – which to a great degree inspired Bernal's thinking on research policy – has largely been dethroned in recent decades, the ideas of Bernalism seem to be alive and well' (Skoie and Såtvedt 1998: 35). He goes on to quote Aant Elzinga: 'Bernal's ideas have been "taken over by the captains of industry and ministers of government in the postwar period"' (ibid. 1998: 35).

3.4.4 Publicly funded research

Developments in the postwar era have clearly favoured governmental administration of research, something that is partly due to the growth of so-called *Big Science* (Price 1963). The so-called Manhattan Project, which resulted in the development of the first atomic bomb in the United States during the war, was an innovation in research policy. It showed that with tight planning and organization, researchers could collaborate to actualize a planned, common objective that

was practical in nature. Individual research efforts focused on partial problems within a larger framework organized by researchers and other professionals. This required not only a large number of researchers from different disciplines and institutions, but also large-scale funding, something that could only be granted by top-level political authorities. Similar projects have been carried out in various contexts, for example in space research. The last Big Science project that has been carried out on a global basis was HUGO, which catalogued the human genome. A case could also be made that worldwide clinical trials of new pharmaceutical compounds are typical Big Science projects. When the objective and organizational form are as controlled as they are in such projects, the individual researcher's independence and freedom become strictly limited to purely instrumental aspects. In reality, it is also not always easy to differentiate between technical aspects and organizational or other user aspects, and participants may experience role conflicts, something that turned out to be very unfortunate in the case of e.g. the Challenger disaster (Davis 1998). Such experiences have among other things increased the need for reliable guidelines for professional and scientific ethics.

In recent decades, questions have been widely raised of whether science has changed so much in the postwar period that traditional academic science – and, along with it, some of its values and norms – has taken a back seat in the production of new knowledge. In part this is because the traditional divide between basic research and applied research, which pertained to industrial science in the early 20th century, seems inadequate to characterize the actual research practices of today. In the high tech era, many of even the most theoretical and abstract branches of knowledge are closely connected to technological applications. This is most conspicuous in modern genetics, where biotechnological applications are often a more or less direct result of new knowledge. The practice of patenting new gene sequences may serve as testimony to this. Comparable examples would be modern chemistry and material research, or formal linguistics and automated systems of language recognition, or hydrogeology and the administration of freshwater resources, etc. With regard to research policy, this has materialized itself in e.g. a form of research funding where strategic basic research – in other words, research that is oriented towards externally defined objectives of knowledge – is a key element. Relevance and usefulness are therefore clearly at the forefront of today's research.

3.4.5 Today's practical research

Given that the divide between basic research and applied research is less evident than before, questions have also been raised about the linear model of innovation. Close user contact is a key factor here. When the traditional model of innovation is abandoned, the clear boundary between academic research at the universities and research at the institutes also disappears.

In a book published in 1994, a group of researchers claim that there have been huge qualitative transformations in research (Gibbons et al. 1994). They refer to traditional academic research as mode 1 research, and compare this to so-called mode 2 research, which they believe characterizes the new mode of acquiring knowledge. The essential differences between these two categories of knowledge production are briefly summarized in the following table:

Category 1 (mode 1):	**Category 2 (mode 2):**
Knowledge mainly produced at colleges and universities	Knowledge produced by different parties in different forums
Research is highly institutionalized	Research conducted through projects and networks of limited duration
Basic research guided by disciplinary interests and problems	Basic research guided by potential areas of application
The production of knowledge is mono-disciplinary	The production of knowledge is trans-disciplinary
Emphasis on individual creativity	Emphasis on collaboration in groups
Homogeneous research groups	Heterogeneous research groups
Peer-reviewing as sole instrument of quality assurance	Economic and social evaluation in addition to peer-reviewing

The analysis of Gibbons et al. has not gone unchallenged. Some contend that the alleged qualitative differences between the two categories have been exaggerated, and that it is rather a case of gradual differences that vary from discipline to discipline and possibly from country to country. Other critics point out that the theory is reminiscent of a theory from the 1970's – the so-called finalization thesis as put forth by the Max Planck Institute at Starnberg (Böhme et al.

1978) – and which already at the time encountered significant professional resistance. At the same time, however, many researchers have called attention to the increasing commercialization of research in general, a trend that not least the universities have been exposed to (Etzkowitz et al. 1998, Greenberg 2001, Slaughter & Leslie 1997, Marginson & Consodine 2000). It also seems evident that the last thirty years have brought about certain institutional innovations that do not follow the traditional organizational form of institutes of applied research. Given the additional tendency towards Big Science, as well as the otherwise widespread trend towards globalization in both business and research, it seems evident that modern research is undergoing fairly significant transformations with regard to research policy and organization (Nowotny, et al. 2001). John Ziman, who has observed the sociological dimension of science for a number of years, is among those who are willing to concede that these innovations entail a certain qualitative transformation, and he therefore speaks of 'post-academic science' (Ziman 1995).

What, then, is the relevance to research policy of these alleged institutional transformations? Even though Ziman seems willing to accept that a greater tendency towards user science could be beneficial for achieving certain objectives, he is still concerned that this process could lead to a loss of scientific integrity. He believes that research ethics must be reinforced in order to ensure that objectivity is strived for. In processes with specific clients and user groups for whom utility is at the forefront, and where there are financial and time management pressures, the research results can easily be one-sidedly oriented towards future technological use. Other effects of the given technology, for example negative social aspects, can easily remain unresolved. Not even when research has a strong utilitarian orientation should the overriding interests of society suffer. Research ethics must compensate for this danger of one-sidedness.

This line of reasoning is already implied in Bernalism. A more recent proponent of this view, Stephen Fuller, believes that the problems of Big Science cannot be solved if a strict division of labour is upheld between ethics and pure epistemology. He says: 'While there is some talk about which social arrangements foster or retard knowledge growth, the full dimensions of Big Science – who and what ends up being enveloped in its sustained pursuit – remain obscured. This situation is largely an artefact of the subdivision between ethics and epistemology within professional philosophy in the Anglo-American world, which fosters the illusion that a clear

distinction can be drawn between the morally and epistemically relevant consequences of a given course of action' (Fuller 2000: 43).

In a consistently utilitarian justification of research, there must be a clearer ethical obligation that ensures that research does not lose sight of overriding social goods. The relatively 'free' position of academic environments conducting applied research could for a long time base itself on a certain premise, namely that the potential bias of individual researchers and their research results would be rectified by others; this premise should not be taken for granted, however, when large parts of research activities are tied up in contracts and projects with specific users and wealthy clients. Not all interest groups in society will be able to act as clients or user groups with regard to research. One possible solution to this dilemma is for the government to support 'free' basic research, and also to show a stronger commitment in fields where certain social interests are in specific danger of being harmed. Such demands have been advanced not least in Norway, but also in other countries as well. As sensible as this approach might be, however, it seems doubtful that it would be sufficient to meet the challenge at hand. When important and sizeable parts of research are Big Science in nature, then the entrance fee for conducting cutting edge research will be prohibitively expensive. Such research requires both large financial resources and highly specialized expertise.

As a result, a reinforcement of research ethics may in any case be necessary to ensure that research does not evolve into an instrument for resourceful interest groups, and to ensure that fundamental social goods are upheld. In our opinion, this seems to be a basic theme in the debate on the need for a new social contract for research (Lubchenco 1997). Initiatives have been drawn up in certain strategy documents that focus on science and technology, in particular the final documents from *The World Science Conference* in Budapest in 1999 (UNESCO & ICSU 2000).

3.4.6 The crisis of confidence in science

It is not unreasonable to place this debate in the context of the oft-discussed crisis of confidence that science encounters in broad segments of the general public. Even though this crisis of confidence transpires differently from country to country, and even though it is typically related to special branches of research, such as for example biotechnology, we may reasonably believe

that the general public reacts with great scepticism when it emerges that powerful forces in society have funded research results. In Norway there is a clear example of this in the lay panel that issued a statement on genetically modified food (NENT 1996). In order to rectify potential bias in the commercially funded studies, the panel called for further independent studies on the effects of such food. When the panel convened for the second time in 2000, they were surprised that the situation had remained largely unchanged since 1996. Many are also surprised when they discover that it is not possible to obtain reliable information about research whose results were 'negative', i.e. that the given research was unable to prove what it set out to prove, for instance a certain medical effect. Just as surprising to outsiders, it is often extremely difficult to obtain a realistic picture of the ongoing research in a certain field. For example, when inquiring into how many researchers study the non-intended environmental effects associated with transgenic plants, the answers are necessarily very incomplete. This is due to a very mixed conglomeration of funding sources and clients, where only certain parts are visible in publicly accessible sources.

In summary, we can say that the justification of scientific activity has undergone large and fairly significant transformations over time, accompanied by institutional and social transformations. The two basic forms of justification, the Aristotelian and the Baconian, have varied in function and significance. The Aristotelian idea of knowledge and science as an intrinsic value or cultural good has typically led to the relative freedom of research activities, while a Baconian emphasis on utility and relevance has tended towards external control and attachment to special interests. The situation today seems to have moved from a mixed form, or heterogeneous justification, to a stronger goal orientation based on usefulness and relevance, where alliances with resourceful parties have been crucial. This tendency towards user science and user groups has also reached the universities, which have traditionally enjoyed greater self-determination. In this manner, the potential arises for norm conflicts in regard to the different functions of research. So as not to lose sight of science's importance for the overriding interests of society, an important step will be to reinforce research ethics in everyday science. Such reinforcement must keep in mind *the overriding interests of society,* and ensure a balance in what is being researched and rectify biased results. A prerequisite for upholding these overriding interests of society is *openness* with regard to ongoing research. Such openness also includes information that was previously considered to be of little relevance, but that in today's climate seems more crucial. At the very

core is the question ‘Who pays the piper?’, i.e. information on funding sources and other institutional or organizational affiliations to interest groups.

3.5 A discussion of post-normal science

When science is in constant change, as we saw above, we should be careful about claiming that certain aspects of today’s research represent a fundamental break with previous types of research. Nonetheless, we should also be open to the idea that certain parts of the development result in significant and noteworthy qualitative changes. We touched upon some of these problems above, when we discussed the differences between mode 1 and mode 2 science. This dealt mainly with organizational transformations in light of the practical innovative challenges that face modern high tech societies. In this section we want to supplement this with a slightly different analysis, one that is based mainly on the content of knowledge rather than on how research is organized.

Silvio Funtowicz and Jerome Ravetz (Funtowicz & Ravetz 1991, 1993, 1999) have concerned themselves with modern research for a number of years. One of the central problems they were concerned with early on was scientific uncertainty. Science has developed methods and tools for arriving at tenable statements concerning reality. These tools are most effective within the problem context that is generated by scientific theories. In such a context, science operates with abstractions and idealizations, often in connection with a reality that in its pure form only exists within the laboratory walls. At the same, however, science becomes ever more important as an adviser and problem solver for problems that are defined by external interests or political forces. These problems are characterized by a relatively high complexity, and the anticipated answers should be valid for the real world outside of the science labs. It turns out that science can as a rule only offer partial answers in this context, and that there is always a significant degree of uncertainty concerning how a system will work in actual practice. This uncertainty usually remains undisclosed in scientific presentations, however, even though it is often of great importance for decision-makers.

Funtowicz and Ravetz have also noted that science is confronted by problems whose complexity arises not only from actual and natural circumstances, but also largely from ethical circumstances

as well. Important ethical principles may be at stake, and in reality there is no possibility of completely value-neutral research. The ethical principles may already be implicit in the way the problem is defined or the types of solutions that are sought. The combination of these two aspects – a high degree of systematic uncertainty combined with important ethical principles that are at stake – is termed ‘post-normal science’ by Funtowicz and Ravetz. The term ‘post-normal’ alludes to Thomas Kuhn’s characterization of paradigm-controlled research as normal science. They illustrate the situation with a simple graph:
**[HIGH, LOW, HIGH, Ethical principles at stake, Degree of uncertainty, Post-normal science, Professional consultancy, Applied research]

It is otherwise worth noting that also applied science and science-based consultancy are considered to be fairly influenced by uncertainty and ethical principles.

The reason we mention post-normal science in this context is that it raises an interesting question about quality assurance. When science not only in a very broad sense rests on ethical principles, but when such principles also directly influence the type of research that is conducted and the underlying assumptions and methods of this research, it is no longer given that quality assurance of the research results should transpire solely through peer review. Ethical principles are not a matter of specialist knowledge, but are rather an integral part of public democracy. Funtowicz and Ravetz suggest therefore that quality assurance should transpire through so-called ‘extended peer-reviews’, an assessment where not only peers, but also various concerned parties, take part. This corresponds to what in various documents are referred to as ‘participatory methods’ in scientific-technical contexts. Not only can other types of potentially valuable practical knowledge be snapped up through such forums, but critical feedback can also be received on whether the proposed questions are adequate and whether the scope of the data is reasonable. Of greatest importance, perhaps, is that such forums will focus on factors of uncertainty as well as ethical choices that are relevant to decision-making.

This provides interesting perspectives on quality assurance in user-oriented applied science. As Funtowicz and Ravetz point out, the traditional peer review is a necessary element in all scientific quality assurance. When utilitarian aspects and practicality are prominent, however, it will – in

the context of research policy – not only be justified, but also necessary, that quality assurance is expanded to include other interested parties. Which parties should be included in such cases depends first and foremost upon the given problem. It is worth noting, however, that interested parties are not limited to those who potentially fund a research project, i.e. the client. In particular, when research projects touch upon ethical questions that are important to society, adequate quality assurance must necessarily entail that a broad spectrum of concerned interests be included in such quality assurance.

3.6 Norms of research ethics in summary

In the above, we outlined some of the historical developments and debates regarding the normative foundation of science, with regard to its inner social organization, its methods and its traditions of justification. These are the three areas that are particularly important for our present concern with contract research.

Of course, the normative foundation of science involves more than those areas outlined above. An essential element that we have not dealt with pertains to problems of scientific integrity, and there are in that context several norms that stipulate scientifically correct behaviour. This is not, however, what we are concerned with here. This project is not about possible cases of fraudulent research, neither in contract research nor in other types of research. Rather, we ask whether the framework conditions and settings of contract research in Norway today are in line with the ethical norms that are otherwise imposed on research, thereby providing a basis for having confidence in the results of such contract research.

Another element of the normative foundation of science concerns research subjects, whether humans or animals, for example in medical research. No objective justifies the unethical use of research subjects. Clear standards have been drawn up for this, for example in the Declaration of Helsinki. However, this issue is not of immediate interest for our project either.

Regarding the norms under current investigation, namely freedom, openness and independence, various factors have emerged that place these in various historical and social contexts. Let us briefly summarize:

The norm of freedom

The norm of freedom in research has been asserted and defended in connection with the emergence of modern research universities in the 19th century. It refers at the outset to the universities' freedom to determine themselves how the accumulation of scientific knowledge should be managed and renewed. Specifically, the norm has consequences for appointments, internal organization and teaching at the institutions. As a direct consequence of the norm, scientific personnel at the institution are given the freedom to choose their own field of work and their own research activity. The research activity is in other words not only exclusively controlled by researchers, but also initiated by researchers. The norm was ideologically associated with the perception of scientific knowledge as a cultural good, something that was indirectly beneficial for society in connection with formative education and schooling. The norm has been limited and modified in pace with the increase of institutes for applied research, which were exclusively utilitarian. In such institutes, research was still largely controlled by researchers, but not initiated by them – the objectives were defined externally. The development of Big Science after World War II, however, as well as later developments that took place on the outer limits of the universities, limited the researchers' control over research. Larger and more complex projects, with predetermined objectives and a clear view towards technological application, demanded a form of supervision and organization that was not necessarily a matter of internal interest to science. Remnants of free research (i.e. research that is controlled and initiated by researchers) are still to be found in today's universities, but when research funds are scarce and large resources are demanded in certain fields, researchers have in reality limited opportunity to initiate projects. The actuality of the norm of academic freedom, such as it is adapted to the modern world of research, is therefore open to debate (Menard et al. 1996).

The norm of independence

For individual researchers, it has always been a goal that their research should remain unaffected by external, non-scientific interests. At the same time, the social context of science has always

required that alliances be struck with other parties and powers-that-be. The greater the need for funding, the closer these alliances became. Alliances always create a mutual dependence and limit the independence of a given party. This entails that the allied partner's interests will colour the given researcher's own activity, something that became ever more relevant as the technological and commercial dimensions of research came into focus. Today's research is characterized by universities and autonomous institutes forging several such formal and informal alliances. Many have noticed a trend towards the increased commercialization of research, something that clearly created new forms of dependency. At the same time, such alliances do not necessarily have to lead to the deterioration of quality specifications in scientific research. In principle it is rather the opposite: it is precisely such quality specifications that make science an attractive alliance partner. It is also because of these quality specifications that the general public is able to have confidence in the results. The challenge lies therefore in the delicate balance between desired connections on the one hand, and a dependent relationship that is detrimental to research quality on the other.

The norm of openness

The norm of openness is not, on the surface, directly evident in traditional formulations of the normative foundation of science. What most resembles the norm of openness is the demand that knowledge be public, and perhaps also the methodological demand for the intersubjective verifiability of research results. Openness with respect to both data and method is a prerequisite for scientific quality assurance. Openness with respect to research results, in the form of publicly accessible publications, is a prerequisite for quality assurance in the form of peer review and for the practical application of research results to the benefit of society. It is well known that complete openness in this respect does not always exist, for example for reasons of national security or to protect industrial secrets. Modern patent practice usually entails a time-limited exclusivity. When discussing Bernalism and post-academic science, however, where special interests to a larger degree influence the contents of research, we asserted that the overriding interests of society linked to the potential welfare benefits of research imply that the norm of openness should include publicly accessible information about a) which research projects are in fact being conducted, b) who is funding this research and which user groups are collaborating on

the project, c) how the research is being quality assured, and possibly d) how the results will fall into the public domain, even though this might take place after a certain time span.

Based on our preliminary discussion, we believe that research should also be controlled by two important norms that are not explicitly mentioned in the mandate, namely quality and accountability.

The norm of quality

Quality assurance of scientific knowledge has been a central part of scientific activity ever since the scientific revolution. The use of method, combined with intersubjective verifiability in the form of peer review, has always been promoted as key parts of such quality assurance. The system of peer review is relatively sophisticated and well established in today's situation. As for method, we have emphasized the important distinction between having an awareness of method on the one hand, and the fact that researchers may, on the other hand, have differing estimations and viewpoints on how scientific problems should be tackled. Professional disagreement is therefore not an indicator of quality failure, nor does professional consensus on a given conclusion indicate that the research quality has been assured. Scientific quality assurance refers to processes rather than conclusions. In research that is out-and-out utilitarian in nature, the required quality assurance will often include other parties than researchers, for example users. In research where common interests are at stake, and where there exists a significant degree of scientific uncertainty (post-normal science), it would be natural to expect that research should be open to input from various interested parties in regard to its preparation, transaction and conclusions. Although adequate quality assurance of scientific research is fundamental to the general public's confidence in research, it can never guarantee valid, final and commonly accepted research results. Such a guarantee does not exist in cutting edge research. It turns out that the scientific community itself values professional quality highest among the goods that are demanded by ethical guidelines for research (cf. SCRES 2002).

The norm of accountability

Modern science, at least from the Enlightenment onwards, has always considered participation in the affairs of society, be they political, cultural or commercial, as a natural part of its activity. Nor

did Weber's postulate of value neutrality lead to a lack of social commitment on the part of science. Weber's postulate did not, however, demand a particular ethical responsibility on behalf of science. As long as the universities had sufficient institutional freedom to control and determine the research agenda themselves, it seemed certain that relevant knowledge would befall the general public. However, when utilitarian ideas exert ever greater influence on what is to be studied, how the research is to be conducted and who shall have access to the results, it seems imperative that research ethics are reinforced in order to compensate on behalf of the overriding interests of society. An empirical study of ethical guidelines for research, conducted by SCRES, shows that social responsibility is the most highly prioritized of the social values that science should seek to attain (SCRES 2002). It is hardly reasonable to claim, as Bernal does, that researchers are categorically responsible for how their results are applied. But it is not unreasonable to contend that researchers are jointly responsible for the use of science in the wider context of society (see Mitcham & Schomberg 2000). It is precisely this form of ethical co-responsibility that we refer to here as accountability. Such a norm of research ethics essentially includes two aspects: 1) When certain decisions and/or technologies that were in essence made or created on the basis of scientific know-how turn out to have unfortunate, unforeseen side effects, and when there simultaneously is reason to believe that a better or broader preparation of the scientific decision-making basis could have forewarned against such possible side effects, then there is reason to believe that science is ethically co-responsible for the negative consequences. 2) When there exists either specific results or important scientific uncertainty which imply that a planned decision and/or technology could have serious consequences for e.g. society, health or the environment, then it is the ethical duty of science and the individual researcher to ensure that this information is effectively made known to the relevant decision makers and the general public. We deem that such a norm of accountability overrides all other obligations, for example obligations towards a client or an institution. This norm entails furthermore that science engages itself in public debates where scientific and technological questions are on the agenda or form an essential part of the debate.

We have, in comparison with the norms that were discussed above, downplayed certain other norms, for example the norm of universality. This does not imply that we do not see the value of such a norm; it is rather due to our opinion that the norm is in reality quite complex, and that for

example a certain amount of local knowledge also has a part to play in research. We refer here to the bibliography for further discussion (see for example Cole 1992). We have also downplayed Merton's norm of disinterestedness, which we believe is better maintained by our norms of openness and accountability.

We believe there is reason to contend that *openness*, *quality* and *accountability* form the normative core of research ethics and are applicable to scientific activity in general. The norm of independence has a secondary meaning in the sense that the quality of science should not be unduly influenced by the given researcher's inevitable relationships of dependency, and as such this norm is important for contract research. On the other hand, it is difficult to uphold freedom and independence as key norms when considered in the general form they were discussed above. Actual research is seldom of the kind these norms seem to imply, and it is difficult to see that they should comprise a minimum standard for research ethics in general – actual research is too complex for that. On the other hand, both of these norms have certain aspects, pertaining to quality assurance and accountability, that are important to uphold. These aspects can be derived as consequences of our three primary norms. We will return to these aspects after taking a closer look at contract research and those issues we should be aware of in the context of research ethics.

4 The focus groups

4.1 Introduction

Contract research consists of many different parties, is conducted in many contexts and has various ambitions. Researchers will therefore also have different perspectives on how it is conducted and on the problems and advantages of such research. In order to become aware of where the shoe pinches, we have chosen to hold group discussions in so-called focus groups. Do Norwegian researchers experience that contract research presents particular problems in regard to research ethics, and if so, what kind? Is there a common pattern that all contract research follows? If certain problems are experienced, are they due to particular clients or particular disciplinary perspectives or arrangements? Do researchers believe that scientific standards conflict with the utilitarian orientation in contract research? To gain an initial insight into such questions, we held partially structured discussions with researchers that were gathered in five different groups. This material has provided us with insight into experiences with and viewpoints on contract research, such as it appears from the perspective of those involved. In addition, the insight from the group discussions provided the basis for working out a survey.

The present chapter begins by presenting the method and the selected participants. Several of the experiences that are presented in this chapter show that contract research, such as it is practiced in Norway today, may exhibit traits that are problematic in regard to research ethics. The structure in the remainder of Chapter 4 is based on various aspects of contract research. First, we will investigate more closely how researchers generally view contract research. We will then discuss how the quality of the research may be influenced by for example institutional circumstances, the given funding, client expectations and the researchers' own assessment of their competence. We will also show how the researchers meet certain challenges in connection with making their research public knowledge. At the end of the chapter we ask how researchers view the social benefit of contract research.

4.1.1 The use of focus groups

Focus groups were developed as a method in the 1940s, and have been increasingly used both academically and commercially since the 1960s and 1970s (Bloor et al. 2001). The purpose of the method is to bring to light viewpoints and experiences that are difficult to map out in for example questionnaires. Even though the data from focus groups is usually unstructured, less evident connections will often come to light (Bloor et al. 2001). It is hard to describe the dynamics of focus group interviews, however, given that the totality of the discussion is far greater than the individual contributions. Since focus groups work best in combination with other methods, we have in our work chosen to combine focus groups with a quantitative survey.

The decision to hold the group discussions early on in the study was motivated by the desire to be as perceptive as possible to the researchers' viewpoints on contract research. Discussions with researchers may present a different picture of contract research from the one provided by the existing literature on the topic. In focus groups it is possible to profit from the group dynamics, in that the participants pose each other questions and supplement each other's statements. Unlike an interview, which centres on questions and answers, focus groups are founded on group interaction based on introductory comments from the person or persons leading the focus group. Our experience suggests that the participants in our focus groups discussed topics which would not have been brought up in regular interviews or surveys.

Statements from focus groups may in some cases be unclear. The resulting uncertainty in the data must be taken into consideration when assessing the insights that are culled from an analysis of the data. The desire to compare the insights from the various focus groups may increase the uncertainty. The groups discussed roughly the same topics, but placed different emphasis on the various topics. In addition, the participants had different professional backgrounds and were from different types of institutions, something that puts the statements from the various groups in different contexts. To reduce some of the potential uncertainty, we have endeavoured to show the context as explicitly as possible, so that the various statements may be as accurately represented in the text as they emerged in the group discussions. We believe that the focus group method has given us a more complete picture of how contract research works in practice.

4.2 Selection of the participants

We selected participants based on what at the outset appeared to be the two central dimensions for the conditions of contract research in Norway: the type of institution and the disciplinary area. In addition, the different participants had experience with different clients. Colleges, universities and research institutes were represented in the group discussions, as were the disciplinary areas of medicine, the social sciences, the humanities and the natural sciences and technology. There was also a certain geographical distribution in the research institutions that were represented.

The recruitment of potential participants was a laborious process, something that might have been due to several reasons. An impression we are left with is that researchers who undertake contract research have very tight schedules. There were many who expressed interest in participating, but were forced to decline because of time constraints. Some researchers appeared to be less motivated to discuss research ethics. Even though we strived for an equal gender representation, we only managed to recruit two female researchers with experience from contract research. One reason for the difficulty in recruiting female participants was our desire to recruit researchers who had a certain amount of experience with contract research. It appears as though is a dearth of female researchers at the institutions, and that those female researchers who are in fact there do not have as much experience as many of their male colleagues. Fifteen researchers participated in five different groups discussions, with between two and four participants in each discussion. This is a low number of participants – in the literature on the focus group method, the usual number of participants is estimated to be between four and twelve. We experienced nonetheless that free-flowing discussions took place between the participants, with each participant being afforded greater opportunity to take the floor. At least two representatives from the National Committees for Research Ethics participated in each discussion so that one could act as moderator[3] and the other could take notes.

Two of the group discussions were held with participants from different institutions, while in two groups only one institute was represented. The purpose of having representation from several

[3] A moderator shall mainly ensure that the discussion between the focus group participants is focused on the given topic and in addition allow the participants to express their opinions and also any doubts. Beyond this the moderator should not to any great extent control how the discussion evolves (Gibbs1997).

institutions was to obtain a comparative and broad impression of the researchers' experiences. Where only one institution was represented, the participants presented their experiences more comprehensively, but did not debate them as much as in the multi-institutional groups. The windfall from the group dynamics was thereby greater in such multi-institutional groups. We found out, however, that it is important that the participants have a certain common platform with regard to their experiences, as this affords them greater opportunity to pose relevant questions and draw comparisons to their own situation. In one of the multi-institutional groups, one of the participants (participant D7) had a fairly different background from the others, for example in regard to the type of client. This entailed that the person in question did not participate as much as the others in certain parts of the discussion.

4.2.1 Execution

The discussions took the research process as their starting point, and the participants were asked to describe their experiences of the initiation, execution and publication phases of contract research. In most groups there was little need to call upon the various sub-topics that we had prepared in advance in case the discussions were sluggish. Those of us who represented the Committees led the discussion, but we tried to be conscious of giving the participants room to present their views and engage in a dialogue among themselves. We posed follow-up questions and made comments that could spur on the discussion. In many instances this was not necessary, as the participants themselves advanced the discussion. It is important, however, that we assess the potential influence we may have wielded over the participants. Those who lead focus groups should ensure that different opinions and viewpoints emerge without any form of pressure or desire for achieving group consensus (Krueger 1988). We have striven for this by emphasizing at the beginning of each focus group that the participants' perceptions of contract research was the key issue, and that our questions were only meant to facilitate and not govern the discussion. We represented the National Committees for Research Ethics, something that in itself might conceivably influence the participants' involvement and their perceptions on how the theme should be treated. There are in other words several factors that might have affected the participants. We believe nonetheless, based on the degree of free-flowing activity and group dynamics that took place in the discussions, that it seems very likely that the participants expressed their genuine opinions.

The focus groups we conducted lasted from one and a half to three hours. Some experts recommend that focus groups should not last longer than one and half hours (McNamara 1999). The participants in our focus groups had a good opportunity to discuss various experiences comprehensively, since there were few participants in each group and the sessions were relatively long.

In order to instil a certain structure upon the discussions, we took as our starting point the regular course of research processes with the three phases of initiation, execution and publication. We encouraged the participants to freely recount their experiences, where such experiences were meant as footholds for the further discussion. The participants were initially asked to state their perception of contract research, both in relation to their own experience and more in general. In the group discussions we used various technical aids. The key points of the discussion were shown either as a PowerPoint presentation on a laptop computer or on transparencies via an overhead projector. The discussions were recorded on tape on a MiniDisc and transcribed in their entirety. Such transcriptions are an important part of the focus group method, in order to gain an overview of the course of the discussion. It was for example interesting to note how large parts of the discussions would proceed without the moderators being heard at all on the tape. The participants posed questions to each other and protested if they disagreed with each other's statements. They would on their own accord draw parallels to their own experiences and add new comments to the discussion. One of the advantages of the focus group method is that hidden connections come to light. In a few of the discussions, where the discourse was initially rather businesslike, we could clearly notice that the participants warmed up after a while. Viewpoints and examples were thus put forth that in our opinion would not have emerged in a normal interview situation.

The discussions are more or less completely transcribed, except for certain beginnings and endings where the discussion had in effect not really begun or had already ended, and where what was said was of less relevance. When we further below in this chapter refer to the survey results, we have concentrated on those topics that were most strongly emphasized in the discussions. We have mostly been interested in those sides of contract research that have worrisome aspects in

regard to the norms of research. As a result, the participants' negative experiences may have come more into focus than the positive.

Chapter 4 can be read in two ways. First of all, it provides several extracts of different researchers' experiences from and viewpoints on contract research. In addition, the chapter provides some of the basis for scrutinizing the degree to which the different norms of research ethics are upheld by researchers, the institutions and mechanisms that affect funding, and the thematic choices and practical execution of contract research.

In the next section we will briefly present the different groups with regard to professional background, number of participants and experience. In the main part of the chapter we will show, based on their comments in the group discussions, what the researchers were concerned with and what they had experienced.

4.2.2 About the different focus groups

Group 1 was conducted in Oslo with four participants from research institutes within the social sciences and the humanities. Two women and two men participated. This group consisted of two political scientists, one economist and one archaeologist. The participants had mostly experience with policy-relevant contract research, but they had also some experience with business-relevant research.

Group 2 was held in Trondheim with three participants who had experience from medical research. Two of the participants were affiliated with the university, of whom one was affiliated with an external institute. These two participants had mostly experience with research commissioned by the pharmaceutical industry. The third participant conducted psychological research and dealt mostly with research initiated by public clients.

Group 3 was conducted at a research institute outside of Oslo, with two participants from the institute in question, an agronomist and a graduate engineer. It was originally intended that one or two other people from another department at the institute should also have participated, but time constraints enforced their absence. The participants had experience with both policy-relevant and

business-relevant contract research, where much of the research was funded by programme grants. The institute's research is mainly interdisciplinary.

Group 4 was held in Oslo at a research institute for the natural sciences, where the participants had mostly experience with public clients. Three participants were involved in the discussion, and their professional backgrounds were in mathematics, oceanography and geophysics, respectively. They described the main part of their research activity as applied research.

Group 5 was conducted at a college with participants whose backgrounds were in the natural sciences. There were three participants in the group, representing the disciplines of microbiology, biochemistry and technical disciplines.[4]

In this report we inquire into which factors may be significant for whether a contract research project is conducted in accordance with research ethics. In the following we will review some of the main statements that emerged in the five group interviews. Such a review will not assess the ethical defensibility of the research conducted by the participants, but is rather intended to help us see what contract research potentially consists of, and also help us identify which aspects of contract research that may be experienced as problematic.

4.2.3 'Contract research is primarily knowledge that is paid for'

The participants in the group discussions related their perceptions of contract research to their own activity and experience as researchers. The various researchers seized to a certain extent upon different dimensions of the term contract research, ranging from financial aspects to which parties may be involved. In itself this reflects that contract research is an expansive term with many different angles of approach. The participants' statements on contract research seemingly present a group whose experiences separated them more than united them. This impression may in part be because we sought insight into different types of contract research, and therefore

[4] The five focus groups comprised: *Discussion I* with D1 female, social sciences, D2 male, social sciences, D3 male, social sciences, D4 female, humanities; *Discussion II* with D5 male, medicine, D6 male, medicine, D7 male, medicine/social sciences; *Discussion III* with D8 male, graduate engineer, D9 male, agronomist; *Discussion IV* with D10 male, mathematics, D11 male, oceanography, D12 male, geophysics; *Discussion V* with D13 male, biochemistry, D14 male, microbiology, and D15 male, technical disciplines.

deliberately recruited participants with different qualities. It is nonetheless a useful confirmation that researchers who conduct contract research in Norway experience many different conditions for work and research.

A social science researcher connected to an institute without a basic grant stated: *Contract research is first and foremost knowledge that is paid for (…) the way contract research is used, it includes what in other connections are known as both research and studies* (D2:1). For this researcher the issue of funding seems to be central in characterizing contract research. A researcher from the natural sciences characterized contract research by distinguishing this type of research from basic research: *You have to distinguish between basic research and contract research and draw up a borderline there* (D10:4). One of his colleagues appears to agree: *What I consider basic research to be is the understanding of fundamental physical processes. Why things happen is basic research. (…) Within the EU they would like to have someone who is able to give advice to for example bureaucrats, that is contract research in my opinion* (D11:4). One of the social scientists felt, however, that there was no clear divide between contract research and basic research: *For me, contract research has ranged from very specific research questions to relatively unrestricted grants and an orientation towards basic research* (D3:1). In his opinion, this wide range of contract research is related to the large size of the institute sector in Norway, and that researchers at Norwegian institutes usually research the same types of problems as university researchers in other countries. From the above it is apparent that funding as well as the different types of research questions are relevant for characterizing what researchers consider to be contract research. On this basis we can say that use of the term contract research will vary in relation to specific settings.

It is not only the delimitation of the term contract research that reveals something about the researchers' perceptions of contract research. One of the college researchers described what role contract research should play at such a research institution: *My motivation for undertaking contract research is to strengthen the disciplinary area, purchase equipment, be financially independent – if I had to depend on the institute's money bin, I would hardly be able to take the train to Oslo. So that's why I think contract research is interesting, to strengthen the disciplinary area, but then it must be channelled back to the disciplinary area and not disappear down the*

drain. But at the same time I believe that contract research should be coordinate, contract research projects are often very specific, and it can be very interesting if you have fundamental research in progress, and then you have some seedlings shooting up (…), but if you have contract research as your foundation, then I would have big problems. If we can have basic research that is controlled by researchers as our foundation and can undertake contract research, then it can be very positive (D15:4). This researcher points out how contract research can function positively if it is limited to a kind of supporting role, while simultaneously emphasizing that basic research controlled by researchers must be the primary building block in the institution's research activities.

Research is to a larger degree than before incorporated in society and comprises several types of concerned parties (Gibbons et al. 1994). This applies to all levels of society, that is to say that more parties concern themselves with research, but it also applies specifically to the execution of given research projects. Two types of parties are usually identified in contract research, namely researchers and clients. In certain cases this represents a simplification of reality. One of the researchers stated: *We have several different parties that we interact with, some who initiate, some who pay for the research and some who are the actual users* (D9:8). One possible example, as described by this researcher, is that an institution wants to conduct a research project which for example local authorities across the country will use or may benefit from, but that this institution cannot afford to fund the research and that a ministry therefore funds it. In such cases, more parties will have to be contended with in a practical sense, and there will also be more parties who may potentially influence the research. Different research institutions can also be said to play different roles in research. In one of the focus groups, one of the researchers described his own research institution as a 'niche institute', with few clients within a fairly limited disciplinary area, unlike other research institutions that navigate within larger areas (D3:8). According to a researcher from one of the other focus groups, some research institutes may be characterized as 'ministerial institutes', something that can possibly be compared to what the former researcher referred to as niche institutes. Ministerial research institutes do not conduct normal contract research, but have, due to their area of expertise, particular institutional foundations and tasks in regard to knowledge production. According to this researcher, there may be limitations in such a mode of organization. The researcher stated: *(…) I have some fairly interesting experiences here,*

because we have actually experienced a couple of times that these ministerial institutes have been pleased when our organization has presented certain critical perspectives and suggestions (…) [it is] interesting that we are allowed as a contract research institute to say something, it becomes a somewhat caricatured world if the perspective here is that 'the world of the contract research institutes' is problematic in regard to independence [when we have] experienced that it is those who should be in the centre of things who are asking us to deliver the critical comments (D8:2). We can therefore state that research institutes have different types of clients and different focus in their project portfolios. The question is whether certain disciplinary areas and organizational affiliations have any bearing on the degree of freedom that applies to the research that is conducted at the research institutions. As we shall see further below in this chapter, some of the researchers have experienced that some clients, especially in the public sector, have attempted to influence among other things the publication of the given research (D9:3). It is conceivable that so-called niche institutes or ministerial research institutions are more exposed to such pressure than research institutions that do not have long-term relations to certain parts of the public administration.

The Research Council of Norway was on several occasions mentioned in the group discussions. As we saw in Chapter 2, there are different viewpoints on whether research generated from the Research Council falls within the definition of contract research. It may be useful, however, to include the viewpoints on the Research Council as a contrast to normal contract research. The researchers referred to their experiences with the Research Council primarily when discussing the initiation phase of their research projects. As one of the researchers said: *In programme research the problems arise beforehand, while in ordinary contract research it depends on the results* (D3:3). Two main points emerged. Firstly, several of the researchers spent a good deal of time on writing grant applications to the Research Council. This can be considered to be a funding problem, in the sense that the economy of some research institutions depends largely on for example programme funds, because the basic grants have declined (Maus 2001:57). Secondly, the researchers felt that they did not have the possibility to write applications that reflected their genuine research interests. Several of the researchers perceived it to be a higher priority for the Research Council that the 'right' terms and approaches were presented. This was referred to as adjusting to 'political correctness' and, from the researchers' viewpoint, the 'clouding' of clearly

defined objectives. As a contrast to programme research, including so-called strategic institute programmes, one of the participants said: *(…) contract research projects have been much more stimulating for me as a researcher* (D1:2). One of the researchers expressed frustration at how much time and energy is used in order to become attached to the programmes, which are then evaluated according to criteria that are hard to fathom (D9:10–11). The importance of knowing someone is referred to as a key problem, something the following statement may indicate: *(…) I have myself been a member of programme committees, and I know that is very often a process where we allocate funds to those who are members and then we see how much is left (…) we're basically sitting there and thinking: do I know anyone on the programme committee, and if not then it is often my recommendation not to apply or submit any outlines at all* (D15:10–11).

When the researchers refer to their own experiences from contract research, they naturally enough emphasize different aspects that largely reflect their own circumstances. Researchers at institutes that largely depend on contract research may be less concerned with the division between research and studies, because both types are in demand without any clear differentiation from the customers. A researcher from within the natural sciences may perceive a clear division between contract research and basic research on the basis of what type of projects that are usually funded by so-called external funds. Even though several other aspects may influence the researchers' perceptions of contract research, it appears that funding conditions as well as the given disciplinary area help shape these perceptions.

4.3 On freedom and helplessness

The researchers have different experiences regarding how and by whom the topics of their research are defined. It turns out that the manner in which research plans are formed ranges from specified, completely defined plans to projects that are more or less initiated by the researchers themselves. It seems as though the researchers view the possibility of influencing such plans in relation to the degree of freedom they have as researchers.

One of the participants, herself a social scientist, stated the following: *I would probably say that contract research within the social sciences and the humanities is slightly freer than other*

contract research (D1:2). She states further that freedom seems to be more limited in medical and odontological research. Some of the statements made by the medical researchers in another discussion support this claim. *(…) protocols are made in other countries and you can always grab a piece of these studies* (D5:5). Protocols are descriptions of the research plan that the individual research projects are to follow. If the protocols are made in other countries and are already established when Norwegian medical researchers apply to them, it is self-evident that these researchers will exert a fairly limited influence on the research plan. The medical researchers referred to themselves as data collectors. One of the researchers expressed the following: *(…) we are very helpless when it comes to writing protocols, they are unfamiliar with ethical committees and the like. As a researcher you try to find parts of the projects that suit your own field of interest* (D6:3). The statements leave the impression that researchers are dissatisfied with this manner of conducting research, but mechanisms nonetheless exist that make it attractive for them to participate in such ready designed plans. The concept of 'competitive inclusion' entails certain incentives for physicians who collect research data, where exceeding a given quota is rewarded with financial benefits. One of the researchers felt, however, that such competitive inclusion might have ethical implications because the incentive puts pressure on the projects to be carried out swiftly. According to one of the participants, however, a trend is underway within medical research where it is possible to participate in so-called 'phase 2 studies'[5], where researchers have a larger say and are in a freer position. It is additionally possible, as one of these participants expresses it, to try to turn a profit on some of the contract research projects and then use the surplus funds on self-determined research. Social science researchers, however, seem to have a greater possibility of influencing contract research projects than medical researchers do. Only rarely do potential clients offer a ready defined and clear-cut research plan. In the vast majority of cases, the researchers themselves are involved in one way or another in influencing the design of the research project. This might be in regard to everything from self-initiated projects, where the project is offered to potential funders, to applications in tender processes.

[5] In medical research, research studies are divided into phases 1, 2 and 3. Phase 1 studies are often basic research, while in phase 2 simple experiments are conducted with patients involved. In phase 3 studies, studies are conducted on large groups of patients.

4.4 'Researchers mix profession and politics'

The mixing of profession and politics was addressed in several of the group discussions. The researchers consider several features of the division between profession and politics to be problematic. Research includes certain aspects that may have political consequences and that may in some cases result in it being arrogated by the client or other interest groups.

Political correctness was cited as an important factor when researchers consider possible contract research projects. One of the researchers contended that a researcher runs the risk of being ostracized if he or she expresses an opinion contrary to what is perceived as politically correct (D2:8). The same researcher felt that within certain areas, such as for example tobacco research, there exists a kind of terror of opinion. One of the other researchers in the group discussion cited a specific example that referred precisely to this: *At our institute we had just undertaken a project related to the tobacco industry and some researchers did not want to participate, they did not want to have their names associated with the tobacco industry, because then their reputations as researchers would be damaged. For the institution this could mean that we would no longer be eligible for contract research projects from for example UN institutions* (D1:8). Though the tobacco industry is in all likelihood one of the more dubious clients for many researchers, it is nonetheless not given that the research requested by this industry is necessarily dubious in itself. The fear of being tarnished by the politically incorrect may, however, hinder the opportunity for professionally stimulating contract research projects.

The mixing of the political and the professional can also be viewed from another angle. One of the institutes represented in the focus groups has an explicit policy of being open about the normative basis of their research. Some perceive this normative basis to be connected to the left wing of Norwegian politics and, it turns out, useful as a means of analyzing the research results from this institution. One of the researchers stated: *We have been criticized a few times for, as researchers, mixing profession and politics (…) [in one instance] they [the clients] claimed it was a case of mixing profession and politics and they also made the same claim in regard to a kind of non-existent document* (D9:6). Alleging that the presented results were not professionally sound, the clients rejected the value of the insights, though it is difficult to assess whether this

conclusion was well-founded without examining the case itself. The example does illustrate, however, how a client may assess and potentially reject research results. The institution's political vantage point had also, according to one of the researchers, been exploited as a kind of alibi for the client, where the political vantage point was used to bolster the client's credibility. To be clear and conscious in regard to political values can in that sense be said to entail complications in more than one way. In order to avoid such complications as much as possible, one of the researchers emphasized the importance of being conscious about scientific method and of being familiar as well with the context of the research.

One of the researchers in another focus group stated the following about value-laden and professional aspects in research: *(…) when you talk and write there will in any case be ideological and ethical deliberations that play a part (…) it is better to clarify the ties that you have, I think, than to pretend that you're independent* (D10:2). Another researcher agreed: *What I consider to be a problem when making statements to public authorities, is when they ask (…) about a few professional questions that you can answer without difficulty, but often they want to apply this to things that go beyond those things that concern the research, and in that case I think it is important to specify when you're making factual statements, and when you move on to talking about personal opinions (…) I want to be the one setting the terms, but they will often ask me to say something more, and I can always speculate about it, but then I move away from my professional area and in that case I think the important thing is to indicate that* (D15:15). As mentioned above, it has been claimed that one of the characteristics of today's research is that the division between profession and politics has decreased. The statements presented in this section might suggest that there is something to this notion.

4.5 'Unprofessional institutions lead to private business'

Is it sufficient, in order to meet the possible challenges of research ethics, that the researcher or researchers who conduct contract research act with integrity and display a critical attitude to circumstances surrounding research? Or must research institutions play an active role in order to ensure that contract research is ethically defensible? Experiences referred to in the focus groups

indicate that researchers sometimes have neither the opportunity nor the inclination to assess whether something might be problematic.

Below follow some specific examples of how set-ups with weak institutional foundations are problematic for researchers who conduct contract research. One of the researchers in the focus groups talked about 'weakness in the organization itself' (D13:5) as a central problem. We will first refer to some statements that indicate that some institutions have an inadequate system for conducting contract research, and that researchers feel that they meet little understanding for the implications and costs of research. Thereafter we will present some examples of what consequences this might entail for the practice of an institution.

It is both a stated ambition and an ever-increasing demand that colleges and universities should conduct contract research. This is supported both by public studies and by statements in the focus groups. According to the participants in the focus groups, the management of contract research seems to be more professional at research institutes than at colleges and universities. This pertains for example to contracts. Increased pressure on colleges and universities to initiate externally funded research is not necessarily accompanied by an automatic process of adapting all parts of the research system at the institutions. College and university researchers experience for example that it is not always easy to market their research environment as one that undertakes contract research, because the workings of the institution are not set up for that. The following statement illustrates this: *(…) there is a widespread misconception in society that we must get rid of, [namely that] I receive a salary from the government in order to do my job and that occupies my working hours, and if I undertake contract research I will have to hire people to do my job, so the day is already filled without us undertaking any contract research at all (…)* (D13:6).

According to one of the researchers, the misconception in the public sector is not only that researchers are more accessible than they actually are, but also that it does not cost anything to request specific knowledge. The researcher elaborated this: *(…) when it comes to public bodies, they aren't aware that they have to pay, the ministry sometimes thinks that they can just come and get knowledge from here, just because they used to be 'our' ministry, they can come and get knowledge (…) I have been summoned to a meeting at the ministry and asked to do a study, and I*

think that if I had stood up at the meeting and said 'listen here, I belong to a university department and if you want to know something you will have to pay us 600 kroner [€ 75] an hour', then I definitely think that they would have been very astonished, there was a clear expectation that I had a job to do (D15:9).

There are in other words several types of pressure that these researchers encounter. They are first of all supposed to do their daily work, but at the same time be open to external research projects. Researchers must also act as their own 'negotiators' in regard to the financial aspects. *It is a problem for us that the bureaucracy does not understand things here, they can prepare some of those forms, but when you go out into the market in order to sell yourself, they don't see the nuances, we are supposed to try to get paid almost half the entire sum before the project is even begun, before you've delivered the product, that is something [the institution] never does itself, they usually ask that an invoice be deferred for two months, but when we're trying to collect from others they think it's very easy for researchers to sit and negotiate about getting in half the sum in advance* (D15:5). Another researcher described a similar situation: *(…) when it comes to contract research and also to some extent to user-controlled research, they never follow up, based on my own experiences you spend a lot of your time on organizing, following up, filling out contracts, especially that, you don't get any assistance, you get a form that we can fill out and use, but not any professional help in that area, at other institutes it may be the case that they have that, but as far as I know we don't, and if you ask for some help they say 'call down to some office or another', but they can't really help you either, so it's a big problem* (D14:3). These statements describe the practical conditions of contract research at an institution within the college and university sector. Some of this pressure could possibly have been relieved if the research institutions in question, where researchers experience the type of pressures described above, to a larger degree informed potential clients about the possibilities, costs and other key aspects of research.

An indication of little awareness at a research institution regarding the external funding of research may be the lack of differentiation between long-term research and research that verges on being a study. One of the researchers said: *(…) if a company such as [a named company] says they want to see things in a long-term perspective, for example they want to station two PhD*

candidates with us, if I use [the routines of a private research institute] it will cost [the company] 2.5 million kroner [€ 300,000] every year, they are totally out of their minds if they do that, they should never go down that road. [This company] should of course be allowed to sponsor some of the more long-term and diffuse projects if they want to be involved in a certain area, and that should cost far less, but our leaders don't understand that, they don't understand a thing. If I'm assigned a project and am supposed to do a study, I have no problems with billing as much as my lawyer, but when it comes to more long-term commitments from companies, the bureaucrats don't understand that this is something entirely different from testing the fat content of mayonnaise or whatever (D13:5). This example shows that the different types of external funding cannot necessarily be considered as a whole. One should be able to charge different prices according to what value the research can add to either the institution or to society in general. If the knowledge is more narrow or short-term, a higher price for the researchers' services is defensible. This may be an important distinction for the college and university sector in light of the discussions on the commercialization of research. The report from the Bernt Commission (NOU 2001:11) specifies that the commercialization of the colleges and universities must not undermine their long-term and fundamental research.

When an institution lacks clear rules for how resources should be used and recouped, a consequence is that the system may be 'exploited' by certain researchers. The researchers in one of the focus groups provided examples of this: *I also don't like it when private business is transacted too much, because then people take what belongs to the institute, and that does after all seem to be unfair to the rest of us* (D14:6). This point was elaborated by one of the other researchers in the same discussion: *It is actually an ethical problem and not a small problem, I can't do much without using the [institute's] infrastructure, so I can't think about doing things in the evening, (…) there's a lot of hardware, and there's a lot of expensive chemicals and so forth, and in any case you would certainly want to combine such things with research, but of course I know that at [a named institute], where the research is more paper-based, for example the economists and such, very many are among the most highly paid (…) and now you probably think that I'm jealous, but I think that it's totally reprehensible to be a researcher at a university and then sell your expertise privately, that is flat-out wrong, and there are many who disagree, I understand of course that it's tempting and that the salaries are perhaps not as handsome as they*

should be for some (D13:6). His conclusion was as follows: *If contract research is to be conducted at the universities without endangering their independence, the universities must be reinforced in every possible way, in management, funding, appropriate staffing – that is my hobby-horse* (D13:3) The threshold for not transacting 'private business' seems therefore to be determined by the researchers' own norms for whether it is acceptable to use the institution's resources for personal gain. One of the social science researchers deems it problematic when university researchers become so-called 'kitchen table consultants' and conduct research (D1:3). She explained: *(…) I [think it is] very unfortunate, that people at the university spend their time on this, because the university researcher is a part of the university, so it's even worse that an individual does this than that the institute undertook it and did it (…) At least he shouldn't be paid, [it is] probably an obligation to society that a university researcher should be of use, but I don't think he should be paid beyond his normal salary, (…) I believe that individual consultants may be a part of cheapening the university as a whole* (D1:4). As one of the participants says, however, there are several researchers who would claim that personal gain outside of the system is entirely appropriate, because the system is unable to provide researchers with a decent salary for their regular activities (D13:6).

Within certain disciplines, such 'private business' may have consequences that directly affect parties who are not involved in the research. In the focus group featuring the medical researchers, questions were raised about physicians who conduct research in their working hours and in practice have the possibility of receiving a double salary. According to one of the researchers, this might have ethical implications in the sense that patient backlogs increase if physicians conduct contract research rather than treat patients. The other participants in the discussion saw this dilemma and agreed that it would be unfortunate with too much contract research (D5/D6/D7:5). The picture is, however, not as clear-cut as it might seem. The researchers emphasized that certain benefits are also derived from contract research, for instance in the form of contacts, networks, meetings and financial subsidies to the institution or the researcher (D5:6). It is unfortunate, however, if arrangements like the one described above are widespread, and not a part of a research strategy. If it is true that medical research in Norway is as dependent on the pharmaceutical industry and contract research as these researchers claim, there is every reason to inspect the advantages and disadvantages that the different arrangements have in relation to

researchers, patients and society in general. The experiences show that researchers who are expected to conduct contract research are in need of institutions having carefully thought-through systems for this type of research. In addition, we have seen that it is not only researchers who need protection. Research institutions and more general social interests may suffer additional burdens because certain researchers exploit a system that does not work.

4.6 Pleasing the client

One of the most frequent objections to contract research is that researchers allow themselves to be influenced by the desires of their clients. But what does it mean to be influenced by a client, and is this something that is negative in every case? The research question of this report highlights confidence in research as a key issue, and the question here is whether potential influence may lead to diminished confidence in research. When influence is exerted, there is always one party who influences and one party who is being influenced. In addition we presuppose that influence may potentially be exerted during every phase of a research process. It is primarily in the publication phase that influence becomes visible, when for example a final report is withheld or modified. Influence may, however, be exerted in the initiation and execution phases as well, by the client consciously or unconsciously laying down provisions for the research. In this section we will examine the different ways in which research may be influenced.

The term influence does not state anything about who is the active party in influencing or being influenced. According to some of the researchers we have spoken with, as we shall see below, it is not exclusively the case that clients deliberately try to exert influence, but that influence nonetheless takes place by the researcher taking the client's expectations into consideration. One of the social science researchers felt that contract research can be problematic precisely because a bond exists between the researcher and the client: *The big problem with contract research is that the client expects something, exerts pressure or expresses certain desires. He is after all paying for a good and wants to have a product that is useful to him* (D2:5). In other words, this researcher apparently believes at the outset that contract research is biased towards the client precisely because of the relationship that exists between the researcher and the client. The above statement differentiates in a way between the different degrees of influence that may exist

between client and researcher: ‘expects something, exerts pressure or expresses certain desires’. An expectation may be perceptible even though it is ‘passive’ and implicit, while exerting pressure or expressing more specific desires may suggest an active influence on part of the client. It is not given, however, that it is the client who is exerting the pressure. One of the social science researchers stated: *I believe that the problem is something other than clients trying to control the results. A greater challenge is self-censorship, you try more or less to please the employer, you compromise a bit more than you should, for example in the final report (…) some researchers try to please the client more than they should* (D3:15). Researchers themselves can therefore be said to define what expectations the client has, and that they can also fulfil these expectations as a way of ensuring their own position or standing with the client. One of the others followed up on this point and recounted certain experiences from her own institution, where researchers have on occasion wanted to please the client and thereby gone too far in their conclusions (D4:16). Another participant elaborated further: *You have a client who expects certain special conclusions and this is a challenge you meet as a researcher, and in meeting the challenge most people avoid cheating, but it may be tempting to compromise your position, and this has to do with the context it is all wrapped in, and many small, imperceptible choices that may be advantageous to the client* (D2:16). The participant believes that one of the greatest ethical challenges in contract research is to exert self-control, both individually and at the institutional level. One of the researchers who works in the college and university sector stated the following about the reasons why researchers become too dependent: *(…) what I consider to be an important point is to what degree you feel that you are ‘in the pocket’ (…) I don’t want to attach myself too closely to a particular company, precisely in order to maintain my independence so that I may also undertake projects from a competing company, it’s important for me that I don’t attach myself more strongly than that a competitor can come to me and ask me to undertake another project* (D15:13). Another researcher in the same discussion recounted such experiences: *I’ve been involved in a case like that, which actually resulted in a project, where I was told by one party that ‘we’ll only participate if the other party is forced out’, there were two companies that supported the application, I thought it was a very unpleasant situation, I did it because I wanted the money, I wanted to write the application, but at the same time I made sure that there was nothing in the application about the companies, I gave them nothing* (D13:13).

If a company or an institution wants to have research done on a special topic or problem, it is understandable that they would want to have influence on the project. Reference groups and steering committees are examples of quality control done by the client. One of the researchers stated the following about how a client may expect to be involved in the research process: *The client envisions ideally a whole series of meetings, steering through committees and so forth, but in actual practice that often doesn't happen, they are unable to live up to that and very often such structures have a tendency to come to nothing* (D8:8). Such committees may be of assistance to researchers in their work, in the sense that the client can contribute with information that is relevant to the research. But in that case, as one of the participants said: *[it must be] a part of the project's method, not as a control of the results (…) the ministry is still entitled to see reports, evaluations, feedback once in a while, which we think is in a grey area. Last time [we had to] say that we actually wanted it that way, this was something we wanted to keep. They make changes and say 'we think this part is unfortunate' and sometimes we've had to make concessions, there may be doubts, but other times we haven't wanted to and they've accepted that. That is the closest we get to a steering committee, that they are a kind of editorial board for the final report, this has to do with control, but they have to give up controlling the process itself because they don't have the time* (D9:8,9) When questioned as to whether it is advantageous to have the client present in the entire research process, one of the social science researchers replied: *(…) often it's 'a pain in the ass', those appointed reference groups are often just horrible (…) in general it's totally okay if they keep clear* (D3:12). One of the other researchers said that the relationship to the client could be problematic if the client consisted for example of several ministries and the researcher had to contend with many different interests (D4:12).

As seen from one of the statements above, it is not always feasible for clients to implement a complete quality control. It is often the case, however, that they through for example reports may discover things they disagree with and may then comment this based on their own agenda. The question here is whether the client, through so-called quality assurance, can try to exert influence in ways that are incompatible with what would considered to be sufficiently autonomous research. Even though researchers may consider the given arrangements to be inconvenient or disruptive, such arrangements are not necessarily contrary to the norms of research ethics.

According to several participants, clients have influenced or attempted to influence researchers on several occasions. It should be pointed out, however, that influence is not problematic in itself, and it can also be generally maintained that the parties in a given relation will necessarily be involved in a mutual relationship of influence. Nonetheless, there might also be good reason for taking a closer look at deliberate attempts to bind researchers closer to a client. Methods for creating social bonds between the client and the researcher were debated in the group discussion featuring the medical researchers. A role that exists in several pharmaceutical companies is the so-called 'external relations officer'. One of the participants said: *(…) it's strange how it's always the marketing department that sends invitations to these meetings, it's not the company's medical department and that certainly says a bit about the purpose of these invitation* (D5:10). Another participant did not see the big problem in being so-called 'bought' by being sent to a convention at the expense of a pharmaceutical company (D7:11). Another participant comments: *People think that physicians do not allow themselves to be influenced, but you can after all see on the sales charts when he's been out travelling* (…) (D5:11). It is not easy to pinpoint exactly which influences that may be problematic. As we saw above, influence may for example be exerted in connection with the planning of the research or the publication of the results. But the researchers' experiences show that influence varies from one client to the next. As one of the participants stated: *Clients vary in their attitudes towards following up. The World Bank (IBRD) follows up very actively (…) specific feedback on slides and such, but it's okay because they're competent, but then we have the Ministry of Foreign Affairs, the only thing they do is meet up at the launch, so it's very different* (D1:13). In this statement the term 'follow up' was used, something that can be interpreted as a form of influence. But here it is used as a positive element, as a contrast to the passivity of another client. This suggests that we should avoid a one-dimensional perception of the term influence. When asked in what way the client is present during the execution phase of the project, one of the social science researchers replied: *That depends on the type of project and the type of client, so it varies* (D3:12). According to the same participant, it is sometimes good if the clients are involved in the research through for example reference groups, but in general it is fine if they keep clear (D3:12). It was not specified whether the term 'good' referred to the personal work process or the professional quality of the research. One of the other participants stated explicitly that he considered it to be a bad omen if the clients stay away when the research is being conducted (D2:13). According to some of the participants, there are certain

generalizations concerning relations of influence that are incorrect, for example that it is those clients who are primarily interested in making a profit who are also the most problematic when it comes to exerting influence. One of the participants asserted to the contrary that profit-motivated clients often have long-term interests in the market, and that it is therefore to their advantage that the research they have initiated is aboveboard (D2:12). At one institute the researchers experienced that the Ministry of Transportation and the Norwegian Air Traffic Management, in their capacity as clients, tried to halt the publishing of a certain research report. The researchers at the institute published the report nonetheless, and one of the focus group participants referred to the experience in this manner: *(…) I have to say that some of the most demanding processes in this regard [publishing] have been experienced with the public sector, though this is of course related to the public sector being a major client, but such processes have in any case been problematic in regard to the public sector, not the private sector. The entire correspondence with the Air Traffic Management and the Ministry of Transportation was designated as classified information* (D9:3).

Influence can also be perceived more indirectly. Already before the actual research is begun, a client may ensure that the premises for the research undermine the researchers' possibilities of casting a critical gaze on the given topic. One of the social scientists described a type of contract research that deals with evaluating measures that have already been implemented. Such projects may have ethical implications, according to this participant, because the instigator of the research is the very party that is to be evaluated and has also has instigated the measure in question. The client will sometimes order a so-called process evaluation instead of an effect evaluation, something which according to this researcher is far less binding. As a researcher he has in such situations experienced being assigned the role of 'partner', as opposed to an impartial evaluator. The researcher explained further that the haplessness of this situation is largely due to the fact that those who order the evaluation are often very involved in their work and that personal interests therefore come very much to the fore. The researcher claimed that a different way of organizing who orders for example evaluations could result in a situation where: *(…) the ethical problems would perhaps not be of the same kind as those we experience today* (D3:5).

4.7 'Milking the projects and work hours'

In one of the discussions it was debated whether economic pressure might compel researchers and institutions to undertake contract research that does not correspond with their expertise or with realistic schedules for conducting the research. One of the participants describes the situation in the following way: *(…) you need employment and that can soon become a dilemma in regard to how much you can milk the project* (D3:6). It is somewhat unclear what exactly is meant by 'milking' a project in this statement, but even though the 'milking' refers to financial earnings, it might nevertheless have consequences for the research that is conducted. Another participant described the temptation of submitting a tender, despite lacking the necessary competence, in order to 'fill up' the need for research projects (D1:7). Contract research projects are in other words 'milked' with regard to competence, according to these informants. A consequence of researchers undertaking contract research that does not correspond with their competence is that the projects exceed their time frames. This will not necessarily be noticeable to the client, in the sense that researchers work outside of normal work hours. Several of the focus groups participants had experience with exceeding the original time frame of the project. As one of the participants described it: *(…) if things go down the toilet, then people work a lot for free, obviously* (D3:7). This indicates that researchers are in certain cases exposed to fairly large pressure. There is pressure at the outset to fill up the project portfolios at the different research institutions, but there is particular pressure upon delivery if it turns out that the project was not sufficiently balanced between the professional demands and the financial frameworks. There is perhaps not a strong connection between such pressure and the ethical relevance of these conditions, but several of the researchers apparently feel that this pressure can undermine their work. One of the researchers at an academic institution said: *I believe it would have been much better if the university had conducted contract research from a position of strength. The problem is that we are so hard-up, we have to say yes to everything and I believe that we're doing a few projects where we aren't competent enough, that we should say to such a company 'go there instead', but of course we don't do that, we can't afford to* (D13:1). The financial situation seems in this way to pressure researchers and research institutions into undertaking contract research they otherwise would not have undertaken, even though they lack sufficient expertise to do the research.

4.8 'Research results end up in the drawer'

For many of the researchers we spoke with, the publishing and public disclosure of research results was a key point in regard to research ethics. It turned out that several of the researchers had experienced that research results were in different ways 'put in the drawer'. The researchers do not unequivocally consider this to be negative, however, and contend rather that it is at times both understandable and unproblematic. In other instances, the client's desires for how the results should be handled or presented may frustrate the researchers.

In some cases, researchers consider it to be unproblematic that the client wants to postpone the public disclosure of the results. In public institutions in particular it does not seem uncommon that research results, prior to being made public, are subjected to an internal evaluation by various bodies (D2:10). One of the participants mentioned a specific example from a research project where the client, a ministry, decided that due to political considerations it would be unfortunate if the knowledge came out (D1:10). This participant did not see any problems with such a postponement, while one of the other participants in this discussion had a clear opinion on the withholding of results: *My impression is that such desires, to the extent that they are expressed, are due to illegitimate interests, people don't want the truth to come out* (D3:10). One of the researchers in this discussion did not think it was of decisive importance that all the results of contract research should be publicly disclosed. Even though the results are not made public, the client may still undergo a kind of learning process, and even though such complete disclosure would be nice in an ideal world, the question should be asked what the alternative is – if researchers demand complete disclosure at all times, this could possibly compel a few potential clients to refrain from initiating research (D2:11). This was a viewpoint that met little understanding from the others in the discussion, with another participant citing a case where various allegations about unfortunate political ties were made against a research institute. In this case it was an advantage, according to this participant, that the institute had as a principle that all research results should be publicly disclosed (D1:10). If the client only publicly discloses certain parts of the research results, that would put the matter in a different light, according to this participant, who does not necessarily think it is imperative that research results are publicly

disclosed in every instance. Attention in for example the media will necessarily result in a skewered picture of the research if only half of the results become 'visible' (D2:11). The right to publicly disclose the results is important for most of the focus group participants. However, researchers, or the institutions they represent, do not always insist that such disclosure should take place immediately upon completion of the project. As one of the researchers stated: *It sometimes happens that we wait for a while, [the clients] often have a need for a few internal processes* (D9:3).

The medical researchers offered several examples of ethical problems during the publication phase. In the discussion it emerged that pharmaceutical companies are often unwilling to disclose negative results, i.e. results that indicate that certain medicaments do not have the desired effect (D5:7). As one of the researchers described it: *Conflict arises when you interpret your data (…) it's totally obvious that the pharmaceutical company calls the shots when it comes to publishing and to who should be credited with authorship of the publication, [I have gone] a few tough rounds with clients, the toughest was a few years ago when there was some data I never obtained from the pharmaceutical industry, allegedly because the data was to be analyzed further, but really it was because the results did not suit them. Then the summer holiday arrived and a deputy sent the data, I notified a congress of this, but the company made sure that this paper was withdrawn, the congress administration contacted me and allowed me to deliver the paper nonetheless and I published it later on, but I was blacklisted for ten years by this firm, then I was back in their good graces, and now I find myself in the same situation once again, they will not give me the data* (D5:7). One of the other medical researchers has experienced that the client has held discussions about the interpretation of the research material. The researcher described this in the following way: *(…) it's clear that they want to stretch things, and that is of course never pleasant, I've experienced that twice (…) they [the clients] exaggerated the importance in a positive direction, there was simply no truth in it, it was unpleasant (…) of course it ended up with a compromise and it [the interpretation of the material] became pretty fuzzy* (D6:7). One of the other researchers agreed, adding that: *a process like that will often result in compromise, and that's fair enough, but I want to feel that I have the final say* (D5:8).

There are in other words several things that researchers may experience as problematic and unpleasant. Firstly, it may be difficult for the researcher to access raw data from the research that he or she has conducted. Secondly, it is a problem that medical researchers experience pressure in regard to how they should interpret the results. In addition it seems as though the pharmaceutical companies want to control how the results are disclosed. An arrangement that several pharmaceutical companies use is the so-called 'medical writer'. These are people who have not been involved in the research itself, and who are often based in a different country from where the research is conducted, and who are supplied with raw data and then write scientific articles about the research results on the basis of this data. This means that those who have conducted the research are barely allowed to contribute to the analysis of the scientific material, if allowed at all. One of the researchers described a case where such a medical writer was employed: *We did a very demanding study of children and we received very solid data, we were going to have a publication meeting in Copenhagen and two people from the firm [the pharmaceutical company] presented a finished publication with raw data, the primary writer was not there and it turned out to be some guy from God knows where, there was a total uproar, we were having none of that (…) we got him dismissed* (D6:8). In this case it was evidently possible for the researchers in question to circumvent the pharmaceutical company's arrangement. The term 'medical writers' seemed to be familiar to the participants in this focus group, something that indicates that the use of such writers is a practice that is in vogue. Something else that indicates that the pharmaceutical companies want to control the publishing, is their desire to read the articles prior to the articles being sent to peer review. The medical researchers were fairly specific about mechanisms that could remedy some of the identified ethical problems. One of the researchers suggests for example that ethical committees should issue a kind of 'publication guideline' that specifies certain rules for publishing the results (D6:7). One of the other medical researchers believes that an independent committee should be appointed for each research project, one that has access to raw data and that is obligated to ensuring that publishing takes place in due time (D5:7).

The researchers from the natural sciences state that they have not experienced problems during the publication phase, for example with regard to censorship or such on the part of the client (D12 /D10:8-9).

(…) it is very important that the researcher has a very conscious attitude, that you have thought through what attitude you should have towards the client, so that you do not quote-unquote 'end up in the client's pocket', that you indicate that you are in a free position and that this is specified in contracts and all that, whether you can publish the results afterwards (D15:4). *I can certainly do a small project where some of the more peripheral aspects aren't published, but it's totally inconceivable to have that as the normal modus operandi ….of course I want to publish. It has to be agreed upon in the contract beforehand if publishing is not intended, but it would have to regard certain special aspects* (D15:16). *There is a regulation in today's university system that puts the brakes on complying with such things, namely that the only way we achieve scientific credit is through publishing, so most of us would not be interested in contract research where we aren't allowed to publish, there's a kind of small security that lies in the system, it's sort of unconscious (…), but it's there* (D13:16).

Pressure and influence do exist, but it is not easy to draw clear-cut conclusions on how this transpires, whether it is intended by the clients and whether it results in problematic consequences for research ethics. Some of the specific examples that were mentioned by some of the researchers indicate, however, that some forms of influence or attempts at influence are hardly in accordance with what we regard to be the researchers' autonomy. Clients who want to control the results should for example not be allowed to edit parts of the final report (cf. D9:8-9).

Another tendency in the statements is the perception that clients from the public sector are more inclined to 'pressure' the researchers than clients from the private sector. The researchers' 'internalization' of the client's expectations may be a sign of the dependency they feel to clients. Many researchers work at institutions that largely depend on external funding, something that might increase the need researchers precisely feel to 'please' those who ensure the funding.

4.9 Vagueness regarding contracts and evaluations

Contracts were something the participants only rarely brought up of their own accord in the discussions, but contracts are normal according to most of the participants. Not everyone, however, has a standard contract (D11/D12:7). What was otherwise mentioned about contracts

was that they regulate the financial relationship between the parties, and that they detail what the research institution promises to deliver, what the client commits itself to do and what will happen should the conditions not be met. According to one of the social science researchers (D1:12), professional aspects are covered by appended project documents.

It almost never occurs that a researcher participates in evaluating their own projects, according to one of the social scientists connected to a research institute (D3:14). One of the other social scientists has experienced that the institution she was connected to conducted user surveys aimed at clients and at evaluations conducted by the Research Council of Norway (D1:14), while another participant stated that most projects at his institution involved internal evaluations (D2:14). The final participant in the group pointed out that many researchers would very much like to evaluate their research projects (D4:14), something the other participants in the group agreed with, but which they considered to be unrealistic in anything but an informal form due to time constraints. As one of the participants put it: *We simply don't have the time and resources for it, to engage in institutionalized hindsight, after all you use the experiences you have and informally you do of course know this* (D3:14).

4.10 The role of contract research in society

On several occasions, the focus groups discussed the role that contract research plays and should play in society. The notions of usefulness and benefit are often central in discussions on contract research. In this section we will examine how researchers perceive the role of contract research in society.

One of the researchers expressed what he considers to be the common perception of research in Norway: *(…) society at large believes that research is a waste of time if we don't have a patent within a year (…)* (D13:1). In this context useful research is something that leads to a patent for a solution or a product. The same researcher explained further that Norwegian politicians are too preoccupied with the financial gains of research and fail to see what research can contribute in itself. There are in other words several values that may stem from research, but some of them may be less visible because a too narrow definition of the term usefulness is employed. In order

to see the usefulness of some research, there must for example be willingness to adopt a longer time frame.

One of the social scientists detailed more closely how the different research tasks should be distributed. Basic research and applied research must collaborate in order to achieve a so-called 'quantum leap' in research. Contract research also plays a role here, according to this researcher, who clarifies with a touch of irony: *(…) in this social collaboration it's okay to say that those who are the most adept at developing methods and theories can work at the universities, while the rest of us, who don't have brains that are that sharp, can work on contract research* (D2:4). The same participant felt that a disadvantage of researchers freely pursuing their own interests is the possibility that no one else has any use for the results of those pursuits. One of the researchers from the humanities supported this, saying the following about contract research: *You're forced to use the knowledge so that it doesn't lie around as a kind of dead knowledge* (D4:1). She explains further that the lack of funds is felt as a problem, but that precisely the shortage of resources can create innovation and new solutions. One of the researchers from the natural sciences stated: *The nice thing about contract research is that it's purposeful and controlled, (…) I think it's motivating to have clear goals* (D12:1). This opinion does not seem to be unequivocally shared by one of the medical researchers, who stated: *Contract research doesn't contribute that much to intellectual development* (D6:4). However, the same researcher also said: *(…) [we] should not only treat patients, but do research and development as well, good contract research is very important* (D6:5).

There is evidently a difference between 'good' contract research and other contract research. In other words, there is a potential in contract research that is not always exploited. Contract research must be of a certain quality in order to fulfil expectations regarding benefit and actual use. One of the other medical researchers described how he has for years depended entirely upon research funds from the pharmaceutical industry, and how he must try to turn a profit in the projects he undertakes in order to have the possibility of pursuing his real research interests. He described this work method as far from ideal, but as long as the public sector does not offer contract research, it is hard to break away from a dependent relationship to the industry (D5:2).

One of the research institute researchers pointed out that it is not easy to produce every type of knowledge at his institute. He explained: *(…) I don't think it's just a good thing to be at an institution such as this one. The workdays are pretty tough, to have to battle, there's some knowledge that is hard to produce here, [for example knowledge] that is time-consuming, we certainly have to fight to get long-term projects at our convenience. It's been a difficult struggle to write articles (…)* (D9:12). This experience is possibly due to there being a certain distribution of labour among the various knowledge producers in Norway. This might be frustrating, as this researcher put it, when there is a need for professional development and specialization that may often only be possible in research projects of a certain duration.

Another question arises regarding the possibility of writing articles in connection with research projects: Is the usefulness of research adequately exploited when 'the product' is delivered to the client? As previously mentioned in this report, peer review in scientific journals is a key source for the quality assurance of research. From a professional viewpoint, it is conceivable that feedback solely from the client will be more narrow than feedback the researcher receives from for example an international journal. One aspect that is thus pointed out is long-term projects, and it is open to debate whether it is such projects that should be the research institutes' mission. Another aspect is whether research is conducted thoroughly enough, in the sense that researchers are given the time to review the professional gain of the work, and not only its usefulness in regard to the needs of the client.

One of the research institute researchers pointed out that clients are often only interested in the product they have ordered: *[The clients] aren't that interested in the more scientific foundations or their potential development* (D12:6). Colleges and universities have, at least traditionally, been the institutions of long-term research. One of the researchers who is himself affiliated with a college problematizes the pressure that exists at colleges and universities to undertake more contract research: *To return once again to contract research at a place like this [college], it is totally out of place here (…) if we are going to sell knowledge, then of course we have to have this knowledge, and that is what people like Kristin Clemet [the Minister of Education and Research] have a tendency to forget, that you actually have to have something to sell, and it is costly and expensive and interesting to do fundamental research* (D13:12). One of the researchers

at the same institution addressed the same topic: *(…) when are we going to have time to obtain new knowledge? You can run completely dry for knowledge, you can then work a double shift, work as usual during the day but in addition also produce new knowledge in the evening without pay.…* (D14:3). The unreasonableness in this work situation should be fairly obvious. Contract research does not necessarily have to be so-called short-term, but it is funded by clients who often lack the opportunity to view the research they order in a longer perspective. The lack of time for specialization is, as expressed by some of the researchers we spoke with, a problem that exists both at research institutes and at colleges and universities. The question here is whether contract research, such as it currently works in society, should take up a greater space than it already does. Such as the above researchers may be understood, it is not contract research in itself that is the problem, but rather that there is too much of it compared with for example research that affords greater opportunity for professional specialization. Close attention should be paid to how society distributes the work of achieving the various types of benefit it has identified. There seems to be a need for a greater awareness regarding what may be beneficial, something we will take a closer look at in the following section.

4.11 'Contract research – beneficial for whom?'

The research topic is a specific concern in regard to the benefits of research. In contract research the client often decides what is to be researched. Depending on among other things the type of client, the perspective will vary on what is beneficial. One of the participants, who is a researcher at a regional research institute, explained that their basis of justification is mainly prescribed as achieving a regional benefit, including for example how many local companies are involved in the projects (D9:13). In the group featuring the medical researchers, criticism was aimed at the disparity that exists between research on medications and research on other forms of treatment. *First of all, pills are not ten times as important as other treatments – these 700 million [€87.5 million] to research are made for finding substitutes to satisfactory medicines in order to make a profit. This one-sidedness should be dealt with* (D5:3). Similar to other private companies, the aim of the pharmaceutical industry is to make money. The drawback is that if they as the main party in medical research employ only this perspective on benefit, then other benefits, for example concerning the health needs for vulnerable groups in society, could be undermined. One

of the researchers cited an example related to this problem. In the 1950's a type of antibiotic existed that is currently seldom used because new substitute medications have been developed. The researcher in the focus group discovered, upon conducting experiments, that the older medication was just as good as the new ones, with the only difference being, according to the researcher, that the modern medications were far more expensive. Because his research was conducted without a large marketing operation, this older remedy has experienced a renaissance only in the researcher's local region (D6:11). One of the medical researchers feels that the ethical dilemmas related to contract research should be seen in connection with what we choose to conduct research on. But who are 'we' in this context? There are many different parties in society, and pressure groups may ensure that research focuses on their particular area of interest – an example the researcher cited was men with cardiovascular diseases (D5:12). From one perspective it may be said that new but in reality 'old' medications burden society and the individual patient with needless expenses. On the other hand, medical research in Norway seems to depend on the pharmaceutical industry to initiate research. Many people would consider it unreasonable to impose commercial companies with perspectives on benefit that go beyond profit making and the company's own self-interest. According to one of the medical researchers, it is vital that the public sector increases its funding of independent research in order to correct the imbalances that may result from contract research (D5:11-12). Another participant in the same discussion emphasized that the topics of research should to a greater degree be based on the needs of the patients. These statements highlight a perceived disparity between what medical research in Norway actually contributes and what it should contribute. One of the participants relates this disparity to what he dubs the utopian vision of a society without pain or suffering, where medications shall remedy the problems (D7:12). Another participant questions the concept of beneficial: *Beneficial for whom? In Norway people often think about the benefit to the patient. It's different in Sweden, where they have their own industry – they think about the benefits to the sector as well. We want a Norwegian pharmaceutical industry* (D5:3). According to the medical researchers, the dominance of international contract research in Norwegian medical research has thereby not only adversely affected patients, but also more commercial considerations as well. One of the researchers believes this may be related to a fear of mixing money and research (D7:4). One of the others believed this was also due to the prevailing attitudes towards clinicians and nurses, who perhaps feel that it is easier to attach themselves to a research project that is

'served up' by the pill companies, than to organize research projects along with for example technologists.

The different types of research objectives reflect the different perspectives on benefit. According to some of the researchers, public clients are often more preoccupied than private clients with the potentially symbolic function of research. As one of the researchers described it: *(…) in the public sector, when you present results, they say 'oh yes, tick the box, finished, project completed, good!', private companies are not that interested in starting up projects, there it's more like 'geez, do we really have to spend money on that baloney', [there is a] much greater dependency on the results* (D9:5). One of the researchers from the natural sciences stated the following on clients from the private sector: *(…) ten-twenty years ago the offshore industry (…) had to conduct research [in order to receive drilling concessions] and splashed research money around. Those days are over now, they're looking for results they can use, that's more aboveboard, you know what they're after, they want to extract the oil and gas as cheaply as possible* (D11:5). According to these statements, the perspective on benefit may vary according to who is requesting the knowledge in the various instances.

4.12 Conclusion

What is the general impression of contract research in Norway, based on the small cross section we have gained through the focus groups? First and foremost it seems as though contract research comprises many different ways of organizing research. Some researchers are in the long term only connected to a few clients, while other researchers work with several different clients. This diversity entails that it is difficult to categorically identify what may threaten the norms of research ethics in contract research. A starting point for identifying the unfortunate aspects of contract research would be to review the particular conditions surrounding the different types of initiation, execution and publication, the different types of clients and the other variables of contract research.

The researchers' overall experience of contract research did not seem to be negative, nor did their statements seem to imply any desire for 'free research' instead of contract research. Contract

research is thus not in itself an ‘evil’. On the contrary, it was stated that contract research can be very satisfying given the right circumstances. Comments on the negative aspects largely specified various traits of contract research that the researchers were critical of and which they thought hampered their work as researchers.

Confidence in research is often linked to whether the knowledge has been produced without ties to particular interest groups or parties. Based on what the researchers said in the focus groups, it sometimes occurs that clients attempt to exert influence, while the researchers may at the same time be more or less receptive to such influence. In many cases it will be completely natural and legitimate for a client to make suggestions concerning the research that is being conducted. On the other hand, the researchers we spoke with cited examples where the influence seems to go beyond what is ethically defensible. Several of the researchers mentioned certain aspects, relating to the public disclosure of results, that were problematic when the clients were from the public sector. Ties, however, do not always have to be induced by a client. One of the researchers mentioned self-censorship and the need to ‘please’ the client as important challenges. The question is whether greater attention and awareness about self-control is sufficient to avoid that ‘small, imperceptible choices’ are made in favour of a client’s interests.

The college and university researchers singled out the problems of having a far from professional apparatus for contract research, something that results in the institutions’ infrastructure being exploited by individual researchers for their personal gain. It is open to debate whether this is problematic in regard to the social contract of colleges and universities, as the main part of their budgets is comprised of basic grants (Maus 2001: 43). Given the expectations that colleges and universities should increase their commercialized research, the apparent lack of professionalization in these organizations in regard to handling contract research is problematic and may entail institutional, professional and financial consequences. Researchers may be hard pressed for time when they are expected to conduct external research projects while simultaneously fulfilling the requirements of their regular research. Poorly worked out routines for how to negotiate with potential clients may have adverse financial consequences, for example in having inadequate resources for covering actual expenses.

A particularly crucial matter regarding the quality assurance of research is the general public's opportunity to gain insight into research that is being conducted. Disclosure and openness are therefore central. The various experiences of the focus group researchers suggest, however, that openness is in some cases under threat. Certain examples show that researchers are willing to compromise when it comes to the timing and manner of public disclosure. This may sometimes be justified if it concerns large-scale financial investments that may be imperilled due to competitive circumstances. On the other hand, the justification of such postponements may be more reasonably questioned if it is a case of finding the most politically 'opportune' moment to present the results in public.

Is the mixing of profession and politics problematic for research? And if that is the case, for whom is this a problem? We have seen that the focus group researchers exemplify that political dimensions are exploited both to reject and to embrace research. The notion that research should be neutral is branded as naive, but research can also be characterized as being more or less neutral. So-called 'niche institutes' that are connected to particular clients, for example ministries or directorates, are considered to be less neutral.

What is benefit in regard to contract research? Benefit can be seen in isolation from the viewpoint of the client. This may regard everything from a patent to using knowledge as the basis for an informed political decision. Benefit can also be seen from the wider perspective of society at large. In that case it becomes important to see how different parts of the research complement each other and how contract research works together with other types of organized research. Within certain fields, for example medicine (as was referred to in the focus groups), there is an apparent imbalance between the benefits for the pharmaceutical industry and the benefits for various patient groups. Though medication undoubtedly plays an important role for those who are ill, it remains unknown whether for example alternative treatments might have an identical or greater benefit, since hardly any research is conducted on such alternatives.

Some of these insights will be elaborated in the next chapter, when we review the survey results.

5 The survey

5.1 Introduction

While the previous chapter provided information about the openness, quality and accountability of contract research, as experienced by individual researchers, this chapter will expand upon these insights by presenting the results of a survey answered by researchers. The purpose of this quantitative approach is to investigate how widespread the various experiences are, and to review the potential connections between researchers' experiences with contract research and their disciplinary and institutional affiliation. The survey also highlights various aspects concerning the organization of contract research, such as routines for quality control and the use of contracts.

The chapter begins by presenting the survey and its method (5.1.2–5.1.4), before the general results are briefly reviewed (5.1.5). The analysis of the results is structured according to the three ethical norms of openness, quality and accountability. In each subchapter, the review will follow the phases of the research process: the initiation phase, the execution phase and the publication phase. The chapter concludes by reviewing a factor analysis, where we believe, based on the statements in the survey regarding attitudes towards research, that two types of contract researchers may be identified, namely the 'pragmatic' contract researcher and the 'idealistic' contract researcher.

5.1.1 The universe

A challenge in carrying out the survey was to determine the universe, i.e. the parties that are the subjects of the survey. The universe is given by the research question, and comprises researchers who work at research institutions that may conceivably have undertaken contract research. The Research Council of Norway states that the number of researchers in Norway is somewhere above 40 000 (2002). However, this number includes everyone in the research and development sector (R&D). As mentioned in Chapter 2, in this report we focus exclusively on research activity and not consultancy work. It was therefore necessary to differentiate between researchers who conduct research and researchers who do consultancy work.

It is not always easy to differentiate between research and consultancy work. We have disregarded research that is done in companies whose primary concern is not research. This applies both to the private sector and to the public sector. For example, even though research is conducted by the Norwegian Water Resources and Energy Directorate (NVE), which is a governmental service, research is not the directorate's primary activity. The same applies to private companies such as Norsk Hydro, where research is but one of many activities. The universe of this survey comprises therefore all the researchers who are employed at research institutions, colleges and universities. Information about the universe was acquired from indexes at NIFU (the Institute Catalogue) and the Ministry of Education and Research. It should be noted that there is a difference between so-called scientific colleges and public colleges, something that may affect our interpretations in the college category.

5.1.2 Execution

The survey was done in collaboration with the Norwegian Market and Media Institute (MMI) and was conducted via the Internet. The respondents, after being invited to participate via their work e-mail, filled out a web form themselves. MMI's background data shows that 93 % of the employees within the occupation category 'education/research' have Internet access, and that among those who actually work with 'research/product development etc.' the percentage that has Internet access is 95 % (MMI Norwegian Media Index/ Target Group Index 2001.2). The prerequisites for self-completion on the Internet are in other words fulfilled, and, even though the deduction basis did not include the entire population, we have no reason to believe that systematic discrepancies have arisen due to the method of collection.

There are in addition several advantages to collecting data through the Internet, for example that it is less expensive due to the lack of costs for interviews or postage. As a result we can interview a larger number of respondents, something that affects which statistical analyses and data breakdowns we can subsequently do; the need in this study to e.g. break down the data according to disciplinary area has guided the target number of interviews we wished to conduct. From experience it is also quicker to collect data via the Internet, not least because the data is sent electronically and goes automatically to the database. This also reduces potential sources of error

that might otherwise occur when registering the answers. The manner in which a web form is constructed also increases the security when collecting data. In a web form we can create jump instructions and other validation scripts that make it impossible to answer the wrong question or answer incorrectly by e.g. ticking two boxes in a single-answer question or by simultaneously answering with both a specific alternative and 'don't know' in a multiple-choice question. The otherwise quantitative web forms also provide ample opportunity for gathering more qualitative information through open categories, where the respondent can write whatever is on his or her mind. From such open categories we may often obtain supplementary information that is valuable to the survey.

In this survey we have used a stratified sampling design. The strata were divided into a matrix according to five disciplinary areas (humanities, social sciences, mathematics and natural sciences, medicine and technology) and three institutional levels (university, college, institute). We drew respondents from the various strata with a distribution of disciplinary area and institution that corresponded with the distribution we found in the population (proportional allocation). The respondents' e-mail addresses were drawn at random from the open web pages of the research institutions. We drew a total of 3,879 e-mail addresses belonging to researchers, professors, associate professors or similar positions distributed among the various strata. 3,338 of the e-mail addresses were current, while 541 e-mails were returned to sender as an 'unauthorized request'; these are counted as dropouts. After one reminder was sent via e-mail, we received a total of 1,729 complete and incomplete answers, i.e. a total response percentage of 52 %. We decided, however, to reject the incomplete answers. 1,288 researchers answered the entire form, and the survey is based on these 1,288 answers, something that gives a response percentage of 39 %.

5.1.3 Dropout

The response percentage mentioned above signifies that there was a certain dropout in the survey. Based on our experiences with recruiting participants for the focus groups (cf. Chapter 4), this was largely as expected. We present the table of the dropout statistics here so that the reader may see which areas have had the greatest and the least dropout respectively.

Figure I – Dropout statistics per disciplinary area and institutional affiliation

**[Institute/discipline, Population, Gross sample, Net sample, Response rate per discipline, Errors (unauthorized request), Total response rate]

**[Total, average = 37 %]

**[Universities, Colleges, Institutes]

**[Humanities, Social Sciences, Mathematics and the Natural Sciences, Technology, Medicine]

The table shows that we received a particularly good response from the institutes, possibly because the topic of the survey is more relevant for this sector. We know that people are generally more likely to respond when they are aware of or interested in the given topic. Even though we emphasized in the invitation, reminder and survey introduction that we wanted answers *independent* of whether the respondents themselves conducted contract research, we also pointed out that the topic of the survey was precisely such research. The larger degree of contract research at the institutes (84 %, against 43 % for colleges and 38 % for universities) may therefore have entailed a higher response rate compared with the other sectors. We have no further empirical base for asserting this, and the argument should not be read as anything other than a possible interpretation.

None of the disciplinary areas in the university sector stand particularly out with regard to response rate, but in the college sector the response rate is low for the social sciences, technology and medicine. We can only speculate as to the reasons why. It might be because the web pages of precisely these disciplinary areas within the college sector have been less updated than others, and that a larger percentage of error messages (‘unauthorized request’) have therefore been returned from e-mail addresses belonging to these disciplines; we lack, however, such detailed information regarding the error messages. Another possible reason, which again cannot be corroborated by any direct evidence, may lie in the differing organization of research in the college sector compared with the other sectors. The combination of extensive teaching and research activity may have influenced the number of researchers who responded, considering both the time that must be allocated to replying and the relevance of the survey topic to their work situation (which generally features more teaching and less research).

The main point further must be to consider the representativity of the answers that we actually received within each disciplinary area/institution. In order to clarify this, we could have compared the gender and age distribution in the population and in the net selection for each disciplinary area/institution – along with other background variables such as position level, research experience and the like. Our information on the population is unfortunately not detailed enough to enable this, but the net sample's distribution in regard to the background variables is presented in the statistical background material. There was a clear preponderance of men among the respondents, with 74 % men and 26 % women. The respondents were fairly evenly distributed among the different disciplinary areas. The social sciences and technology were both represented with 23 % of the researchers who participated, while 22 % were from mathematics and the natural sciences. The humanities and medicine were somewhat less represented in the survey with 16 % and 18 % respectively.

5.1.4 Estimation

The responses were subsequently weighted according to which stratum they belonged to, based on the distribution we found in the population (the universe). The respondents within each stratum were assigned a weighted percentage in the form N % / n %. One of the main groups, the colleges, had a noticeably lower response rate than the others. College researchers from certain disciplinary areas were in danger of being underrepresented in the survey, and were therefore assigned extra weight in accordance with the distribution in the universe. University researchers in all disciplinary areas were assigned the weight 1 because the percentages of the sample corresponded entirely with the percentages in the population. Since we received relatively many responses from researchers within most disciplinary areas at the various research institutes, these were assigned somewhat less weight in order to correspond with the percentage of the population. The weight matrix, with the relative weight per cell, is presented below. The weight matrix reflects the dropout level for the various disciplinary areas in the various institutions.

Since we do not know the distribution of the background variables in the population (the universe), we will presuppose here that the responses for the various disciplinary areas/institutions are representative, and trust that the random sampling from the web has provided us with a self-weighting sample within each stratum (disciplinary area/institution).

Assuming that the distribution per disciplinary area and institution that we have used for the universe is correct, the weighted estimations will provide unbiased results.

Figure II – Weight matrix per disciplinary area and institutional affiliation (N % / n %)
**[Universities, Colleges, Research Institutes]
**[Humanities, Social Sciences, Mathematics and the Natural Sciences, Technology, Medicine]

We make in other words three important assumptions when commenting the survey results: i) the distributions of the researchers per discipline and institution in the sample matrix correspond with reality, ii) the fact that the deduction basis comprises around 95 % of the population has not resulted in significant biases, and iii) we have achieved a self-weighting sample within each stratum in the sample matrix.

5.1.5 General discoveries

53 % of the respondents state that they have themselves conducted or participated in contract research during the past three years. Unsurprisingly, the percentage is far higher among researchers affiliated with institutes (84 %) than those affiliated with universities (38 %) or colleges (43 %). Contract research is most common among technologists (74 %) and least common among humanists (29 %).

58 % of the male respondents state they have conducted contract research, while a somewhat less percentage of women, 41 %, state the same. About 1 in 5 of those who have experience with contract research can be described as 'major contract researchers', that is to say that contract research comprises more than three-fourths of their total research activity during the past three years. However, most of respondents, 40 %, state that contract research comprises less than one-fourth of their total research activity.

54 % of the respondents state that they have dealt exclusively or mainly with business-relevant[6] contract research. 33 % state that they have dealt with policy-relevant[7] contract research.

[6] Business-relevant contract research is research that primarily provides knowledge that is geared towards improving commercial products or processes.

5.2 The norm of openness

Openness (albeit in varying degrees) during all phases of a research project is a prerequisite for continuing to have confidence in the results that stem from contract research. The lack of openness provides fertile ground for suspicion and is therefore detrimental to the confidence in research and research results. The norm of openness is based on the demand for public knowledge. Information on the type of research, the underlying data and the chosen method should be publicly accessible, something that is important for accountability and thereby for confidence. There should also be openness regarding the results of a research project in the form of (at least one) publicly accessible publication, and it should at least be suggested in the course of the research how the results will be publicly disclosed. In addition, it should be readily apparent who is funding the research project, who is collaborating on the project and how the professional quality of the project is being assured.

5.2.1 The initiation phase and openness

The initiation phase denotes the part of the research project where contact is established between the researcher and the client, where the given problems are defined and/or presented and where the research design is worked out.

It is in particular the survey question concerning the use of standard contracts that sheds light on the degree of openness in the initiation phase. Such standard contracts will normally include information on funders, end users and other interest groups that will potentially be involved in the project. Other terms are also commonly specified, for example in regard to the underlying data or a plan for publishing the results. When a researcher acts in accordance with the standard contracts of his or her institution, this is something that contributes to openness in regard to the project's initiation. The question, then, is to what extent standard contracts are developed at research institutions.

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[7] Policy-relevant contract research is research that primarily takes aim at supporting decision processes related to public/political decision-making.

Figure III 'Have standard contracts for contract research been developed at your institution?'
**[Yes, No, Don't know]

A majority of the respondents (55 %) state that standard contracts have been developed at their given institution. 23 % state that standard contracts have not been developed, while just as many (22 %) did not know whether standard contracts have been developed, something we interpret to mean that such contracts are not in use in the event that they exist. A fairly large minority do not use standard contracts, and in the degree that such contracts are suited to protect the norm of openness, and in the next instance reinforce confidence in research, this is unfortunate. The survey also reveals fairly evident differences between the different types of research institutions. Significantly more respondents affiliated with research institutes (77 %) state that standard contracts have been developed than respondents affiliated with colleges and universities (both 35 %). This result suggests that the institutionalization of contract research varies among the different types of research institutions. The focus groups gave us the impression that colleges and universities have made fewer arrangements for contract research at their institutions as compared with research institutes, and this impression is reinforced by the survey results. Seen solely in light of the deficient use of standard contracts, colleges and universities are thereby the most vulnerable to attacks on the norm of openness during the initiation phase of research projects.

Figure IV 'Have standard contracts for contract research been developed at your institution?'
**[Research Institution, Universities, Colleges, Research Institutes]
**[Disciplinary Area, Humanities, Social Sciences, Mathematics and the Natural Sciences, Technology, Medicine]
**[Yes, No, Don't know]

Furthermore, there are differences between the various disciplinary areas in regard to the existence of standard contracts. Technology stands out with a significantly higher percentage of researchers who are familiar with standard contracts at their institution (72 %). A possible explanation for the widespread use of standard contracts within technology might be the importance of safeguarding patent rights. At the other end of the scale we find medicine and the humanities (with respectively 35 % and 36 %), while the social sciences and mathematics and the

natural sciences lie in the middle (with respectively 49 % and 54 %). This result is perhaps of greatest concern for the area of medicine, where researchers, as was evident from the focus group discussions, seem to have the least opportunity to initiate projects themselves, and even when they do, to have less control over openness during the initiation phase.

In regard to the development of standard contracts, we also find significant differences between policy-oriented researchers (53 %) and business-oriented researchers (61 %). The use of standard contracts is in other words most common in business-relevant contract research. The picture remains unaltered when the results are correlated with the type of client (public or private sector).

5.2.2 The execution phase and openness

Upholding the norm of openness in the execution phase means first and foremost providing relevant project information to the client, interested parties and end users. This might for example be information about the progress of the project or partial reports. 94 % of the respondents state that they have had contact with the client during the project.

Figure V 'Did you have any form of contact with the client during the execution of the research project(s)?'
** [Yes, No]

In other words, client contact is clearly the rule, and over half of the respondents stated that they had client contact many times during the project. Except for researchers from the area of technology, who had more contact with their clients than other researchers, there are no significant differences here between the various institutional levels or disciplinary areas. Nor are there significant differences between business-relevant research and policy-relevant research when it comes to the percentage of researchers who have had client contact during the project, though business-oriented researchers have significantly greater contact with their clients than policy-oriented researchers. This might mean that the conditions are more favourable for openness in business-relevant research, but it might also mean that these researchers are subject to more pressure than others, and that researchers' autonomy is more under attack here. We will

return to the consequences of client contact in the sections on quality assurance and accountability in the execution phase.

The prerequisite for upholding the norm of openness is that all relevant parties or interest groups that so desire, including the general public, are incorporated in the stream of information from the project. Reference groups (31 %), steering committees (41 %) and seminars (33 %) can be suitable forums for this, but may also seem restricted, perhaps in particular in regard to the general public. In that respect, contact with the client and others through group meetings and seminars is a prerequisite for openness in the project, but is not in itself sufficient to uphold the norm of openness. Partial reports from the project should also be made accessible to interested groups that do not have access to other forums related to the project. A common form of client contact is the writing of reports (57 %), but we do not know how widespread it is to make partial reports accessible to wider segments.

5.2.3 The publication phase and openness

Open (in the sense of accessible) reporting of the results from a research project is an important prerequisite for upholding the norm of openness and maintaining confidence in contract research. A major part of the criticism of contract research is founded on suspicions that information from the research projects is strategically withheld or ‘spun’ to the client’s advantage. To the extent that this occurs, it entails a clear breach of the norm of openness and undermines thereby the confidence in the results. Publicly accessible research reports enable decision makers to familiarize themselves with the research results, independent of how various parties choose to spin the material to them.

A small minority of the respondents (14 %) state that they have experienced conflicts with the client in connection with publishing or publicly disclosing research results. As we shall see, conflicts are less common in the publication phase than in the execution phase. There are no significant differences here between the various institutions or disciplinary areas. Among the projects where conflicts arose in connection with reporting, most were business-oriented (64 %). The low degree of conflict with the client in regard to publication seemingly inspires confidence, and it might be inferred that contract researchers largely preserve their autonomy when it comes

to reporting their research projects. Conversely, the absence of conflict might also be because researchers by and large allow the clients to set the terms for disclosing research results. We find clear indications in the data that clients at times try to influence the public disclosure of results. For example, the degree of conflict is greater where an institution has a standard contract for reporting than where such a contract does not exist.

Standard contracts that deal with issues of reporting and public disclosure are important in order to uphold the norm of openness during this phase. A majority of 62 % of the respondents do not have, or are unaware if they have, standard contracts that regulate public disclosure at their institution. Researchers who can refer to such standard contracts experience a greater degree of conflict in the reporting phase than researchers who do not have reporting stipulated in a standard contract. This is presumably because a standard contract makes it easier for the researcher to stand his or her ground when a client makes demands in regard to reporting. Where standard contracts have been developed, the most probable outcome is that the conflict surrounding reporting/publication ends in compromise. Where standard contracts have not been developed, it is just as likely that the researcher/institution yields as it is that the conflict ends in compromise. Standard contracts in regard to publication seem therefore to aid the researcher somewhat in regard to attacks on the norm of openness (we presuppose here that it is the client who wants to limit the reporting), even though it increases the conflict level somewhat. In that respect, it is of concern that a majority do not use such contracts, but it is not thereby said that issues related to reporting are not usually stipulated in the contract. We assume that *ad hoc* contracts also usually treat such issues, even though the client in such a case is afforded a greater possibility of exerting influence.

At the same time that the majority do not use standard contracts, 35 % of the researchers also state that their institution does not have a policy of always making research results public.

Figure VI 'Is it the institution's policy that research results should always be made public?'
**[Yes, No, Don't know]

Whether such a policy is an established practice does not seem to influence the conflict level. When the conflict has first arisen, a compromise solution is the most common outcome when guidelines exist that stipulate the use of standard contracts in connection with contract research; when no such guidelines exist, it is just as likely that the researcher yields as it is that the conflict ends in compromise. Both standard contracts and guidelines seem therefore to reinforce the norm of openness in the publication phase, but we note that only a minority of the respondents state that these measures are in use.

In relation to the norm of openness, there is one issue in particular that may lead to conflicts regarding publishing/public disclosure, namely whether the research results should be made public at all. Of the minority that has experienced conflict with a client, 56 % cite this as the cause of conflict in the publication phase. The issue of whether the results should me made public at all remains therefore as one of the most significant causes of conflict in the publication phase, along with whether public disclosure should be delayed or the text modified. The tendency in the survey is that research institutes and the area of technology have the highest percentages of conflict surrounding publication, but we cannot state anything with statistical certainty based on the data here.

To summarize, a minority of researchers experience conflict in the execution phase. Standard contracts and guidelines for publication will bolster the norm of openness here, but are only used by a minority of researchers. Among the most common causes of conflict during the publication phase is the issue of whether the research results should be made public at all.

5.3 The norm of quality

Quality assurance of scientific work is essential for the general public's confidence in research. Research should be arranged so as to enable intersubjective verifiability, something that requires a conscious attitude towards the use of method. Peer review is a recognized form of quality assurance in today's research, and may take place in various ways. Quality assurance may also include other parties than researchers, and a research project may in all phases be subjected to comments from users, or other interested parties, with regard to the quality assurance of the

project. The primary concern of quality assurance is to minimize the risk of errors in research, increase the possibility of the research process being conducted in a professionally defensible manner, and to counteract the possibility of information being omitted due to strategic reasons or a desire to please the client. Quality assurance assists in this manner to increase the general confidence in research.

5.3.1 The initiation phase and quality assurance

In the initiation phase it is mostly relevant to assure the quality of among other things the research design, along with the estimated time schedule and wordings in the contract. Assuring the quality of the preliminary work may in different ways help assure professional quality and not least intersubjectivity: by creating a good research design (‘outline’), by the researcher not compromising normal work hours in order to complete a project, and by avoiding misunderstandings or conflicts between researcher and client due to deficient or vague wordings in the contract. These are all aspects that bolster the norm of quality and thereby give good reason for having confidence in research.

Figure VII ‘Which routines for quality assurance are there at in your institution (for outlines, research design, tenders, contract proposals and the like)?’
**[Quality assurance, Regular internal project meetings, Seminars, Checklist, No routines, Don’t know, Other]

A small minority of 14 % of the respondents state that no routines for quality assurance exist at their institution. In addition, 12 % state that they do not know if such routines exist. This means that almost 3 out of 4 researchers may possibly, in one way or another, be subject to internal quality assurance. This can be said to inspire confidence with regard to the norm of quality. In addition there is the possibility of external quality assurance, which we did not directly ask about in the survey. This might e.g. entail the use of seminars and reference groups, which might perhaps not be equally relevant in the initiation phase as in the other two project phases.

There are once again notable differences between research institutes on the one hand and colleges and universities on the other. Replying to the question regarding quality assurance, significantly

fewer of the researchers affiliated with institutes (6 %) state ‘no such routines’ or ‘don’t know’ than researchers affiliated with universities (44 %) and colleges (42 %). This disparity may conceivably be due to differences in how the research is organized, and the relatively high percentage of college and university researchers that lack a conscious relationship to quality assurance does not necessarily entail that the norm of quality is undermined at those institutions. The universities in particular have a larger constituency of senior researchers (professors and other researchers with PhDs) who are able to ‘assure their own quality’, while institutes more commonly have less experienced researchers in need of quality assurance by one of the institute’s senior researchers. Such quality assurance from a senior researcher is far more widespread at research institutes (82 %) than at universities (41 %) and colleges (42 %). This result reinforces the impression that contract research is more institutionalized at the nation’s research institutes than at our colleges and universities.

5.3.2 The execution phase and quality assurance

Quality assurance in the execution phase can take place through both internal quality assurance and through meetings and other forms of contact with the client and other involved parties during the project. Quality assurance by a senior researcher (a variant of the peer review) is common for 60 % of the respondents, though researchers within the humanities and medicine have noticeably lower percentages compared with the other disciplinary areas. 1 in 3 respondents (33 %) also state that they regularly hold internal project meetings as part of the routine of quality assurance. There are no significant differences here between the disciplinary areas or between business-oriented and policy-oriented researchers, but such internal project meetings, held as a part of quality assurance, are more common for research institutes than for colleges and universities. This does not necessarily mean that the quality assurance is worse at colleges and universities. Differences in the use of internal project meetings may rather be related to differences in how the research is organized, and that it is more common for college and university researchers to work alone on projects than for researchers at institutes.

Client contact during the project will in most cases influence the quality of the research project in one direction or the other. The most widespread forms of contact between researcher and client are undoubtedly telephone discussions, letters and e-mail. Contact is also commonly kept by

writing reports, participating in joint meetings and attending seminars and conferences. Social gatherings represent the least common form of contact. If researchers experience that such contact increases the quality of the project, there is at the outset reason to believe that the norm of quality is actually better attended to.

4 in 5 respondents (79 %) state that client contact has by and large had a positive effect on the result, while only 1 % state that such contact has by and large had a negative effect on the result. There are no significant differences at the institutional level here, even though researchers from research institutes seem to be the most positive to having such contact during the execution phase in order to assure the quality of the project. Among the disciplinary areas, technology has the significantly most researchers (91 %) who state that client contact has a positive effect on the quality. The type of research (business or policy) also affects whether client contact is experienced as positive or negative. Among business-oriented researchers, 82 % state that client contact by and large has a positive effect on the result. This is a significantly greater percentage than among policy-oriented researchers, where 75 % state the same.

There may be reason to emphasize the fact that a large majority of the researchers themselves experience client contact as positive for the quality of the project.

The survey also shows, however, that various forms of conflict arise between the researcher and the client during the execution of the projects, something that may undermine the norm of quality. In this section we will especially mention conflicts pertaining to method and data. As mentioned, the norm of quality requires a conscious attitude to the use of method because of the emphasis on peer review and intersubjective verifiability. A minority of 27 % experienced conflict during this phase.

Figure VIII 'Have you during the past three years experienced disagreement/conflict with a client during the execution phase of a project?'
**[Yes, No, Don't know]

37 % of all researchers who have experienced conflict in the execution phase state that this is due to questions of data and method. If such conflicts lead to sizeable adjustments in the original and perhaps already quality assured research design, this might compromise the quality of the project. Conflict indicates an unmistakable disagreement between the researcher and the client, and the handling of data and the use of method are fundamental to a research project. Such conflicts are therefore serious with regard to the level of confidence in the project. In sum, we note that a relatively large minority of the researchers have experienced conflict during the execution phase, but that well under half of these conflicts pertained to data and method.

5.3.3 The publication phase and quality assurance

Quality assurance is perhaps not as central when it comes to the publication of research results as it is during the initiation and execution of research projects. We have previously reviewed quality assurance in the execution phase, however, and this form of quality assurance, through either peer review or by a senior researcher, may conceivably fortify the researcher against potential attacks on his or her autonomy in the publication phase.

As previously mentioned, quality assurance is the rule for contract researchers, and even more so at research institutes than at colleges and universities. The severity of the conflict with the client in regard to publication is not affected by whether the researcher has internally assured the quality of the research. Just as many researchers who have conducted quality assurance as researchers who have not done so (14 %) have experienced conflict with the client during this phase. When conflicts first arise in regard to publication, the conflict more commonly ends in compromise when the researchers have assured the quality of the research through internal meetings or through a senior researcher than when the quality of the research has not been assured. Regarding the causes of conflict in the publication phase, the question of ‘whether the public disclosure of the research results was to be postponed’ may cast light on the norm of quality. 38 % of the researchers who have experienced conflict during this phase state this was due to such postponement. This may just as often be because the researcher wants to postpone the original publication date as that the client tries to withhold the results for strategic reasons. In those cases where it is the researcher him or herself who requests a postponement, this may enhance the quality of the research (assuming that such postponement takes place) because the

researcher is given time to make the necessary adjustments. When a conflict is due to a request for postponement during the publication phase, it is just as common for the client to yield as it is for the researcher to yield, and such conflicts also often end in compromise. In cases where the researcher requests more time to enhance the quality of the project, it therefore seems as though this is to a certain extent granted by the client.

5.4 The norm of accountability

Participation in the affairs of society is a natural part of modern science. Researchers and research institutions have a shared ethical responsibility, along with any clients and other involved parties, for the defensible use of research results in accordance with the overriding interests of society. Researchers and research institutions share an ethical responsibility for the unfortunate consequences of decisions or innovations that originate from their research, if such consequences should have been discovered or studied in the course of the research. This also applies to the responsibility for disclosing any uncertainty regarding the potentially negative social effects of an innovation. The researcher is in other words ethically obligated to disclose such information to decision makers and the general public in a suitable manner, and to set the terms for public debates within their area of expertise.

5.4.1 The initiation phase and accountability

Accountability in the initiation phase entails that the researcher is clear on how his or her expertise and competence can contribute to value adding and new knowledge. By concealing a lack of competence, the researcher violates the demand for accountability and may thereby undermine confidence in research. However, the survey results inspire confidence. A clear majority of the respondents state that they have not compromised their professional competence when pitching research projects: 80 % state that they have not undertaken contract research which they lacked the necessary competence to conduct. Among those who have undertaken contract research without the necessary professional competence, 60 % state that they have allowed for time during the project to increase their competence. This means that they have in such cases been open about the need for increasing their competence, and that due consideration

was made to the norm of openness. Researchers at institutes have to a significantly greater degree (21 %) than researchers at universities (8 %) and colleges (10 %) undertaken contract research that they lacked the necessary professional competence to conduct, something that is presumably due to smaller basic grants and a greater need for income. Among the disciplinary areas, technology stands out negatively in this regard, with 25 % stating that they have undertaken contract research without the necessary competence; on the other hand, a clear majority here allowed for time in the project to increase their competence. Business-oriented researchers have significantly more often than policy-oriented researchers lacked competence in the contract research they have undertaken (17 % against 6 %), but in both types of research a large majority allowed for time in the project to increase their competence. Considering the competence of Norwegian researchers, there is every reason to be confident that the norm of accountability is adhered to during the initiation phase.

We should expect that some projects will be rejected during the initiation phase. Regardless of whether such a rejection is due to professional, financial or ethical reasons, it strengthens accountability that rejections take place when the researcher considers it necessary. Of those who have rejected specific offers for contract research projects, 27 % from research institutes, 15 % from universities and 18 % from colleges state that the rejection was due to a lack of competence. We do not have sufficient data to say anything for certain about these differences, but the result points in the same direction as the previous results, namely that the research institutes stand out. A possible explanation for this may be a greater need to demonstrate accountability in order to obtain future projects.

There are in particular two other reasons for rejecting a proposed project that may illuminate the researchers' accountability during the initiation phase: that there were ethical concerns related to the project, and that the project was irrelevant or uninteresting. 11 % of those who have rejected offers state that the rejection was due to ethical concerns. The term 'ethical concerns' is wide-ranging, but rejection on such a basis will in any case strengthen the researcher's accountability. None of the institutions or disciplinary areas stands significantly out in regard to those who state ethical concerns as the reason for rejection. About 1 in 10 researchers have, as stated, taken a stand on the basis of ethical principles. This shows that ethical assessments are in fact made when

contract research is initiated, something that must be said to inspire confidence. Assessments are also made on how relevant or interesting the research offer is. Given that economy and capacity were separate answers, the assessments referred to here concern the professional relevance of or interest in the project. Some of the rejections made on this basis will in other words result from researchers assessing that the project lacks social benefit or a 'cumulative' effect. Over half of the researchers (51 %) who rejected contract research projects stated irrelevance or a lack of interest as the reason. This percentage is probably inflated by requests from clients being sent to the 'wrong' research institution in regard to the institution's areas of commitment and planned areas of research. Nonetheless, many of the rejections in this category are also partly due to assessments of the project's social benefit. Rejections on such a basis strengthen accountability during the initiation phase, especially when the researcher makes his assessment known, and provide a basis in this regard for having confidence in contract research.

5.4.2 The execution phase and accountability

During the project, a researcher's accountability may be put to the test by the various forms of client contact. In Chapter 4 we discussed among other things the researcher's individual desire to accommodate a client, as well as the client's desire to participate in the project, as factors that may influence the research. If such influence – formal or informal – leads to the obscuring of any negative social consequences of a given measure or innovation, it constitutes an attack on the norm of accountability.

We have already established that researchers who conduct contract research will, as a rule, experience influence in the form of client contact during the project. In cases where the contact has had a negative effect on the result, it might lead to the project's social benefit being reduced. This might occur either because the intrinsic value of the data is not sufficiently utilized, or that valuable information is withheld. In that case it might compromise accountability. As we have already pointed out, however, only an entirely minor percentage of the researchers (1 %) state that the contact has been negative for the results of the project, so this does not seem to be a significant problem in contract research. However, contact creates fertile ground for various types of conflicts. In general, a minority (27 %) of the researchers experienced conflict with the client when executing a research project. There are no significant differences among the institutional

levels or disciplinary areas here, even though technology (34 %) and medicine (18 %) stand farthest apart in experiencing conflict during the execution phase. As mentioned above, client contact is more frequent in business-relevant research than in policy-relevant research. The conflict level during the execution phase is also higher in business-relevant research with clients from the private sector than it is in policy-relevant research with clients from the public sector. 52 % state that the conflict was with a client from the private sector, against 32 % for clients from the public sector.

Conflict with a client may in general compromise a researcher's opportunity to act in an accountable manner. Conflicts during the execution phase that arise due to time constraints, for example, may entail that certain aspects of consequence for the research results go undetected (cf. Chapter 4, where we discussed the 'milking' of projects). This would in that case be unfortunate for the accountability of the project and the basis for having confidence in the research results. 41 % state that the execution of the project was the cause of conflict with the client.

Figure IX 'What caused the disagreement/conflict?'
**[Handling of data and method questions, Project execution, The project's aim and relevance, Personal conflicts, Problems in connection with billing and payment, Other]

One type of conflict is especially relevant to the norm of accountability, namely conflict that pertains to the project's aim and relevance. 41 % of the researchers who experienced conflict with the client state this as the cause. Along with the execution of the project and the handling of questions of data and method, disagreement on aim and relevance is the most common cause of conflict during the execution phase. We cannot say for certain whether there are any differences among institutions or disciplinary areas here. Colleges stand out, however, with the highest percentage of researchers (52 %) that have experienced conflict regarding aim and relevance, along with the social sciences (52 %). Conflicts regarding the aim and relevance of a research project probably originate from differing assessments of the project's cumulative research effect or what social benefit may subsequently be derived from the project. The researcher's accountability is in other words put to the test when he or she must engage in such discussions with the client. To the extent that the researcher yields, it may provide a basis for claiming that

confidence in contract research is undermined because the norm of accountability is attacked. It is difficult to draw more categorical conclusions on what consequences this survey result has for having confidence in contract research. We conclude that conflicts with the client occur among a relatively large minority, and that many of these conflicts concern disagreements about the project's aim and relevance.

5.4.3 The publication phase and accountability

As shown above, the degree of conflict between researchers and clients is low during the publication phase. As many as 84 % of the researchers have not experienced conflict during this project phase during the past three years, and there are only minor differences among the disciplinary areas and institutional levels. Conflicts pertaining to the publication of results are less common in policy-oriented projects than in business-oriented projects. The focus on accountability is especially important in connection with the public disclosure of research results. The researcher is jointly responsible when it comes to the use of his or her research, and according to the norm of accountability he or she should be interested in what the research results are used for, how they are presented in the media, and what conclusions are drawn from the results by society at large. In that respect it is a confidence-inspiring result that 3 in 4 researchers disagree (entirely or partially) with the statement 'It is of little significance for my work as a researcher what my research results are used for'. Researchers at research institutes are even more interested in the use of their results than college and university researchers. Among disciplinary areas, technologists stand out as being the most concerned with how their research results are used. We find no differences in the emphasis placed on usage among business-oriented and policy-oriented researchers, but most state that their most recent conflict in regard to publication was with a client from the private sector.

Figure X 'Have you experienced disagreement/ conflict with a client in regard to the publishing/ public disclosure of research results during the past three years?'
**[Yes, No, Don't know]

Conflicts due to 'modifications of the text in the final report' that go in disfavour of the researcher, i.e. that the researcher 'yields', may undermine accountability. 36 % of the

researchers who have experienced conflict in regard to publication state this as the cause of the most recent conflict. We must assume here that it is the client who, upon reading a draft, makes objections on the basis of their own agenda. Compliance from the researcher might undermine accountability, if the modified text entails that the research results are presented differently from what the researcher had originally anticipated and can vouch for. Such instances are typical examples of the 'politicization' of the results of contract research, and we may note that politicization exists to a certain extent. We presuppose here that it is the client who exerts pressure on the researcher to modify the text, and that the researcher has at the outset reported the results as neutrally and objectively as possible. The data breakdowns here provide an insufficient basis to say anything for certain, but the tendency is that researchers at colleges and institutes experience this type of conflict more frequently than university researchers, and that the problem is greater within the social sciences and the humanities (where answers are less 'definite') than in the other disciplines.

A more serious attack on the norm of accountability are conflicts arising from a desire to modify the research results themselves. This is the least common cause of conflict. 19 % (of the minority of 14 % who experienced conflict) state this as the cause of the conflict. Only in very exceptional cases, where the researcher has patently failed to do a professional job, will it be defensible on the grounds of accountability for a client to demand that the results should be modified. The survey results indicate that such conflicts are extremely rare, but it is nonetheless a serious matter that it happens at all.

Figure XI 'What was the outcome of the disagreement/conflict?'
**[Other 4 %, The client yielded 14 %, I yielded / we yielded 30 %, Compromise 51 %]

Conflicts during the publication phase end most commonly in compromise. The tendency otherwise is for researchers to yield more readily than clients, and it might therefore seem as though clients, as the 'owners' of the research results, sometimes achieve compliance with their demands regarding publication. Assuming that the researcher has acted in an accountable manner and presented the results as accurately as possible, this may compromise the accountability of the given projects. We reiterate, however, that this type of conflict takes place only in a small

minority of the projects, and that it is impossible for us to determine whether it is the client or the researcher who is in the 'right' when the conflicts occur.

5.5 Attitudes towards contract research

5.5.1 General remarks on attitudes

In order to determine the attitudes to contract research among researchers, both with and without experience with such research, we proposed a number of statements that the respondents replied to along a scale ranging from complete agreement to complete disagreement. The total results are presented in the figure below. In order to facilitate the presentation, we have merged the categories 'agree completely/ agree fairly much' (= agree), and 'neither-nor/ disagree fairly much/ disagree completely' (= disagree).

Figure XII – Attitudes towards contract research

**[Researchers who conduct contract research do not compromise their professional competence in order to obtain contract research to a greater degree than other researchers do.]

**[Researchers with long-term relationships with their clients will more readily be influenced by their clients' expectations than researchers who only have a short-term relationship with their client.]

**[Contract research is less credible than other types of research because the quality assurance is inadequate.]

**[Contract research is less credible than other types of research because unfortunate ties are more readily formed between researcher and client.]

These questions were posed to researchers both with and without experience with contract research. A relatively large minority agree that contract researchers compromise their competence in order to pitch projects. A majority agree that long-term relationships with the client open up for greater influence from this client. A small minority agree that inadequate quality assurance undermines the credibility of contract research, while more than 1 in 3 believe

that contract research has less credibility than other research because unfortunate ties are formed between researcher and client.

In addition to the variables that the above analysis focused on, it is interesting in this context to examine whether the answers hinge on whether the respondent has experience with contract research. Do the most negative attitudes to contract research stem from researchers without such experience? To what extent do we find negative attitudes among those who do in fact conduct contract research?

The answer to the first question is yes: researchers who do not themselves conduct contract research are by and large more ‘suspicious’ and believe that contract research is less credible. Researchers without experience from contract work believe to a greater degree than contract researchers that unfortunate ties are formed between client and researcher (52 % against 22 %), that contract research is less credible because the quality assurance is inadequate (25 % against 12 %), that contract researchers with enduring relationships with a client are influenced by the client’s expectations (68 % against 50 %) and that contract researchers may compromise their competence in order to obtain contract work (67 % against 49 %). These results differ significantly, and it is safe to say that those who express the harshest criticism of contract research are those who have the least to do with such research.

It might be that certain ‘prejudices’ against contract research manifest themselves in the given numbers, assuming that the actual conditions are most accurately depicted by the contract researchers themselves. It might also be the case, however, that the contract researchers have answered somewhat strategically in order to defend their own activities, and that they thereby express more positive attitudes than what is really the case. At the same time, we may note that contract researchers as well make certain admissions in connection with the credibility of contract research. Half of the contract researchers agree that they are more readily influenced by a client’s expectations. In Chapter 4 we pointed out that contract researchers admit that a conscious or unconscious desire to please the client may threaten the autonomy of researchers. Some contract researchers seem to be aware of this problem, especially in connection with long-term relations between researcher and client. 1 in 5 contract researchers believe that it undermines the

credibility of contract research that unfortunate ties are more readily formed between researcher and client. In general it must nonetheless be said that an equally ominous picture of contract research is not drawn by those who themselves know where the shoe pinches as by those whose daily work is not within contract research.

With regard to the various attitudes towards contract research, technology on the one hand, and the humanities and to a certain extent medicine on the other, stand out, something that reinforces other survey results in regard to the various disciplinary areas. We discern an evident pattern in the answers when we compare the disciplinary areas, namely that technologists are on the whole more positive to contract research than other researchers. The social sciences and mathematics and natural sciences do not differ significantly from each other. Researchers within these disciplines are less positive than the technologists, but are at the same time much more positive than researchers within medicine and the humanities, who are on the whole the least positive to contract research. For example, 48 % of medical researchers and 47 % of the humanists agree (completely or partially) that the credibility of contract research is less than for other types of research because of unfortunate ties between researcher and client. For both the social sciences and mathematics and natural sciences this percentage is 34 %, against 21 % among technologists.

The differences that we have previously noted between the various types of institutions are also found in the statements on attitudes. In their answers, researchers from research institutes display a more positive attitude to contract research than college and university researchers. This applies to all the statements, and it is perhaps natural considering that contract research is most widespread at the institutes. The differences between college and university researchers are not as great, but university employees seem more sceptical to contract research than college employees. For example, only 35 % of the university researchers agree (completely or partially) that contract researchers do not compromise their professional competence when competing for contract research. For colleges this percentage is 45 %, against 51 % for institutes.

We find a somewhat more negative attitude to contract research among policy-oriented researchers as compared with business-oriented researchers. For example, 27 % of the policy-oriented researchers agree with the statement regarding unfortunate ties between researcher and

client, against 17 % of the business-oriented researchers, while 17 % of the policy-oriented researchers agree that contract research is less credible because of inadequate quality assurance, against only 8 % among the business-oriented researchers. Contract researchers who exclusively or mainly conduct policy-relevant research are in other words more sceptical to contract research than contract researchers who exclusively or mainly conduct business-relevant research.

In addition to the statements on attitudes that pertained directly to contract research, we proposed certain statements that applied specifically to the Research Council of Norway (NFR). As we pointed out in the introduction to this report, research projects from NFR fall outside of our definition of contract research. In light of the experiences from the focus groups, and considering that some of the research funding from NFR seems to verge on what is meant by contract research, we will nonetheless briefly mention the survey results on this point. 84 % of all the researchers agreed (completely or partially) with the statement 'The research programmes of the Research Council of Norway lead researchers to adjust the topics of their research in order to increase the possibility of funding – in the same manner as with tender processes with clients'. There are only minor differences here between the various disciplinary areas, but researchers at research institutes agree more with the statement (92 %) than college and university researchers (86 % and 84 % respectively). A somewhat smaller majority of 61 % agree that 'Networks and connections play as important a role in receiving funding from the Research Council of Norway as they otherwise do in obtaining contract research'. Again, very little separates the various disciplinary areas here, but researchers at the more decentralized colleges agree with the statement to a larger degree (66 %) than researchers at universities and institutes (57 % and 59 %).

5.5.2 Potential measures

Previously in this chapter we cited various mechanisms, such as the use of standard contracts or internal or external quality assurance, that may increase confidence in the results of contract research. When surveying the attitudes to contract research, we also made more specific inquiries about the suitability of various measures that aimed at preempting or preventing potential problems linked to contract research. The overall result is presented in the figure below:

Figure XIII – Viewpoints on proposed measures

**[How suitable or unsuitable are the following measures for preempting or preventing potential problems linked to contract research? The percentage that replied 'suitable'.]

**[Voluntary use of standard contracts]

**[Mandatory standard contracts]

**[Complaints board for completed projects]

**[Independent committees that provide advice and guidance in connection with contract research]

**[Guidelines for proprietary rights, publication, access, etc., prepared by the Ministry of Education and Research, a committee for research ethics or the Research Council]

The alternatives were rotated in the survey in order to counter possible bias caused by the question order. The measure that gains the most widespread support among the researchers is the proposal for guidelines to be drawn up by the Ministry of Education and Research, a committee for research ethics or the Research Council. The complaints board receives the least support, with a substantially lower percentage than for the other proposals.

Researchers from the humanities and medicine place the greatest emphasis on guidelines, with respectively 57 % and 55 % answering that these would be suitable. Among the disciplinary areas, technologists place the least emphasis on guidelines, with 31 % answering that these would be a suitable measure. Once again we note that researchers from the area of technology stand out. Technologists appear to be more enthusiastic about the proposal for the voluntary use of standard contracts: 44 % believe this is suitable for preempting or preventing problems in contract research. Researchers within all the disciplinary areas agree that a complaints board would be the least suited for this purpose.

College and university researchers mostly favour the proposal for guidelines, while a substantially greater percentage of researchers from institutes emphasize the voluntary use of standard contracts in this context. The institutes, having the greatest degree of contract research and thereby perhaps also the greatest use for standard contracts, stand out once again from the colleges and universities.

Among contract researchers themselves, the percentages are roughly equivalent for those who believe that guidelines would be suitable (39 %) as for those who believe that the voluntary use of standard contracts would be suitable (37 %). While business-oriented researchers would prefer standard contracts (42 %), policy-oriented researchers would prefer guidelines (42 %). Researchers without experience with contract research believe guidelines would be the most suitable (52 %), followed by mandatory standard contracts (31 %). As shown above, this group is less positive to contract research than contract researchers themselves. Professional guidelines for public access etc. and the regular use of standard contracts would in other words be the most suitable measures for increasing the standing of contract research among researchers without personal experience with contract research.

5.5.3 Factor analysis

Factor analysis is commonly used in surveys with a large data set. One reason for conducting a factor analysis is to investigate whether the respondents group themselves in any specific way in regard to certain variables, here in relation to attitudes towards contract research. Data sets may be more or less suited for factor analysis, depending on the relationship between the number of statements and the number respondents, as well as on the distribution of the respondents among the variables. Several statistical tests have been developed to gage how suitable a data set is for factor analysis. We have used the so-called KMO-test, where the result is normalized and varies between 0 and 1. For our data set the result of the KMO-test was 0.66, which indicated that the data set was fairly well suited for factor analysis. Analyzing the results of the factor analysis entails certain judgment calls, among other things when naming the various groups or segments that emerge. Nor is it unproblematic to assign various labels to respondent groups merely on the basis of empirical results from a quantitative survey. We believe nonetheless that the results of the factor analysis are interesting and that they indicate that different ‘cultures’ exist within contract research.

The factor analysis was conducted exclusively on the respondents who have had experience with contract research. The results of the factor analysis showed that the respondents group themselves along two dimensions – what we have chosen to call an ‘idealistic’ dimension and a ‘pragmatic’

dimension. It is in other words possible to talk about two types of contract researchers – 'the idealistic contract researcher' and 'the pragmatic contract researcher'.

The idealistic contract researcher scores high on the first four statements on attitudes in the survey, especially the first three (see Figure XII and Appendix X: Survey). That is to say that such a researcher shows a conscious attitude in his or her research to the possible existence of unfortunate ties to the client, to the importance of quality assurance for the credibility of the results and to the danger of being influenced by their clients' expectations. The idealistic contract researcher is at the same time concerned with not compromising his or her professional competence in order to obtain contract research. Compared to the emphasis he or she places on these dimensions of contract research, the idealistic contract researcher is nonetheless not very concerned with what his or her research results are used for.

The pragmatic contract researcher, on the other hand, is very interested in what the results of his or her research are used for. He or she is conversely not very concerned about the danger of compromising his or her professional competence in order to obtain contract research, and is perhaps less 'scared' of allowing time in projects to increase such competence. The pragmatic contract researcher also scores low on the statements concerning the dangers of ties to and influence from the client and concerning the impact of quality assurance on credibility. It is in other words the function and social benefit of contract research that the pragmatic contract researcher is primarily concerned with.

We correlated the results of the factor analysis with the background variables in the data set in order to find out which researchers may be respectively denoted as pragmatic and idealistic. The evidence suggests that male researchers are somewhat more pragmatically oriented than female researchers, even though the differences are not that great. The results also show that researchers on the research fellow/assistant professor level are somewhat more pragmatically oriented than researchers on the associate professor/ professor level.

The results are particularly interesting when examining disciplinary area, institutional affiliation and the percentage of contract research in the researchers' total research activity. Among the

social sciences, medicine and especially the humanities, there is a tendency towards pragmatically oriented researchers. In technology in particular, but also in mathematics and the natural sciences, there is conversely a tendency towards idealistically oriented researchers. Technologists stand out among the idealistically oriented researchers, and this group shows the greatest divergence between the relative percentages of idealistically oriented and pragmatically oriented researchers: while technologists comprise 25 % of the pragmatically oriented contract researchers, they comprise as much as 37 % of the idealistically oriented contract researchers.

The survey also revealed clear differences with regard to institutional affiliation. The percentage of researchers from research institutes increases considerably (from 39 % to 54 %) when we move from pragmatically oriented to idealistically oriented contract researchers. Over half of the idealistically oriented contract researchers work in other words at an institute. The tendency is the opposite for researchers who are affiliated with universities or colleges, and the difference is most conspicuous for researchers who are affiliated with universities. At the universities we find in other words more pragmatically oriented contract researchers than idealistically oriented ones.

The analysis also suggests that there are relatively large differences between the idealistic and the pragmatic contract researcher when correlating with the percentage of contract research in the researchers' total research activity. There is a clear tendency that the researchers who have the most experience with contract research are also the most idealistically oriented, something that coincides with the find that the majority of the idealistically oriented researchers conduct research at an institute.

To put it simply, the typical idealistic contract researcher is a female at the associate professor/ professor level, employed at an institute and whose background is typically in technology or mathematics and the natural sciences. She is more interested in the research being conducted properly than in what the results are used for. The typical pragmatic contract researcher is a male on the research fellow/assistant professor level, employed at a university and with the social sciences, medicine or the humanities as his disciplinary area. He is more interested in the utility and social benefit of the results than in how the research is conducted.

5.6 End remarks and conclusions

Through an analysis of the results from our quantitative survey, this chapter has cast light on the fundamental question of this study: *Are there grounds for having confidence in research even though its results stem from contract research, where an interested party funds the research with the intent of using the research for its own purposes?*

We believe that upholding the three essential norms of research ethics is crucial in order to answer this question in the affirmative. The norm of openness demands public access to the research projects, the norm of quality demands peer review and verifiability, while the norm of accountability demands social responsibility. We have further argued that these norms are subject to pressure during the three phases of a research project: the initiation phase, the execution phase and the publication phase. Various factors in these three phases – such as standard contracts, quality assurance, various institutional guidelines and allowing time to increase competence – may act as 'bulwarks' when the norms are challenged.

Openness is an important prerequisite for having confidence in contract research. The norm of openness may be attacked during all three phases of a research project. We found that a majority of researchers use standard contracts during the initiation phase. We consider this to be advantageous in regard to the norm of openness, because such standard contracts handle issues that are significant for how information about the project is to be publicly disclosed. A large minority of researchers do nonetheless not use such standard contracts during the initiation phase. This often applies to researchers at colleges and universities, where contract research is less widespread than at research institutes.

The key question during the execution phase is to what degree relevant information is disclosed to the general public in the course of the project. According to the researchers, there is usually extensive client contact during a project, and reference groups, steering committees and seminars are commonly used. The norm of openness is thus upheld in regard to clients and perhaps certain interest groups as well, but we do not know to what degree project information is disclosed to the

wider user and/or interest groups that do not have access to seminars or meetings during the execution phase of the projects.

The norm of openness is perhaps most relevant and most exposed to attack during the publication phase of the projects. Standard contracts and institutional guidelines for public disclosure will fortify the norm of openness during this phase, but are only employed by a minority of researchers. With regard to the norm of openness, it does not inspire confidence that the most common cause of conflict during the publication phase is whether the results are to be publicly disclosed at all. That said, we must emphasize that only a small minority experienced conflicts during this phase, and that the most common outcome of the conflict is compromise.

Quality assurance of contract research projects is crucial in regard to what level of confidence there is reason to have in the results. 3 in 4 researchers have the possibility of internal quality assurance for their projects, and such quality assurance is most common where contract research is most widespread, namely at the institutes. In regard to the execution phase, 3 in 4 researchers state that client contact during the project had a positive effect on the result. Clients will usually have highly competent people in their employment, often with their own research experience, and client contact during the project may therefore enhance the quality of the project. A fairly large minority have experienced conflict during the execution phase, and the conflicts intensify when client contact is more frequent. Some of these conflicts are due to the handling of questions pertaining to data and method. Significant modifications to the method design of already quality assured projects may be unfortunate in regard to the norm of quality, but it appears that this only occurs in exceptional cases. Quality assurance in the first two phases – something that is the rule – fortifies the researcher in case of conflict during the publication phase. A small minority experience conflict during this phase, in which case the outcome is often a compromise. Conflicts that arise when reporting is postponed may enhance the quality of the project, if the outcome is that the researcher is allowed more time to complete the project. To a certain extent this also seems to be the case.

The third norm we have taken as a basis for research ethics is accountability. During the initiation phase it strengthens the accountability of contract research that researchers sometimes reject

proposed projects. Rejecting offers due to the lack of competence, if time is not allowed in the project itself to increase the researcher's competence, demonstrates accountability on behalf of the researcher. 1 in 10 reject contract research projects due to ethical concerns, while roughly half reject contract research projects due to a negative assessment of the project's relevance or social benefit. Rejections on these bases contribute directly to strengthening the norm of accountability in contract research. It is evident that researchers, within contract research as well, do not undertake every project that comes their way based on a unilateral focus on financial gain, but also take into consideration other aspects that strengthen the accountability of the research. Hardly any researchers state that client contact during the execution phase has a negative effect on the result, but a large percentage of those who experience conflict during this phase state that such conflicts are due to discussions about the project's purpose and relevance (social benefit). This may compromise accountability if the researcher yields in such discussions, and attention is transferred from the cumulative social benefit to a benefit that pertains more directly to the client. In connection with the publication of results, most researchers are interested in what these results are used for. It is particularly at research institutes, where the percentage of contract researchers is the highest, that there is a focus on how the results are used. We find, however, that results are to a certain degree 'politicized', and that a relatively large percentage of conflicts during the publication phase are due to the text being modified. Once in while clients achieve compliance with their demands related to publication, something that may compromise the autonomy of the researchers, and the accountability of the project may therefore be in doubt. Nonetheless, this occurs only in a small minority of the projects, including contract research projects.

6 Conclusions and recommendations

6.1 Introduction

The question this report asks is whether there are grounds for having confidence in research even though its results stem from contract research, where an interested party funds the research with the intent of using the research for its own purposes. The answer must be both yes and no. On the one hand, the report shows several positive results with regard to the upholding of important norms, but our material also indicates that there may be cause for concern in certain areas. This chapter will highlight certain results and problem areas that we believe deserve attention, and against that background we will formulate certain measures and recommendations.

The conclusions are subject to certain caveats. First of all, it must be emphasized that the survey results reflect the researchers' own experiences with and opinions of contract research. Caution must therefore be exercised when interpreting the answers and providing recommendations on the basis of these results. When for example the survey categorically shows that researchers are more positive to contract research the more they themselves have conducted such research, it may be that they are embellishing their own activity. If other parties, for example the client, were to have a fundamentally differing opinion, this will remain hidden in our survey.

Second, the response rate is relatively low. This means that we cannot be certain that we have captured the entire range of opinions on and experiences with contract research among researchers.

Third, the topic itself is difficult to study, since it concerns certain problems that might be difficult for researchers to glimpse and that statistical methods do not reveal. In our material it is interesting to note that the focus groups, even though their results cannot be generalized, provide a different and more immediate information than the survey.

Fourth, certain psychological sources of error must be taken into consideration, namely that respondents may adapt their attitudes to contract research to correspond better with their actual behaviour. This will to a certain extent lead to fewer problems being reported.

Finally, there is a gradual transition between research and studies, something that might influence the respondents' answers as well as our interpretations. That contract research spans across a broad diversity of activities is something else that makes the topic difficult to study.

We are conscious of these caveats and concerns, and have attempted to take them into consideration when interpreting our finds. Against this background we discern some relatively clear tendencies in our material, and certain finds are significant in themselves. We anticipate, however, that different parties will understand and interpret the results differently with regard to the significance, scope and seriousness of the problems. It is therefore important that the results are subject to public discussion.

6.2 Conclusions

6.2.1 Contract research – largely in adherence to research ethics

The overall conclusion of our survey is that Norwegian contract research by and large maintains an acceptable standard of research ethics. It may therefore be claimed that contract research is in better condition than the Storting seems to fear and critical media reports would suggest. Institutions that conduct contract research extensively seem by and large to have adequate routines for such research. This applies chiefly to the research institutes.

A large majority of the researchers at institutes, where the degree of contract research is the greatest, use standard contracts. In connection with the initiation phase, it also inspires confidence that very few researchers state that they compromise their own competence when pitching research projects. Where competence is at the outset lacking, it is common to allow for time in the project to increase competence. A clear majority of contract researchers have the possibility of quality assurance, though this does not say anything directly about the professional

level of such assurance. Quality assurance is most comprehensive where contract research is most widespread, namely at the research institutes. Our finds also indicate that researchers seem to act with integrity and are able to reject contract research projects when they have professional or ethical concerns. We also found that client contact during the project is the rule in contract research. This does of course open up for potential influence from the client, but at the same time a large majority of the researchers state that such contact has a positive effect on the result. This applies in particular to technologists and business-oriented research, where the degree of contract research is high. A minority of the researchers state they have experienced conflicts with the client. Research institutes, the disciplinary area of technology and business-relevant research stand most out in a positive sense here.

Attitudes to contract research are on the whole mostly negative among researchers who do not themselves conduct contract research. This does not necessarily mean that contract research is in fact more problematic than other research, and such attitudes may be based on a lack of information or on prejudices. We do, however, find clear signs in the data that the norms of research ethics are in some cases put under pressure in connection with contract research. In the following we will therefore indicate certain areas where there is cause for vigilance.

6.2.2 Deficient use of contracts at colleges and universities

Nearly half of the respondents in the survey state either that standard contracts do not exist at their institution or that they are unaware of whether such contracts exist. The use of standard contracts is in other words generally not that common among contract researchers, neither during the initiation phase nor during the publication phase. This may compromise the norm of openness, because it would be natural in such contracts to include demands for access to the projects and issues pertaining to publication. In addition, the use of standard contracts might fortify the researcher in any conflicts that might arise with the client. It is college and university researchers, and researchers from the humanities and medicine, who in connection with policy-oriented research use standard contracts the least.

Standard contracts are most commonly used where contract research is most prevalent, namely in research institutes and in connection with business-oriented research. It is to be expected that

contracts are more widely used at institutes than at colleges and universities, considering that contract research comprises a far greater percentage of the research activity at the institutes. This result is noteworthy nonetheless. Less awareness about the use of contracts at colleges and universities makes this sector less prepared when it comes to managing contract research. The focus group discussions gave the impression that colleges and universities have not made conditions as favourable for contract research as the institutes have, an impression that is reinforced by the survey results.

An interesting difference between the disciplinary areas is also worth noting: medicine stood out negatively to a surprising degree, with only 35 % of the medical researchers stating that they were aware of standard contracts at their research institution. This consigns medicine to the bottom of the list, along with the humanities, with regard to the use of contracts. In light of the critical discussions in scientific journals regarding parts of medical contract research (for example Kjaergard & Als-Nielsen 2002), we maintain that this is a disturbing result.

6.2.3 Are the contracts good enough?

The survey shows that conflict is more frequent when researchers state that standard contracts exist, something that might suggest that contracts provide researchers with the necessary support and protection to go toe-to-toe with the client when necessary. It might also indicate that contracts are used primarily in those environments that have previously experienced such conflicts, and that the typical projects they undertake are often rife with conflict. On the other hand, the higher level of conflict may conversely indicate that contracts do not necessarily in themselves solve problems. For contracts to be truly meaningful, they must clarify important issues relating to e.g. reporting, publication and the proprietary rights to the data. When discussing various measures below, we will specify some of these requirements that should be stipulated in the contracts.

The results of both the focus group and the survey seem to demonstrate a need for standard contracts in regard to clients from the public sector, who are by and large the instigators of policy-relevant research. In order to increase the level of confidence in research, it will be particularly valuable that the rules for public disclosure are publicly accessible in research

projects with this type of client. This is related to the risk that such research results may be ‘politicized’.

6.2.4 Manipulation of data and method?

The survey revealed that conflicts relating to questions of data and method sometimes arise, albeit not very often. When such conflicts do occur, however, they are a serious problem. Such conflicts may originate from the clients misunderstanding their roles. It is unquestionably the researcher who has the complete professional responsibility for questions relating to method and data. When the client interferes with this part of the research process, the suspicion arises that the client is attempting to manipulate the finds in order to support certain results. That said, this type of conflict might also be due to ambiguities concerning the researchers themselves, for example that professional standards are by and large not clarified in advance of the project. An overriding principle must be that it is the researcher who is responsible for method and data, and should conflicts arise with the client concerning questions of method, the researcher must have the final say.

This principle should be viewed in connection with another result of the survey: some researchers who have experienced conflicts with the client concerning the modification of the text, state that they ultimately compromised with the client. The results of the survey certainly do not indicate that this occurs frequently, but such compromises are very unfortunate because they may give the impression that research results are a matter of negotiation. However, it is not easy to know what exactly is meant by the term ‘compromise’ in such instances. One may choose to believe that the compromises did not concern the professional substance of the project, but that they rather pertained to modes of communication and matters of style. On the other hand, we cannot rule out that such compromises dealt precisely with more substantive matters. In this context as well, there is due cause for recalling the overriding principle that it is the researcher who must ultimately be responsible for the research results. Substantive aspects of the research results cannot be a matter for negotiation with the client.

6.2.5 The withholding of unwanted results?

For a research institution, a contract that demands publication and a principle of universal publication may be important measures to ensure public disclosure. Nonetheless, our survey shows that these measures are only in limited use. For example, more than half of the researchers do not think about making sure that their institution has guidelines for publication. This is in other words an area with a clear potential for improvement.

The need for having clear rules on publication also manifests itself when considering the conflict level regarding this question. From the survey it emerges that more than half of the researchers who have experienced conflict with the client state that this was due to questions relating to publication.

In the focus group interviews, several researchers stated that they had experienced that research results 'land in the drawer'. This is unfortunate in regard to both the openness and the accountability of research, as well as the general confidence in research. If certain results are deliberately obscured in order to get across a certain message, it would not least ruin the possibilities for research to set the terms of the public debate. It seems as though powerful interests in some cases are able to prevent unwanted results from reaching an interested party or the general public by hindering or complicating publication.

It should be recalled that the publishing of research results is desirable for at least two essential reasons. First of all, there might be important social interests linked to the research results that are not encapsulated by the client's interests. The norm of accountability entails that ties of loyalty to the client must be limited and that the researcher takes his or her social responsibility seriously. To curtail a researcher's right to publish would not be in accordance with sound research ethics. The public disclosure of research results, on the other hand, along with the opportunity to participate in the public debate with research-based knowledge, does serve an overriding social responsibility.

Second of all, publishing is a crucial part of the quality assurance of research. A practice where the publishing of results is not the rule does not, in our opinion, deserve the status of research. It

should in other words be in the research institutions' own interest to ensure that their research results are adequately published, precisely in order to assert their status as a serious research institution.

6.2.6 Deficient routines for quality control

In the survey a predominant majority of the researchers state that they have not undertaken contract research that they lacked the competence to conduct. In those instances where it was stated that competence was initially lacking, the clear rule is that the development of competence was incorporated in the project. This must be interpreted with caution, however, as it is the researchers themselves who have assessed their own competence, with all the bias that might result. Self-inspection is not always sufficient, and we consider it to be an important task that independent professional criticism is maintained, i.e. that every research project should be subject to various forms of both external and internal evaluation and quality control.

The survey shows that a large majority of the researchers have the opportunity for quality assurance through various forms of peer review. There are nonetheless differences here among the institutions and disciplinary areas. Quality assurance is less common for the humanities and medicine, and at colleges and universities, than within the other researcher groups. This may in part be due to differing pursuits and differing ways in which the contract research is organized, but is worth noting nonetheless.

Already in section 6.2.5 we emphasized that the publishing of research results is an important element of quality assurance. The form of peer review that accompanies publication in acclaimed scientific journals provides a reassuring quality assurance of the research results. Ambiguous publishing practices and relatively many conflicts regarding publishing does, however, undermine the quality assurance. At the same time, we are aware that some contract research will be of such a nature that it will hardly gain access to scientific journals. This applies for example to projects and studies that concern problems of local interest or narrow research questions that lack widespread interest. For such research there is no established channel for institutionalized peer review, and thereby independent quality assurance. If the results are not publicly accessible either, the possibility of quality assurance through professional debates is also ruled out.

Publishing is therefore a necessary, though not always sufficient, prerequisite for quality assurance.

In this context it is also relevant that 4 in 5 researchers state that client contact has by and large enhanced the quality of the research results, while only 1 % believe that such contact has been detrimental to the result. We believe this indicates that quality assessment and quality control in modern research is no longer categorically limited to evaluations from peers. In section 3.4 we mentioned the need for so-called 'extended peer reviews', where concerned parties are included in the quality assurance. Close client contact may be viewed as the first part of such a process of extended quality assurance. However, given that the client may justifiably be assumed to represent merely a small segment of the interests of the concerned parties, the quality assurance remains incomplete as long as other parties are not included in the process as well.

The focus groups showed that researchers were little concerned with evaluating completed projects. If this is a widespread trait of contract research, it means that researchers have little opportunity to reflect over their own activities. A possible measure may be to formalize retrospective evaluation.

6.2.7 Contract research in a grey area

We asked whether the research funding from the Research Council of Norway has similarities with what is traditionally defined as contract research. The answers were clear: an overwhelming 84 % of the respondents either completely or partially agree that the research programmes of the Research Council lead researchers to adapt their research topics in order to increase the possibility of funding. A clear majority agree that networks and connections play as important a role in obtaining funding from the Research Council as in obtaining contract research in general.

These assertions confirm that definitions of contract research operate in a grey area and that scarcely any research may longer be considered to be so-called 'free'. It is difficult to differentiate between 'traditional' contract research on the one hand and programme research, funded by the Research Council and incorporating user participation, on the other. Especially in those instances where the Research Council is one of several possible funders, the demarcation

may be difficult. In our survey we have chosen to disregard funding from the Research Council, except for the questions on attitudes towards contract research at the end of the survey. The answers suggest, however, that our demarcation was arbitrary and not very pertinent. It is not easily supported by any substantial arguments.

6.2.8 Two cultures?

A factor analysis of respondents with experience from contract research provided the basis for stating there are two types of contract researchers, which we called the idealistic and the pragmatic contract researcher. These types may be intuitively understood as an expression of two different cultures. The idealistic contract researcher is conscious of unfortunate ties to and influence from the client, is interested in quality assurance and does not compromise his or her competence. The idealistic contract researcher is at the same time not very concerned with what his or her research results are used for. The pragmatic contract researcher, conversely, is not very concerned with unfortunate ties to and influence from the client, is less afraid of compromising his or her competence and is less interested in quality assurance. The pragmatic contract researcher is, however, very interested in what the results of his or her research are used for. It appears as though it is the pragmatic researcher who is most oriented towards the social benefit of research.

This find is very interesting, yet it is also difficult to pinpoint its significance for research ethics. In our opinion, the two identified cultures suggest there are certain divergent perceptions in the research community regarding the task, role and function of research. They therefore highlight basic ideological differences in how research is viewed. In the context of research ethics, a possible interpretation may be that the idealistic contract researcher considers the norm of quality to be the primary obligation of research ethics, while the pragmatic contract researcher values social benefit and accountability the highest. The existence of the two cultures may be interpreted as though there is an unresolved conflict in the perception of the abovementioned norms of research ethics. It would in that case not be unreasonable to contend that the research community is subject to norms and objectives that point in various directions, and that each researcher must make a fundamental choice him or herself.

There are two possible answers to this interpretation. The first answer is to contend that the conflict is real and based on an inadequate clarification of the relationship between the norms. The second answer is to contend that the conflict is rather based on an apparent clash of interest between the norms, arising from a lack of reflection on their meaning and consequence. Regardless of one's preferred answer, however, the very existence of the two different cultures shows the need for the research community to further contemplate, clarify and debate research ethics. Our finds are relevant to research ethics and are linked to fundamental ideologies in the research community. It may be justifiably claimed that quality, on the one hand, and accountability and relevance, on the other, are norms that lie in an actual and unresolved tension with each other, or that the situation is experienced as such. It must therefore be a challenge to the research community to become aware of and reflect on these norms. We consider a wide-ranging debate and a strengthening of the awareness of research ethics to be a natural response to this challenge.

6.3 Recommendations and proposed measures

The contents of this report are based on a limited empirical study of contract research in Norway, as analyzed against the background of research ethics. Previously in this chapter we summarized those conclusions we considered to be the most crucial and relevant in regard to both research ethics and research politics. One of the primary conclusions is that Norwegian contract research maintains an acceptable standard of research ethics, although we have simultaneously highlighted certain aspects of Norwegian contract research that raise concerns regarding research ethics.

Research is dependent on the general public being able to have confidence in the research results that stem from established research institutions. If researchers fail to live up to satisfactory standard of research ethics, it may undermine the standing of research. It is therefore in the research institutions' own interest to clarify the rules of the road and publicize common standards. It is in line with this reasoning that we will in this section make our own recommendations for necessary and desirable measures. The recommendations are not in themselves a part of our empirical finds. They are based on assessments, made at our own discretion, of which actions the empirical finds seem to indicate. We make no claim that our

recommendations are the only ones that are right for Norwegian contract research, or that they are necessarily the most effective, but rather that they are appropriate in regard to our finds.

We want to clarify that some of our recommendations deal mainly with objectives that contract research should strive to achieve, while other recommendations deal with means and measures. Objectives and measures are not systematically separated here, but will be treated as a whole. The following recommendations are arranged according to how we perceive their order of priority.

6.3.1 Public disclosure of results – a necessary rule

The rule for all forms of contract research must be that research results should be publicly disclosed and that attempts should be made to publish them in the appropriate scientific journals and publication series. The reason for this is that the client should not be able to shirk unwanted results and that quality assurance should be conducted for all research. Research is of public interest and is a social benefit, and should as a rule benefit each and every one. All research is grounded on an expectation of public knowledge and a comprehensive and professional quality assurance. If exemptions from the rule are to be made, a valid and explicit reason must be stated. For example, national security interests might justify that certain research results are withheld. In industrial contract research, another reason might be the client's legitimate interests in gaining a competitive advantage based on their investments in contract research. With regard to patentable research results, the demand for public disclosure follows the usual conditions for patenting. We also believe that any exemptions from the rule of public disclosure must always be of a limited duration. The Swedish Research Council recently decided that the client is not allowed to postpone publishing the results for more than two months, and in case of patenting, for no more than six months.

The Report to The Storting No. 32 (1997–98), *On Freedom Of Information In Public Administration*, assessed the need for greater accessibility and openness in public administration. The follow-up to this report, as well as the Report to The Storting No. 39 (1998–99), *Research At The Beginning Of A New Era*, specified the existing need for greater public disclosure in regard to internal documents received from experts and other advisers, something that clearly applies to

research reports. At the same time, our finds seem to show that this principle has not been widely followed up in actual practice, especially in regard to clients from the public sector.

The demand for the public disclosure of research results is primarily aimed at the research institutions, i.e. the independent contractors in our context. Every research institution that conducts contract research should clarify their guidelines so that public disclosure should always follow upon the completion of a project, unless there should be particularly weighty reasons for making an exception. Research institutions that feel that such a principle is hardly compatible with the interests that their typical clients have in such projects, should choose to market themselves as consultancy firms rather than as research institutions. The public disclosure of results is the be-all and end-all of research, and only if this norm is consistently followed up will research institutions obtain the stamp of quality they desire.

We will specify our recommendation in two further points. First of all, it should be a matter of course that the demand for public disclosure includes a demand for access to the raw data. Public disclosure without access to the data hinders quality control, which is why there is a requirement in research to store data. This requirement should in other words apply to contract research as well. How to best secure access to the data is something that the institutions themselves should determine. With the technological possibilities afforded by today's computer technology, practical difficulties cannot be a decisive obstacle to accessibility. The research community the world over has become aware of what is experienced as increased secrecy in research (Ceci 1988; McCain 1991; Kaiser 1996). There is in our opinion no reason why contract research should not play by the same rules as research in general.

Secondly, there is due cause for emphasizing yet another issue related to the demand for public disclosure, namely the researcher's opportunity to actively participate in the public debate. The consideration to clients and their projects should never extend so far that the researcher is denied the opportunity of making public statements about his or her discoveries, for example in the media. This may be particularly relevant where public interest surrounds a given project and where the client is interested in influencing the public discussion in a unilateral direction. The

interpretative acts that the publication of research activity always entails should not be the client's prerogative. The researcher must contribute with his or her own viewpoints.

We summarize our recommendation in the following statement:

> Research institutions that undertake contract research should formulate a clear and unambiguous principle that research results should as a rule be publicly disclosed, and that exemptions from this rule must be for significant reasons and for a limited time only. Public disclosure should also include access to data and the researchers' opportunity to participate in the public debate.

6.3.2 A template for standard contracts is called for

Our finds demonstrated that standard contracts for contract research are greatly lacking at research institutions. We will therefore recommend that the Ministry of Education and Research (UFD) should take responsibility for working out a template for standard contracts for contract research in Norway. The purpose of such a template should be to reinforce the interests of the research institutions vis-à-vis powerful clients, and provide guidelines for what may be considered to be standard procedures in such a context. The better such a standard contract is worked out, the less chance there will be for conflicts to have adverse outcomes. Such a template should not least emphasize the fundamental norms of research ethics that are mandatory for all research, including contract research. The National Committee for Research Ethics in the Social Sciences and the Humanities (NESH) has worked out general guidelines for research ethics in the social sciences, law and the humanities, in addition to a checklist for the formation of a research contract (NESH 1999). References to the norms and guidelines of research ethics may naturally occur in the preamble to such a standard contract. Issues of particular significance to contract research should be clarified, such as the public disclosure of results, the distribution of responsibility during the research process, accessibility and the body of authority that is to address complaints. We believe that UFD is the most qualified authority for managing this task, due to both its legal competence and its overarching function in Norwegian research.

We are of the opinion that a meticulously worked out standard contract for contract research, including references to the main obligations of research ethics, seems to supersede the need for particular ethical guidelines for contract research. Ethical guidelines have an important function for research in general, but we have difficulties in seeing that contract research forms a distinct category that necessitates separate guidelines. The potential sources of conflict that are particularly endemic to contract research demand above all a legal clarification in the form of contractual agreements. Referring to the guidelines of research ethics hardly carries the same weight of authority when conflicts arise.

> The Ministry of Education and Research should draft a proposal for a standard contract for contract research, based on the general norms of research ethics.

6.3.3 Clients from the public sector should invite tenders

Our finds indicate that connections and networks are considered to be important prerequisites for securing contract research. In regard to clients from the private sector, there is hardly any reason to regulate how they allocate their contract research. It is their own business if they consider their connections and networks to be a sufficient basis for assessing who is best qualified to undertake a given project. It is a different matter, however, when it comes to clients from the public sector. Given that they administrate public funds, they should be obligated to ensure that their research projects are conducted by the institutions that are best qualified and that certain environments are not favoured. It is therefore important that tenders are invited for contract research projects. This creates greater openness, and in those instances where close networks have been established between a client and an independent contractor, it might help sever such networks. Competitive tendering does not guarantee that the most qualified research environments are chosen, but it does create greater openness and may afford access into the use of research by public authorities. Contract research should be allocated in accordance with the same rules that apply to other public procurements. In this connection, a change should be considered to the exceptions for purchasing R&D services that are stipulated in the Law of Public Procurement (of July 16, 1999, No. 69; see paragraph §1–3 (2) g). This stipulation states that tenders do not need to be invited where the

client does not fully pay for the service or the service does not completely accrue to the client for use in his activity.[8]

> We recommend that research projects that are allocated by clients in the public sector should be done so in accordance with the same rules that apply to other public procurements. Clients in the public sector should as a rule invite tenders for their research projects. The authorities should ensure that the regulations are adhered to.

6.3.4 Openness about financial aspects

The previous section dealt with the norm of openness and the principle of greater public disclosure. Another related issue deserves attention as well. In some cases, researchers have financial interests that may lead to conflicts of interest or complicate the impartial and objective execution of a research project. Both ownership and other commitments, such as consultancy for a firm, may entail conflicts of interest, as may long-term or large-scale research projects commissioned from the private sector. It is irrelevant that researchers themselves often believe they are not influenced by such interests. The point is that openness surrounding financial interests and other commitments is an important prerequisite for the general public's confidence in contract research. It is also important for the professional assessment when allocating contract research, and it provides a relevant background when assessing the research results.

The Regional Committees for Medical Research Ethics require such information for medical research, but the same requirement does not apply to other research. In the USA, for example in the National Science Foundation, there is a longstanding practice where researchers must account for potential conflicts of interest. In February 2003, the Swedish Research Council passed new guidelines, in effect from 2004, that required that financial interests be accounted for in all applications to the Council. Accounting for financial interests is a prerequisite for obtaining grants.

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[8] We could in this connection also mention that the EU has worked out detailed guidelines for the collection and use of expertise in the Commission's work, where quality, openness and efficiency regarding the process are important considerations of research ethics. So-called 'open-calls' are important measures in this connection (see Commission of the European Communities, Communication from the Commission 'On the collection and use of expertise by the Commission: Principles and Guidelines.' Brussels, 11.12.2002, COM (2002) 713 final).

Our finds do not give us reason to believe that access to the researchers' financial interests will greatly affect contract research in Norway. In many cases it will merely represent another administrative routine, which some might experience as inconvenient. At the same time, it might in some cases relate to highly relevant information, and in these cases openness will facilitate the treatment of applications and ultimately increase the confidence in research in general. We believe that openness in regard to financial interests and possible conflicts of interest should be required when allocating research funds. This presupposes that a standard is worked out that the Research Council of Norway may use as basis for their regular administrative procedures when allocating research funds. Other clients from the public sector will be able to use the same template in their own allocations of research funds.

> The Research Council of Norway should include the disclosure of financial interests and possible conflicts of interest as an integral part of their administrative procedures when allocating research funds. This should also be the standard when other public authorities allocate research funds.

> The Regional Committees for Medical Research Ethics are encouraged to continue requiring that researchers account for financial interests and possible conflicts of interest as an element in the assessment of research ethics.

6.3.5 Quality assurance – a challenge for the research environments

Even though our finds indicate that many environments of contract research exhibit a conscious relation to the quality assurance of research results, we have also registered exceptions and other weaknesses (see 6.2.6). We have no basis for evaluating how important these exceptions are for the overall picture of Norwegian research, but every weak link in the system of quality assurance undermines the confidence in Norwegian contract research. The system of quality assurance is undermined when research results are not routinely published in peer-reviewed scientific journals, when new projects are not routinely assessed by and discussed with senior researchers, or when research environments do not find the time to evaluate and discuss completed projects. In section 6.3.1 we contended that research results should be publicly disclosed as a matter of

routine, but it is also important to ensure that those results that are not published in peer-reviewed scientific journals are subjected to an adequate quality assurance as well. Such professional systems of quality assurance should in our estimation be a matter of course in research environments. We have no detailed recipe at hand for how the quality assurance of research results should take place, and such quality assurance will depend on the given discipline, professional networks and other traditions. However, institutions that conduct contract research are responsible for making the system of quality assurance explicit and for publicizing the system to society at large.

As a further element in such a system of quality assurance, research institutions should also have clear-cut guidelines for what is commonly referred to as extended peer review, i.e. those processes where (contract) research is subjected to a critical discussion among concerned parties. The client and the user group are at the outset such concerned parties, but, depending on the type of research, many cases will also require that other parties be incorporated, such as for example public administration and public interest groups. Contract research will in many cases entail projects with a high degree of uncertainty and where large values are at stake. It is precisely for such projects that extended systems of quality assurance are crucial.

This latter point, concerning an extended quality assurance with several external parties, is in our opinion an integral part of the more recent political and ethical discussions on a new social contract for research (Lubchenco 1997). Collaboration and participation in such research projects become then an important element in achieving the social and environmental objectives of research. We therefore believe that the research of the future – not only contract research – should have a greater awareness of such processes in connection with quality assurance.

> Research institutions that conduct contract research should develop and publicize their systems of quality assurance, based primarily on the professional quality assurance. Quality assurance should in the long term be expanded to include concerned parties.

6.3.6 An independent committee as complaints board and supervisory body

Our finds showed that conflicts occasionally arise in contract research and that some conflicts may be detrimental to either the results or their publication. Even though improved contract systems and an increased awareness of research ethics could reduce the number of conflicts, it would be impossible to eliminate them completely. Some disputes will inevitably arise, most likely when major interests are at stake. In such situations it will be important that the research institutions, researchers and clients that are involved can take their dispute to an independent committee. The committee should act as an advisory complaints board for various parties in a contract research process. It should simultaneously have the authority to examine cases of public significance on its own initiative or upon the initiative of a third party, for example the Storting. The committee should also be able to act preemptively. Such responsibilities may give the committee status as a type of supervisory body for contract research.

We believe that the responsibility for implementing such a system must lie with the Ministry of Education and Research. The Ministry has experience with a system of independent advisory committees and is in addition in the process of establishing an integrity committee for Norwegian research. At the outset it does not seem unreasonable that questions of accountability in contract research can and should be seen in connection with the establishment of the integrity committee. In both cases, systematic distortions and bias due to external interests are feared, and both questions also demand informational and preventive measures. It would therefore be natural if a newly established integrity committee for Norwegian research also acts as a complaints board and supervisory body for Norwegian contract research. Regardless of which practical solution is ultimately chosen, it is in our opinion important that an independent body is appointed with such an authority to inspect and supervise contract research. We would consider it unreasonable to leave serious conflicts to the concerned parties alone, where in any case the most powerful party often wins through with their views. Establishing an independent complaints board would also strengthen the confidence in contract research.

> The Ministry of Education and Research should establish an independent committee that can act as a complaints board and supervisory body for contract research.

6.3.7 Research ethics on the agenda

We have pointed out that there is a need in the research community for increasing the awareness of, and the level of the debate on, research ethics. This is indicated not only by certain issues relating to the handling of conflicts, but also by the existence of an idealistic and a pragmatic researcher culture.

The teaching of ethics to researchers is currently very limited. We would recommend that courses in research ethics and science ethics are strengthened at colleges and universities, and that ethics courses are offered that are relevant to contract research. The teaching of ethics is important because it promotes an awareness of research ethics. Reflections on research ethics, based on specific examples, should be a key element in the education of researchers in general.

We believe that researchers who already conduct contract research should also be offered continuing education in research ethics. As far as we know, such systematic courses are currently few and far between, both from professional associations and from colleges and universities.

The National Committees for Research Ethics have themselves helped develop Internet courses in research ethics, though these courses do not focus in particular on specific questions related to contract research. The Internet courses were developed on an interdisciplinary basis and are offered by the University of Oslo. The courses were chiefly designed for the continuing education of external users at the university, but the experiences from last year show that Masters students and PhD candidates at the various faculties also took the courses. As yet the courses have only been offered within medical research ethics, but during 2003 Internet courses will also be offered in the social sciences, the humanities, law and theology.

The experiences at the University of Oslo with the development of Internet courses for research ethics should be carried on in regard to continuing education in research ethics that is relevant to contract research. This should entail that colleges and universities take responsibility for offering continuing education to researchers.

Is must also be imperative that research institutions themselves require their employees to take continuing education courses in research ethics. How this should be done must be up to each institution, but there are for example some clients and research institutions that want to certify their research staff in order to ensure that they are familiar with research ethics, that they are able to identify the relevant problems and can reflect on and logically evaluate different courses of action.

Colleges and universities should create and offer courses within research ethics for all the disciplinary areas that educate researchers. It is a challenge to make this education relevant to the problems that may arise in contract research.

Colleges and universities should also offer continuing education courses within research ethics for external users at colleges and universities, particularly in regard to researchers. In this area as well there is a challenge to adapt the courses so they are relevant to the problems that may arise in contract research.

Research institutions should consider requiring their researchers to take continuing education courses in research ethics, e.g. in collaboration with colleges and universities.

6.3.8 Limits to the commercialization of research?

Contract research is put under pressure by powerful clients. Many of the professional environments this concerns have largely come to depend on external research funds linked to specific user interests. It cannot be ruled out that this goes so far that researchers start to internalize the client's expectations already in their research designs, or that self-censorship occurs in the final report (see section 4.6). This may be a serious problem, especially in those cases where research institutions serve very few potential clients. In a small country such as Norway, it is inevitable that certain research institutions will over time establish a near monopoly on certain research questions, while simultaneously obtaining the majority of their contract research from one client or only a few clients. The danger lies in that a more or less conscious adaptation to the client's expectations takes place at the expense of professional quality and integrity.

The mechanism that serves to curtail this type of adaptation is the existence of a critical professional environment, where professional standards are discussed independently of specific user interests. So long as thriving professional environments exist in relative independence from possible contract research funding, professional debate will persist and thereby reinforce contract research environments vis-à-vis external users. Contract research environments also depend on professional growth, even though that might be difficult within the strict budgets and narrow time frames of contract research (see section 4.9). Hence we see that contract research environments indirectly come to rely on research done at institutions that are not solely governed by contract research funding. We have also seen that demands for social benefit and relevance are felt to be at odds with the demands to professional quality, something that suggests that one should be cautious of research funding which focuses exclusively on user benefits and socio-economic relevance.

Based on our interpretation of these finds, and based on our familiarity with the international debate on research ethics, it may be justifiably pointed out that the increasing commercialization of research leads to fundamental problems in regard to quality, openness and accountability. The point is not that the commercialization of research gives in itself cause for concern in regard to research ethics, but rather that it always presupposes a certain counterweight in another, relatively independent research, where user interests and commercial profit are not always and unconditionally in focus. Quality standards, professional criticism and objectivity are put under pressure when research is reduced to being a support and service function for powerful interests. When research environments no longer exist where knowledge is developed at a relative distance from and independent of partisan interests, both a professional yardstick and an important source of criticism are lost. When knowledge production becomes a matter of negotiation, as though it were just any commodity on the market, the risk is run that critical and independent research, or research that strives to serve the interests of the disadvantaged, is undermined or precluded. Secrecy and selective public disclosure undermine the most fundamental principles of research. Research, to carry it to the extreme, is ultimately done in the service of society in general and the whole of mankind, and contract research may be satisfactorily conducted only as long as this overriding mission is not undermined.

Our finds give no reason to believe that Norwegian contract research as of today compromises professional standards and expectations of objectivity. In most environments it seems that contract research is conducted according to reassuring quality standards, though some researchers, especially in the more informal focus groups, do express concern over the degree of dependence on external interests.

The buying and selling of research and the accommodation to commercial interests, the so-called commercialization of research, should in our opinion take place with caution and within certain limits. Contract research is part of a wider range of various trends and measures within research politics that help bring commercial interests to the forefront of research activity. In this report we have no data on the financial scope of contract research in relation to other research. At the outset, however, it seems reasonable to believe that an increasing dependency on external funding will cause researchers to have increasing concerns in regard to research ethics. The tricky question is thereby of finding a good and defensible balance.

These issues do not refer to individual parties in Norwegian research, but they signalize the need for clarification and plans of action on the political level. Several suggestions from the political domain have called for college and university research to be more closely linked with the private sector (NOU 2000:14 *Freedom With Responsibility*) and for colleges and universities to make conditions more favourable for the commercial exploitation of research results (NOU 2001:11 *From Insight To Industry*). This is also clearly expressed in the Research Council's strategy proposal, *Commitment To Research* (Research Council of Norway 2002), which is currently being presented in a larger series of meetings with the relevant ministries, research environments and businesses and industries. The Research Council's research strategy for a significant advancement in Norwegian research presupposes a close collaboration with the private sector and the authorities. Neither in the Research Council's proposed strategy, nor in the abovementioned studies, do we find any critical objections to commercialization or any suggestions for how to manage the many difficult mediations and conflicts of interest that may arise from increased commercialization. We also find very few signs of viewpoints that specify that in order for commercialized research, including contract research, to be conducted satisfactorily, strong and

independent research environments must exist external to such commercialization, and that there are therefore limits to the desirability of research being commercialized and made the subject of contract work.

In a consultative response to NOU 2001:11, *From Insight To Industry*, the National Committees for Research Ethics stated among other things the following:

> 'There is due cause for asking whether the study … does not send the fundamentally wrong signal to decision makers and the general public. Such as the Committees perceive today's reality, it is the independent and basic knowledge production that is most under pressure and undermined. One of the central factors that increase this pressure is precisely the commercialization of research, which is a fact already today. An extensive process of commercialization is currently underway, also in regard to the research results from colleges and universities. The problem is that the public research at colleges and universities does not partake in setting the terms for how this commercialization should transpire, nor does it derive any income from the research results. When today's system for innovation seems in addition to favour large-scale commercial parties, this may be considered to be clearly detrimental to the sound development of society.'

Furthermore, the dangers of increased commercialization were highlighted:

> 'The commission itself points out a possible problem when it states that "the right to control follows the money" (p. 28). But unlike the commission, the Committees do not see that the problem of ensuring a free and independent research is solved when "problems related to commercialization are … known among researchers and at institutions" (p. 28). When the commission in its recommendation in section 5.9 emphasizes that the researcher and research institution must develop a more "conscious attitude to commercialization" – "in regard to both financial and proprietary aspects" (p. 48) – it at best limits the possibilities for third parties (external funding sources) to exploit the research results for their own financial gain. Increased awareness does not necessarily entail greater autonomy in "what should be researched, and … how the research should be conducted" (p. 28). It is such autonomy, however, that is the key to the populace's confidence in colleges and universities.'

Proposition no. 67 (2001–2002) to the Odelsting (the lower chamber of the Storting) states among other things:

> 'A fundamental principle for the Government is that it is the researcher and the professional environments who should themselves decide the topics of research, the relevant methods and the modes of presentation. Intellectual freedom and the disinterested search for the truth, as well as historical experiences on how best to make conditions favourable for new scientific understanding, all demand this. Another fundamental principle is the right to publish and the right to publicly disclose research results. The researchers' right to publish their research results is a prerequisite for the research environment to discuss, criticize and assure the quality of the results. Publishing one's own results is furthermore the main way for researchers to further their competence and standing, while commercialization more often presupposes a certain degree of secrecy and a monopoly on using the inventions.' (p. 3)

This extract from the Odelsting Proposition accords far better with the norms of research ethics that we have analyzed in this report, in our opinion, than with the principles found in the abovementioned studies and most recently in the Research Council's own proposal for a research strategy. The extract advocates that limits should be set on commercialization and that contract research must be conducted in accordance with the norms of openness and accountability. In addition, the empirical survey in this report shows that there is reason to believe that contract research, such as it is practiced, involves conflicts between the instrumental objectives of contract research and the overall objectives and norms of research. Such questions pertaining to research policy have in our opinion important ethical consequences for research and science in regard to quality, openness and accountability.

We have noted that the Swedish Research Council during the past year has initiated a process discussing not only the advantages of commercialization, but also its disadvantages for research as such and how to manage conflicts of interest.[9]

[9] See the home page of the Swedish Research Council, www.vr.se. See also Hermerén 2002.

We believe it would be natural to challenge the Research Council of Norway to initiate a similar process in regard to what the Research Council itself calls ‘increased research-based value adding’. This would among other things entail a greater awareness and clarification of the advantages and disadvantages of commercialization, how to manage conflicts of interest and how to achieve a balanced and viable relationship between commercialized research on the one hand, including contract research, and independent research on the other. An important ethical and political challenge today is to set limits to the commercialization of research.

The Research Council should initiate processes discussing the disadvantages of the commercialization of research as seen in relation to the advantages that are presented in its proposal for a new research strategy.

The Research Council is encouraged to evaluate how the norms that were discussed in this report (especially the norm of openness) should be realized in practice in order to manage the various conflicts of interest.

The Research Council should in particular debate and evaluate limits to the commercialization of research and what role it itself should play as an adviser in research politics, in order to ensure that framework conditions are established where contract research on the one hand and independent research on the other are placed in a balanced and viable relationship to each other.

Bibliography

Bernal, J.D. 1967. The Social Function of Science. Oxford: Oxford University Press.

Bloor, M. et al. 2001. Focus Groups in Social Research. London: SAGE Publications.

Böhme, G., et al. 1978, Die gesellschaftliche Orientierung des wissenschaftlichen Fortschritts, Frankfurt a.M.: Suhrkamp Verlag.

Cartwright, N. 1999. The Dappled World – Studies of the Boundaries of Science. Cambridge: Cambridge University Press.

Ceci, S. J. 1988. 'Scientists' Attitudes toward Data Sharing.' Science, Technology, and Human Values 13:45–52.

Central Committee 1981. Forskning og etisk ansvar. En rapport for utvalget 'for forskning og moral' nedsatt av Hovedkomiteen for norsk forskning. [*Research and Ethical Responsibility. A report from the commission on 'research and morality' appointed by the Central Committee for Norwegian Research.*] Oslo: Central Committee for Norwegian Research.

Chubin, D.E. & Hackett, E.J. 1990. Peerless Science. Peer Review and the U.S. Science Policy. New York: State University of New York Press.

Cole, S. 1992. Making Science – Between Nature and Society. Harvard: Harvard University Press.

Davis, M. 1998. Thinking Like an Engineer – Studies in the Ethics of a Profession. New York, Oxford: Oxford University Press.

Etzkowitz, H., et al. 1998. Capitalizing Knowledge – New Intersections of Industry and Academia. New York: State University of New York Press.

Feyerabend, P. 1975. Against Method. London: NLB.

Fuller, S. 2000. The Governance of Science. Ballmoor Buckingham: Open University Press.

Funtowicz, S. & Ravetz, J. 1991. Uncertainty and Quality in Science for Policy. Dordrecht: Kluwer Academic Publishers.

Funtowicz, S. & Ravetz, J. 1993. 'Science for the Post-Normal Age', Futures 25/7: 735-755.

Funtowicz, S. & Ravetz, J. 1999. 'Post-Normal Science – An Insight Now Maturing', Futures 31/7: 641–646.

Gibbons, M., et al 1994. The New Production of Knowledge: Dynamics of Science and

Research in Contemporary Societies. London, Thousand Oaks, New Delhi: SAGE Publications.

Gibbs, A. 1997. Focus Groups. University of Surrey, Department of Sociology. http://www.soc.surrey.ac.uk/sru/SRU19.html.

Greenberg, S.D. 2001. Science, Money and Politics. Political Triumph and Ethical Erosion. Chicago and London: The University of Chicago Press.

Hermerén, G. 2002. 'Forskningen behöver ny uppsättning etiska regler.' [*'Research needs a new set of ethical rules.'*] Dagens Forskning 4–5 November.

Kaiser, M. 1996. 'Toward More Secrecy in Science? Comments on Some Structural Changes in Science – and on Their Implications for an Ethics of Science.' Perspectives on Science 4:207-230.

Kaiser, M. 2000. Hva er vitenskap? [*What Is Science?*] Oslo: Universitetsforlaget.

Kjaergard, L. L. & Als-Nielsen, B. 2002. 'Association between competing interests and author's conclusions: epidemiological study of randomised clinical trials published in the BMJ.' BMJ 325:249.

Krueger, R.A. 1988. Focus Groups: A Practical Guide for Applied Research. London: SAGE Publications.

Kuhn, T.S. 1962. The Structure of Scientific Revolutions. Chicago: The University of Chicago Press.

Lubchenco, J. 1997. 'Entering the Century of the Environment: A New Social Contract with Science.' Presidential Address at the Annual Meeting of the American Association for the Advancement of Science, published as: Lubchenco, J., 1998. Entering the century of the environment: A new social contract for science. Science 279:491–497. http://sciencemag.org/cgi/content/full/279/5350/491.

Marginson, S. & Considine, M. 2000. The Enterprise University. Power, Governance and Reinvention in Australia. Cambridge: Cambridge University Press.

Mason, S. F. 1962. A History of the Sciences. New York: Collier Books.

Maus, K. W. (ed.) 2001. Det norske forsknings- og innovasjonssystemet – statistikk og indikatorer 2001. *[The Norwegian System Of Research and Innovation – Statistics and Indicators]* Oslo: Research Council of Norway.

McCain, K.W. 1991. 'Communication, Competition, and Secrecy: The Production and

Dissemination of Research Related Information in Genetics.' Science, Technology, and Human Values 16:491–516.

McNamara, C. 1999. Basics of Conducting Focus Groups. http://www.mapnp.org/library/evaluatn/focusgrp.htm

Menard, L. et al. 1996. The Future of Academic Freedom. London: The University of Chicago Press.

Merton, R. K. 1973. The Sociology of Science – Theoretical and Empirical Investigations. Chicago & London: The University of Chicago Press.

Mitcham, C. & Schomberg, R. von 2000. The Ethic of Scientist and Engineers: From Occupational Role Responsibility to Public Co-responsibility. Amsterdam: JAI Press.

Mulkay, D. 1979. Science and the Sociology of Knowledge. London: George Allen and Unwin.

NENT 1996. Kvikklaks og teknoburger. Sluttrapport fra Lekfolkskonferansen om genmodifisert mat, 18.–21. oktober 1996. [*Fast Salmon and Technoburgers. Report from the first Norwegian consensus conference on genetically modified food, 18-21 October 1996.*] Oslo: The National Committee for Research Ethics in Science and Technology.

NESH 1999. Forskningsetiske retningslinjer for samfunnsfag, jus og humaniora. [*Guidelines For Research Ethics In The Social Sciences, Law and The Humantities.*] Oslo: The National Committee for Research Ethics in the Social Sciences and the Humanities.

Nowotny, H. et al. 2001. Re-Thinking Science. Knowledge and the Public in an Age of Uncertainty. Cambridge: Polity Press.

Price, D. J. de Solla. 1963. Little Science, Big Science. New York: Columbia University Press

Ruyter, K. (ed). 2003. Forskningsetikk – Beskyttelse av enkeltpersoner og samfunn. *[Research Ethics – Protection Of Individuals and Society]*. Oslo: Gyldendal Akademiske Forlag.

Sarewitz, D. 1996. Frontiers of Illusion: Science, Technology and the Politics of Progress. Philadelphia: Temple University Press.

SCRES 2002. Standards for Ethics and Responsibility in Science – an Empirical Study. The Standing Committee for Responsibility and Ethics in Science, under The International Council for Science (ICSU). See www.icsu.org or http://www.icsu.org/Library/Reviews/SCRES/SCRES-Standards%20report.pdf

Skoie, H. & Såtvedt, Ø. 1998. Forskning, kultur og autonomi. Et bidrag til debatten om den frie universitetsforskning. Rapport nr 17. [*Research, Culture and Autonomy. A contribution to the debate on free university research. Report no. 17*]. Oslo: The Norwegian Institute for Studies in Research and Higher Education.

Slaughter, S. & Leslie, L. L. 1997. Academic Capitalism. Politics, Policies, and the Entrepreneurial University. Baltimore & London: The Johns Hopkins University Press.

Tranøy, K. E. 1986. Vitenskapen – samfunnsmakt og livsform. [*Science – Social Power and Form of Life.*] Oslo: Universitetsforlaget.

UNESCO & ICSU 2000. World Conference on Science. Paris: United Nations Educational, Scientific and Cultural Organization.

Watson, J. D. 1968. The Double Helix: A Personal Account of the Discovery of the Structure of DNA. New York: New American Library.

Weber, M. 1936. Vitenskap og politikk: To taler. [*Science and Politics. Two speeches.*] Oslo: Aschehoug.

Ziman, J. 1978. Reliable Knowledge. An Exploration of the Grounds for Belief in Science. Cambridge: Cambridge University Press.

Ziman, J. 1984. An Introduction to Science Studies. The Philosophical and Social Aspects of Science and Technology. Cambridge: Cambridge University Press,

Ziman, J. 1994. Prometheus Bound. Science in a Dynamic Steady State. Cambridge: Cambridge University Press.

Ziman, J. 1996. 'Is science loosing its objectivity?' Nature 382: 751–754.

Public documents

NOU 2000:14. Frihet med ansvar. Om høgre utdanning og forskning i Norge. [*Freedom With Responsibility. On higher education and research in Norway.*] Oslo: The Ministry of Church Affairs, Education and Research.

NOU 2001:11. Fra innsikt til industri. Kommersialisering av forskningsresultater ved universiteter og høgskoler. [*From Insight to Industry. Commercialization of research results from colleges and universities.*] Oslo: The Ministry of Church Affairs, Education and Research.

Dok. nr. 8:58 (1996–1997) Forslag fra stortingsrepresentantene Sigurd Manneråk, Jon Lilletun og Lars Sponheim om å oppnevne et utvalg med mandat til å vurdere forskningens åpenhet, frihet og uavhengighet. [*Proposal from the Members of the Storting Sigurd Manneråk, Jon Lilletun and Lars Sponheim to appoint a commission with a mandate for assessing the openness, freedom and independence of research*.] 05.03.1997.

Innst.S. nr.221 (1996–1997) Innstilling frå kyrkje-, utdannings- og forskingskomiteen om forslag fra stortingsrepresentantene Sigurd Manneråk, Jon Lilletun og Lars Sponheim om å oppnevne et utvalg med mandat til å vurdere forskningens åpenhet, frihet og uavhengighet. [*Recommendation from the Standing Committee on Education, Research and Church Affairs concerning the proposal from the Members of the Storting Sigurd Manneråk, Jon Lilletun and Lars Sponheim to appoint a commission with a mandate for assessing the openness, freedom and independence of research*.] 29.05.1997.

Ot.prp. nr. 67 (2001–2002) Om lov om endringer i lov av 17. april 1970 nr. 21 om retten til oppfinnelser som er gjort av arbeidstakere. Tilråding fra Utdannings- og forskningsdepartementet av 19. april 2002, godkjent i statsråd samme dag. (Regjeringen Bondevik II) [*Concerning changes to the Law of 17 April 1970 no. 21 about the right to inventions that have been made by employees. Recommendation from the Ministry of Education and Research on April 19 2002, sanctioned in the Council of State the same day. (The Bondevik II Government)*]

St. meld nr 39 (1998–99) Forskning ved et tidsskille. Tilråding fra Kirke-, utdannings- og forskningsdepartementet av 11. juni 1999, godkjent i statsråd samme dag. [*Research at the beginning of a new era. Recommendation from the Ministry of Church Affairs, Education and Research on June 11 1999, sanctioned in the Council of State the same day.*]

St. meld nr 32 (1997-98) Om offentlighetsprinsippet i forvaltningen. Tilråding fra Justis- og politidepartementet av 30. april 1998, godkjent i statsråd samme dag. [*On freedom of information in public administration. Recommendation from the Ministry of Justice and the Police on April 30 1998, sanctioned in the Council of State the same day.*]

Forskrift om offentlige anskaffelser. Fastsatt ved kgl.res. 15. juni 2001 med hjemmel i lov

av 16. juli 1999 nr. 69 om offentlige anskaffelser § 11. Jf. EØS-avtalens art. 65 og vedlegg XVI (Rdir. 1993/37/EØF, Rdir. 1993/36/EØF, Rdir. 1992/50/EØF, Rdir. 1989/665/EØF, Rdir. 1997/52/EF). Fremmet av Nærings- og handelsdepartementet. Endret 28 juni 2002 nr. 645. [*Law of Public Procurement. Sanctioned by Royal Decree June 15 2001 pursuant to the Law of July 16 1999 No. 69 on public procurement § 11. Cf. EEA Agreement Art. 65 and Appendix XVI. Proposed by the Ministry of Trade and Industry. Changed June 28 2002 no. 645.*]
(See http://www.lovdata.no/for/sf/nh/th-20010615-0616-0.html)

Research Council of Norway 2002. Vilje til forskning. (Utkast til Forskningsrådets strategi). [*Commitment To Research. (Proposal for the Research Council's strategy).*] See http://www.forskningsradet.no/omnfr/strategi/hva_gjor_vi/vilje_til_forskning/vtfutkast-221002.pdf

Commission of the European Communities, Brussels, 11.12.2002, COM(2002) 713 final, Communication from the Commission, On the collection and use of expertise by the Commission: Principles and guidelines; 'Improving the knowledge base for better policies'. See http://europa.eu.int/eur-lex/en/com/cnc/2002/com2002_0713en01.pdf.

Newspaper articles

Ola Henmo & Anne Hafstad, 'Nektet innsyn i legemiddeldata' ['*Denied access to pharmaceutical data'*], Aftenposten 27.04.2001.
See http://tux1.aftenposten.no/forbruker/helse/d206808.htm.

Anders Sømme Hammer, 'Oslo kommune avfeier forskning' ['*The city of Oslo dismisses research'*], Dagsavisen 26.07.2001.
See http://www.dagsavisen.no/innenriks/2001/07/587769.shtml?string=Daniel%20Siraj.