Peer review at the University of Tromsø

A study of time spent on reviewing and researchers' opinions on peer review

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Preface

My work with the topic of this thesis started as Leif Longva from the University of Tromsø Library contacted the program for Documentation Studies at the University of Tromsø about an idea of a project that could be carried out by a graduate student. The idea came from him and Bård Smedsrød who are members of a group called "Resource group for publishing". They were planning the annual Munin seminar, which is a conference arranged by the University Library, where topics related to academic publishing and open access are discussed. In 2009 the seminar topic was to be peer review. Longva and Smedsrød had the idea of trying to get an estimate of the amount of peer review related work carried out at the University of Tromsø, as this was unknown, and there were a number of reasons for why it could be interesting to find out more about this.

It sounded like an appealing project to me, and I soon got interested in the topic. Having previously worked with questions related to open access and electronic scientific literature, in particular e-journals, I could make use of some knowledge I had from before, while at the same time this was something new and different. Therefore, it did not take long before I decided to do the peer review project as the practical part of my master project, and have this as the topic for my master thesis.

My work with the project on peer review at the University of Tromsø can be divided into three parts; the practical work with the data collection, a presentation at the Munin seminar, and writing the thesis. During the master project I carried out a survey in order to get an estimate of the work done with reviewing by the researchers at the University of Tromsø. The questionnaire was constructed, the survey conducted, and the responses collected during my internship at the University of Tromsø Library from August 17th to October 16th 2009. In the following month, the work towards the Munin seminar 2009 was initiated. The responses from the survey were analyzed, and some of the findings were selected for presentation at the seminar. The presentation went well, and it was a good opportunity to show the results to the approximately 100 participants, and it was a great and useful experience for me. The seminar was otherwise very interesting with regard to further work on the thesis. The last part of the work was writing the thesis, including a further analysis of the responses from the survey. This was done mainly during the spring semester 2010 with the collaboration of my advisor.

Working with the project and the thesis has been both interesting, challenging and demanding, and I have had much help on the way. Andreas Vårheim has been my main

Abstract

This thesis examines peer review at the University of Tromsø (UiT). It focuses on how much time is spent on reviewing at this particular institution, in addition to examine the researchers' opinions on several aspects of peer review. It starts with a theoretical introduction to peer review, with a historical background, presentations of different models, problems and advantages in the review process, peer review's role in the publication system etc. After this general introduction, peer review at UiT will be the main point of interest. The method used for data collection was a survey, with an online questionnaire sent to researchers at UiT.

Key findings from the survey are that 69% of the respondents are active reviewers (did one or more reviews annually), and altogether, these reviewers carry out 1850 reviews annually. This makes an average of 4.9 reviews per active reviewer. Average time spent per review was 7.8 hours, and the total number of hours spent on reviewing annually by the respondents amounted to 12 614 hours. The number of hours for UiT as a whole should be higher, since many researchers did not respond to the survey. While priority given to peer review is relatively high, 26% of the requests to review are declined. Few researchers have received courses and training, while some, especially new and inexperienced reviewers, would like courses and training. 37% of the researchers were satisfied with the present peer review system as a quality ensuring method, but some (22%) were dissatisfied, and the remaining 41% were neutral. All over, many researchers want reviewing to become included in the performance-based budgeting system, and thought peer review should be better acknowledged in their own institution, and be more visible as a part of scientific research.

The findings are discussed in relation to the individual researchers, the institution, and the research community. This discussion shows that there are reasons for making peer review more visible and recognized, especially considering the extensive amount of time and work spent on reviewing. Closer involvement in the peer review process by institutions could make changes in the process, which in turn could have effects for both the researchers and the research community.

1. Introduction

As an introduction to peer review, the following definition can be used: "Peer review is the critical assessment of manuscripts submitted to journals by experts who are not part of the editorial staff" (Hames 2007:1). This brief definition will be expanded and discussed later. A normal peer review process would progress along these lines: When an author sends a manuscript to a journal for publication, it will be passed on to external reviewers who comment on the text. Following this, the manuscript is sent back to the author, who edits and revises the text according to the comments, and then resubmits the manuscript to the journal. "The goal of th[e peer review] process is to ensure that the valid article is accepted, the messy article cleaned up, and the invalid article rejected" (Weller 2001:xii). In other words, the intention of using peer review is both to improve and ensure the quality of scientific publications, and to filter manuscripts for publication.

Peer reviewers are, as the definition above states, experts in the relevant field, and they have to be external and not part of the editorial staff. Many of the reviewers will accordingly be researchers employed in institutions where research is conducted, for example universities and other research institutions. There is a reason to believe there must be a considerable amount of work carried out with reviewing in universities, because they are important research institutions with many researchers being qualified for doing peer reviews. There is, on the other hand, insufficient knowledge about the work with reviewing at universities, as the work is not usually registered by the universities, and few, if any, studies have been done on peer review originating from specific institutions. It would therefore be interesting to look closer into this, and find out more about peer review seen in the context of an institution. As a starting point for the thesis I wanted to find out more about the work carried out with peer review at my own university, the University of Tromsø. To focus on peer review is of interest on different levels, and can be relevant both for the individual researcher, for the university and its management, and for the research community at large.

Seen from the researcher's perspective, it can be especially relevant to look at the present publication system. This will be more thoroughly examined later (chapter 2.6), but for now we can state that the pressure to publish has been increasing. More publications will lead to the institution getting more funding, and the researchers are normally expected to publish. The priority of the publication-related work results in less time for other tasks. Time has in other words become more costly, and should be spent "the right way", with less time to do

work that does not pay off (Eriksen 2006). Reviewing can be an example of such work. It is of course an important part of the publication process, but it is the publication itself that in effect pays off. Even if peer review is supposed to guarantee quality and add value to the publication, it does not leave many obvious traces for the readers. It has often been described as "invisible" (Harnard 2000; Kearney et al. 2008:395; Wærp 2009:6), and is rarely recognized or rewarded. As Godlee says: "Reviewing can seem a thankless task, performed in isolation with little or no feedback and no obvious reward" (Godlee 2002:2764). To focus on peer review and make it more visible can be crucial seen from the researchers' viewpoint, especially as time has become more important. Many researchers claim that it should be more rewarded and recognized as a part of the research related work (more about this in chapter 4.3.3).

From the university management's perspective, peer review has rarely been a focus, and there exists no overview of the work with reviewing. Peer review is rather something happening between the publishers and the researchers, and is initiated and managed by the publishers. As noted above, how time is spent during working hours is more important today than earlier because of the publication system. It is often suggested that time spent on research and teaching should be evenly balanced, but in Norway there are "no national rules or agreements that regulate how the university staff should distribute the time between different work tasks" (Smeby and Gulbrandsen 2005:87 [my translation]). However, a goal for 2010-2012 suggested by the Norwegian Association of Researchers is that "[a]cademic staff in associate professorships and professorships should spend at least 50 per cent of their working time on R&D[1]. Academic staff in other combined positions should be assured that at least 30 per cent of their working time can be spent on R&D" (NAR 2009). This is followed at the University of Tromsø, and according to the guidelines professors and associate professors should divide their time evenly between R&D and teaching, while others should spend 20-30% on R&D, and 70-80% on teaching (UiT 2009:3). With the increasing expectations to publish, it has become more relevant for the universities to regulate the researchers' time during working hours to a greater extent than today, for example by deciding specifically how much time should be spent on research, how much on teaching, and also include minor activities, such as reviewing.

Because of this, it should be interesting for the university's management to have an overview and some form of control with how much work is carried out with reviewing. To

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[1] Research and development.

have this overview, especially if the amount of work shows up to be extensive, would provide an argument for- and make it easier to include peer review as a work task in the researchers' work instructions, and thus regulate the work and make it more formalized. This could lead to more awareness about peer review, and ensure that time is allocated for reviewing. Looking upon reviewing as a formal work task could also result in it being professionalized, with for example training and courses in doing reviews, which in turn could make better reviews.

Concerning the research community at large, and the general public as well, peer review can be of importance with regard to the development of "open access publishing" and the "serial crisis". This can also be an argument for the university possibly controlling the work carried out with reviewing. In short, the term "serial crisis" refers to the dramatic increase in subscription fees to journals in the "hard" disciplines such as science, technology and medicine the last 20 years, which especially puts university libraries in a difficult position, as they cannot afford to purchase all the documents they ideally should have (Swan 2006:9). The open access movement, on the other hand, favors the model of open science, which says that scholarly information should be a public good (Borgman 2007:35). It has often been suggested that publicly financed research results should be freely accessible to everybody (Schjølberg 2009). Researchers giving away their manuscripts to journals for free, while the institutions then have to buy back the research results produced by their own researchers, sometimes for huge sums, is not unproblematic. Therefore, many institutions and other actors (such as the Norwegian Research Council, the European Research Council, Harvard University, Stanford University, and others (Muninseminaret 2008)) demand that research results produced by or funded by the institutions should be made openly accessible, usually either through open access journals, or through institutional repositories.

The focus of the open access movement has usually been on the researchers doing work for free for journals when writing articles, while commercial journals can make huge profits of this. However, not only the original research is done for free in this way. Peer review is essential for most scientific journals, and also this task is something the researchers usually do without getting paid from the journals. As a journal editor says: "I am conscious that I'm asking someone to find several hours of their time to do something for me basically for free" (Weale 2007:27). It is likely that the researchers are reviewing articles mainly during working hours, and thus are paid by the universities. This provides another argument for why it should be important for the universities to have an overview over the extent of this kind of work. If the work with reviewing is extensive, aspects regarding the institution's economy should be taken into consideration. It could be demanded that reviewing should be done more

for open access journals and less for the commercial publishers, in the same tone as it has been demanded to make the publications openly accessible. This could in turn have positive effects for open access journals, and make them of better quality and more attractive, which would be of benefit for the research community as a whole. All in all, we see that peer review has effects and is of relevance both for the researchers, the institutions, and the research community as a whole, and there are several reasons to study peer review in the context of a university.

Even if peer review has been used for a long time, the tradition for studying it is fairly new, and "a relatively limited body of literature exists on peer review" (Rojewski and Domenico 2004:43). "[L]ittle was actually known about of the process, even by those who practiced it, until studies focused on scientific communications in the 1960s and 1970s" (Henderson 2002:156-157). In the recent years more research has been done on the topic, and "literature on the subject could and does exist in almost every scholarly field with a journal publication outlet" (Weller 2001:8). Usually peer review has been studied and discussed within specific disciplines, for example medicine or biology, and many studies and discussions can therefore be said to be discipline-specific. Literature on peer review has thus often been coming from disciplines where the authors can be specialists in for example medicine or biology, rather than being specialists in peer review as such. This leads to a rather diverse literature on the topic, with many contributions and different points of views. Much has been written based on practical experience and general reflections, and different opinions and experiences have contributed to a better understanding of peer review.

In addition, there are some studies with more general approaches to peer review, where peer review has been studied not only as a part of- or in connection to a discipline. Several general (and sometimes cross-disciplinary) surveys have been done in order to map different aspects of the peer review process. In many cases they have obtained lists of reviewers from journals in order to get respondents. In that way one can study reviewers and peer review in general, or examine the relationship between reviewers and journals. However, to see peer review from a university's (or another institution's) perspective has probably not been done on a large scale previously, as no surveys and no writing on this topic was found in the literature. To focus on peer review in the context of a university can accordingly have the potential to reveal new and important knowledge. While this thesis will build partly upon other research on peer review, it can also be seen as an extension of the existing literature, as the angle of seeing peer review in the context of an institution is new and different.

Because peer review is of interest both for the researchers, the institution, and the research community, and because little research on peer review in the context of an institution exists, it was interesting to study peer review at the University of Tromsø. It was particularly relevant to focus on how extensive the activity of reviewing is, and to learn about the researchers' attitudes and opinions towards peer review. To achieve this, a large scaled survey was carried out in cooperation with the University of Tromsø Library, where I at the present time had an internship. As we did not know much about the researchers' opinions and the amount of work spent on reviewing beforehand, and since there have been few or possibly no similar studies, the approach to the topic is broad and exploring, without having any clear-cut hypothesis in advance. The project itself, the findings, and the conclusions will be presented in the following.

The project was done as a survey, with a questionnaire sent to all the researchers at the University of Tromsø. Key questions to examine are: How much time is spent on reviewing? How many persons are engaged as reviewers? How many articles are reviewed combined per year? What do the researchers think about the present peer review system regarding quality, visibility, reward and similar? Is there a need for courses and training in reviewing? There are two main purposes in this thesis. One is to **do a mapping of the amount and extent of work spent on reviewing by the researchers at the University of Tromsø**. The other is to **examine these researchers' opinions on relevant aspects of peer review**. In turn, this will provide a better overview of this work, and a better understanding of what the researchers think about peer review. The findings will make a foundation for further research on peer review, and will in this way contribute to the research field. Other points of special interest are how these two aspects relate, and whether there is room for improvement in the peer review system with regard to the researchers, the institution, and the research community.

The thesis is divided into four main parts. Chapter 2 is a theoretical chapter, which gives a broad introduction to peer review, and presents an overview over history, different models, pros and cons of peer review, peer review's role in the publication system, and gives a presentation of other studies on peer review. Chapter 3 explains the method used, with a closer look at the response rate, constructing a questionnaire, and similar. Chapter 4 presents the results and the findings from the survey, focusing on time spent on reviewing, and the researchers' opinions about certain aspects of peer review. Chapter 5 is a discussion of the findings, with special regard to the researchers, the institution, and the research community at large.

2. Peer review – Theory

2.1. Definition and narrowing the scope

Hames' definition which was presented in the introduction, "peer review is the critical assessment of manuscripts submitted to journals by experts who are not part of the editorial staff" (Hames 2007:1), focuses on peer review for journals, which also is the case for most of this thesis. The term peer review in itself, however, can refer to more than this. According to Shatz, peer review refers to "an evaluation of all aspects of a professor's performance, including not only scholarship but also teaching and committee service" (Shatz 2004:7). He continues: "In academia, though, the term usually conjures up to something narrower, namely, the review of articles or books that have been submitted for publication, of articles or books that have already been published, and of proposed research projects" (Shatz 2004:7). These definitions are wider than Hames' definition. As we see, articles do not necessarily have to be journal articles, but can for instance be articles in anthologies or book chapters. Peer review of research projects (grant applications) and book reviews can also be included. Unlike Hames, he claims that peer review can happen both before and *after* publication, while Hames only talks about peer review as something that happens to a manuscript, i.e. a not-yet-published document.

Peer review can be hard to define, and there are many different definitions, both broad and narrow. Peer review can be regarded as "an imprecise term [which] varies across disciplines" (Mulligan 2005:137). It has even been said that "peer review is impossible to define in operational terms" (Smith 2006:178). Anyway, a general definition can be something like this: Peer review is the critical assessment of scientific documents before or after publication, done by external experts in the relevant field, in order to improve and ensure the quality of scientific publications. It is, however, important to remember that the systems and practices can have variations.

The focus for this thesis will be somewhat narrower, and things like peer review of grant applications and book reviews etc. will not be looked into. The focus is on what is often called *editorial peer review,* and particularly peer review of journal articles. Studying all types of peer review would be a more comprehensive project than is room for in this thesis. To focus on one type of peer review was also reasonable with regard to the survey, since asking about different types of peer review would require a more complex questionnaire and detailed explanations. Other reasons for focusing on peer review of journal articles are because this is

the most common and widely used form for peer review, and it has been relatively much studied, and there is considerably more literature on journal peer review compared to other forms of peer review.

2.2. History

Peer review in journals has gradually evolved together with the fields of study and the journals, especially when it comes to changes in the subjects and the increasing amount of publications. It has a relatively long tradition, and "[s]ome form of prepublication review has been part of the journal production process since the first scientific journals appeared over 300 years ago" (Weller 2001:1). Naturally, editors of journals wanted some kind of control over the content, and this provided a control mechanism. From the 1700s until the mid 1900s most scientific journals were rather similar to regular newspapers and magazines, and it was the editors themselves who were responsible for most decisions on what to publish, usually without getting help from experts (Suls and Martin 2009:41). Often they lacked material to fill the pages, as there were few contributors. The editors usually wrote much of the content themselves. It was common to state subjective opinions, and the quality did not have to be very high (Burnham 1990:1324). Although the editors would consider what to publish and would go through the material, this is far from the peer review processes we have today.

The editors of scientific journals were often specialists in the journals' fields of study, and early on they could therefore evaluate the material themselves. With more and more specialization, however, this became increasingly difficult. "Peer reviewing, in fact, developed in situations in which an editor or editors lacked the specialized knowledge that would have permitted them to make decisions about highly technical articles" (Burnham 1990:1324). Consequently, as the fields of study evolved and became more complex and specialized, it often became necessary to make use of external experts to asses and evaluate the manuscripts.

Another important factor was that more research was conducted, and as a result the number of papers increased. Even though the number of journals rose, the amount of manuscripts exceeded this. This meant that not every article could be published because of limited space in many of the journals, and it soon became a competition to be published. In a high quality scientific journal only the best articles would be accepted for publishing, and those of poor quality would be excluded. Peer review became an important tool in selecting the best articles, and improving them as much as possible before publication. Peer review has

gradually been implemented, but the development has been different in the various disciplines, and the extent to which it has been used has varied from journal to journal (Burnham 1990). Peer review was used first in fields such as natural science and medicine, but has gradually expanded to other disciplines, such as social sciences and the humanities. After World War II it has become common to use peer review in most scientific journals, and today the peer review process is usually fairly well defined and standardized.

Today an ever increasing amount of research is carried out. With the present publication system, sometimes described as the "publish or perish" regime, it can be a tough competition to get published. The rush to publish may lead people to lower the quality or take short-cuts in order to be quick and effective, and this might make peer review an important tool in our age, to ensure continued quality of articles. However, it does not always work as it is supposed to, and there are several recent examples where peer review has failed to work as intended (See Furedi 2010:5). One important case was "Climategate", where reviewers tried to prevent papers which questioned their own research from being published. An e-mail leakage revealed how reviewers intended to keep out papers from journals and reports. "I will keep the [papers] out somehow – even if we have to redefine what the peer review literature is!", one reviewer wrote (Reviewer's e-mail cited in Pearce 2010:31). This, and similar statements, created much debate, and shows that peer review is a hot topic, being of current interest. It is presently much disputed and sometimes controversial, which this quote can illustrate:

> [P]eer review has become the subject of two extreme visions; on one hand, it is considered as *'a non-validated charade whose process generate results little better than does chance'*; on the other hand *'it is one of the sacred pillars of the scientific edifice and a necessary condition in quality assurance for scientific publications'* (van der Wall 2009:187)

Sometimes peer review works well, while other times it might not work as it is meant to. The reliability and effectiveness of peer review has been discussed, and many factors are involved when it comes to reviewing and commenting on another researcher's work, which will be looked into later.

2.3. The peer review process

The traditional peer review process usually evolves along these lines (illustrated in figure 1): The author submits a manuscript to a journal, which the editor receives. The editor can either reject it straight away, if it is not dealing with journal's subject or if the quality is too low, or, the editor can send it to external peer reviewers. A third possibility is that the editor accepts the manuscript immediately without any review process (Weller 2001:2). Even if this can happen in some cases, it is not very common, and is usually not mentioned as a part of the review process in other literature. The two common outcomes to a submitted manuscript, then, are either to be rejected by the editor before peer review, or to be sent to external experts to go through a peer review process. If the manuscript is sent to external reviewers, the number of reviewers can vary. A study from 2005 found that "75% of the journals used two reviewers, 17% three reviewers, 2% a single reviewer, and 6% used more than three reviewers" (Hames 2007:53). There can be variations between different disciplines, and natural sciences usually use fewer reviewers than the social sciences (Suls and Martin 2009:40).

When the reviewers receive the manuscript from the editor, and they are often "asked to classify the paper as publishable immediately, publishable with amendments and improvements, or not publishable" (Rowland 2002:1). The most common decision is that the manuscript should be revised (Rowland 2002:1), and in those cases the reviewer should of course indicate what should be revised, and give reasonable and constructive comments to the author to the best of their abilities. Then, the manuscript is sent back to the editor, who usually takes the reviewers' opinions and suggestions to consideration. The final decision lies with the editor, and the outcomes may be that the manuscript is accepted for publication, rejected, or, most commonly, that it has to be revised. In the latter case, the manuscript is sent back to the author who revises it according to the comments, and then submits it once more. When this happens, the entire process repeats itself. A manuscript can thus go through several rounds of review and revision before getting published.

Figure 1. The peer review process

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    manuscript
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                        to peer review
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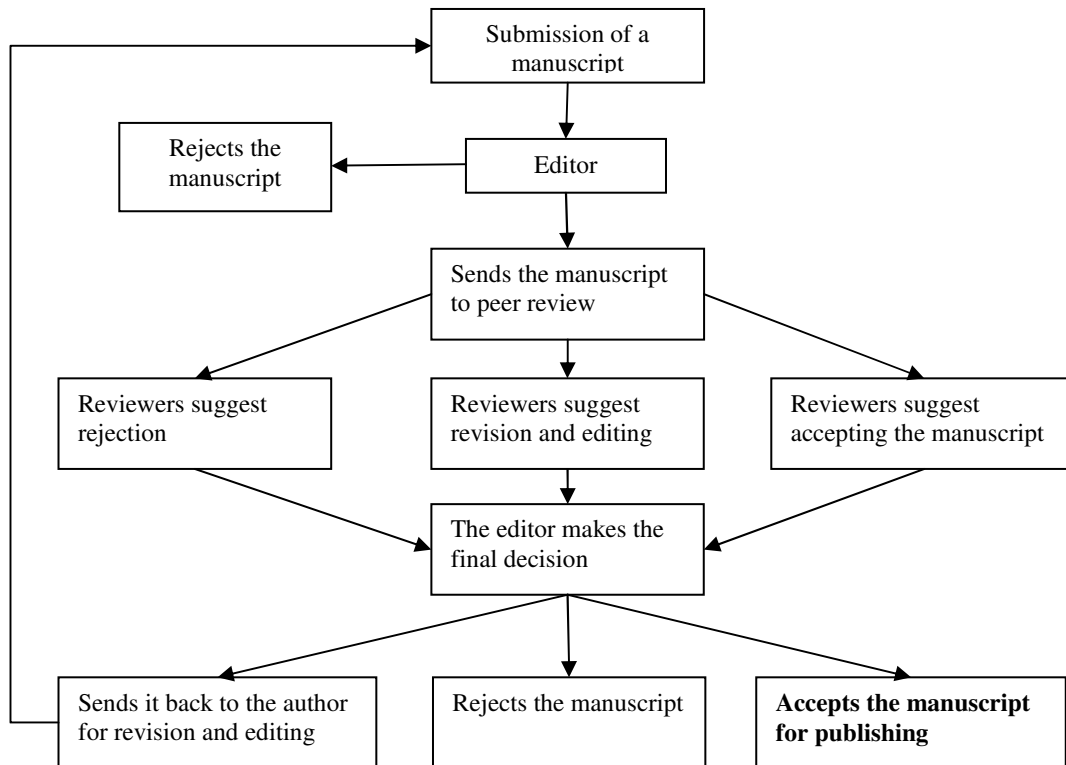
2.4. Different models

The peer review process described above is an example of a common and traditional peer review process, but "[P]eer review is not in fact a single process, but rather a flexible set of mechanisms" (Weale 2007:15). There are variations both between journals and disciplines, and several models can be followed.

Many journals practice the model often referred to as **single blind peer review**. This means that the reviewers know the name of the author, but the author does not know the reviewers' identities. Because of this, the reviewers often know which institution the author comes from, the author's sex, and sometimes they may also have heard about- or know the person, especially if he or she is well known in the relevant field of study, or if the discipline is small and narrow with few researchers working within it. Ideally this information should not matter in the peer review process, as the reviewers should be objective, and only consider "the quality and importance of the research; its design, methodology, analysis, discussion, and conclusions; and the logic of the thought process" (Weller 2001:207).

However, one important critique against peer review is that the reviewers can be biased, and this can be relevant for the model of single blind peer review. The bias can be either negative or positive, and thus lead to better or worse evaluations compared to a completely objective review. If an author is affiliated with a respected institution known for conducting highly reputable research, he or she might have an advantage compared to people from small and unknown institutions. The same can happen if somebody has a big name. A former editor of *BMJ* (earlier called the *British Medical Journal*) tells about this: "as a young editor I had to consider a paper submitted to the *BMJ* by Karl Popper. I was unimpressed and thought we should reject the paper. But we could not. The power of the name was too strong. So we published" (Smith 2006:180). This shows that it may be harder to reject papers coming from famous authors. Further, it can be easier to reject papers from unknown or badly reputed institutions and authors, and bias has been proven against women (Wennerås and Wold 1997). In addition, we can imagine bias caused by ethnicity, religious belief, and so on. Even though single blind peer review is widely used, this shows that it can have several problems.

A second model, called **double blind peer review** or anonymous peer review, has been tried out by some journals in response to these problems. It recognizes that bias can be of major importance, and suggests that the reviewers "cannot be relied upon to eradicate their biases or cannot be relied upon to prevent the biases from playing a causal role" (Shatz 2004:48). Double blind peer review means that the reviewers do not know the author's name, and the author does not know the reviewers' names. This process then, is meant to be more anonymous, and can be seen as a way of trying to deal with biases caused by single blind peer review.

In both these models (single blind and double blind) the reviewers' names are not known to the authors. Reasons for this can be that the reviewer is "protected" from angry authors who are dissatisfied with the review, and that it may be easier to feel free to criticize without worrying about what the author may think. Additional reasons for hiding the author's name can be to avoid the personal and affiliational biases described above in the model of single blind peer review. When the author's name and affiliations are removed, such biases should ideally be eliminated since the author then becomes anonymous. On the other hand, it can lead to speculations. As DeCoursey says: "Even if it is not obvious, most authors try to guess the identity of their reviewers from their comments or recommendations. For example, one author angrily accused me of rejecting a manuscript that I had not in fact reviewed. The author assumed it was me because the offending reviewer had recommended citing several of my papers" (DeCoursey 2006). The reviewers can in some cases have an idea of who the

author might be if he or she recognizes the style of writing, a special topic of interest, the context, the research group, etc. In other words, it can be hard to conceal the author's identity, and anonymity is never guaranteed and can possibly lead to more speculations than if the author's identity is known.

Open peer review is a third model, which contrasts significantly from double blind peer review. Here both the reviewers' and the author's identities are known during the review process, and often for the readers in the aftermath as well. The degree of openness can be varying; sometimes the journals are only publishing the reviewers' names, and sometimes the entire reports from the reviewers may be available online together with the published article. Openness concerning the identity of both the author and the reviewers can of course lead to bias, but maybe more important, it can enable dialogue and scientific communication within the research community to a much greater extent than more closed and anonymous peer review. The scientific community is strongly based on communication between the researchers, and open peer review can make this easier, and the process becomes more transparent. Even though it may be harder to criticize and be honest in some cases, for instance criticizing senior researchers upon whom one is dependent on for career advancement (PRC 2007:5), open peer review eliminates the possibility that reviewers act irresponsibly and write careless reviews because they know they will remain anonymous. Further, it also makes it easier to acknowledge the reviewers in a more direct way.

Another definition of open peer review is "review by the scholarly community at large, instead of a few anonymous referees along with an editor or board" (Shatz 2004:16). This is related to open scholarly communication as mentioned above, and implies that all peers can try to contact the reviewer to ask questions, start discussions, give comments on the review process, or similar. Open peer review can also mean that anybody can comment upon the manuscript, instead of asking selected referees to do the reviews. This can be the case if the manuscript is posted on a website, and all readers are able or encouraged to submit commentary (Shatz 2004:149-150), usually signed with full name. If the paper in the end is rejected, it is removed from the website, and if it is approved it will be "published" (in the way that it gets to stay permanently on the website since publication requires permanent access and existence). Advantages can be that the number of reviewers is not limited, but there are several problems, such as bias, or the reviewers might not be experts in the field of study. *Nature* is one of the journals which have tried this kind of open peer review for a limited period, with a rather negative result. The interest was low, and the comments submitted by the public were few, and not nearly as good as comments submitted by

blind/closed peer review, so they decided to keep using single blind peer review (Greaves et al. 2006).

As we see, there is a diversity of approaches to peer review. Overall principles peer review should follow are "timeliness, transparency and verifiability" (PRC 2007:5). Maybe a combination of different models might be favorable, with more transparency and openness than has been usual previously. An option could be to have a traditional review process first with selected reviewers, either single or double blind, or both author's and reviewers' identities known, but this process can be relatively private with little interference from outsiders. Then, if the article is accepted, it could be posted online, possibly together with the reports from the reviewers and the pre-publication history, in order to make it more open, transparent and accountable. It could then also be possible to add (signed) comments for the public in the aftermath of the publication, with possibilities to discuss topics and write replies. This can be called post publication review, and shows possibilities for scholarly communication and is a more transparent and open process.

2.5. Peer review: Pros and cons

As mentioned earlier, peer review has been much debated, and is not a perfect system. As Hames says; "the peer-review process depends on trust and good behaviour of all participants. Unfortunately, as in all areas of human activity, good behaviour sometimes falls by the wayside, and misconducts occurs" (Hames 2007:173). Several critiques have been raised against peer review, in addition to the problems concerning bias and lack of objectivity which were examined in the previous chapter.

Peer review is never guaranteed to be consistent, as it cannot be measured and carried out the same way every time. Much depends on the reviewers, and they may "favor articles which share their own points of view or theoretical perspectives" (Elvebakk and Enebakk 2006:16 [my translation]), or they might even obstruct publication of manuscripts which go against or question the reviewers' own research. Reviewers often tend to reject innovative papers that go against the conventional (Shatz 2004:83). In many cases the reviewers do not agree on whether to recommend a manuscript for publication or not (Weller 2001:182), and the same manuscript can be treated different from person to person. Peer review cannot be absolutely reliable and correct since it is carried out by persons with different opinions, standards and practices. The reviewers are experts in their own field of study, but they often lack specialized competence in reviewing, as there is usually little or no formal training. The

researchers' competence as reviewers may therefore be questionable. It has been said that "the system does not, in fact, always work. It suffers from widespread bias, subjectivity, and incompetence – and therefore should be reformed or replaced" (Shatz 2004:3).

Peer review has been criticized for being expensive, ineffective and slow (Tite and Schroter 2007:9; Smith 2006:179). The process can be slow because there are many stages, and the reviewing itself takes time. Multiple revisions can be especially time consuming, and sometimes it can take more than a year to get a paper reviewed and accepted for publication (Smith 2006:179). In addition, peer review can be expensive, and there are costs both for the publishers to organize and administrate the process, and while the reviewers are usually not paid by the publisher, they still get their salary from the institution where they are employed. It has been estimated that for an article to be reviewed by two reviewers will cost between 4500 NOK[2] (Morris 2005:119) and 8000 NOK (Weale 2007:28). If a manuscript has to be revised and go through the peer review process several times, or if the manuscript is rejected in one peer reviewed journal and then is sent to another, the costs regarding peer review will rise for that specific manuscript.

Another criticism against peer review is lack of evidence that peer review actually works. One study concluded that "[e]ditorial peer review, although widely used, is largely untested and its effects are uncertain" (Jefferson et al. 2002:2784). Another concluded that there is "little empirical evidence to support the use of editorial peer-review as a mechanism to ensure quality of biomedical research, despite its widespread use and costs" (Jefferson et al. 2001:2).

However, peer review has its positive sides. When peer review works well, it can detect cheating of various kinds, and improve the quality of the paper significantly. It has the potential to add value to the paper, and in most cases it will do so. The opposite, i.e. making it worse, will rarely be the case. Peer review can also enable scholarly communication, especially with a more open and transparent variant of peer review, and the reviewers as well as the authors can learn from the process. Reviewing helps reviewers to become updated and to gain new insight and knowledge, and can lead to engagement and involvement in new and interesting topics. Reviewers take an active part in the research community, and contribute to a discipline as helpful peers.

Even if peer review does not *guarantee* high quality, it is usually thought to indicate so. For a publisher, it is an important step to implement peer review in order to be seen as

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[2] The cost to the academic community and the cost to the publisher are added.

serious, as it is an important mark of quality. Even if peer review has its flaws and is not a perfect system, it is widely used, and there is presently no real alternative. Peer review has often been compared to Winston Churchill's opinion of democracy; a system full of problems, but the best one possible (Sieber 2005; Smith 2006:178; Fraser 2007:91). However, it can be improved, and to focus on peer review and draw attention to how it is practiced and its positive and negative sides, can be important in order to reform the system, and make it as good and well functioning as possible.

2.6. Peer review and scientific publishing

Scientific publishing has become increasingly important in the Norwegian university system the last years. In 2006 the model of performance-based budgeting was implemented. The model introduces a system where academic publications can give publication points, and the points are counted and added. In short, institutions with many publication points get more money than institutions with few points. Here it is interesting to see what counts as an academic publication. In the document *A Bibliometric Model for Performance-based Budgeting of Research Institutions*, which lay the foundation for this system, these four criteria are stated.

An academic publication must:
1. present new insight;
2. be presented in a form that allows the research findings to be verified and/or used in new research activity;
3. be written in a language and have a distribution that make the publication accessible to most interested researchers;
4. appear in a publication channel (journal, series, book publisher, website) that has routines for external peer review (UHR 2004:12).

As we see from the last point, to have a routine for peer review is a prerequisite for the publication to be counted as academic in this system, and this is consequently an important element in academic publishing. If the document is not published in a peer reviewed channel, it will not count in the performance-based budgeting system.

The academic publication channels are divided into two levels, where level 1 contains the normal publishing activities, while level 2 is supposed to consist of outstanding research published by only the leading publishers (Elvebakk and Enebakk 2006:14). To publish in a level 2 publication channel gives more points than to publish in a level 1 channel. Table 1 shows how the points are distributed.

Table 1. The distribution of publication points

Publication type	Level 1	Level 2
Monograph	5	8
Article in a periodical or series	1	3*
Article in an anthology	0.7	1

* A weight of 5 was proposed in the original report, but this was changed to 3 when the model was implemented.

(The table is taken from UHR 2004:44).

If the publication channel is not approved as level 1 or 2, which is the case for many publication channels with some extent of scientific content, it can be looked upon as a level 0, not giving any points.

The focus on publication channels is interesting. As Hagen and Johansen notes, the quality of scientific publications is no longer measured from what is written and how it is written, but from where it is published (Hagen and Johansen 2006:7). This fact might seem somewhat suspicious, and the performance-based budgeting system has been widely criticized by many researchers and others. It forces the researchers to have a strong focus on publishing. Critiques include that in terms of workload, it pays off to write articles rather than books, and to write short articles rather than long ones. It also affects the fields of studies differently, and fields without any level 2 publishing channels may be seen as less profitable (Elvebakk and Enebakk 2006:24). Further, the extent of peer reviewed material is not the same from field to field, and some might use other methods for ensuring the quality. It has been claimed that the system favors natural sciences and health sciences, and is not suited for "softer" fields (Elvebakk and Enebakk 2006:21), such as the humanities, social sciences, or fine arts. The researchers might get less time for other tasks if the pressure to publish is high. There will be less time to help students and colleagues, arrange conferences, be engaged in debates and work in organizations, work as an editor or a reviewer, and similar (Eriksen 2006:84).

The performance-based budgeting system encourages quantity, because this will lead to many points and much money. It may therefore be tempting to take shortcuts and lower the standards in order to get published fast. This can affect the quality, and as long as an article is good enough to get published it is no point in doing an extra effort. It is also possible to submit a manuscript early rather than working more on it, and hope that it will go through. It can also be tempting for researchers to cheat in various ways, which can result in falsification, plagiarism, or duplicate publications. "Worryingly, the incidence of misconduct in science appears to be increasing. Or perhaps it is just being picked up more frequently or more people are being made aware of it" (Hames 2007:173).

Here well functioning peer review comes in as an important and necessary tool. Maybe peer review is especially important in a system where the focus mainly is on quantity, while peer review focuses on quality. Peer review can help keep up quality, uncover cheating and misconduct, and make the researchers do a good job since they know their work will go through a control mechanism. This may be why peer review has such an important role and is a prerequisite for a publication to count in the performance-based budgeting system.

2.7. Studies on peer review, and relevant findings

As we see, peer review can be criticized, but is also an important tool in the publication system, and it has therefore been studied. As noted in the introduction, there have been several surveys on peer review, of which some are of interest for this thesis. The most recent and relevant will now be looked into, focusing on aspects such as the extent of peer review, time spent on reviewing, training, acknowledgement, and satisfaction level with the present peer review system. These are topics which later will be examined in the analysis of the UiT peer review survey.

One relevant study is presented in the article "Why do peer reviewers decline to review? A survey" (Tite and Schroter 2007). The survey focuses on the overall fact that reviewers decline to review. It also focuses on why this is the case. An important finding is that "[l]ack of time is the principal factor in the decision to decline", and often there is conflict with other workload (Tite and Schroter 2007:9). This is followed by "tight deadlines to do the review, [and] having too many other manuscripts to review" (Kearney et al. 2008:396). The findings imply that the aspect of time is of importance. The researchers have to prioritize their time, and less time is provided to reviewing than before. Another conclusion from this survey is that "[r]eviewing should be formally recognised by academic institutions, and journals should formally, and perhaps publicly, acknowledge the contribution of their reviewers" (Tite and Schroter 2007:12).

Another study from 2002 explores "the process of peer review in medical education from the reviewers' perspective" (Snell and Spencer 2005:91). The respondents were only from the field of medical education, and they received a questionnaire together with a manuscript they were requested to review. They were asked, among other questions, about how much time they spent on reviewing this article, and if this was more or less time compared to what they usually spent on reviewing an article. The respondents reported to have spent between 30 and 810 minutes reviewing the article, with an average of just over

three hours, and most said that the time commitment was similar to previous reviews (Snell and Spencer 2005:92). The study also revealed little training in doing peer reviews, but many (66%) wanted formal training, and new reviewers often lacked confidence in reviewing (Snell and Spencer 2005:92-93)

Yet another relevant study is an international survey among nurses. The survey confirms that few nurses receive any remuneration or acknowledgement for reviewing, and, like the former study, few receive formal training in reviewing, while this is desired by many (65%) (Freda et al. 2009:101). This survey interestingly also examined the number of reviews carried out per year, and the time spent per review. Findings were that the "[r]eviewers reported completing 0-120 reviews per year, but most responses were clustered around the average of 7 to 8 reviews a year, on each of which they reported spending from 30 minutes to 72 hours, with an average of about 5 hours per review" (Kearney et al. 2008:397). This study as well describes lack of time as an important reason to decline requests to review and to submit reviews late, and suggests that time commitment is seen as the worst aspect of being a reviewer (Kearney et al. 2008:398).

A study from 2007 is called *Peer review in scholarly journals: Perspective of the scholarly community – an international study.* This is a broad and large scaled study examining "attitudes to peer review and current practice in peer review" (PRC 2007:1). Most (64%) of the respondents were overall satisfied or very satisfied with the peer review system used by journals, while 12% were dissatisfied or very dissatisfied. They were also asked how many reviews they had done during the last year, and when those who had not reviewed at all during this time were excluded, the average was 8 papers, varying with age, seniority and discipline (PRC 2007:37). Concerning reasons to decline invitations to review, this survey confirms findings from the other studies. Reasons include "[t]oo many prior reviewing commitments", followed by "[t]oo busy generally", and "[p]roposed deadline was too short to conduct a high quality review" (PRC 2007:41). As we see, lack of time and being busy are repeating factors, which again states that the aspect of time is central in the peer review process. When it comes to hours spent per review, the survey showed an average of 8.5 hours (PRC 2007:42).

In 2009 a follow-up survey to this study was carried out. While the full findings and report were not ready at the time of writing, some preliminary findings were posted on their website. The satisfaction level with the present peer review system was somewhat higher in 2009 than in 2007, as 69% were satisfied or very satisfied and 9% were dissatisfied or very dissatisfied in 2009 (SenseAboutScience 2009:10). 48% of the respondents reported to have

done between one and five reviews during the last year, 21% had done between six and nine, and 12% had done between ten and nineteen. Few, only 8% had done twenty reviews or more, and the remaining 11% had not been reviewing the last twelve months (SenseAboutScience 2009:17). The median of time spent per review was 6 hours (SenseAboutScience 2009:20). Regarding reasons to decline to review, the three most decisive factors were: "Paper was outside my area of expertise", "[t]oo busy doing my own research, lecturing etc" and "[t]oo many prior reviewing commitments" (SenseAboutScience 2009:14).

3. Method and data

3.1. Choice of method

Since the purpose of the master project was to find out more about peer review at the University of Tromsø (from now on UiT), the data were obtained from the scientific staff (researchers) at UiT. Regarding choice of method, several approaches were considered. As the main objective was to do a mapping of the amount of work spent on peer review, and examine some general opinions on certain aspects of peer review, it was natural to choose a structured and quantitative method. Quantitative methods are preferred when you want to measure something in numbers, and usually it will lead to a general overview of the field of enquiry. It is suitable for determining the extent of something, and should be used "if you want to *quantify the variation* in a phenomenon, situation, problem or issue; if the information is gathered using predominantly quantitative variables; and if the analysis is geared to ascertain the *magnitude of the variation*" (Kumar 2005:12). To use a quantitative method seemed reasonable regarding the aim of the project.

A common quantitative method is the survey, and in this case it seemed logical to choose the survey as method. Then the choice regarding type of survey had to be made. Some alternatives were telephone interviews, personal meeting interviews, questionnaire sent out by mail or handed out personally, or online questionnaire sent to the respondents by e-mail. The decision fell on an online questionnaire using e-mail invitations, as this would be possible to carry out within the limits of time and resources available.

However, online surveys may have certain weaknesses. Most important, the response rate can often be low and unrepresentative compared to other approaches like interviews in personal meetings or telephone interviews. Other drawbacks are that you cannot elaborate the questions for the respondents in order to avoid misunderstandings, and the technical solutions in the online tools may be of low quality (Boolsen 2008:30-31). Anyway, the fact that it is quick and effective, and that it was feasible in terms of workload, outweighed the negative sides. The researchers at a university as the target group were likely to use e-mail on a regular basis, and it would therefore be an easy way to reach out. It would also be easier to handle data in an electronic format, and it enabled doing a large scaled survey.

3.2. Constructing and testing the questionnaire

The questionnaire was constructed in QuestBack, which is an online survey tool. The questions were based on the main focus for the thesis, namely to what extent do the researchers at UiT work with peer review, in addition to some questions concerning opinions on some aspects of peer review. The focus was on peer review of journal articles. Other types of peer review were not included in order to have a clear focus and not to make the survey too complex. However, to include only journal peer review in the survey may have been unfortunate, since it does not lead to a complete overview over the work with peer review. Several respondents commented on this, and pointed out that they had been reviewing anthologies and grant applications. On the other hand, journal peer review is most widespread, and is of special relevance seen in relation to the serial crisis and the open access movement. It was therefore of particular interest.

Almost all the questions were closed-ended, and the respondents would choose between alternatives. This avoided diffuse answers and diminished possibilities for misinterpretation when analyzing the results. The questions began with variables like gender, age, position, and similar, and then starting to concern experiences and work patterns with peer review. The last part dealt with opinions on certain aspects of peer review. Altogether the questionnaire contained 20 questions. As an introduction to the questionnaire there was an invitation letter containing a brief definition of journal peer review, and an explanation of why the survey was being carried out. In addition, it encouraged the researchers to respond. The questionnaire and the invitation letter can be found in its entirety in appendix 1.

When constructing questions for a questionnaire, there are several aspects to take into consideration. To construct good questions is important in order to avoid misunderstandings and to get correct answers. Boolsen recommends that the questions should not be ambiguous, and not be too long (Boolsen 2008:58-63). Further, it is important to avoid sensitive, hypothetical, too general, and leading questions. Double negations, technical and difficult expressions should be avoided, and the questions should not require special knowledge. (Boolsen 2008:58-63). One should also ask about one thing at a time, and not have double questions (Hansen, Marckmann, and Nørregård-Nielsen 2008:80). In other words, it is important to formulate questions the right way, and make them as easily understandable as possible.

This was taken into consideration while making questions for the UiT peer review survey, but was not always easy, and some of the questions could have been better. One example is the question "are you a member of an editorial board, or regularly reviewing for a

journal?", which asks about two things at the same time. The fact that both English and Norwegian versions of the questions were used in the same questionnaire, made the amount of text more comprehensive than desirable. However, most of the questions were clear and fairly easy to answer, with little room for misinterpretation.

To achieve a well functioning questionnaire without many weak spots, it is important to test it thoroughly. Hansen, Markmann and Nørregård-Nielsen suggest three phases of testing a questionnaire; 1) to test the content and the understanding of the content, 2) to test the understanding of questions and answers, and 3) to test the final questionnaire (Hansen, Marckmann, and Nørregård-Nielsen 2008:120-125). In the UiT peer review survey a number of persons tested the questionnaire. First and foremost, my two supervisors gave important comments on the drafts, and contributed to a more nuanced and complete understanding of the peer review process. Friends and colleagues gave input on the language used, and were asked about how they understood the questions and the alternatives in the answers. The final questionnaire was tested on several persons from the target group, who after completing a test version of the survey were interviewed about different aspects of the questionnaire, and came with general comments.

The questionnaire underwent many changes and modifications before the final version was ready. The process was not always easy, as the comments from others sometimes were contradictory and sometimes did not fit with the main question of the survey. However, the process was very useful, and one had to think through a number of things not obvious from the beginning. Most of the comments were very helpful and contributed to improve the questionnaire significantly.

3.3. Increasing the response rate

The last years the response rates in surveys have generally been falling (Johannessen, Tufte, and Kristoffersen 2006:209; Aarø 2005:28). Accordingly, it is central to increase the number of responses. In the UiT peer review survey, several steps were taken to achieve a higher response rate.

Most important, the deans and vice deans for research of the different faculties were contacted and informed about the project, and were asked if they were willing to send out the survey. This would give the survey weight, and the researchers would be more likely to answer if the survey came from a person of authority they knew or had heard about. All the deans and vice deans were positive to the project, and agreed to send out the survey in their

names. The technical solution in QuestBack made it difficult for the deans to forward the questionnaire to their respective researchers, as initially planned. The solution we landed on was that I could send out the questionnaire on behalf of them. They all wrote an introduction (or accepted a suggested wording) where they encouraged the researchers to respond to the survey.

Other steps taken to improve the response rate include:

- Announcement of the survey on the UiT website
- The same announcement was automatically e-mailed to most researchers
- Posters informing about the survey were hung up in strategic spots
- Flyers were placed at researchers' rest- and lunchrooms and similar
- The project was done in cooperation with the University Library, and the invitation letter was co-signed by the library director
- In addition to the first sending, two reminders were sent out
- Before the first reminder a joint e-mail was sent to the heads of the departments asking them to spread the word about the survey to their researchers
- The UiT logo was used in the questionnaire to give a serious impression
- Information about anonymity and confidential treatment of the answers was given
- The respondents would participate in the drawing of a NOK 1000,- gift voucher
- The date and time of the sending was taken into consideration

The effects of these actions are hard to measure, but hopefully they have contributed to an increased response rate. Acquaintances, colleagues and friends told they had noticed posters, flyers and the announcement, which indicates that these actions might have had effects.

3.4. Population and response rate

When doing surveys it is often necessary to use a sample, as the population one wants to study can be large. However, if the population one studies is relatively small, it is fully possible to enquire the whole population, which means that problems regarding sampling are avoided (Jacobsen 2005:276, 295). As the population (numbers of researchers at UiT) in the UiT peer review survey was not too large, it was possible to send the survey to all of them. However, some groups were excluded. These were PhD students as they are not permanently employed and make up a quite large group, in addition to scientific assistants and other smaller groups who were not likely to be engaged as reviewers.

Altogether 1251 questionnaires were sent out. Out-of-office replies and invalid addresses were subtracted from this number, making the actual population count 1210. At the closing date 553 valid responses were received. The response rate thus became 45.7%. The response rate in surveys should preferably exceed 50% (Ringdal 2001:277; Jacobsen

2005:300). However, today it is common with a lower rate, often between 30-40%, and sometimes no more than 10%, although this can be a problem when it comes to generalizing the results (Johannessen, Tufte, and Kristoffersen 2006:209-10). The UiT peer review survey is well above 40%, and in comparison, large international peer review surveys have had response rates on 7.7% (PRC 2007:6) and 10% (SenseAboutScience 2009:6). All in all, the response rate can be regarded as satisfactory, even if one should be careful with doing uncritical generalizations.

The data received from the 553 responses was exported from QuestBack to SPSS, where the analysis was carried out. The analysis in the next chapter is done through looking at frequencies, and using bivariate and multivariate analysis. Before this further analysis, it is important to look for possible skewness in the material through using non-response analysis. It was expected that researchers not engaged as reviewers would be more reluctant to answer than those engaged in reviewing, even if everybody was encouraged to answer regardless of whether they were active reviewers or not. Those who are unfamiliar with- or uninterested in a survey's topic will generally be less likely to answer.

Regarding the different fields of study, no obvious patterns were found, and the response rate was relatively evenly balanced at the different faculties and units. Figure 2 below illustrates the relationship between questionnaires sent out and responses received at the different units.

Figure 2. Size and response rate at the faculties

BFE: Biosciences, Fisheries and Economics

NT: Science and Technology

HSL: Humanities, Social Sciences and Education

TMU: Tromsø Museum

■ Number of questionnaires sent out
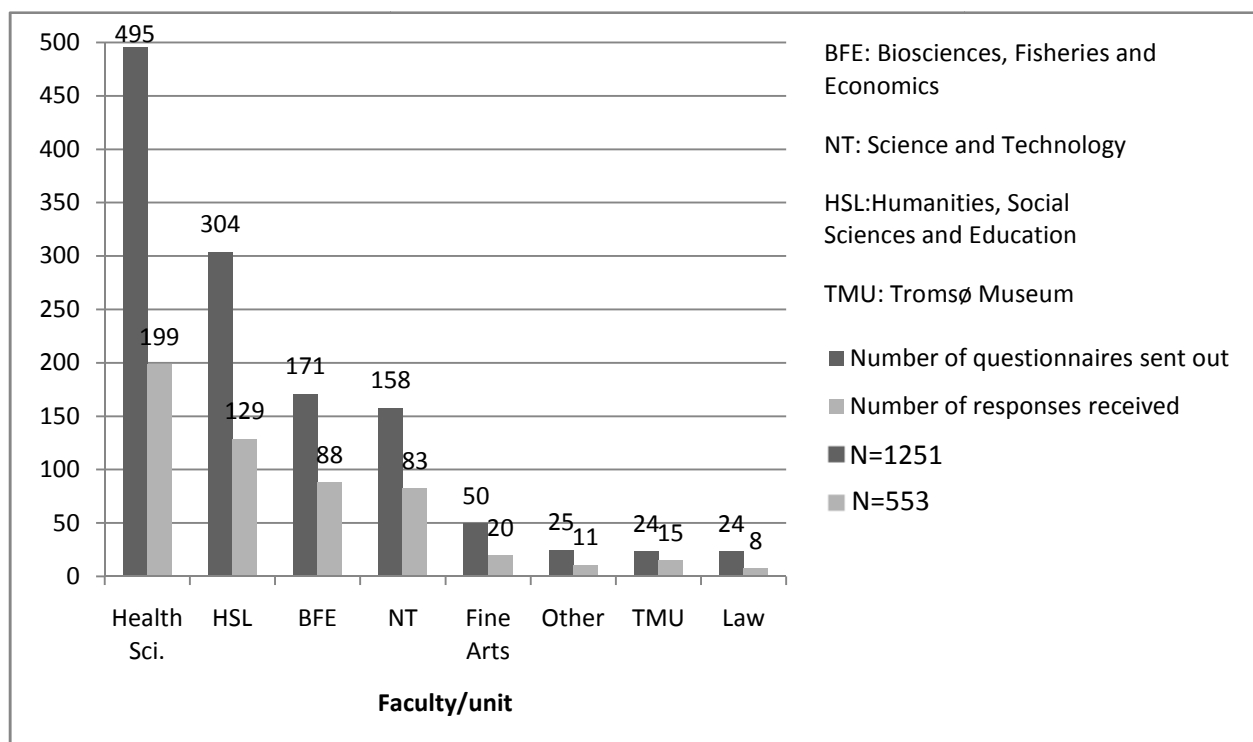■ Number of responses received
■ N=1251
■ N=553

Figure 2 shows that the faculties vary greatly in size, but the response rate is relatively consistent, and does not indicate significant skewness. For example did the Faculty of Fine arts have a slightly higher response rate than the Faculty of Health Sciences, despite the fact that only 5% of the respondents from Fine Arts were active reviewers, compared to 76% of the researchers from Health Sciences. However, Tromsø Museum had the highest number of active reviewers per employee, and also had the highest response rate, which can indicate that active reviewers answered to a greater extent than others. Looking at the researchers' position also supported this finding. People in positions as university teachers did less reviews than all other groups, with 88.5% doing no reviews annually, and the remaining 11.5% doing one or two reviews per year. The response rate for this group was significantly low, only 26.9%. In comparison, all other positions (except the category "other" where few had placed themselves) had between 66,1% and 95,4% active reviewers, and the response rates for these groups were all higher; between 46,5% and 56,4%. This indicates that people not engaged as reviewers have answered to a lesser degree than active reviewers.

4. Survey findings

In this chapter, some of the interesting findings from the survey will be presented. First, some facts about the respondents will be briefly summarized. In the next part the focus will be on time spent on peer review and related topics. Relevant here is how many reviews are carried out annually, how much time is spent per review, and how much time is spent on peer review combined at UiT. Other questions which will be touched upon are how the researchers prioritize work with reviewing, and how often researchers decline an invitation to review. The last part will focus on opinions about peer review. The researchers' opinions on topics such as courses and training in peer review, how well the present peer review system works, and whether or not peer review should be more visible, rewarded and acknowledged, will be examined.

4.1. The respondents

Of the respondents 62.6% were men and 37.4% were women. This corresponds well to the university as a whole, and the questionnaire was sent out to approximately 36% women and 64% men. Their age was relatively evenly spread, except for few respondents below the age of 30, but this was expected as one has to study for several years to get an academic position. The median was in the category 40-49 years old, and the average was estimated to be around 49 years old. This can be seen in relation to years employed in a scholarly position. As expected, all over the older researchers had been employed longer in a scholarly position than the younger researchers. The median of years employed in a scholarly position was in the category 10-19 years.

The researchers were asked which faculty or unit they belonged to. At UiT there are six faculties, and the survey was also sent to Tromsø Museum (the University Museum). There was also an additional category "other" where people from several smaller research centers, the University Library, and others not belonging to any of the large units could place themselves. The faculties and units vary greatly in size, from the two smallest, Faculty of Law and Tromsø Museum where 24 questionnaires were sent out, to the largest, Faculty of Health Sciences, where 495 questionnaires were sent out. Regarding the respondents, 36.0% were from the Faculty of Health Sciences, 23.3% were from the Faculty of Humanities, Social
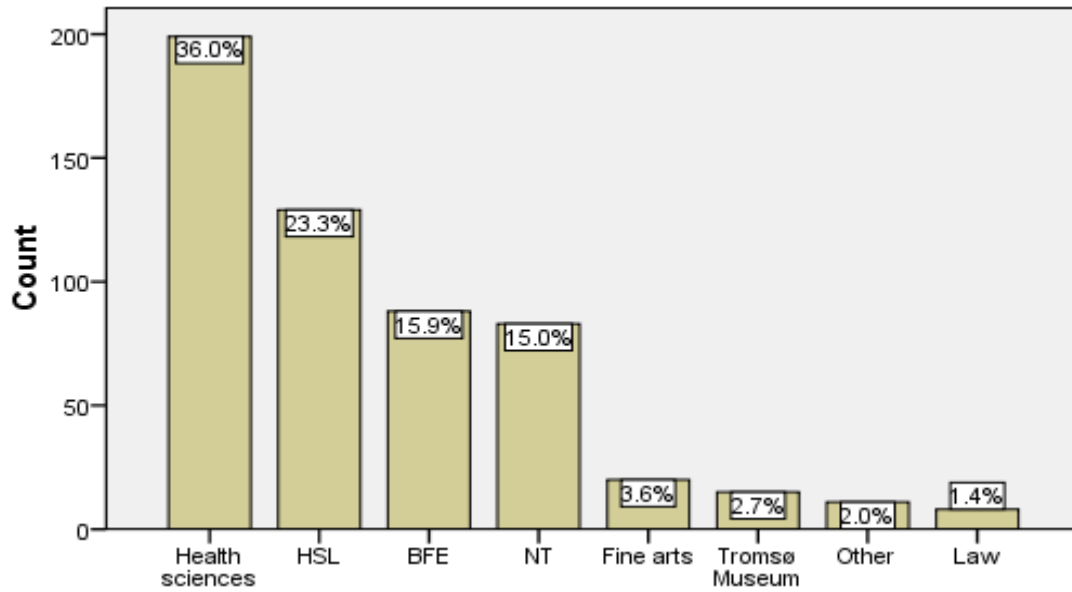
Figure 3. Faculty affiliation   **N=553**
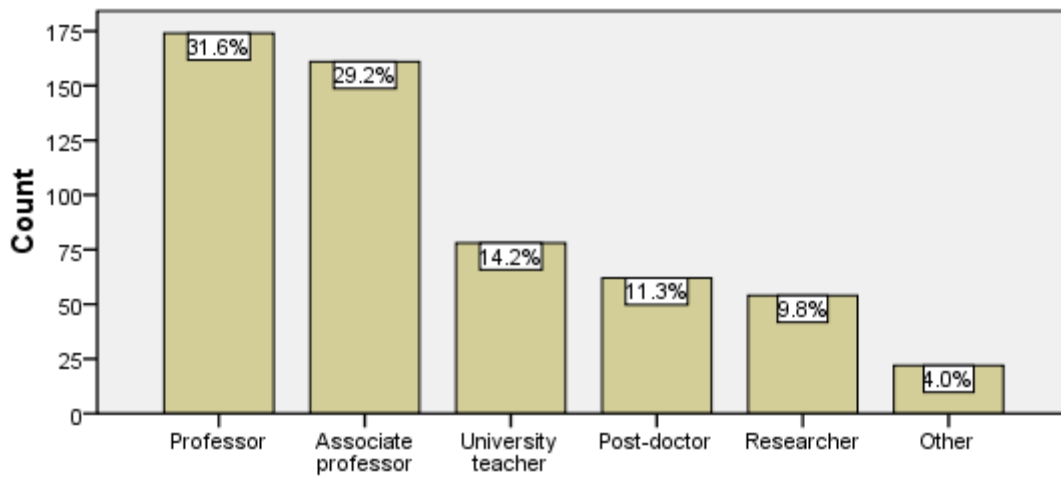

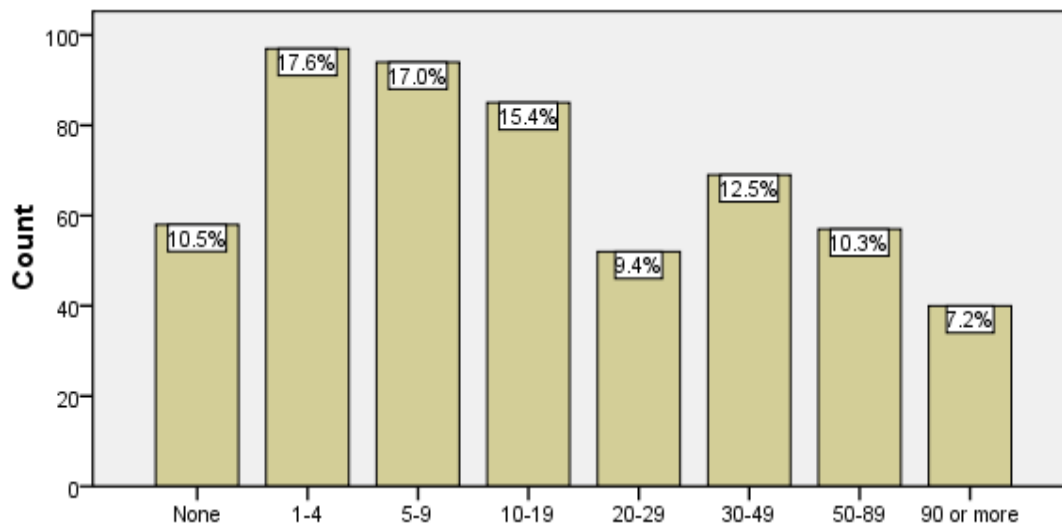**Figure 4. Position**   **N=553**

Figure 5. Publications in scientific journals   **N=552**

Sciences and Education (HSL), 15.9% were from the Faculty of Biosciences, Fisheries and Economics (BFE), and 15.1% were from the Faculty of Science and Technology (NT). Concerning the smaller faculties and units, 3.6% of the respondents were from the Faculty of Fine Arts, 2.7% were from Tromsø Museum (TMU), 2% were in the category "other", and 1.4% were from the Faculty of Law. This is shown in figure 3. As we can see, the number of responses from the different faculties and units is of great variation, but this is mainly explained by differences in size of the faculties and units.

When asked about their position, 31.6% of the researchers were professors, 29.2% were associate professors, while the rest were spread on the categories university teacher (14.2%), post-doctor (11.3%), researcher[3] (9.8), and other (4.0%). This is shown in figure 4. In other words, many of the respondents had the highest and most prestigious positions. How many articles in scientific journals the respondents have published[4] was also of interest. 10.5% had not published any articles in scientific journals, while 17.6% had published between one and four articles. 17.0% had published between five and nine, and 15.4% had published between ten and nineteen. The remaining 39.4% had published more than 20 journal articles, and many had published significantly more than twenty. For a complete overview, see figure 5. Regarding number of years employed, position and number of publications in journals, the UiT researchers all over seemed to be relatively experienced within the academic world.

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[3] The term "researcher" can have different meanings, and for the most part of this thesis it is used as a collective term for a person employed in an academic position. However, "researcher" is also a distinct position within the university system, but it will be evident from the context when the term "researcher" is meant as a category of position.
[4] Many of the researchers will obviously also have published in other channels than journals.

4.2. Time spent on reviewing

4.2.1. Number of reviews carried out annually

Aspects with peer review that could be related to time commitment were of particular interest. The question "how many journal articles, on average, do you review annually?" is relevant here.
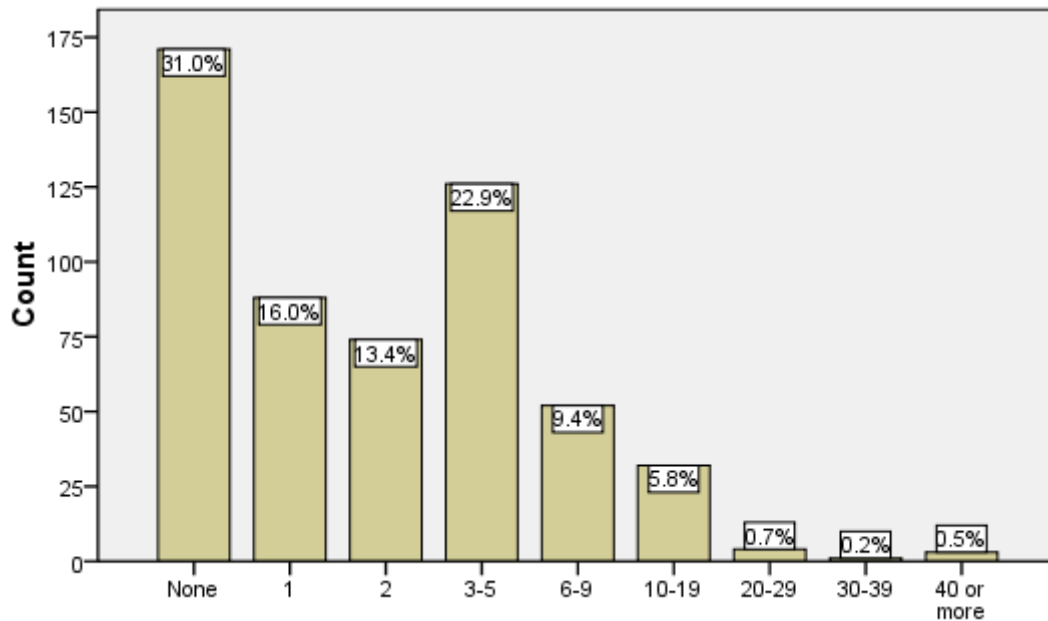

Figure 6. Number of reviews carried out annually   N=551

As we see from figure 6, 171 (31.0%) of the 551 respondents answering this question reported to not carry out any reviews annually. This contrasts to many other peer review surveys, but the number of researchers not engaged as reviewers being extraordinary high at UiT can obviously be explained by the fact that other surveys usually have turned to reviewers only (PRC 2007; Snell and Spencer 2005; Tite and Schroter 2007; Kearney et al. 2008; SenseAboutScience 2009). The UiT peer review survey, on the other hand, turned to every employee in a scientific position, regardless of who did peer review and who did not. To see how many are actually engaged in the work with reviewing journal articles is of course interesting in the context of an institution. 69.0% of the respondents did one or more reviews annually, and can therefore be classified as active reviewers. However, to state that 69.0% of the scientific staff at UiT are reviewing for journals, is probably to overestimate. As previously shown, groups who did few or no reviews for journals were more reluctant to answer than groups who were more active as reviewers, and the active reviewers can thus be overrepresented. The numbers are probably affected by this fact. The exact number of active

journal reviewers at UiT is therefore not known due to skewness in the material, but 380 out of the 1210 persons asked were doing peer reviews for journals. The *absolute minimum* of reviewers at UiT is therefore 31.4% of the scientific staff, but the correct number should be significantly higher than this.

As we see from figure 6, 22.9% of the active reviewers carry out three to five reviews annually, but it is also common to do somewhat more or less than this. 16.0% of the reviewers do one review annually, 13.4% do two reviews, 9.4% do between six and nine, and 5.8% do between ten and nineteen reviews annually. There are very few, altogether only 1.4%, who do 20 or more reviews per year. The peer review surveys from 2007 and 2009 mentioned in chapter 1.7, show rather similar results, with a significant drop around 20 reviews annually. Only 5% (PRC 2007:37) and 8% (SenseAboutScience 2009:17) of the respondents from these surveys had done more than 20 reviews during the last year, while the number was significantly higher in the other categories above zero. Like in the UiT peer review survey, the category 3-5 reviews annually was the most common in the 2007 survey, with 31% choosing this alternative (PRC 2007:37). In the 2009 survey the category 1-5 was the most popular, with 48% of the reviewers choosing this category (SenseAboutScience 2009). As we see, the results from the Tromsø-survey are rather similar to the results of the other two surveys in this respect.

When the numbers of reviews carried out at UiT are added, we get an approximate total sum of **1850 reviews carried out annually**[5]. This is only peer review for journals, since other types of peer review were not included in the survey. If we divide the total number (1850 reviews annually) on the 553 respondents, the average number of reviews carried out annually is 3.3 per researcher, and this average rises to 4.9 when only the 380 active reviewers are included. In comparison, the active reviewers from the 2007 peer review survey reported to have done an average of 8 reviews during the last year (PRC 2007:37), which shows that the UiT researchers are less active than these reviewers.

If we divide the active reviewers into groups of highly active reviewers, reviewing six or more articles annually, and less active reviewers, reviewing between one and five articles, we find that the less active group, which makes up 75.8% of the active reviewers, does 740 reviews per year (40.1% of all the reviews at UiT registered by this survey). The highly active group, counting 24.2% of the active reviewers, does 1107 reviews (the remaining 59.9%). In comparison, the peer review survey from 2007 found that the reviewers doing more than 6

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[5] This is when using the middle value, letting the response alternative 10-19 count as 14.5, 20-29 count as 24.5 and so on, and 40 or more count as 40.

reviews annually (this group was counting 40%) did about 79% of all reviews (PRC 2007:37). The reviews carried out may initially seem to be more equally distributed at UiT, but since there are fewer in the category being less active than in the category of highly active reviewers, this is not the case if we look at reviews per researcher. Highly active reviewers conduct a higher proportion of reviews than the 2007 peer review survey, implying a more exclusive reviewer population in Tromsø.

There are many variables which can be interesting to see in relation to the number of reviews carried out annually. Some of these, such as age, gender, present academic position, discipline, years employed in a scholarly position, and number of publications in journals, will now be looked into. To get a better overview in the graphs, it was necessary to merge the categories of articles reviewed annually into four new categories; none, 1-2, 3-5 and 6 or more, in this analysis. This means, however, that the picture is somewhat simplified. The graphs show the total percentages for each variable category (the categories on the x-axis), and do not show the differences in number of respondents within the different variable categories.

Concerning age, the 2007 peer review survey found that older reviewers did more reviews than younger reviewers (PRC 2007:37), which is not surprising with regard to experience, seniority and similar. This also seemed to be the case among the UiT researchers, and the tendency for older researchers reviewing more than younger researchers is illustrated in figure 7. Regarding gender, it looked like men did somewhat more reviews than women, which is illustrated in figure 8. While the number of men in the different categories of number of reviews carried out annually is rather constant, there are more women in the categories doing few reviews than in the categories for doing many reviews annually.

Further, the researchers' position is of interest. It was expected that researchers in high and prestigious positions would do more reviewing than researchers in lower positions. These expectations seemed to be correct, and the findings are presented in figure 9. We see a clear tendency of professors doing more reviews than others, and almost all professors (95.3%) report to review one or more articles per year. The professors are followed by the associate professors, researchers and post-doctors, and between 66% and 73% of the researchers in these positions are active reviewers. The category "other" has 40.9% active reviewers, while among the university teachers only 11.5% report to review one or two articles annually. In other words, there are big differences between professors and university teachers, but the differences are smaller between the associate professors, people employed as researchers, and post-doctors.
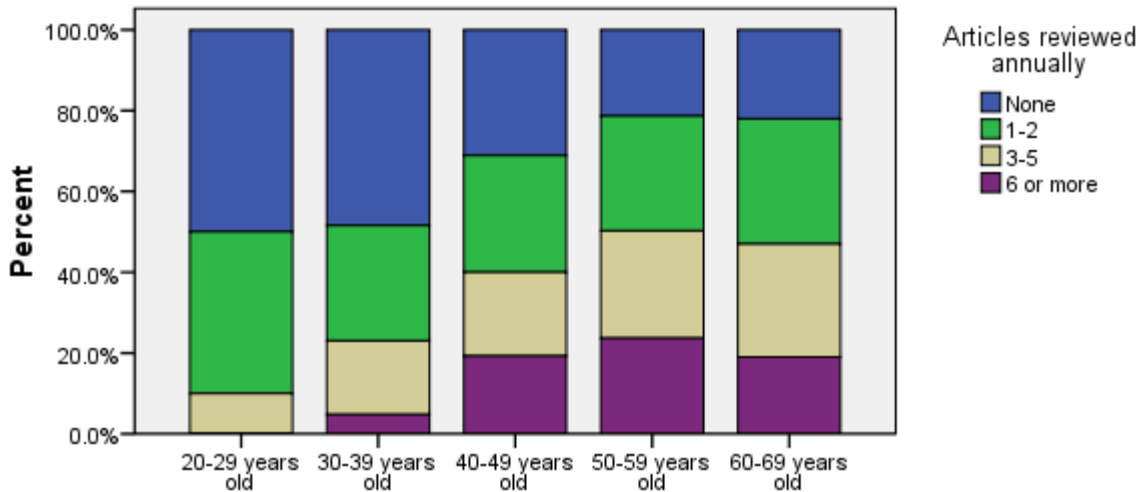
Figure 7. Researchers' age, and number of reviews annually   **N=540**
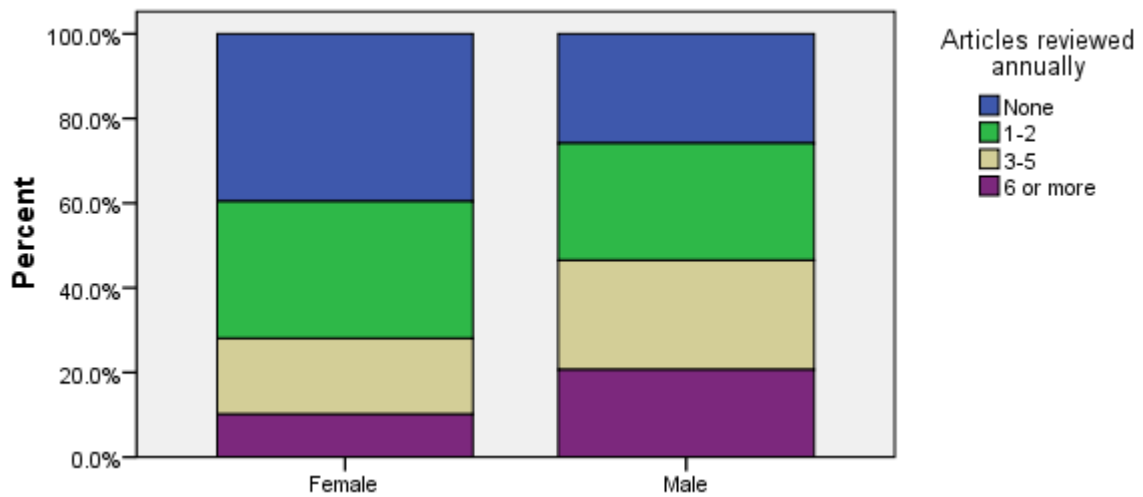

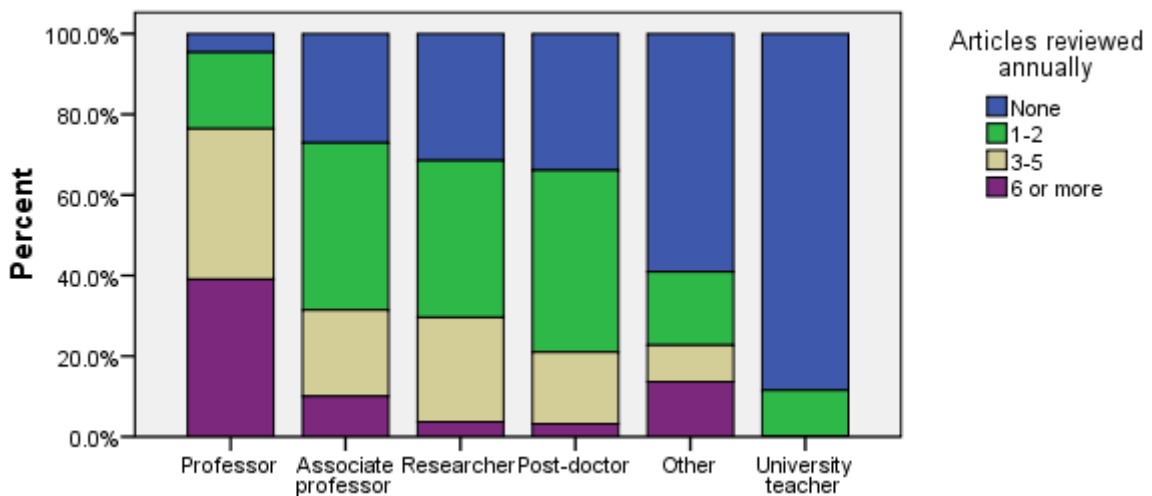**Figure 8. Gender and number of reviews annually**   **N=551**

Figure 9. Researchers' position, and number of reviews annuallyN=546

Likewise, it was expected that years employed in a scholarly position could be of significance for how many reviews a researcher reported to do annually. The 2007 peer review survey found strong correlations between seniority and the number of reviews carried out during the last year (PRC 2007:37). Figure 10 shows similar tendencies at UiT. In general, the longer the researchers have been in a scholarly position, the more reviews they report to do annually.
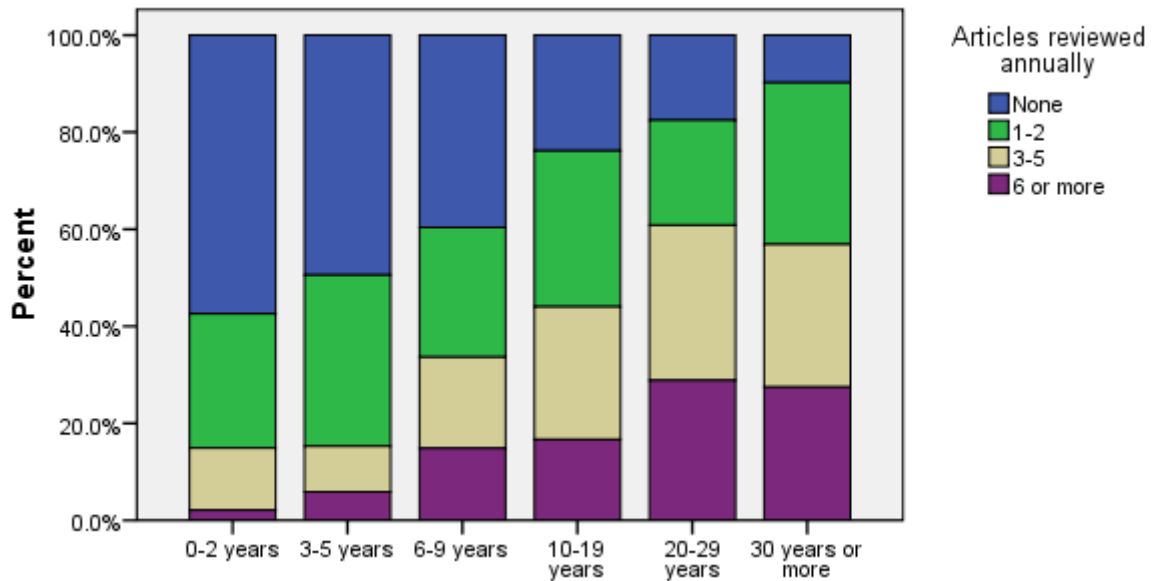

**Figure 10. Years employed in a scholarly position,
and number of reviews annually   N=549**

Another relevant variable is discipline, and to examine the number of reviews carried out annually at the different faculties is interesting. Disciplines like science, technology and medicine (in the literature often referred to as STM-disciplines) have strong traditions for using scientific journals for publishing research results. The "softer" disciplines like the humanities, fine arts, and to some extent law and social sciences have stronger traditions for using books rather than journals. It was therefore probable that peer review for scientific journals would be comprehensive in the STM-related fields compared to other fields such as social sciences, fine arts and the humanities. This was also the case for the 2007 peer review survey, which found that life sciences and clinical medicine/nursing reviewed the most, followed by physical science and engineering in the middle, while the humanities and social sciences were reviewing the least (PRC 2007:37). Figure 11 shows how many articles are reviewed annually at the different faculties and units at UiT.
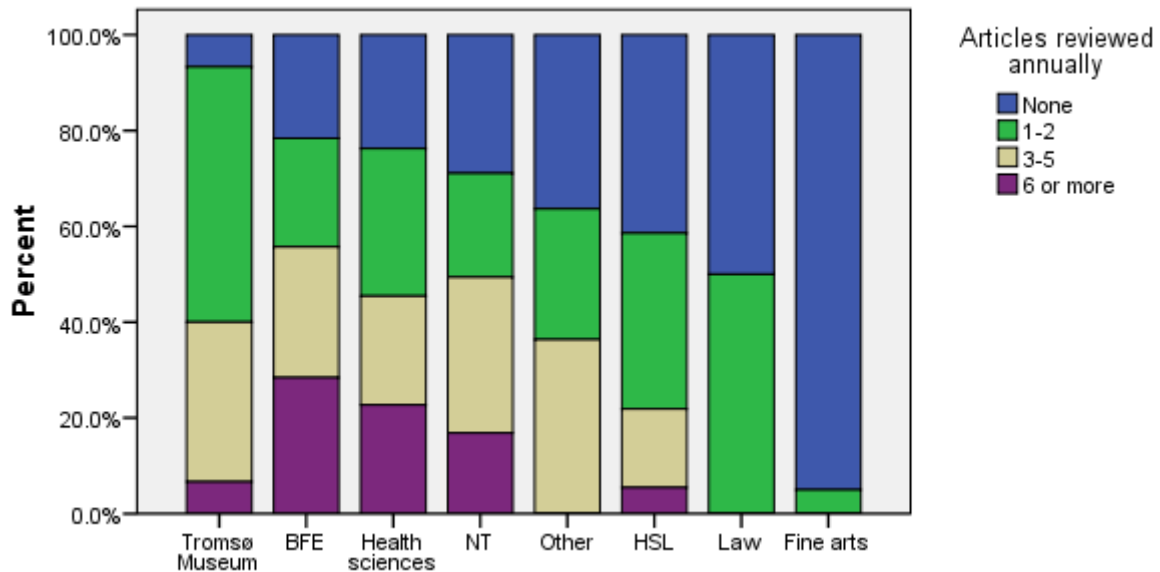
Figure 11. Faculty affiliation and number of reviews annually   N=551

As we see, the chance to work as a reviewer is very small for researchers connected to the Faculty of Fine Arts. Some of the researchers commented on this, and pointed out that their scientific activities were about different things, such as giving concerts, and some reported that they felt the survey was irrelevant for them. In the other end we find Tromsø Museum, where altogether 93% of the respondents reported to be active reviewers. However, rather few reported to review more than five journal articles annually. After Tromsø Museum, where many natural scientists are employed, come the other "hard" scientific disciplines, represented by the Faculty of Biosciences, Fisheries and Economics, the Faculty of Health Sciences, and the Faculty of Science and Technology. The "softer" disciplines represented by the Faculty of Humanities, Social Sciences and Education, the Faculty of Law and the Faculty of Fine Arts, are in the other end, doing fewer reviews annually. In other words, the researchers' discipline (represented by their faculty affiliation) seems to have effects for how many papers they review annually.

Further, the number of publications in scientific journals could be another relevant factor, and it was probable that researchers with many publications would review many papers annually. The relationship between journal publications and number of reviews carried out annually is shown in figure 12 on the next page.
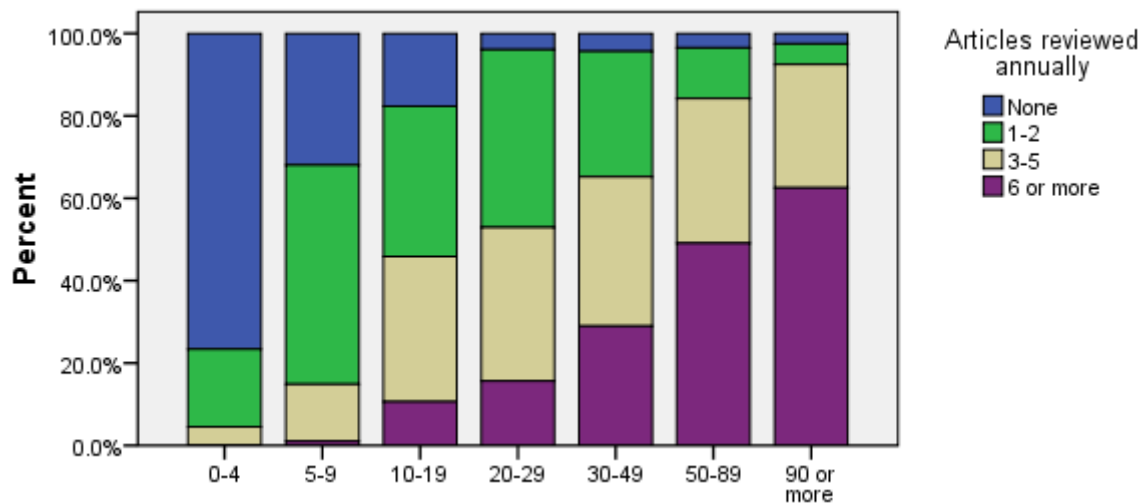
Figure 12. Total number of publications and number of reviews annually   N=547

As we see, the tendency seems clear. Researchers with many publications in journals are more likely to do many reviews for journals than researchers with few publications. This seems logical, and was not unexpected. Among the researchers with more than 20 journal publications, almost all report to be active reviewers, doing at least one review annually.

All these variables (age, gender, position, years employed, faculty affiliation and publications in journals) seemed to be relevant for how many articles a researcher reviewed annually. However, to see if the correlations were statistically significant, an analysis of bivariate correlations had to be done. Since it was difficult to rank the faculties, they were divided into two categories, "soft" disciplines (HSL, Law and Fine Arts), and "hard" disciplines (BFE, Health Sciences and NT). The results are shown in table 2.

Table 2. Bivariate correlations with number of journal articles reviewed annually

Variable	N	Pearson Correlation	Significance
Age	540	.228	.000
Gender	551	.191	.000
Position	527*	.570	.000
Discipline (soft/hard)	540*	.293	.000
Years employed in a scholarly position	549	.358	.000
Publications in scientific journals	550	.720	.000

*the category "other" is excluded because it could not be ranked.

The bivariate analysis showed that all variables were significant at the .000-level, which is a very high significance level. The variable with the strongest correlation was the number of publications in scientific journals. Having many publications is connected to reviewing many

journal articles annually. Position was also of relevance, and researchers in high positions reviewed more than researchers in lower positions. Further, researchers employed in scholarly positions for a long time reviewed more than fresh researchers, researchers from hard disciplines reviewed more than researchers from soft disciplines, older reviewed more than younger, and men reviewed more than women.

To find out which variables had most effect for how many articles a researcher reviews annually, a multivariate regression analysis was done. Since all the variables examined had statistically significant bivariate correlations with number of reviews carried out annually, they were all included in this further analysis. The results are shown in table 3.

Table 3. Multivariate correlations with number of journal articles reviewed annually

Variable	N	Correlation (β)	Significance	T-value
Age	540	-.095	.021	-2.315
Gender	551	.031	.331	.972
Academic position	527*	.147	.001	3.247
Discipline (soft/ hard)	540*	.088	.009	2.629
Years employed in a scholarly position	549	.055	.205	1.269
Number of publications in journals	550	.585	.000	11.774

*the category "other" is excluded because it could not be ranked.
Adjusted R^2= .530

Most of the variables are statistically significant in this analysis too, with exception to gender and years employed in a scholarly position. Number of publications is significant on the .000 level, position and discipline is significant on the .010 level, while age is significant on the .050 level. From the regression coefficients, we find number of publications in journals as the definitively most important factor for how many reviews a researcher does annually. Also academic position has a strong effect. According to the adjusted R^2, we can also see that the regression model explains 53% of the variance on the dependent variable, which is very high for survey data.

4.2.2. Hours spent per review

The researchers were asked about how many hours they on average spent on one review. The results are shown in figure 13.
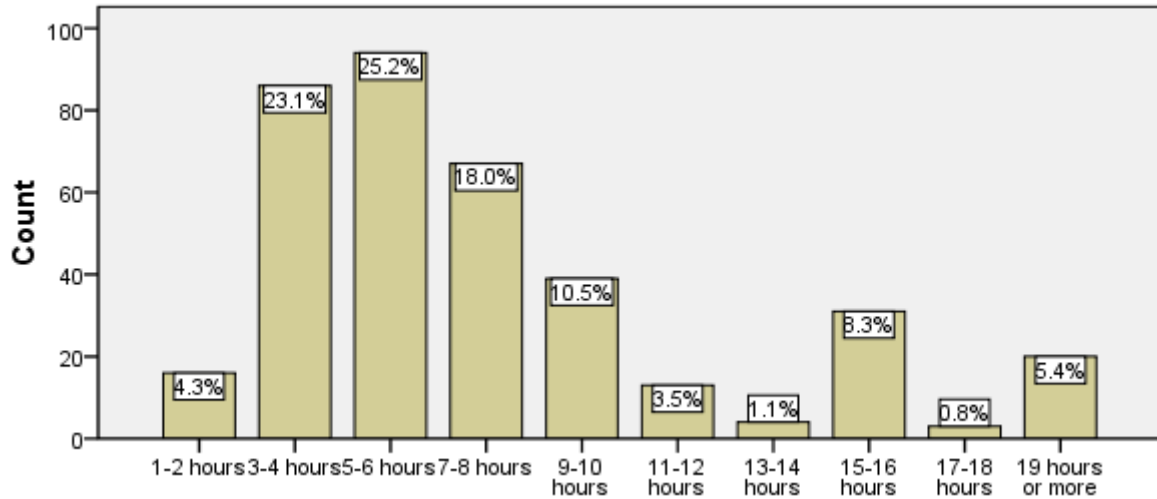

Figure 13. Hours spent per review   **N=373**

As we see, most responses clustered around 3 and 10 hours, but some were also well above this, using 15-16 hours and 19 hours or more. The average is 7.8 hours per article, while the median is 6 hours. Other surveys have estimated the average of time spent per article to be approximately 3 hours (Snell and Spencer 2005), 5 hours (Kearney et al. 2008), 6 hours (median) (SenseAboutScience 2009), and 8.5 hours (PRC 2007). The UiT peer review survey fits rather well in here, and can be placed somewhere in between the two latter studies.

To find out exactly how many hours the respondents altogether spend on reviewing annually, the number of reviews carried out by the individual researcher should be seen in relation to how many hours the researcher spends on one review. Table 4 shows how the numbers are divided. When these numbers are added, the number of hours spent reviewing annually among the 370 respondents answering both these questions, is altogether **12 614 hours**[6]. This is obviously not an accurate number, due to the uncertainties regarding the broad categories, and the fact that the respondents were asked to give an average.

We can state that the work carried out with reviewing is of a considerable amount. However, seen in the context of UiT as an institution, this is a bare minimum of time spent on reviewing at UiT as a whole. The 12 614 hours reflect only reviews done by the actual respondents, and the estimate does not include the 657 researchers (54.3%) who did not respond to the survey. Moreover, only peer review of journal articles is included, and

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[6] When calculating the broad categories, the middle value was used. 3-5 reviews annually was counted as 4, 6-9 was counted as 7.5 etc, and 40 or more was counted as 40.

Table 4. Hours spent on reviewing annually   N=370

Hours spent per review	Articles reviewed annually							
	1	2	3-5	6-9	10-19	20-29	30-39	40 or more
1 hour	0	0	1	0	0	0	0	0
2 hours	2	2	5	1	3	0	0	1
3 hours	3	4	11	9	4	0	0	0
4 hours	13	12	14	10	4	0	1	0
5 hours	9	9	12	10	2	1	0	0
6 hours	14	6	15	5	9	1	0	0
7 hours	1	2	5	2	1	0	0	1
8 hours	14	12	20	5	3	1	0	0
9 hours	0	0	2	0	0	0	0	0
10 hours	7	9	17	2	2	0	0	0
11 hours	0	1	0	0	0	0	0	0
12 hours	3	1	6	1	1	0	0	0
13 hours	1	0	0	0	0	0	0	0
14 hours	2	1	0	0	0	0	0	0
15 hours	6	5	4	3	1	0	0	0
16 hours	4	1	6	0	0	1	0	0
17 hours	1	0	0	0	0	0	0	0
18 hours	1	0	1	0	0	0	0	0
19 hours	0	1	0	0	0	0	0	0
20 hours or more	4	6	6	2	1	0	0	0
Total	85	72	125	50	31	4	1	2

inclusion of other kinds of peer review would most likely add somewhat to this number, even if journal peer review is the most common form of peer review in most fields of study. These factors indicate that the real number is significantly higher, but to suggest a definite number of hours spent on peer review at UiT is difficult.

If we estimate from the response rate 45.7%, the number of hours spent reviewing for journals per year would be 27 659 hours in the university as a whole. Important to note is that this number is highly inaccurate, and probably overestimated, as non-reviewers probably are overrepresented as non-respondents. The exact number is not known, but should be somewhere between the absolute minimum of 12 614 hours and the approximate maximum of 27 659 hours. Unfortunately, there is clearly a large gap between those numbers, but to give a more exact number is problematic.

However, if we make an educated guess at 20 000 hours, this represents 533 working weeks, or 11.4 full time labor years containing *only* reviewing. This, again, will correspond to approximately 23 scientific positions, since the researchers usually are supposed to spend half of their time on research and development, and the rest on giving lectures, administrative tasks, and similar. 23 such positions at UiT would be approximately as many scientific positions as there are at the smallest units, like Tromsø Museum and the Faculty of Law.

To employ a researcher is of course of variable costs, according to differences in salaries. In addition to the salary come social fees, like the employer's social security contributions, holiday pay etc. When the cost to the salary and the social costs are added, it will cost between 543 000 NOK and 707 000 NOK to employ a researcher in the position as an associate professor, according to the administration at UiT. A professor would be more

expensive than this, while a university teacher would be less expensive. However, if we say that employing the average researcher would cost 630 000 NOK annually, 23 such positions would become almost 14 500 000 NOK in expenses for the university. This shows that if the university was to employ and pay researchers in positions as reviewers, this would amount to a considerable cost. In other words, the invisible costs of peer review are extensive.

There are several of the variables which can be interesting seen in relation to hours spent per review. In the following, variables such as age, gender, academic position, discipline/faculty affiliation, years employed in a scholarly position, number of publications in journals, articles reviewed annually, years of experience as a reviewer, and confidence as a reviewer, will be examined. To illustrate this better, the number of hours spent per review had to be merged into the categories 1-5 hours, 6-10 hours, 11-15 hours and 16 hours or more, which makes a simplified picture. Some of the variables will only be briefly presented in writing, while the ones regarded as more interesting will also be illustrated in graphs.

Regarding age, the peer review survey from 2007 found that "younger reviewers spent much longer than older reviewers" (PRC 2007:42). There seemed to be a similar, but not as strong, tendency among the UiT researchers, with exception to the youngest group, 20-29 years old, where the respondents reported to spend less time than all other groups. However, the number of hours spent in the category 20-29 years old may be random because of few respondents (only five), whereas the other age categories had between 65 and 131 respondents. From 30 years and above, we see the tendency to older researchers spending less time than younger. This is illustrated in figure 14. When it comes to gender, it was found that time spent per review was relatively even for men and women. Men spent somewhat less time than women, but the difference was small (illustration in appendix 2).

The next figure (figure 15), gives an impression of differences in time spent per review among researchers in different academic positions. As we see, the professors and "others" spend the least time, but the differences between most categories are relatively small. It seems like the post-doctors on average spend the most time. However, there were few respondents in the categories "university teacher" and "other", as few reported to be active reviewers, and this makes the numbers for these categories uncertain.

Further, the variable concerning how many years the researchers had been employed in a scholarly position was examined. The findings are showed in figure 16. The figure shows remarkable little variation between the different categories. It does not look like years employed has anything to say for how fast a researcher carries out a review. Similar, years of experience as an active reviewer did not seem to have strong effects for how fast a review
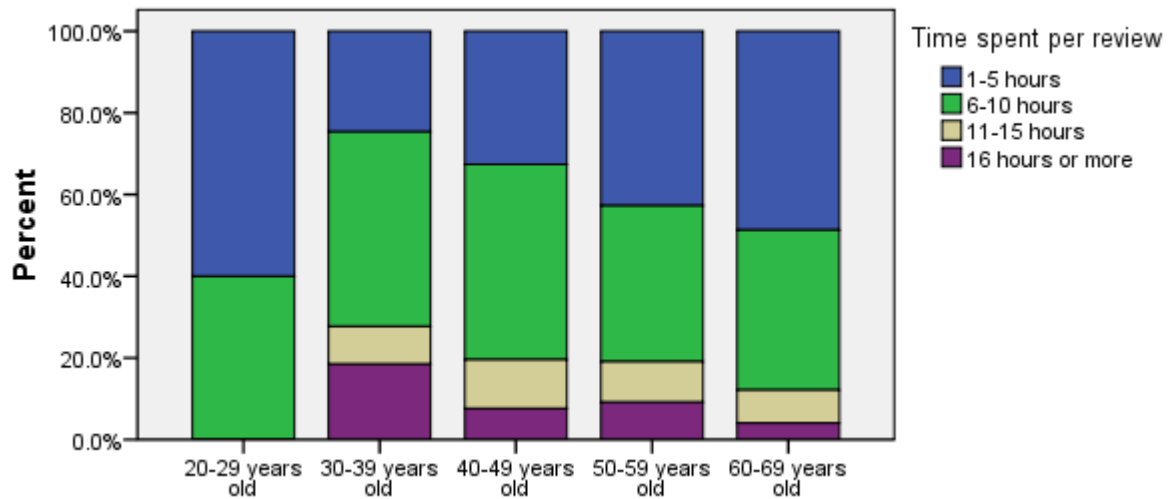
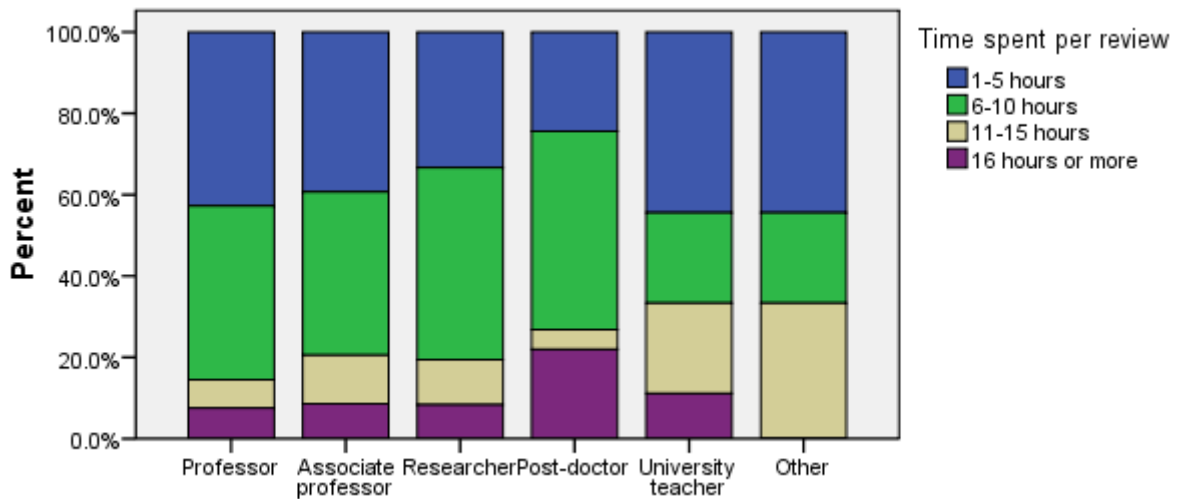**Figure 14. Age and time spent per review** N=367

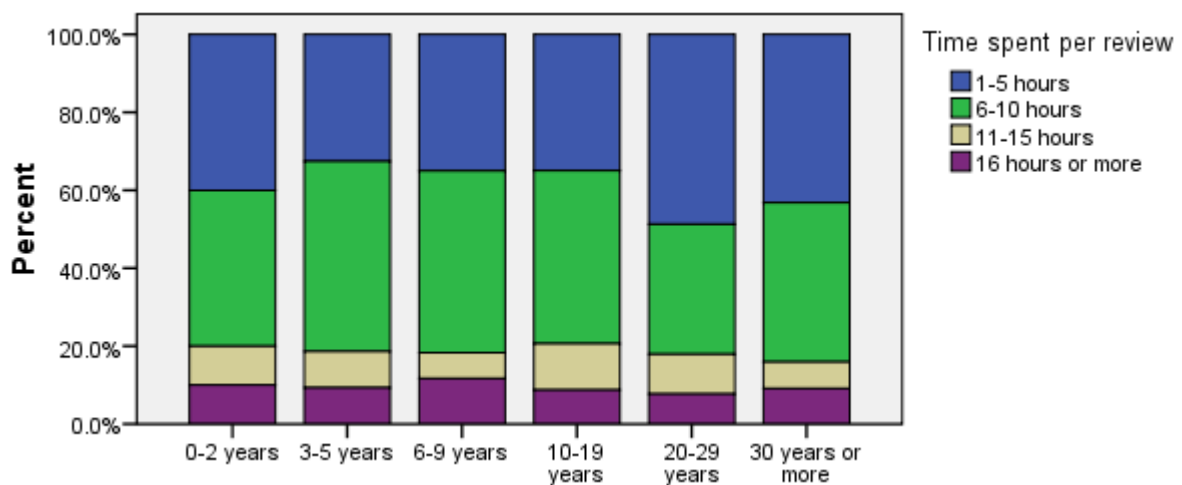**Figure 15. Position and time spent per review** N=371

Figure 16. Years employed in a scholarly position, and time spent per review, N=371

is carried out either, as the categories looked rather similar. There was slight tendency for fresh reviewers to spend more time per review than well experienced reviewers, but this tendency looked very small. The number of publications in scientific journals did not seem to be of notable relevance either, as there was no obvious pattern concerning who spent much time and who spent less. Regarding confidence as a reviewer, the findings showed that there was almost no variation between reviewers in the categories "confident", "somewhat confident" and "medium", while reviewers in the categories "somewhat insecure" and "insecure" spent more time per review than the others[7].

Regarding discipline, other studies have shown that in health sciences like medical education and nursing the average time spent per review was 3 hours (Snell and Spencer 2005) and 5 hours (Kearney et al. 2008). Cross disciplinary surveys have shown higher numbers, like 6 hours (SenseAboutScience 2009) and 8.5 hours (PRC 2007) per article. It was therefore possible that researchers from the Faculty of Health Sciences at UiT could be below the average at UiT as a whole. When examining time spent per review in relation to the different faculties and units, the Faculty of Fine Arts, Faculty of Law and the category "other" were excluded due to few active reviewers, and accordingly few respondents and uncertain numbers. Time spent per article at the remaining faculties is shown in figure 17.

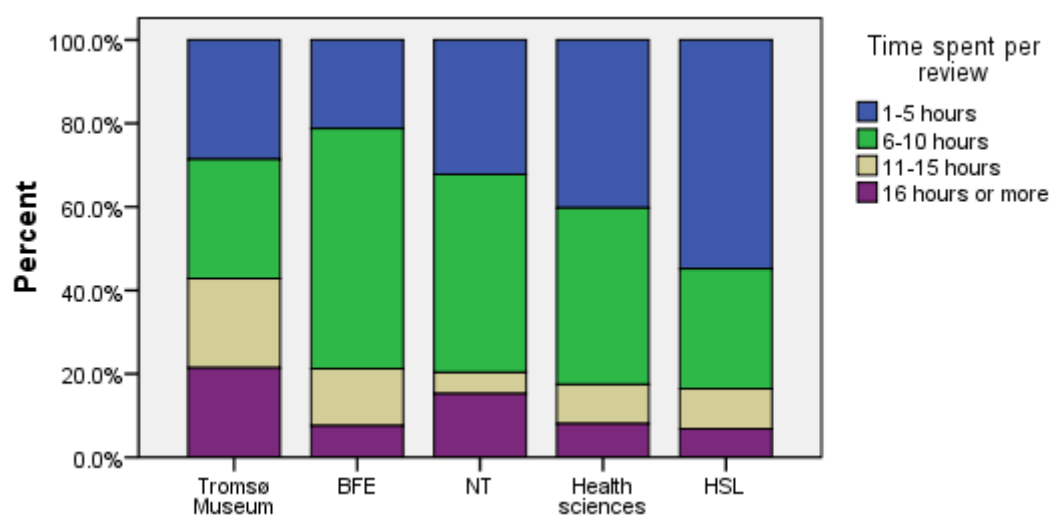**Figure 17. Faculty affiliation and time spent per review   N=361**

The average time spent per review at Tromsø Museum was 10.4 hours, and at the Faculty of Biosciences, Fisheries and Economics it was 8.8 hours. Further, at the Faculty of Science and Technology is was 8.5 hours, at the Faculty of Health Sciences the average was

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[7] Graphs on years of experience, publications and confidence can be found in appendix 2

7.4 hours, while at the Faculty of Humanities, Social Sciences and Education it was 7.1 hours. All in all, the differences were rather small, and the Faculty of Health Sciences did not stand out by doing reviews much faster than all the others, as could have been expected from comparing with the discipline specific and the cross disciplinary surveys above. The average for UiT as a whole was 7.8 hours, and the Faculty of Health Sciences was not very much faster than this. However, an interesting finding is that the disciplines classified as "hard" in the previous chapter, seem to spend more time per review than the researchers from the "softer" Faculty of Humanities, Social Sciences and Education.

The last variable selected to be examined in relation to time spent per review, is the variable of number of reviews carried out annually. The 2007 peer review survey found that highly active reviewers spent less time than less active reviewers (PRC 2007:42). To find out if this was the case at UiT too, the categories used in chapter 4.2.1.; less active reviewers (76.2% of the reviewers, doing 1-5 reviews annually) and highly active reviewers (23.8% of the reviewers, doing 6 or more reviews annually[8]), were used.
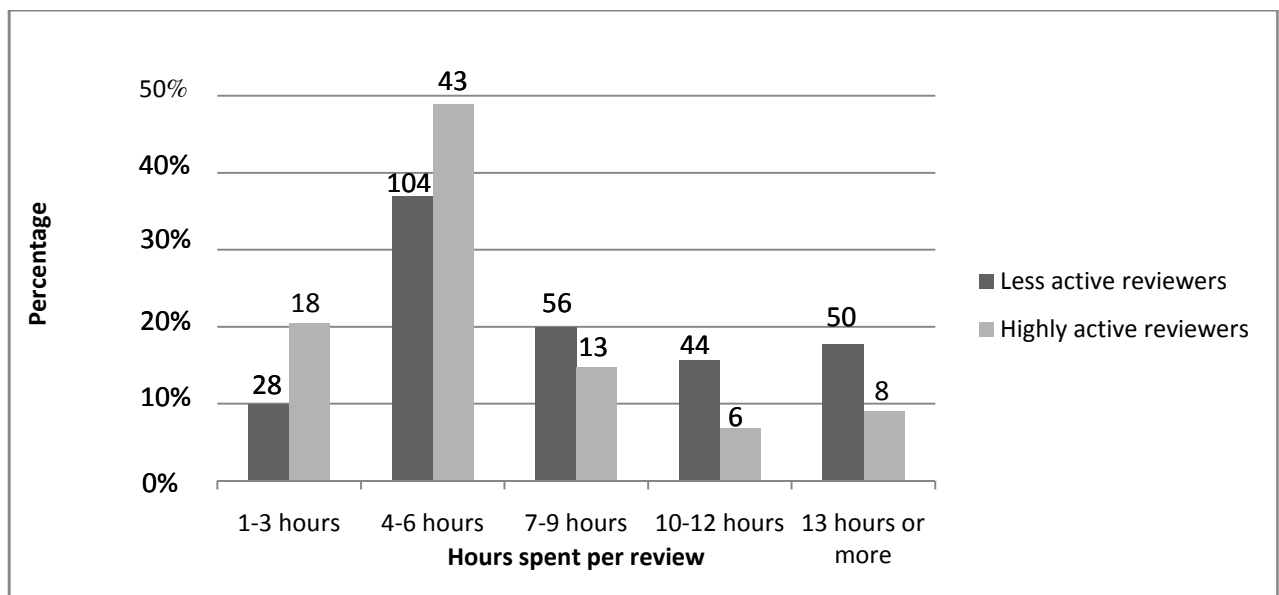
Figure 18. Activity of reviewers, and time spent per review   N=370

Figure 18 shows that the highly active reviewers were overrepresented in the categories to the left, while in the categories from 7-9 hours and above, the percentage of less active reviewers is higher than the percentage of highly active reviewers. This suggests that in general, highly

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[8] In chapter 4.2.1. the percentage of less active and highly active reviewers were a little different. This is explained by missing responses to the question about hours spent on peer review.

active reviewers tend to do reviews quicker than less active reviewers, which seems reasonable in terms of experience, and how much time can be provided to reviewing.

Summarized, the variables seemed to be of varying relevance for how many hours were spent per review, and the tendencies were less clear here than in the previous chapter. To see if the independent variables were correlated with the dependent variable, a bivariate correlation analysis was done. The results from this analysis are shown in table 4.

Table 5. Bivariate correlations with hours spent per review

Variable	N	Pearson Correlation	Significance
Age	367	-.148	.005
Gender	373	-.089	.086
Position	362*	.159	.002
Discipline (soft/hard)	365*	-.098	.062
Years employed in a scholarly position	371	-.047	.366
Number of publi-cations in journals	372	-.133	.010
Number of reviews carried out annually	373	-.144	.005
Experience as a reviewer	370	-.143	.006
Confidence as a reviewer	371	.131	.012

*the category "other" is excluded because it could not be ranged.

This analysis shows that most of the variables have a statistically significant bivariate correlation with hours spent per review. The variables which are significant on the .010 level are age, position, number of reviews annually, and experience as a reviewer. Publications in scientific journals and confidence as a reviewer are significant on the .050 level. Gender, discipline[9] and years employed in a scholarly position are not correlated with hours spent per review. None of the variables have a particularly strong bivariate correlation with hours spent per review. The correlation coefficients show tendencies to young reviewers spending more time than old, reviewers in high position spending less time than reviewers in low positions, and reviewers with many publications spending less time than those with few publications. Further, according to the bivariate correlations, those who do many reviews annually spend less time than those who do few, and those who have been employed in a scientific position

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[9] The disciplines were, as in the previous chapter, divided into "soft" and " hard" disciplines.

for a long time spend more time per review than the ones who have been employed for a short time. Confident reviewers spend less time than insecure reviewers.

The factors which showed a statistically significant bivariate correlation were included in a multivariate regression analysis. The results from this analysis are shown in table 6.

Table 6. Multivariate correlations with hours spent per review

Variable	N	Correlation (β)	Significance	T-value
Age	367	-.118	.117	-1.571
Position	362*	.085	.265	1.115
Number of publications in journals	372	.029	.727	.349
Number of reviews carried out annually	373	-.116	.084	-1.732
Experience as a reviewer	370	.064	.483	.703
Confidence as a reviewer	371	.083	.186	1.325

*the category "other" is excluded because it could not be ranged.
Adjusted R^2= .030

As we see, none of the variables are statistically significant in this further analysis, except the variable "number of reviews carried out annually", which was slightly significant (.100 level). Because of unexpectedly few statistically significant beta coefficients and strong bivariate correlations between the independent variables, it was central to look for multicollinearity problems, which can occur if the independent variables are strongly correlated. If this is the case, the variables should not be included in the same regression analysis, and the regression analysis would have to be split into several regression models. However, signs of collinearity were not found, as the tolerance- and VIF (variance inflation factor) values were within the limits, which means that the regression analysis above should be correct the way it is.

Getting few statistically significant variables was anyway not very surprising, as the graphs had not shown clear tendencies compared to the graphs in the previous chapter. In other words, it was hard to find factors which had clear effects for how much time a researcher spent per review, but the variable with the most effect, was the number of reviews carried out annually. However, this variable did not have a strong effect. In addition, the regression model does not explain much of the variance on the dependent variable (adjusted R^2= .030). Maybe this means that the time spent per review can be more related to the content

of the articles rather than to external factors. However, there might be other variables that better explain time spent per review, which have not been examined in this thesis. Further research could therefore be needed.

4.2.3. What priority is given to peer review?

As the performance-based budgeting system opts for an increase in publications, and the result often being less time for other work tasks, it was interesting to see how researchers prioritize reviewing. The active reviewers were asked: "What priority do you give to peer review compared to other research related work tasks?" The responses are shown in figure 19.
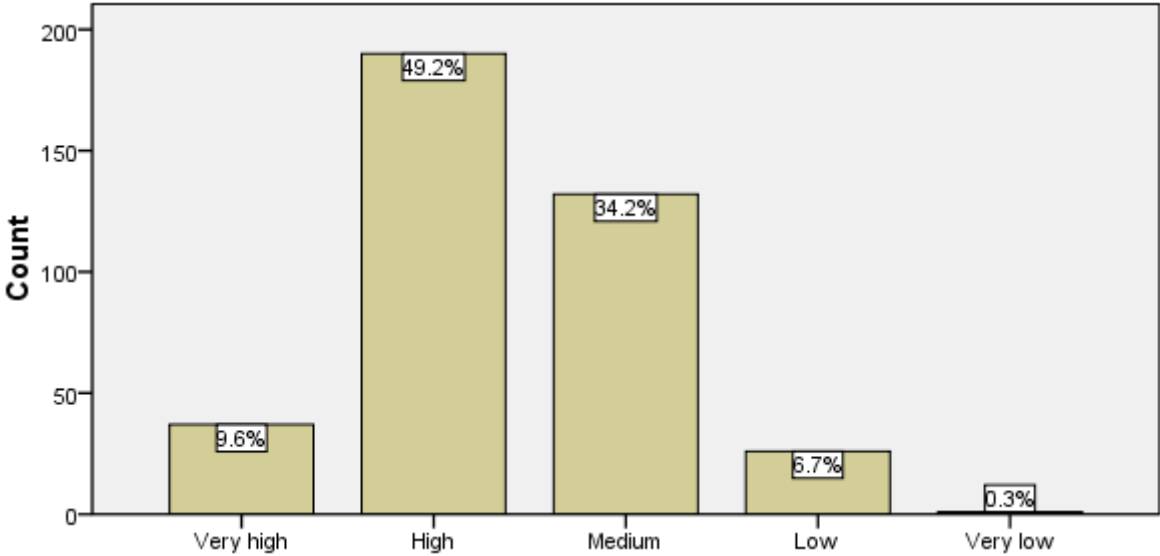

Figure 19. Priority given to peer review   N=386

As we see, most of the reviewers give high or medium priority to this task. There are few who give peer review low or very low priority, and few who prioritize it *very* high. Altogether we can say that peer review is given a relatively high priority. It shows that researchers usually devote time to reviewing, and it seems like the task is rarely neglected, even though many researchers can experience time pressure.

The researchers were also asked about how many times annually they were requested to review a journal article, and by comparing the answers to the amount of articles they actually reviewed annually it is possible to say something about how many of the requests are declined. We have earlier seen that approximately 1850 reviews are carried out annually at UiT. In comparison, the researchers get altogether approximately 2510 requests to review

annually, which means that 660 invitations (26.3% of all invitations) to review are declined. Figure 20 shows the relationship between the number of requests to review and the number of reviews actually carried out.
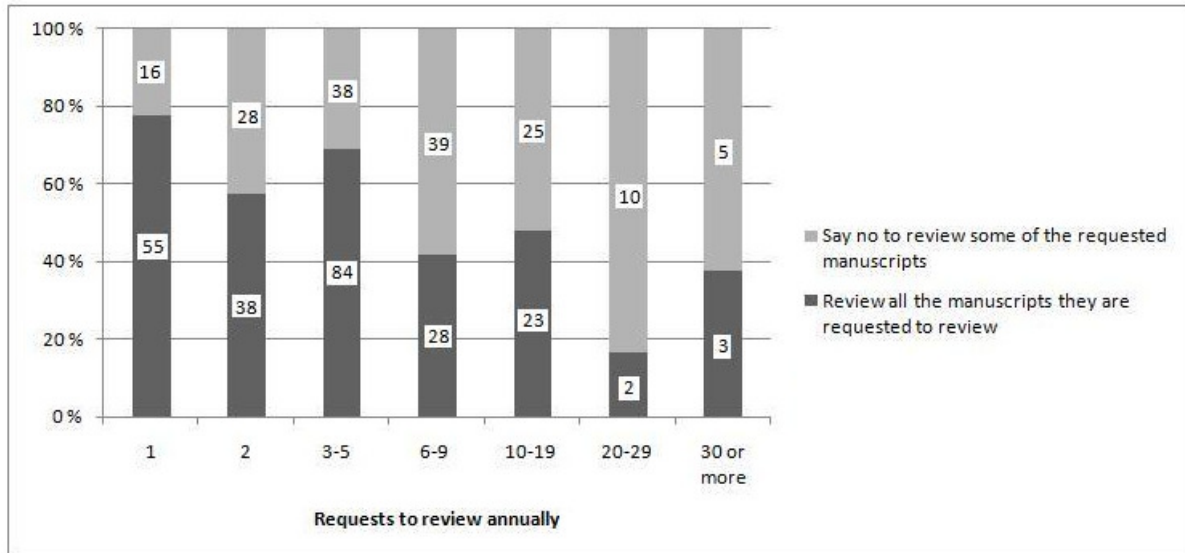

Figure 20. Tendency to decline to review   N=548

As we can see, in none of the categories all requests for reviews are reviewed. Even among researchers who are only asked to review one article annually, some reject this single request. There is some variation between the categories. Generally, it is more common to reject reviewing some of the articles if one is requested to review many times annually compared to if one is requested to review few times annually. The table does not show exactly how many of the articles are declined for each category, but in most cases the number of reviews actually carried out below the number of requests was one (and sometimes two) categories below the number of requests. This means that a reviewer being requested 10-19 times annually would normally not review less than 6-9 articles annually etc., although there were some exceptions.

Even if the priority given to peer review is relatively high, it is still not uncommon to decline requests. This survey has not examined why people decline to review, but other studies conclude that researchers often decline to review because they are too busy with other work tasks, they have had too many prior commitments with reviewing, or the deadline from the journal may be too short (PRC 2007:41; Tite and Schroter 2007:11; SenseAboutScience 2009:14). These reasons can all be seen in relation to time commitment, and lack of time may be an important reason for not accepting to review all the requested articles, and might be an important factor in why researchers decline to review.

4.3 The researchers' opinions on peer review

All the researchers, not only the active reviewers, were supposed to answer the section of the questionnaire which dealt with opinions on peer review. The "questions" were made as statements, and the respondents should indicate to what extent they agreed or disagreed with these statements. Researchers who were not engaged as reviewers might have been uncertain about what to answer, as some might not have been familiar with- or have special opinions about peer review. This can be the reason for why some researchers (between 5 and 16) did not answer the questions. However, many of the non-reviewers might be interested in the topic and have opinions on peer review which would be interesting to register, and it was therefore decided to include both active reviewers and researchers not engaged as reviewers.

4.3.1. Training and courses in reviewing

The respondents were asked whether they had received much training or attended courses in reviewing, and if they would like (more) training or courses in reviewing. They could rank their answers from strongly agree to strongly disagree. The responses were divided like this:

Figure 21. Training and courses in reviewing
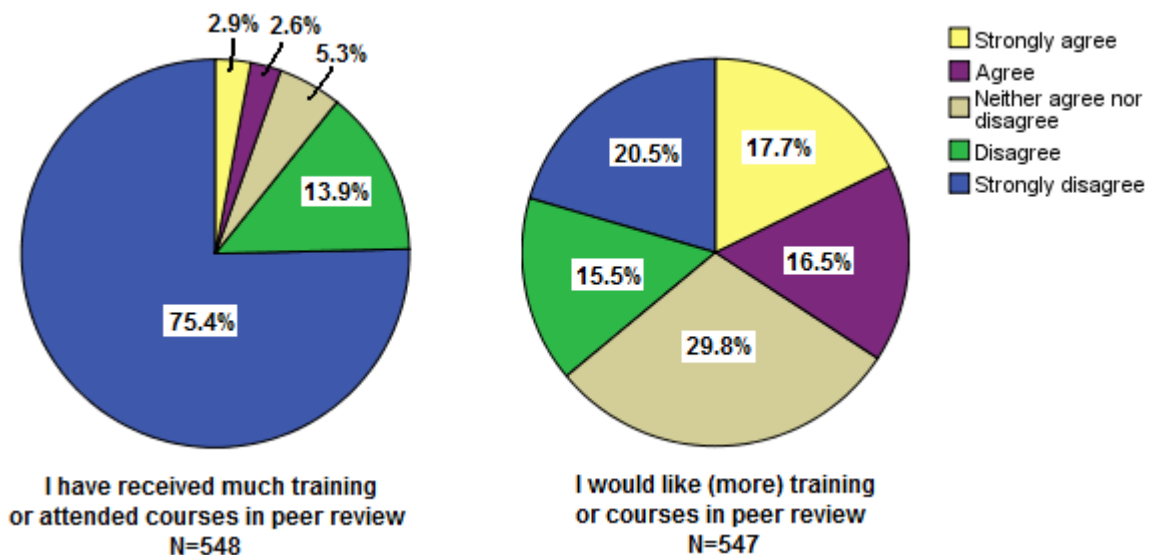
The first diagram shows that very few have attended courses or received much training in reviewing. In fact, altogether only 5.5 % agree or strongly agree to have had much training and courses, and 75.4% *strongly* disagree, which probably indicate that they have had very little or no such training and courses at all, opposite to *much* training and courses, as they

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were asked about. It shows that UiT researchers do not get much formal training in reviewing. It has been suggested that it is common for fresh reviewers to learn how to review through more informal ways, for example "through informal apprenticeship from mentors and supervisors, together with reflection on peer review reports they had seen" (Weale 2007:24), or through guidelines and instructions they get from journals (Freda et al. 2009:104), or through trying and failing, or with help from senior colleagues (Smith 2006:181). This is probably the case at UiT as well.

The second diagram shows that the respondents are divided regarding the question of more training or courses in peer review. When the categories agree and strongly agree, and disagree and strongly disagree are added up, 36.0% are generally negative to more training and courses, while 34.2% are positive, and the remaining 29.8% are neutral. As mentioned, all the respondents were supposed to answer to this question, regardless if they were engaged in reviewing or not. Somewhat surprisingly, many (46%) of those who were not active reviewers wanted courses and training. This may be explained by many researchers expecting to become reviewers later in their career, and since many of them probably have little experience, courses and training could be useful. Generally, people who on average did 3-5 reviews and upwards annually were more reluctant to training and courses than those doing fewer reviews. Likewise, the experienced reviewers were not as interested in courses and training as the less experienced. This can mean that those fresh to reviewing have stronger needs for training and courses, while the experienced and more active reviewers are not as interested in courses and training, as they maybe feel that they have already learned it, and do not see the need to improve it. Courses and training can also be time consuming, which can be regarded as negative.

Another aspect which can be seen in relation to courses and training in reviewing, is how confident the researchers feel in the role as a reviewer. A survey conducted among nurses showed that "[f]or most peer reviewers, it took one to five reviews before they felt comfortable with the process, [and] some commented that, "I still question my reviews" and "It took a few years"" (Freda et al. 2009:101). It could be interesting to see if this was the case among the UiT reviewers, and the researchers were therefore asked how confident they felt as reviewers. Here only the active reviewers were included, as the researchers not engaged in peer review would not have the experience required to answer. The responses are shown in figure 22 on the next page.
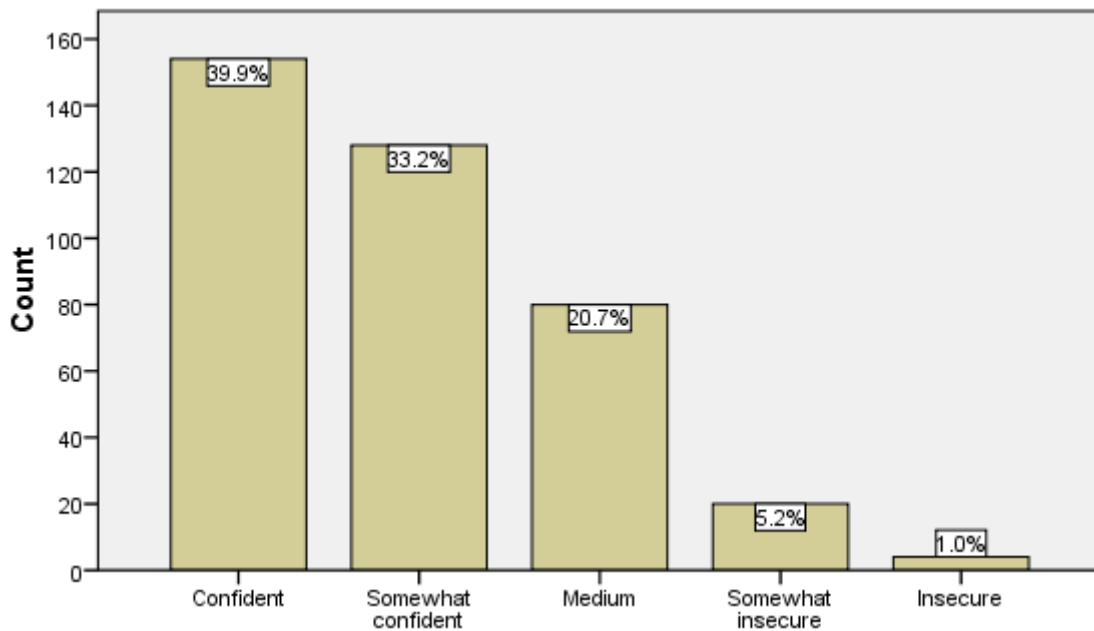
Figure 22. Confidence as a reviewer   N=386

As we see, most of the respondents report to be confident or somewhat confident, and while some answered medium, very few claimed to be somewhat or directly insecure. When compared to who would like training and courses in peer review, it was found that the less confident one feel, the more probable it is to be wanting courses and training in peer review, which seems logical.

All in all, the survey showed that the majority of UiT researchers agree to having had very few courses and little training in peer review, but they are more divided when it comes to *wanting* courses and training. Even if they are not unified in the latter question, it is clear that those who prefer not to have courses and training are satisfied with today's situation, while those who want such courses and training in most cases do not have this opportunity. The nursing survey mentioned above found the same tendencies, and concluded that "many reviewers' needs for training and support are not being met" (Freda et al. 2009:101). Here, all of 65% of the reviewers wanted formal training, but only 30% received such training (Freda et al. 2009:101). Further, a study in medical education found that 14% of the respondents had "received specific training in reviewing [while t]wo-thirds (66%) stated they would like to receive formal training" (Snell and Spencer 2005:92). There were in other words more reviewers from these two studies who wanted training than there were UiT-researchers, since at UiT only 34.2% wanted more training or courses. When only the active reviewers at UiT are included, which is more correct to compare with since the other studies had asked reviewers only, the number falls to 28.8%. The other surveys also showed that it was far more common to receive training among their respondents than at UiT, especially among the

nurses, since at UiT only 5.5% of all researchers, and 5.9% of active reviewers, had attended courses or training. However, all the three surveys show that in general, researchers want more courses and training than they are offered or actually have attended.

4.3.2. Opinions about how well peer review works

While peer review has been disputed and criticized, it has also been suggested that "[m]ost of us would agree, at least in public, that peer review works reasonably well" (Triggle and Triggle 2007:40). Several surveys have often shown that in general, reviewers, authors and others are rather satisfied with the current peer review system. It was interesting to find out what the researchers at UiT thought about the peer review system, and they were therefore asked to consider the following statement: "Peer review works well as a quality ensuring method the way it is today". Figure 23 shows the responses to the statement.

Figure 23. How well peer review works
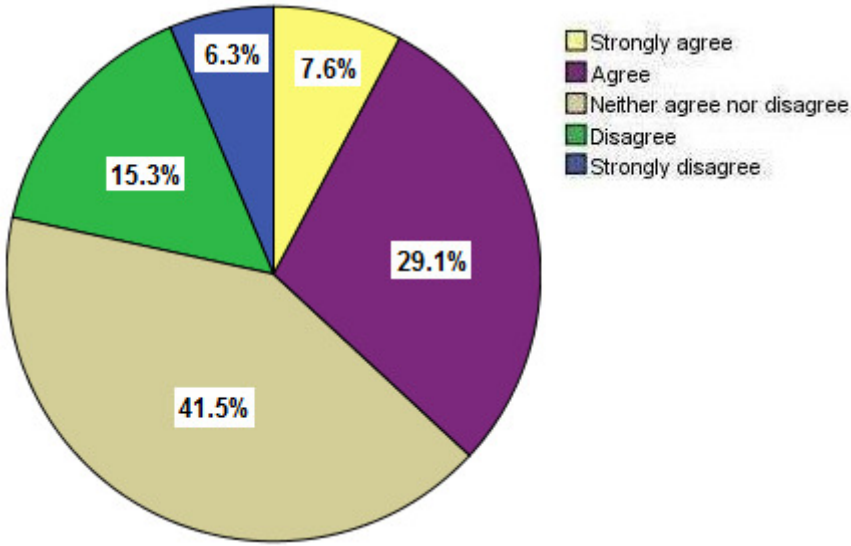
"Peer review works well as a quality
ensuring method the way it is today"
N=537

When the categories of agreement and disagreement are collapsed, 21.6% disagree or strongly disagree to this, while 41.5% are neutral, and 36.9% agree or strongly agree. The responses are relatively spread, but with a tendency to more people being satisfied than dissatisfied with the present system, but there are also many who are neither satisfied nor dissatisfied.

This can be compared to three other surveys which asked about more or less the same thing. The results showed that respectively 65% (PRC 2007:10), 69% (SenseAboutScience 2009:10) and 70% (ALPSP survey referred to in Rowland 2002:3) of the respondents were satisfied or very satisfied with the present peer review system. All in all, the satisfaction level at UiT is rather low compared to this. However, at UiT the researchers were asked if they thought the present peer review system works well as a method for ensuring the *quality*, while the other studies asked about how satisfied the reviewers were with the peer review system in general[10]. The question in the UiT peer review survey was thus more specified, which might contribute to explain why the UiT researchers seemed less satisfied with the peer review system. The level of agreement was anyway relatively low, which can imply that the UiT researchers think the system could have been better, and that there is room for improvement. The fact that at UiT only 7.8% *strongly* agree to the statement underlines this.

However, the statement is somewhat vague and unspecified. As shown in chapter 4.2., peer review is by no means carried out in one single way, and there are many different practices and models which can be followed. The most common however, is single blind review of an unpublished manuscript, and this is probably what most researchers think of as 'the way peer review is today'.

The researchers were not asked about what they thought about different models of peer review, as many might be unfamiliar with this, and it would require more elaborate explanations which was not desirable in the questionnaire. The researchers were, however, asked if they had heard about open peer review. Here 33.6% answered yes, while 58.2% answered no, and 8.2% answered don't know. All in all, there were quite many who had not heard about open peer review. To make people more aware of different models and approaches to peer review, and generally increase the knowledge about it, could probably be favorable in order to discuss the topic and to find possibilities for improvement, which again could lead to more satisfaction with the peer review system.

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[10] In the 1999 survey the researchers were asked about how satisfied they were "with the current system of peer review" (Rowland 2002:3), and in the two other surveys the question was formulated as "[o]verall, how satisfied are you with the peer review system used by scholarly journals?" (PRC 2007; SenseAboutScience 2009).

4.3.3. Peer review: Acknowledgement, reward and making it visible

The researchers were asked to state their opinions about making peer review more visible, making it better acknowledged in one's own institution, and whether it should count in the performance-based budgeting system[11]. This is in connection with the problems of reviewers declining to reviews (Tite and Schroter 2007). To make peer review more visible, acknowledged and rewarded might oppose this tendency, and increase the quality of the reviews, especially if the researchers think more awareness and reward is important. Peer review is usually not much rewarded and acknowledged, and it was interesting to find out what the researchers thought about this. The results from the three questions are shown in figure 24.

Figure 24. Reward, acknowledgement and increased visibility
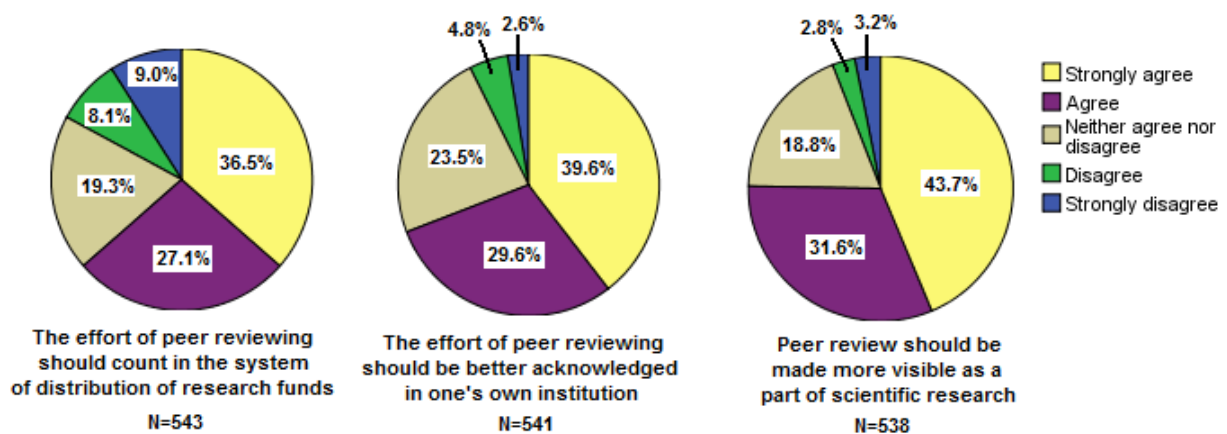
These diagrams show a clear tendency that all over, people did to a large extent agree with the statements. This was not very surprising, but although the figures show the same tendencies, there are some differences regarding the extent of agreement to the different statements.

The one statement providing the least agreement was "the effort of peer reviewing should count in the system of distribution of research funds". Nevertheless, most researchers agreed to this, and 63.6% either agreed or strongly agreed, 19.3% were neutral, while 17.1% disagreed or strongly disagreed. To make peer review count in the performance-based budgeting system would be beneficial for many researchers, and would be a way to effectively reward peer review and make it pay off. The statement might be seen as the most radical of the three, which would have an actual effect for the whole publishing process as well as for the researchers and the institutions.

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[11] In the questionnaire this was called "the system of distribution of research funds".

The fact that this statement generated less agreement than the other statements might have several reasons. The performance-based budgeting system is a much disputed and controversial system, and to include peer review in this system might be unpopular among some researchers, since it can be seen as confirming, strengthening and accepting the system. Researchers who did none or few reviews annually were generally more reluctant to include peer review in the performance-based budgeting system compared to those who did many reviews annually. Not being involved in the process can lead to less personal interest, and to reward it will therefore not be important for them personally. The researchers who only do a few reviews annually might be less concerned about getting rewarded than highly active reviewers. To incorporate peer review in the performance-based budgeting system would also mean that researchers doing few or no reviews would get less points than frequent reviewers, which could be unfortunate for them. As we have seen, there were differences regarding the extent of peer review in the different disciplines, and it could therefore affect the fields of study differently.

The next statement, "peer review should be better acknowledged in one's own institution", received more agreement than the first one. Altogether 69.2% agreed or strongly agreed, 23.5% neither agreed nor disagreed, while only 7.4% disagreed or strongly disagreed. There was in other words a general agreement, and the majority of researchers wanted peer review to be better acknowledged in their own institution. The inspiration behind this statement came from a study which, among other things, examined why peer reviewers recently have declined to review, and looked at what could be done to oppose this. It concluded that reviewing should be formally recognized by the academic institutions (Tite and Schroter 2007), and it was therefore expected that the UiT researchers would be of similar opinion. This was indeed the case, and the findings confirm the results from the other study, and suggest that institutions can be more involved in the peer review process.

The last statement, "peer review should be made more visible as a part of scientific research", was the statement which received the most agreement of the three statements. It is the broadest, most general and most unspecified statement. Here all of 75.3% strongly agreed or agreed, 18.8% were neutral, while only 6.0% disagreed or strongly disagreed. It is clear that most researchers want peer review to become more visible as a part of scientific research. It can therefore be suggested that most researchers think that peer review is an important part of scientific research, which should not be overlooked and neglected. It also means that many researchers think peer review is not visible enough today.

All in all, the researchers' evaluation of these statements speaks for making peer review more visible as a part of the work with scientific research, to make it more acknowledged in one's own institution, and to include it in some way in the performance-based budgeting system. To make it more visible is the highest rated statement, followed by acknowledgement in own institution, and thereafter making peer review count in the performance-based budgeting system as the lowest rated, but still by no means not low rated. Since the agreement is high, and since many chose the category "strongly agree" it seems like the researchers think that this is important.

5. Discussion and implications

Peer review in general, and the findings from the survey in particular, can be relevant in different ways. After a brief summary and general discussion of the findings, the findings will be seen in relation to the researchers, the institution, and the research community at large, as the peer review process is of importance for all these agents in various ways.

5.1. Summary and general discussion of findings

In chapter 4 the number of reviews annually and the time spent on reviewing by the UiT researchers' were mapped, and opinions on relevant aspects of peer review, such as training and courses, satisfaction with the present peer review system, and reward, acknowledgement and visibility of peer review were examined. A key finding was that 69% of the respondents were active reviewers, i.e. reviewing one or more manuscripts annually for academic journals. These reviewers perform approximately 1850 reviews yearly, with an average of 4.9 reviews per active reviewer. The factor with clearly most effect for how many journal articles a researcher reviews annually, is the number of publications in scientific journals. Other important factors are position, and field of study. Regarding hours spent per review, it was most common to spend between three and ten hours. The average time spent per review was 7.8 hours, and the median was 6 hours per review. The active reviewers spent approximately 12 614 hours annually on reviewing. Factors which could explain the time spent per review were hard to find. However, it was probable that highly active reviewers spent less time per review than less active reviewers, as this variable showed a slightly significant correlation with time spent per review. The priority given to reviewing is quite high, but still, relatively many invitations to review are declined.

Summarized, the findings show that quite a lot of time is spent on peer review. Many articles are reviewed annually, and most of the reviewers devote several hours of their time on each article they review. This should mean that peer review is regarded as an important work task and a serious activity, which is properly done. This is underlined by the fact that the priority given to reviewing is relatively high. The work with peer review work should therefore be considered important and seen as being of great value for the scientific journals.

However, even if it seems like relatively much time is spent and a lot of work is carried out doing reviews, this is not necessary the case if compared to other places. The peer

review survey from 2007 showed that the reviewers had done an average of 8 reviews the last year, and the average time spent per review was 8.5 hours (PRC 2007). This is more than at UiT, where the average numbers were 4.9 reviews and 7.8 hours per review. However, other studies have shown less time spent per review. It is difficult to know if reviewing at UiT is more or less extensive than at other institutions and universities, as no similar studies from other institutions were found. UiT is a small university internationally, and nationally, the other "old" universities in Norway, the University of Oslo, the University of Bergen, and the Norwegian University of Science and Technology, are significantly bigger. Regarding the number of publications for 2009, both the University of Oslo and the University of Bergen had more publications in journals per researcher than UiT (DBH 2009), and as we have seen, at UiT there was a strong correlation between getting published in journals and being an active reviewer. In January 2009 UiT was merged with what was previously Tromsø University College, and since more research usually is carried out at a university than at a university college, researchers from universities are likely to be more engaged in peer review as well. The recent amalgamation has most likely led to fewer reviews in relative terms than earlier.

Concerning the researchers' attitudes towards peer review, there were very few who had received training or attended courses in reviewing, while rather many (34.2%) would like such training and courses. The researchers were relatively divided regarding how well peer review works as a method for insuring quality, but there was a tendency that they were more satisfied than dissatisfied. Further, there was widespread agreement that peer review should count in the performance-based budgeting system, that it should be better acknowledged in one's own institution, and most of all, that it should be made more visible as a part of scientific research.

In summary, there was an overall agreement[12] among the researchers to most of these statements, with exception to the statement regarding whether the researchers would like (more) training or courses in reviewing, and to some extent the statement about how well the peer review system works. The agreement being comprehensive is central, since the opinions then should have more weight, and could easier have consequences for the peer review system, especially for how reviewing is practiced, managed, and dealt with in the institution. As the opinions show, the satisfaction level regarding how well peer review works, is by no means overwhelming, and there are many who would like changes in visibility,

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[12] The statement "I have received much training or attended courses in peer review" generated mainly answers in the categories disagree/strongly disagree, but there was agreement among the researchers in disagreeing.

acknowledgement and reward. In other words, there are many issues surrounding peer review which could (and probably should) be discussed. To discuss such issues in the context of an institution could be favorable, as research institutions are powerful agents in the scientific community, and could work towards changes and improvements.

However, to make changes in the present system could also be relevant for journals. As we have seen, many researchers decline to review. This can be an outspoken problem for the journal editors, who can have hard times finding reviewers (See Wærp 2009). Maybe it would be more important for the journals to make it more attractive to become reviewers, and work towards visibility, acknowledgement, rewarding reviewers and other things the reviewers think are important. Some journals have taken steps towards this by publishing lists of reviewers or appoint a "reviewer of the year" (Lee and Greenley 2009), or by acknowledging reviewers on the journal's website. More direct rewards, like payment or gifts, or free subscription to a journal, have also been used (Tite and Schroter 2007). The review process has traditionally been between the journals and the reviewers, but the involvement of the institutions where the reviewers are employed could lead to changes and new routines. This could contribute to peer review becoming less invisible, and one could better accommodate peer review as an activity.

5.2. Peer review and the researcher

As we have seen, most researchers want to include peer review in the performance-based budgeting system, and make it more visible and acknowledged. This is combined with the fact that peer review is relatively highly prioritized, and in most cases a request to review is accepted and the review is carried out. This suggests that reviews are usually carried out even if the activity of reviewing is not often appreciated and recognized satisfactory. The lack of recognition can result in peer review sometimes being regarded as "a thankless task" (Godlee 2002:2764) or an obligation by the researchers, which is of course not an optimal situation.

It has been suggested by professors to do the following: "give far more recognition to the unpaid, altruistic labour of those who do it and the system will be under less strain" (Shepherd 2007). This might be a good idea, and the UiT peer review survey shows that many UiT researchers would probably agree to this. Recognition could most likely make reviewing more popular, attractive, and a thankful task, and could contribute in making up for some negative aspects for the researchers, like time commitment, usually not getting paid, and taking on extra workload.

Regarding training and courses in peer review, it has been suggested that training of new reviewers is essential. The British Academy suggests that training in reviewing should be available to postgraduates, and states that "it is important that new generations of scholars are inducted into [peer review's] norms and values" (Weale 2007:24). Also Walbot claims that early training is important, and that training of graduate students and post-doctors is sorely needed (Walbot 2009). The UiT-survey showed that there were few who had attended courses and training, but some, especially researchers who were inexperienced or did few or no reviews (but probably expected to review later), were interested in such courses and training. The suggestion that training of inexperienced reviewers is desirable, combined with many of the inexperienced reviewers actually *wanting* courses and training, speak strongly for introducing some kind of formal training in reviewing, especially for new and inexperienced reviewers.

When it comes to time spent on reviewing, this varies greatly between researches, and some spend a lot of time while others do not review at all. The 380 reviewers carried out altogether 1850 reviews annually, and the average time spent per review was 7.8 hours. When this is calculated, the average time spent on reviewing annually per respondent is 26.1 hours, or approximately 3.5 working days. When only the 380 active reviewers are included, they on average spend one working week (38 hours) annually. This might not be very much compared to many other work tasks, but since there is a broad consensus to make peer review more visible and acknowledged, this can indicate that the researchers think this work is not only important, but also rather extensive and substantial, and that the time spent on reviewing is significant and should not be overlooked.

The UiT peer review survey showed that the researchers sometimes reject invitations to review articles, and as mentioned, other studies have shown that lack of time is one of the main factors in declining to review (Tite and Schroter 2007; PRC 2007; SenseAboutScience 2009). This may also show that the time spent on reviewing is of importance, and that researchers think it takes up much, and sometimes too much, time. When time has become more important, especially due to increasing focus on work aimed at being published in channels which counts in the performance-based budgeting system, less time will be provided for other work tasks that do not pay off or are rather invisible and not particularly appreciated (Eriksen 2006). The work with reviewing takes much time, and is voluntary and usually not included in the work descriptions, combined with not being much recognized, acknowledged or rewarded, and to a large degree invisible. This might lead the researchers to reject requests to review articles, thus making recognition an overall key factor to oppose this.

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In summary, the one aspect regarding time spent on reviewing, and the other aspect of getting more recognition and acknowledgement, seem to be rather interconnected for the researchers. Time being more important can create a wish for more recognition, acknowledgement and reward for what one does and the time one spends.

5.3. Peer review and the institution

To make peer review more visible, acknowledged and rewarded could be a task for the university, especially regarding the statement "the effort of peer reviewing should be better acknowledged *in one's own institution*". To acknowledge peer review in one's own institution could be done by allotting time specifically for carrying out reviews. It could be included in the work descriptions for those who can be expected to perform reviews, and it would thus be recognized as an important and existing activity, instead of being neglected. In this way, it would be provided a more formal place among other work tasks the researchers are expected to do. Other ways of acknowledging the task of reviewing could be to write about peer review and reviewers on the UiT website, in newsletters and other publications, it could be mentioned and pointed to in relation to research, good reviews and highly active reviewers could be rewarded in some way, it could be the topic for conferences and similar, the university could offer courses and formal training in reviewing, and it could otherwise be acknowledged in a number of ways.

To give some form of reward or making reviewing count in the performance-based budgeting system would probably make a big difference for many researchers. It could then be looked upon not as a burden in relation to the time spent, but instead something one willingly would spend time on as one would be rewarded in a more obvious and direct way than is the case today. On the other hand, the performance-based budgeting system has been widely criticized, and affects the various disciplines differently. It has been said to be better suited for "hard" fields of study than "soft" fields of study (Elvebakk and Enebakk 2006). To include peer review in this system might be favorable for some disciplines, but disciplines such as fine arts, where we saw that almost no reviews are carried out, will not benefit from this. However, the survey showed comprehensive agreement to include peer review in the performance-based budgeting system, and for many researchers this would be an advantage. Further, if the institutions were more involved and responsible for the reviews, and included reviewing in work descriptions, it could also be seen as more of a serious work task. Especially if peer review was formalized, professionalized through courses and training, and

recognized by the university, it could be easier and more probable to incorporate peer review in the performance-based budgeting system.

We have already seen that there are reasons for implementing training and/or courses in peer review, especially for new and inexperienced reviewers, as many of them would like to have such courses and training. Concerning who should potentially give such courses and training, there are different possible options. One suggestion is that the publishers with routines for peer review could do this. They could offer courses for those who review on a regular basis, or for their new or first time reviewers. It could, however, be expensive and impractical if the publisher is situated in another location, like another country, than the reviewer. Usually it would be easier to give guidelines, instructions and information about the review process through some kind of a document, like a pamphlet, an e-mail, an information sheet or a web page, which is an already common practice.

Another possible solution for courses and formal training could be that the institutions where the reviewers are employed offered this, and The British Academy has suggested that "formal training in peer review and its principles [should] be incorporated into the training guidelines of the Research Councils and HE institutions" (Weale 2007:24). This would be practical and feasible, and could provide a more general approach to peer review, instead of being related closely to the journal publishers and their specific approach(es) to peer review. It would then be possible to use this general knowledge when working as a reviewer for different journals. In addition, if the institutions were to include peer review in the work descriptions for those who can be expected to be reviewers, this provides an argument for closer involvement by the institution, especially since a formal work task should be institutionalized and have a certain level of quality. One way of increasing the quality of peer review is to have competent and well prepared reviewers, which can be achieved through courses and formal training. It would be important with clear guidelines from the employer who instruct the researchers to carry out this work, instead of letting it be random and too much up to the individual researcher. Most likely, this would increase the quality of the reviews as well.

It is problematic to get a complete and exact estimate of all the work with reviewing at UiT through this survey, but the survey has provided a much better overview than existed before. The combined time spent on reviewing annually just among the respondents was 12 614 hours. This shows that the number of hours spent at the institution as a whole is altogether quite extensive, and can have serious economic consequences for the institution. As

we saw in chapter 2.5, peer review is an expensive process, and in chapter 4.2.2. it was pointed out that peer review is expensive for the university as well.

Clearly, the researchers' work with peer review is of economic significance for the institution, and the work with reviewing articles results in money "disappearing" from the institution. This is unfortunate since the institution does not benefit from it, as the work is done for independent publishers, and not for the institutions. Commercial journal publishers can increase this unfortunate effect, because high subscription fees will result in additional expenses in order to get access to the peer reviewed material. Traditionally, peer review has taken place between the researcher and the publishers, being controlled, managed and operated by the publishers, and the individual researchers can decide how much they want to do. But because of the problematic situation (researchers employed and paid by a university doing reviews for journals for free, while the peer reviewed literature often has to be obtained from journals through high subscription fees), it can be suggested that the institution should have control with the work their own employees carry out with reviewing. To implement peer review as an official work task from the institution's side could provide an important step in starting to take control over this work, and could make it possible for the institution to take part in making decisions, giving guidelines, regulating the work, and all over playing a more central role in the process.

On the other hand, if the institutions were in control of the peer review process, this could possibly lead to less freedom for the individual researcher. The institution's policies regarding research traditions and fields of interest could potentially influence the process. This is especially so if the institution has a clear political position, or has strong financial interests in a field of research. For example, it could be relevant in a communist state, but it will probably not be an outspoken problem in the Norwegian university system.

5.4. Peer review and the research community

What goes for the institution with regard to high costs and limitations in access to peer reviewed literature, also goes for the research community, and this can make scholarly communication difficult. As an opposition to this, the open access movement has become central within the research community. Peer review can be related to the serial crisis and ideas concerning open access. It has been suggested that "[t]he cost of peer review has become more important because of the open access movement" (Smith 2006:179). If the author was to pay in an author-pays open access model, the cost for peer review has been estimated to be

between approximately 3200 and 16 000 NOK, while "at the moment the academic community pays about $5000 [32 500 NOK] for access to a peer reviewed paper" (Smith 2006:179).

In most cases publishers do not pay the reviewers, and for many small publishers, especially numerous within the social sciences and humanities, this is decisive for their existence, as they could not afford to pay their reviewers as much as it would cost with a normal wage (Weale 2007:28). However, much of the market is dominated by a few large publishers, for example Elsevier, Taylor & Francis, Springer/Kluwer and Swets Blackwell, which provide a huge number of journals to rapidly increasing prices (Hillesund 2006:74). Many of the prestigious and high quality journals are well established and commercial, with large yearly profits. As these journals are leading in the different fields, the university libraries have to subscribe in order to stay updated. The large publishers are in a monopoly-like position with little competition from others, and can consequently demand high subscription fees. This is, however, mainly the case in science, technical and medical journals, while journals in arts and humanities usually have more reasonable prices (Gorman 2002:260).

If the publishers use their position to demand unreasonably high prices for subscriptions to journals, this can be a hinder for the flow of information and the scholarly communication within the research community. In such cases, not only the research results produced at an institution in the form of journal articles and similar, but also value added to the publications through peer review, will disappear from the particular institution, and have to be bought back. It will not be openly available for the research community at large, which is unfortunate. While the publications are counted, and the extent of this work is known, this has not been the case for the more invisible and unregistered peer review process. However, the unfortunate effect is stronger if much value is added through extensive review processes, only for disappearing from the institution. The mapping of time spent on reviewing at UiT is therefore central in this respect.

As mentioned in the introduction, it has been suggested that publicly financed research should be freely available, and many research institutions support the model of open access, and demand their researchers to publish in such channels. In publicly financed research the focus is often on the original research, but indeed peer review can be seen as an extension of this work, and especially as an important part of the work towards a final publication. This can be supported by the fact that most UiT researchers agreed to the statement "peer review

should be made more visible *as a part of scientific research*", which can mean that many see peer review as an important part of scientific research.

As one of various powerful players in the research community, the universities could be influential in promoting change in the present situation, and many universities have taken steps towards recommending or demanding open access publishing, and contributed to facilitating this. Regarding peer review, closer involvement by the institution in the peer review process would make it possible to suggest or demand that the work with peer review, as a part of the work with research, should be done more for open access journals and less for the commercial publishers. If this was the case, money would not disappear from the institution in the same way, as there would be no high subscription fees for getting the peer reviewed articles, and instead, they would be openly available for the research community. In turn, if the researchers were supposed to do more reviewing for open access journals, this could have effects for the open access journals, as the quality probably would become higher and it would become easier to get reviewers. With higher quality it could become more popular to publish in such journals. In turn, maybe this could result in more open access journals becoming "level 2 channels", the highest level in the performance-based budgeting system. However, while many of the commercial publishers probably could be able to pay the reviewers, this is not the case for most smaller and independent publishers. It could be harder to get reviewers if the researchers are supposed to review for specific journals.

The research community is not always altruistic, and there are many powerful and opposing forces, and economic aspects are important in various ways for different players. Access to peer reviewed material is essential for the research community, and as peer review has become a mark of quality, the work carried out with reviewing is important and valuable for different agents. It can consequently be disputed, especially the way the system is today. How peer review best can be of benefit for the research community is an important question.

5. Conclusion

> "For editors, editorial peer review adds considerable work to the journal publication process. It also requires countless hours on the part of reviewers who could be spending those hours on their own research and scholarship. Authors are burdened with revisions. Does editorial peer review really work as it should, and does it justify the tremendous time and effort that goes into it?" (Weller 2001:xii).

Weller poses a highly relevant question, and as we have seen, peer review can be questioned, and does not always work as it should, and the system has many weaknesses. In addition, the process takes much time and demands great resources from both the researchers who carry out the reviews, and from the universities that pay the reviewers. However, peer review is widely used, and currently there is no viable alternative used for ensuring the quality and filter manuscripts for publication. Because of this, and since peer review often is rather invisible, it is important give it more focus, discuss it, and try to find room for improvements. Some forms for improvements have already been explored, and several models have been tested with varying results, or are in the process of being tested. There is no obvious final solution, and the peer review system remains a questioned process, which could be improved and changed.

The main focus of this thesis, however, was not to focus on peer review's problems, strengths and weaknesses, different models, etc, but rather to do a mapping of peer review at UiT. The main objective was to provide a better overview of the time spent on reviewing at UiT, in addition to get knowledge about the researchers' opinions to some aspects with peer review, such as training and courses, how well peer review works, and the aspects regarding acknowledgement, reward and visibility. In this way, this particular university (UiT) gets to know more about the extent of work carried out with reviewing, and what the researchers think about the process. An initial foundation is laid for making it possible for the university to get more involved in the process. The work with reviewing proved to be quite extensive and comprehensive in many parts of the university, and these findings could present an argument for the university to get more control over work carried out with peer review. In addition, the researchers wanted peer review to become more visible, acknowledged and rewarded, which could be done to a greater extent if the institution was engaged.

If closer involvement was to happen, it could cause changes in the peer review process, which has traditionally been between the researchers and the publishers. It could possibly improve the process in some ways, as it might become more formalized, institutionalized, and more visible and acknowledged. Further, the university as an agent in the research community has other interests than many journal publishers, and engagement in the peer review process could steer reviewing more towards open access publishing, and less towards for-profit journal publishers, which in turn could be beneficial for the research community.

In the literature, improvement and changes in the peer review process has been debated with regard to different peer review models, critique of its weak sides, experiments with different methods, changes caused by the publishing process and scholarly communication being digitalized, etc. The involvement of institutions, on the other hand, has not usually been a focus. Closer involvement of institutions, however, which has been examined to some extent here, may lead to changes and improvements, and in this way the thesis has added to the discussion. But of course, engagement from the institution's side in the peer review process remains to be tried out in practice.

However, it is obviously not easy to make changes and getting involved in a system which has been used for a long time and has its traditions and routines. The current peer review system is deeply rooted in the academic world, and even though there is a general agreement that peer review has its flaws and weaknesses, change towards new and different models has been slow. Attempts at changing the peer review process towards the better have not always proved fruitful. Therefore, the involvement of one single institution in the peer review process might be difficult, and would probably have less effect than if this was done by several research institutions. Further investigations of the work with reviewing at other institutions could therefore be needed. Similar studies at other institutions could be done in order to further map the extent of the time spent on reviewing. In addition, qualitative studies could be carried out, in order to examine researchers' opinions in depth, and learn more about peer review. To do such studies could be the first step in closer involvement and better control over the work.

Doing studies at other institutions, which were similar to the UiT peer review survey, would also be interesting in relation to this study, as it would be possible to compare and discuss the results, and UiT could be placed in a broader context among other institutions. This was unfortunately not possible in this thesis because no similar studies could be found, but would of course be of interest. All in all, the aspect of time spent on reviewing and

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reviewers' opinions on peer review are important parts of the peer review process. These two aspects are often interconnected, and could be seen as arguments for change in the current peer review system.

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Appendix 1

E-mail invitation and questionnaire (Norwegian and English versions)

_____

Undersøkelse om fagfellevurdering (peer review)

[The e-mail started with an individual introduction written by the deans and vice-deans, or a suggested wording accepted by them, where they encouraged their researchers to answer to the survey. The survey was also sent out in the deans' and vice-deans' names]

For English, see below.

Til vitenskapelig ansatte ved Universitetet i Tromsø

I samarbeid med Universitetsbiblioteket gjennomfører jeg en spørreundersøkelse om arbeidet med fagfellevurdering (peer review) av vitenskapelige artikler ved Universitetet i Tromsø. Med fagfellevurdering menes den kritiske vurderingen av manuskripter som sendes inn til vitenskapelige tidsskrifter, foretatt av eksperter på det aktuelle fagområdet. Hensikten med undersøkelsen er å kartlegge arbeidsmengden som går med til fagfellevurdering. Dersom du ikke har vært engasjert i fagfellevurdering av artikler, er det likevel viktig at du deltar.

Undersøkelsen er viktig fordi man på mange måter vet lite om arbeidet som gjøres med fagfellevurdering, ettersom det ofte ikke er en formalisert oppgave, og normalt ikke inngår i forskernes arbeidsinstruks. Det er uklarheter rundt hvordan det praktiseres, og hvor mye tid som blir brukt på dette. Det har i den siste tiden vært mange diskusjoner om hvor godt fagfellevurdering fungerer, og hva som kan forbedres. Denne undersøkelsen kan være et ledd i å synliggjøre arbeidet som blir gjort med fagfellevurdering, og vil bidra til at man får bedre oversikt over dette arbeidet.

Det tar ca 10 minutter å svare på undersøkelsen. Svarene vil bli behandlet anonymt. De som er med i undersøkelsen vil bli med i trekning av et sentrumsgavekort på kr 1000. Vi håper du vil ta deg tid til å svare på disse spørsmålene:

[generert unik lenke]

På forhånd takk.

Med vennlig hilsen
Maria Refsdal
Masterstudent i dokumentasjonsvitenskap
E-post: maria.refsdal@uit.no

For Universitetsbiblioteket
Helge Salvesen
Bibliotekdirektør

To scientific staff at the University of Tromsø

In cooperation with the University Library I am conducting a survey concerning the work with peer review of scientific journal articles that is carried out at the University of Tromsø. Peer review is the critical assessment of manuscripts submitted to scientific journals, done by experts in the relevant field. The purpose is to do a mapping of the amount of work spent on peer review by UiT researchers. If you haven't been engaged in peer review, it is still important that you participate in the survey.

The survey is important because in many ways we don't know much about the work done with peer review. It is not a formalised task, and it is normally not included in the researchers' work instructions. There are uncertainties concerning how it is practiced, and how much time is being spent on peer review. Recently there have been many discussions about how well it works, and what can be improved. This survey might play a role in making peer review more visible, and it will contribute to a better overview of the work that is carried out.

It takes approximately 10 minutes to answer. The answers will be anonymous. Those who complete the survey will participate in the drawing of a city centre gift voucher (1000 kr). We hope that you'll answer these questions:

[generated unique link]

Yours sincerely
Maria Refsdal
Master student in documentation science
E-mail: maria.refsdal@uit.no

On behalf of the University Library
Helge Salvesen
Library director

Undersøkelse om fagfellevurdering / Survey about peer review

Denne undersøkelsen dreier seg om arbeidet som blir gjort med fagfellevurdering (peer review) av artikler for vitenskapelige tidsskrifter.

This survey is about the work that is done with peer review of articles for scientific journals.

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1) 1. Kjønn: / Gender:

○ Kvinne / Female
○ Mann / Male

2) 2. Alder: / Age:

[- Velg alternativ - ▾]

3) 3. Hvilket fakultet tilhører du? / Which faculty are you connected to?

○ BFE-fak. / Biosciences, Fisheries and Economics
○ Helsefak. / Health Sciences
○ HSL-fak. / Humanities, Social Sciences and Education
○ Jur.fak. / Law
○ Kunstfak. / Fine Arts
○ NT-fak. / Science and Technology
○ Tromsø Museum
○ Annet / Other

4) 4. Hvilket institutt tilhører du? / Which department are you connected to?

[- Velg alternativ - ▾]

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5) 5. Hva er din nåværende stilling ved UiT? / What is your present position at UiT?

○ Professor
○ Førsteamanuensis / Associate professor
○ Post-doktor / Post-doctor
○ Forsker / Researcher
○ Universitetslektor/Førstelektor / University teacher
○ Annet, spesifisér: / Other, please specify:
[   ]

6) 6. Hvor stor stillingsprosent har du ved UiT? / How large is your position at UiT?

○ 100 %
○ Mellom 50 % og 100 % / Between 50 % and 100 %
○ Under 50 % / Below 50 %

7) 7. I hvor mange år til sammen har du vært ansatt i en vitenskapelig stilling, ved UiT eller andre plasser? / For how many years altogether have you had a scholarly position, at UiT or other institutions?

○ 0-2 år / years
○ 3-5 år / years
○ 6-9 år /years
○ 10-19 år / years
○ 20-29 år / years
○ 30 år eller mer / years or more

8) 8. Omtrent hvor mange artikler har du publisert i vitenskapelige tidsskrifter? / Approximately how many articles have you published in scientific journals?

[- Velg alternativ - ▾]

[Neste >>]

33 % completed

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9) 9. Omtrent hvor mange forespørsler får du i året om å fagfellevurdere en artikkel for et vitenskapelig tidsskrift? / Approximately how many times annually are you requested to review an article for a scientific journal?

- ○ 0
- ○ 1
- ○ 2
- ○ 3-5
- ○ 6-9
- ○ 10-19
- ○ 20-29
- ○ 30-39
- ○ 40 eller mer / or more

10) 10. Hvor mange tidsskriftartikler fagfellevurderer du gjennomsnittlig i året? / How many journal articles, on average, do you review annually?

- ○ 0 - Gå til spm 18 / Go to question 18
- ○ 1
- ○ 2
- ○ 3-5
- ○ 6-9
- ○ 10-19
- ○ 20-29
- ○ 30-39
- ○ 40 eller mer / or more

Dersom du svarte "0" på spørsmål 10, kan du gå rett til spørsmål 18. / If you replied "0" on question 10, you can go directly to question 18.

11) 11. Fagfellevurderer du fast for et tidsskrift, eller er du medlem av et redaksjonsråd? / Are you a member of an editorial board, or regularly reviewing for a journal?

- ○ Ja / Yes
- ○ Nei / No

12) 12. Hvor mange timer bruker du gjenomsnittlig på å fagfellevurdere en artikkel? / How many hours do you on average spend reviewing an article?

- Velg alternativ - ▼

13) 13. Hvor lang frist i gjennomsnitt pleier tidsskriftene å gi deg til å vurdere en artikkel? / How long, on average, is the deadline you get from the journals before you have to submit a review?

- ○ 1 uke / week
- ○ 2 uker / weeks
- ○ 3 uker / weeks
- ○ 4 uker / weeks
- ○ 5 uker / weeks
- ○ 6 uker / weeks
- ○ 7 uker / weeks
- ○ 8 uker eller mer / weeks or more

14) 14. Hvilket tidsskrift har du oftest fagfellevurdert for? Oppgi ett tidsskriftsnavn. / Please name the one journal you most frequently have been reviewing for.

[<< Tilbake] [Neste >>]

67 % completed

15) 15. Hvordan prioriterer du fagfellevurdering i forhold til andre forskningsrelaterte arbeidsoppgaver? / What priority do you give to peer review compared to other research related work tasks?

○ Svært høyt / Very high
○ Høyt / High
○ Middels / Medium
○ Lavt / Low
○ Svært lavt / Very low

16) 16. Hvor lang erfaring har du som aktiv referee/reviewer? / How long is your experience as an active referee/reviewer?

○ 0-2 år / years
○ 3-5 år / years
○ 6-9 år / years
○ 10-19 år / years
○ 20 år eller mer / years or more

17) 17. Hvor sikker føler du deg i rollen som som referee/reviewer? / How secure do you feel in the role as a referee/reviewer?

○ Sikker / Confident
○ Litt sikker / Somewhat confident
○ Middels / Medium
○ Litt usikker / Somewhat insecure
○ Usikker / Insecure

På en skala fra 1 til 5, der 1 er helt uenig og 5 er helt enig, /
On a scale from 1 to 5, where 1 is strongly disagree and 5 is strongly agree,

18) 18. Hvor enig eller uenig er du i disse påstandene? / To what extent do you agree or disagree with these statements?

	1	2	3	4	5
Jeg har fått mye kursing eller opplæring i fagfellevurdering. / I have received much training or attended courses in peer review.	○	○	○	○	○
Jeg vil gjerne ha (mer) kursing eller opplæring i fagfellevurdering. / I would like (more) training or courses in peer review.	○	○	○	○	○
Det trengs formalisering og flere retningslinjer rundt fagfellevurdering. / Peer review needs more formalisation and guidelines.	○	○	○	○	○
Fagfellevurdering fungerer bra som kvalitetssikringsmetode slik det er i dag. / Peer review works well as a quality ensuring method the way it is today.	○	○	○	○	○
Fagfellevurdering bør bli mer synliggjort som en del av forskningsarbeidet. / Peer review should be made more visible as a part of scientific research.	○	○	○	○	○
Arbeidet med fagfellevurdering bør gi uttelling i resultatbasert omfordeling av forskningsmidler ("tellekantsystemet"). / The effort of peer reviewing should count in the system of distribution of research funds.	○	○	○	○	○
Arbeidet med fagfellevurdering bør bli mer anerkjent i egen institusjon. / The effort of peer reviewing should be better acknowledged in one's own institution	○	○	○	○	○

19) 19. Har du hørt om "åpen fagfellevurdering"? / Have you heard about "open peer review"?

○ Ja / Yes
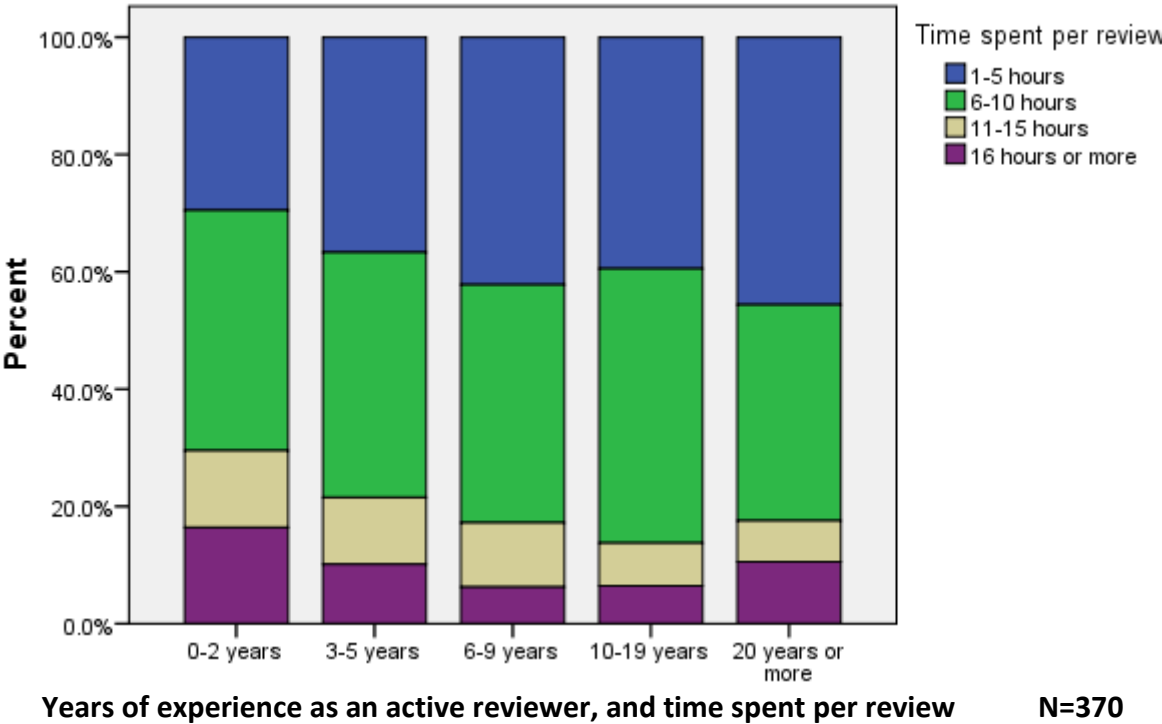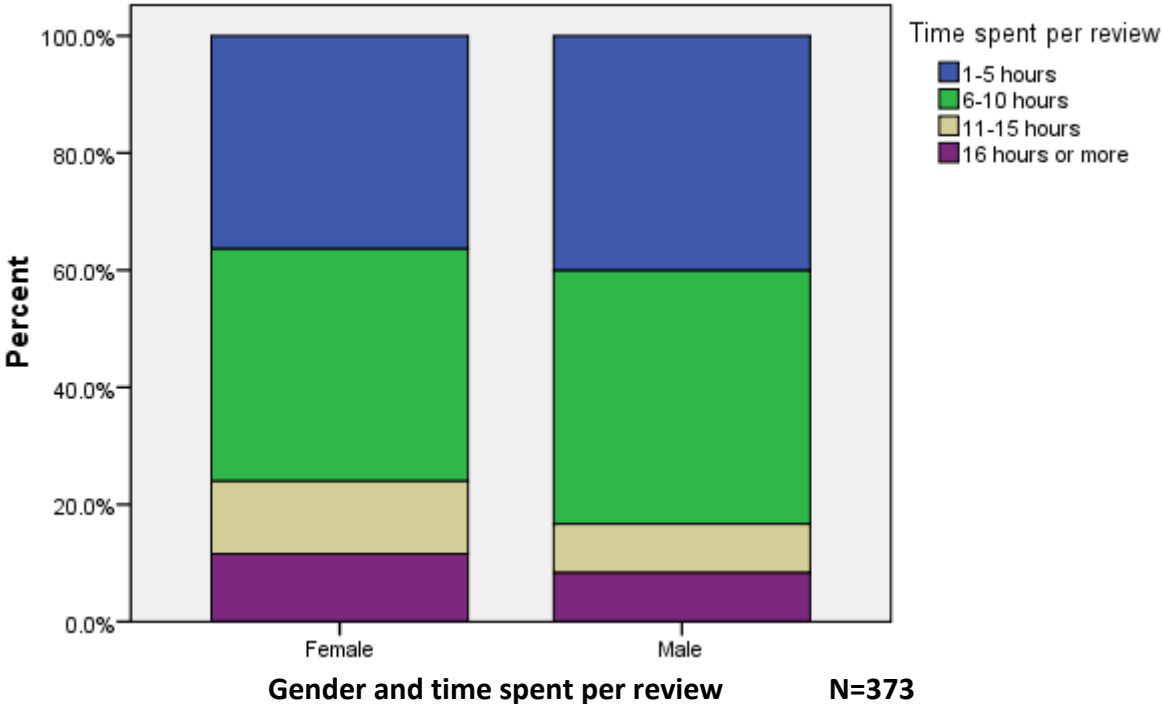○ Nei / No
○ Vet ikke / Don't know

20) 20. Eventuelle kommentarer til undersøkelsen: / Additional comments to the survey:
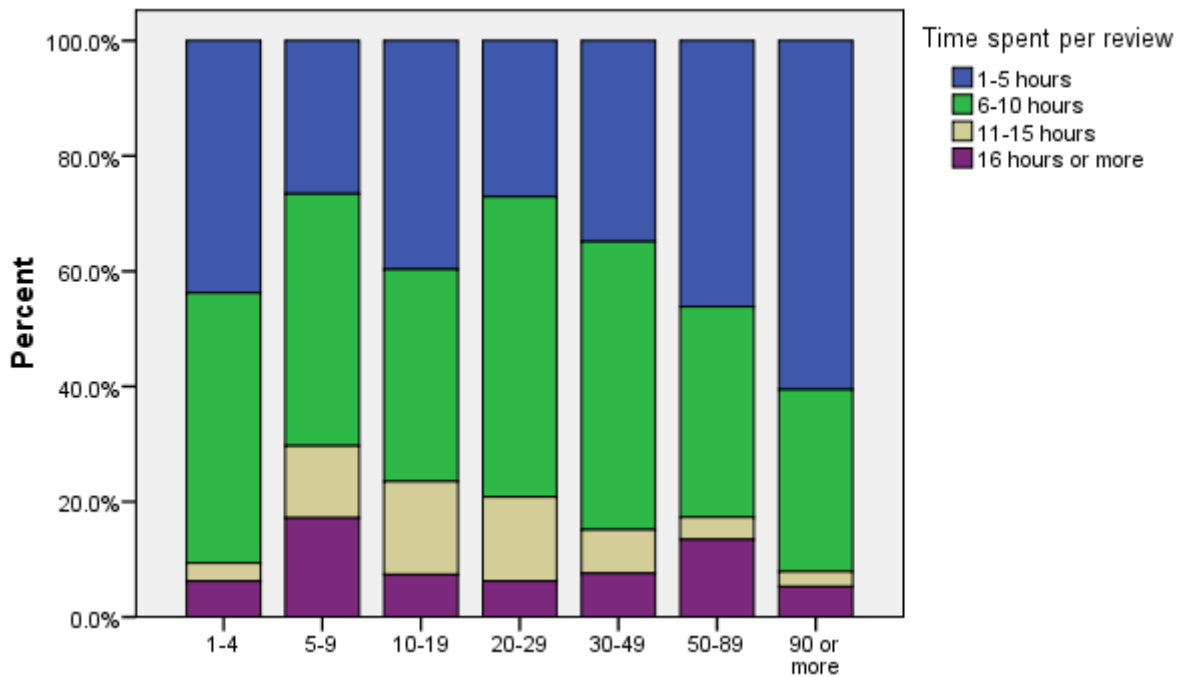
[text area]

[<< Tilbake] [Send]

100 % completed

Appendix 2

Graphs for chapter 4.2.2.

Gender and time spent per review   N=373

Years of experience as an active reviewer, and time spent per review   N=370

Number of publications in scientific journals, and time spent per review   N=372
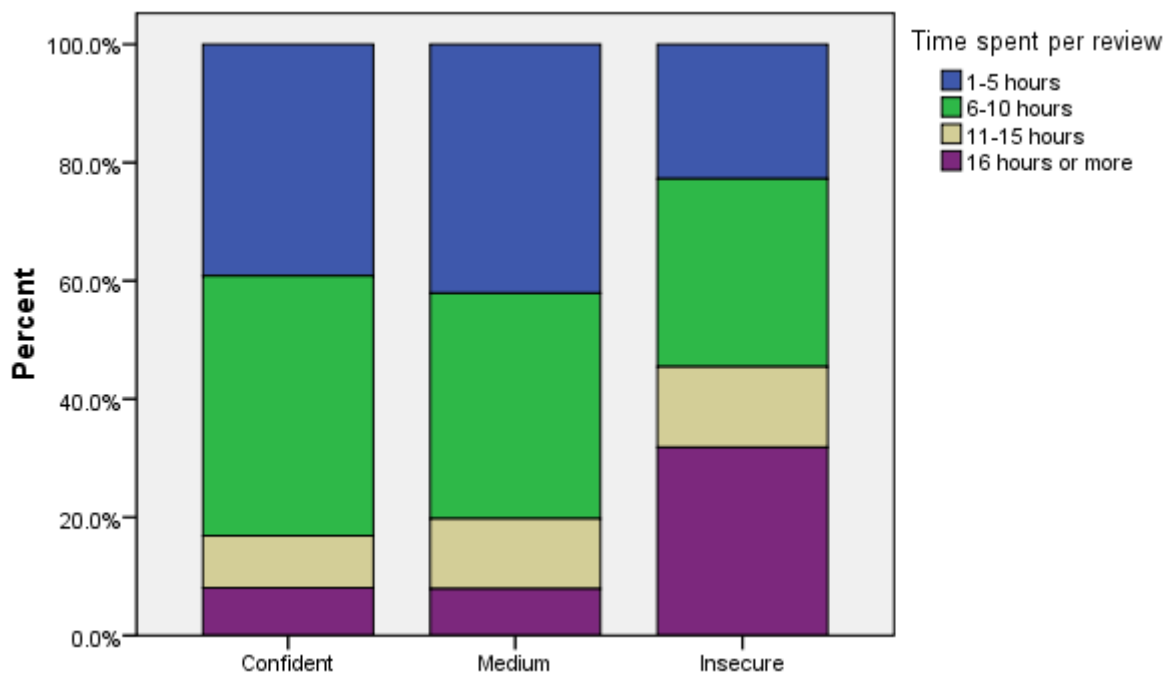
Confidence as a reviewer, and time spent per review[13]   N=371

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[13] The categories "confident" and "somewhat confident", and the categories "insecure" and "somewhat insecure" are merged.