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THE ARCTIC  
UNIVERSITY  
OF NORWAY

Faculty of Biosciences, Fisheries and Economics  
Tromsø School of Business and Economics and University Library

# Understanding researchers' intention and habit regarding publishing in open-access journals

*An extended reasoned action approach*

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**Lars Moksness**

*A dissertation for the degree of Philosophiae Doctor – December 2018*







## **Abstract**

*Purpose*—Scholarly publishing is the vessel for the dissemination of research articles. Contemporary scholarly publishing is achieved by two main models, open access (OA) and non-open access (non-OA). OA refers to articles that are available at no cost to the end-user; however, authors may incur a fee for accepted manuscripts. Non-OA articles are available at a cost, either via subscriptions or via individual downloads. Governments and funders are increasingly requiring research to be made openly available. This is causing friction in the research community, as the premise of OA is supported but not necessarily the practice. There are several reasons for this, and this dissertation provides four articles with the aim of improving the theoretical and empirical understanding of researchers' intention and scholarly publishing behavior within an extended theory of planned behavior: a reasoned action approach. The general approach included testing the importance of the theory of planned behavior (TPB) constructs and identifying and developing belief dimensions and constructs pertaining to individual differences. The approach also included a discussion and test of how habit strength (using alternative models) relates to OA and non-OA publishing intentions and behavior. Articles 1 and 2 provided the starting point by investigating how individual differences in innovativeness and personality affect the precursors (e.g., attitudes, perceived quality, and trust) of publishing intentions in a small sample of researchers. Articles 3 and 4 furthered the knowledge obtained in the previous articles and examined factors such as perceived quality and habit strength. The fourth article also assessed the effects of habit strength on both OA and non-OA publishing behavior.

*Design/methodology/approach*—All four articles employed web-based surveys as the main method for data collection. The first two articles relied on data from the Arctic University of Norway (UiT) (n = 322) and the final two articles on data from the major universities in Norway (n = 1588). The samples consisted of researchers who had published or were going to publish scholarly articles. Structural equation modeling (SEM) techniques were used in the analyses, and they were conducted in IBM SPSS and AMOS.

*Summary of the findings*—In the first article, the purpose was to understand how attitudes, norms, and perceived behavioral control influence the intention to publish

with open access (OA) and how personal innovativeness in information technology (PIIT) affects attitudes and perceived behavioral control (PBC). The results showed that attitudes contribute the most to intentions, followed by norms and PBC. All the factors influence intentions positively apart from PBC autonomy, which has a negative effect. Innovativeness was found to increase attitudes and reduce behavioral autonomy.

The purpose of the second article was to learn how agreeableness and conscientiousness influence trust and perceived quality and how these factors subsequently influence the intention to publish research articles via OA or non-OA channels. The main findings are that trust increases the intention to publish via OA and decreases the non-OA intention. Perceived quality has a positive influence on the intention to publish via non-OA and reduces the intention to publish via OA.

In the third article, the aim was to understand whether and how two factors of self-identity and three perceived quality factors influence the intention to publish in OA or non-OA journals. The study found that the perceived impact quality increases the intention to publish through non-OA while decreasing the intention to publish through OA. Content quality is only associated with non-OA journals. Perceived visibility increases the intention to publish with OA, and the opposite effect was found for non-OA. The career self has the strongest effect on the impact quality, and the work self contributes more to the content quality.

The intention of the fourth article was to explore alternative models of habit strength from the theory of planned behavior perspective (TPB) in the context of OA and non-OA publishing. Some of the findings are that OA habit strength reduces the intention to publish in non-OA journals and non-OA publishing behavior. Descriptive norms were also found to contribute to habit strength over and above attitudes.

*Originality/value*—This project was the first of its kind in Norway and provided valuable insights into the scholarly publishing behavior (OA and non-OA) in this country. The tradition in library and information system (LIS) research is to rely on descriptive studies with unclear or altogether missing theoretical perspectives or frameworks. Surveys in the area of OA publishing are rarely constructed with latent models in mind and may be subject to common method bias without the investigators' awareness. A handful of previous studies investigate the deeper attitudinal and behavioral structure

in scholarly publishing. However, to date, only the present work, to my best knowledge, takes into account a wider range of potential precursors of publishing intentions and behavior. The use of structural equation modeling is an advantage to increase the estimation of the quality of the measures and tests of structural relationships between theoretical constructs.

*Practical implications*—The present research provides a valuable foundation for policy makers, administrators and LIS researchers and has implications for the future of OS implementation and adoption. This study suggests that institutions can encourage OA publishing by expanding on the way in which information campaigns and presentations are run. Attitudes are important in this context; however, researchers operate within a social context as well, emphasizing the importance of normative influences. Norms are found to increase habit strength, and perceptions of quality are likely to be affected substantially by norms as well. For instance, the results from the national study show that perceived visibility is positively associated with OA but not perceived content quality and status. The latter two are only affiliated with non-OA. Efforts should therefore be made to unify the publishing models under the banner of scholarly dissemination in both daily and professional discourse. Strategies could also benefit from addressing publishing habits by exposing researchers to viable OA options for their research. Care should be taken not only to provide researchers with information about OA and OS on demand but to run recurring events with question and answer (Q and A) sessions at faculties and institutes. Recurring events will increase the probability that behavioral change interventions will be successful, particularly if habits are involved.

*Future research*—Future research could draw on the findings presented in this dissertation to refine and expand the constructs. A fruitful goal to pursue is the development of standard operating procedures (SOPs) for policy work (development, testing, implementation, refinement, and effect). The vast body of literature in psychology, marketing, and organizational studies is well suited to this purpose. Investigators could also develop procedures to test how researchers process the validity and reliability of scholarly articles under different conditions.

*Research limitations*—This research relied on self-reported cross-sectional data in its entirety. Alternative research designs are recommended to alleviate some of the

challenges of this methodology. These could include a mixed-method approach that includes experimental and qualitative aspects in concert with representative cross-cultural samples and a longitudinal survey design.

Keywords. Psychology, Open Access, Scholarly Publishing, Information Science



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Part 3. Articles.

- Article 1. Moksness, L., & Olsen, S. O. (2017). Understanding researchers' intention to publish in open access journals. *Journal of Documentation*, 73(6), 1149–1166. doi:10.1108/JD-02-2017-0019
- Article 2. Moksness, L., & Olsen, S. O. (2018). Trust versus perceived quality in scholarly publishing: A personality–attitude–intention approach. *College & Research Libraries*, 79(5), 671–684. /doi.org/10.5860/crl.79.5.671
- Article 3. Moksness, L., & Olsen, S. O. (2018). Perceived quality and self-identity in scholarly publishing. *Journal of the Association for Information Science and Technology*, under review.
- Article 4. Moksness, L., & Olsen, S. O. (2018). Exploring the effects of habit strength on scholarly publishing: A decomposed theory of planned behavior perspective. *Government Information Quarterly*, under review.

Note. The articles attached to this document are the accepted versions prior to publication (Articles 1 and 2) and the submitted version in the case of the articles with “under review” status (Articles 3 and 4).



## Part 1. Introduction

The aim of this dissertation is to contribute to the growing body of research investigating open-access (OA) and non-open-access (non-OA) publishing behavior and to present the role that attitudinal and behavioral theories play in explaining, measuring, and predicting this behavior. This will be achieved by introducing a theory-driven latent model approach to OA and open science (OS) research. Two surveys were conducted to provide the data for the articles presented in this dissertation: a pre-study at the Arctic University of Norway (UiT) and a follow-up study that was run nation-wide at the major universities in Norway. The surveys comprised several theoretical constructs. The sample consisted of researchers who either had or would publish scholarly articles.

Apart from specific sections pertaining to essentially Norwegian matters, the contents and topics of this dissertation may cater to a much wider audience. The document comprises several interrelated topics, ranging from the history of scientific dissemination, scholarly publishing, and its inherent challenges and technological development to social psychological theories and their applications within this context. The magnitude of topics and information is consequently significant, but it is arguably fruitful to provide a document that encapsulates and synthesizes pertinent information on both the traditional non-OA and the OA publishing model and their history to provide a comprehensive framework and understanding for the research articles presented later.

Addendum: September 6, 2018. Following the completion of this dissertation, the European Research Council (ERC) in concert with 11 other research funders launched a new initiative for OA requirements, the so-called “Plan S,” on September 3 (European Commission, 2018). Among other things, it will require researchers who are funded by these institutions to publish all articles as Gold OA. Hybrid OA will no longer be tolerated for recipients of funding, and processing charges will be capped. As such, some of the suggestions in this dissertation should be read in light of this new initiative. An accelerated transition towards open science is taking place, and this research is now, perhaps more than ever, relevant to aid in this transition.



## 1.1. Background

The dissemination of science started in earnest with seventeenth-century academic book publishing, which evolved at a later stage into the publication of articles (Weld, 2011). The world's first scientific journal, the *Philosophical Transactions of the Royal Society*, was founded in 1665, and some 90 years later, in 1752, members of the Royal Society of London formed a committee that would review papers slated for publication in the journal. There is some debate, however, regarding whether the Royal Society in London was actually the first to undertake peer reviews, since there are indications that the Royal Society in Edinburgh had implemented such a system two decades earlier (see Biagioli, 2002).

What and who is science for? The assurance of the scientific process is flexibility and the ability to adapt, to change, and to improve what needs improving: to strive for excellence. To facilitate change, one needs to be open to change and possess the ability and control to see it through to completion: to scrutinize the available information and expose the advantages and disadvantages that the changes may herald but still advance any change that may generate significantly more benefits than costs. Then, how are the benefits and costs evaluated? First and foremost, in the context of science, the tangible benefits of that venture are found everywhere. We make strides in medicine, architecture, engineering, design, pharmacology, psychology, astronomy, geology, politics, social development, and agriculture, to name but a few. Then we share this knowledge to build on what came before with the aim of developing what comes next. At the very core of this is the researcher, whose primary function is to generate ideas, progress those ideas to testable hypotheses, conduct the research, write up a paper, and finally select the best channel for distributing the research so that others may know about it, criticize it or applaud it, and ultimately learn from it. Publication is arguably one of the most critical steps, as this occurs when the work has been evaluated, stamped with a seal of approval if accepted, and made available to a wider audience.

Technological development throughout history has provided the tools to elevate and improve scientific dissemination. The pursuit of science has been costly, though, and often the privilege of the wealthy to indulge themselves in the latest developments from the natural world. The invention of the printing press enabled academic writings, among

other things, to reach a wider readership and in so doing democratized science and facilitated distribution. In many ways, it was a slow and cumbersome process, dictated by the constraints of the available technology, whereby pens and pencils, paper and postage, typing and typewriters, and correspondence with peers and publishers all happened at very different rates from the norm today. The requirements of the business models employed in the pre-Internet era were naturally different and reflected the demands of that time. These models have also evolved, to some extent, but still perhaps revolve around a way of thinking that is anchored to printed media (Larivière, Haustein, & Mongeon, 2015).

The current model accomplishes the task—scientists from all disciplines go through the rigorous motions associated with furthering the collective scientific knowledge by making it available for a larger audience. A scientific article is evaluated by peers in terms of validity, coherence, originality, and contribution to the collective scientific corpus before being accepted by a relevant journal and subsequently published. Not unlike a century ago, or half a century ago, a couple of decades ago, or even today, the motions and movements of the scientific process remain similar. From conceptualization to maturity, the scientific article may have an equally long and challenging life today, fraught with adversity and challenges, as it has had before. Although the process remains the same, and it delivers the results, it pays to reconsider and evaluate whether it is, indeed, taking full advantage of the tools at our disposal.

Publishing houses, publishers, and businesses in general are driven by a quest for profit, which is a natural state for any business and certainly not a bad thing, but few businesses operate with as large profit margins, often funded by public money, as some of the major publishers (Larivière et al., 2015). Fewer still rely on the goodwill of so many people to keep their comfortable profit margins, a topic that has already been a matter of debate (Bergstrom, 2001). An important reason for that is naturally the digital nature of many contemporary scientific publications, which in turn leads to a reduction of production and shipping costs. An important cost-saving feature for publishers nowadays is the “circle of gifts” with which universities provide publishers. The “circle of gifts” (Bailey, 1994, p. 9) refers to the system today whereby universities provide the training of researchers (most often governmentally funded), produce research, and quality control scholarly articles (peer review) at no or little cost to the publishers.

Subsequently, the research is sold back to the universities as journal subscriptions or as individual downloads with a price tag. This system appears to be unbalanced and uneconomical in the digital age, at least from the perspective of universities, yet it persists.

### 1.1.1. Digital communication—The advent of open access

Emerging technologies enabled a paradigm shift in scientific dissemination, but the question remains of whether today we fully utilize the possibilities that this promises. The emergence and development of open access was a result of globally networked computers, the Internet, and the World Wide Web in the 1990s. Open access was in many ways the logical evolutionary step for scientific communication, after PCs became connected globally and started speaking the same language (i.e., html protocol).

The early days of what would later become the Internet led to a major change in the way in which we communicate, not just for scholarly communication, as we well know. The *Electronic Journal of Communication*, which was one of the first peer-reviewed online open-access journals, was launched in September 1990 ([www.cios.org](http://www.cios.org)), even before the first web page was written. The world's first web page was written in October 1990, proclaiming the World Wide Web (W3) (World Wide Web Consortium) to be an "information retrieval initiative" with the aim to "give universal access to a large universe of documents" (the World Wide Web standard was released by Cern and Tim Berners-Lee in May 1991). Soon thereafter, the free peer-reviewed online journal *Bryn Mawr Classical Review* ([bmcr.brynmawr.edu](http://bmcr.brynmawr.edu)) was launched (November 1990). More free and online peer-reviewed publications followed.

A concept in the open-access vernacular, "self-archiving," was first proposed by Stephen Harnad in June 1994 and promptly termed "the subversive proposal" (Harnad, 1995), since it called for scholars (i.e., authors of "esoteric" writings) to archive all their writings freely online, thus causing quite a stir (e.g., "paper publications will die!"). Self-archiving refers to institutional data repositories in which scholars can deposit a manuscript version of an article, typically without it being peer reviewed. In 1994, it referred to the establishment of globally accessible archives for scientific writings. However, two decades earlier, the libraries of Stanford Linear Accelerator Center and Deutsches Elektronen Synchrotron initiated digital archiving of pre-print literature

(grey literature), which was known as the High Energy Physics, or the HEP, preprint network, which already had a considerable number of global users and hits per day in the 1990s.

Fast forwarding to the early 2000s, already one can see that the pace had quickened and several initiatives and conventions concerning open scholarship, open archives, and communication best practices had been conducted ([www.oad.simmons.edu](http://www.oad.simmons.edu)). A particular milestone was the Budapest Open Access Initiative (see [www.budapestopenaccessinitiative.org](http://www.budapestopenaccessinitiative.org)), launched in early 2002. In response to the development of scholarly communication and the demand to make research freely available to anyone with a computer and access to the Internet, guidelines were established by a small, but driven, coalition of the willing. In short, the initiative stated that, to achieve open access to peer-reviewed scholarly journal literature, it was recommended to provide open electronic archives that are accessible by search engines and other tools and, second, to launch a new generation of journals committed to open access. The initiative further stated that copyright should not be invoked to restrict access but to ensure permanent open access to all published articles.

Who owns what then? Do researchers own the rights to their own work when it is published? What if a manuscript is made available in an institutional repository and the author wishes everyone to use it and distribute it as they see fit? How does copyright work then? How did licensing and copyright laws and agreements fit with the growing digitalized information dissemination in the early 2000s? Many of us are familiar with “all rights reserved,” according to which basically the publisher retains most of the rights. Creative Commons (CC), founded in 2001, provided an answer to this question, with the aim of providing copyright licenses for free to the public, thus enabling the authors of esoteric writings to define which rights they reserved and which rights they waived. In December 2002, inspired by the open-source and free-software movements, the first machine readable licenses were launched ([www.creativecommons.org](http://www.creativecommons.org)), which allowed greater flexibility within the “all rights reserved” copyright but did not replace it. Now, it was possible for copyright holders to “easily inform others that their works are free for copying and other uses under specific conditions” (first paragraph, press release). The licenses consisted of “three layers” (a format still used to date): a simple and easy to understand summary (human readable), legal code (legal script and format),

and digital code (machine readable) ([www.creativecommons.org/licenses](http://www.creativecommons.org/licenses)). That said, some researchers still raised concerns about the idea that copyright somehow had to be relinquished “to the whole world” in the OA model and that it was far better to do so to a publisher (Anderson, 2004).

From then onwards, statements, initiatives, policies concerning scientific dissemination and other scholarly communications, summits, OA journals, and repositories were plentiful. Perhaps one of the more important events was the launch of the Directory of Open Science Journals, or DOAJ, at Lund University in Sweden in 2003 (with 300 open-access journals at the time). The (current) aims and scope of the DOAJ are to be a comprehensive database for “all open access journals and scholarly journals that use a quality control system to guarantee the content.” In short, “the DOAJ aims to be a non-stop shop for users of open access journals” ([doaj.org/about](http://doaj.org/about)). Today, the DOAJ contains more than 10,000 open-access journals covering all areas of science. Another major event that took place around the same time was the launch of what was conceptualized as the open-access counterpart to the elite journals (e.g., *Nature* and *Science*), namely the Public Library of Science (PLOS). *PloS Biology* was launched in October 2003 and has subsequently become the world’s largest journal (by volume).

### 1.1.2. Open access

The Internet and digital media have given us the means to change, or perhaps even to return to, the idea and practice of how science ought to be disseminated. Open-access literature is, as outlined, digital, online, free for all users, and not as restricted by most copyright and licensing regulations as the traditional publishing model. Its focus is on the dissemination of scholarly research via digital media, and it rests on the notion that information and knowledge should be available for all to use and not placed behind economic and legal barriers. Note that the term “open access” was not used until 2001, when the strategies in the Budapest Open Access Initiative (BOAI) were first outlined and specified how to achieve open access to scholarly journal literature. In a work published a few years later, Peter Suber defines open access as follows: “Open-access (OA) literature is digital, online, free of charge, and free of most copyright and licensing restrictions” (Suber, 2004, para. 1).

Open access is achieved, for example, by publishing articles in OA journals, journals that do not operate with subscription costs or charge for the downloading of individual papers. Another option is for the author(s) to buy an article by paying a publication fee/article processing charge (APC) in a traditional non-open-access journal, which is known as hybrid OA. A third, or supplementary option, is green OA, which means that an approved version of the manuscript is made available in an open-publication archive. Open archives, also called repositories, are often maintained by university libraries. They usually retain the last version of the manuscript before submission, or “pre-print,” that is made available. However, this version is not peer reviewed. A “post-print” version may also be made available in repositories, and this version is the final manuscript after review but prior to publication. Typically, a post-print article will not be made available immediately but will be subject to an embargo period lasting anything from 12 to 36 months depending on the journal or publisher.

A growing number of universities now operate with research funds to which scholars can apply to have the APC covered; however, often these funds do not support the hybrid OA option. To date, approximately 26% of the journals listed in the Directory of Open Access Journals (DOAJ) actually charge an APC, and the size of the fee varies greatly (Morrison, Salhab, Calvé-Genest, & Horava, 2015). In many cases, journals may waive the fee entirely if it poses a severe economic obstacle to an author. A common misconception concerning OA publication costs is the notion that it is fully an “author pays” model. This is misleading, as many journals do not charge an APC and a large number of these journals receive funding through other channels, such as advertising, sponsorship, grants and subsidies, and partnerships (for an overview of open-access income models, see Crow, 2009).

Suber (2012, preface) states that “OA benefits literally everyone, for the same reason that research benefits literally everyone.” Nevertheless, it is not only research articles that are being shared and made available for all; a concept enjoying increased attention is open science, in which not only are articles shared freely but also scientists can, for example, make their research data freely available (open science is an umbrella term that includes open peer review, methodology, data, source, and educational resources). Some authors even label it “the second scientific revolution” (Bartling & Friesike, 2014), the professionalization of knowledge creation being thought of as the first scientific



revolution. Open science holds great potential, for example for sharing data, as other avenues and research questions not initially thought of by the original authors can be explored by anyone with the desire to do so—dedicated amateurs and professionals alike. Naturally, this is not without challenges, as the bad habits of the former model may very well be transferred to the newer one, and even novel challenges may arise (article brokering, predatory publishing, etc.).

### 1.1.3. Open access in Norway

The 1990s witnessed the first few declarations concerning open access to data and research, but the first that was specifically tailored to a worldwide open-access campaign was the Budapest Open Access Initiative in 2001, or the BOAI, as briefly mentioned above. The original declaration from Budapest was co-signed by various individuals from Norway, many of them representing the major universities ([budapestopenaccessinitiative.org](http://budapestopenaccessinitiative.org)) and other learned societies.

In Norway, at the turn of the millennium, the debate revolved around raising the research output to an international level (Regjeringen, 1999, 2001; st.mld.nr. 39, 1998–1999; st.mld.nr 27, 2000–2001). The strategies emphasized international collaboration to facilitate this rise, and publications in international journals were seen as particularly important to elevate research to an international standard.

The focus shifted towards the ever-increasing costs of non-open-access journals in a later government white paper. It addresses the challenges connected with subscription-based journals, such as increased subscription costs draining library budgets and erecting an insurmountable price barrier, especially for users from developing countries. The development of openly available journals and repositories was advocated as a response to this problem (Regjeringen, 2005; st.mld.nr. 20, 2004–2005). At the time of the paper, roughly 800 OA journals were available, some of them already gaining some renown. It was, however, mentioned that this paradigm should be developed further in close collaboration with publishers, presumably to avoid licensing conflicts from publishing pre- or post-publication manuscripts in institutional repositories, as is also a matter of importance today. The paper further expresses the Government's interest in also making research that has already been funded by public money available electronically and freely. Note that the BOAI had already been in existence for more than

two years at this point, and how the distribution of science would actually be facilitated, not just that it should, was gradually becoming a matter of general discourse.

The Government's principal attitude towards open access was expressed some years later, in a 2009 white paper (Regjeringen, 2009; st.mld.nr. 30, 2008–2009). Recognizing that civilization to a large extent owes its successes to the insights generated through research, scientific discourse, and breakthroughs, the paper stresses the importance of such contributions being distributed to as wide an audience as possible. Governmentally funded research should be openly available, thus facilitating the optimal distribution of the research, the paper states. While being important to maintain academic freedom and allow researchers to choose their own venue for disseminating their research, it is also important to acknowledge that this freedom may hold the solution to realizing the potential for making research openly available. Objectively, where a paper is placed ought not to matter as long as it fulfills its purpose, that is, furthering knowledge by being read and used by scientists, professionals, and lay people alike. Systems that facilitate this transition should, however, be in place so that the open-access alternative does not cause any obstacles or disadvantages to researchers, the paper notes. Many universities and other funding bodies had implemented guidelines governing open access to their publications, requesting all research manuscripts to be made accessible in an institutional repository. At the time of publication of the paper, nearly all universities and university colleges in Norway either had, or had access to, an institutional archive. The access policy for these archives was uniform: the archives should provide open access to all users, including external or off-campus users.

The government rhetoric was sharpened a few years later, when recommendations were made for a requirement for fully or partially governmentally funded research to be made open access—through either the gold or the green model—in agreement with the publisher (Regjeringen, 2012; st.mld.nr. 18, 2012–2013). Additionally, establishing institutional funds for covering processing fees and having the Current Research Information System in Norway (CRISTin) negotiate terms with publishers for ensuring open access to the results of Norwegian research were highlighted as being important for promoting research. CRISTin is a cooperative effort under the Ministry of Education and Research and is chiefly concerned with research documentation and access to research information ([www.cristin.no](http://www.cristin.no)). It is clear that the policy is gravitating towards a

model in which publicly funded research will also be made freely available for the public that it was supposed to benefit in the first place. Academic freedom, which gives the individual researcher the freedom to choose where to publish, was maintained as a paragon in dissemination. The researcher is then free to chase vanity publishers while complying with this agreement by ensuring that an article version that corresponds to the published version is available in an open archive. This satisfies the criterion for ensuring open access to research results spawned from public money, but it somewhat hampers the transition to a full open-access model in that the established economic model is still supported. However, given that one goal is that research should be available for all, it is still an important step towards a truly open research environment.

In August 2017, the Ministry of Education and Research released new goals and guidelines concerning open access to research articles in Norway (Regjeringen 2017, 2017b). The overarching goal is that “all publicly funded Norwegian research articles should be made openly available by 2024” (p. 1, *ingress*). The guidelines include recommendations for establishing a national repository and the requirement for depositing articles in local or national repositories. The latter is a requirement to be counted in the performance-based funding schemes.

#### 1.1.4. Challenges

A positive effect of digitized archives, globally networked computers, and the Internet is that, as long as the infrastructure is in place, what is sent through that infrastructure incurs an extremely low cost. Naturally, this benefit is somewhat diminished by infrastructure maintenance and technical costs. However, not much work is needed for writing the necessary software to run a web page or a repository, maintain it, or reach a wide audience in a short amount of time, in comparison with a printed medium, such as a journal. Digital media are a cost-efficient and extremely well-suited channel for disseminating scientific articles and other forms of scholarly communication, though they are not without challenges.

##### 1.1.4.1. Lack of familiarity

It was already a matter of debate in the early days of open access (Goodman, 2004) whether this was indeed the right way to progress and what the fallout might be if all

scholarly writings were to be accessible to everybody at no cost. Some feared doom for printed media and publishers at large (Harnad, 1990). In an article from 1995, Forbes asks whether the European media company Reed Elsevier would be “the internet’s first victim,” a casualty of publishing going digital (See Doeble, 1998). This turned out to be just as accurate as the prediction that computers and the Internet would make us a “paperless” society. In reality, the leading subscription publishers appear to have sustained very little or no damage at all from open-access publications and are enjoying a steady increase in stock price performance (Aspesi & Luong, 2014).

Many researchers were in general positive and eager to disseminate their research to as large an audience as possible but also had doubts regarding quality, price, and peer review (Warlick & Vaughan, 2007); these doubts linger today. One of the major challenges to OA, presently and previously, is an apparent lack of understanding of what OA entails. Peter Suber stated that “my honest belief from experience in the trenches is that the largest obstacle to OA is misunderstanding. The largest cause of misunderstanding is lack of familiarity, and the largest cause of unfamiliarity is preoccupation” (Suber, 2012, preface). Scientists are, in his words, very busy and do not have the time to familiarize themselves with the particulars of open access. Preoccupation may not be the largest cause, but a lack of familiarity, in other words inadequate information, certainly creates hurdles. Decision makers, or researchers, arrive at ill-informed conclusions based on faulty or missing information. Still, arguments are made both for and against the open-access publishing model, sometimes based on misconceptions spawned from unfamiliarity and superficial processing of information. Some of these arguments, but not all, are entirely stereotypical but nonetheless pervasive in the debate surrounding open access (Kingsley & Kennan, 2015), and, if they are out there, they are shaping opinion. This is not surprising. As human beings, we are adept at forming and voicing strong opinions, which need not be based on much information, and we let these opinions dictate our lives, intentions, and behaviors.

#### 1.1.4.2. Lack of prestige

Great importance is given to a journal’s impact factor, a system that calculates the average of the number of citations in a journal over the last two years, which is subsequently used as a proxy for that journal’s quality and importance. For many

reasons, printed publications, or journals with a longer history in academia, are assigned a higher status and by extension become a more sought-after venue for the publication of research articles. These journals, then, attract some of the best minds in the business and some of the most cutting-edge research and receive a high number of submissions. A few of these articles will receive a very high readership and often be cited in subsequent research papers, thus inflating the impact factor for that journal further. Not all articles in a high-impact journal are cited as often—most articles are not cited at all—but the highly cited articles will raise the journal’s impact factor nonetheless. Review papers tend to be cited more often than research papers, thus boosting a journal’s impact factor further (The *PLoS Medicine* Editors, 2006).

In an environment in which data or scores vary greatly, the arithmetic mean is probably not the best indicator of central tendency, since it is not informative about variance, yet great significance is placed on the impact factor. Where something was published appears to be more important than what was published. The proof of the pudding is in the eating, but apparently the proof of an article is in the watermark. Arguably, high-prestige journals attract great research—but great research is by no means only found in high-ranking journals. Why scholars, free thinkers, opt to perpetuate such a system is likened by some to intellectual prostitution (Frey, 2003). An important counter-argument is that the “traditional” way of publishing has an established economy and funding for projects is often closely connected to prestigious publications. This is evident from the journal ranking system in Norway, in which the highest-ranked journals generate more “publication points” and hence more funding for the institution. OA publications are downloaded and cited more often than non-OA publications (Atchison & Bull, 2015), but if an OA journal lacks those highly cited papers, then the impact factor of that journal will necessarily also be low. Does that mean that the quality of the articles is also low? Not necessarily, although journals of lesser quality and scope will probably accept and publish what is deemed to be a sub-standard manuscript by other journals. Just having a low impact factor, however, does not preclude high-quality content. A journal’s impact factor ought not to be the primary measure of content quality; the contents should be allowed to speak for themselves.

#### 1.1.4.3. Lack of trust

Another issue of concern is the relative abundance of unsavory characters in the online and digital publishing world—people trying to make some quick money from article processing charges with the promise of fast peer review and high acceptance rates. Typically, these “journals” also have a very high publication rate. These operators are called predatory journals or publishers and are in many ways more an indicator of the relative ease of constructing the semblance of an electronic journal/web page than a symptom of the open-access model per se. Note the two different terms used to refer to this business model. The term “predatory publisher” refers to a publisher that owns anything from a couple of journals to a fleet of journals, and “predatory journal” typically refers to a single publication (Shen & Björk, 2015).

Some people, such as Jeffrey Beall, an associate professor and academic librarian at the University of Colorado in Denver, have worked to seek out these practitioners and inform the public about such questionable journals (see Beall, 2012). It is, however, ultimately the researcher’s own responsibility to use some inkling of critical thinking skills when choosing a journal for publication. As Beall (2012) states: “scientific literacy must include the ability to recognize publishing fraud.” According to Beall, predatory publishers force legitimate OA publishers to promise shorter submission-to-publication times, weakening the peer review process. Why? As there are publishers of questionable moral standards, there are also scientists of equally skewed moral compasses who do not mind plagiarizing, either in part or completely, their own or others’ work to gain tenure or fill their publishing quota. If a venue for publishing with both scant quality control and scant peer review exists, and it will accept more or less any manuscripts, then those venues will also be used by people who submit questionable manuscripts. Consequently, a market exists for the predatory publishers, partly because some people are either too gullible to know they are being duped or perhaps because they are under so much pressure that cutting corners becomes a viable option. If under pressure, it could be easy to overlook the warning signals when dealing with some of the aggressive marketing tactics employed by some of these publishers. Often the cost of having an article published is hidden and the author is only billed upon the acceptance and subsequent publication of the article. If a market was not present, these publishers would not have found a foothold in the first place, which the numbers also clearly



indicate. According to Retraction Watch (McCook, 2015), the number of articles published by predatory journals ballooned from 53,000 per year in 2010 to 420,000 per year in 2014 and is showing no signs of slowing down.

#### 1.1.4.4. Digital fallout

Predatory publishers' mere existence and lack of transparency are a major concern, but they are not the only fallout from publishing going digital and an "author pays" publishing model. When the fees can be around the 2000 USD mark for an article (or more), with a seemingly endless supply of scientists needing to publish their papers, it is no surprise that some find a way to exploit this as well. Downright criminal scams akin to "phishing," familiar from other digital media, traverse the gap from one medium to the other, following the money and capitalizing on the poor judgment of some researchers. A couple of years ago, some reputable European journals fell prey to such a scam when criminals stole journals' identities and set up counterfeit websites that were hardly distinguishable from the real ones (Butler, 2013). When scientists, in good faith, submitted their manuscripts and paid the APCs to what they believed were legitimate journals, their article processing charges were instead funneled to somewhere in Armenia, in all probability to the scammers' own bank accounts.

These were not isolated incidents, however. An ever-growing list of hijacked journals, also composed by Beall, shows that this is not a problem that will vanish anytime soon. The list is regularly updated as new incidents are reported, for instance the case of an MIT journal's hijacking. The hijacked version used a somewhat different title from the original, but it was similar enough that potential authors may fall victim to the scam. The original journal is subscription based, but the hijacked version follows the gold open-access model, presumably with the intention of making money on the article processing charges and even article sales (Beall, 2015).

## 1.2. Conceptual framework discussion and research issues

The purpose of this dissertation is to improve the understanding of researchers' OA and non-OA publishing behavior and provide investigators with a set of tools to aid in policy development. This will be achieved by empirically testing and explaining how intentions to submit research articles to OA and non-OA journals are influenced by attitudes,

norms, perceived capacity and autonomy, individual personality traits, and self-identity. In addition, the role of habit strength is included to challenge our understanding of whether and how academic publishing is a reasoned, intentional, and calculated action or more a matter of automatic behavior. The conceptual framework follows a personality/value–attitude–intention–behavior structure, and in the following a short discussion of the theoretical framework and the selection of motivational factors used in this study are presented.

The TPB is by no means the only conceptual framework that can be utilized in the context of scholarly publishing research. In the first article, a brief examination of other potential candidates was presented. Perhaps the two most widely recognized models that could fill this role are the TPB (Ajzen, 1991) and the technology acceptance model (TAM) (Davis, 1989). The TPB proposes that the intention to perform a behavior is determined by attitudes, perceived norms, and PBC. The TPB has experienced extensive use, including to explain and predict several categories of behaviors, such as health-related behaviors, consumer behavior, environmental behavior, political behavior, organizational behavior, and job behavior (see Fishbein & Ajzen, 2010). One previous empirical study (Park, 2009) uses the TPB as a general framework for studying OA publishing. The TPB and its predecessor, the theory of reasoned action (TRA) (Fishbein, 1979), has been further refined and unified into the reasoned action approach (RAA) (Fishbein & Ajzen, 2010); however, the basic structure remains the same. Throughout the dissertation, the abbreviation “TPB” will be used as it is the most familiar.

The TPB approach postulates that expressions of certain beliefs (i.e., attitudinal, normative, and control) influence behavioral intentions and subsequently the probability of performing an action or behavior. The three direct determinants of behavioral intention are the following. First, a person’s latent disposition or attitude towards the behavior in question is construed as an instrumental (anticipated positive/negative consequences) and an experiential (perceived positive/negative experiences) aspect. Second, the perceived normative pressure itself and from significant others (injunctive norm/descriptive norms) also influence the intention to perform the behavior. How easily a behavior can be performed, in terms of capacity (belief in one’s own ability and capability to perform the behavior), autonomy (perceived degree of control), and actual control (relevant skills, abilities, and

facilitators/inhibitors to perform a behavior), constitutes the third and final determinant of intention within the TPB (Ajzen, 1991; Fishbein & Ajzen, 2010).

Beliefs are important in attitude theory and are suggested to be the basic building blocks of attitudes (Eagly & Chaiken, 1993, p. 103). They can be defined as the associations and linkages that people establish between the attitude object and the expected values of various attributes ascribed to the attitude object. This view implies that individuals form attitudes by learning what the characteristics of the object are. Within the TPB, the general attitudinal, normative, and control constructs can be thought of as expressions of specific beliefs or assumptions associated with the attitude toward an object, perceived social pressure, or control aspects (Fishbein & Ajzen, 2010). For instance, a researcher who expresses that “OA articles are of inferior quality” is likely to possess a negative attitude toward OA journals, and thus experience a reduced likelihood of forming an intention to submit articles to a journal of this kind. Similarly, a statement such as “I choose a journal to publish in based on the impact factor” is likely to reflect a researcher who is influenced by some form of peer pressure or social expectations *and* one who prefers traditional non-OA outlets for publishing. According to Fishbein and Ajzen (2010), then, whereas an attitudinal belief focuses on the expression of positive or negative aspects of an object or behavior, the normative consideration concerns the performance of the behavior within the same context. The way in which an underlying belief shapes the subsequent perception of control is also evident from the statements “I do not enjoy learning something new on the computer” and “I will not pay to have an article published.” In this event, both perceived behavior capacity and autonomy are likely to be affected and subsequently determine whether an intention is formed.

The first paper viewed OA publishing behavior as a special case of adopting new information technology, and thus the technology acceptance model (TAM) and the unified theory of acceptance and use of technology (UTAUT) were evaluated for inclusion in the study (Davis, 1989; Venkatesh, Morris, Gordon, & Davis, 2003). Previous work on the adoption of OA (Dulle & Minishi-Majanja, 2011; Khalili & Singh, 2012) uses these frameworks. However, due to the increased flexibility and explanatory power of the TPB, it was selected to constitute the framework for the research. The TPB has been expanded over the years with different adaptations of attitudinal or evaluative, normative, and control variables (Conner & Armitage, 1998). Within this framework, personality or

other traits and values are considered to be more general and stable constructs and thus influence the attitudinal, normative, and control aspects (Ajzen, 1991; Fishbein & Ajzen, 2010).

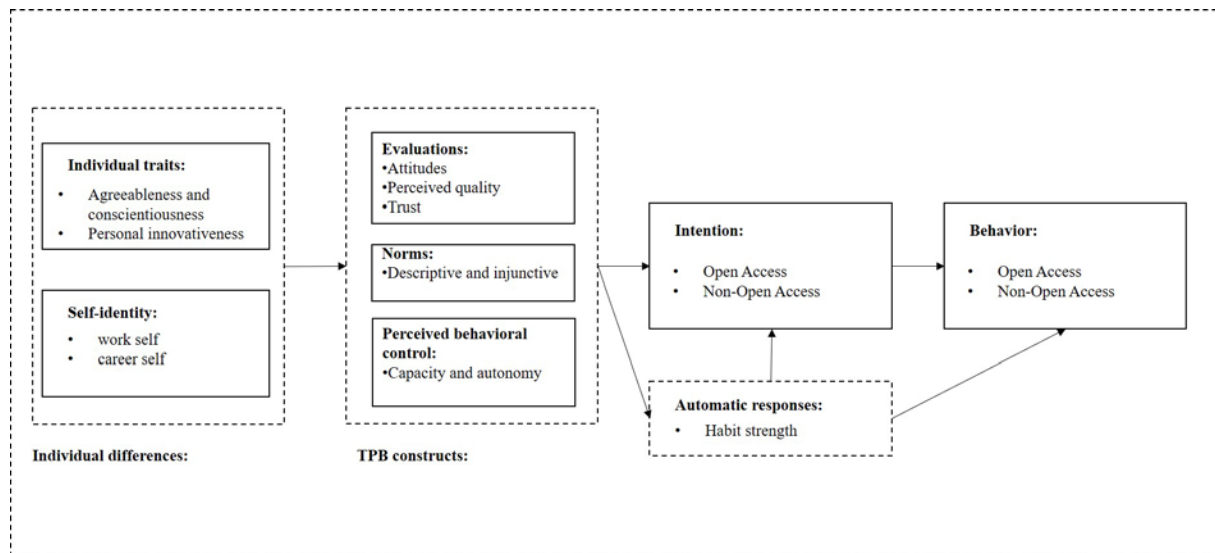
In the following sections, the constructs employed in the studies will be presented in more detail. The sections address each group of concepts in turn, starting with the dependent variables (intention and behavior) and followed by evaluations, norms, and perceived behavioral control. The final sections pertain to individual traits and self-identity. OA habit strength is tested at various levels in the model and is in this regard represented outside the evaluative factor group in Figure 1. Figure 1 presents the relationships between all the constructs included in this dissertation.

The overall aim of this dissertation is to improve the theoretical and empirical understanding of researchers' intentions and scholarly publishing behavior (OA/non-OA) within an extended TPB framework by using a best-practice analytical procedure for research development and strategy. This includes:

- a. To test the relative importance of the TPB's general evaluative constructs, attitudes, norms, and perceived behavioral control in explaining intentions to publish in OA journals.
- b. To identify, discuss, develop, and test salient beliefs and belief dimensions to contribute to a deeper theoretical and practical understanding of OA adoption/scholarly publishing intentions within a TPB framework.
- c. To identify, discuss, develop, and test the role of individual differences (personality and self-identity) and their contribution to the understanding of the salient evaluative dimensions within the model.
- d. To discuss and test whether and how habit strength (alternative models) is related to OA and non-OA publishing intention and behavior.
- e. To use structural equation models (SEM) to validate constructs and test structural relationships within the extended TPB and the theoretical framework.

This dissertation contributes to the existing literature about OA publishing by testing and answering those research questions. This was achieved within one integrated conceptual framework with a nationwide sample of researchers utilizing validated methods and analytical procedures.

**Figure 1.** Conceptual model.



### 1.2.1. Publishing behavior and intentions

Within the TPB, intentions are conceptualized as a predictor of future behavior but also display a strong correlation with retrospective measures of behavior (Fishbein & Ajzen, 2010), suggesting that one is an acceptable predictor of the other. For instance, Dulle and Minishi-Majanja (2011) and Khalili and Singh (2012) report a strong relationship between the intention to publish OA and a retrospective measure of OA publishing behavior. Given that intentions remain a strong predictor of behavior, this suggests that, for researchers who reported having published in OA journals before, their future intentions are a strong indicator of repeating this behavior.

Publishing research articles is an infrequent behavior and is consequently challenging to measure. Whether a researcher submits an article to an OA or a non-OA journal is likely in many instances to be subject to cognitive evaluations emanating from beliefs about the action, including attitudes, but also behavior that falls outside of the evaluative realm, such as routine behavior or habits. Specifically, Fishbein and Ajzen (2010) cautioned that, although the instigation of novel behaviors may indeed be the result of

overt cognitions (e.g., researchers searching for new and alternative OA journals, locating funding for APC, etc.), this does not necessarily mean that all intentions are cognitive events.

The intention to submit to a specific journal is a decision made well in advance of the actual event, and researchers' intentions regarding submitting to either an OA or a non-OA journal are likely to remain stable unless the article is rejected and must be resubmitted (Özçakar, Franchignoni, Kara, & Muñoz, 2012). Intentions should therefore be a sufficient indicator of whether a researcher will submit to OA journals or not. Intentions are defined as "indications of how hard people are willing to try, of how much of an effort they are planning to exert, in order to perform the behavior" (Ajzen, 1991, p. 181). Typically, a strong correlation between intentions and behavior is found in TPB studies (Armitage & Conner, 2001). Several studies, investigating a wide array of topics over the years, successfully utilize the intention to perform a behavior as the ultimate dependent variable (Fang, Shao, & Lan, 2009; Liao, Chen, & Yen, 2007; Venkatesh et al., 2003; Wu & Chen, 2005).

Typically, the dissertation relies on intentions as the ultimate dependent variable (Articles 1, 2, and 3). However, an alternative model that includes behavior (retrospective) and habit strength is included in Article 4.

## 1.2.2. Evaluations

### 1.2.2.1. Attitudes

The definition of attitudes used throughout this dissertation is built on the work by Fishbein and Ajzen (2010), in which an attitude is defined simply as "a latent disposition to respond with some degree of favorableness or unfavorableness to a psychological object" (p. 76). Thus, attitudes within this research context (Article 1) were conceptualized as "researchers' positive or negative evaluations of submitting their articles to an OA journal" (p. 1152). In Article 1, recommendations for constructing the attitude factor were followed and the initial analyses confirmed the cognitive and affective subscales, thus merging into one attitudinal factor. Although the subsequent survey included affective items, they were later, on theoretical and empirical grounds, removed and the cognitive subscale of the attitudinal component was retained for Article 4. The rationale underpinning this decision was that attitudes toward submitting

articles are likely not to be affective in nature (e.g., pleasant or unpleasant) but rather are cognitive (e.g., useless or useful).

Consequently, attitudes toward submitting articles to OA journals are considered to be the primary and most robust determinants of intentions (Dulle & Minishi-Majanja, 2011; Khalili & Singh, 2012; Masrek & Yaakub, 2015). Indeed, most studies that use a TPB framework find that attitudes are the foremost predictor of intentions (Armitage & Conner, 2001; Fishbein & Ajzen, 2010). The premise for OA attitudes is that the more favorable the attitude, the stronger the intention to perform the behavior. To learn more about the impact of OA, several studies have been conducted over the years to gain a broader understanding of researchers' attitudes and practices concerning OA adoption (e.g., Dallmeier-Tiessen et al., 2011; Rodriguez, 2014; Warlick & Vaughan, 2007; Xia, 2010). Xia (2010) notes that, even though familiarity with OA is increasing and attitudes are equally becoming more positive, they apparently do not translate into action equally often. This is also evident from the study by Dulle and Minishi-Majanja (2011), in which the influence of attitudes on intentions is confirmed, although intentions do not have any effect on behavior. Accordingly, Articles 1 and 4 hypothesized that attitudes have a significant and positive effect on the intention to publish OA.

As previously mentioned, attitude theorists, such as Fishbein and Ajzen (2010), maintain that attitudes are the expressions of an underlying belief about an object or action. Beliefs represent all the information that people have in this instance and constitute the foundation of their subsequent favorable or unfavorable attitudes. These beliefs can be conceptualized as the associations or linkages that people establish between the attitude objects and their various attributes. Although people can form many beliefs about something, not all of them are necessarily active at once. Salient beliefs are "beliefs about the object that come readily to mind" (Fishbein & Ajzen, 2010, p. 99) and constitute the primary contributors to attitudes. The activation of salient beliefs is typically not effortful and can happen without conscious awareness. Fishbein and Ajzen (2010) suggest that only a limited number of beliefs are salient at any given time and that their evaluative component is activated more or less automatically.

Within the context of this dissertation, salient beliefs were extracted from the extant literature on OA attitudes, adoption, and behavior (e.g., Rowley, Johnson, Sbaffi, Frass, &

Devine, 2017; Tenopir et al., 2015; Togia & Korobili, 2014). For instance, Togia and Korobili (2014) find that common beliefs affecting researchers' OA attitudes are associated with perceived low quality, inferior peer review, negative views of author pays models, low impact, low readership, and a general distrust toward OA. As such, one may surmise that any discussion that concerns scholarly publishing and OA may render any of these beliefs salient. Subsequent favorable or unfavorable attitudinal evaluations could then manifest themselves both as an expressed attitude and as a perception of quality and thus make separate contributions to intentions. Bear in mind that, whether or not these beliefs are an accurate representation of reality is of lesser importance, the evaluative component will still be activated (Fishbein & Ajzen, 2010). This is evident from the misconceptions and erroneous beliefs and attitudes about OA journals and content commonly reported in the literature about scholarly OA publishing (Rowley et al., 2017; Tenopir et al., 2015; Togia & Korobili, 2014; Watkinson et al., 2016). This study argues for two relevant belief-based attitude or evaluative constructs, perceived quality and trust. The perceived quality construct is sub-divided into three distinct belief-generated factors, termed *journal impact*, *visibility*, and *content quality*.

#### 1.2.2.2. Perceived quality

A recurring theme in the discussion about scholarly publishing, particularly in the context of OA, is quality—or more accurately a set of indicators that determines the perceived quality of OA journals (Knight & Steinbach, 2008). Recurring arguments against publishing in OA journals concern perceptions about unreliable peer reviews and the lack of prestige concerned with publishing in low-impact-factor journals (which OA journals often are) (Togia & Korobili, 2014). Perceived quality was initially defined (Article 2) as “the criteria researchers deem important when selecting a publication outlet.” This definition was expanded and refined in Article 3 of this dissertation and consequently viewed as “as a global concept pertaining to researchers' subjective evaluation of indicators which determine whether a journal is appropriate for submitting research articles to” (p. 6). These criteria were conceptualized in Article 2 as representing properties of the journal that include the impact factor, the elevated status for researchers who publish there, and an evaluation of the overall quality of the journal. Based on the findings from Article 2 and further literature studies, the perceived quality construct was expanded and refined. The final perceived quality measure thus included



three distinct factors, termed *perceived journal impact* (e.g., impact factor and status), *perceived visibility* (e.g., a wide audience and fast turnover), and *perceived content quality* (e.g., the journal publishes articles of good quality and offers reliable peer review).

It should be mentioned that, although the impact factor (IF) is merely a proxy for quality and does not correlate with the actual quality of the *individual* articles in any given journal (Flemming, 2012; Lozano, Larivière, & Gingras, 2012; Opthof, 1997), it is nevertheless used diligently for this purpose (Catling, Mason, & Upton, 2009; Seglen, 1997). Relying solely on the IF in quality assessment is thus likely to produce a biased evaluation of the individual contributions of the journal in question (Hegarty & Walton, 2012). Although the impact factor is objectively unsuited to measuring journal quality, it remains a suitable subjective measure, as it reflects researchers' attitudes. The IF, however, is merely one quality indicator that determines whether a researcher perceives a journal to be attractive to publish in, and some studies suggest that it is even perceived as an inferior indicator compared with whether an article receives proper review or not (Tenopir et al., 2015). Other studies, however, find that the IF is correlated with a subjective evaluation of quality (Saha, Saint, & Christakis, 2003). Other indicators are associated with the access type, reliability of review, acceptance rates, reputation, and status and prestige (Chang, 2017; Dulle & Minishi-Majanja, 2011; Khalili & Singh, 2012; Knight & Steinbach, 2008; Warlick & Vaughan, 2007).

Article 2 utilized a single-factor measure termed *perceived quality* with hypothesized direct effects on two dependent variables, the intention to submit to OA journals and the intention to submit to non-OA journals. Specifically, it was hypothesized in Article 2 that perceived quality has a significant and *negative* effect on the intention to submit articles to OA journals while contributing *positively* to non-OA intentions. Similarly, in Article 3, it was expected that the *journal impact* factor would contribute negatively to OA intentions and positively to non-OA intentions.

Another important attribute that researchers consider is that their research articles are *visible* to the right readership. Visibility enables further use, either by being read or by being cited in someone else's research. Although studies show that most research papers are never cited, many of them can still have been read (Larivière, Gingras, &

Archambault, 2009). Article 3 therefore assumed that an article's visibility potential, as measured by three indicators (audience, turnover, and communication), should function as a determinant of the intention to submit research articles to either OA or non-OA journals. In this instance, OA journals hold the advantage given that arguably one of the publishing model's more prominent features is the visibility of published articles (Wang, Liu, Mao, & Fang, 2015). However, visibility is not necessarily a strong enough reason to choose OA over non-OA, as research indicates (Chang, 2017). In this regard, it was hypothesized in Article 3 that *visibility* would significantly increase OA intentions while decreasing non-OA intentions.

The final perceived quality factor conceptualized and tested in Article 3 was *content quality*. Inextricably linked to a journal's impact and potential visibility is the quality of the articles that it publishes, the lack of which has been a recurring criticism, albeit unfounded, of OA journals (Warlick & Vaughan, 2007; Xia, 2010), particularly as far as acceptance rates and peer review are concerned. In the early years of OA, researchers worried that sub-standard journals would contribute to the erosion of science by accepting and publishing sub-standard research (McCabe & Snyder, 2005). The so-called predatory journals, however, are a legitimate target for this criticism. Predatory journals exploit the author pays model (APC) and are not overly concerned with publishing quality articles (Shen & Björk, 2015). The goal is to achieve unrealistically fast turnover to increase profits. However, predatory journals assume a mantle of being OA and thus their unsavory reputation spills over to legitimate OA journals, contributing to an overarching concern with everything OA. If researchers publish in such a journal, their publication resume will be forever tarnished. According to Aaker (2009), perceived quality is crucial in such an environment. Actual quality, that is, good-quality OA journals, is not sufficient: consumers/researchers must also *perceive* the quality to be good. Consequently, if researchers believe that a journal offers poor review and an inconsistent and low-quality publication record, they are likely to refrain from submitting articles to it.

As such, it was hypothesized in Article 3 that *content quality* would significantly decrease the intention to submit to OA journals while significantly increasing the intention to submit to non-OA journals.

### 1.2.2.3. Trust

As previously noted in relation to the challenges for OA publishing, a lack of trust is an important inhibitor of the adoption of this publication model (Knight & Steinbach, 2008; Tenopir et al., 2015; Warlick & Vaughan, 2007; Watkinson et al., 2016). The second article of this dissertation built on the definition of trust proposed by Mayer, Davis, and Schoorman (1995), whereby trust is “the willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action important to the trustor, irrespective of the ability to monitor or trust that other party” (p. 712). This definition immediately illuminates the importance of trust in relationships in which the parties are not in direct face-to-face contact, such as when engaging in various online behaviors (Kim, Ferrin, & Rao, 2008; McKnight, Choudhury, & Kacmar, 2002), including academic journals (Tenopir et al., 2015). The following definition of trust was therefore suggested: “an evaluation of the reliability and trustworthiness of OA and non-OA articles and outlets.” The intention was to capture the notion that, when researchers evaluate a potential publication outlet, they scrutinize both the journal and its products. In a recent review contrasting OA with non-OA publishing, the author confirms the lingering distrust among academics concerning the perceived substandard reliability, quality, and peer review of OA journals (Cuschieri, 2018). However, Cuschieri notes that the contemporary OA publishing landscape is by no means the same as it was and that many OA journals now engage in equal, if not more, rigorous peer review than their non-OA counterparts.

Trust has played a central role in the evolution of the Internet and digital media among researchers and the public alike (McKnight et al., 2002; Nicholas et al., 2014) and is considered to be crucial in online IT adoption (Gefen, 2002). The transition of scholarly publishing from print to digital left many uncertain regarding the future and survivability of traditional publishing (Odlyzko, 1995), fearing that the Internet would render them bankrupt. Although that worry proved to be unfounded, skepticism arose quickly again with the introduction of OA. Although inextricably linked to the relative novelty of the technology at the time, distrust of OA has lingered (Watkinson et al., 2016). Typical concerns relate to the low impact factor of many OA journals compared with that of non-OA journals (Hall & Page, 2015), rapid and thus low-quality peer review (Furnival, 2010), predatory publishers (Beall, 2012; Vinny, Vishnu, & Lal, 2016), and

article processing charges (APCs) (Togia & Korobili, 2014). Naturally, a consequence of accepting low-quality articles and churning them out with little or no peer review is that any results or predictions made in them cannot be trusted. This distrust, then, would also extend to the journal or publisher responsible for the articles. Trust is widely investigated within the paradigm of online or web-based activities (Gefen, 2002; Kim & Peterson, 2017), including perspectives that are constructed around the TAM or TPB (Wu, Zhao, Zhu, Tan, & Zheng, 2011; Wu & Chen, 2005).

It was hypothesized that trust in OA is a necessary hurdle to overcome and thus would have a significant and positive effect on the intention to submit articles to OA journals.

### 1.2.3. Norms

The second determinant of intentions within the TPB framework is social norms. According to Fishbein and Ajzen (2010), norms represent the social pressure that a person experiences in relation to performing a behavior. This social pressure can be either injunctive or descriptive, which translates into what people perceive that others expect from them and what they see significant others do. Many studies define and measure norms as perceptions of accepted social rules and codes of conduct (Cialdini & Trost, 1998), in addition to the expectations emanating from significant others in relation to these behaviors (Rivis & Sheeran, 2003). Norms are found in several studies to exert an influence on intentions (Armitage & Conner, 2001). The influence of norms in the context of OA is also expected to be significant. For instance, Migheli and Ramello (2013) find that social norms influence OA adoption differently according to discipline.

Academia and researchers' behavior are heavily affected by norms, expected behaviors, or codes of conduct (Braxton, 2010). Also consider the tendency among publishers to accept only "positive" results and original findings, indirectly leading to what some have termed "a reproducibility crisis" (Baker, 2016; Grimes, Bauch, & Ioannidis, 2018). Perhaps not unfamiliar to academics is the "publish or perish" imperative, which implies that, to be a successful, or even accepted, researcher, one must conduct research and disseminate the results (Neill, 2008). An implied descriptive norm in this regard is the tendency to gravitate towards publishing in high-ranking and desirable journals, especially if the journal is acknowledged by peers and significant others (Migheli & Ramello, 2013, 2014). A likely reason for this is that high-ranking publications act like a

conduit to status and prestige, not just the affirmation of being a capable researcher. Importantly, and especially in relation to the relatively low status of OA publications compared with non-OA publications, there is an expectant positive effect on securing tenure or promotion (e.g., Togia & Korobili, 2014). As such, social normative influences are considered to be a significant predictor of the submission of articles to OA or non-OA journals.

The effects of the normative component in relation to intentions to submit to OA journals has been hypothesized in previous studies (e.g., Dulle & Minishi-Majanja, 2011; Khalili & Singh, 2012; Park, 2007). Park (2007) speculates that the reason for the lack of support of the normative factor was that the instrument did not assess publishing policies or evaluation systems. However, a potential solution incidentally may be the one ventured by Khalili and Singh (2012), whereby the normative factor predicts self-reported OA publishing behavior: in other words, the descriptive aspect of the normative construct. The first paper of this dissertation advocated the decomposition of the normative construct, recognizing possible confounding if assessed as a singular dimension. Expanding on this reasoning, it becomes evident that, in terms of influencing intentions to submit articles to OA journals, whether a researcher feels obliged to submit to a specific journal or whether he or she does so of his or her own volition, that is, by conforming to significant others' behavior, is potentially a wholly different process.

As such, this dissertation contributes to the existing literature by testing whether and how a two-factor solution of injunctive and descriptive norms would significantly and positively affect OA intentions individually.

#### 1.2.4. Perceived behavioral control

The concept of perceived behavioral control (PBC) considers the availability of skills, opportunities, and other resources required to perform a behavior as well as the possible barriers to be overcome (Ajzen, 1991). PBC was added to the TRA to explain behavioral situations that may not be under complete volitional control (Ajzen, 2002a; Fishbein & Ajzen, 2010). Several different terms are used to measure control across studies. These include perceptions of control, self-efficacy, locus of control, and personal control (Venkatesh et al., 2003), whereas capacity and autonomy are fairly common

(Fishbein & Ajzen, 2010; Sparks, Guthrie, & Shepherd, 1997). PBC in Article 1 was defined as “researchers’ evaluation of own capacity or skill to submit research articles to OA journals (capacity), and whether performing this action is perceived to be completely up to them (autonomy)” (p. 1154). It is important to note that Fishbein and Ajzen (2010) draw a distinction between actual control and perceived control given that actual control is challenging to measure and it is the perception of control that influences intentions. In the context of scholarly publishing, this means that the intention to submit an article to a journal is also determined by researchers’ ability to locate a journal, format the paper, provide funding (APC), and so on and by whether doing so is within their skillset or control.

Behavioral capacity in this context is relatively straightforward to grasp; however, behavioral control, or autonomy, deserves further elucidation. A matter that arguably affects researchers’ perceived control could be high article processing charges (APCs) combined with a lack of institutional funding, forcing researchers to choose other options if they wish to pursue publication in an OA, especially if the target journal only offers hybrid OA. The norm among institutional funds (in Norway), and increasingly among other funding bodies, is the requirement and support for only gold OA (STIM-OA, forskningsradet.no). In this case, behavioral autonomy may actually reduce the intention to publish in OA journals even though the perceived capacity is positive. It becomes apparent that the PBC construct in this particular research context is likely to provide erratic results due to situational and contextual variations in, for example, funding and publishing policies, despite Fishbein and Ajzen’s (2010) argument that a factor containing both dimensions may display good internal consistency. The idea that the PBC subscales may produce disparate results is by no means new (Sparks et al., 1997). Indeed, the measurement-related uncertainty regarding the veracity of a single PBC construct in developing a model for assessing OA publishing intentions is also evident in the extant research literature on OA publishing (Dulle & Minishi-Majanja, 2011; Khalili & Singh, 2012; Park, 2009).

The somewhat disparate results of PBC-related constructs emanating from the research literature prompted some uncertainty in the hypothesis development in Article 1, whereas PBC capacity was hypothesized to contribute positively to OA intention. The direction of PBC autonomy, on the other hand, was left undetermined and only

hypothesized to be significant. Thus, this study contributes to the existing literature by exploring whether and how assessing a two-factor solution of PBC captures effects on OA publishing intentions that otherwise would be lost.

In Article 4, an argument was put forth for decomposing the TPB and utilizing only the capacity/ability subscale of PBC. Consequently, PBC capacity was tested in a baseline TPB model alongside descriptive norms and cognitive attitudes. Further testing of alternative models included added habit strength at various levels.

#### 1.2.5. Habit strength and routine behavior

Intentions to perform a behavior can reach a point at which little or no conscious activation or deliberation is required to carry out the behavior—it becomes routine (Fishbein & Ajzen, 2010). Indeed, many actions performed on a daily basis are the results of routines or habits (Wood & Rüniger, 2016), and publishing activities, although infrequent and varying, are also likely to be subject to routinization or habituation. Scholarly publishing behavior includes familiarizing oneself with a range of factors, which arguably becomes less effortful as experience increases (Extejt & Smith, 1990; Knight & Steinbach, 2008; Watkinson et al., 2016). The concept of habit within academia is not new. In a checklist for doctoral students, Kidd (1954) simply stated: “Get publishing habit” (p. 557). Criteria such as journal rankings and publishing norms guide where it is “accepted” to publish, thus allowing publishing habits to form (Goudard & Lubrano, 2013).

The notion that behavior and actions can be instigated automatically by having previously performed, or learned, the action is not new. Habits have been described in the psychological literature dating back more than a hundred years, and past behavior is well known to be a good predictor of future behavior (Wood & Rüniger, 2016; Yerkes & Dodson, 1908). A key point in the understanding of habit is that it can instigate relatively complex behavior, albeit with minimal cognitive effort or awareness (Triandis, 1979). Previously, researchers have operated with various definitions of habit; however, a common denominator is that habit encompasses some form of automated behavior resulting from learning from repeated exposure to an event (Gardner, 2015; Triandis, 1979). Publishing research articles is no exception, as this often takes place in the same journal or within the same set of journals. For instance, some institutions operate with

shortlists of accepted journals to publish in, and it is likely that authors familiarize themselves with these criteria. Article 4 relied on a definition of habit strength emanating from a tripartite source (Gardner, 2015; Triandis, 1979; Verplanken & Aarts, 1999), in which OA habit strength was defined as “*initially* being automated, non-effortful, and goal-directed actions” (p. 4).

An important point to consider in this context is that publishing preferences and habits have had decades to form. The fourth paper of this dissertation elucidated this point by suggesting that not only journal preferences but also the *dissemination method* may be subject to habitual behaviors. The question is “at which level does this take place?” For instance, intentional behaviors affect habit formation, and habits therefore ought to be able to influence future intentions (Gardner, Corbridge, & McGowan, 2015; Ouellette & Wood, 1998). This means that, at some point, repeatedly publishing in the same journal will result in a publishing habit for this particular journal. This also suggests that the habit may extend to whichever publishing model is associated with the journal (OA or non-OA). Academic publishing has for the most part been subscription based (non-OA), and this is the dominant and preferred method, which means that publishing habits are likely to be linked to this model. However, there has been ample time for OA publishing habits to form as well.

Whether and how habit strength relates to intentions within a TPB framework are a matter of discussion (Ajzen, 2002b; Gardner et al., 2015; Limayem, Hirt, & Cheung, 2007; Ouellette & Wood, 1998). Habit is included as an intentional antecedent alongside the classic factors (Honkanen, Olsen, & Verplanken, 2005), as an intentional mediator (Saba & Di Natale, 1998), and as a behavioral moderator (De Bruijn et al., 2007; Gardner et al., 2015; Limayem et al., 2007). Some debate revolves around the operationalization of habit, and, according to some researchers, measuring habit as either automatic behavior or an aggregation of past behavior can produce varying results in addition to being methodologically disparate (Limayem et al., 2007).

To investigate the contribution of habit strength to OA and non-OA intentions and behavior, Article 4 opted to assess several alternative models. Specifically, habit strength was tested as: a direct determinant of intentions alongside the traditional intentional precursors (Model 1); a full mediator of attitudes, norms, and PBC (Model 2a); a partial



mediator of attitudes, norms, and PBC (Model 2b); and a determinant of intentions (OA/non-OA) and behavior (OA/non-OA).

#### 1.2.6. Individual traits

The research stream on inter-personal differences in personality is receiving increased attention among scholars, including the influence of personality traits on scientific creativity, technology acceptance, and trust in new technology (Devaraj, Easley, & Crant, 2008; Grosul & Feist, 2014; Lounsbury et al., 2012; Zhou & Lu, 2011).

Nowadays, the consensus is that personality can be measured as five distinct factors, termed openness, conscientiousness, extraversion, agreeableness, and neuroticism (Goldberg, 1990), and that differences in intrapersonal factorial constellations influence cognition and behavior. This model is commonly known as the five-factor model of personality, or the big five (John, Robins, & Pervin, 2008), which is also validated internationally (Schmitt, Allik, McCrae, & Benet-Martínez, 2007). The dimensions in the model represent being creative and open to new ideas (openness); cautious and calculating (conscientiousness); outgoing and sociable (extraversion); trusting and tolerant (agreeableness); and anxious and worried (neuroticism). The notion that fundamental differences in personalities have a great influence on people's lives has sparked much interest in research areas such as health and exercise (Courneya, Bobick, & Schinke, 1999; Rhodes & Courneya, 2003b), technology acceptance and use (Barnett, Pearson, Pearson, & Kellermanns, 2015; Devaraj et al., 2008; Svendsen, Johnsen, Almås-Sørensen, & Vittersø, 2013), education and academia (Poropat, 2009; Vedel, 2014), and work and career (Barrick & Mount, 1991; Barrick, Mount, & Judge, 2001; Barrick, Mount, & Li, 2013).

Within this factorial constellation, there are some apparent candidates that may be important influencers of the intentional antecedents. These are conscientiousness, openness, and agreeableness. Being of a careful, cautious, calculating, and self-controlled disposition (conscientiousness) and possessing a propensity for creativity and openness to new ideas (openness) seem to be valuable traits for a researcher (Feist, 1998).

However, in the second article, the investigation concerned trust and perceived quality in relation to OA journals, and the evidence from the extant literature suggested that a trusting disposition is likely to be rooted in agreeableness and not openness (Goldberg,

1990). According to Goldberg (1990), indicators such as being trusting, tolerant, and honest are aspects of an agreeable personality, suggesting a stronger link to the individual trait agreeableness. Conscientiousness, on the other hand, is linked to early academic achievement (Vedel, 2014) and to someone who is task and goal oriented (Barnett et al., 2015), which implies a strong connection to perceptions of quality. The assumption is that achievement, or success, as a researcher is linked to traditional non-OA publishing (e.g., publishing in high-impact journals), thus manifesting itself as an expression of the predominantly conscientious researcher. OA adoption can also be explained in terms of technology adoption or acceptance (Davis, Bagozzi, & Warshaw, 1989; Venkatesh et al., 2003). As such, the first article opted for an approach that assessed the effects of personal innovativeness in the domain of information technology (Agarwal & Prasad, 1998), which can be viewed as an expression of openness to experience (Nov & Ye, 2008). In the following sections, these constructs, and how they contribute to a broader understanding of OA publishing, will be explored in further detail.

#### 1.2.6.1. Agreeableness and conscientiousness

The second article in this dissertation discussed the relationship between personality traits and the way in which researchers perceive quality and trust. This perspective emanated from research that suggests that researchers score differently on some personality traits from non-researchers (Busse & Mansfield, 1984; Feist, 1998; Lounsbury et al., 2012). Although contested by some research (Lounsbury et al., 2012), Feist (1998) finds that scientists score higher on conscientiousness and the controlling of impulses, a trait that is important for goal-directed behavior (Barnett et al., 2015; Feist, 2008) and is a main driver of academic achievement as well (Poropat, 2009). Feist (2008) notes that scientists tend to be more introverted and less affiliated; however, this varies according to the different sciences. It is therefore reasonable to expect that prominent personality traits also affect the choice of publishing model.

The premise in Article 2 was that the two personality traits of agreeableness and conscientiousness would influence trust and perceived quality, respectively. Being agreeable is considered as possessing a favorable disposition toward the characteristics of OA and consequently being more trusting toward the model. A conscientious and career-driven researcher, on the other hand, would favor perceived quality aspects that

are typically associated with non-OA. As such, it was specifically hypothesized that agreeableness would have a significant and positive effect on trust and that conscientiousness would have a significant and positive effect on perceived quality.

#### 1.2.6.2. Personal innovativeness

An influential perspective concerning OA adoption and usage in previous research is the way in which researchers interact with technology (Dulle & Minishi-Majanja, 2011; Khalili & Singh, 2012; Masrek & Yaakub, 2015). These efforts mostly utilize the technology acceptance model (TAM) (Davis, 1989), which was briefly presented above, and some use a TPB framework (e.g., Park, 2007, 2009). However, the first paper of this dissertation ventured that technology acceptance and usage, and by extension OA acceptance and usage, are related to a researcher's personal innovativeness. Personal innovativeness in the domain of information technology (PIIT) (Agarwal & Prasad, 1998) is conceptualized as a trait, meaning that it is considered to be stable across situations and contexts. The PIIT scale is used extensively throughout the literature on technology adoption and usage (Agarwal & Prasad, 1998; Crespo & del Bosque, 2008; Jackson, Mun, & Park, 2013). Article 1 relied on the definition ventured by Agarwal and Prasad (1998), who define PIIT as "the willingness of an individual to try out any new information technology" (p. 206).

OA adoption can be understood as a special case of technology adoption or innovation (Harnad, 1990) in that it involves familiarizing oneself with and using new terms and perspectives pertaining to digital scholarly publishing. Importantly, it also involves change from the familiar to something new, and with change comes resistance (Oreg, 2003). If someone is unsure or anxious about using computers or the Internet, one may surmise that this negatively affects his or her intentions to utilize or learn new software, a finding that is also reported in the literature over the years (Rockmann & Gewald, 2018; Thatcher & Perrewé, 2002). Although computer anxiety is negatively related to innovativeness, efficacy is not. As researchers' adaptability varies according to their personality dispositions, their level of innovativeness is also likely to influence how their attitudes toward OA are expressed and how they view their perceived abilities to publish in OA journals (Agarwal & Prasad, 1998). Article 1 surmised that attitudes themselves are likely to facilitate the intention to publish in OA journals. However, these attitudes are also likely to be influenced by researchers' degree of innovativeness, since

this indicates a general disposition toward novelty and willingness to engage in the use of new technologies. Both attitudes and perceived behavioral control are previously found to be influenced by personal innovativeness (Fang et al., 2009; Yi, Jackson, Park, & Probst, 2006). However, some studies indicate that PIIT is sensitive to the research context (Agarwal & Karahanna, 2000; Lu, Yao, & Yu, 2005) and can produce varying results. In this regard, it was assumed in Article 1 that the effect of PIIT on PBC autonomy would be uncertain.

As such, three research hypotheses were proposed within the confines of Article 1: PIIT was expected to have a significant and positive effect on attitudes and PIIT would also significantly and positively influence PBC capacity. The hypothesized effect of PIIT on PBC autonomy was, on the other hand, only expected to be significant.

#### 1.2.7. Self-identity

A fundamental human motivation is to understand who we are, including our beliefs and what we do—something that is inextricably linked to self-associations with products, brands, and behaviors (Reed, Forehand, Puntoni, & Warlop, 2012). Typically, there are different bases of identities that pertain to the role, group, and person (Stets & Serpe, 2013), which, in short, describe the meanings associated with the way in which people are tied to the people in the world around them. The salience of such self-categorizations varies according to situational contexts and demands, in turn influencing attitudes and behavior (Callero, 1985). Self-identity is the salient part of a person's self-concept that relates to a specific behavior and whether performing this behavior is viewed as important (e.g., Conner & Armitage, 1998). A variety of self- and identity-driven effects of this motivational driver is studied and described in research published over several decades (Hornsey, 2008; Schwartz, 2001). Baumeister (1999) describes the self-concept as a person's intrapersonal knowledge. This identity can be defined as "any category label to which an individual self-associates, either by choice or by endowment" (Reed et al., 2012, p. 312). The identities and self-concepts are situationally and contextually associated as well as being role specific (e.g., researcher, supervisor, consumer, or practitioner). This also implies that the distinct selves and identities can be appraised across multiple identities simultaneously, such as a researcher appraising his or her standing as a scholar, colleague, lecturer, or group

leader. Some identity concepts are defined slightly differently, although the underlying associations are largely the same (Reed et al., 2012). According to Stets and Burke (2000), the concept of self-identity is subtly different from that of social identity, mainly due to self-identity being role specific and not necessarily linked to membership of a social group.

#### 1.2.7.1. Work self and career self

One of the defining characteristics of researchers is the production and dissemination of research (Henkel, 2005; Lee, 1969), and one may surmise that performance in accordance with this criterion comprises a large part of their identity. Article 3 cautioned that the concept of researchers' self-identity surpasses that of the confines of the current research. Researchers' self-identity is likely to be a constellation of various roles, meanings, and expectations found within the organization and society. However, the purpose of our research was to investigate markers in relation to academic publishing, thus limiting the self-identity concept to two related constructs, termed *work self* and *career self*. As with personality, identity concepts are a topic of interest in relation to work and behavior within organizations (Ashforth & Mael, 1989; van Knippenberg, 2000), including within academia (Henkel, 2005; Jain, George, & Maltarich, 2009). Some of the work also encompasses augmentations to the underlying theoretical framework of this dissertation (Fekadu & Kraft, 2001; Smith et al., 2007). A key point of the self-identity concept in relation to academic or scholarly behavior is identity salience. Identity salience is, according to Stets and Serpe (2013), quite simply "the readiness or probability to act out an identity within and across situations" (p. 42). Within the framework, the work self is considered to be a fundamental trait and is defined according to researchers' participation in the scientific endeavor as a trigger of identity salience (Jain et al., 2009).

Article 3 thus construed the work self as "a facet of self-identity which is salient in the context of engaging in publishing intentions and behavior" (p. 9). The work self is conceptualized as a drive to contribute to the advancement of science. The career self, on the other hand, surpasses the mere desire to contribute to the advancement of science; it taps into being successful based on high-ranking publications to earn status and prestige as well as recognition. Studies show that the career self and advancement

are important when considering a journal to which to submit an article (Peekhaus & Proferes, 2015). In other words, whereby *work self* describes the inherent drive to contribute, *career self* describes the desire to achieve success in this venture as well. Most academics are likely to be familiar with the phrase “publish or perish” (McGrail, Rickard, & Jones, 2006), which implies a strong publishing culture that resonates throughout academia. The career self was thus conceptualized in Article 3 in terms of indicators pertaining to long-term fulfillment as a researcher.

Hence, it was hypothesized that the self-identity constructs would significantly and positively affect the perceived quality factors *journal impact*, *visibility*, and *content quality*. Furthermore, it was ventured that the largest observed effect would be from the *career self* on the *journal impact*, as this factor is more tightly linked to traditional publishing and by extension success.

### 1.3. Methods

Digital surveys constituted the primary data collection method for the articles comprising this dissertation. The first two articles utilized data from the first survey, which was distributed to researchers at the Arctic University of Norway (UiT) in the spring of 2016. The following two articles utilized data from the second survey, which was distributed at the major universities in Norway in the fall of 2017. The first three papers adopted a confirmatory approach whereby specific theoretical assumptions were tested, and the fourth paper was more exploratory, the effect of a specific theoretical construct (habit) being tested at various levels in an established model (TPB). The particulars of the survey method and questionnaire design will be discussed further in the following sections.

#### 1.3.1. Survey design

Surveys are a common approach to data collection in research settings in which the assessment of broad attitudinal and behavioral aspects in a large, or widely dispersed, population is of interest (Wright, 2005). Surveys remain the preferred method for research on OA publishing and behavior (e.g., Dallmeier-Tiessen et al., 2011; Dulle & Minishi-Majanja, 2011; Khalili & Singh, 2012; Park, 2007), although some studies also use interviews (e.g., Warlick & Vaughan, 2007; Watkinson et al., 2016). The choice of

method depends on the aim of the research, and surveys have the potential to generate large volumes of data, while interviews are typically time consuming but generate in-depth and detailed knowledge.

The first point concerns the choice of method, which then determines the design of the questionnaire and the item selection. As mentioned above, the typical surveys found in the extant OA literature are descriptive, without a clear conceptual theory or framework explaining the causal linkages between the variables, constructs, or elements. A common questionnaire design in these instances relies on assessments of the central tendencies of single items—mostly beliefs associated with the expectancy value of OA journals, content, and the publishing model in general. A solution for increasing accuracy lies in employing a structural equation modeling approach (SEM) with latent factors, similar to that utilized in the present research. In short, this means that complex theoretical structures can be tested, measurement error controlled for, and the reliability of measures ascertained (MacKenzie, 2001). A key element of this approach is designing a set of indicators or survey items that are thought to reflect some latent underlying theoretical constructs. For instance, Fishbein and Ajzen (2010) suggest several indicators that together reflect the different components of the TPB model. The veracity of this approach is validated in a range of studies (Armitage & Conner, 2001), and models of this kind seems to be used frequently in research on attitudes and behavior related to technology adoption (Venkatesh, Thong, & Xu, 2012), consumer behavior (Han & Stoel, 2017), and health behavior (McEachan, Conner, Taylor, & Lawton, 2011).

The second point concerns survey distribution, response rates, common method bias, missing data, and the generalizability of the findings. According to MacKenzie and Podsakoff (2012), the effects of common method bias can be minimized through rigorous design and partly controlled for by post hoc statistical techniques. Another limitation that affects response and completion rates is the length of the questionnaire (Krosnick, 2018). If respondents are not motivated to complete the survey, some may discontinue it or even skip survey items. In this instance, the researcher needs to consider whether providing a response should be optional or mandatory, with obvious drawbacks to each strategy. For instance, while mandatory items might provide complete data sets, optional items may result in a higher completion rate and thus a higher number of respondents. However, the latter is likely to result in more missing

data and outliers (i.e., extreme scores), affecting the generalizability of the findings, particularly for small data sets. There are various strategies to deal with missing data (Kline, 2011); however, the proportions of missing data in the theoretical constructs utilized in a survey may be mismatched, further affecting the generalizability.

### 1.3.2. Samples and procedures

The first survey collected data from researchers at the Arctic University of Norway (UiT). A total of 321 questionnaires were returned; a minimum of 295 were usable. The survey assessed researchers' evaluations, within the context of a TPB model (Fishbein & Ajzen, 2010) adapted to OA, of intentions, attitudes (instrumental and experiential), norms (injunctive and descriptive), and perceived behavioral control (capacity and autonomy). Other constructs pertained to *perceived quality*, *trust*, *agreeableness*, *conscientiousness*, and *personal innovativeness*. The perceived quality scale was based on findings from the literature on scholarly publishing (Masrek & Yaakub, 2015; Park, 2009; Warlick & Vaughan, 2007). The trust scale was a three-item scale based on McKnight et al. (2002), and personal innovativeness (PIIT) was constructed according to Agarwal and Prasad (1998). Agreeableness and conscientiousness were measured using a short version of the Big Five Inventory (BFI-S) (Lang, John, Lüdtkke, Schupp, & Wagner, 2011).

Article 1 utilized the theoretical constructs TPB and personal innovativeness, while Article 2 was based on intentions to submit to OA and non-OA journals, trust, perceived quality, and agreeableness and conscientiousness. IBM SPSS and AMOS were used for the data analysis.

For Articles 3 and 4, a national survey was conducted. The survey was sent via email invitation to 19,649 employees at the major universities in Norway. Of these, approximately 14,255 were scientific staff. A total of 1,588 questionnaires were returned, which approximates an 11% response rate. The respondents were questioned on the factors pertaining to *self-identity*, *perceived quality*, the TPB, including publishing behavior for OA and non-OA, and OA *habit strength*. The TPB items used in the second survey were based on the same indicators as those employed in survey 1, and the self-identity scale, comprising *work self* and *career self* subscales, was based on the broader literature on self-identification, self-identity, and publishing behavior (e.g., Baumeister,



1999; Chang, 2017; Hornsey, 2008; Jain et al., 2009; Reed et al., 2012; Stets & Burke, 2000; Xia, 2010). The perceived quality scale and its respective subscales (*journal impact, visibility, and content quality*) were developed based on the findings from study 1 and the general literature on OA adoption and behavior (e.g., Knight & Steinbach, 2008). Habit strength was measured according to Verplanken and Orbell (2003) and reflected 5 automaticity-specific items extracted from their 12-item self-report index of habit strength (SRHI). The item selection was based on previous work that seeks to reduce the number of items in the SRHI to reflect automaticity better (Gardner, Abraham, Lally, & de Bruijn, 2012). The only adaptation to the research context was that the introductory text that preceded the items reflected OA publishing.

The following constructs were used for Article 3: self-identity (work self and career self), perceived quality, and the intention to submit to an OA journal/non-OA journal. For Article 4, the TPB and OA habit were used. IBM SPSS and AMOS were employed for data analysis.

### 1.3.3. Measures and construct validation

The models tested in the four articles explained a major part of the variance in intention ( $R^2 = 0.25-0.65$ ), and all the models showed an acceptable to good fit. The fit indices for the measurement model in Article 1 were acceptable (CMIN/DF = 1.92, DF = 208, CFI = 0.96, TLI = 0.95, RMSEA = 0.055). Generally, a CMIN/DF (normed chi square) below 5 is considered to be acceptable; in addition, a CFI and TLI exceeding 0.90 and an RMSEA below 0.08 indicate an acceptable fit (Browne & Cudeck, 1992). The factor loadings (0.61–0.94), variance extracted (AVE > 0.70), composite reliabilities (CR > 0.50), and correlational matrices were within the acceptable levels ( $p < 0.05$ ;  $r < 0.70$ ), further indicating acceptable convergent and discriminant validity of the constructs. The construct validity of the six constructs in the measurement model tested in Article 2 also indicated an acceptable fit after deleting one problematic item from the personality factor agreeableness (CMIN/DF = 1.77, DF = 75, CFI = 0.97, TLI = 0.95, RMSEA = 0.051). Most loadings were significant and ranged from 0.60 to 0.94. Most of the CR and AVE scores also exceeded the recommended thresholds. The correlations did not exceed 0.70.

In Article 3, the measurement model displayed a good fit (CMIN/DF = 4.57, DF = 149, CFI = 0.98, TLI = 0.97, RMSEA = 0.047). The loadings were significant, and all the values of CR and AVE were within acceptable levels of the 0.70 and 0.50 thresholds, respectively (CR = 0.75–0.98; AVE = 0.48–0.94). The correlations did not exceed 0.70. In Article 4, the unconstrained measurement model exceeded the recommended threshold for CMIN/DF (7.48, DF = 131) while displaying a good fit for the remaining indices (CFI = 0.96, TLI = 0.95, RMSEA = 0.064). Further analysis revealed possible problems with the covariance of three items, which was resolved by constraining these items, improving the fit (CMIN/DF = 4.45, DF = 131, CFI = 0.98, TLI = 0.97, RMSEA = 0.047). The loadings were significant, and the levels of CR and AVE were found to be within the acceptable thresholds (CR = 0.76–0.98; AVE = 0.52–0.94). The correlations were within the acceptable limit.

#### 1.3.4. Structural equation modeling (SEM)

This dissertation used a latent variable structural equation modeling (SEM) approach, which is uncommon in LIS research; however, it is well suited to investigating and understanding OA intentions and publishing. The following excerpt from Article 2 summarizes the general SEM approach:

MacKenzie states that the advantages of using this method include “the ability to control for measurement error; the ability to test complex theoretical structures; and more powerful ways to assess measure reliability” (MacKenzie, 2001). SEM models consist of two major components: a measurement model, which connects the indicators to the latent factors, and a structural model, which connects the constructs to other constructs. The procedure starts with running a confirmatory factor analysis (CFA) to ascertain construct validity. This is followed by a structural analysis using maximum likelihood estimation (MLE) to test the hypotheses. To ascertain how well the model fits the data, several fit indices are reported. These include the normed chi-square (CMIN/DF), of which the value should be less than 5; the comparative fit index (CFI), of which the value should exceed .90, the closer to 1 the better; the Tucker Lewis index (TLI), of which a value exceeding .90 is considered to be good; and the root mean square error of approximation (RMSEA), which

should be lower than .08 to indicate a good fit (Browne & Cudeck, 1992). To ascertain discriminant validity, or to ascertain that unrelated constructs are unrelated, the squared root of the AVE is extracted, and this value should be greater than the respective correlations for the constructs. These numbers are printed on the diagonal in the respective correlational matrices. Furthermore, the correlations between the constructs should be below .85 to obtain reasonable discriminant validity between the constructs (Kline, 2011).

## Part 2. Main findings and discussion

The foundation of this research rests on the premise of the theory of planned behavior and the reasoned action approach (Ajzen, 1991; Fishbein & Ajzen, 2010). Recall that behavior within this approach is most immediately influenced by the intention to perform the behavior. That is, without an explicit cognition to undertake something, the likelihood of undertaking it is also small, unless the behavior has surpassed a threshold for routinization or habituation. The intention to perform a given behavior is influenced by the strength of the attitudes toward the behavior and the nature of the social, or normative, pressure that exists in this context. Whether a person has the necessary skills to perform the behavior and any situational constraints that may exist also affect the intention. This general framework allows for the expansion and inclusion of a range of variables that fall into the evaluative, normative, and control categories—as well as the exploration and testing of fundamental traits. Furthermore, the level of specificity can be adjusted to suit a variety of research contexts, from highly specific to general. A major advantage of this approach is the vast body of literature that utilizes the TPB, providing a validated approach and a functional toolbox for investigators, strengthening the generalizability of their results.

The aim of this dissertation was to improve the theoretical and empirical understanding of researchers' intentions regarding scholarly publishing (OA/non-OA). How researchers interact with OA and non-OA journals and why and where they choose to publish have been a topic of interest for several years (e.g., Anderson, 2004; Park, 2007). However, systematic and theory-driven empirical approaches are rarely found in the literature (e.g., Dallmeier-Tiessen et al., 2011; Rodriguez, 2014) and just as infrequently used to support policy makers' or institutions' transition to an open-science model (e.g., European Commission, 2017). Nonetheless, the pace towards a more open and transparent scientific environment is quickening (Piwowar et al., 2018), and works such as this dissertation could prove to be a valuable foundation to build on in facilitating this transition. A key question has carried the momentum of the entire dissertation, namely "why do researchers choose to submit articles to OA or non-OA journals?" Taken at face value, it seems like a straightforward question to answer, and superficially perhaps it is—the debate, in the vernacular, surrounding OA and open science is after all brimming

with half-truths and misunderstandings spawned from a lack of knowledge. The findings from the four articles comprising this dissertation can amend some of these misgivings by shedding light on the complexity of different motivational forces of researchers' publishing behavior.

The success of this dissertation relies on the accomplishment of the research objectives. In the following sections, the main findings and theoretical contributions from the articles will be presented and discussed.

### 2.1. The role of attitudes, perceived quality, and trust

Evaluative constructs were tested in all the articles comprising this dissertation. Recall that attitudes, as measured by recommendations by Fishbein and Ajzen (2010), were utilized in Articles 1 and 4, while Article 2 tested the evaluative dimensions of trust and perceived quality. Article 3 focused on a three-factor solution of perceived quality. It was confirmed that attitudes are a substantial predictor of intentions to submit to OA journals, which is in line with the findings from other studies (Dulle & Minishi-Majanja, 2011; Khalili & Singh, 2012; Park, 2009).

In Article 2, it was found that the unidimensional perceived quality construct reduces the intention to submit to OA journals while strengthening the intention to submit to non-OA journals. Perceived quality in this study represented researchers' evaluations of important criteria in journal selection. These were the impact factor, status, and overall quality evaluation of a journal. The strength of the effect of perceived quality in relation to OA and non-OA intentions was also more pronounced for non-OA, implying that perceptions of quality are inextricably tied to traditional publishing, a finding that also resonates with the broader literature on scholarly publishing (e.g., Conn, 2015; Vanclay, 2012).

However, recall that the perceived quality construct was expanded with more indicators and tested in a larger sample later in the project period. The results in Article 3 showed that the most substantial predictor of publishing intentions was the journal impact, which contributed positively to the intention to submit to non-OA journals while reducing the intention to publish in OA journals. This finding is in line with other research that suggests that researchers do not associate OA publishing with any status

or prestige (Xia, 2010). It is, however, the first study to provide empirical evidence of this relationship in a relatively large sample of researchers, which has some implications for future work within this paradigm, especially when considering that the researchers in this study associated visibility with OA journals but not with non-OA journals. One explanation for this finding could be that a frequently used argument for OA over the years is that it increases the visibility of the research (Swan, 2010a).

Researchers apparently do not associate content quality with OA publications, and this factor was rendered non-significant regarding the intention to submit to OA journals. It did, however, contribute positively to the intention to submit to non-OA journals. The picture that emanates from the analyses of the perceived quality constructs resonates with the broader literature on scholarly OA publishing (Togia & Korobili, 2014). This is perhaps also a surprise, given that some of the misgivings found today are similar to those reported more than a decade ago (Anderson, 2004). The OS landscape is rapidly changing, and yet it would seem that, at least to some extent, researchers' attitudes have not fully adapted to this changing environment. A recurring theme in this context, and a potential explanation, is the incentive structures that presently favor non-OA journals in Norway. The loosely defined "academic freedom" has allowed researchers to submit to their preferred journals under the Norwegian publishing guidelines. Increasingly, more stringent OA policies and demands from funders are being implemented (European Commission, 2018; Regjeringen, 2017), which are likely to cause friction given the misalignment with incentive systems and favored publishing practices.

The findings revealed that trust in OA is an important hurdle to overcome and that it significantly strengthens the intention to submit articles to OA journals. The results also suggested that trust, at least as examined in Article 2, leads to a decrease in the intention to submit to non-OA journals. The results further demonstrated that agreeableness increases trust while conscientiousness strengthens perceived quality.

Within the evaluative constellation of Article 2, how trust would influence the dependent variables OA and non-OA intentions was also tested. The results showed that believing that an OA journal and its content is trustworthy increases researchers' positive intentions to submit their own research to these journals. This finding resonates with the extant literature on information technology and adoption research, in

that trust acts as a significant predictor of intention (Gefen, 2002; McKnight et al., 2002; Nicholas et al., 2014; Watkinson et al., 2016). Trust is especially important in overcoming risk and uncertainty in a digital environment (Kelton, Fleischmann, & Wallace, 2008), and for many researchers who are unfamiliar with OA, navigating the plethora of available journals can be daunting. Additionally, the practices of predatory publishers have undermined perceptions about OA, adding to the distrust. Furthermore, the findings showed that trust in OA leads to a simultaneous reduction in non-OA intentions, which appears to suggest, albeit tentatively, that, as long as researchers manage to overcome their distrust of OA, this will be their preferred dissemination method. Strong publishing norms dominate academics' behavior and are likely to result in increased pressure on the criteria that researchers already employ to assess potential future publishing outlets. Among these criteria, trust and perceived quality dominate, and understanding their effects is crucial.

## 2.2. The importance of different norms

In Article 1, the results confirmed that attitudes are the most influential predictor of intentions, followed by a positive effect of both injunctive and descriptive norms. The normative influence means that researchers' intentions are to some extent governed by the expectation of peers and are shaped by observing peers' behavior. As mentioned above, strong norms influence much of the activity in academia. This is also the case for scholarly publishing (e.g., Frey, 2003; Linton, Tierney, & Walsh, 2011). Although norms are investigated in relation to OA, the results are inconclusive (Dulle & Minishi-Majanja, 2011; Khalili & Singh, 2012). This could be due to situational and contextual variations as well as variations in measurements. However, from the larger perspective of TPB research, it is evident that intentions are influenced by the actions and expectations of significant others (Ajzen, 2006; Fishbein & Ajzen, 2010). It should be noted that the results from Article 1 were from a relatively small study conducted at the Arctic University (UiT), so generalizations ought to be made tentatively.

In Article 4, the sample population was greatly increased and the focus shifted to the investigation of the descriptive aspect of norms. Several models were tested; however, the baseline model represented the simple attitude–norm–control–intention structure of the TPB. In the baseline model, the norms followed the expected pattern of inferior intentional influence to attitudinal influence. An interesting finding emanated from the

results of testing the models that included habit strength as an intentional mediator (full and partial). The primary contributor to habit was norms, and in the partial condition it shifted from attitudes to norms. Recall that descriptive norms influence behavior through the observation of what is judged to be normal behavior. In this instance, the findings suggested that, when it comes to shaping OA publishing habits and intentions, the actions of one's peers appear to be more important than one's attitudes. Although the mediator was rendered non-significant in the partial model, the superior contribution of norms over attitudes in this instance as well showed the importance of this facet to OA publishing intentions.

Perhaps one explanation lies in the usage of metrics, journal rankings, and shortlists—would there be status and prestige without publishing norms? Norms tend to emerge in a relatively short time after a group has formed (e.g., Bettenhausen & Murnighan, 1985), and, in the case of academia, “invisible colleges” or constellations of likeminded researchers have been in existence since the founding of the Royal Society of London (Lievrouw, 1989), although for the Royal Society the term arose as a function of members' geographical proximity and the lack of affiliation with a formal institution.

### 2.3. Capacity and autonomy as facets of perceived behavioral control

Perceived behavioral control (PBC) was tested in a two-factor solution in Article 1, and the effects on intentions to submit to OA journals were examined. Other research suggests that PBC can benefit from being segmented into its subfactors (Armitage & Conner, 1999; Kidwell & Jewell, 2003). OA publishing can in this regard be considered a condition in which this conceptual and operational split is justified. Being on the threshold to submit research articles to a journal is likely to premeditate a belief in one's own capacity to complete the action successfully; as such, a positive influence of capacity is expected. The results from Article 1 confirmed this. In Article 4, the subconstruct of capacity was tested in a baseline model and three alternative models. The direction of the construct reflected that of the smaller study in Article 1, namely a minor but significant and positive effect on intentions.

OA autonomy, on the other hand, can reflect the presence of both perceived and actual barriers, and this subfactor was found to decrease intentions. This suggested that the decision to submit articles to OA journals is not perceived to be fully within researchers'



control. For instance, in a scholarly publishing environment, not all disciplines are equally well represented by the necessary high-level OA alternatives to traditional journals. Although many institutions now operate with funds to support APC payments, this might not always be the case. Another point may concern the perception that publishing in OA journals is too easy (Park, 2009); that is, researchers view it as undesirable even if it is within their control.

The results from other studies are inconclusive regarding the contribution of capacity and autonomy (Dulle & Minishi-Majanja, 2011; Khalili & Singh, 2012; Park, 2009). However, as we pointed out in Article 1, there are some operational disparities between the studies. For instance, Park (2009) defines self-efficacy (capacity) in terms of the perception of being accepted by an OA journal, which contrasts with the operationalization utilized in the present study. Khalili and Singh (2012), on the other hand, define effort expectancy (capacity) along the lines of possessing the necessary skills to adopt OA as a system. The case is similar for autonomy, for which some contrasting results are reported, possibly illustrating contextual or methodological differences (Dulle & Minishi-Majanja, 2011; Khalili & Singh, 2012; Park, 2009). As such, focusing on capacity may be fruitful in terms of alleviating, for instance, the confounding effects of institutional idiosyncrasies in larger samples.

#### 2.4. Influence of individual traits and self-identity in a TPB framework

An extensive research stream investigates and extends the TPB. The approaches include psychological attachment (Malhotra & Galletta, 1999), trust and perceived risk (Hsieh, 2015), narcissism (Kim, Lee, Sung, & Choi, 2016), personality traits (Rhodes & Courneya, 2003a, 2003b), and other factors that are assumed to contribute to intentions either directly or indirectly (Fishbein & Ajzen, 2010). This dissertation contributes to this research stream by discussing and testing the effects of three individual traits and two facets of self-identity.

Arguably, all behaviors and their constituent parts emanate from variations in fundamental and individual traits and identity. Within a TPB framework, these traits and values influence the intentional antecedents. In Article 2, the general individual personality traits agreeableness and conscientiousness were examined with regard to their effect on trust and perceived quality, respectively. The results confirmed that

agreeableness influences trust positively, while conscientiousness enjoys a strong relationship with perceived quality. This can be explained by the nature of these traits. For instance, conscientious people and researchers are often found to be more conscientious than non-researchers and are goal driven, meticulous, and career or achievement oriented (John et al., 2008). Agreeable people tend to be more trusting and positively inclined toward new technology (Zhou & Lu, 2011) and knowledge sharing (Mooradian, Renzl, & Matzler, 2006), although some recent research suggests otherwise (Wang, Noe, & Wang, 2014). However, as pointed out in Article 2, an agreeable disposition and the tendency to focus on the more positive aspects of a technology (which is often criticized) may be a reason for the positive effect observed on trust.

Mooradian et al. (2006), however, caution that being agreeable may be found to mean either being of a pleasant disposition or being predominantly compliant, depending on the factor rotation and one would suspect depending on the indicators utilized in the measurement and naturally the sample. This, in turn, may explain the contrasting findings on knowledge sharing. For instance, the indicators in the present study reflect a pleasant disposition as opposed to one of compliance, which may explain the positive effect on trust.

On the other hand, predominantly conscientious researchers are more concerned with perceived quality. In Article 2, it was suggested that a reason for this may be found in risk-taking behavior and a propensity for caution and planning. Conscientious individuals are sometimes found to be less inclined to engage in risk taking (Chauvin, Hermand, & Mullet, 2007) and thus uncertainty, and to many there is risk associated with OA publishing (e.g., predatory publishers). Arguably, there is far less *perceived* risk involved in publishing in journals that are associated with familiar indicators, which explains the positive effect of conscientiousness on perceived quality.

Article 1 viewed OA publishing as a relatively novel form of research dissemination and introduced the more specific individual trait of personal innovativeness in the domain of information technology (PIIT) scale (Agarwal & Prasad, 1998) to OA research. The results indicated that researchers' personal innovativeness has a positive effect on their attitudes. Given that attitudes constitute the predominant influence on intentions (Dulle & Minishi-Majanja, 2011; Khalili & Singh, 2012), a simple measure to ascertain a

person's innovativeness in relation to technology could in this regard be a valuable indicator of willingness to engage with OA. Indeed, the link between a person's attitudes and his or her innovative behavior is discussed habitually in the literature published over the years (e.g., Ettlie & O'Keefe, 1982).

Identifying early adopters could be important, as they may assist in facilitating the diffusion of an innovation, such as a novel publishing paradigm (Agarwal & Prasad, 1998). Computer self-efficacy is previously found to be positively associated with PIIT (Thatcher & Perrewé, 2002). One would expect to see that PIIT significantly influences perceived capacity and autonomy as well, given that the perceived skill to publish OA and control in doing so would be within the domain of mastering an innovation. As the results from the first study demonstrated, this was not the case. The effect on perceived autonomy was marginally significant but negative. The explanation offered in the article was that innovative researchers may perceive the bar of being accepted in an OA journal as too low. Naturally, another explanation may pertain to the effect being context or sample specific. The number of participants was relatively low and the study limited to one university (the Arctic University of Norway (UiT)).

As the discussion so far has shown, researchers have a set of criteria that they deem to be important to achieve academic success. These are commonly found to relate to perceptions of quality, which subsequently determine the intentions to submit to either OA or non-OA journals. Article 3 examined some potential antecedents to perceived quality. Specifically, self-identity salience, as measured by work self and career self, was found have direct and positive effects on the perceived quality constructs, with some notable differences between the two. For instance, being work oriented, presumably focusing on one's role as a researcher, was found to have a large effect on selecting journals that produce quality content, followed by impact and visibility. Being career oriented, on the other hand, showed the largest effect on the journal impact, with small effects on the content quality and visibility. These findings seem to suggest that the criteria that researchers perceive to be important when selecting a journal for publication differ according to self-identity salience. Notably, a career focus predicts the focus on the journal impact, which in turn increases the intention to submit to non-OA journals.

## 2.5. Is scholarly publishing a mental habit and routine behavior?

In Article 4, an automaticity-specific subscale of the self-reported habit index (SRHI) (Verplanken & Orbell, 2003) was tested at various levels in a TPB-based model. First, habit was examined as a determinant of intentions to submit articles to OA journals alongside attitudes, norms, and behavioral capacity. In addition, habit's role as a mediator between traditional intentional antecedents and intentions was analyzed. Finally, non-OA intention and behavior were included in a decomposed, or deconstructed, behavioral model in which habit determined all the intentional and behavioral factors.

The results from the first model indicated that a habit to publish in OA journals does not significantly affect the intention to submit to OA journals when measured alongside attitudes, norms, and behavioral capacity. Although the effect was within the  $p = .10$  significance level, the size of the effect was trivial. Some potential explanations for this were offered in the article; for instance, although a moderately high correlation between the attitudinal and the habit constructs suggested that there is some interrelation between the two, elaborative constructs were found to produce superior predictions of intentions in contexts that are also deliberate (Ouellette & Wood, 1998). The results from Model 2a and Model 2b indicated the possibility that habit mediates the effect of the traditional intentional precursors on the intention to submit articles to OA journals, although mediation by habit at this level is questioned (Limayem et al., 2007). When habit was forced as a mediator between attitudes, norms, and behavioral capacity, an effect was found; however, this model did not fit the data well. A similar pattern was replicated in the partial mediation model, although in this case habit did not produce a significant effect on intention. Nevertheless, the findings showed that norms, attitudes, and behavioral capacity all influence habit, and it appears that the descriptive effect of peers' publishing behavior is the most important precursor of habit strength. However, given the poor fit of the model, this should be the target of more research in the future.

Model 3 assessed whether habit, as the sole determinant, can predict intentions and behavior, and it appeared that, when assessments of behavioral outcomes and those of peers' behavior were removed from the model, the contribution of habit to intentions could be isolated. The results revealed that habit increases OA intentions while decreasing non-OA intentions. Furthermore, a negative effect on non-OA behavior was

found, and the effect on OA behavior was non-significant. The foremost predictors of behavior in this model were the intentional constructs. Both the intention to submit to an OA journal and the intention to submit to a non-OA journal had positive effects on their respective behavioral outcomes.

Article 4 contributes to the understanding of how habit interacts with the constructs in the TPB to explain OA and non-OA publishing. Previous research shows that attitudes are typically the strongest indicator of whether researchers intend to publish in OA journals (Dulle & Minishi-Majanja, 2011; Khalili & Singh, 2012). Article 4 corroborated this finding but also showed that, when it comes to influencing OA habits, descriptive norms are an influential instigator (Models 2a and 2b). However, the findings from Model 1 suggested that whether habit will affect intentions is determined by the presence of deliberative assessments of behavioral and normative outcomes (Ouellette & Wood, 1998). Clearly, there is a distinction between elaborative and automated behavior, of which habit is the latter. When these constructs were separated, the effects of habit on intentions and behavior could be examined. The results were in line with previous studies that show that habit can predict intentions (Honkanen et al., 2005; Ouellette & Wood, 1998).

## 2.6. Theoretical and practical implications

This dissertation, and its research and model development, builds on and extends the previous efforts to examine and understand the particulars of OA and non-OA publishing behavior (Dulle & Minishi-Majanja, 2011; Khalili & Singh, 2012; Masrek & Yaakub, 2015; Park, 2009; Park & Qin, 2007). This dissertation constitutes a comprehensive effort to provide some building blocks for a framework for identifying, examining, and interpreting the factors that influence publishing intentions and behavior. Importantly, the convergence of theories and approaches from different fields of research shows the value of cross-disciplinary strategies in domains in which this is uncommon, as is evident from the limited number of published studies that follow similar approaches (e.g., Dulle & Minishi-Majanja, 2011; Khalili & Singh, 2012; Park, 2009; Park & Qin, 2007). Although the four articles comprising this dissertation assessed a fairly large number of independent variables, some common denominators of the findings emerged. The logical place to start is the fundamental traits employed throughout the articles. First, individual differences in innovativeness, personality, and self-identity were found

to influence the intentional antecedents. This suggests that the development of behavioral change interventions would benefit from catering to fundamental interpersonal differences.

For example, in the second article, agreeableness was found to influence trust and conscientiousness to influence perceived quality. The research showed that these personality traits are related to an experiential and a rational thinking style, respectively (Pacini & Epstein, 1999). In this regard, workshops or outreach programs could structure the information according to these personality traits. Another option is to identify which antecedents to OA publishing behavior are associated with various personality traits in the researcher population and augment the main features of the respective indicators that are presented. Importantly, infrequent interventions are likely to be of limited success (Jeffery et al., 2000), so any effort to facilitate the transition to OA should be a recurring event to allow habits to develop. This also resonates with OA adoption studies, which find that familiarity with the model breeds acceptance, although it does not necessarily translate into behavior (Xia, 2010).

Researchers appear to be relatively positive toward OA, and these positive attitudes translate into an increased intention to submit their research to journals that are open. However, the current publishing climate, including the incentive systems and norms, strongly favors publications that fulfill some criteria that OA journals are not perceived to possess. Positive attitudes are not sufficient; researchers are also influenced by their peers' actions. The normative component plays a role in the importance of variables such as impact, status, and prestige, factors that do not carry meaning without normative pressure.

An advantage of OA that advocates successfully communicate, however, pertains to the increased visibility of research that OA enables. It seems that, although OA adoption is progressing at a slower rate than its proponents envisioned (Björk, 2017), some of the efforts are apparently being accepted and internalized in the general researcher population. Small successes can, however, be strengthened; a fruitful strategy for OA advocates to pursue is to integrate key elements of status and content quality, which are typically associated with non-OA publishing, into OA. This means addressing the concerns of researchers regarding the impact factor, status, prestige, and content quality

of OA publications. These factors were found either to reduce or to fail completely to be associated with intentions to submit articles to OA journals. Consequently, these matters should be the target of OA training to shift researchers' publishing behavior. Perhaps faculty members who conduct OA training would benefit from changing the focus of their presentations from the plethora of unfamiliar OA terms and terminology to more practical matters. Concentrating on the merits and practicality of updating one's publishing habit could be more conducive to success.

Another interesting perspective emanates from a recently published article by Verplanken (2018). Addressing various aspects of sustainability, the author suggests that successful behavior change interventions may benefit from acknowledging that similar behavior may be driven by different reasons. For instance, two researchers who are considering publishing in OA journals may have very different motives for doing so. Individuals may find themselves in one of four segments according to their level of opportunity to act and motivation to act (i.e., high opportunity/low motivation; high opportunity/high motivation, etc.). The main argument is that these individuals are susceptible to different types of interventions, some of which may even have adverse results if presented to individuals in the wrong segment. From the perspective of publishing behavior, this means that researchers are possibly found in any of the four segments according to their level of opportunity and motivation to publish OA. For instance, some may have ample opportunity but low motivation and are thus susceptible to incentives according to the model. Verplanken asserts that these individuals may respond poorly to "preaching" about the benefits of OA and so on. A segmentation approach of this kind is highly suited to experimental testing and would indeed be a fruitful venue for future researchers to explore.

The notion that attitudes influence intentions and behavior comes as no surprise, and consequently investigations into OA attitudes are quite common (e.g., Togia & Korobili, 2014). Recommendations that academic libraries and universities should continue to inform researchers' and the public's opinion therefore seem to be superfluous. However, the findings from Article 3 suggested that a shift in the focus of these information campaigns may prove to be fruitful. Recall that the results suggested that researchers view OA articles as possessing increased potential for visibility as opposed to non-OA articles. Proponents of OA have long championed the outreach potential of the

publishing model (Swan, 2010b). Apparently, these efforts have had an effect. The results were not as positive in terms of content quality and status, though, which weakened researchers' intentions to submit to OA journals while strengthening their intentions to submit to non-OA journals. Steps should be taken not to differentiate between OA and non-OA publications but to unify the two publishing paradigms under one banner of scholarly communication. A potential way to achieve this is to blur the borders that differentiate the modalities. Future research could investigate how researchers evaluate the quality of an article if no information about authors, journal, or access type is available to avoid triggering any preconceived categorization. An investigation of this kind could be carried out experimentally and through large-scale surveys.

However, all these efforts would be futile if incentive systems were not amended as well. As pointed out above, publishing incentives favor non-OA publishing indirectly via norms but also directly via journal rankings. The publication system in Norway ranks accepted journals on either level 1 or level 2. Level 2 represents the highest level and constitutes the leading publications within their respective fields. Of 2052 journals in all the fields that are ranked as level 2, only 49 of them are OA ([www.dbh.nsd.uib.no](http://www.dbh.nsd.uib.no)). Naturally, level 2 publications are associated with higher status and prestige. Enforcing strict OA policies with unrealistically short embargos for self-archiving is more than likely to cause friction in the research population given the relative dearth of approved high-level OA journals.

## 2.7. Limitations and future research

The methodology of the articles comprising this dissertation was subject to some limitations. The data collection relied in its entirety on self-reported questionnaires, a method that can affect the generalization of the findings. Respondents may, for instance, answer randomly or abandon the survey prematurely due to its length or other factors. Such response patterns may skew the data or render parts unusable. Response patterns and missing data can partly be controlled for by careful survey design and statistical procedures (MacKenzie & Podsakoff, 2012). For instance, missing data can be rendered usable with imputation techniques, and surveys ought to be designed with latent factors reflected by a minimum of two indicators per factor, more if the  $n$  is small (Marsh, Hau, Balla, & Grayson, 1998). Another limitation inherent in online surveys is the low



response rates that are increasingly common for this method (Fosnacht, Sarraf, Howe, & Peck, 2017). Typical response rates are around 10%, which was also the case for the surveys in this dissertation. As such, the first two articles were based on a survey with a relatively small number of participants. The number of respondents in the second survey, on the other hand, was large enough to lend some strength to the generalization of the results despite the low response rate.

Furthermore, Articles 1, 2, and 3 utilized intentions as the ultimate dependent variable and did not assess actual publishing behavior. Academic publishing is, however, an activity that can take time, making it challenging to obtain behavioral data within a limited time period. Article 4 did include a behavioral measure; however, this information was collected in the same survey. Consequently, a time series approach utilizing an automaticity-specific habit strength measure would have been more suitable. The measures that were employed in this dissertation could also benefit from being refined and synthesized into a more parsimonious approach. Several attitudinal, identity, and personality measures were tested to provide a broad foundation on which future studies can build. As such, the most promising ventures to pursue are to explore the outcomes and antecedents of the evaluative dimension (e.g., attitudes, perceived quality, trust), the control dimension (e.g., self-efficacy), and habit strength on various aspects of open science and not just OA.

Drawing on the findings from Article 4 and the extant literature on habit strength, we can see not only that habit strength affects publishing intentions and behavior but also that changing this behavior requires a prolonged effort, lest the behavior revert to the established habit (Gardner, 2015). Being cognizant of this effect and implementing recurring interventions is therefore likely to have a positive influence on the target behavior. Future research could in this instance test whether recurring interventions (e.g., monetary, status, and visibility) have a positive effect on habit formation or publishing behavior and whether this effect is permanent. Furthermore, the results from Article 4 suggested that descriptive norms are influential in habit strength formation. Exploring the effects of norms on publishing habits is therefore suggested as a particularly interesting avenue for future research. Without a normative component, there would be little status and prestige associated with publishing in high-level journals, and the likely evaluations of quality would be different as well. More research into the

effects of publishing norms is therefore recommended, and these efforts would also benefit from ascertaining the veracity of normative interventions. As noted above, a segmentation or a person-centered approach (e.g., Wedel & Kamakura, 2012) to identify researchers' personality profile, self-identity, attitudes, values, norms, or other relevant motivators is considered to be important to extend the understanding of OA publishing intention and behavior.

In conclusion, LIS research would not only benefit from expanding and further refining the constructs utilized in this dissertation; investigators could also aim to develop a standardized framework to apply at various stages of policy development and implementation. The concept of standard operating procedures (SOPs) is not new and is frequently used in, for example, medicine and organizations (e.g., Kim, 1997; Thomassen, Storesund, Søfteland, & Brattebø, 2014). Developing an SOP for OS policy work is, however, novel. A framework or approach of this kind could contain best-practice guidelines and strategies for addressing challenges as they arise and give suggestions for data analyses and interpretation. There are several advantages to utilizing a standardized approach. For instance, cooperation between agencies and institutions (national/international) will be facilitated by using the same tools, measures, analytical procedures, and wording (language may be adapted to national contexts). Pre-test and post-test surveys can be run to provide investigators and policy makers with the ability to evaluate the efficacy of policies with greater precision.

The findings provided empirical evidence for the veracity of employing a latent factor approach in research on publishing behavior. This approach allowed the determination of how central constructs in the debate about publishing models affect researchers' intentions and behavior differently.

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