

Pasi Aalto

Project characteristics of research proposal development

Master's thesis in Management
Supervisor: Jan Alexander Langlo
September 2020

Pasi Aalto

Project characteristics of research proposal development

Master's thesis in Management
Supervisor: Jan Alexander Langlo
September 2020

Norwegian University of Science and Technology

Table of Contents

Abstract / Sammendrag	4
List of figures	5
List of abbreviations	5
Introduction	6
Background	7
<i>Centres for Research-based Innovation (SFI)</i>	7
Introduction to the SFI Scheme	7
Mandate for the evaluation of the SFI scheme.....	7
Evaluation of the SFI Scheme	8
The SFI-IV call	10
NTNUs response to the SFI-IV call and outcome	10
<i>Theory</i>	11
Projects, processes, phases, initialization and scope	12
Cost, Time and Scheduling	14
Autonomy and knowledge work	15
Quality and success criteria.....	15
Teams and collaboration	16
Stakeholders.....	16
Success factors.....	17
The role of the project manager	19
Other aspects.....	19
Methodology	21
<i>Design of interview guide and questions</i>	22
<i>Conducting the interviews</i>	24
<i>Text processing and verification</i>	25
<i>Developing Matrices</i>	25
Findings	27
<i>Meet the leaders</i>	27
Spearheading professors	27
Able researchers.....	27
Skewed gender balance.....	28
One final play?.....	29
Projects learned on the job	29
So who are the leaders?.....	30
<i>Work and autonomy</i>	30
<i>The Good Posse</i>	31
Core group	33
Governance	33
Communication.....	34
Administration and budgeting.....	34
<i>Doing it Right</i>	35
Communication.....	35
Governance and resource management.....	36
Stakeholders.....	36

Team	36
Problem definition	36
Success factors compared to proposal outcome	37
<i>Outside the doorstep</i>	37
<i>Findings summary</i>	38
Analysis and discussion	39
<i>In the midst of things</i>	39
The Blunted Spearhead	39
The Solid Core	41
<i>A world at stake</i>	42
<i>The Governed</i>	43
Conclusion	47
Recommendations for future work.....	49
Reflections and personal recommendations	50
References.....	51
Appendix A – Interview invitation note.....	54
Appendix B – Interviews	56
Proposal Alpha	56
Proposal Beta	58
Proposal Delta.....	61
Proposal Zeta	64
Proposal Eta	66
Proposal Theta	68
Proposal Iota	71
Proposal Kappa	73
Proposal Lambda	74
Proposal Mu.....	77
Proposal Nu.....	81
Proposal Omicron	83
Proposal Rho	86
Proposal Sigma.....	88
Proposal Tau	90
Appendix C – Matrix development questions.....	93
Appendix D – Matrices	96
Workload Hours calculations	96
Timelines	97
Success Factors	98
Organisation of proposal teams.....	99
Industry contacts	102
Project Management Experience.....	103

Abstract / Sammendrag

This study tries to determine the project characteristics of research proposal development processes as seen through prevalent project management theory relevant to the Nordic context. The work is conducted as a case study of the Norwegian Research Councils *Centres for Research-based Innovation* (SFI) IV call in 2019 and the response from the Norwegian University of Science and Technology in the form of 19 research project proposals. The study interviews 15 project leads between the proposal dead-line and the publication of the funding decisions for the call. The interviews are analyzed to reveal characteristics, success factors and traits in each of the proposals which are then categorized in non-submitted, submitted and funded proposals to uncover differences in approach that might contribute to the success of the proposal. The findings show both similarities and differences in the individual proposal processes. The findings are also in line with current project management theory, which provides insight into the mechanisms at play. The study provides an important insight into the research proposal development process that can be used to develop the host organizations, teams and individuals, to discuss systemic challenges and opportunities and to gain insight for the individual who is about to embark on a similar journey.

Dette studien prøver å etablere prosjektkarakteristika for utvikling av forskningsprosjektsøknad sett gjennom nåværende teori innen prosjektledelse i Norden. Casestudiet ser på Forskningsrådets fjerde utlysning for Sentre for Forskningsbasert Innovasjon (SFI) i 2019 og det resulterende arbeidet gjennomført ved Norges Teknisk-naturvitenskapelige Universitet (NTNU) i form av 19 forskningssøknader. Studien er basert på 15 intervjuer av de som ledet søknadsarbeidet mellom fristen for utlysningen og publiseringen av finansieringsvedtak. Intervjuene er analysert for å avdekke karakteristika, suksessfaktorer og egenskaper ved de enkelte søknadsløpene for deretter å bli delt i ikke-leverte, leverte eller finansierte søknader for å undersøke hvilke elementer kan bidra til en vellykket forskningssøknad. Studien avdekker likheter og forskjeller i de enkelte søknadsløpene. Funnene er i stor grad i tråd med nåværende teori innen prosjektledelse som bidrar til å belyse problemstillingene. Denne studien gir et viktig innblikk inn i utviklingen av forskningssøknader og kan bidra til at organisasjoner, team og individer kan utvikles, til å drøfte systematiske muligheter og utfordringer og for å gi støtte til individer som ønsker å utvikle egne forskningssøknader.

List of figures

Figure A	SFI evaluation success factors	11
Figure B	Division of Stakeholders	18
Figure C	Thesis Workflow and methodology	23
Figure D	Key figures of leads publications	28
Figure E	Gender balance	29
Figure F	Age distribution	30
Figure G	Project Management Experience	30
Figure H	Organisation of Proposal Delta	33
Figure I	Organisation of Proposal Mu	33
Figure J	Organisation of Proposal Theta	34
Figure K	Identified roles in proposals	35
Figure L	Organisation of budgeting	36

List of abbreviations

Abbreviations are given with English translations even if referring to Norwegian.

FME	Norwegian Centre for Environment-friendly Energy Research
GDPR	General Data Protection Regulation
NFR	The Research Council of Norway
NTNU	Norwegian University of Science and Technology
PMBOK	Project Management Body of Knowledge
SFF	Norwegian Centre of Excellence
SFI	Norwegian Centre of Research-based Innovation

Introduction

The way we develop research proposals is not sustainable. During my time working at the Norwegian University of Science and Technology, I have on many occasions observed the apparent stress and cacophony resulting from different organisational processes. Regardless of the person, most employees will say that they are out of time, out of breath and still running strong. One meeting at a time, they struggle onwards to meet their long term goals, be that in teaching, research or managing whatever comes through the door or inbox that day.

Over the years, I have become interested in the processes I see around me. While most would argue that running a master level course is the very definition of operations, I have seen more and more project management traits emerge in daily work. In no other process does this shift from operations to projects make itself more evident than in the rise of the research project. Moving from internally funded, long-term research, the focus now is securing funds from outside the organisation. No matter if it is our national Research Council or the coveted Horizon 2020 funding from EU, the competition is getting ever fiercer.

The celebratory cheers of those securing research funding tends to be accompanied by the resigned gazes of those who worked hard, built up expectations and focused their minds on some problem worthy of solving, only to be turned down in the very end. The sullenness of a failed proposal can turn into aversion of trying. Over time, two tracks emerge: those who can secure funding, build their CVs and learn the game, and those who resign from the race, focus inwards and reject the system.

It is in this context I chose to examine the most essential process that is part of this system, the development of the research application. As luck would have it, at the time of starting my thesis, the deadline of the Norwegian Research Councils (NFR) Centres for Research-based Innovation (SFI) was just around the corner. The SFI represents something of a champions league when it comes to Norwegian research proposals, only eclipsed by the famed SFF and FME Schemes. Once again, I saw the tired, stressed and (after the dead-line) relieved colleagues in my organisation. I wondered what had they been through, what had they learned and – perhaps most importantly – what could we all learn from their experiences that would make this process better the next time around?

I designed this study to document my colleagues' reflections in the interim period after they had delivered their proposal, but while the funding decisions were not yet published. In order to achieve this, I have used the lenses from project management theory. However, the study might have also been conducted from a wide variety of fields: psychology, health and politics, just to name a few. An initial review of existing research did not yield many results, so my quest became to answer the most basic of research questions in this context:

“What are the project characteristics of a research proposal development ?”

Furthermore, I made a mental note to be as inductive, open-minded and explorative as possible, as I was very uncertain what I would find along the way. This might not be the best strategy for a coherent and precise thesis, but to understand the complexities of the process and learn the most, this was nonetheless the choice I was determined to make. In this, I feel I am very much taking the leap of faith together with my colleagues. Now let's see how this all panned out.

Background

Centres for Research-based Innovation (SFI)

Before delving too deeply into the study, some background information about both the SFI Scheme, the specific IV call and the circumstances surrounding it is necessary. It should also be noted that I am assuming that the reader is already familiar with the current world of academia, including the general workings of research projects both before and after funding.

The Norwegian Research Council (NFR) invests 10 billion NOK annually into research and innovation projects with the aim of ensuring that the best proposals receive funding (Forskingsrådet, n.d.a). Among the calls are three larger schemes for centres, namely the *SFF Norwegian Centres of Excellence* scheme, *FME Centres for Environment-Friendly Energy Research* scheme and SFI Centres for Research-based Innovation scheme. These centres are considered by many research organizations to be highly desirable as the stable funding presents an opportunity to move an entire field a leap forward, the SFI especially spearheading the shift from research to innovation.

Introduction to the SFI Scheme

The Research Council presents the SFI Scheme as follows:

“The Centres for Research-based Innovation are to develop expertise in fields of importance for innovation and value creation. Through long-term research conducted in close collaboration between research-performing companies and prominent research groups, the SFI centres are to enhance technology transfer, internationalisation and researcher training. The scientific merit of the research must be of high international calibre. The SFI centres may receive support for a total of eight years (an initial five-year period with the possibility of a three-year extension).” (Forskingsrådet, n.d.b).

The SFI scheme has at the time of writing had 4 calls funding 60 SFI centres, starting with the SFI-I call in June of 2005 and most recently the SFI-IV call in September 2019:

SFI-I (2007-2014): 14 centres funded
SFI-II (2011-2019): 7 centres funded
SFI-III (2015-2023): 17 centres funded
SFI-IV (2020-2028): 22 centres funded

Before the latest call, the SFI scheme was subject to a periodical evaluation. The results of this latest evaluation are discussed below. These evaluation results were available to the teams developing the proposals as they were published in 2018.

Mandate for the evaluation of the SFI scheme

The SFI evaluation in 2017-2018 was based on a mandate from December 2016 (Forskingsrådet, 2016). The mandate discusses the purpose of the evaluation through 2 central tasks for the evaluation:

1. "Examine if the SFI scheme has fulfilled the initial overarching goals and expectations so far."

This task is further broken in to 12 questions addressing, among others, a) the benefits for Norwegian companies, b) increased applied research and c) what aspects have been important to reach the goals set in the individual centre? Specifically for point c, the mandate calls for systematic overview of success factors. The other central task is as follows:

2. "Gather input on adjustments and changes for further development of the scheme, seen in the context of adaptation and change in the national and global scale."

This task is also described through 3 questions addressing a) changes for increased goal achievement or value creation, b) increased public innovation and c) the Norwegian Research Councils administration of the SFI scheme. The mandate proposes approximately 10 months of work to systematize and organize the provided source materials to produce a report. It is clear both implicitly from the mandate as well as explicitly from the previous 2010 evaluation that the SFI scheme is considered a success. There is a clear goal of understanding what success factors are prevalent as well as which success criteria should be considered most important.

Evaluation of the SFI Scheme

The 140-page evaluation was done by Damvad Analytics (with contributions from Cambridge University and Rand Europe) and published 31. January 2018 (Damvad Analytics, 2018). The report was written in English with a Norwegian summary. Several methods were used in the evaluation, including "*quantitative data analysis, interviews, questionnaire surveys, document studies, workshops and bibliometric analysis.*" (ibid, page 5). The report evaluates the SFI-I (2007-2015), SFI-II (2011-2019) and SFI-III (2015-2023) generations of the SFI scheme. The evaluation identifies and discusses some phenomena that are of interest to this thesis and a multitude of other aspects that, while interesting, are not the focus of this thesis and therefore omitted in the discussions below.

As a baseline the evaluation states that "*the overall impression across all the evaluation results is that the SFI scheme performs well in facilitating close cooperation between R&D-performing companies and prominent research groups.*" (ibid, page 5).

The evaluation points out several times the different participation levels from industry and R&D partners. Specifically it is stated that "*...It is also apparent that the industry partners are not as active in the research-based activities of the centres as one should expect. Also, the evaluation reveals challenges in regard to the research competences of the companies and the innovation competences of the researchers.*" (ibid, page 6). This indicates both the participation difference, but perhaps most significantly, the difference in focus between the different type of partners. The evaluation further elaborates this divide:

"The goals regarding participation differ among partners, however. 80 pct. of the industry partners use the centre primarily to learn about new research results, while only 13 pct. use it to publish articles with researchers. Only 34 pct. of the researchers states that they use it to publish articles with companies. The bibliometric analysis shows that that in total 11.9 pct. of the published publications has co-authorship with industry. There is no clear trend over time with 12.5 pct., 9,5 pct. and 12,7 pct. industry co-publication for SFI-I, SFI-II and SFI-III,

respectively. A comparison with research and innovation schemes in Sweden and Denmark indicates that the share of industry co-authorship in the SFI scheme is below average. One could argue that ambitions should be higher given the objective of the scheme to support research-industry collaboration. In addition, it seems that the large bulk of publications with industry co-authorship are concentrated on a rather small number of companies. "

"A challenge is that many of the participating companies are not research competent and many are not as active as expected in the activities of the SFI centres. This is important since the competence and active participation of companies in specific projects and in research collaboration is one of the strong driving forces for the SFI centres ability to generate commercially oriented outputs on the basis of excellent research. This observation goes both ways. Feedback from industry partners indicates that participating researchers do not have sufficient innovation and market understanding. It is argued that the researchers lack knowledge of market mechanisms and are generally not thinking or acting like innovators. " (Damvad Analytics, 2018)

Perhaps the most distinct illustration of this gap is found where the evaluation documents uncertainty in terms of the innovation impact from the SFI centres: "...result in the survey that only a minority (14 pct.) of the companies can confirm that their innovations are due to their involvement in the SFI centres. It is complemented with the result that only few companies seem to use the SFI centre to get help with commercialisation." (ibid, page 7) This, of course, does not mean that the SFI centres do not contribute to innovation, but rather that the distinct pathways to innovation are complex and that increased participation and common culture for research driven innovation likely has the potential for even larger gains. This is further discussed in the report chapter 4.1.2. where knowledge transfer to businesses, mainly through personnel mobility, is discussed. The evaluators propose additional researcher training focusing on industry skills, such as leadership, project management, entrepreneurship and so forth.

The evaluation also investigates goal attainment, explored through a survey. The partners' responses are clear. 89% of the partners consider their SFI centre a success when asked to answer either *Yes* or *No* (n=185). More interestingly, the evaluation has asked for the importance of factors for goal attainment (ibid, page 10): "The complementing survey results find that the top 3 most important factors for the individual SFI centres goal attainment according to the partners is the geographical closeness of partners, being able to manage IPR and cooperation agreements, and finally the in-cash payment of participating companies."

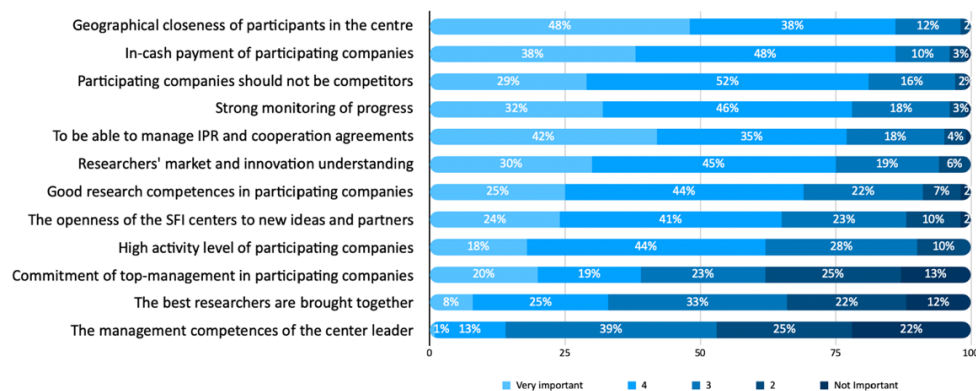


Figure A: Question answers to "How Important are the following factors for your SFI centres goal attainment (On a scale from 1 (Not important) to 5 (Very important)", Data source: DAMVAD Analytics Survey for partners in SFI centres, 2017.

Finally, the evaluation recommends 6 adjustments as per mandate to ensure a greater goal achievement in the future rounds of the SFI Scheme (ibid, page 13). Two points are specifically interesting for this study, namely (bold text by evaluators):

1. "There needs to be more **committed, competent and active industry partners** in the SFI centres. This will also support the ambition of stronger user/industry control of the centres. "

It is significant that greater industry participation is promoted as the first adjustment, showing that the evaluators give this aspect large significance, something also evident in the many mentions and discussions of this aspect throughout the document. An aspect that is not as widely discussed, but is also considered a key adjustment is the last one:

6. "**SFI centres need a faster start.** The centres need to be operational from day 1. This is also about the function of the consortia agreements, the partners' commitment and how to organise an application process, which will result in the best selection of SFI candidates. "

Here, the evaluators pin-point the application process and the actions taken there as key elements in a SFI that is productive faster and therefore also can achieve more goals during the 8-year centre period.

The SFI-IV call

The SFI-IV call was published in late 2018 at which point most proposals were already well underway due to the expectations of the new call already well known in academia and industry. The call had two distinct deadlines: an obligatory first sketch due 4. April 2019 and the final deadline on 25. September 2019. The call had a funding range of 50 – 96 mNOK per proposal with expected total funding of 960 mNOK. The centre duration was 5+3 years. With a start between 1. September 2020 and 1. December 2020, this placed the final possible ending date to 30. November 2028.

Notably for this call, private industry must contribute at least 50% of the funding. With the NFR contribution ranging between 10-12 mNOK per year, the total funding for a centre ranges from 180-192 mNOK over the entire 8 year period.

NTNUs response to the SFI-IV call and outcome

As a response to the SFI-IV call, NTNU developed 19 sketches to the April deadline. 14 of these were developed to full proposals and submitted for the final deadline in September. The proposals came from several research groups. The Faculty of Engineering Science (7 proposals, 1 successful) and Faculty of Information Technology and Electrical Engineering (5 proposals, 4 successful) were the most prominent contributors.

Published 30. June 2020, 22 centres were financed with a record 2100 mNOK total funding, more than twice then expected amount. 5 NTNU-led proposals received funding and NTNU participated in several more as research partners.

It is clear from both the format and magnitude of the call and NTNUs response that the SFI-IV represented a major strategic opportunity and that this was grasped with both hands at the university.

Theory

As you will recall, the study is exploratory and it is therefore necessary to have a wide scope of theory to draw from in the discussion. At the same time, the amount of project management literature is overwhelming, not to mention the entire field of management, leadership, communication, teams and so forth. It is therefore necessary to balance the selection of literature which is within the scope of a thesis such as this, without needlessly limiting the discussion framework of the findings. It has to be explicitly noted that there is little previous research in project management that look specifically at research proposals as projects to draw on, but several theoretical approaches can provide insight into specific characteristics, especially in the initial exploratory phase.

In order to manage the wide range of topics, specific criteria for selection had to be developed. Normally, this is done by limiting keywords for searches or by focusing on specific journals. I have chosen a somewhat untraditional, but I believe more suitable approach: Context.

This needs some explanation. Imagine that you would describe the procurement process for an industrial project in Mumbai to a developer in Denmark who is starting on a similar endeavour. You could describe the importance of stakeholder management, the approach to project plans or something as trivial as registering time. All of these 3 topics would be easily found in project management theory, indeed in the same journal and with the same keywords - and all of them would be completely different in both locations. This illustrates that given unknown terrain, *context* might be a better criteria for selection if the setting of the study is well defined and the goal is to explore as many characteristics as possible within the available time frame.

In order to refine the selection further, we must define NTNU as a context. First and foremost, it is a working environment very much in line with the Norwegian or Nordic understanding of work life. This means that we need to take into account the origins and context of the research that we base our theory on, or at least search for research that has been validated within the realm of the Nordics. A second notable aspect is the key characteristics of academic freedom, highly skilled individuals and autonomy. This is a basis for a many universities, but even more so with the absence of tenure tracks, lab hierarchies and strict rules found in other universities around the world. Finally, we also need to acknowledge the international nature of today's research and the fundamental impact of theories that transcend national borders and become central pieces of current theoretical understanding.

Based on these criteria, 6 books were selected as the initial pool of theory:

- Lederskap i prosjekter (Aarseth, Rolstadås and Klev, 2015)
- Veien til suksess (Hussein, 2016)
- Arbeid i team (Levin and Rolfsen, 2015)
- Prosjekt i tidligfasen (Samset, 2015)
- Project Management Body of Knowledge (Project Management Institute, 2013)
- Project Management – Achieving competitive advantage (Pinto, 2016)

The first four books are all written by authors from NTNU. They are all written for the Nordic context and are assumed to balance international theory, recent research and the authors own impressions. The latter 2 are considered central works in project management theory and also heavily used as references in the Nordics. All of the works, while looking at specific sub-domains, are also comprehensive, well referenced and provide a good overview. They are therefore considered good starting points for this study and assumed to give a good, contextually accurate understanding of the current theoretical landscape. As the study progressed, more studies were included as necessary to increase precision and to provide alternative approaches.

A basic overview of project management theory described in the literature is provided here, also for those who are not familiar with the project management jargon, theory or practice. The topics are grouped in a somewhat unusual manner to make the linkages to the findings and analysis sections easier to navigate.

Projects, processes, phases, initialization and scope

A project, according to The Project Management Body of Knowledge guide, or PMBOK, (Project Management Institute, 2013) is a *"temporary endeavour to create a unique product, service or result"* (ibid, page 3). Project management, then, is the *"application of knowledge, skills, tools and techniques to project activities to meet project requirements"* (ibid, page 5). This definition is also used in the Nordics, for instance by Samset (2015, page 25) and Hussein (2016), among others. An application process for an SFI fits well within this definition as it is both temporary, with a clear deadline and also unique, as each proposal is a result of both internal and external pressures and processes.

Both the PMBOK (page 38) , Pinto (2016, page 33) and Hussein (2016, page 41) describe a life cycle of a project with 4 distinct phases, presented here using Pintos nomenclature:

1. Conceptualization
2. Planning
3. Execution
4. Termination

This division relates strictly to the project realization period, i.e. from the initiation to delivery. This view was expanded upon by de Wit (1988, page 164-170) with a distinction between project management success and project success and later nuanced (Shenhar, 2001) to include

- Project realization (incl. conceptualization, planning, execution and termination)
- Benefits for client
- Benefits for the company
- Future success

Aarseth et al. (2015) use this distinction between the project realization and project effects (i.e. project management success and project success) when they describe phases of a project. Interestingly for us, Samset (2014, page 21) ties the project success criteria directly to the initialization phase of the project, as it is during this phase the overall strategy – and therefore the potential effects of the project – are decided. Scheduling and planning is an integrated part of project management (Project Management Institute, 2013, page 141). However, as

Hussein points out (2016, page 85), there are different opinions about systematic approaches as well as flexibility, but regardless of the methods and weights attributed to different aspects, a general consensus is that the scheduling and planning is building on the results of the initiation phase.

These theoretical approaches gives us 3 possible avenues of understanding the SFI proposal process as a project:

1. As a project in its own right, disconnected from the SFI centre and its anticipated effects in the future.
2. As the conceptualization phase (as well as some initial planning) of an SFI centre, but with a clear understanding of the SFI centre as a project with start and end dates, as per traditional project management success criteria.
3. Same as 2, but with a distinct consideration of project success and effects, some of which can be realized without funding approval. For instance, parts of the SFI concept can be reused in other applications, while other long term effects only possible through the realization of an SFI.

While option 2 is perhaps the most straightforward framework for analysis, it is clear that the proposal process itself is quite comprehensive, involving more hours, costs and discussions than other projects at NTNU with external funding. It is therefore warranted to be considered as a project in its own right, as suggested in option 1. Also adding to the complexity is that the proposal also sits within a larger context at both NTNU and the Research Council where the effects of an SFI are of great strategic importance. This makes it clear that option 3 is also relevant and important as a theoretical approach.

To point out the two extremes, if the entire proposal process of an SFI can be considered an initiation phase of an SFI centre, it would follow from theory that the scheduling and planning never needs to enter the picture. A good example of this type of process is a completely ad hoc approach of brainstorming and discussions that through more or less random processes lead to a proposal. In the other extreme, the proposal process is a project in its own right. In this case, we would try to identify all phases of a project and evaluate them based on their own merits and entertain a more nuanced view of each part. As of now, we must accept that proposal processes come in many different shapes and sizes, making strict claims of categorization is likely to introduce theoretical blind spots.

There are three prevalent methods for organizing projects (Hussein 2016, page 60). The main distinction is the placement of authority. In *functional* organization, the authority resides in the host organization and draws resources from there. At the very opposite end of the spectrum, *project* organization places the authority within the project team. A balance between these two extreme approaches is considered a *matrix* organization where we find both autonomy and the ability to attach resources as needed from the host organization.

To further discuss alternative theoretical approaches, a contrast to the process oriented view is proposed (Small and Walker, 2011) which argues that in order to find meaning in project work, the entire entity needs to be seen as a system of human activity and social process. They emphasize that it is therefore necessary to move away from linear and predictable models of project practice to “one that better highlights the complex nature of human interrelations.”

Another more human centric approach, agile project management, rose due to the need for alternatives to linear process oriented software development. It emphasizes culture, people and communication (Liubchenko, 2016). This can also include methods such as scrum that prioritize small teams and iteration as working methods, among others.

While circular, iterative processes and small teams might be a better theoretical framework for describing the project proposal work, it has to be noted that both NTNU and to even larger degree, the Research Council, both expect a linear process. This is evident in the deadlines and procedures during the proposal development process, but the mentality can also be found embedded in the Research Council *project proposal template* that requires information only found in waterfall type planning and scheduling practices.

Cost, Time and Scheduling

There are few studies conducted into the time use in academia with regards to building research proposals, both internationally or in Norway. The most relevant study is conducted by Nordic Institute for Studies in Innovation, Research and Education (NIFU) in 2016 (Ramberg, 2016) that points out that 90 % of people working on project proposals have zero direct costs, and those that do, generally are below NOK 50.000, consisting mainly of travel costs.

NIFU (ibid. figure 6) also documents that 70% of the time used by the scientific staff on a proposal is used on the application document itself, followed by filling out the electronic application form (9,5%) with the rest going towards call reading and other administrative tasks. It is clear that project management does not seem to be separated into its own category in this study, nor does the nomenclature correspond to typical topics found in project management literature, but should rather be seen as embedded in these figures.

Finally, NIFU (ibid, figure 4 and table 7) publishes time use on proposals for Centres of Excellence (SFF), a program similar to the SFI in size. Here, the average mean time use is registered to be 20,9 weeks in the host organization with a maximum of 52 weeks in one of the respondents (N=18). This is approximately 4-5 times the median value of the entirety of the proposals in the study. Overall, the 34 SFF proposals received in the 2016 call are estimated to cost 14,2 working years to develop or 0,42 working years per proposal. Other factors that increase the use of time in the proposals in general are the amount of funding applied for and the amount of people involved in the proposal process.

Internationally, a recent study (N=285, 3727 total applications submitted) estimates the Australian 2012 National Health and Medical Research Council (NHMRC) Grant scheme (AU\$458 millions) to cost 550 working years of researchers time, equivalent to AU\$66 million or 14% of the total Grant scheme budget (Herbert, Barnett and Graves, 2013). Given the schemes 21% success rate, this equates to approximately 430 working years “wasted” annually, not including administration, peer review hours or other costs beyond the use of hours by the scientific staff. Re-submitted proposals used slightly less time (28 days as compared to 38 in general) while also having 36% lower probability of success.

Relating this to the context of NTNU, a budgeted hourly pay for a professor at NTNU is NOK 1000, divided in to NOK 718 in salary costs and NOK 282 in indirect costs (NTNU 2020, bidragsprosjekt). At the same time NTNU practices a 50/50 split in time between research and teaching activities among professors.

Autonomy and knowledge work

First introduced in the book *Landscapes of Tomorrow* (Drucker 1955) the concept of knowledge workers and what constitutes knowledge work has been discussed extensively, first in a wave from 1950s to 1970s, and again from 1990 and still ongoing, although it is noted that a lot of this discussion has been inside academia (Darr and Warhurst, 2008). Morgeson and Humphrey (2006) are proposing following factors are more evident in knowledge work, based on a “work design questionnaire” and a verification of 540 replies from 243 jobs:

1. Autonomy (feeling of freedom and independence in work)
2. Work complexity (The difficulty of the work tasks)
3. Information processing (The degree of cognitive information processing in the work)
4. Problem solving (The extent to which the work requires novel ideas and solutions)
5. Multitude of skills (The extent of skills required to solve work problems)
6. Specialization (The extent to which the work requires deep knowledge)

In the Norwegian context, Sandvik (2011) points out that “specialization” does not factor in significantly in Morgeson and Humphreys work and proposes therefore to omit it in the discussion of leadership styles in his own work.

NTNU has yearly evaluations of the working environment (NTNU, 2019). In the most recent results from 2019, the employees rate their own autonomy at 4.1 on a scale from 1 (largely non-autonomous) to 5 (great autonomy). Similarly, both “meaningfulness at work” (4.2) and “Inner motivation” (3.9) rate high, while the organizations “openness to new initiatives” is not very far behind at 3.8. The same study documents time use and we see that approximately 75% of staff work overtime every week, ranging from 1-5 hours (44%), on to 6-10 hours (19%) and over 10 hours (13%).

Working hours, the role of the scientific staff and autonomy are ongoing discussions in Norwegian academia (Halvorsen, 2020; Vidnes, 2020a, 2020b). The general gist of it at the moment is that many are frustrated over the governance of the universities that results in less autonomy and less focus on scientific work and teaching.

Quality and success criteria

We have already notified the distinction between project management success and project success, but it is also important to reflect on quality and success criteria in this context. The most obvious success criteria is an funding approval from the Research Council and receiving funding for an SFI. However, there are several other possible success criteria that could be put forth, for instance:

- A good starting point for an SFI with a strong team, not merely funding.
- Organizational learning and the ability to re-use parts of the application
- Establishing a good international network

This short example already illustrates the 2 central challenges in defining quality and success in projects (Hussein, 2016, page 37):

1. How to you define success?

2. When do you measure success?

This is closely related to the causes of success criteria change identified in a Norwegian industry study (Hussein, 2012):

1. Poor managerial attitude to success criteria and subsequent neglect
2. Lack of measurability
3. Shifting boundary conditions outside the control of the project

Hussein et al further discuss the problems in defining project success (Hussein, Ahmad and Zidane, 2015), notably including lack of managerial support as one key factor, as well as confirming the relevance of points 1 and 2 above with a new study (N=155).

Teams and collaboration

Especially in the Nordics, teams and collaboration are central in our daily working lives (Levin and Rolfsen, 2015, page 13). One of the key takeaway from the Norwegian original collaboration experiments in 1960s lead by Einar Thorsrud, was the concept of self-organizing groups. This was further developed into 10 decisions points for groups (Gulowsen, 1971) that included things like (1) choosing your own working methods, (2) who is working on what, (3) when to work and so on. Today, we can define teams by their characteristics (Johnson and Johnson, 1991):

- Goal orientation
- Interdependability
- Interpersonal interaction
- Sense of membership
- Common structure
- Mutual influence
- Individual motivation

There are many theoretical avenues to discuss teams beyond these simple characteristics, ranging from how to combine individuals based on personality traits and onward to effects of digital tools. Most of these, although fascinating, fall beyond the scope of this thesis. However, two topics are central. The presence or absence of trust is key in teamwork and especially well rooted in the Nordic approach to work. Specifically, it is considered as a necessary basis for the Norwegian *Trepartssamarbeidet*, a joint agreement between employees, employers and the government (Levin and Rolfsen, 2015, page 32). The other key aspect is communication within the team, defined as “*a persons directed efforts to make something known to others...* (a) social process that encompasses both sharing of information and behaviour” (Levin and Rolfsen, 2015, page 115). Specific aspects of communication include the pattern of communication, the environment for communication and ways of communicating.

Stakeholders

PMBOK (Project Management Institute, 2013, page 391) describes four stages to stakeholder management, namely to (1) identify stakeholders, (2) plan stakeholder management, (3) manage stakeholder engagement and (4) to control stakeholder engagement. Each of these

aspects have their specific methods and processes, most notably the power/interest grid which divides stakeholders into 4 categories based on strategy as shown in Figure B:

:

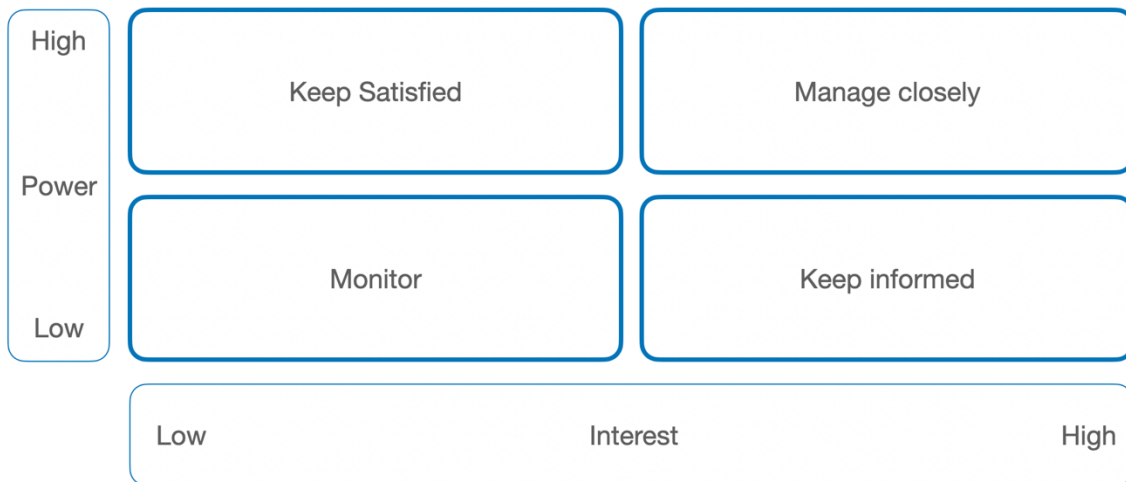


Figure B: Division of stakeholders based on their interest in and power over the project based on PMBOK (Project Management Institute, 2013, page 397).

These processes increase the project managers capacity to anticipate and react to opportunities and challenges earlier (Friedman and Miles, 2002; Karlsen, 2002). Stakeholders can be positive or negative, engaged or indifferent. Their actions can have a large impact on the success or failure of a project. Negative impacts can be accredited to for instance “poor communication, challenges identifying hidden stakeholders, negative publicity about the project in the news or the society’s negative reactions to the project itself” (Aarseth, Rolstadås and Klev, 2015, page 51).

Success factors

Different projects exhibit different sets of success factors and several ways of classifying and organizing success factors have been proposed (Dvir *et al.*, 1998). Pinto and Slevin (1987) documented early on a set of 9 common success factors that were evident in several studies:

1. Clearly defined goals
2. Competent top manager
3. Competent project team members
4. Sufficient resource allocation
5. Adequate communication channels
6. Control mechanisms
7. Feedback capabilities
8. Responsiveness to clients

In Norway, Hussein (2019) describes the relationship between project characteristics and success factors. The case study (N=21) uses 5 project characteristics, 2 of which are highly relevant for an SFI proposal process (and their corresponding identified success factors):

1. Organizational complexity (Timely and purposeful information flow to various stakeholders; Clarity of roles and responsibilities; Project manager with adequate decision-making authority)
2. Uncertainty (Flexibility; Structured risk management process; Use of lessons learned from previous projects; Experience, skills, knowledge and competence; Mindfulness about biases, heuristics such as overoptimism, narrow focus and assumption)

Hussein also proposes that “the empirical findings from this study suggest that trust, openness, respect, loyalty, and commitment are important shared values.”

Zidane et al (2016) describe the importance of understanding the underlying organizational values that form the basis for work such as an SFI proposal. Notably, they differentiate between *shared values* (promoted values) and *practiced values* (values actually shared in the organization) and their congruence in understanding organizational values effect on project performance. They find openness, trust and flexibility to be key values, both shared and practiced. In addition, they find other values, such as positive attitude, tolerance, honesty, engagement and so forth to be present in their construction industry case study (N=15, interview and survey).

Specifically in Norwegian research and development, Ghazinejad et al. (2018) build on the work presented in Zidane et al in a case study from a leading research institution in Norway. They document through interviews that trust, openness and commitment are perceived as important factors for research project success (N=12).

While there is little research done into the success factors of research project proposals, there is an abundance of guidelines that detail how to “write a proposal”. A characteristic example by the Brussels office of University of Bergen (Vlaeminck, n.d.) details the road from reading a call to developing a proposal. Another good example from Hamburg (Gottwald, n.d.) also includes more of the processes around the proposal. Similarly, the Research Council has published 7 tips for writing research proposals (Norwegian Research Council, 2020):

1. Read the call carefully
2. Get to know the proposal template
3. Remember to save often
4. Send the application as soon as possible
5. Read the call guides and reach out to the contact persons in the call
6. Call the hotline before the deadline
7. Keep the deadline

It is difficult to classify these tips/guidelines. Some, like saving your proposal often, are so elementary and obvious that they cannot be considered a significant success factor. On the other hand, there is just as obviously a reason the research council feels the need to include this in their list. Sufficient to say in the context of this thesis is that there is a perceived difference between tips, tricks and guidelines when compared to success factors in the project management literature, although there might be some overlap. Regardless, very few coherent studies of success factors in R&D project proposal development has been found.

The role of the project manager

Several sources point out the central role of the project manager (Project Management Institute, 2013; Hussein, 2016; Pinto, 2016). PMBOK describes the project manager as the lead of the project that has to satisfy the needs of tasks, team and individuals. This is accomplished through (1) Knowledge (what the project manager knows about project management), (2) Performance (what he or she is able to accomplish with said knowledge) and (3) Personal (how he or she behaves when accomplishing these tasks). There is a great emphasis on interpersonal skills, such as leadership, team building, motivation, communication, influencing, trust building and so forth. Pinto (2016) brings up an important discussion of leading versus management, where the former to a larger degree focuses on the partnership between him or herself and the team. Pinto points that (1) exchange of purpose, (2) a right to say no, (3) joint accountability and (4) absolute honesty are all necessary to promote a good partnership. A good example given on the difference between leaders and managers is that while the latter do all the things right, leaders do the right things. A more focused role described is a project champion (originator, entrepreneur, sponsor or manager) who, according to Pinto, are keys to implementation success.

Aarseth et al. (2015, page 35) point out that while a manager will plan, organize, steer and control, “a leader will be responsible for the results and that those results are not made by the leaders themselves.” They also detail the current styles of leadership in the Nordic context:

- Human centric leadership
- Task oriented leadership
- Situation based leadership
- Supporting leadership
- Involving leadership
- Performance based leadership

This list can be expanded with *potential-based leadership* (Barlebo Rasmussen, 2015), which focuses on maximizing the potential of each and every employee in strategic management in knowledge intensive organizations. This book is also used in leadership training at NTNU, both at the level of deans, heads of department and research group leaders.

Other aspects

The aim of this thesis is to examine characteristics SFI proposal processes. To limit the scope of the work, some topics have been excluded, either because they to a large extent are the same for all of the proposal processes or because they are considered not central to the process. These topics include:

- Project organization and integration to daily work at NTNU. While highly relevant during the actual research, the main consideration is time use during the proposal process.
- Portfolios and Programs, since these strategic discussions are mainly done at another level than the actual project proposal teams and are assumed to provide the same framework for every team.

- Project selection and governance at the faculty and rectorate levels of NTNU, as they are also assumed to be same for everyone and because there is a documented push from the top to participate in SFI applications.
- Procurement management as very little is expected to be procured.
- Risk management, as this would both require a very detailed account of occurrences during the proposal process as well assuming that the proposal teams would have had a conscious risk management plan, something none of the interviews gave an expression for.

Methodology

The interviews for this study were conducted after the deadline for the call of SFI-IV in September 2019, but before the funding decisions were published by the Norwegian Research Council. Consequently it has been possible to interview the proposal leaders before they knew the outcome of their proposals but at the same time identify the successful proposals after the interviews were conducted.

The study only interviews project leads on NTNU-led proposals, working at NTNU, on a very specific and large call. This introduces both a context and a bias into the study. Specifically, the findings need to be understood in the organisational context of NTNU, which notably the author also is a part of. This makes it hard to determine if different characteristics in the proposals are universal, spring from the organisational context or if it is introduced by the proposal team itself. Also within this consideration is the fact that NTNU is a very diverse and large organisation, making pinpointing causes difficult.

Another clear bias introduced by the selection of participants is the assumed opposing views of other partners or stakeholders. In some proposals, the industry's view of the proposal was clearly so negative that they chose not to support it, in some cases resulting in the withdrawal of the proposal. The difference between their considerations and the considerations of the interview participants is not documented and would likely both introduce depth and opposing view to some of the claims by the participants in the study. This also goes for researchers from SINTEF, administrative personnel, other members of the core group, individual industry representatives and so forth. To cover such a large group of stakeholders in the proposal it would have been only possible to examine one or two proposals, leaving it up to chance whether or not those would be successful or not. It was therefore considered necessary to define a narrower participant pool in order to cover more proposals.

The main ethical consideration of the study is the relationship between the participants and their working environment. Given that the participants describe the roles and relationships at work, a non-anonymous study could potentially expose their opinions in a very un-professional manner and therefore result in placing them in a difficult position. At the same time, it is important to document both the negative and positive characteristics of the research proposal process. Therefore, the study has gone to great lengths in order to ensure the anonymity of the participants.

Since there is very little previous work done on understanding the process of writing research proposals from a project management point of view, the thesis adopted an exploratory approach in the form of semi-structured interviews with relatively open questions. This was conducted as per recommendations of interview design (Jacobsen, 2018, page 122) to promote non-biased results when the subject area is not well understood. It has to be mentioned that the author works at NTNU and so there was concerted efforts to reduce assumptions and bias. There have never been direct working relations between the author and the participants. At the same time, working within the same organisation is assumed to have aided in getting access to the participants as well as an initial positive attitude towards the study, as opposed to this study being conducted in an organisation that could be seen as a competitor for research funding.

The methodology in this study consists of 4 parts:

- Design of interview guide and questions
- Conducting the interviews
- Text processing and verification
- Building matrices and identifying findings.

This is followed by the necessary discussions and conclusions as illustrated in Figure C:

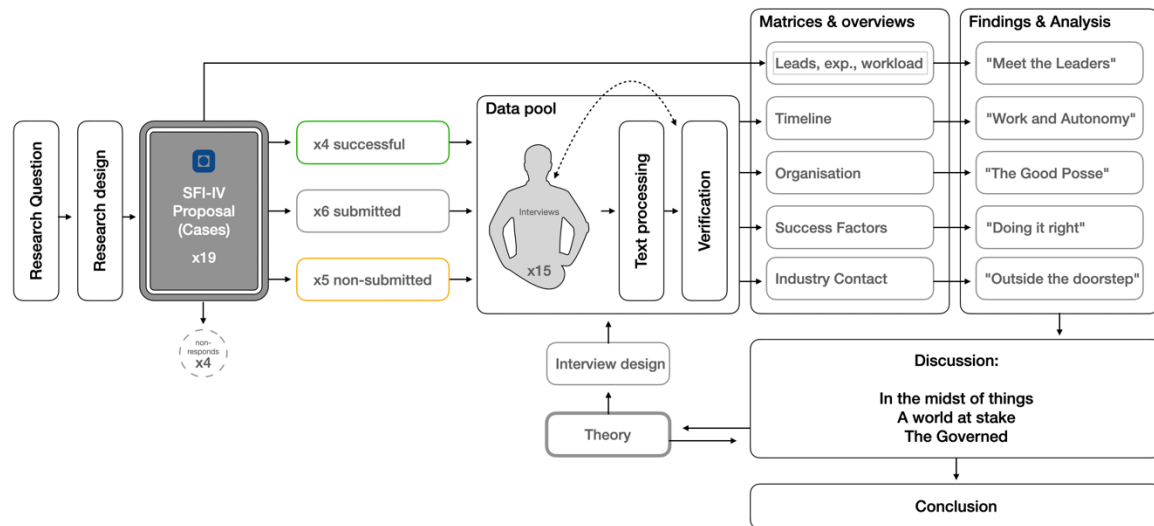


Figure C: Illustration of workflow and methodology of the thesis.

Design of interview guide and questions

The questions themselves are based on project management theory and designed to encourage the interview subject to put their own words on experiences, thoughts and reflections of the research proposal process. The specific questions and their theoretical justifications were:

NOR: Kan du fortelle litt om søknaden dere skrev?

ENG: Could you tell me a little bit about the proposal you wrote?

This question is designed to give the necessary background on the proposal, i.e. what scientific/societal field it was from, what were the specific topics and so forth. This question worked as an ice-breaker and to give both enough common ground to have a fluent dialogue about the work and for the interviewer to have enough context to understand the rest of the interview.

NOR: Hva var motivasjonen for å søke?

ENG: What was your motivation to develop a proposal?

This question encourages a chronological approach, what happened in the very beginning? In terms of project management, this is considered background or problem statement. Possible reasons might include such things as push from faculty or department (i.e. governance), expanding existing research (portfolio of program organization), corresponding to external events (strategy) or other aspects. This question might also introduce self-reflection on the personal motivation of the project manager, which could also be discussed within the theoretical approach of knowledge work. Altogether, it is important to understand whether

the motivation is internal or external in nature and try to identify some factors that resulted in the proposal process.

NOR: Hvordan la NTNU og ledelsen til rette for søknaden?

ENG: How did NTNU and your leaders provide support?

This question provides background on whether or not the proposal had the support of the leadership and at what level. The question is intentionally left open as to which level of leadership is discussed, so that the participant can naturally make this choice. It is also important to understand what form this support, if any, was provided in and if the proposal actually benefited from it? Specifically important aspect here was whether or not the leadership at some level were active participants in the proposal or if they simply provided other support. Another key aspect here is the working conditions of the project manager, especially regarding whether or not the proposal was developed as overtime or if the person was exempt from other duties during the proposal period.

NOR: Hvordan var teamet som utviklet søknaden?

ENG: How was the team that developed the proposal?

This question is to encourage a reflection on the team and how their collaboration worked during the entire process. Specifically, this is also to better understand how large or small the teams were, how were they organised internally and to what extent this provide a positive or negative contribution to the work?

NOR: Hvordan var samarbeidet med eksterne?

ENG: How was the collaboration with external parties?

This question is to encourage discussions about the stakeholders without specifically mentioning the specific word. External parties, such as industry, are perhaps the most important stakeholders, but obviously this topic is broader than this question as it ties to both leadership, administration and others. However, both the Research Council and NTNU has previously pointed out that industry participation is a weak point in SFIs and it is also "common knowledge" at NTNU that getting industry participation can be tough on some projects, both before and after funding. When active, this topic can be discussed as relationship management or stakeholder management, but also ties into communication aspects within project management theory.

NOR: Hvordan var det å lede søknadsprosessen?

ENG: What was it like to lead the proposal process?

This question is intended to get the interviewee to reflect on their own role in the process and what they personally did, contributed to, neglected or prevented. Replies could be discussed based on autonomy, knowledge work, the concept of a project champion or other similar theoretical approaches.

NOR: Har du bakgrunn innen prosjektledelse?

ENG: Do you have a background as a project manager?

While it is clear that most likely all of the proposal leads have a vast experience in leading research projects, it is important to establish whether or not they have formal education within the field or have learned things on the job, as well as how big this experience is.

NOR: Hvordan var samarbeidet med administrasjonen?

ENG: How was the collaboration with the administration?

This question ties into the proposal leads understanding of stakeholders, as well as establishing a specific part of the support framework for the proposal.

NOR: Hva tror du er de viktigste tingene å passe på for at man skal lykkes med en søknad?

ENG: What do you think are the most important things to consider in order to succeed with a proposal?

This question tries to establish a reflection of causality in the project lead and to promote them to put words in what success factors they consider the most important.

NOR: Ble det gjort noe evaluering av prosessen?

ENG: Did you evaluate your process?

This question tries to establish whether or not reviewing and iteration are included as part of a holistic approach to writing applications, but also to see whether organisational learning or a wider concept such as project success (in contrast to project management success) is focused on.

Conducting the interviews

The interview process started with contacting the 19 proposal leads. These included all that delivered a sketch for the first April dead-line, including those that did not submit a final proposal. Those initiatives that did not deliver an April sketch were not documented in any way during the process and could therefore not be included in the study. Only proposals lead by NTNU were included, although in hindsight the discussions of leading between NTNU and SINTEF could have warranted including also SINTEF-led proposals. The initial contact was made by phone. The goal of the first contact was to introduce the study in few words and to ask if they would be interested in receiving more information by e-mail and to participate. Each participant was told that participation was entirely voluntary. If no contact was reached after 3-4 tries, an e-mail was sent. It has to be noted that due to the Covid-19 pandemic and the fact that some participants only listed their work phone number on the NTNU Website, the departments of the respective participants were used to get in touch.

17 of the 19 participants were reached and 15 agreed to the interview while 2 did not respond after initial contact. These 15 received an invitation to the study as a PDF (see Appendix A) and were given a list of proposed time slots in the near future to choose from in order to participate. Due to the Covid-19 pandemic, the interviews themselves were conducted online via video-based tools, mostly Microsoft Teams and Skype, in the period of March to June 2020.

Each interview started with a short introduction, notifying the participant once again that it was voluntary to participate, informing them that the study would strive for anonymity and then conducting the interview as described in the interview guide. All questions were

conducted in the order of the guide, unless the participant him or herself brought up topics or the natural dialogue warranted an adjustment. The interviews themselves were to a large extent a narrative from the participant as all were interested in telling about their experiences. This also included other aspects of the proposal process that the participants themselves decided to highlight during the interview.

The interview was documented by making written notes while conducting the interview. This included both topics and direct quotes, as thoroughly as possible. The interview was not recorded as NTNU's IT systems did not offer this functionality at the time, nor was there a technically feasible method of doing this within the constraints of the Norwegian GDPR legislation. Each interview lasted between 25 and 40 minutes. Immediately after the interview, all notes were reviewed and as much as possible of the narrative was recreated.

Text processing and verification

A very important aspect of the study was to guarantee the anonymity of a relatively small group of project leads and to ensure that Norwegian GDPR legislation was followed. This was communicated clearly to the participants. To ensure this, the following steps were taken:

- The text was translated to English and the flow of the text altered to the same tone and narrative style to match the other interviews, as there were identifying traits within the text. This included shifting the order of paragraphs in the narratives to make them consistent.
- All numbers of how many people in groups, teams and gatherings were made approximate.
- All company names, fields of study, faculties and departments were anonymised with the exception of NTNU and SINTEF, as these both were present in so many proposals that they could not be used to identify the person giving the interview.
- Any directly identifying aspects, such as illnesses or shifts in proposal leadership were omitted.

The text was then sent back to the participant who was allowed to read through the narrative and to confirm that it represented a true and accurate account of their interview. Those who wished to change the text were given the possibility to do so. The changes consisted of either clear misunderstandings or misheard details, increasing precision in some parts or, in a few cases, to omit some identifying characteristic that was not identified beforehand. Eight participants made corrections, 3 verified that there were no corrections while 4 did not respond to the offer to make corrections.

Both losing the opportunity to record the interviews in person due to the Covid-19 pandemic and consequent necessity to re-write the interview in accordance to the GDPR requirements potentially introduces two sources for inaccuracy. Both of these were partly corrected by giving each participant the opportunity to read, comment and correct their narrative. Also, while details might have been distorted, the general story of the narrative is considered to be intact and accurate to the extent that they are valid for the purpose of this study.

Developing Matrices

As mentioned before, the study adopted an exploratory approach to identifying interesting topics within the interviews. This was largely done by developing matrices of answers that

could be used to identify similarities or differences in the characteristics of the individual proposals. Each matrix included every proposal, but naturally there were elements that were only mentioned by some of the participants. In these cases the data points were left blank. In each matrix, the proposals were marked according to whether they were a) successful, b) submitted but not successful or c) not submitted. It is clear that the interviews could be approached in many ways and do provide a wealth of information beyond what is documented in this study. It is also clear that while some aspects could be quantified, the matrices themselves hold qualitative nuances that are important in understanding the results.

Seven matrices were developed (Appendix D):

1. **Leads:** Analysis of the 19 proposal leads with regards to their positions at NTNU, affiliation, scientific output and other variables. This matrix is only presented in aggregated form due to GDPR considerations.
2. **Workload:** Analysis of time used by the proposal leads to develop the application.
3. **Timeline:** Analysis of all details that had a chronological reference or were described with a magnitude (such as “many workshops in the spring”). This also included the workload of the proposal lead during the work period, which was asked for explicitly during the interview, as well as any work load on fellow team members that was offered. The collected data was structured as coherently as possible. This included converting the workload to the same format as detailed in the findings section in order to calculate averages deviations and other factors.
4. **Success factors:** Each participant was asked to reflect on which success factors they deemed most important in order to succeed. These factors were documented in a matrix and categorised by grouping similar claims. Each occurrence of a success factor was evaluated in relation to its surrounding text to ensure that it belonged to a specific category.
5. **Organisation:** For those proposals that varied the most, each entity (person, company, sector and so forth) was documented and their role and interactions were visually represented to uncover the interactions between different entities. Notably, the proposal was also included as an entity, as it was often used as an intermediary between the writing group and other proposal stakeholders. Where given, the manner of the connection was also documented. Finally, all entities from all proposals were listed and analysed to document the potential roles.
6. **Industry contact:** During the interviews, it was noted that the individual participants described their relation to the industry in distinctly different manner. This was systematically examined and the approaches that were used in each proposal were identified.
7. **Project Management experience:** Extract from interview question regarding project management experience divided into experience from industry and academia, as well as formal training at course, study or research level.

These interviews show a wealth of information, much more than can be analysed within the time frame of this study. Given time, more information could be gathered.

Findings

As you will recall, this exploratory study tries to define the characteristics of large research proposal processes through the lens of project management. It is expected that these processes, while rarely planned as projects, still show project traits and that project management theory can be used to discuss different aspects to gain insight into pros and cons of different approaches. Through the performed interviews, many such traits and characteristics were discovered, although the evidence ranges from explicit and quantifiable characteristics to more tenuous hints of certain mechanisms. This section is divided into 5 specific topics that each provide a perspective into the proposal process.

Meet the leaders

“You need a well organised and holistic approach for the centre, ranging from vision to goals”

-Participant

While all the people interviewed emphasised the team effort going into the proposal, some also pointed out that they were the ones that worked the most, focused the most and, simply put, lead the most. Now while there might be a certain bias towards estimating one’s own work load and effort, the point remains: someone has to take the lead. And we can therefore ask, who are these leads, when seen collectively as a group?

Spearheading professors

To point out the obvious, leads are established researchers. Of the 19 proposals considered, all but 2 were led by professors. The remaining two were led by associate professors. While this might seem an easy categorisation, the interviews did uncover some internal processes that give a more diverse picture. 2 of the proposals were spearheaded by the heads of department during the development and in both cases, the final lead in the proposal was changed during the process. At the same time, 3 of the professors have positions within the management of their departments or other major organisational constructs within NTNU.

Able researchers

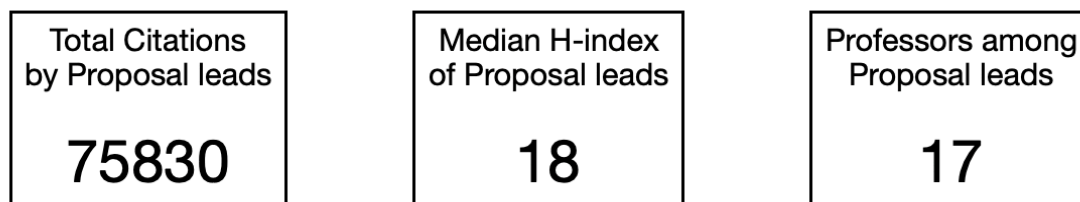


Figure D: Key figures of publication activity among the proposal leads.

When looking more closely at the scientific output from the leads, the range varies quite widely. Using data acquired from *Google Scholar*, alternatively *Researchgate* if *Google Scholar* is not available, we see that the h-index ranges from 5 to 64, averaging out on 21 with a median value of 18. Looking at the citations, the span is also clear. From 156 citations at the lowest to 48856 at the highest. This lands the average at just shy of 4000 citations, but

most notably, the median at 1075. The top 2-3 researchers have a significant impact on the statistic, but at the same time it is clear that most are well established and productive within their fields of research. It should also be noted, that different disciplines have different outlets for research and it is very difficult to compare h-index and citations across so varied scientific fields as is the case here.

Skewed gender balance

On a more sombre note, the vast majority of the proposals are led by men. This is especially concerning, since out of the 4 proposals with women as the lead in the final submission, two took over a proposal development process initiated and first lead by men. The research council has a distinct point in their templates addressing gender balance and having a woman lead in a proposal is looked upon as a positive aspect, increasing the chances of success. This might be problematic when a proposal is changed from a male to a female lead, as it might be looked upon as a tactical manoeuvre to increase selection chances. However, there are no indications in any of the interviews that this would be the case, as both changes were the result of external factors. From the interviews it seems like simply the most competent people were chosen to continue the work.

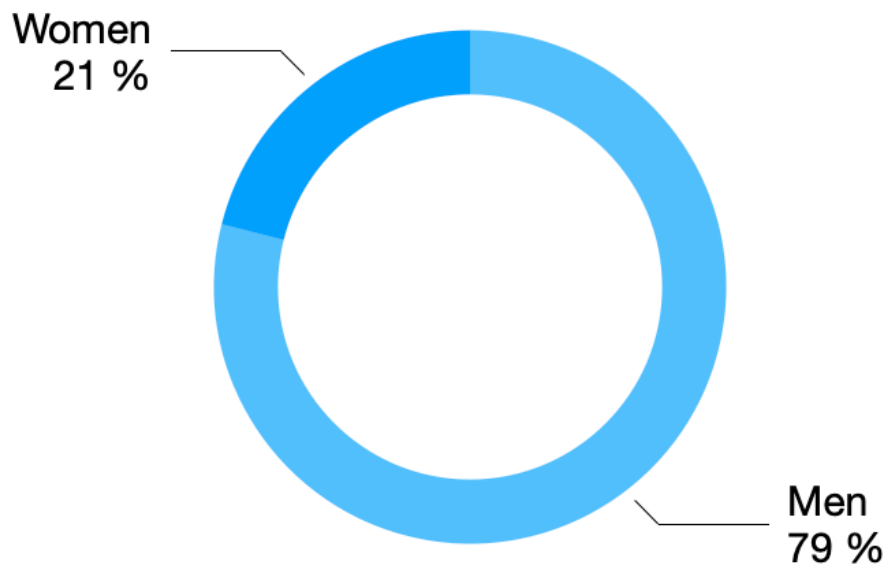


Figure E: Gender balance in proposal leads upon submission.

At the same time, this does not change the fact that only 2 women spearheaded a SFI-proposal process from the early stages to the end.

One final play?

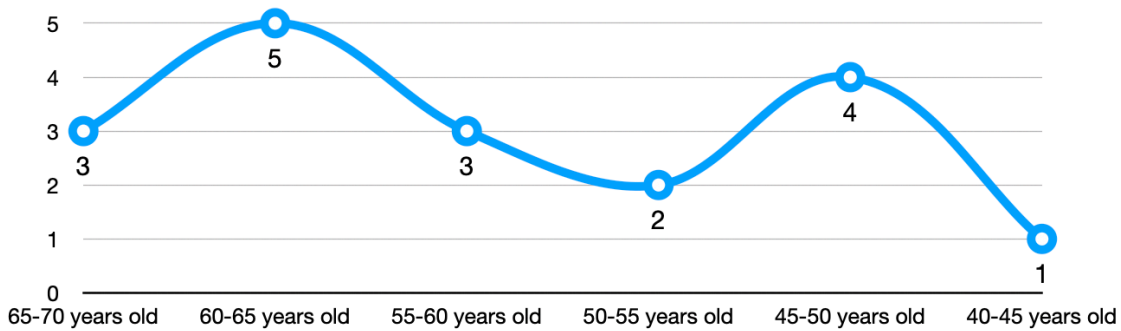


Figure F: Age distribution of project leads.

Having already established that the leads are competent researchers, it is also interesting to look at the age span of the leads, from 43 years old to 67 years. Both the average and the median age is 56 years. Given a retirement age of 67, four people will be retired before the initial 5 years of an SFI are complete. An additional 4 would retire if we account for a 3-year extensions on the SFIs, (given that the centres are started in 2020 regardless of Covid-19). Five of the proposal leads are born in the 70's, being in their forties and representing what might be called a younger generation in this context. Looking at the group overall, a significant portion of the leads seem to be towards the end of their careers.

Projects learned on the job

All of the participants are experienced project managers when it comes to research projects. Of the 15, six also have run industry projects and quite a few have experience from SINTEF as well. As such, each of the participants considered themselves to be well capable as project managers.

When considering formal training, the picture was more varied. Eight participants had participated in varied project management courses, but most noted that the value of these was limited, either due to the content or due to the fact that these were of short duration well in the past. Only two participants had formal education within project management.

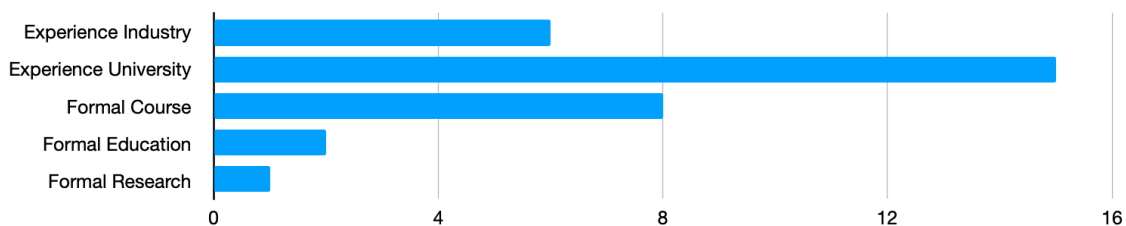


Figure G: Project management experience among the project leads.

It was noted by one of the participants that it is strange that NTNU does not offer or even require research project training as part of the employment as they do with a 100 hour pedagogical course:

“There should have been an SFI school, a sort of professors school at the departments where we could share best practice. We should have had this NTNU-wide, a forum where

experienced people can share what they have learned along the way to newcomers. We should systematically look at best practice in relation to the application processes.”

This reflection pinpoints the perceived potential of a more systematic approach at NTNU in terms of project management training, versus just learning on the job.

So who are the leaders?

The leaders mostly established researchers with a long career, a significant academic output already in their CVs and mostly men. Organisationally, this raises at least 2 questions. Firstly, the small proportion of the women leading SFI proposals is clearly problematic. While 19 proposals is too low of a sample size to draw conclusions from alone, it is clear that the structure follows a trend of inequality which is well documented in academia. Secondly, several interview subjects point out the importance of SFIs as a long-term learning arena. It is therefore paradoxical that the arguably most valuable position in the SFI in terms of developing the ability to spearhead large projects, is to a large extent occupied by people at the ends of their careers. As such, enabling researchers to initiate these types of proposals earlier in their career would likely benefit NTNU in the long term. At the same time, the Research Councils focus on Project Manager CVs makes this difficult to achieve in practice.

Another notable aspect is the absence of formal project management training. At an organisational level, this seems to be an area of great potential, considering the participants are both late in their careers and still pinpoint the importance of shared learning. As such, this is perhaps a neglected area of sharing knowledge.

Work and autonomy

“This thing really took a lot of time.”

- Participant

The interviews showed that the proposal processes began at in different points in time. While some proposals effectively launched after the faculty deadlines had passed in December 2018, others started years before. The first proposal started with talks as early as February 2016, around 3,5 years before the application deadline. As such, the proposals can be categorised based on the length of their process:

Early starters (2016): 2 of which both were succesful

Planners (late 2017-early 2018): 7 of which 1 was successful and 2 were not sent

Late runners (late 2018): 4 of which 1 was successful and 2 were not sent

Many of the interviewees made a distinction between the work before January 2019 and after. This coincides with NTNUs internal deadlines where it was necessary to write a 1-pager or similar document. It could be that this time also signified a point of commitment and a need for clarification on the topic, spurring an increased focus on developing the application and "getting things done." From this point on, it becomes easier to compare the time used to develop the proposals. The hours used by the project leads accounts for a large extra strain during January to September of 2019. Assuming a normal working year of 1850 hours and that work ceased on September 10th, the average time use per proposal was 385 hours for the project lead, or 2.12 hours per day. All but 2 respondents pointed out that these hours were used "on top of everything else", i.e. they were given no exemptions from existing duties,

teaching, research or other work. Several interviewees pointed out that the work load was considerable, with ill effects to their own health and/or the quality of the work they were doing otherwise. Many of the project leads were sceptical of attempting a SFI proposal again, a significant finding considering that the interviews were conducted while the results of the proposals were not yet published but months after the actual deadline. It is clear that many consider the experience to be stressful and negative, even after considerable time.

Using the average of 385 hours for both the 15 interviewed proposals as well as the 4 un-interviewed ones, the total hours used by the NTNU projects leads from January to September in 2019 is estimated to be 7300 hours or 7,3 mNOK given a 1000 NOK/hour cost per professor as per the TDI model used at NTNU. It is important to note that this is only partly the cost of developing the proposal as it does not include:

1. The work of the project lead prior to 2019
2. The work by any other scientific personnel than the project lead
3. The work done by administration at NTNU, such as budgeting, guidance, etc
4. The direct costs on the proposal, such as travels, meetings, venues, etc.

This clearly shows that the overall cost to NTNU as an organisation is considerably higher, although it cannot be quantified well based solely on the interviews. At the same time, it is justified to say that the SFI-IV call process at NTNU generally made possible due to the extraordinary and unpaid work done by project leads, in some cases with considerable ill effects to themselves and their work.

The Good Posse

“In the end, it’s all about collaboration and involvement.”

-Participant

The proposals show many different organisations and, perhaps more importantly, many different roles in the proposals. The interview did not specifically ask for details of each role, nor is it possible to define in black and white terms the inclusion of different roles. For instance, how much a professor actually helped in the development of a work package might vary both in time and situation, a grey area of whether or not they were part of the project team or not. Additionally, the findings presented here only show the organisation from the viewpoint of the project lead and this would no doubt look quite different if we could include the inner workings of say, industry partners or faculty administration. Nevertheless, there are some similarities that can be pointed out, some variance and also some characteristics that are more prevalent in the successful SFI proposals.

Illustrated below are 3 different approaches to organising the proposal. Proposal Delta shows a very detailed hierarchy and planned approach, resulting in a large and complex structure. This proposal shows a method of distributing the workload with defined roles and well set up structures. It has to be noted that this was the only proposal that explicitly stated that they had a complete proposal available for partner review before the summer. Proposal Mu has a similar approach, focusing on industry involvement. The organisation, however differs, as it seems the approach is much more agile and focused on individuals. At the same time, this proposal had very clear common vision from the beginning and the industry bonds to build a consortium on top of that vision. Finally, Proposal Mu shows an NTNU-centric approach where much of the proposal was developed by a small group of people. A slow start and late

industry involvement developed into lack of commitment from both internal and external partners, finally terminating the proposal before the deadline.

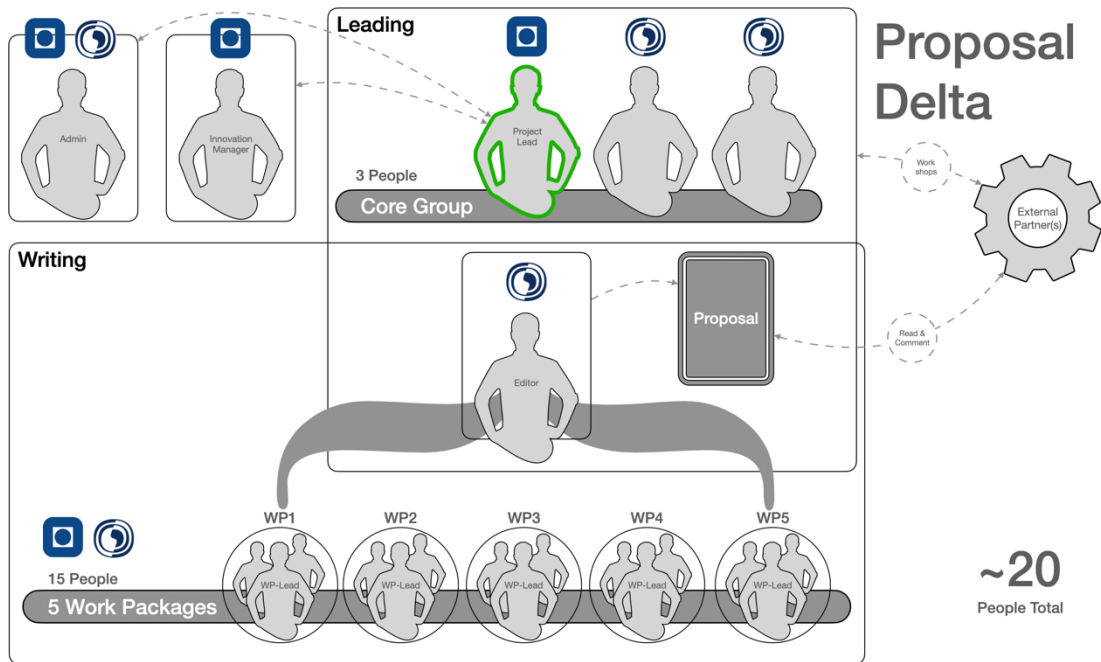


Figure H: Organisation of Proposal Delta, the most complex organisation that could be extracted from the interviews. The proposal a separate writing structure with a dedicated editor, while the proposal lead focused on industry dialogue, together with 2 colleagues.

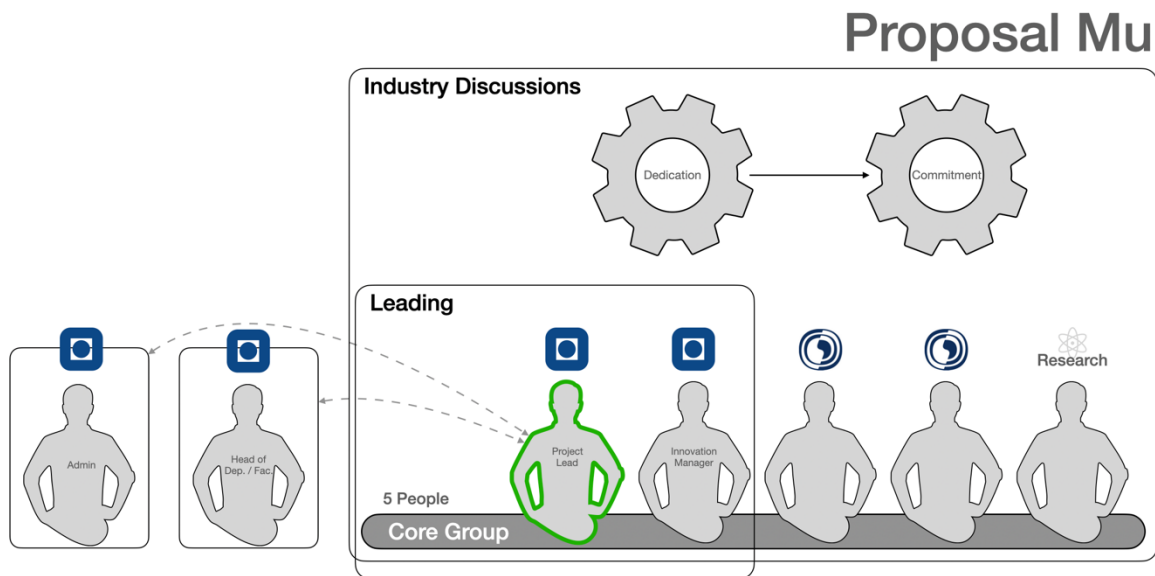


Figure I: Organisation of Proposal Mu, which was characterised by high dynamics, massive industry contact and an agile approach.

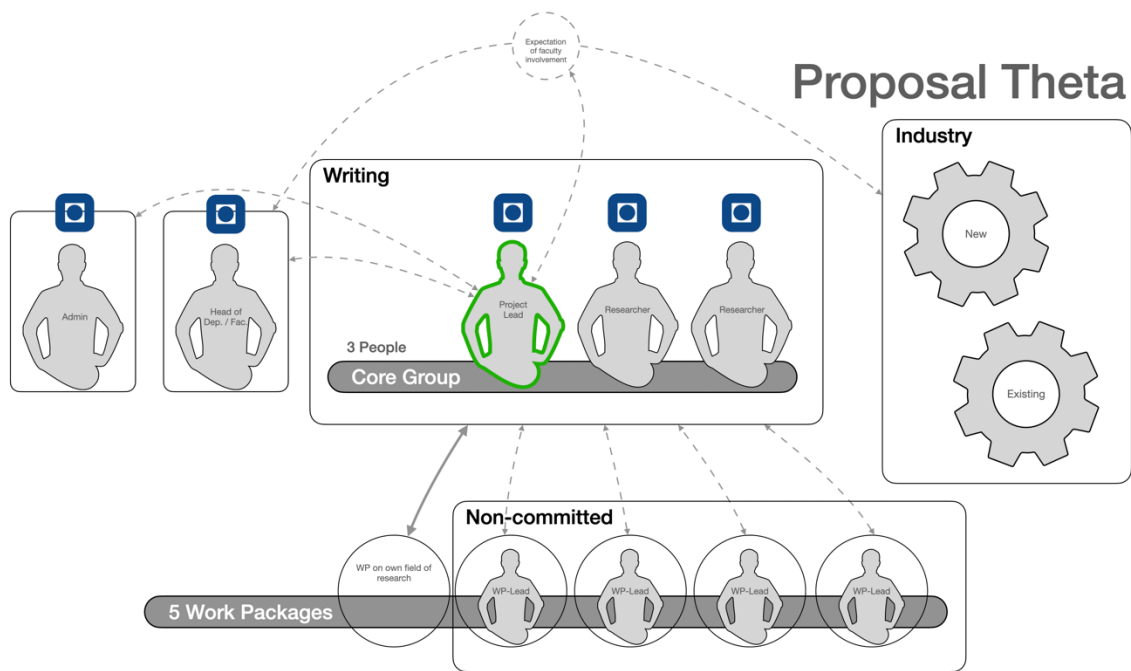


Figure J: Organisation of Proposal Theta, which was characterised by difficulties with commitment both inside NTNU and from the industry.

Core group

In all proposals, there is a core group or team that is at the midst of things. The project lead is in each case defined as part of this group. Beyond that, it is somewhat fluid, in some cases being only 2 people in the beginning and then increasing to up to 5. There is very rarely an impression of this group being larger than 5 people, but other mechanisms for including people beyond this are in place. In most cases this group is in charge of the writing process and the industry contact. The balance between these two tasks is one of the key defining characteristics of the teams and discussed more thoroughly afterwards.

Governance

There are a few examples of a steering committee or similar body, in addition to more or less formal contact with heads of departments, deans, leaders at SINTEF or other leaders in their respective organisations. A distinction here is that a steering committee is unique to the individual proposal, while other governing bodies will actively balance several SFI proposals and are usually not directly involved in the development beyond timed comments and checks regarding formal arrangements within the organisations. In all cases, the steering committee consists of representatives from the central organisations. Their function is in some cases to align the organisations and ensure strategic support, but can also be more directly involved in the development.

From the interviews, we can identify 14 roles in the proposals, as shown in Figure K:

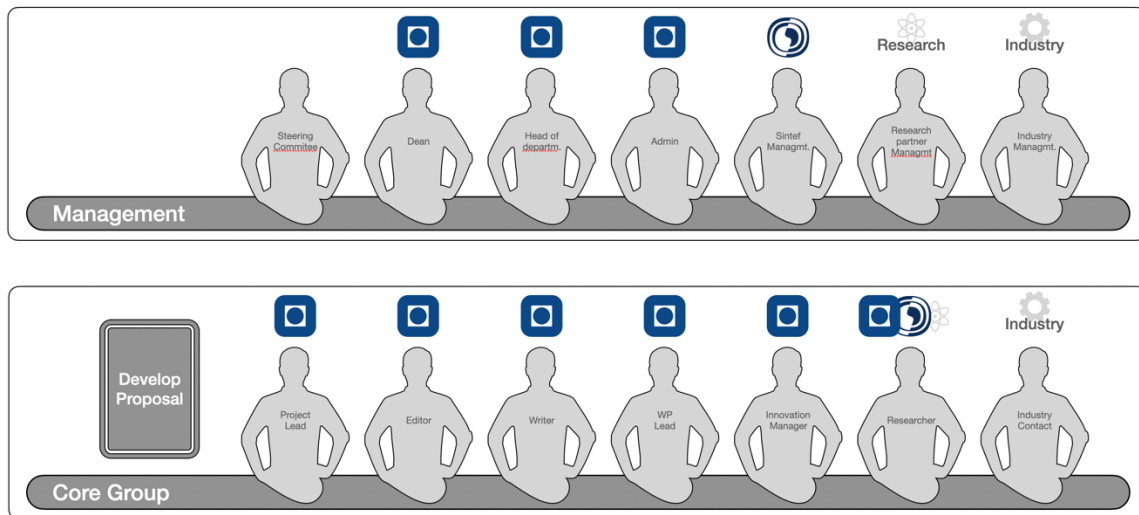


Figure K: Identified roles in Core group and Management.

Communication

The interviews uncovered 6 communications methods with each their own characteristics in active use:

- Email and written correspondence
- Phone calls
- Online video meetings
- In-person meetings
- Workshops and seminars
- Online repositories

All of these methods serve different nuances of communication in the projects, but notably the proposals that had a high focus on industry collaboration described a high number of workshops (10-20-30 and even more) while those that focused more on application writing had perhaps only 1 or 2 workshops, if any. Similarly, industry focused proposals had more in-person meetings with the industry, while those working on application writing had more internal in-person meetings. 3 of the 4 interviewed proposals that succeeded in financing an SFI, had a large focus on workshops and a massive industry contact, while the final successful proposal also had a high industry focus, but mostly communicated without joint meetings. On the other hand, 3 of the proposals that were not delivered had limited communication with the industry and all failed to secure large enough industry interest during the process.

Administration and budgeting

At NTNU, the budgeting for research proposals can be quite complex and in the case of SFIs, it is done by highly skilled individuals. It has to be noted that of 15 proposals, 13 were very happy with the budgeting help from the administration, 1 was unhappy due to circumstances and 1 was unhappy due to the work. At the same time, 3 people noted that the administration could have been more part of the core team, as the budgeting in most cases seem to be both 1) a dialogue between the project lead and a project economist, 2) not include any processes

between organisations, i.e. each organisation does their own budgets and 3) the project economists are not included in the development of the joint budget, i.e. the allocation of the funds to different partners in the proposal.

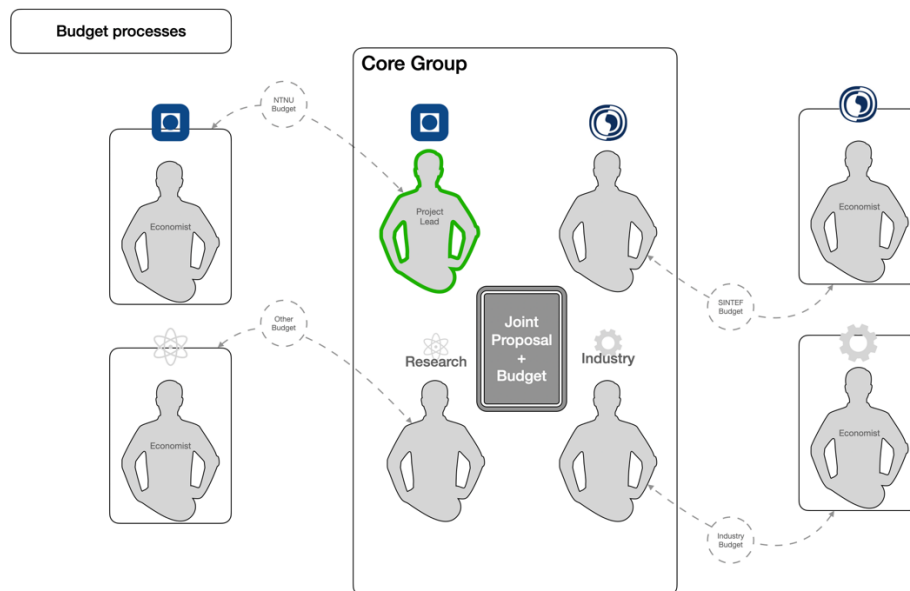


Figure L: Budgeting between partners is done in the core group, seemingly without administrative help, while budgeting within each host organisation is done internally. This could present inaccuracies in budgeting.

Doing it Right

“Something that doesn't get said much is that you need the opportunity to think”

- Participant

Each of the participants was asked what they considered to be important in order to succeed with a proposal. Without using the words, they were asked to suggest the most important success factors in hindsight. As expected, their answers, 47 in total, were varied and nuanced. On average, the participants offered 3,13 success factors, ranging from 2 to 7. One participant did not mention success factors during the interview.

Several different categorisations are possible and would likely yield other patterns of understanding. However, as this is a study within project management, the choice landed on topics from established theory, presented here from most mentions to least.

Communication

Getting your message across was mentioned 20 times by the participants in different variations. While being suggested the most, this is also a category that has the largest span, as communication ranges from convincing the industry to fund the proposal to broader considerations like developing a good narrative or graphics that support that narrative, or manage expectations. The common factor of these statements is however that the communication is described as one way. The message is composed with the intent of persuading the recipient to take action that is certain, well-defined and planned.

Governance and resource management

The framework within which the proposals operate was mentioned 10 times. This includes a wide variety of topics spanning from resources to positive attitudes from one's leaders. This is linked to another aspect that is well established in the interviews and also turns up in success factors, namely the time and resources to focus on the proposal itself. This includes administration support and the ability to start early, i.e. the longevity of the support. To summarize, the relevant success factor is to have leader support and resource availability as well as mental, administrative and financial support. This also means that the leaders of at the department will need to understand and be updated quite frequently of the proposal process in order to govern it effectively.

Stakeholders

While communication was defined as a more one-way interplay, 8 mentions of stakeholders focus more on two-way dialogue and the ability to collect ideas and build a common goal based on a common understanding. The main difference here is that the stakeholders are invited in as part of the proposal process instead of being defined as "users" or "industry" – they are all part of the proposal and the team behind it. There is also a clear tendency in the beginning of some of the proposals to engage with many stakeholder sin order to receive information, while others focus on internal development in order to send it to others after it is already well defined.

Team

If stakeholders are understood as the surroundings, the team is very much those on the inside. Eight participants were clear that the team was a key success factor. It is important that this differs from resource management in that the interest is not in hours as much it is the hearts and minds of the right people. This includes that people are heard and valued, there is a feeling of trust, the focus is on leadership and not management and this all leads to the correct consortium to develop the task. The participants define a fine balance between individualism and common purpose as you need diversity, but that diversity needs to be direct towards a joint goal.

Problem definition

Interestingly, only 5 people mentioned problem definition as a success factor. This included knowing the framework within which one worked in – the call - as well as focus on the innovation and novelty of the proposal, i.e. how it fits into societal needs. There are a few possible explanations for this. Either the problem definition is already given, meaning that the project core group already knows everything about the topic and can therefore describe this with little difficulty. Another possibility is that the core group thinks this is a result of the proposal process and as such not a success factor in itself. This means that for instance engaging with the stakeholders would be more in focus as a success factor, because it enables problem definition. This means that in this context the problem definition must only refer to the ease of the process of defining it, not the actual content or problem itself.

Success factors compared to proposal outcome

When comparing the success factors to the outcomes (see Appendix D – Success factors) from each proposal it can be pointed out that two of the successful proposals had the most mentioned success factors, seven each. These two proposals also show a larger variety of different topics mentioned. The non-submitted proposals had a larger focus on communication and convincing the industry, while the successful proposals had a larger focus on involving the industry as stakeholders and team. There was little variance concerning governance and resource management or problem definition.

Outside the doorstep

“If you don't have the partners, you have nothing”

- Participant

The process of engaging with the industry was central in each proposal, but approaches differed. Not every participant provided information on each aspect, so the findings should be considered confirmed positives or negatives, with many blank spots distributed throughout. Starting out, 8 of the 15 participants pointed out that they already had an existing centre, large project or other construct that was within the concept of their SFI proposal. In contrast, 5 of the SFI proposals focused on new ground and were not based on an existing project. At a more detailed level, 8 participants pointed at significant organisational ties already existing within the consortium and 4 confirmed also strong personal ties to other industry partners, mostly through individuals having worked there during their career.

Continuing from existing ties, the proposals were categorised based on their attitude towards the industry, most notably what mechanism of interaction was chosen by the core team when approaching the industry. Six proposals were developed quite far within NTNU before contacting the industry, at which point the focus was to communicate the proposal. Four more proposals had a more continuous focus on industry involvement, but still considered these to be 2 separate processes. One additional proposal did this, but had a different divide where some industry partners were involved in the core development. Finally, 4 proposals had a massive focus on industry interaction and viewed the proposal development and the industry interaction as the same process. These proposals had many industry workshops and also included the industry in the proposal writing process to a larger extent.

When distributed between the non-submitted, submitted and funded proposals, the approach to involving the industry is distributed as:

- Of the non-submitted proposals only 1 had a previous project with some organisational ties. The other proposals had little organisational or personal ties to the industry. All but one of the proposals chose the strategy of developing the proposal at NTNU and only approached industry later on. The industry contact involved one-on-one contacts, with few joint gatherings.
- For Submitted proposals, we find several existing projects as background and also well-established organisational ties, but with only 1 proposal with strong personal ties. There is a larger focus on industry involvement, but these are still mostly two separate processes.

- For the funded proposals, we uniquely find both strong personal ties between the proposals and the industry as well as a massive focus on the industry from the very beginning of the process.

Findings summary

The 5 sections above show that there are both similarities and differences in the proposals.

The main similarities consist of:

- The Proposal Lead is an established academic, often a male late in his career and has extensive background from projects, but rarely formal training.
- The Proposal Leads work significant overtime without compensation in order to develop the proposal, often with ill effects on other work or their health.
- The proposals main organisational unit is a core team that works well and consists often of 2-5 people. While sporadic connections to NTNU management exist, the teams are largely autonomous and are rarely steered.
- The proposals are generally very satisfied with administrative help and budgeting.

The main differences consist of:

- Proposals that focused more on one-way communication from the core team to the industry were less likely to secure funding.
- Proposals that focused on massive involvement of the industry and two-way dialogue were more successful in securing funding.
- Proposals that had existing organisational and personal ties to industry were more successful in securing funding.
- Proposals that had a larger focus on industry participation and involvement were more successful in securing funding.

We will draw upon these main similarities and differences, as well as other aspects and nuances from the interviews, as we now begin discussing the findings from a theoretical perspective and defining the project characteristics of a research proposal development.

Analysis and discussion

There is clearly no one-size-fits-all solution for developing an SFI proposal. The participants find themselves affected by different pressures and respond to them differently. Nevertheless, the findings show some common ground that can be discussed with the lenses of project management theory, namely the internal workings of a proposal, the process of developing a consortium and finally, the organisational challenges and opportunities of research proposals. In this section, we examine how project management theory can provide useful perspectives and uncover key characteristics of proposal process development.

In the midst of things

At the core of the research proposal is the team and the project lead. Understanding the mechanics of these two parts is essential in understanding the research proposal process as a whole. Let's start by discussing the role of the project lead and expand from there.

The Blunted Spearhead

"To be honest, I would probably become depressed if I ever wrote down my hours."

-Participant

The SFI proposal, and indeed other proposals of this magnitude, represent a considerable effort to attempt, let alone accomplish. (Ramberg, 2016). The brunt of the workload is something all of the participants commented, but perhaps more interestingly, they all considered this "a given", "part of the job" or many other expressions for normal, if not an everyday occurrence. Simply put, it was as they expected. To add even more depth to understanding this position, they also worked considerable overtime, often balancing other tasks such as teaching, supervising, administration and research to the point where there simply was no more time left around the clock and the SFI proposal became almost all-consuming near the end. The complete lack of slack seems to have resulted both in neglect of other work as well as deteriorated health, a common symptom of stress over time. In order to understand why this situation arises, we have to understand what their role was, how they directed their efforts and what pressures they had in this situation.

The project leads fit the characteristics of knowledge workers well (Morgeson and Humphrey, 2006) and I would argue that developing proposals is in fact a specialisation, although it has been suggested omitted in the Nordic context (Sandvik, 2011). This is evident in the many expressions of increased complexity and the participants remarks on multitude of new tasks that follow proposal development that are not part of other processes at NTNU. Perhaps most significantly the participants all show their independence and autonomy (Morgeson and Humphrey, 2006). The faculty or department level has minimal contributions or steering of the processes, specific steering committees are rarely used and even then sometimes neglected. It is therefore reasonable to assume that inner motivation (Barlebo Rasmussen, 2015, page 29) is a key driver, and that the findings in this study are in line with the overall findings of working environment at NTNU (NTNU, 2018).

This inner motivation is important in the concept of project champion (Pinto, 2016, page 135) as well as potential based leadership (Barlebo Rasmussen, 2015). It is fair to say that each of the proposals have had a champion, who has used both their knowledge, performance and

interpersonal skills (Project Management Institute, 2013, page 513) to push forward a proposal with high autonomy and great vision. The prevalence of *potential based leadership* at NTNU could have been key in developing a culture where these individuals have had the possibility to push forward with their proposal.

So once we have established that the participants are spearheads, the next obvious question is how they have utilised this space of opportunity. Here, the proposals differ. Some proposals are more *task oriented*, while others are more *human centric* or involving and a mix of different leadership approaches that are prevalent in the Nordic countries (Aarseth, Rolstadås and Klev, 2015, page 35). All proposals also show traits of *situation based leadership* and the proposal leads have both expressed adaptation to dynamic processes and their relief when such situations have been clarified or settled. This specific trait between task or human centric focus is one of the key differences in the proposals as we will discuss later on.

Finally, considering the spearheads, their position and their goals, was it really necessary to push forward at such a high cost, or did other pressures affect the situation? The first obvious solution is to share the workload with others, establish a team. This process needs to be understood as more than just collecting CVs for the application or thinking about Work Package Leaders, but the process of building ownership and positive attitudes towards the proposal. There are two possibilities for ensuring more resources on the proposal. One option is that people are told to participate by heads of department or faculty, something that very much goes against all notions that we have already made about knowledge workers and autonomy - and something we really can't find any indications for in any of the proposals. The other option is that the proposal manages to include others and build a team of autonomous individuals that choose to work on the proposal, also to the point where the workload is considerably more than actually paid for. Also here, there seems to be a difference in between those who weigh the task of writing the proposal higher than the human centric approach in the process.

The other pressure at play is the prevalence of "other work" during the proposal period. As commented by some of the participants, the other stuff needs to get done and there is no one else to do it. No help was forthcoming from the departments to ease the load, although some got promises that never materialised. Almost all of the participants chose to either do this as well, use parts of the research leave or even to hire other people to do their work with other funding in order to concentrate on the proposal. At the same time administrative resources were available to each proposal and most commented fantastic help from the administration regarding budgets and other help. Also, proposal writing help was hired in some cases.

"I didn't ask for but neither was I offered a reduction of other work like teaching, but I did have our researcher available who could do a lot of the writing as he had the capacity."
-Participant

"I organised someone to take over some of my teaching duties, which I paid for from my own funding."
-Participant

In recap, the participants are spearheads but the need to juggle other tasks during the proposal writing process results in a too large workload that reduces the potential quality of the proposal and has ill effects on their work. Spearheads, yes, but at the same time blunted by their surroundings.

The Solid Core

While task centric or human centric leadership might sound like a black and white choice, it is definitely not. All proposals and proposal leads showed very good skills at building a team and focusing on task. This does not seem to be an either/or type problem, but rather a discussion of subtle nuances. To put it bluntly, all groups that initiated the proposals seem to have worked really well, some commented relationships going well back in time and good friendship among the members, also after finishing the proposal. Based on the participants descriptions, although sparse, the teams seem to show all the classical traits of self-organising teams. Using the definition from Johnson and Johnson (1991), the teams have a clear goal in the proposal, depend on each other and interact to freely to achieve those goals. The participants answers do not explicitly state a sense of membership, but implicitly it is clear that the core groups were well defined and had a mutual influence on the process supported by individual motivation, as discussed above. Based on these characteristics, it is safe to assume a high degree of trust in the core group (Levin and Rolfsen, 2015; Masoumeh Ghazinejad, Bassam Hussein and Youcef Zidane, 2018) and that their communication worked well.

An important consideration in this study is that if these traits were not present, it is unlikely that the core group would have been able to deliver a sketch for the first dead-line in April. It therefore follows logic from this study, that a both a project champion and a self-organising, autonomous core group are perceived to be necessary to develop a research proposal at this level. This conclusion is also supported by explicit statements from the participants:

“The most important part, if you want to get even close to submitting, is a good team that can develop ideas.”

-Participant

“I think one of the important things is giving a sense of leadership, not simply managing. Only after that are people willing to engage and give more of themselves to the process and not do it just because it’s their job. This makes the people the important part.”

-Participant

“I think the most important part for a process like this is that people feel like they are heard and valued.”

-Participant

It is important to note that this construct of a core group is not a given. We are well accustomed to high degrees of trust and openness in society as well evidenced by the prevalence of the Norwegian *three part collaboration* (Trepertssamarbeidet). This basis makes it easier to implement leadership strategies that require high trust, such as the use of self-organising teams (Johnson and Johnson, 1991), *human centric leadership* (Aarseth, Rolstadås and Klev, 2015, page 35) or *potential based leadership* (Barlebo Rasmussen, 2015). The ability of the project lead to implement such strategies in the core group, either by intuition or by formal training not only reflect the *shared values*, but also *practiced values* in the group. This, again, points to high degrees of trust and openness (Zidane *et al.*, 2016).

Looking at the organisation of the group, all interviews showed that due to the flexible nature of the process, the teams also needed to agile in response (Liubchenko, 2016). It is difficult to

determine the balance between linear planning and more iterative organisation models, but both seem to be present.

While we can make assumptions being valid for other research proposal projects, I am hesitant to generalise. The projects leads in this call were very experienced and the level of the call was very high. At the same time, the study only includes a single point of view from each proposal. As said earlier, some characteristics are common, but each proposal is different. Where the border of our scope lies cannot be answered from this study alone.

A world at stake

While a project champion and an efficient core team might be a key success factor in any research proposal, the involvement of industry is definitely a major driving force of the SFI scheme. The importance of this aspect – and the existing SFI centres shortcomings in addressing it – is one of the key points in the 2018 SFI evaluation where they specifically state that:

"There needs to be more **committed, competent and active industry partners** in the SFI centres. This will also support the ambition of stronger user/industry control of the centres."
(Damvad Analytics, 2018)

The importance of this aspect is not lost on the participants, with their focus ranging from strategies to entice the industry to participate on a developed proposal and all the way to making the entire proposal industry-centric. At the same time, it has to be noted that not one of the proposals was initiated by the industry, although some had industry participation and existing trust from the very beginning. Four of the five proposals that decided not to submit, cited lacking industry participation as the reason.

If we look at the proposals in order to identify stakeholder management stages, we see that all proposals have identified the industry stakeholders and have a very clear idea who they are. However, since lack of commitment was a recurring topic, it is clear that at least some proposals failed to uncover the needs of the industry stakeholders. This would suggest that either the planning or the management stages were not executed well enough. According to theory (Friedman and Miles, 2002), this can result in the waning or lack of interest, something described by the participants with non-submitted proposals. It is clear that the strategy chosen in these non-submitted proposals had a higher task focus and lower focus on stakeholders, lowering the proposals capacity to anticipate and react to opportunities and challenges early on (Friedman and Miles, 2002). This also made it hard to engage in effective stakeholder management that respects the dynamic nature of the stakeholders (Karlsen, 2002; Project Management Institute, 2013; Hussein, 2016, page 20).

In order to discuss stakeholders further, we need to make a mental division to illustrate different characteristics of the stakeholder process in the proposals. For this reason, we need to make a clear division between the core group and the industry so that we can have two sides to compare. The interplay between these two sides has 3 distinct aspects that determines the strength of the bond between the core group and the industry and that were identified in the interviews.

Firstly, the initial bond to the industry partners is stronger in the proposals that were successful. They report both existing projects, strong organisational ties and exclusively also

strong personal ties. It is therefore safe to assume that since the proposals leads have had more interactions with the industry partners prior to the proposal process, there is a better understanding of each other's needs and wants early on.

Secondly, the proposals that had a longer period to strengthen the bonds to industry were more successful in securing funding. Early starters had a higher success rate, contrasting with only one successful proposal that started late. Similarly, the non-submitted proposals where industry interest either faded or was never gained, all started late with the industry discussions. This pattern held even if the proposal development started early at NTNU.

Thirdly, the strategy to strengthen the bonds during the proposal period played a role in success rates. Those proposals that had a large focus on involvement, co-creation, dialogue and two-way communication had a larger success rate than those that focused on one-way communication and the proposal as the main carrier of communication.

From this it is clear that the bonds between the core group and the industry as a stakeholder are likely a result of what base they build upon, how they were strengthened during the proposal process and the amount of time used to strengthen them.

This mental exercise makes it straightforward to link the findings from the interviews to project management theory, specifically the role of trust and shared values in the Nordics. The bonds described above are essential to understand the underlying organisational values of the industry partners, specifically both the shared values and practiced values (Zidane *et al.*, 2016).

The interactions that are planned and executed based on stakeholder management and the proposal strategy, provide inter-organisational and inter-personal bonds that form the basis for trust, openness, respect and commitment (Masoumeh Ghazinejad, Bassam Hussein and Youcef Zidane, 2018; Hussein, 2019). It could be argued that these values are at the core of the desires of the individual industry organisations and therefore essential in securing support and enthusiasm for a SFI proposal. In addition, such insight during the proposal phase of an SFI could also be good ground for establishing shared values within the centre faster, a direct response to the SFI evaluations recommendation that new SFIs should be operative faster (Damvad Analytics, 2018). However, it needs to be pointed out that this introduces a catch-22 as time can either be used before the funding decision or after the funding decision to create bonds between partners. Whether or not this time should be funded by academia and industry as part of everyday operations or as part of a SFI proposal with a funding from the research council is a political discussion outside the scope of this thesis. Needless to say, the bonds obviously are a central tool in developing the proposal and have to exist at a certain level in order to develop a successful proposal.

This in turn makes it possible essential to understand the underlying organisational values of the industry partners, specifically both the shared values and practiced values (Zidane *et al.*, 2016).

The Governed

A final area of discussion is how NTNU as an organisation supports or hinders the development of research proposals through active or passive governance. The research proposal process fits well with the definition of a project. It is both complex, limited in time

and represents a considerable effort to make something unique (Project Management Institute, 2013, page 3). It therefore follows that the relationship between the project and its host organisation (in our case NTNU) is of importance. But before we can look at the interplay between the proposal as a project and NTNU as host, we have to conclude on the open discussion initiated in the theory section and define what kind of a project the proposal process is.

As you will recall, there are 3 possible definitions. Either the proposal is a project in its own right with an impact goal of receiving an SFI. Alternatively, we could approach the proposal process as the conceptualization (and partial initial planning) of the SFI centre itself and therefore treat the funding decision as a milestone to be accomplished.

Finally, we can obfuscate this a little bit by introducing the concepts of project success and project management success (Aarseth, Rolstadås and Klev, 2015, page 29) into the discussion and adapting a wider point of view. The third approach is namely to focus on all expected effects of the proposal development, both positive and negative, and to evaluate their costs and gains individually before making a strategic decision concerning the initialisation of a proposal process. Similarly, an end evaluation would reveal whether or not the initial expectations were confirmed.

There are limited explicit clues in the interviews that support one definition instead of another. We can draw some conclusions from the focus on industry interaction, as at least 3 proposals that had a large interest in industry interaction explicitly state that they are working on the start-up process of an SFI prior to a funding decision, such as consortium agreement, speedy start-up meetings and following up on partners. Others state quite distinctly that they are more or less done with the proposal mentally and will pick it up if they get funding. Given that some of the proposals have quite strong ties to the partners through other activities, in some cases the partner contact would not be dependent on this proposal. Alternatively, if this proposal represents the only contact between partners, not developing that contact (or bond) between deadline and funding decision would most certainly slow down the starting-up process for the SFI, as commented in the SFI evaluation (Damvad Analytics, 2018). In the end, the deadline for the proposal needs to be understood as a significant point in time, regardless of whether we call it a project end or one of the most significant milestones of a larger project in terms of theory.

This goes to show that while the proposals are concentrated processes, at least some of the participants describe effects that are not dependent on the outcome of the proposal, such as evaluation of the process, learning more about project management and re-using the proposal in other calls. These are valid examples of *project success*, in contrast to *project management success*. This would suggest that while it may not be the case in all the proposals today, having increased focus on all possible effects from the proposal process is positive. Over time, the third approach is more likely to maximize the benefits for the host organisation.

Looking at the proposals more from the perspective of the employee, overtime in academia is a constant discussion (Vidnes, 2020b). For NTNU, the ongoing vigour at which scientific staff choose to participate, spearhead and succeed in research project proposals and secure external funding is paramount. At the same time, very few parts of the organisation manage to operationalise this strategy to the level that frees up the necessary resources. To point out the obvious, the SFI proposals are to a large extent only possible because the leads are able and willing to devote significant parts of their free time to work on them.

While it is tempting to only look at the CVs of the project leads, the dependence on overtime can also introduce other pressures at play. For instance, employees with young children might not be able to participate due to family considerations, something that disproportionately affects women and young professionals (SSB, 2019). While a good academic record is needed to lead central parts of an SFI, it has to be noted that only 8 CVs can be included in the application, much less than the amount of people working on most of the examined proposals. At least the thought can be entertained that young professionals looking for a balance between work life and family might be discouraged, especially if they expect to be bypassed in the end as stronger CVs are included to strengthen the application.

This seems to be such an obvious area of improvement for NTNU. There is clearly not enough dynamic capacity in the organisation to develop these type of proposals without considerable ill effects, so why is this not on the agenda?

We find two significant clues in the interviews. First, when asked about their time use on the proposal, almost everyone commented that this was hard to estimate. To understand this, we have to look at the formal positions of the scientific staff, who have 50% teaching and 50% research as a split in their hours. The use of these hours is largely decided by the employee and rarely documented. The scientific staff is also defined to have a “særlig uavhengig stilling”, a Norwegian law term that defines employees in non-leading positions that nonetheless have large responsibilities. Among the defining traits of the type of positions is significant autonomy, but perhaps more importantly the right to delegate work to others. This trust based system is a good fit to the autonomous and knowledge heavy organization, but leaves the a large part of the responsibility on the individual. As several of the participants pointed out, there is really no one to delegate to: the work is highly specialised to begin with, and in order to delegate, you have to convince others and win them over to your cause. If that cause is a proposal, you might have a chance. If that cause is additional administrative work then you just might have to be the most convincing person around. It seems that autonomy has a flipside.

The second clue hints more at systematic approaches rather than looking at individuals. Very few of the proposals did systematic evaluations during the proposal process, although NTNU did conduct a survey at the end of the proposal process among the leads. The participants did not seem to put high value on evaluations and only a few noted that this was a positive thing. This means that there is little, if any, transfer of knowledge from the processes: the only way to learn is to participate. At the same time we see that the framework of overtime, CVs and requirements show up as organisational hindrances along the way. When there is little documentation, little evaluation and limited forums for discourse, the barrier for young academics to build up their project capacity at NTNU becomes difficult to surmount. Looking at the prevalence of on-the-job training among the participants, this seems to have been the case for quite some time.

Finally, theory indicates that there might be skew in balance regarding the organizational model of the projects. All proposals exhibit clear *matrix* organisation (Hussein, 2016, page 60) characteristics, but at the same time do not seem to have access to the right type of resources at the right time, especially concerning reduction of other work. This suggests that the communication between the host organization and the proposal needs to be improved.

It seems that the potential in governance to develop the research proposal teams is not yet realized at NTNU. We can identify barriers and mechanisms that actively hinder participation and learning. These pressures are to large extent overcome by the extraordinary contributions of individuals and teams. There is a clear opportunity to develop the proposal teams further, to reduce barriers and to make sure that their considerable efforts bear more fruit and inspire others to participate.

Conclusion

This goal of this study has been to examine the case of the SFI-IV call and by interviewing the proposal leads at NTNU to answer quite a broad research question, namely:

“What are the project characteristics of a research proposal development ?”

With the findings, analysis and discussions above, it is possible to suggest characteristics that are in line with the findings and that can be identified in current project management theory. It is also clear that the interviews could have been designed and interpreted from many different theoretical points of view and would likely have yielded other insights into this process. Even though the proposals differ in shape and size, some common patterns are identifiable. We therefore have to conclude that:

1. The process of developing a research proposal can be defined as a project because it is *a temporary endeavour to create a unique result*. Furthermore, it represents a process of *applying knowledge, skills, tools and techniques to the proposal process in order to meet application requirements*.
2. The proposal process is ambiguous whether it can be defined as a project in its own right, an initialisation of an research project or a project that has several impacts regardless of funding. The definition varies from proposal to proposal but can be subject to strategic development in the host organisation.
3. The main characteristics common to these research proposals are:
 - a. The proposals are mainly initiated at NTNU or in some instances together with SINTEF, but rarely directly with industry.
 - b. Lead by an individual. This is usually a male professor late in his career, with a good CV and experience in leading research projects, but little formal training in project management. They have the possibility to work considerable overtime and high inner motivation, with the knowledge, skills and traits to become a project champion.
 - c. This individual can engage in human centric leadership, potential based leadership or similar strategies to win the hearts and minds of his or her colleagues to form a core team.
 - d. The self-organizing team consists of the “right” individuals with high autonomy, good knowledge and a high degree of trust.
 - e. The team has low degree of steering from the host organisation and engages in situation-based leadership practices.
 - f. The team has good collaboration with administrative services, such as budgeting.
4. A proposal has a higher chance of succeeding if they additionally:
 - a. Start developing their proposal early.
 - b. The proposal is based on existing activities and has strong organisational and personal bonds between the industry partners and the core group
 - c. The process has a high focus on industry participation and involvement, including two-way dialogue early on to build common ground and trust.

- d. The proposal prioritises joint, in-person communication such as workshops.
 - e. The team engages in stakeholder management practices
 - f. Have more focus on project success, rather than project management success.
5. Based on comments from the participants, the proposals would have even higher chances of success if:
- a. The project teams would receive more resources to develop the proposal, most notably removed from other duties so that they could focus exclusively on developing the proposal over time.
 - b. More project management training specifically for developing research proposals, although some of the participants disagree on this point.

Additionally, the two areas for improvement noted by the SFI evaluation in 2018. These were the need for a faster start, as well as increased industry participation, commitment and involvement. Both be traced back into processes that are developed during the proposal process.

While it is clear that the funding decision for the SFI is ultimately decided by the quality of the application and the competition it faces, I would argue that the quality of the process leading to the dead-line is a fundamental contributor to the quality of the application itself. I would suggest that this study successfully uncovers some of the key characteristics of a project proposal development process, with an aim of securing external funding, at least in the case of the SFI Scheme. I am hesitant to generalise the findings as valid for other types of high level applications, as a lot of the essence is connected to the interplay between the core group and the strive to involve industry. It is my hope, however, that those reading this can relate the findings and discussions to their own work and perhaps find some insight that will serve them well in their daily working lives.

Recommendations for future work

This study has some obvious blind spots. Most notably, only one person from each proposal was interviewed. While this makes it possible to compare different proposals, there is no mechanism in place to uncover different points of view within a proposal. We are also making an assumption that the project lead has a total overview of the processes, something that might not be the case.

Therefore, it would be interesting to study a single proposal process in more detail and document the interactions, pressures and perspectives along the entire process. Alternatively, a long term study that looks at the proposal process as an iterative occurrence and designs interventions (training, workshops, mentoring and so forth) to see whether or not this has an effect on the processes and outcomes.

Finally, a larger, national study that establishes the aggregated costs and benefits of this organization of research funding would likely yield results that are interesting in decision-making at faculty, university and national levels.

Reflections and personal recommendations

While working on this study, I have pondered not only the reflections of the participants, but also what I myself would have done in their stead – and what insights I can only claim through hindsight. I recognize the topics put forth in the interviews, the working hours, the uncertainties and the pressures. And I remember myself presented with many of the dilemmas for the first time as a young academic at NTNU. I would therefore like to point out some personal reflections from along the way, recommendations that make sense from where I am standing today and some musings that might guide my own choices in the future.

Firstly, I cannot help but to be amazed at the processes some of the participants describe. Some show large ingenuity, profound insight into processes and also project management efficiency that is impressive. However, there is a large variety of approaches and I see that some proposals would clearly have benefited from the insights of others at a purely project management level. I would therefore recommend that NTNU would consider building a culture of openness between the proposals regarding common topics, as well as develop mechanisms for knowledge sharing before, during and after the process.

Secondly, I see a world that is difficult to enter for young academics. Large amounts of tacit knowledge and barriers to overcome create a playground seemingly available to only those in the very end of their careers. I would recommend putting a forth a large effort to ensure that more academics earlier in their careers can develop the necessary knowledge, skills and networks to develop their own proposals with greater ease and with more support.

Finally, I would strongly recommend those that find research proposal development difficult to find inspiration and knowledge in project management theory. The challenges and opportunities present in a proposal process are not unique and for many of them, there is guidance to be found in central scientific literature of the field.

To conclude, I would also like to reflect that this thesis is a milestone in my own journey to understand organisations, leadership and projects. It is a journey that has many interesting turns along the way, some which are easy to see, but not so easy to follow in practice. I appreciate the guidance as I move forwards, one step at a time.

References

- Aarseth, W., Rolstadås, A. and Klev, R. (2015) *Lederskap i prosjekter*. Fagbokforlaget.
- Barlebo Rasmussen, S. (2015) *Potentialeledelse*.
- Damvad Analytics (2018) *Evaluation of the Scheme for Research-based Innovation (SFI)*. Available at: https://www.forskningsradet.no/siteassets/publikasjoner/evaluation_of_the_scheme_for_research-based_innovation_sfi.pdf (Accessed: 19 September 2020).
- Darr, A. and Warhurst, C. (2008) 'Assumptions, Assertions and the Need for Evidence: Debugging Debates about Knowledge Workers', *Current Sociology*, 56(1), pp. 25–45. doi: 10.1177/0011392107084377.
- Dvir, D. *et al.* (1998) 'In search of project classification: a non-universal approach to project success factors', *Research Policy*, 27(9), pp. 915–935. doi: 10.1016/S0048-7333(98)00085-7.
- Forskningsrådet (n.d.a) *Kva gjer Forskningsrådet?* Available at: <https://www.forskningsradet.no/om-forskningsradet/oppgaver-organisering/om-forskningsradet/> (Accessed: 19 September 2020).
- Forskningsrådet (n.d.b) *SFI – The Centres for Research-based Innovation scheme*. Available at: <https://www.forskningsradet.no/en/about-the-research-council/programmes/sfi/> (Accessed: 19 September 2020).
- Forskningsrådet (2016) 'Evaluering av Sentre for forskningsdrevet innovasjon (SFI) - Mandat'. Forskningsrådet.
- Friedman, A. L. and Miles, S. (2002) 'Developing Stakeholder Theory', *Journal of Management Studies*, 39(1), pp. 1–21. doi: 10.1111/1467-6486.00280.
- Gottwald, J. (n.d.) 'Success factors for project proposals'. Hamburg university of applied sciences. Available at: <https://www.slideshare.net/microlife/success-factors-for-project-proposals> (Accessed: 22 July 2020).
- Gulowsen, J. (1971) *Selvstyrte arbeidsgrupper*. Tanum.
- Halvorsen, T. (2020) 'Ta forskinga tilbake', *Forskerforum.no*, 9 March. Available at: <https://www.forskerforum.no/ta-forskinga-tilbake/> (Accessed: 23 July 2020).
- Herbert, D. L., Barnett, A. G. and Graves, N. (2013) 'Australia's grant system wastes time', *Nature*, 495(7441), pp. 314–314. doi: 10.1038/495314d.
- Hussein, B. (2019) 'The influence of project characteristics on project success factors. Insights from 21 real life project cases from Norway'. doi: 10.13140/RG.2.2.13699.66088.
- Hussein, B. A. (2012) 'Causes of change to project success criteria: a study based on project management practices in Norway', in. Project Management Institute.
- Hussein, B. A. (2016) *Veien til suksess fortellinger og refleksjoner fra reelle prosjektcaser*. Bergen: Fagbokforl.

- Hussein, B. A., Ahmad, S. B. S. and Zidane, Y. J.-T. (2015) 'Problems Associated with Defining Project Success', *Procedia Computer Science*, 64, pp. 940–947. doi: 10.1016/j.procs.2015.08.611.
- Jacobsen, D. I. (2018) *Hvordan gjennomføre undersøkelser*. 3rd edn. Oslo: Cappelen Damm.
- Johnson, D. W. and Johnson, F. P. (1991) *Joining together: Group theory and group skills*. Prentice-Hall, Inc.
- Karlsen, J. T. (2002) 'Project Stakeholder Management', *Engineering Management Journal*, 14(4), pp. 19–24. doi: 10.1080/10429247.2002.11415180.
- Levin, M. and Rolfsen, M. (2015) *Arbeid i team: læring og utvikling i team*. Bergen: Fagbokforl.
- Liubchenko, V. (2016) 'A review of agile practices for project management', in *2016 XIth International Scientific and Technical Conference Computer Sciences and Information Technologies (CSIT). 2016 XIth International Scientific and Technical Conference "Computer Sciences and Information Technologies (CSIT)*, Lviv, Ukraine: IEEE, pp. 168–170. doi: 10.1109/STC-CSIT.2016.7589897.
- Masoumeh Ghazinejad, Bassam Hussein and Youcef Zidane (2018) 'Impact of Trust, Commitment, and Openness on Research Project Performance: Case Study in a Research Institute', *Social Sciences*, 7(2), p. 22. doi: 10.3390/socsci7020022.
- Morgeson, F. P. and Humphrey, S. E. (2006) 'The Work Design Questionnaire (WDQ): Developing and validating a comprehensive measure for assessing job design and the nature of work.', *Journal of Applied Psychology*, 91(6), pp. 1321–1339. doi: 10.1037/0021-9010.91.6.1321.
- Norwegian Research Council (2020) *Syv tips til et vellykket arbeid med søknaden*.
- NTNU (2018) 'Kunnskap for en bedre verden - NTNUs strategi 2018-2025'. Available at: <https://www.ntnu.no/ntnus-strategi/overordnet-mal#visjon>.
- NTNU (2019) *Arbeidsmiljøundersøkelsen 2019*. Trondheim: NTNU. Available at: https://innsida.ntnu.no/documents/portlet_file_entry/10157/2019-NTNU_no.pdf/99d7d2dc-c9c8-4b57-ad6b-59b306c98572?status=0 (Accessed: 18 July 2020).
- Pinto, J. K. (2016) *Project management: achieving competitive advantage*. Fourth ed., global ed. Boston, Mass.: Pearson.
- Pinto, J. K. and Slevin, D. P. (1987) 'Critical factors in successful project implementation', *IEEE Transactions on Engineering Management*, EM-34(1), pp. 22–27. doi: 10.1109/TEM.1987.6498856.
- Project Management Institute (ed.) (2013) *A guide to the project management body of knowledge (PMBOK guide)*. Fifth edition. Newtown Square, Pennsylvania: Project Management Institute, Inc.

Ramberg, I. (2016) *Tids- og ressursbruk for søkning til Norges forskningsråd i 2016*. 2016:43. Nordisk institutt for studier av innovasjon, forskning og utdanning NIFU. Available at: <http://hdl.handle.net/11250/2429103> (Accessed: 23 July 2020).

Samset, K. (2015) *Prosjekt i tidligfasen*. 2nd edn. Fagbokforlaget. Available at: <https://www.fagbokforlaget.no/Prosjekt-i-tidligfasen2/I9788245017540>.

Sandvik, A. M. (2011) 'Ledelse av kunnskapsarbeid', *Magma*, pp. 56–63. Available at: <https://www.magma.no/ledelse-av-kunnskapsarbeid> (Accessed: 19 July 2020).

Shenhar, A. J. (2001) 'One Size Does Not Fit All Projects: Exploring Classical Contingency Domains', *Management Science*, 47(3), pp. 394–414. doi: 10.1287/mnsc.47.3.394.9772.

Small, J. and Walker, D. (2011) 'Providing structural openness to connect with context: Seeing the project entity as a human activity system and social process', *International Journal of Managing Projects in Business*, 4(3), pp. 389–411. doi: 10.1108/17538371111144148.

SSB (2019) *Færre barn, flere i heltidsjobb, Færre barn, flere i heltidsjobb*. Available at: <https://www.ssb.no/arbeid-og-lonn/artikler-og-publikasjoner/faerre-barn-flere-i-heltidsjobb> (Accessed: 23 September 2020).

Vidnes, A. K. (2020a) 'Fride Vullum-Bruer fikk nok av råkjøret. Hun reddet helsa ved å slutte på NTNU', *Forskerforum.no*, 4 March. Available at: <https://www.forskerforum.no/nok-av-rakjoret/>.

Vidnes, A. K. (2020b) 'Jeg følte at enten stopper jeg eller så sykmelder jeg meg', *Forskerforum.no*, 6 March. Available at: <https://www.forskerforum.no/jeg-folte-at-enten-stopper-jeg-eller-sa-sykmelder-jeg-meg/>.

Vlaeminck, K. (n.d.) 'How to write a good Horizon 2020 project proposal?' University of Bergen. Available at: https://www.uib.no/sites/w3.uib.no/files/attachments/how_to_write_a_proposal.pdf (Accessed: 22 July 2020).

Zidane, Y. J.-T. *et al.* (2016) 'Categorization of Organizational Factors and Their Impact on Project Performance', *Procedia - Social and Behavioral Sciences*, 226, pp. 162–169. doi: 10.1016/j.sbspro.2016.06.175.

INTERVIEW INFORMATION

PASI AALTO, NTNU, MARCH 2020

Thank you for considering to participate as an interview subject. Here are some key points to help you make a decision.

WHAT IS THE INTERVIEW FOR?

This interview is part of a thesis for a masters degree in Organization and Management (MORG) at NTNU Videre. The research focus is to examine the application process of larger research proposals from a theoretical framework of project management. The goal is to better understand how application processes work, how people collaborate and what frameworks are in play when proposals are developed. Hopefully the work will be able to answer the following research question:

"To what extent can we describe and understand the processes in an application process with the use of project management theory?"

Specifically, the project uses the proposals submitted for SFI-IV call in the fall of 2019 from NTNU as a case. This includes 18 proposals from a wide variety of research groups, departments and fields. The thesis will hopefully include interviews with persons with first hand knowledge of the individual proposal development processes as well as the systemic approach to the proposal development as a whole as the empirical data. It is our sincerest hope that you would contribute to this work with your insight.

WHAT IS THE FORMAT OF THE INTERVIEW?

The interview will be held in 2 parts. The first part will be a free discussion based on a loose starting point of 8 interview questions. The interview will not include audio recording, but written notes are taken. The interview subject is given a copy of the notes and the opportunity to correct any mistakes. The interview will take approximately 30 to 45 minutes.

The second part of the interview will be at a later stage to cross reference answers from individual interviews with each other and explore whether or not individual key points are in consensus within the interviewed professionals. This later part will be conducted either as an interview or as an online questionnaire, dependent on preliminary findings.

HOW ARE YOUR ANSWERS USED?

The answers are used only for the work included as part of the thesis, nothing else. In addition, the interview subject will be completely anonymous:

- The written notes will not include information to identify the subject, proposal or research topic.
- The thesis will anonymise the companies, groups, departments, teams and others in such a way that individuals, either the interview subject or the persons referred to can not be identified.
- The online solutions used for a questionnaire will not record any identification data (IP, e-mail, etc.)

It is possible that direct quotes and other individual responses from the interview are included in the thesis to illustrate key points and to discuss the subject matter.

It is voluntary to participate in the research and you can at any stage withdraw your approval without explanation. Please note that the interview and data gathering is specifically designed to not fall under GDPR and NSD approval by eliminating the collection of identifying information.

WHO IS DOING THIS RESEARCH?

As a short introduction, my name is Pasi Aalto. I work at the Department of Architecture and Technology at the Faculty of Architecture and Design at NTNU. This means that I am most likely your colleague and we might even meet from time to time. Currently, I am the Centre Director at NTNU Wood (www.ntnu.no/wood), a cross-disciplinary effort to develop knowledge on how the Nordic Forest Resources are best developed and utilised. I started the MORG masters degree at the same time as I took on my 4 year engagement as Centre Director, mostly because I needed a larger repertoire of methods and deeper understanding of the underlying processes in management and leadership. During this time, I have participated in many early stage and incubator type processes that resulted in both successful and unsuccessful research and innovation applications. Working with many groups, research traditions and calls, what struck me every time is the different approach consortiums and individuals, even within the same department, have to application processes. This has ranged from ad-hoc applications written single-handedly the last moment to deliberate processes with a top-down approach. This has sparked my interest in better understanding how these applications work and hence inspired me to have this as a topic for my thesis.

Should you have any questions regarding my work, please do not hesitate to get in touch: pasi.aalto@ntnu.no.

The work is supervised by Jan Alexander Langlo from the Department of Mechanical and Industrial Engineering.

Appendix B – Interviews

Proposal Alpha

We noticed early that there were two applications, one from NTNU and one from SINTEF that had an overlap, including the same name. Regardless of this, the collaboration with SINTEF was ok.

Previously, we had established a PhD pilot that looked at the scientific topic of our SFI, a pretty broad focus at NTNU that prepared the groundwork for our application. In addition, we had been discussing the scientific basis for a good while and everyone agreed that the topic was overripe for an SFI. This was pretty well received in the industry where we got a 2-3 producers, a monitoring company and 2 technology companies interested. Overall, the spirit was high at both NTNU and at the industry.

We started work on the application way too late, even though this had been a topic within our networks a long time and we had a group ready for action. We had already started planning for a sketch in the fall of 2017 as an initiative. We did some work internally with some industry and established a preliminary sketch and the framework in early 2018. I thought, as the coordinator, that we were ahead of the curve. Both the research partners and the industry were interested and it seemed like we had a good consortium.

At the faculty, we got a good response for the sketch and also the department and our existing, large centre was very positive, giving us support. We didn't get much help in the writing phase though. We had a central group with 3 people from NTNU that were very active, but the other partners were not. We had 4 other people in the group, but their contribution was low compared to the NTNU work. These 7 people were the core team, but there was also an industry group that was supposed to participate. There is a big difference between our industry and other industries, we simply couldn't have contact with all the industry partners so we established a link to 2 core partners. There were actually 3 core partners but they agreed that only 2 of them would be contacts. This worked pretty well in the beginning but got more difficult as time passed. The contact disappeared, they wouldn't even pick up the phone towards the end. The whole foundation for involving the industry just crumbled away.

We started writing too late. We made a sketch at NTNU that we were happy with and we even got a good evaluation from the Research Council. What we did wrong was involving the industry too late. There was no ownership and they obviously had to be involved to pay. We were too late, starting around Easter in 2019. We didn't get the sketch evaluation before Easter either. We did have a workshop in early may for all the partners, both users and research partners, where we went through the entire project and discussed everything. This was the first workshop, we should have gotten the industry committed a lot earlier. When the industry asks what we want from them in an SFI process, it is just the wrong approach. The industry never understood the basic concept of the SFI, they had little thoughts about innovation themselves and only thought in the short term. There was a clear lack of reaching for heights and planning forward.

We are all still good friends in the core team and we have also written more proposals since the dead-line. If I would have run for an SFI again, I would have done it quite differently. Make the partners more responsible and get the industry in a lot earlier. I have used an incredible amount of time, without it resulting in anything. This might be a critique towards NTNU, but there was no possibility to reduce other obligations. I had to do all of my teaching with no help, even in the fall. After the summer, everything was done sloppily. There was no one there to take over the teaching. I was offered help to take over some of it, but that ended up being empty promises. The next time I won't run an application unless it also means less teaching during the proposal development, it simply isn't feasible to combine it. Just imagine 3 calls to industry partners taking the whole day, not getting a response or them calling you back later, you just can't combine the unpredictability with students. I think I used 30% of my position in 2019 to develop the application, on top of everything else.

In the end, we did have 18 partners from industry and public bodies, 5 research partners and 5 international partners. Most of the communication was by phone, especially the industry were not that responsive by e-mail. Some of the partners told me they "could participate in the discussion if they were in Norwegian, but wouldn't deal with English." This illustrates the separate worlds between the academics and our industry.

I have worked at SINTEF for quite many years and had a leading position in research, where I learned a lot about running projects on the job, both EU, Research Council and directly with the industry.

We got a lot of help from the faculty administration, they were really professional. There was some troubles with the project budgeting support due to illness and we ended up getting a lot of help from someone coming in that was new. This would have been better if there was someone there who already knew us and the process all along. We also used writers from NTNU and the faculty did have a central group for proposal review and approval. We had a good contact with this group and got a lot of help. I don't think the other research partners had this kind of support and I also think that SINTEFs contribution was a little low, perhaps because they were involved in 2 similar applications at the same time, the other one being more prioritised than ours?

I think there are some key success factors. We need an understanding from the industry partners that this something they need, something positive and it is access to a research group. They also have to understand that this costs money. The industry needs to be committed early but in our case they left. We had already made the budgets and needed 6 million NOK, getting only positive feedback. In the end they industry only wanted to pay 3 million NOK. We need commitment, not well-wishing, kind words. If you do not believe in the proposal, say it.

In the end, the proposal was not sent because the industry backed out. We will try to recycle the proposal for new calls.

Proposal Beta

In my group, we have a long tradition of close collaboration with our industry, especially one large company is central. We work from fundamental research all the way to applied science and innovation, the latter that is also the basis for our application. We wanted to apply for an SFI because of our historical tradition of close industry collaboration in the past 20-30-40 years. In general, and historically, our industry has very good links to several advanced research groups at both NTNU and SINTEF. We have also applied for an SFI before, as well as an SFF, but didn't get selected. This time, some of the industry partners strongly urged us to take the lead for an application. We ended up having 3 large national partners as well as some smaller ones. The large ones use hundreds of millions of kroner on research and development every year, a lot of it ending up in Trondheim. We are always looking for ways to expand this. We have many experimental activities that cost money, including large labs with advanced equipment and we need funding to maintain and run these labs. We have over the years made investments for many tens of millions and now the running expenses need to be covered.

I think we started the discussions 1,5 -2 years before, maybe fall of 2018, when we heard that there would be a new SFI call. This was mainly to take responsibility for the process and for the industry dialogue. The initiative originally came from our research group, strongly encouraged by our department. The faculty also had a process quite early as they always have a lot of proposals. Some of the industry partners were involved early on, mostly because 3 of our adjunct professors are in leading positions at the largest partner and got them involved. Our faculty had a process where we submitted preliminary sketches for approval and good feedback. It was a sort of reporting, which also involved our department head. There were some deadlines for deliverables, and I do recall some reporting meetings.

We had 2 steering committees. The top level one consisted of the dean, a vice-head at SINTEF, my head of department as well as a representative from the industry, and its formal role was to secure strategic anchoring, both at NTNU and SINTEF and to sort out possible conflicts that might come up between the partners during the application process.. We didn't use this group much, instead we established a group of professionals, with people from NTNU, SINTEF and industry that were closer to the process and the application content. We had a sort of writing group, although I think it might have been too large. During the last 6 months, there were 5 or 6 of us that were really active. Throughout the winter and spring, we had a meeting once a week with the core team. We did some internal workshops late 2018 and then again together with the industry in early 2019. We invited a lot of potential partners.

There was an intention of reducing my other workload during this process, but basically that never happened. Probably because I was too nice and compliant. I was already working with research management at the department level and we had a lot of unexpected things happening such as parental leaves, illnesses and so forth. Small groups are very vulnerable for events like this. At NTNU, it is very difficult to reduce someone's teaching workload. I mean, the students are there, they keep on coming, just as your other obligations. There was an intent to help us with this and there were some small things done, but in practice, the whole proposal was developed on top of everything else. Thankfully, SINTEF had a different position and were able to allocate resources to the development of the proposal, otherwise this would never have worked. That was very important. It's hard to say how much work we put into the proposal. I would guess I put at least about 3 months of work, around 450 hours down. The core team worked a little bit on and off, but 4-6 people with a month worth of

work each is pretty realistic. I am not going to celebrate if I join another similar application process. This simply isn't very tempting to do again; the cost is extremely high. If you make it, you can celebrate. If you don't make it, you might be able to salvage and re-use something. I used some of my research leave as well. The personal cost (including sacrifice of family and private life) is just too high.

Other than that, the industry participation is a small project in itself. They really don't want to commit before there is a life on the line. We did have some intense meetings towards the end. One thing to note is the size of the companies. In Norway, we have a few large companies and corporations that are the main supporters to Norwegian research and then a multitude of smaller companies that have less resources available to put into research in general and an SFI in particular. A key challenge here is that the large ones get invited to many proposals. They are waiting as long as they can, telling everyone they are supportive, but at the same time looking how everything develops. It would have been sensible and beneficial that someone higher up at NTNU and SINTEF would have made some clarifications earlier on. We are competing about the same funding, after all. Another thing, there is a clear contrast between the expectations of the Research Council and government with respect to the SFI scheme on one side and on the other side, how industry actually operate and what they want to get out of R&D and innovation projects. For the large partners, money is in most cases not the main issue, but allocating in-house/own resources often is. After all, it is not us that should be doing the innovation part, it should be the industry (making use of the R&D results generated in the SFI). This is a big challenge. I am already involved with an existing SFI, and we face the same problems there, with many of the same partners as in our proposal there as well. My impression is that many companies are short-sighted. Not all of the people working there, but the ones at the top (management/economy people) controlling the money and budgets. Many companies in our industry have their own R&D departments with plenty of people with background from NTNU working there. Some of the large companies have a very 'long way' from these departments all the way to the top. There are many layers of decisions to be made along the way.

We had 2 workshops, a large one in January of 2019 and an another large one in the beginning of July 2019. Other than that, we had one-on-one discussions continuously with the companies. As I mentioned, these are partners we already work with on other projects. But that is mainly all on a researcher-to-researcher level. That's also where you have to develop an SFI. We had around 10-11 partners when we wrote the sketch in late March/early April, not all of them joined in the end. There was quite some back and forth with respect to partners throughout the process. Finally, during the last days, 3 of the largest corporations committed, each with an equal and quite high amount. In addition, we had 5-6 other companies that joined with less financing. This happened literally in the very end. This was far from ideal and quite stressful.

I haven't had other project management training, other than a 3-day course from NTNU. That was nearly 20 years ago. Before joining NTNU, I worked at SINTEF for 10 years, where I also had some internal courses. But obviously I have lead research projects, both nationally and internationally.

Towards the end (submission deadline) we had very good follow-up from both the faculty and even more so from the department. From the department we got very support from a highly experienced and skilled person concerning administrative issues and budgeting of large proposals to the Research Council, a person that also could handle the stress quite well.

Fantastic support at our department, but I see that this is very dependent on the people. We also had some writing help for the last 2-3 months from the faculty administration. That was more strategic help on the technical shaping of the proposal. So, all in all, towards the submission deadline we got as good a help as we could hope for.

I wrote a small evaluation in the end (after submission). There were some things that weren't ideal. You really need a good concept. And you need a good plan for what you are going to do. Of course, if possible, commitments and some key industry partners as early as possible would be great. And finally, you need a core team that has the time and resources to actually work on this. In our NTNU research group, which initiated and lead the proposal process, we are only 6-7 people, and during the proposal process, one on research leave, 2 parental leaves, some had other obligations limiting them only to normal working work hours. The students are of course there, and you can't get extra resources that easily. In the end, it is classical NTNU: you can only get so far with money, it's peoples time that is the real value.

Proposal Delta

The whole initiative was based on one of the central shifts in the industry which is also now very much at focus at our department. During the process, we modified this a little bit in order to fit it more closely to societal changes as well. In addition, we needed a technological shift to be matched with a shift in peoples mindset to be able to actually use the technology, so there was a clear focus early on.

The proposal didn't appear from thin air. We already have several good projects, but we are missing the impact on the industry, which we consider to be too fragmented. Here, SFI is quite a good tool and we also developed a proposal in the previous call. That proposal also resulted in a lot of things, even though there wasn't an SFI. That's also what we are looking at here if we don't get an SFI. This proposal is more a development and a continuation of that one. We think that this time we would be able to get enough impact. We can't really solve the issues we are facing with small, fragmented projects. Not when we are hoping to change the industry towards all new heights in terms of performance.

I think we had a really good early process, a good start. We worked on this intensively for the last 2 years, and we already had the previous proposal when we started. We set up a lot of workshops and events, focused on getting industry committed and getting feedback all the time. Some of the workshops were really broad while others were very narrow and focused on specific aspects. We had a workshop just for a public agency locally, for instance. SINTEF had a relevant conference 2 years ago, we jumped on that one to connect to partners. Basically, we worked on commitment and engaging partners for 2 years before we even started developing the application itself. There were some expectations in terms of the partners. We had other partners involved, quite a few in the beginning since we were very open at that time, fewer towards the end. We even had a workshop just for the academics, inviting around 10 academic institutions to join. This stirred up expectations and we had to close things off a bit afterwards. Some doors we just had to close as politely as possible. This work was mainly done by myself and a partner I had at NTNU, but that person quit at some point and I had no more internal assistance. At that point I had to lean more on SINTEF and at a point we decided to move the entire proposal there.

After developing our ideas since 2017, the application work itself started speeding up in 2019. We already had partners, ideas and everything set for a great starting point. One key thing we did, was to get an editor for the application from SINTEF. That person was responsible for writing. That meant that we could have a group of myself and 2 other people from SINTEF that focused on the partners and financial platform, we were both the steering committee and doing the work. There were some hard discussions along the way, especially concerning budgets. There's still things buried there, there might be negotiations since the details are not solved. I do think we got all the coarse work done, so we are all still friends. I think that we were 3 people pulling the proposal was probably a good thing.

For the writing process itself, our editor started working in early 2019. We recruited a writing group and made sure they were committed. Work packages developed over time, we ended up with 5 in the end. There was 1 writing group for each work package, around 3 people in each from different fields and groups, so 15 people in total, give or take a few. Our editor was given freedom to be independent and strict. We had several rounds where the writers delivered their own proposals. Some versions were not coherent at all. Our editor was given resources and capacity to develop the proposal. The 3 leaders that I was a part of had a

different focus. We worked on getting the consortium committed, developing the budgets, setting up a good organisational structure and getting this integrated at both NTNU and SINTEF. We were the leaders for the proposal, we made the decisions, that was it.

The writing process started from individual proposals and texts from the writing groups and these were put together during the process. The industry was not much involved in the writing process. We had a big workshop in June, 4 months from deadline. We picked out the most central partners and they all came. There were some collisions with other events, which meant maybe some of the people from each partner could not attend, but it went well in the end. We got a lot of feedback. Based on all of this, we made our next proposal for the application, our editor got it done before the holidays and this was delivered to all the partners for review. We asked for direct comments on the text by the end of holidays. This sort of changed our strategy. We had already included a lot of things they were asking for, so this review really helped in quality control of the proposal as well as getting everyone committed to it. This was really important. In retrospect, I might have held the proposal open for too long, should perhaps had closed the group of partners a little bit earlier.

This thing really took a lot of time. I've had a full position and this process on top. I got good support from my head of department, including 500.000 NOK to develop it. With this money, I hired my partner at NTNU for 2 years in part-time, which was crucial. If I would have done this without him on top of everything else, there is no way it would have worked. I don't know how many hours I used, but my best guess would be 30% of my position for the last 2 years and I only survived because of my partner. Our head of department gave us free reign and kept himself on the sidelines. I don't think my colleagues got involved enough and we would have been better positioned in the negotiations if we get the SFI. Right now, SINTEF is a lot better positioned. All of this made it quite easy to make the decision to move the whole thing to SINTEF towards the ends and let them take the lead. Their administration is a lot more honed and are learning a lot from the other similar SFIs they are involved in.

Altogether, my experience of the process is really positive, as I had hoped. After the deadline, I worked abroad and asked my colleagues to keep the interaction with the partners ongoing, but that didn't happen. It will be a real challenge now to build this up again if we get an SFI. I am a little concerned, both for not having been in touch and because of COVID-19. Thankfully, we have a good set of partners.

I do have a PhD in project management, on governance. I've worked on large projects, both in the industry and in research, including very complex projects.

We worked on the budget ourselves and we really did push this to SINTEF. That was linked to the competency and capacity at our administration, as we had just lost some of our key people. The ones that were left were not eager to work on our proposal and they had really high demands on deliverables all the time. We ended up rather using SINTEF for this work.

In the end, its all about collaboration and involvement. That is what I focus on. Everyone is so focused on writing something, text, show that they have done something. I gathered people and got them to talk to each other, collected their ideas. That ended up being a fuzzy material that was not easy to organise or write a text from, but that's when our editor came in. And it worked really well. What we got was a richness of stuff to work from and the question became more about focus. Later on, the dialogue with the partners was key. We need a

common goal, a common understanding: why are we doing this? We would have never gotten the backing we needed without this.

We did evaluate along the way, but nothing formal. There were some initiatives from the faculty and rectorate, which we answered. Internally, it was more ad hoc. Sometimes it was a chat with our head of department, sometimes the 3 of us leading the proposal. This was mostly a discussion of how far we had come and what was left to do. In that way, the 3 of us were really complimentary in terms of resources, network, academic knowledge and so forth. We all had our different contributions.

I really enjoy the beginning of this, the change of ideas. I does get a little bit more intense towards the end though.

Proposal Zeta

There were several reasons to apply for an SFI, but mainly that it is a long term project that makes it possible to build a strong collaboration. I've worked in an SFI before and that was a positive experience. Another reason is that an SFI is big, so you can connect different fields in a way that has impact on both society and industry. In the industry we are collaborating with the SFI will be essential, especially with regards to environmental impact.

We started working on this 2,5 years before the deadline, in the spring of 2017. The whole process started with discussions with our co-group at SINTEF, mainly whether or not we would work on an application and who was going to take the lead. That was something we needed to be on the same page on, straight from the beginning, and this was also a start of the long discussions on scope we had with SINTEF. We had the first internal workshop with SINTEF in November of 2017. This was completely necessary, both for the organisations in terms of in-kind, but also for the individuals. They need to see themselves in the SFI in the future. This was a bottom-up approach. Already in the spring of 2017 we started talking to selected industry partners and got them onboard. We had the first workshops together with the industry in January 2018, this was more top-down. From here on, we had several workshops together with the industry where we worked on focus and to describe the innovation. In parallel smaller focused groups worked on the description of research questions, methodology and deliverables.

I had a partner at SINTEF with project management experience, also from SFI. In addition we had identified work package leaders early on and a few people from the industry I used as discussion partners. This gave us access to reflections and thoughts from the industry all the time during the process. At the same time, there was a clear personal effort from me. I was the one who worked on putting everything together to something coherent.

We had some industry talking among each other, which was good. At least 2 partners had discussions because they wanted to coordinate a joint collaboration. Other than that, we had an open forum although we obviously had to coordinate the discussions. We initially opted for a steering committee, but in the end we all agreed that it was not necessary and we never formalised it.

We had a good time working together with our partners and we also got a good relation to new, large, industry partners. I think that is something to build on and one of the key points for me has been to invest time on that relationship. At the same time, we have also used this work to strengthen our internal collaboration at NTNU between different groups and persons, something that needs to be a central driving force in this type of processes.

To be honest, I would probably become depressed if I ever wrote down my hours. I would guess I used half a year full-time on the application. The last 2 months were more intense when we were putting the whole thing together into a coherent document where everybody felt represented. I was the one in charge of that part, but we did get good help from colleagues from NTNU, SINTEF and the industry.

I did some teaching while developing the application, but I also got help: an adjunct professor a larger part of a course and I also got help from others. All in all, I had a good working environment to develop the application.

I got help from the administration to develop the budget and checking out the rules, we had a brilliant project economist as well as help from the faculty and rectorate. The thing I am concerned about now is the contracts. It's critical we get legal help from NTNU when preparing the consortium agreement, but it looks like this will be in the middle of July. I have had a contract change before in July, that didn't work out as well as it could have. I think this is critical.

I have had training for leading research groups at NTNU as well as another leadership course. The former was really inspiring, thinking how to combine groups in terms of subject maturity. The way we think about different steps and the understanding that you can't just run everything together but you need groups and distinct processes.

I think the most important part for a process like this is that people feel like they are heard and valued. In addition, you need people who know the rules and make you aware of the space you are operating in and understand the limitations. For instance, someone you trust to develop your budgets. Something that doesn't get said much is that you need the opportunity to think. If you are there to generate and develop ideas, you can't be caught up in the daily routines, you need excess energy.

We did evaluations at several points. Are we optimised, do we have the right people, are we working correctly?

Proposal Eta

This was an initiative where a lot of groups at NTNU are working with the same thing from different approaches, as well as some groups at SINTEF. We thought about getting something going together and the common denominator ended up being the resource utilisation in the field.

We were actually pretty late in the start. We started around the end of 2018. We were supposed to deliver a sketch to the faculty in November, but were late. We had to ask the faculty nicely if we could present a sketch anyway. They said yes, and we got to deliver the sketch by the end of the year as it was being sent from the faculty to the Rectors Office in January. At this stage, we already had a sketch that we had developed towards the industry and EU calls, so we had a good starting point. The other NTNU and SINTEF groups came together in January and February 2019. By that time, we were 4-5 people working on the application, 1 from each group. The whole proposal was written by NTNU and SINTEF, mainly by 1 researcher I work with at NTNU. The industry wasn't involved.

We had good people at the department, but their focus was on the budget and formal processes. The leaders from the department were involved in reviewing the application and the faculty had an approval process, but the majority of the work was done by the core group.

I didn't ask for but neither was I offered a reduction of other work like teaching, but I did have our researcher available who could do a lot of the writing as he had the capacity. We were in the same office the whole time and we are still good friends. There were a lot of ad hoc meetings, especially between the two of us writing together, so it's really difficult to estimate the amount of work I put into the application. I would guess somewhere between 100 and 150 hours from the beginning until we stopped the application process, so perhaps a month's worth of work.

We got a processing partner, producer, two equipment suppliers as well as another closely related producer that also needs to understand and control quality over time. We really wanted a good collaboration and we had a good topic where we could see significant impact on society's resources. We couldn't get the industry in place fast enough. By the time we were in August, it was too late. The external partners were the reason we didn't send in the application. The partners never participated in the meetings, although they might join by video every once in a while. They were never connected to the writing process itself and we didn't have a workshop. In contrast, the core group had a meeting every 14 days and there were a lot of ad hoc meetings as well. We had 4-5 partners before the summer but didn't get letters of commitment in August. That's when we found out that we shouldn't pursue this further. I still think the topic is a good match for an SFI and we have proceeded with some parts of the SFI proposal as separate projects with some of the partners afterwards. So there has been positive effects from the process. I would say that we had developed our thoughts on the topic a lot further than the other partners.

I have worked a long time at NTNU and SINTEF, writing applications has been a part of the job for many years. At the same time, we do have some calls that we want to prioritise instead of others. We quite frequently develop applications together with SINTEF. I consider the collaboration with them to be very close and I think they are a very important partner to us. I wouldn't want to run a process for SFF, we focus on industry projects with the partners we have a close relationship to.

I have been on a lot of courses on project management at SINTEF, also some courses from academia, but nothing while I've been at NTNU. Nor have I ever gotten the offer to do so.

We didn't use any of the offers of help from the Rectors office. The head of department joined sometimes for the discussions and the faculty did have their review. At the same time, I did have my researcher available who is already financed, so it seemed unnatural to apply for funding to write the application.

I think the most important success factors are the partners, that's where we started working too late and didn't get them confirmed early enough. They were not involved in all aspects of the application. Next time we should start working earlier with building the consortium. We did get a closer collaboration between the groups at NTNU and SINTEF. We have since written more application together and now also have some ongoing projects. It is possible we should have hosted more seminars, perhaps that would have been more efficient and it would have been easier to get the industry confirmed. It might be that I was a bit busy with other things as well.

In the end, we didn't get the industry involved enough by august so we didn't send the application.

Proposal Theta

We had already applied for a few similar projects and we have focused on the topic in proposals both before and after the proposal. For the SFI, the main reasons were that we already had a group on the topic and I had already been involved with an SFI previously. They give a good platform to work long term so the format is really suitable. In addition, we had a concept that we thought would work well, it was a good core idea. Then finally, there is obviously the push from your surroundings, from NTNU. It is pretty powerful and we are affected by it.

I think we started about a year before, when we described our concept. I think an SFI has to build on existing project activities, there is no way to start from a clean slate. We had to involve companies we hadn't collaborated with before, new perspectives and proposals from everywhere that we had to deal with. This was a lot heavier to handle. Even with the push and focus on developing an SFI proposal, the work is expected to be done by the individual. In this case we got some money from our department, about 150.000 NOK for travels, hiring help and such. This was done after prioritising initiatives at the department, with us and another initiative ending up with support.

We were 3 people from our group that were really motivated for the proposal. We're good friends, both with the companies and between ourselves. At the same time, there were some things that didn't work. We were 3 key people, but we didn't manage to get a broader team involved. This meant that the 3 of us ended up with a lot of the work, a lot of the other peoples work, to be specific. We had 5 topics in the proposal, but the 3 of us were all from one field. This ended up generating a lot of work and I also see that it was my responsibility to make it work as the lead. The focus of the proposal was really cross-disciplinary, which meant that the returns in each field were less than in an application that was just concentrating on one field. So I guess that lead to us not getting the traction we needed.

If I were to define the main challenge in this, as I experienced it, it would be that the leadership from the departments and faculties do not have the necessary time to promote and involve themselves in the initiatives. We get questions from our industry partners, whether or not our proposal is something NTNU is spearheading. The answer is obviously yes, but then again, so are they spearheading 40 other initiatives. You simply can't do this for everybody, so maybe we should choose earlier and then really push for the ones that are selected. Right now, everyone can just do whatever they want, but at the same time I miss the leadership at the departments and faculties to get involved.

The faculty did ask for reporting, or required it, to be more specific. But that was it. There was one round where we got some advice, but an application is really dynamic. When we sent our proposal in for feedback, by the time we got it back, it had already changed. They were not involved in the processes we had. 12-13 applications is a lot to coordinate and to give feedback on, so I see and respect the difficulties this poses. So I guess it's more of a wish.

We had different types of companies as partners, ranging from large, national corporations to big companies and some medium size ones. Some of them we were really familiar with. We had one small company with us, but the profile was the big ones. I think most of them knew about SFIs and what it was about. We usually got in contact with the right people, they understood what we were working on and we got a dialogue going. For example, one of the

large partners can prioritise several SFI proposals, from more core technologies to fringe activities, I would guess at least 4-5 directions. The decisions about which SFI to join have to be made at a reasonably high level. I would guess that some of the really large national corporations probably get at least 10 different proposals in and it is of course in their interest to decide as late as possible with as much information as possible. That's the way it is, you just have to decide whether or not you can deliver without them.

We developed the concept first at NTNU. To build a consortium on top of that, we used our relations as well as built some new links. This mostly done by e-mails and on the phone, but we did visit some. Some of the partners we already had good contacts with, those were quite easy. It was a lot harder to involve those we didn't know from before. They really wouldn't give a formal commitment nor make a decision before everything was ready. At the same time we had to finalise the writing. How much should we really work for something that might not happen? We had a continuous risk assessment going and we saw that there was a real danger of not being done with the application by the deadline. We simply didn't want to use our energy on the final big push when there was little chances of getting the companies on board.

We really started with plenty of time. We had a good concept, a project description of a few pages. At the same time, we didn't get enough traction early on even though we had interest from industry partners. We couldn't describe the benefits for each company and finally, 2 months before deadline, we realised we didn't have the support needed and decided to stop the process. I think in the end, we stopped in a good place. We hadn't burned any bridges or an excessive amount of resources. We just sort of agreed that this time, we didn't make it, we didn't have the partners to go through with this.

I think I used about 200 hours on the proposal, maybe closer to 300. I think the two others used as much together, somewhere between 100-150 hours each. I had full teaching responsibilities, basically a full position, the whole time as well. And I think this is what is so demanding at NTNU generally. These applications are run by professors and associate professors, their calendars are filled with teaching and research, there is no real possibility of freeing up time. It has to be really rare that you can clean someone's calendar for a few months. This is a really a challenge. In addition, none of the deadlines are planned out of an academic calendar, all the exams and other processes are running at the same time. This makes it really challenging.

I have about 80% experience and 20% training with regards to project management. I've been at both NTNU and SINTEF, where I have participated in some courses on the topic. I also have some formal background in project governance, on management its more experience based. But I did participate on some programs from SINTEF previously.

We did some of the budgeting ourselves, but got some help as well. The big challenge in these type of projects is that they are so dynamic, both bottom-up and top-down. For instance, the financial framework is given by the Research Council, where most would of course maximise their budgets. That means both from the Research Council, but also industry direct funding and in-kind. At the same time, we are dealing with the individual tasks that are very much bottom-up, with PhDs and such that we did get help on budgeting. But we never communicated any of this out, this was an internal document at NTNU that the economists worked on. It was also not a match with the one we used when we were communicating with the partners. This a systems challenge at NTNU and in these processes. I remember a

previous application, we had companies joining in the very last hours, we got an additional 4 mNOK and could push in another PhD into the project. This was so badly received by the budgeters at the administration - they were livid that they should have gotten to know this before. Well...yes, but it just doesn't always work that way and can't just turn down the money, can we? There is a clear difference between us, that want to create the best vision from what we have and the budgeting economists at the administration that just want the details. It's two worlds colliding. It is a very fascinating aspect. This whole time we were developing 2 budgets, a detailed from the economists and a separate overall one by us doing the project planning. I guess that's just the way it is, it's nobody's fault.

I think one thing that could have been done, would be some sort of a letter of intent at an early stage. Something that says that a partner is committed to the application process and also willing to share the costs of the development. Just somehow try to formalise the relationship a little bit more, not a final decision. Right now, it is the lead and the core team that donate 95% of the time needed to develop the application. We should get a process that is formalised 6 months before, just to say that we are now some people who are willing and able to develop the proposal, a division of work and resources. I think that could be formalised and I think that would have strengthened the process. There's just so much lone soldier mentality out there. I am already central in some of the ongoing teaching and research, I, like a lot of others, have to be involved in a lot of other processes as well. We have no mechanisms to free up people in to participate in these type of processes. NTNU is simply not a project organisation like SINTEF. There, they can free up resources for a few months to work on an application. We can't do that at NTNU and that makes application processes extra demanding for us. I think we would have been a lot better off adding more to our dynamic capacity than we are today. But I do understand it's not that easy because of the whole faculty, department, research group and professorate organisation we use. There's no silver bullets, but I do think we need a change to be able to deal with the bigger applications. That also means we have to make prioritizations internally, and that might obviously be terribly painful for us.

We did not do any formal evaluations during or afterwards, but we obviously constantly thought about where we were and what remained to be done. But formally and systematically we did nothing. I think we neglected this a bit, we could have learned from it. I think it would have been useful.

Proposal Iota

We had brainstorming from 2017 until 2018. The application process started a little bit before 2018. SINTEF had a competing process and there was a need to combine the two processes. There was a discussion of leadership where NTNU insisted on taking the lead. After a while, more research partners and also a long process of including industry partners followed. But all together, this was very much an initiative from NTNU and SINTEF.

SFI is important because it is long term, also seen from the department side. The topic we worked on was a good fit for an SFI and we have positive experiences with an SFI. To some extent, this application was a continuation of our previous SFI but we also agreed that a new centre needs new content. But yeah, both the previous SFI and another large centre we are involved in are the foundations for this application.

Altogether, I expect I used about 30% of my position from January 2019 until the deadline to work on the application. This was on top of everything else. The initial sketch was done in 2018. There are administrative resources, but it's clear that they cannot help you with everything. The time used for the application has negative impact on other activities, either its PhDs, other research or other things. I did have to solve the time issues all alone without help. The department wanted to help and asked, but you can't just not supervise your PhDs or quit your teaching - there is no one there to do the work, you can't just shuffle hours around. During the process, several other application dead-lines were ignored. The SFI application overruns all other processes. The biggest help we had with extra hands was the innovation manager, he was new and didn't have a full calendar, so he joined. He made drafts and professional presentations as well, which helped. We also did get some help from SINTEF.

Many of the people working on the application knew each other from before, but there were some new faces as well. In the core group, myself and the innovation manager participated, as well as another NTNU professor. We also had a person from SINTEF and another research partner in the team. There was also an extended group that included the 7 Work Package Leaders as well as some others, 10 in total. So there was a smaller core group as well as an extended group. Everyone was very professional and we are still friends afterwards.

In January, we had an internal kick-off meeting, followed by an industry meeting late March, something of a milestone. The latter had an ok participation, but nowhere near good enough. We just had to work on getting more industry involved all the way to the summer, even though we were supposed to be ready before the holidays. This became the main challenge.

As the SFI requires a lot of user involvement, we need to have industry that has their own research activity, they have to have the capacity to participate in the research and innovation, something SMBs don't have. We need a locomotive. One other large industry company had already chosen another strategy and another was in a fusion process. We focused our efforts on a specific, remaining large partner and had long discussions. Overall, we thought they were very positive, but on the 6th of September they chose not to join our proposal, just before the dead-line. We were left with tiny companies and no locomotives. In the end, this lead us to not submitting the proposal.

In an ideal world, the users would have come to us, told us about their problems and we could have developed solutions together. Instead, we have to go out and tell them about

interesting challenges. At the same time, we did think everyone was being open and shared their opinions.

All the stakeholders joined from end of March, after they were involved in the preliminary processes. The challenge was to get them committed and to get them to comment. We had a new workshop planned in end of August, had a room booked at Oslo Airport to make it easy to participate, but we had to cancel. There were simply not enough confirmed participants and we ended up following each partner up by e-mail and phone instead.

Regarding joining in on a new proposal, there is an SFF proposal process now which I have turned down the offer to participate because of the topic. I think it is very important that you have enthusiastic people who can be there to do the work, otherwise the whole process will be dead. Departments are obviously interested in getting a big centre, but you need a core group that is interested in pulling the weight and everyone is always very busy.

I don't have a formal project management or leadership training but I do have an industry background. I do feel like I have learned a lot along the years from leading several projects, being a work package leader at a large centre where it was a pleasure to work as a researcher and not deal with all the administration.

I got pretty good help from the administration with budgeting and finances. There is a good project administration at the department but from the faculty and above, the offer was only gatherings dealing with the overall things. What you need is people who are there to produce and work, not people who tell you what is smart, those we have plenty of. The Innovation manager was helpful.

I think there are several success factors for an SFI. You need a good idea and you need to magnify that through the user partners. You need a core group of researchers that have the right background and CVs. You need a well organised and holistic approach for the centre, ranging from vision to goals. This also includes the connection between the work packages, business areas and cases. Both the research and the collaboration is important, connected to the data management and innovation centres, with their own responsible managers.

Overall I think we had a pretty solid run.

Proposal Kappa

We had a working title that was really easy to communicate, it just stuck to peoples heads. The proposal itself was divided into three areas that were also the work packages. NTNU and SINTEF are the research partners, with NTNU joining in with 3 departments. We also had 2 international partners on the research side. We started around the time we got a requirement to send sketches to the faculty in late 2018, but it was only a 1-pager. The head of department was very positive to all of this and they had some application development funding available for those wanting to develop applications. There were 2 or 3 initiatives that I know of at the department then and everybody got some money for travels and such.

We had a steering committee that was formalised. There were people from NTNU, SINTEF, 3-4 of the most central industry partners and it ran for almost the whole proposal development process. We had acceptance to pull in resources when we needed them. In addition we had a core writing group, which was more informal. We had 4-6 people from SINTEF and the rest from NTNU, probably 10-12 people in total. The industry partners were not involved in the proposal writing, but they did get texts sent for comments along the way.

My personal motivation for the call was that I am on a 5-year contract. I got hired to build up a centre and to get that to grow. When we get an answer on the SFI sometime during the summer, it has perfect timing in terms of growing our centre with an SFI. I had teaching duties all the time, there was never any discussion about getting relieved, same as always. You do have to do this on top of everything else. I haven't counted the hours, but it is ridiculous. We had 14-15 partners, 3 to 4 meetings with each, both physically and through video conference, I reckon I used at least 200 hours just on meetings. Writing, coordinating between NTNU and SINTEF, everything else on top of that. I would guess 4-500 hours in total.

Our relation with the industry worked quite well. We have a large network and our consortium is our greatest strength. We know everyone from before, but that might be both positive and negative. We can get hold of people to run for an SFI, it's not that easy to get in touch with partners you have no previous work with. We finally landed on 4 large corporations, 3-4 small companies and the rest in between as large companies. The big ones are somewhat financing activities for the small ones, but overall its pretty even and fair.

I have worked at SINTEF previously so the collaboration with them was quite ok, same as all of these types of processes. As always, a lot of decisions get done late. I think people are in a mindset that you need pressure in order to deliver. I would have wanted to be done before but we again ended up working around the clock in the end.

I have had some project management courses and I had access to a network on the topic during my PhD, but I haven't done anything that gives credits. I have gotten offered courses, so they are there, for those that need them.

The collaboration we had with the administration was mostly about budgeting, which we considered to be a sort of approval process. Budgeting of PhDs, in-kind and so forth, it was all done as a dialogue. We were mostly happy, but at the same time NTNU has a lot of different departments with economists working everywhere. Turns out they don't always

agree on the details and we got a lot of different answers. It would have been great to have an SFI guru, but for now there is a discrepancy, both at the department and faculty level.

It's quite hard to say what's important in the proposal in the end. I mean, we've all read the criteria, you think you know what they focus on at the Research Council, the core topics to answer. You just try to do your best to describe your proposal. I think one of the most important things outside the proposal is your consortium. You need them to span an area, be complimentary, cover Norway both in terms of the areas they work in as well as geographically. I think that counts as a positive in the review. In addition, you obviously need a dimension of innovation in your proposal, beyond what exists today. We looked at the SFIs that are already running, who was involved and so forth. We really wanted to make something new, not copy something that was already out there.

We didn't do an evaluation beyond a small questionnaire from NTNU that I filled out, no meetings in the core group or steering committee after we were done.

Proposal Lambda

The process started relatively early. We had an early version done a year before, but then the research council decided to do their evaluation. There was a good deal of criticism of the existing SFI structure, specifically that it didn't result in new companies. I really do take the Research Council evaluation seriously when they say that the SFI doesn't work the way it was intended, resulting in no new jobs in Norway. The innovations need to support new jobs. In addition, you really need to focus on something that everybody, also those not in the field, can see the potential of. Our initiative sprung out and was driven solely at NTNU in the beginning, even though there was obviously some industry contact. We had another large Norwegian research partner and a large international partner. SINTEF was not involved. We did think about it back and forth during the process, but it was more important for us to include our other large research partner because of their scientific strength. SINTEF really doesn't have that much expertise in our field of research, but there is always doubt in these processes. If our other partner would be included, they also needed a few million kroner a year. We had 4 departments from NTNU joining in the proposal, so the whole thing becomes a balance of scientific quality and economic considerations of actually getting the work done.

In the beginning, the leadership had little interest in what we were doing, later this changed. I think it was mainly because we were 4 departments collaborating at 2 faculties. At our faculty, they had 2 or 3 meetings where they went through our entire proposal. The group that did the review gave us a lot of good and valuable feedback. That said, we did have to do the heavy lifting ourselves, of course. In the end we also had an external company going through our proposal, but that was maybe just a waste of money as they pointed out pretty obvious things. In comparison, the faculty review was really helpful and they also checked out all the formalities of the proposal.

The early version was written at NTNU. Afterwards, we used most of our time to include companies, a rollercoaster ride. We had started discussion 2 years before the deadline with 2 of the major companies and they knew already then that we were going to make an application. We were pretty confident that they would join. Another company, owned abroad took a lot of time and meetings to get on board. In the end, we had 7 partners. One of the 2 major companies barely joined. From the first version of the proposal, they used 3 or 4 months to make a decision and to give us an answer. They had a policy that they would

answer all of the SFIs in the same way, which I think was mostly internal politics. In the end we got an answer 14 days before the deadline. We were lucky. It was an exciting and an uncomfortable process. The time from when they agreed to when we were supposed to be finalised with the entire application was really short. Another partner was waiting for the major partner to say yes, before they agreed as well. Thankfully our research partners committed really early on and we had a really constructive collaboration. We barely raised the money required for an approved application. We did get a government partner, they even put in cash, which was positive. Afterwards the economic downturn started, if we had tried building an application now, we wouldn't have had a chance.

During the last 6 months, I worked on this a few hours every day. In the end, I did nothing else. I didn't get exempt from teaching duties and did some during this period, but on the other hand I have very little teaching so this wasn't really a problem. The management didn't push any other work over on me during this period, so that was good. We had a core team of 5-6 people that discussed the Research council evaluation of the SFI really carefully during the process: How do enable start-ups, how can we create value for existing industry, etc. These are things that are always there. I think that is generally an issue that springs out from the distance between academia and business. Our 2 research partners were not involved in the day-to-day writing process. When we were done, they were invited to comment and read. Most of the communication was on Skype, but we did have 1 meeting in Trondheim, but obviously our international partner didn't join since they were half the world away. So the process ended up as a mix of Skype, writing, sending documents by e-mail and internal meetings. In the end, we all worked as much as I did, although all together I was the one who probably worked the most. But yeah, I think we all used around 80% of our time after the summer on the application.

The way we organised our workshop was probably the biggest mistake we made. It was a proper 1 day workshop with everyone. We were waiting for the Research Council evaluation and the rules changed along the way so we waited too long to invite the industry in, putting it after the evaluation. This took so much time, traveling out, presenting the project, getting a meeting in Trondheim set up with everyone. In the end, there was a lot of people joining in, maybe 20 total from both NTNU and the industry. But this was too late, it would have been a lot better to have it one or two months earlier. Both for the proposal and to get them committed. We had 2-3 meetings with every company during the process, but the big value was in the partners meeting and talking to each other, something we completely underestimated. We should have had the workshop earlier, but it ended up with a sort of a Paris-complex where everyone needs to fly though Paris to get out in the world. All the communication was going through us and that wasn't very effective. It would have been a lot better if the partners would have had contact with each other.

Leading the process was ok. We have worked on several parallel proposals before, I would consider it a part of the job, being a professor. To be honest, I really don't think we will get the SFI, there is so much that has to be done right. Over time, I have received my fair share of rejections, but I have gotten many approvals as well. You really do need to have a lot of proposals going on at all times and because of that, we also pushed forward with the SFI. After the deadline, we have already written 3 more proposals. It is pretty stressful, but it's also fun in a way. I think it is perfectly fine to be a pessimist and at the same time see the value in it. It's important to be realistic when considering these application processes.

I had some project training when I worked in the industry, there might even be a diploma somewhere, but I wouldn't say I am formally trained in project management. I've lead my share of projects and work packages, but mainly I have been the head of an international consortium that has lasted for over 20 years with 15 industry partners and also lead some very large projects in the industry.

The budgeting help we got from the administration was perfect. They were supportive all the way. A lot of the budget parameters were given in the call, such as the 20 million kroner yearly budget. We also saw early that the industry contribution was going to be hard to achieve. I continuously kept a rough budget in my head during the work. It was important that you had specific people helping you, I can't stress that enough. It cannot be like the IT-support where you need to explain the whole problem over and over again each time.

We did have a small evaluation afterwards, got pretty much the same type of questions as during this interview, but more focused on support from the administration, sort of a written debriefing.

Proposal Mu

If you want a larger research centre focused on industry, SFI is pretty much the only way to go. We are involved in a larger centre today and it works brilliantly. Today, our industry is facing technological changes that they need to address and Norway should be in the forefront. This change really started showing already in 2016, the companies were doing some experimental stuff together with both SINTEF and NTNU. I would say that we have a unique ecosystem for this industry in Norway, but at the same time, other countries are very much pushing for developing the technology we are focusing on. SFI doesn't actually involve that much funding, but it works well as a centre of gravity in a way which enables you to build an ecosystem of thematically-related projects.

In 2016, we were already familiar with the SFF applications. To move forward, we decided NTNU should lead an SFI proposal, a responsibility I was given. This was also to mark that NTNU was apart from SINTEF. At the time, we felt like we were not included in their processes in this field of development. It is important to understand that our field is very young in implementation and nobody knows how it will develop. That means we need masters degrees, PhDs and Postdocs, competent people going out into the industry to create the necessary products and services. SINTEF's focus is to do the research and then sell their hours afterwards. We saw a gap that needed to be filled. But then again, there is always a discussion about who should lead an SFI.

The proposal process started with our first meeting in December 2016. That was a meeting linked to another centre and was held internally at NTNU. Several departments were invited to discuss what is scientifically interesting and relevant. In hindsight, it might have been a little naive to think that NTNU knew what needed to be done without others. We picked our focus and started developing the work package structure during the spring and fall of 2017. Here, the process stopped a little bit. I had too much to do and became a block in the flow. Luckily, we got an innovation manager involved that was very competent. We started working on this together, focusing on research and innovation at the same time. This speeded things up again.

I have an industry background as well as a researcher background with some leadership experience from both. I also have a good network in both places. We had our first industry workshop in November 2018, with some of the big companies. We had to clarify our position with SINTEF as well and in January, we had a higher level meeting with them. It became clear that there were going to be two proposals. Ours, as well as one headed by SINTEF where the focus was less technological. This meeting was good as both the industry, SINTEF and NTNU needed a clarification on this. In 2019, we had a really hectic spring. In the end of February, we had a big event where we invited a lot of companies from our industry. We were making a national team. We had high level people opening the event as well as media coverage. The proposal was going everywhere at the same time, everyone wanted their topic included. Maybe we tried to put in too much. At least we clarified the technology part with SINTEF.

We had a large seminar at NTNU in May of 2019, a lot of people from different departments joined. More people than was realistic to include in the proposal, it turned out. In the same month, we also had a workshop to identify and work on the use cases in the proposal. This was with the industry to get more commitment.

Another perspective that became clear along the way was that since NTNU is ahead of the game and also has its own innovation processes, some people in the industry were looking at us as a threat. Especially concerning startups. What the industry does when it is faced with radical innovation is wait, look how things turn out without using their own resources on R&D, wait until there is a market and then buy up the startup companies in the segment. That's the way it is. We had to argue that we need to see beyond our local markets, look at what Asia, especially China, Japan and Korea are doing. They are the competitors, not Norwegian startups. They are looking at the whole value chain and they are putting billions into developing this technology.

We had one large company that was very focused on developing their own benefits from the proposal, which was good. They really tried to connect it to existing activities. Their priorities were made in the very last moments. They had several SFI proposals on the table, as did another large partner. Both of them made the final decisions in the very last moments. There were also some negotiations involved, with not everyone pulling in the same direction. But all of this is very dependent on the people involved, they mean a lot for a process such as this. During the process, we had an industry representative from one of the partners that downplayed the need to develop new technology. At the same time, we knew that the company that he was from had given the impression that they had developed something to their clients, something we knew they actually hadn't developed yet. I don't think they wanted that to be a part of the proposal. One of our other research partners had a political agenda, they were trying to build things up locally. In the end, this partner were taken off the proposal, they really didn't have that much to offer in terms of the scientific contribution, it was more politics that they were involved in the first place. We had new partners coming in as late as June. In the end, we had 13-15 industry partners, some public partners as well as 5 research partners.

I worked sporadically with this before 2019, then a lot for the spring of 2019. I probably had 70 meetings, events and seminars. We had a meeting pretty much every week and worked on this. I don't know where even to begin counting, it's all quite chaotic. If I had to guess, I would say 40% of a position. This was of course on top of everything else. I am definitely not going to be doing this again in my current position.

This proposal was worked on at our department. The faculty was clear that those that were working on an application should concentrate only on that. It really is madness for me to put this on top of everything else. The faculty was not very involved in the process: they had some milestones, feedback and stuff that they expected to get at certain points. I mean the bottom-up approach is the thing that works. If you don't have the support of the professors, you have nothing. Everyone is very busy, no one is just hanging around with free time on their hands. So that's what I worked on, getting people engaged without bothering them too much.

In the spring of 2019, we were 4 people in the core team: 2 from NTNU, 2 from SINTEF and 1 from another partner. During May-June, a writing group was established. We didn't have a steering committee along the way, just the faculty milestones. The structure was pretty ad hoc. We had about 10 people writing, one editor with the main responsibility. This was very hectic towards the end, but we got there in the end. Some topics were omitted from the final proposal, so that also meant some research areas and corresponding people from NTNU were not part of the final application.

We were really too late with everything at the end. We shared the responsibility and worked with the industry, but it was a lot of work. Too much. And our team has never done this before. Applying for an SFI is probably one of the most challenging things you can do as an academic, there are so many stakeholders and opinions. SFIs represent incremental innovation in a lot of industries, but in ours there is a lot of uncertainty and novelty going forward, with potentially radical developments in both technology and business models. We had our disagreements with SINTEF, we had companies undermining our efforts. A lot of things happened along the way. But in the end, what I think we should have done differently is really getting people to commit internally much earlier on and delegated the work much more.

On the other hand, I think we were really good at getting the industry involved. A lot of SFIs are planned as "industry pays"-projects, more of a research ego trip from NTNU and SINTEF. We were really focused that the industry needed to dedicate people to our proposal, not just participate in the board meetings.

I don't have project management education, but plenty of courses on management and leadership. I think NTNU should have a course on this, same as we have Pedup. There's so much on-the-job-learning, it should be worked on systematically. Academic research projects are not like industry projects and SFIs are a lot harder to develop, organize and manage than regular research projects. There is just so many people to report to, so many interests to balance. It's everything from research questions to liquidity and balances of the industry partners. If you want to do it well and get the maximum impact out of an SFI, that is no mean feat. There should have been an SFI school, a sort of professors school at the departments where we could share best practice. We should have had this NTNU-wide, a forum where experienced people can share what they have learned along the way to newcomers. We should systematically look at best practice in relation to the application processes. Of course this needs to be done without sharing any industry secrets and such. We were quite lucky with this, we had good contacts, including leadership at other SFIs. But in the beginning, it would have been good to get more insight.

We got help with the budgets, but in the end it was quite chaotic. I think the whole thing is more a chaos-like balance. But the help we got from the faculty was very good.

The whole process is like the chicken and the egg, with regards to involving the industry or developing the research content. There is a big difference in SFIs that look at early technology versus late technology. Regardless, you need a good team made of good people around you. This means both scientifically and in terms of motivation, perseverance and networks. It's important to match the motivation and the long term research goals with the short-term business focus of the industry. They are often not interested in next 5 years, they are looking at their next quarterly report. I think this is the root cause to all the challenges for collaboration. It really is two worlds colliding. We have companies where we find super-motivated people, but hey often have no money. We have companies with loads of money. They are not always the same companies. This is a real challenge.

I would also recommend not trying to do everything yourself, it is important to delegate the work efficiently and involve people. We were often too few that did too much for too long. You need to manage expectations, it's so very tempting to say yes to everything. You need to know how to close the door. You also need time to lead this type of processes. You basically need a clean calendar. Without that, you cannot have a good process and the attention that is

needed. And finally, you need a good narrative, something that is plausible connected to people with the ability to do it. You need an application that is specific and a narrative with a red thread.

We actually had a meeting 3 weeks ago, just to decide on an action team. This is there in case we get the SFI, a plan for who does what, how do we deal with the consortium agreement, who is contacting who, and so on. We are planning the process in case we get an approval for the SFI, we just can't start with that after we get the approval. We need to clarify roles while we are solidifying things, especially in administration before we are hiring the administrative lead.

We are obviously worried if the companies actually will join due to COVID-19. We asked the research council whether or not they have a plan b, but there was no answer. As far as we know, they don't have one. It might be that the SFIs need to be postponed a year? I mean, some of the companies have gone from pretty solid finances to barely surviving, how interested are they really in working at an SFI when they might have to be sacking people at the same time?

Proposal Nu

Our proposal is combining research and ongoing societal changes and looking at how applied research can be a coherent reply. That makes our topic suitable for SFI, instead of, say, an SFF. At the same time, the other schemes from the Research Council are a lot smaller, they simply cannot accommodate this sort of scale. Of course there are other options, like Horizon, and we are actively pursuing those as well.

We started developing the application in February 2016, when we had the first internal meeting. This was just to prepare and obviously did not have the same activity level as towards the end. Our proposal is connected to another centre with existing funding and activities and from there we already had a mandate to actively move towards an SFI in anticipation of the call. We defined the concept and looked at potential partners, but it was too early to start contacting them. Mainly we made sure we had management approval everywhere so there would be no later crashes and we also started looking at best practices from other SFI. At the same time, we sent out a notice to our centre partners, making our intentions clear.

The process became a lot more active in 2018. There was firstly a process run by the faculty which proved to be very helpful. We got templates for work and help with other organisation things. We refined our concept in 2018 and started in earnest in January 2019 with a proposal for the faculty. In addition, our proposal is very closely linked to the national strategy in Norway, which had also been updated since 2016, so we had to incorporate that into our concept.

We had to sections from SINTEF as well as 2 other research partners that contributed in the writing process, but most of this came from one of the SINTEF sections, since they were there from the beginning. The remaining 3 groups came in a bit later. By the end everyone was contributing a lot. Mostly, these were the Work Package leads that were writing, so 5 people in addition to myself. We had a steering committee as well: our head of department, a director from SINTEF, the rest were industry representatives.

I didn't ask for resources, but there was support. The faculty, as well as external parties, reviewed several of our drafts, providing valuable comments. We also got a fair bit of help from the faculty and department with identifying partners, onboarding them and getting them committed. I didn't write hours, but I would say something like 30% of my time. The last period was really intense. The other 5 people didn't work as much. I am also only teaching in mid-autumn so during the intense period, I didn't have teaching, but I did have other obligations for 50% of my work time. Thinking about it now, running for another proposal is dependent whether or not we will get this one. I think we had an ok process. Challenging, yes, but also quite enjoyable overall. Everyone is still friends in the end.

The industry was invited to comment, some of them did. But I still can't say that the industry was that much involved in the writing. It's not because they weren't invited, but I think they just didn't have the time. We did do a joint workshop in May 2019, the rest was done through collaborative networks. There were many aspects to consider when working with the industry partners. You have to take a sort of a life cycle point of view: how do you make the initial contact, based on previous relationship? Many ways to do that. Because of the focus of our proposal and our existing centre, we decided to go talk to those partners first. We worked on an initial pool of partners based on suggestions from the WP leaders that were from either

NTNU or one of the SINTEF sections. After that, we developed another pool of invitees based on suggestions from the department and faculty, as well as the management from our centre. In a few cases we had people asking to be involved after we held public presentations. A very difficult part was always to get the engaged and then committed, especially within the time frame. In July, you can't find many people working in Norway. To work on this, we engaged them by involving them in the drafting process as much as possible. They were not that interested, understandably. Usually, the industry is not contributing to the writing process that much. In most cases, you should be quite happy if you get a use case or similar. Along the way, we did a workshop that helped a lot. Some industry got onboard, others left because the focus of the proposal was not within their scope. That's fair.

The hardest part in the end was moving to financial commitment in the end, mostly because of the timing. We were sending confirmation letters back and forth 2 days before the deadline, one partner even left a day before the final deadline, they couldn't sign the letter before because of internal re-organisation. We had even identified this as a risk in the process, so we actually had 2 drafts ready just in case. But that's the key, the level of commitment.

I have no formal training as a project manager, but I've been learning on the job doing academic and government projects for 20 years or so.

The quality of help we got from the administration was great. The budget was not reviewed externally in the end because of the time and the partners committing so late, but we did do an internal review.

I think one of the important things is giving a sense of leadership, not simply managing. Only after that are people willing to engage and give more of themselves to the process and not do it just because it's their job. This makes the people the important part. At the same time, you need management approval and active support. And that is not just the technical support, but the encouragement, the expectation, the strategic importance. After that, I would say the resources have to be there internally. All of this, together with contacts - and I mean personal contacts within the industry. This gives you the necessary initial trust so that you can start discussing. It is imperative that you can convince the partners about the gain. In Norway, in particular, you should convince them that you are not only interested in your own research, but would actually like to solve industry problems. There was a big surprise among the partners when I told them I would like to apply already existing research in the SFI, not write papers. In Europe, the industry is more used to working with academia, so that's a bit different. Finally, the budgeting is really important. You really do have to have people who know how to budget, how to work with academics, who can work late. They simply have to be prepared for late nights and be committed.

There was a faculty evaluation process afterwards.

Proposal Omicron

There were several reasons why we wanted to apply. Mainly, this was a second attempt after the previous call. SFIs are a really good programme because we have quite strong industry in our field in Norway. The big companies have the expertise needed and we have a lot of small companies that make end products as well. We even got tiny companies working in this area, also around Trondheim. We already have a strong project base together with SINTEF and several EU projects, creating a strong consortium here.

We started slowly building this up in the spring of 2017 after there was an indication that the call dead-line might be towards the end of 2018. There were only two research partners, NTNU and SINTEF. We did have discussions with another large academic partner, but we never got to the point where we agreed. We wanted to start about 1,5 years before the final date, but this turned out to be longer because the Research Council didn't put out the call when we expected. The way it all started was that those most involved in the previous call, sat down together, went through the previous application and tried to figure out how a new version might have a chance of success. We made a small two-pager that we used to get in contact with companies. We had the first meetings at the end of 2017, but started to have meeting in earnest during spring of 2018. Before that, the discussions were more about having a chat, rather than working on an application.

Everyone in the starting group knew each other well, either from the previous call or from other projects. Everyone was working together on proposals or teaching, so we had a pretty broad network to start out with. That made it easy to call people. We went to meetings to discuss the project with specific companies, since they were in doubt. Some didn't join in the end. Otherwise, our first large meeting was a strategy seminar with our department in early 2018, close to February. Already then, relevant partners participated and showed interest in the initiative. It wasn't specifically about the SFI application, but we presented our initiative during the program. From there, it took quite a while before we had the first proper workshop, in December 2018. People flew in from everywhere and that worked great. Other times, the companies in Trondheim would join in, while everyone else would be on video call.

During all of this, the department and the faculty suggested that we run for an SFI, rather strongly. Since we got good feedback on the previous call and had a solid industry base, we were an obvious candidate to write an SFI application. In the beginning it was more pushing, after a while it was more backing. Both the department and faculty got really involved in May to June of 2019, having different types of reviews that helped us a lot. The faculty paid for external assistance and we also got internal review help on both the scientific part and the organisation with people from the top management at both the department and faculty level actually reading our proposal and commenting.

For the application itself, we had a core group with 5 from NTNU and 2 from SINTEF that were active in the writing. Since I was the coordinator, I naturally wrote a lot. This went on from the beginning and all the way to the more hectic end. The companies, on the other hand, didn't write that much, mostly reading and commenting. We asked them to write why this was important, both in the document and in their letters of interest.

The collaboration was good, we didn't expect any extensive writing from the companies. I think that would have been really difficult to get from the most of them. Also, if you are

going to be active in this type of a process, a lot of time is required. It is simply not feasible in the companies. We wrote proposals for work packages and presented them to the companies, asking for comments. We really looked for responses, asked whether or not this was something useful for the companies. These types of discussions were really important. If the companies couldn't see the point in involving themselves in the work packages, it was either re-written or cut out altogether.

The documents were a back and forth game. We put one version out online in a folder that the companies could access and comment on. Separately, we had one that the researchers were working on, where we did all the development. Whenever we needed comments from the companies, we would post it online and ask for comments. That was pretty challenging sometimes. Some companies said outright that they wouldn't join, otherwise they were pretty active. We got answers when we put out a document, wrote an e-mail to everyone and asked for responses. But while some would reply straight away or the next day, some waited for a reminder a few days later. The last ones we had to write to individually, in which case we always got a swift reply.

The time use ended up being quite special, since we miscalculated the dead-line. I had a research leave but ended up working on this instead during my travel. In 2019 I probably used about 20% of my position until June, then ramping up to about 50% from there over the summer. After summer, pretty much all of my time went to the proposal. I used a lot more time than the others in the core group, and didn't get any reduction of other work - with the exception of what I had already planned as a research leave. On the other hand, I didn't have that much teaching during the spring, so that helped.

I have to admit, writing these types of application is not my favourite part of the job. They are a hassle, and not something I particularly look forward to. I do look at it as part of my job at NTNU and I guess if you have to, then you have to. Other than that, I do think I do this in a pretty decent and structured way, so I say yes every now and then.

I haven't had any formal education as a project manager or done training. I have gotten an offer on academic leadership or something similar a year or so ago. I guess that was geared more towards people who want to lead departments, not developing proposals. I think that might have been useful. I didn't do it though, it just wasn't possible with my schedule. In addition, I really don't want to be the head of a department.

I got really good help from the economists and administration at the faculty, a little bit from the department. The faculty had the main responsibility, though. We did have an issue that it took so long before we got the project templates from NTNU, so that we had to use temporary solutions. We got it all coherent somehow, even in the end when I was abroad and the economists were sitting here, everyone working together. That was an interesting exercise, to put it mildly. Especially since they won't accept a single kroner in discrepancy in the budget at the Research Council.

I think it's pretty obvious that you have to start early, it's incredibly important. I dislike writing applications, but I hate trying to make sense of them the last week even more. We did it right in this application, but it was still a hassle with the companies until the very end. That was mostly formal agreements and such. In hindsight, we should have been even more on top of things to get the companies committed, just to be sure we are not left hanging all the way to the end. I would also recommend making some good graphics that explain the idea,

something that can be used to explain and discuss things, as well as in the application. It is somehow both a logo and branding, but most importantly it is something that explains the overall concept, how we are going to make this happen. We got this made professionally during the process, it looked very good and it's got a prominent place in the application as well. It's a logo, but it's also a lot more than that.

We are still good friends and waiting for an answer.

Proposal Rho

We already had a project that you could regard as a sort of mini-SFI. It is a collaboration between 3 faculties, 5-6 professors, some PhDs and Postdocs. What we have really seen there is that we can develop things ourselves, but we really need an industry link to bring everything to market in a good way. Thankfully, in our case the market is already there, but there is a lot of technical and systematic solutions missing in between. What we really want to innovate on is integration and accessibility. I think that would be a great fit for and SFI.

We got the first push from our previous head of department a few years ago, pushing us to define what our innovations are. Ever since then, we worked on this and we have understood that we can do this. We can actually get stuff out into market. That is hugely motivating. That's why we are not looking at an SFF right now, we are pushing for strong innovations.

We started in January 2019, right after New Year's Eve, when the faculty wanted an overview and was promising support. When the call came, we were encouraged to apply by the faculty, mostly to develop our existing project to a full SFI. We really needed to expand in terms of funding and we had full support from faculty and department, but that support was more as encouragement. We did get the usual help from administration, regarding budgeting and such. At one point we really needed an external company to read our proposal, but then suddenly our faculty was broke and couldn't afford the 30.000 that cost. At that point we figured out that the whole thing was on us, if it was ever going to get done. We did get a lead from SINTEF to read through the proposal, as they were involved as well. Our department has experience with SFIs and we had access to some of the people who have been running SFIs before. We got some feedback around their thinking and actually got some of the old proposals that went through. That was really useful. At this stage we were very ambitious. Turns out it's not that easy to land all of the ideas after all.

We had an early meeting with the obvious partners. Basically, we had a core group of 6-10 people figuring out the specific topic - what is the problem, what are we trying to solve? This was a group with a lot of existing trust, including a few companies. When it comes to writing, I don't think it's wise to have too many involved. We were only 2 people, making edits and sending them out to comments, presenting in meetings and processing the feedback. In addition, we had the individual experts writing the WPs. So overall, 2 people writing, then 2-3 central people commenting, then a larger group of 10-15 people after a while. It is really important to get the right kind of feedback at the right time. If we would have opened for 10-15 people commenting early on, it would have been impossible to move forward.

We had a good relationship with the industry in the beginning. Some of them got cold feet along the way when they understood what was expected from them. I think we could have been better at this, especially start earlier. We had an evaluation on this afterwards. We were very happy with our partners in the end, it is a really strong team. But yeah, we probably should have started a half a year earlier, some of the meetings were a bit hectic.

Personally, I think the process was very motivating, we were a great team. The cross-disciplinarity was good and the level of knowledge was very high. During our previous project we understood how much we can learn from each other when we cross faculty and department borders. The lift in our thinking with a cross-disciplinary approach has been huge and a big motivator. It was such an eye-opener how much stronger we were together. And just to point it out, we are applying a lot of other places as well. Some of the projects are

huge and we all agree that the key to success here is a team that works well together. Right now, this is working amazingly well, given the span of our joint disciplines.

This whole thing took so much time. Of course it varies over time, but I would guess the both of us used 40% of a position overall. Some of the months it might have been 120%. I organised someone to take over some of my teaching duties, which I paid for from my own funding. We also had a Research Council application on a completely different topic along the way, which actually went through.

I have not had any formal project management education, but I have gotten some background in previous work as well as a department course. I didn't get much out of that, it was more about the formalities of research proposals and such. I have learned most from just trying, building up our research group from the very beginning to the 50-60 people involved now. I think I have gotten pretty good at building teams that work well together.

The project economist from the administration was worth her weight in gold. There is no way we would have been able to make this happen without her. That goes for all the projects, there is simply no way to make proposals to the research council or the EU without this support.

The most important part, if you want to get even close to submitting, is a good team that can develop ideas. In addition, you need a small writing group, especially in the beginning. After that, I do believe in routines. For instance, we had a meeting every 14 days to drive us forward. You really need continuity because everyone is pushed from all sides.

In the end, we were really fed up with the proposal, so we didn't do any evaluations. We sort of agreed that being a few dedicated people was a good choice and we probably would have chosen another approach towards the industry, be ready 8 months before. Then again, we have a concept that we have been working on for the last 8-10 years, so I am not sure if reaching out earlier would have made that much difference in the end. Maybe.

Proposal Sigma

We had a clear focus on applying existing research and we thought that an SFI would be a great tool that would lead to commercialisation. We could have made an application for an SFF as well but the way we framed the whole thing, the base concept became the drive towards innovation. At the same time, we have several people in our group that are already doing commercialisation and we have already made the necessary equipment investments, so all in all we thought that our position now was a good match for an SFI.

We started working immediately when the call came, but we had made up some initial thoughts beforehand. We did join in on the NTNU information meetings about the SFI process along the way, I do consider those to be important. We got a sort of a guide on how to apply. I don't think it would be realistic to expect more. We did get busy towards the end.

During the process, we had SINTEF and NTNU as partners as well as industry and public bodies. We covered a lot of ground and a lot of scientific areas. Everyone was involved in the writing process, but we were 5 people who were hands on all the time from SINTEF and NTNU. Basically, we did the heavy lifting and got feedback from the others, as well as giving them specific things to work on every once and a while. None of us got exempt from anything at work. This process was run completely on top of everything else. We already work overtime every single day, many of us work twice the hours we are paid for.

My experience of the core team was good. We had 3 people who said they were going to work on this and they did. In hindsight, we were perhaps a little premature on our expectations from the SFI program. Maybe we should have used even more time on shaping our idea. It's only a sketch of the basic concept. What we really wanted to point out was that this was knowledge that would become innovation in the future, not today. We got offers of writing assistance, but we didn't use it. We did try it out in a SFF proposal previously but I don't think that would have helped us in this case. This is state of the art, to describe it we would have needed someone who is an expert in the technology. That someone would have been from the outside and also much more fitting to write on the main application in stead of the sketch. We did describe that we needed a steering committee, but that was going to be later and we didn't end up starting it up after the sketch.

Well, we did actually talk to some industry partners, we knew they were important. The core team worked some weeks with a lot of extra effort the last 3 weeks before the first sketch deadline. We tried to fill in the application, but it's hard to promote our specific topic, most of the applications from field are technology and product driven. We involved both small and large companies that had shown interest, but not that many understand the technology behind this as it comes across as a bit of sci-fi for some, in retrospect perhaps also the Research Council.

We had a good collaboration with the industry. One large partner didn't have that much on the core technology, but suggested good solutions on other topic to give you an example. The other partners were also very active. We were also very closely connected to SINTEF, which also worked really well. All in all, our partners in Norway were really good, although the technology that we were focusing on obviously had to be largely described by us. Also, we really wanted SINTEF to be a partner, but at the end they didn't want to commit.

In the end, we chose not to send the final proposal because of the feedback we got from the research council. They told us that our proposal would be a better fit in another program. It might be that we missed the scope of the SFI, but I think that our proposal was not understood correctly in the first review. In the other program, the framework is built in a completely different way. In our proposal we had well defined projects, specifically tailored to target new innovations, what we thought was at the core of an SFI. I don't know what the feedback was like for the other proposals from the first sketch, perhaps they chose to move forward with their proposals. The Research Council were clear that they were going to be critical, but for us it was just a big turn down that they suggested another program. There weren't any experts in the first evaluation panel, seems like they were far off from catching the essence of our proposal. I kind of understand that they don't have the time for that. At the same time, I do wish that we could have had a meeting with the Research Council as our idea is extremely forward thinking. The evaluators just trashed out initiative, so I wanted to give them an understanding of what our concept was. Could be that we were too bad at getting out points across. I would have understood it if this was a half-hearted idea, but here we really had a very good project. In the end, the department and faculty suggested that we might aim for an SFF, which is at least closer than the other program, but then again there are other topics that we would rather have an SFF on than this.

Just to point it out, there was a lot of good feedback as well, and plenty that the Research Council wanted to know, but in the end, it is only 4 pages. There is simply not enough room. Maybe the feedback wasn't that bad overall but just that last comment of switching to another program showed that they hadn't really understood anything. This is the most advanced topic in our field, its not something you can just go shop around for equipment for and start doing projects. There was a huge amount of research done, ready to be moved forward into innovation projects. I think we might try to run for this SFI one more time, I still think it is a good SFI proposal. Also, time is working for us. I just hope that next time there would someone at the Research Council that had some insight into our field, since this time it was an internal screening and nothing more. We had a more thorough process on an SFF application than we did on this SFI. I mean, NTNU has gotten a lot more projects through the SFI program than SFF, I think the process could have been more well developed.

I got plenty of education, but not on project management. Plenty of experience though. I have both led a research department for 10 years as well as infrastructure for 150 researchers for 3 years, tens of projects and pretty much been continuously funded for the last 15 years. I think a project management approach has too narrow of a focus when compared to all of this.

We got superficial help for the budget since it was only the first sketch. Economy wasn't that much in focus. We had a few project economists involved and we got good help as we always do.

I think the important parts are novelty, competency and cross-disciplinarity in a proposal from our field. It needs to be realistic to create industry and to create jobs. Other than that, I dont know...I think it might have been nice to get feedback internally on our proposal. We do have people at the department who could have commented on the scientific aspects in the proposal, as well as the strategy, but we never got that far. Yeah, I think that might have been useful.

We didn't have any evaluation of the proposal, just a small communication with the rectors office, but they are just administrative personnel, nothing on the scientific part.

Proposal Tau

I started at NTNU not so long ago and this was just about the first thing that was happening in our group. We had discussion between NTNU, SINTEF and a third academic partner about running for an SFI and the main topic of our proposal was already on the table then, although the content was pretty vague. I wasn't that familiar with the topic as it is a little bit on the side of what I have worked on. This was an alliance of some strong individuals from NTNU, SINTEF and the third partner that had already done a conference together and were looking at a research topic on the rise and a clear societal need for solutions.

From there on, back in 2017, until January of 2019 it was quite unclear who was going to lead the work. A central person from SINTEF, who was a potential leader had quit in the fall of 2018, which ended up revitalising the process. I really didn't have much to do with the application at the time as people were discussing which organisation was going to host the SFI and who was going to be the leader. It was a time of a lot of political positioning. I got suggested to the position at the end of 2018, starting first of January in 2019 on the process. I think it was a result of strategy and resource considerations, along with the conflicts of interest between NTNU and SINTEF. We had a steering committee with representatives from NTNU, SINTEF and the third academic partner. They were pretty high-ups and they were controlling who were invited to join in the proposal.

I didn't get exempt from teaching duties, this process was running on top of everything else. In the 8 months I ran the process, I had at least 2 month's worth of overtime. For a single person, I would never recommend doing this, but I did it because I would like to extend my contract at NTNU. I think the system is a bit cynical in this aspect. I would guess that the whole proposal, with all the work included, would be around 2 person-years or closer to 4000 hours. That's what you have to expect and that's what you have to plan for.

We were mainly 3 people in the core group writing the proposal including SINTEF. I think the size of the group is very important. I ended up with a lot of time pressure. The application is obviously evaluated on consistency, which means it has to have a good structure. Any more than 3 people, you are looking at using a lot of time making all the parts fit together.

My experience of running the proposal was similar to herding cats. That's just the way it is with professors. It is hard and you really have to figure out what sort of weight you need to put behind the work. There's plenty of potential for conflict, even in the incentives from NTNU. I think that no-one is going to run for this unless you can pressure them into it somehow or that they see this as something missing from their career. Because of the requirements for CVs from the Research Council, you are basically looking at professors at the very end of their careers, just before retirement. But in the end, I did find my role in all this.

What you really need is an idea, you need to talk to companies and land the budgets. The industry partners are interested in specifics, the things that will get done. If you have this on a list, you can do a little bit of matchmaking with the companies. On the other hand, if everything is fluid, it drains your energy. This was a big source of stress. Also, the partners are also matchmaking and shopping for proposals, especially the big national corporations. We had a large partner meeting in August. We tried to run a linear process, but because of this it all ended up with too much fluidity.

We had rounds with the industry partners quite early, but then we had a gap. Afterwards, you find out that the people you were talking to are not the same anymore. Then, other people higher up need to get involved. All the major national partners have their own processes and their own approval panels. I would guess they get anywhere from 3-8 questions to join in on a proposal. So if you look at it, you are competing at the Research Council, you are competing at NTNU and you are competing among each and every one of the partners, those are the playing fields.

We used a mix of old networks and some new. There was a lot of continuous communication, although we did try to control it some extent. That was mostly what partners to involve, the overall concept and so forth. But it is important to understand that the process is not linear, it is circular. We had several rounds with the major partners. This means you describe something, get the partners involved and then you adjust and do it all again. I heard some of the other proposals had a more steered process than us. We got one of the major national partners involved in a small process on the side to keep them interested, I know some of the other proposals, that tried to steer the process more, lost this partner in the end. The only committed one and a half week before deadline. That is completely insane, everything is flowing everywhere until the very end. I remember the moment we secured an approved budget in the very end, a moment of happiness and relief for the whole team. That's also something to consider, you need a budget that has flexibility, that can buffer and handle setbacks. You need to plan for maxing out the budget, but you really can't lock it before the last days.

I haven't done any training to develop projects, just the school of life. I have started a company, been a leader in the industry as well as a project management. I haven't gotten any offers for learning this from NTNU either, but then again I probably would have thought "I know this already" anyway. Funnily, I have gotten plenty of offers about learning how to teach, and also there was a course on writing applications. I didn't join in on that either.

We did get feedback from the faculty which ended up being quite useful. Also, we got good help from the administration on the budgets and I quite like that they do it so detailed, it's all proper. There's quite a difference here between NTNU and SINTEF, where in the latter, the budgets are actually done by the project manager and at a much rougher scale. There's little understanding that we have to connect budgets to people at NTNU because of the TDI model. I think the person who did the budgets thought the whole process messy, but there were so many considerations to make both politically and strategically. I think it would be better if there was a more organised approach to budgeting, a single person at the faculty developing the budget that is then approved by both the head of department as well as the faculty. We shouldn't be doing this individually.

In the end, if you can't reach the budget requirements, you have nothing. If you don't have the partners, you have nothing. The outmost goal is to get commitment among the partners, a task in its own right and one that is not so easy to know beforehand who will be responsible for it. For us, NTNU was supposed to do the proposal writing, while SINTEF was supposed to onboard partners, something they were a bit reluctant to do. You do need time to bring aboard the partners that you want at all times. In the end, I wrote all the letters and got them signed by the partners. This is also politics. They always want the communication to come from the head of the SFI proposal. In the end, all the processes were run internally at NTNU.

There's some good qualities in the proposal but it can be a bit vague. I think that's ok as long as you can show partners that support it and believe in it. Nothing trumps partner commitment.

I think it was really difficult to balance enough budgets with a clear concept. We did look at the Research Council evaluation where this is also discussed. One success factor is to have few but large partners in terms of the budget. That was hard in our case, we had such an overarching topic and there is a clear societal benefit, but nobody wants to put money on that, the payback time is too long.

We didn't do any evaluations.

Appendix C – Matrix development questions

These questions, derived from theory, were used as an initial pool to explore the interviews and to systematically uncover both subtle clues and explicit statements that support patterns both within and across the proposals.

Is there a clear planning aspect to the proposal?

- Conceptualization
- Planning
- Execution
- Termination (evaluation)?

Are there indications of project success considerations?

- Benefits for research group?
- Benefits for NTNU?
- Benefits for industry?
- Preparedness for future?

Approach to SFI?

- Project in its own right?
- Conceptualization phase?
- Conceptualization with project success considerations?

Is the proposal task or human centric?

Are there indications of Agile, Scrum or other approaches?

What is the time use on the proposal?

What is the time frame of the proposal?

Is the lead exempt from teaching or gets other aids?

Was there an optimum working environment?

Is the work structured and planned or more ad hoc?

Does the process fill the definition of knowledge work?

- Autonomy?
- Work Complexity
- Information processing
- Problem solving
- Multitude of skills
- Specialization

Definition of success

- Other than successful application?
- Measurement of success?
- Poor managerial attitude to success criteria a subsequent neglect
- Lack of measurability
- Shifting boundary conditions outside the control of the project
- Lack of managerial support?

Team and collaboration, identify:

- Goal orientation

- Interdependability
- Interpersonal interaction
- Sense of membership
- Common Structure
- Mutual Influence
- Individual motivation
- Social process, sharing of information and behaviour
- To what extent is the team everyone, including industry?

Stakeholders

- Was there stakeholder management procedures?
- Does it seem like the stakeholders were managed?
- Were changes sudden or anticipated?

Success factors

- Clearly defined goals?
- Competent top manager
- Sufficient resource allocation
- Adequate communication channels
- Control mechanisms
- Feedback capabilities
- Responsiveness to clients (industry?)

Organizational complexity

- Timely and purposeful information flow
- Clarity of roles and responsibilities
- Project manager with adequate decision-making authority

Uncertainty

- Flexibility
- Structured risk management process
- Use lessons learned from previous projects
- Experience, skills, knowledge and competence
- Mindfulness about biases, heuristics such as overoptimism, narrow focus and assumption
- Trust
- Openness
- Respect
- Loyalty
- Commitment
- Shared values?
- Practiced values?
- Flexibility
- Positive attitude
- Tolerance
- Honesty
- Engagement

Project manager

- Knowledge
- Performance

- Personal behaviour

Leader vs. management

- Exchange of purpose
- Right to say no
- Joint accountability
- Absolute honesty (in partnership)

Leadership style:

- Human Centric
- Task oriented
- Situation based
- Supporting
- Involving
- Performance based
- Potential based
- Is the leader doing the work self or delegating?

Proposal questions:

- What is the origin of the proposal?
- When did the discussions start?
- When did the application work start

Appendix D – Matrices

Workload Hours calculations

Proposal	Outcome	Estimated hours	Quoted hours	Overtime
Proposal Alpha	Not-submitted	380	30 % of position	YES
Proposal Beta	Funded	450	450 hours	YES
Proposal Gamma	Submitted, not interviewed			
Proposal Delta	Submitted	384	30 % over 2 years	YES
Proposal Epsilon	Submitted, not interviewed			
Proposal Zeta	Submitted	640	50 % of position	Partly
Proposal Eta	Not-submitted	150	150 hours	YES
Proposal Theta	Not-submitted	300	300 hours	YES
Proposal Iota	Not-submitted	380	30 % of position	YES
Proposal Kappa	Submitted	450	450 hours	YES
Proposal Lambda	Funded	230	Few hours every day, 80% after summer	YES
Proposal Mu	Funded	510	40 % of position	YES
Proposal Nu	Funded	380	30 % of position	Partly
Proposal Xi	Funded, not interviewed			
Proposal Omicron	Submitted	220	20% until end of June, 50% aug-sept	YES
Proposal Pi	Submitted, not interviewed			
Proposal Rho	Submitted	510	40 % of position	YES, but paid for substitute
Proposal Sigma	Not-submitted		?	?
Proposal Tau	Submitted	400	at least 2 months overtime	YES
Calculations				
Overall Average		385		
Median		382		
AVGdev		93		
STDdev		130		
Average Funded		392,5		
Average Submitted		434		
Average Not-submitted		302,5		
Sum of hours		7307		
Total hours cost		7306857		

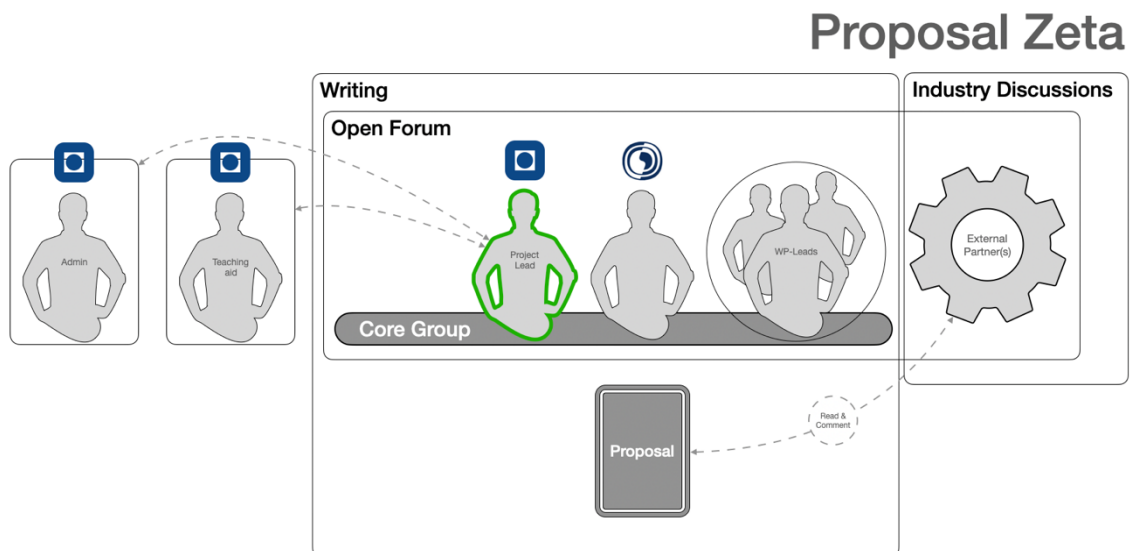
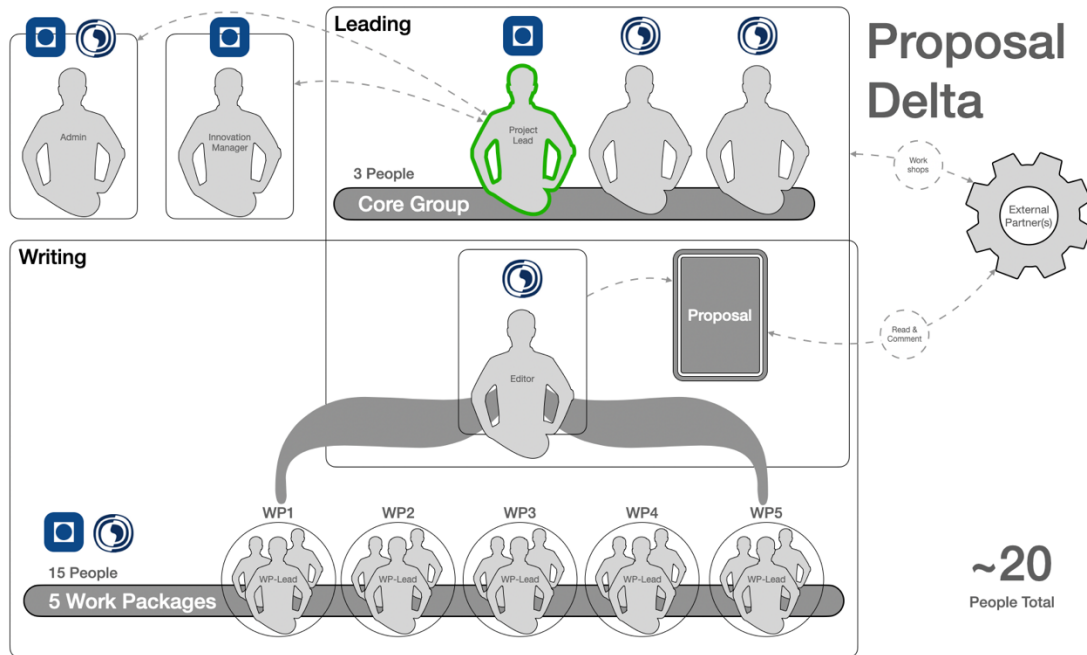
	Earliest activity	SFI Initiative Identified	First Sketch Proposal	Initial industry contact	Clarification of topic	Faculty deadline	Application document start	Research partners contacted	Sketch feedback	Industry partners contacted	Termination, if applicable	Proposal ready/confirmation	Final industry confirmation	Writing assistance	Workshop with industry	Workshop with R&D
Proposal Alpha	Non-submitted	2017	Fall 2017	Early 2018	Early 2018	December 2018		Early 2019	Easter	Easter 2019	Fall 2019				Early/May 2019	
Proposal Beta	Funded	2018	Late 2018	Late March 2019	Late 2018	December 2018			Easter	Spring/summer 2019	End	August 2019		Fall 2019	Early 2019, July 2019	Late 2018
Proposal Gamma	Submitted, not interviewed					December 2018			Easter						Early 2018, several	
Proposal Delta	Submitted	2017	Fall 2017	Early 2019	Fall 2017	December 2018	Jan 19		Easter			June 2019				
Proposal Epsilon	Submitted, not interviewed					December 2018			Easter							
Proposal Zeta	Submitted	2017	Spring 2017	Early 2019	Spring 2017	December 2018	Early 2019	Early 2019	Easter	June 2019	August 2019				Jan 18	Nov 17
Proposal Eta	Non-submitted	2018	Late 2018	Early 2019	Spring 2019	December 2018			Easter							Early 2019
Proposal Theta	Non-submitted	2018	Fall 2018			December 2018			Easter							
Proposal Iota	Non-submitted	2017	Mid 2017			December 2018	Late 2017		Easter	August 2019	September 2019				March 2019	January 2019
Proposal Kappa	Submitted	2018	Late 2018			December 2018			Easter							
Proposal Lambda	Funded	2017	Late 2017		Late 2017	December 2018			Easter	August 2019					After easter	
Proposal Mu	Funded	2016	Late 2016	Spring 2017	Jan 19	December 2018		Late 2016	Easter	August 2019					Nov 2018, Feb 2019, May 2019	Jan 2019, May 2019
Proposal Nu	Funded	2016	February 2016	February 2016	2018	December 2018	Jan 19		Easter							
Proposal Xi	Funded, not interviewed					December 2018			Easter							
Proposal Omicron	Submitted	2017	Spring 2017		May, June 2019	December 2018			Easter					Mid 2019	February 2018, December 2018	Late 2017, Spring 2018
Proposal Pi	Submitted, not interviewed					December 2018			Easter							
Proposal Rho	Submitted	2019	Jan 19			December 2018			Easter							
Proposal Sigma	Non-submitted	2018			January 2019	December 2018	January 2019		Easter		Easter 2019					
Proposal Tau	Submitted	2017	Mid 2017			December 2018			Easter							

Timelines

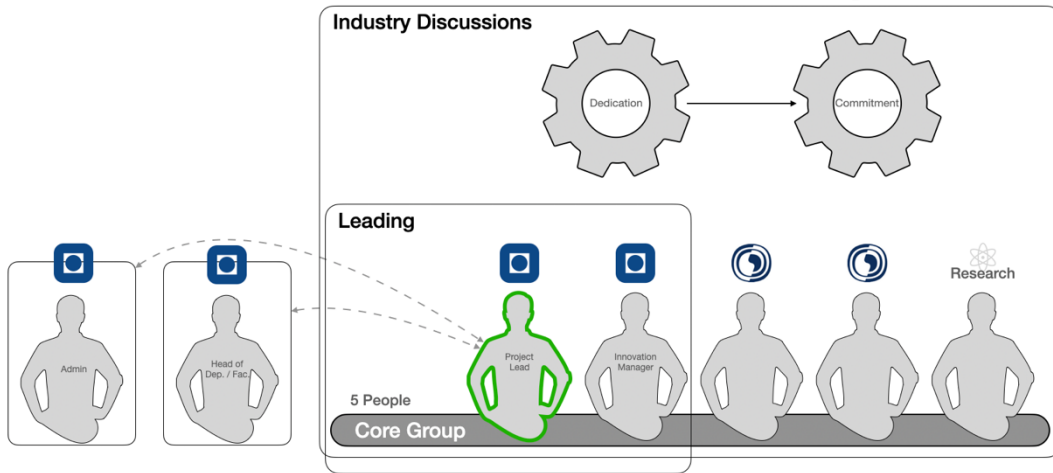
Success Factors

Proposal	Outcome	Communication	Stakeholder	Team	Problem def	Resource mgmt	Governance
Examples		Convince industry of participation, efficient ways to communicate, narrative	Understand industry needs, collaboration and involvement, dialogue and ideas collection.	People Centric, hearts and minds, correct consortium with correct backgrounds, individuals	Understand the framework, processes and call, able to define problem	Opportunity to think, excess energy, resources, Dynamic Capacity, resources	Internal prioritization, leader support, acceptance.
Proposal Alpha	Not-submitted	1					
Proposal Beta	Funded	1				1	
Proposal Gamma	Submitted, not interviewed						
Proposal Delta	Submitted		4				
Proposal Epsilon	Submitted, not interviewed						
Proposal Zeta	Submitted			1	1	2	1
Proposal Eta	Not-submitted		3				
Proposal Theta	Not-submitted	1				1	1
Proposal Iota	Not-submitted	11		1			
Proposal Kappa	Submitted			1	2		
Proposal Lambda	Funded						
Proposal Mu	Funded	3	1	2		1	
Proposal Nu	Funded	1		2	1	1	1
Proposal Xi	Funded, not interviewed						
Proposal Omicron	Submitted	1				1	
Proposal Pi	Submitted, not interviewed						
Proposal Rho	Submitted			1			
Proposal Sigma	Not-submitted			2	1		
Proposal Tau	Submitted	1					
SUM		20	8	10	5	7	3

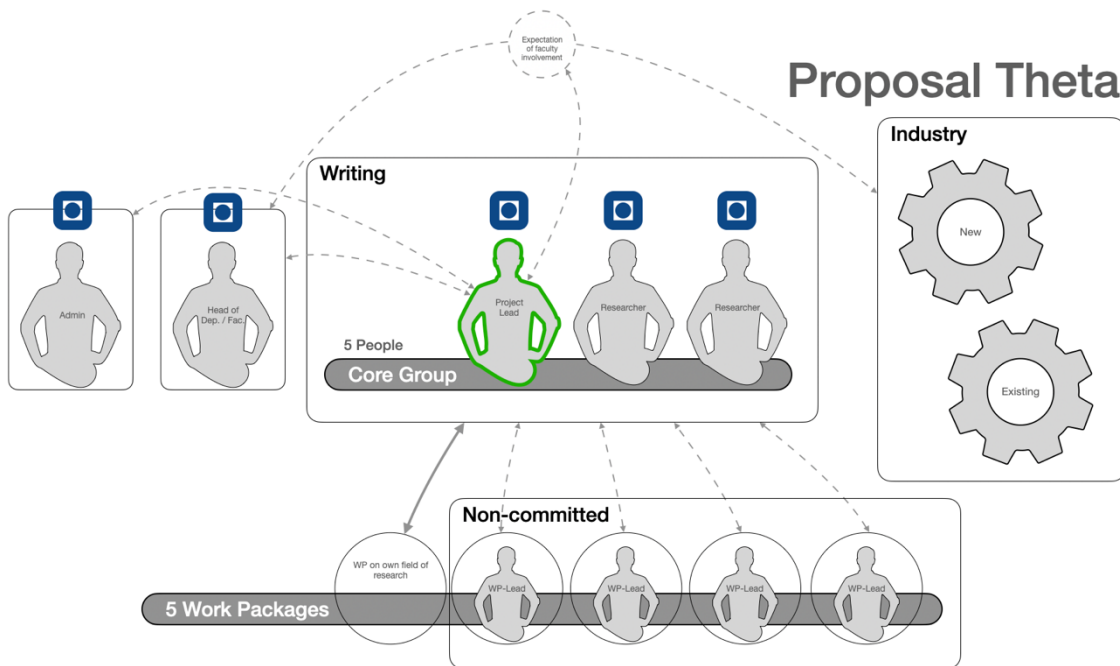
Organisation of proposal teams



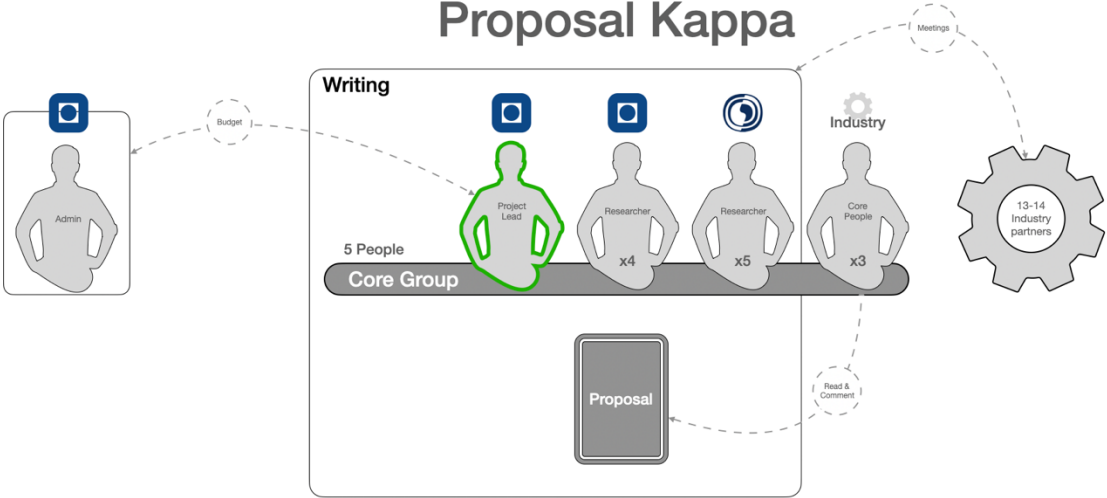
Proposal Mu



Proposal Theta



Proposal Kappa



Proposal	Outcome	Existing project	Existing org ties	Existing personal ties	Industry involvement focus	Industry join writing	Industry workshops
Proposal Alpha	Not-submitted	Phd Pilot, large center	Yes	Some	No	No	No
Proposal Beta	Funded	Yes	Yes	Massive	Yes		
Proposal Gamma	Submitted, not interviewed						
Proposal Delta	Submitted	Several, but not this	Yes	Massive	Little		Many
Proposal Epsilon	Submitted, not interviewed						
Proposal Zeta	Submitted	Experience from SFI	Yes	Yes	Forum		Many
Proposal Eta	Not-submitted	No	No	No, NTNU first	No		No
Proposal Theta	Not-submitted	Yes	Some	No, NTNU first	No		No, emails and phone
Proposal Iota	Not-submitted	No	No	No, NTNU first	No		Few
Proposal Kappa	Submitted	Yes	Yes	Yes	No, comments		Yes
Proposal Lambda	Funded	No	Little	Little	No, comments		One
Proposal Mu	Funded	Yes, large centre	Yes	Massive	Yes		Many
Proposal Nu	Funded	Yes, large centre	Yes	Massive	Yes		Many
Proposal Xi	Funded, not interviewed						
Proposal Omicron	Submitted	Several, but not this			No, NTNU first	No, comments	Yes
Proposal Pi	Submitted, not interviewed						
Proposal Rho	Submitted	Yes	Yes	Balanced	Yes		Yes
Proposal Sigma	Not-submitted	No	No	No, NTNU first	No		No
Proposal Tau	Submitted	No	No	No, NTNU first	No		Individual

Industry contacts

Project Management Experience

		Experience	Experience	Formal	Formal	Formal
Proposal	Outcome	Industry	University	Course	Education	Research
Proposal Alpha	Not-submitted		Yes			
Proposal Beta	Funded		Yes	Yes		
Proposal Gamma	Submitted, not interviewed					
Proposal Delta	Submitted	Yes	Yes		Yes	Yes
Proposal Epsilon	Submitted, not interviewed					
Proposal Zeta	Submitted		Yes	Yes		
Proposal Eta	Not-submitted		Yes	Yes		
Proposal Theta	Not-submitted		Yes	Yes	Yes	
Proposal Iota	Not-submitted	Yes	Yes			
Proposal Kappa	Submitted		Yes	Yes		
Proposal Lambda	Funded	Yes	Yes	Yes		
Proposal Mu	Funded	Yes	Yes	Yes		
Proposal Nu	Funded	Yes	Yes			
Proposal Xi	Funded, not interviewed					
Proposal Omicron	Submitted		Yes			
Proposal Pi	Submitted, not interviewed					
Proposal Rho	Submitted		Yes	Yes		
Proposal Sigma	Not-submitted		Yes			
Proposal Tau	Submitted	Yes	Yes			
		6	15	8	2	1

---END OF THESIS---

