Kirsi Pulkkinen

Managing Contradiction

Researchers' practices in balancing performance, research integrity and societal interaction

LAPIN YLIOPISTO
UNIVERSITY OF LAPLAND

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"The Road goes ever on and on
Down from the door where it began.
Now far ahead the Road has gone,
And I must follow, if I can,
Pursuing it with eager feet,
Until it joins some larger way
Where many paths and errands meet.
And whither then? I cannot say"

J.R.R. Tolkien

Abstract

Universities, their roles and responsibilities in society have been a topic of discussion in both academic and popular forums throughout their history. In recent decades, performance management systems have been introduced, the relative weight of external funding has increased, and researchers have been encouraged to collaborate more closely with societal partners. This has happened simultaneously with demands to improve academic quality and competitive advantages. Combined, the changes have placed multiple pressures on researchers who in the midst of major structural reforms are required to balance between upholding research integrity and renewing their practices while ensuring continuity of work.

I examined the ways in which researchers in Finnish universities balance performance demands with calls for more societal interaction. The study is an investigation of the strategies researchers use to adjust their work habits and create new interactive professional practices in a rapidly changing funding and performance landscape. For the study, I used a dual approach. The first part sets the context for the study and focuses on how researchers make sense of the multiple and complex demands on their work. The second part used case studies to examine the development of new knowledge co-producing practices which involve direct interaction and close collaboration with experts outside academia.

This dissertation comprises four original articles and a summary article. The empirical data were mainly qualitative, comprising semi-structured thematic interviews and observation in a structured experimentation, complemented by some survey and documentary data.

The analysis demonstrates that in response to the changes in the funding environment and increasing pressures on their work conditions, researchers take control of the situation to enhance stability and renewal of their work. Researchers perceive the new situation as an incoherent system in which they are faced with a need to show evidence of accountability to multiple actors with contradictory expectations. Yet, the analysis also suggests that despite the mounting pressures and feelings of frustration, researchers have learnt to not only adapt but also to utilise the creativity and learning inherent in research work to build a transformant new modus operandi. This interpretation is based on four main findings arising from the analysis.

First, although researchers protect their discipline or academic profession and its practices, they also master the art of learning. This ability to interpret information of different kinds allows researchers to identify gaps in their own knowledge and

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skillsets and recognise where potential partnerships could be utilised to serve both scholarly and societal needs. Secondly, by engaging in co-creative interaction with other societal experts they can connect with knowledge that otherwise would be beyond their reach. In integrating interaction into the knowledge production process, researchers cross knowledge boundaries and apply practice-based learning tools to adjust the governance of knowledge production. Thirdly, in increasing their external funding researchers create more freedom to do their research and more space between them and the principle state funder and the strategic management of the university. Researchers use societal interaction and external funding to increase authority over their work while relatively reducing that of managers. Finally, the main drivers for researchers to make strategic decisions are derived from outside the performance management systems despite their goals to renew research and make it more effective and accountable. Instead of encouraging researchers to search for innovative and societally more relevant approaches, the managerial reforms seem to guide researchers to conform by playing it safe and following conventions that are built into the performance management systems. Based on the findings of the sub-studies, I present an argument that rather than merely adjusting to circumstances beyond their control, researchers use their critical analysis skills and creativity to mould existing circumstances to fit their needs better. The situation is characterised by a capacity-building ethos.

Tiivistelmä

Yliopistot, niiden roolit ja vastuut yhteiskunnassa ovat olleet keskustelun kohteina niin akateemisilla kuin yleistajuisilla foorumeilla koko historiansa ajan. Viime vuosikymmenten aikana on otettu käyttöön tulosperustaisen hallinnan järjestelmät, ulkopuolista kilpailtua rahoitusta on suhteellisesti lisätty ja tutkijoita on kannustettu tekemään läheisempää yhteistyötä yhteiskunnallisten kumppanien kanssa. Samanaikaisesti on vaadittu parantamaan tieteellistä laatua ja tutkimuksen kilpailukykyä. Yhdistettynä muutokset ovat kohdistaneet moninkertaisia paineita tutkijoihin, joiden edellytetään suurten rakenteellisten muutosten keskellä tasapainoilevan tieteellisen integriteetin toimintamallien uusimisen välillä samalla, kun he pyrkivät varmistamaan työnsä jatkuvuuden.

Tutkimuksessa tarkastelen tapoja, joilla suomalaiset yliopistoissa toimivat tutkijat tasapainottelevat tulosperustaisuuden ja moninaisemman yhteiskunnallisen vuorovaikutuksen vaatimusten ristipaineessa. Tutkimus selvittää strategioita, joiden avulla tutkijat sopeuttavat työtapojaan ja kehittävät uusia vuorovaikutuksellisia ammatillisia keinoja nopeasti muuttuvassa rahoitus- ja tuloksellisuusympäristössä. Tutkimus hyödyntää kaksijakoista lähestymistapaa. Ensimmäinen osa asettaa kontekstin ja keskittyy tutkijoiden tapoihin hahmottaa tilannetta ja työtään kohtaan asetettuja moninaisia ja kompleksisia vaatimuksia. Toinen osa hyödyntää tapaustutkimuksia, joiden avulla tarkastellaan uusien, vuorovaikutuksellisten tiedon yhteistuotantotapojen kehittymistä, jossa edellytetään suoraa yhteistyötä akateemisen yhteisön ulkopuolisten asiantuntijoiden kanssa.

Väitöskirja koostuu neljästä alkuperäisestä artikkelista ja yhteenvetoartikkelista. Keskeinen empiirinen aineisto on laadullista, ja koostuu puolistrukturoiduista teemahaastatteluista ja jäsennellyssä kokeilussa kerätystä havainnointiaineistosta, sekä täydentävästä kysely- ja dokumenttiaineistosta.

Analyysi osoittaa, että vastauksena rahoitusympäristön muutoksiin ja työolosuhteisiinsa kohdistuviin paineisiin tutkijat ottavat tilanteen hallintaansa parantaakseen vakautta ja työnsä uudistumista. Tutkijoiden hahmottavat uuden tilanteen epäjohdonmukaisena järjestelmänä, jossa heidän tulee osoittaa tilivelvollisuutta lukuisille, ristiriitaisia odotuksia omaaville toimijoille. Analyysi osoittaa kuitenkin myös, että kasvavista paineista ja turhautumisesta huolimatta tutkijat ovat oppineet mukautumaan, ja hyödyntämään tutkimustyölle ominaista luovuutta ja oppimiskykyä rakentaakseen muuntautuvan uuden toimintatavan. Tulkinta perustuu neljälle osatutkimusten tulosanalyysistä erottuvalle löydökselle.

Ensiksi, vaikka tutkijat suojelevat tieteenalaansa tai akateemista ammattikuntaansa sekä näiden käytänteitä, he myös hallitsevat oppimisen taidon. Tämä kyky tulkita monenlaista tietoa sallii tutkijoiden hahmottaa aukkoja omassa osaamisessaan ja taidoissaan sekä tunnistaa, milloin kumppanuuksia voitaisiin hyödyntää palvelemaan sekä tieteellisiä että yhteiskunnallisia tarpeita. Toiseksi, muiden yhteiskunnallisten asiantuntijoiden kanssa toteutettu yhteisluova vuorovaikutus voi yhdistää tutkijat tietoon, joihin heillä ei muutoin olisi pääsyä. Integroimalla vuorovaikutus tiedon tuottamisen prosesseihin tutkijat ylittävät tiedollisia raja-aitoja ja soveltavat käytäntölähtöisen oppimisen keinoja sopeuttaakseen tiedontuotannon hallintaa. Kolmanneksi, kasvattamalla ulkopuolista rahoitustaan tutkijat kasvattavat vapauttaan tehdä tutkimusta sekä luovat tilaa itsensä ja valtiorahoittajan sekä yliopiston strategisen johtamisen välille. Tutkijat käyttävät yhteiskunnallista vuorovaikutusta ja ulkopuolista rahoitusta kasvattaakseen valtaa omaan työhönsä samalla, kun he suhteellisesti heikentävät yliopistojohtajien valtaa. Lopuksi, pääasialliset ajurit, jotka ohjaavat tutkijoita tekemään strategisia päätöksiä, juontuvat muualta kuin tulosperustaisista hallintajärjestelmistä, vaikka näiden tavoitteena onkin uudistaa tutkimusta ja tehdä siitä tehokkaampaa ja vastuuvelvollisempaa. Sen sijaan, että ne kannustaisivat tutkijoita etsimään innovatiivisia ja yhteiskunnallisesti relevantimpia lähestymistapoja, managerialistiset uudistukset vaikuttavat ohjaavan tutkijoita toimimaan turvallisuushakuisesti ja noudattamaan perinteisiä käytänteitä, jotka on rakennettu tulosperustaiseen järjestelmään. Osatutkimusten tulosten pohjalta väitän, että tutkijat hyödyntävät kriittisen analyysin kykyjään ja luovuuttaan muokatakseen olemassa olevia olosuhteita palvelemaan paremmin heidän tarpeitaan sen sijaan, että vain sopeutuisivat hallintansa ulottumattomissa oleviin olosuhteisiin. Tilannetta luonnehtii kykyjen vahvistamisen eetos.

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Acknowledgements

Many years ago, in my final examinations at high school, I wrote an essay entitled "all good things come to an end". My choice of topic horrified my beloved English teacher. Today, looking back at the many twists and turns of writing my dissertation on a topic that raised questions when I started, I am reminded of that essay and of my apparent will to choose my own path. The time has come to thank those who have made this endeavor possible.

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ground and head high up in the clouds. Thank you for being the loving person you are, for surprise dances in the weirdest of places and for reminding me that I could do this when I doubted. Our children, Veikko and Vilja, you are my greatest treasures and best source of inspiration. You remind me of what is truly important, and how wondrous the world around us is. Veikko ja Vilja, te olette parasta maailmassa.

In Helsinki,
on the International Day of the Girl Child, 11 October 2020

Kirsi Pulkkinen

List of original publications

The thesis is based on the following original articles, which will be referred to in the text by their Roman numerals I-IV

I.   Söderlind J., Berg L.N., Lind J.K., Pulkkinen K. (2019) National Performance-Based Research Funding Systems: Constructing Local Perceptions of Research? In: Pinheiro R., Geschwind L., Foss Hansen H., Pulkkinen K. (eds) *Reforms, Organizational Change and Performance in Higher Education.* Palgrave Macmillan, Cham

II. Lind J.K., Hernes H., Pulkkinen K., Söderlind J. (2019) External Research Funding and Authority Relations. In: Pinheiro R., Geschwind L., Foss Hansen H., Pulkkinen K. (eds) *Reforms, Organizational Change and Performance in Higher Education.* Palgrave Macmillan, Cham

III. Pulkkinen, K. & Hautamäki, A. (2019) Co-creation with companies: a means to enhance societal impact of university researchers? In: Sørensen, M., Geschwind, L., Kekäle, J., Pinheiro, R. (eds) *The Responsible University: Exploring the Nordic Context and Beyond*. Palgrave Macmillan, Cham

IV. Pulkkinen, K., Aarrevaara, T., Rask, M., Mattila, M. (manuscript): Societal Interaction Plans – a Tool for Enhancing Societal Engagement of Strategic Research in Finland.

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Figures and tables

Abbreviations

EU   European Union
OECD   Organisation for Economic Co-operation and Development
PRFS   Performance-based research funding system
NPM   New public management
NPG   New public governance
RRI   Responsible research and innovation
SIP   Societal interaction plan
SSH   Social sciences and humanities
SRC   Strategic Research Council
STS   Science and Technology Studies

Contents

1.   Introduction

Universities have been one of the core institutions in cultural life since their inception and have played a significant role in the development of societies. As organisations they have traditionally been bottom-heavy communities of scholars in which academics have had strong autonomy over their own research and teaching activities (Fumasoli & Stensaker, 2013). However, in recent decades universities have become increasingly embedded in the developments of global knowledge societies. Along with the new public management regime and financial stringency universities have been put under increasing pressure to function more proactively in global competitive markets. The changes have entailed new societal connections and made visible the numerous relationships not only within academic constituencies and with state funders but particularly in relation to different types of societal stakeholders (Bleiklie, Enders, & Lepori, 2017). These developments have meant a move from university self-governance to an increasingly complex system in which universities have to balance multiple internal and external demands arising from the operating environment (Olsen, 2007).

While adapting to changing circumstances and societal developments, universities have historically been rather resilient to changes in political landscapes and economic regimes (Pulkkinen K. , et al., 2019). Despite being highly dependent on public resources and hence susceptible to changes in the operating environment, universities are far from merely passive objects that react to external environments and reforms. They have been able to protect the core of academic work, that which Burton Clark named the 'academic heartland' (Clark, 1998). According to Clark, most academic work continues to be done in disciplinary units, be they old or new, even interdisciplinary in nature. It is here in the 'academic heartland' that transformations and innovation are either supported and encouraged or opposed. In this environment, researchers are the fundamental academic professionals that constitute the central asset of universities (Siekkinen, 2019). As such they are a key profession which aims to protect academic freedom and guard the values and principles of research integrity.

The relationship between researchers and universities as institutions is complicated and entails multiple tensions. Changes to research policy and the university structures have affected researchers as a profession and required changes at multiple levels of the system. Due to policy convergence (Knill, 2005), the emergence of new political ideas and instruments such the European Union's EU's responsible research and innovation (RRI) have meant that similar policies have developed across countries

over time. This has meant that researchers have felt increasing pressure to adjust to the changes and to develop new work methods and practices. The policies, objectives and standards that have been promoted at the EU or OECD circles are also being implemented at national levels (Holzinger & Knill, 2005) where changes in funding arrangements and structures have simultaneously taken place. In the middle of these changes, researchers are required to uphold high research quality and integrity while adjusting to the demands posed by the performance-based research funding systems and developing new societally interactive practices.

The debates around societal interaction are part of broader discussions on the development of research and creation of societal impact. By focusing on the development of societal interaction implies attention on the roles and dimensions of academic researchers in society and the ways in which professional work methods develop to meet the needs of a changing environment. Societal interaction rests on the presumption that one-way activities, such as communication, dissemination or consultation are not enough, as these largely rest on the activities taking place after or separate from the knowledge production process. Co-creative practices instead rest on the premise that there are multiple actors with valid interests and stakes in the process of knowledge production itself. The process is more akin to that of social innovation in which new combinations of practices and knowledge are created. In such a process there is an outspoken aim of pooling expertise in order to solve problems – scholarly or societal – that are beyond the scope of any one sector or professional group (Howaldt, 2014). With this type of co-creative approach to societal interaction, researchers and their societal partners are seen as active agents in the process. Identifying problems and searching for solutions is done by tapping into an extended pool of expertise and utilising the full potential of the quadruple helix model (Carayannis, Barth, & Campbell, 2012).

As academic professionals, researchers reflect these societal changes in their work environment and development of research practices (Musselin, 2007). Universities as institutions can only succeed in meeting their goals and the social contract with the state and broader society, if researchers are able to do their work well and perceive that their roles and expertise are valued and respected by their institutions. Hence, studying how researchers make sense of and respond to new challenges, which place yet another layer of pressure and expectations on them, provides significant knowledge on their sources of adaptability. It also sheds light on what kinds of support mechanisms and incentives researchers require and find motivating in their work.

In this dissertation, attention is drawn to the actors at the core of the academic environment, the researchers who are expected to produce new knowledge and in doing so, serve broader society in addition to the academic community. Focusing on the micro level allows analysis on how researchers respond and adjust to changes to protect their academic freedom and autonomy in a rapidly changing

work environment. Directing attention to the micro level means looking at how researchers, rather than the institutions in which they work, understand and make sense of the multiple pressures that are placed on them and the universities. Furthermore, a micro-level approach seeks to understand how researchers rationalise the actions they take to exert better control over their own work conditions and to balance the different needs and expectations directed at their work. Are their actions guided by protecting and upholding conventions, or do they look to the future and anticipate potential scenarios to strengthen control of a disorderly and increasingly competitive reality?

This dissertation seeks to investigate how researchers balance tensions and contradictory pressures in a rapidly changing performance and funding landscape which demands societal interaction. It consists of four original articles and this summary article, and combines an analysis of researchers' perceptions of the macro and institutional level contexts of their work with case studies of capacity building activities that researchers exercise in order to strengthen their societal interaction. While this dissertation represents the field of higher education studies, it also draws on concepts and approaches from innovation studies as well as science and technology studies (STS), and management studies. As such, this dissertation applies a multi-disciplinary approach to the topic.

The purpose of this summary article is to provide a metanarrative for the original articles. As such, the summary article aims to expand the conceptual frameworks and empirical findings of the articles and to set them in a broader context. In doing this, I revisit the articles and discuss their findings as a whole rather than as separate entities.

This dissertation is structured in five parts. After this introduction, in *Chapter 2*, I will present the aims and research questions of the study. The chapter includes the motivations for the topic and the perspectives that each of the four articles provides for the dissertation. This will be followed by the theoretical framework in *Chapter 3*, which provides the foundation and themes for the analysis of this dissertation and builds on the research done in the articles. *Chapter 4* introduces the data and methodology used in the articles. The chapter also includes a data analysis, which delves into the research process in more detail. In *Chapter 5* I will present the condensed empirical findings of the articles, while deepening their analysis. Finally, *Chapter 6* discusses the findings in a broader context and links them together to form concluding arguments of this dissertation.

2.   Aims of the study and research questions

My overall aim with this dissertation was to investigate the ways in which researchers in Finnish universities balance performance demands with calls for more societal interaction. The study investigates the strategies researchers use to adjust their work habits and create new interactive professional practices in a rapidly changing funding and performance landscape, while upholding research integrity. More specifically, the research questions are

1. How has the changing research funding landscape and increases in external competitive funding affected academics' interpretation of their roles and opportunities to manage research?
2. How and why do researchers adapt and develop their capacities to utilise novel, interactive collaboration models with non-academic actors?

The research questions are addressed through two intertwined lenses. They consist of independent sub-studies with specific goals that the NPM-inspired environment with different angles. Combined, they provide a holistic view of research work undertaken at Finnish universities in an era affected by major structural changes.

The first lens, which comprises Articles I (Söderlind, Nordstrand Berg, Krog Lind, & Pulkkinen, 2019) and II (Krog Lind, Hernes, Pulkkinen, & Söderlind, 2019), draws a picture of the changing funding landscape, one in which increasing performance demands are placed on researchers. It sets the stage for researchers' current environment. In these articles, the focus is on how researchers and academic managers make sense of the situation and the multiple and complex demands that a more managerial university structure places on research work.

In Article I the aim was to study how national performance metrics have affected the ways in which researchers and academic managers view research work and measurement of performance. More specifically, the article reports on an investigation of how researchers and managers make sense of their working realities and of the multiple pressures under which research is conducted. The study shows that alongside the formal structures for resource allocation and decision-making there is an array of informal uses of performance metrics, which help in organising research activities. The in-built incentives influence publication practices and choices, for example. In the Finnish case, metrics are generally accepted and considered to increase the transparency of management. This supports the legitimisation of performance metrics. Yet, there is also an indication that the potential lock-in effects

have been less considered. As a result, when managers and researchers make daily strategic choices to maximise performance, they may be unintentionally guided to inhibit dynamic development of practices and instead lead towards conventional behaviour.

Article II is an investigation of how the increases in external funding and projectivisation of research have affected authority relations among researchers and academic managers. The article sheds light on the complex relations and practices of academic professions within universities, and how they have evolved as the role of external funding has strengthened. The study finds that researchers adjust the content of their research to meet the requirements of funders and to increase their chances of getting funding. Managers have little authority over and willingness to influence the content directly but can affect it through recruitment. Researchers' integrity has thus not been affected to a high degree. Furthermore, while the rise of external funding has increased divisions between 'winners and losers' it has generally made cooperation between researchers more necessary. The power of external funding is more systematic than episodic in nature. In the Finnish case, the authority over research has been most restrictively affected as more funding has started to steer research towards societal themes and more interactive working models. Yet, Finnish academic staff see both positive and negative aspects in the acquisition of external funds: it provides freedom from managerial decisions but simultaneously risks their freedom by guiding the choice of topics.

The second lens, comprising Articles III (Pulkkinen & Hautamäki) and IV (Pulkkinen K. , Aarrevaara, Rask, & Mattila, In peer review process), investigates the rise of new research practices which involve direct interaction and close collaboration with non-academic experts. It is a study of how researchers in the social sciences and humanities (SSH) adapt their work methods to co-produce knowledge with partners outside academia. As such, this lens provides a view to a how researchers utilise aspects network governance approaches by incorporating results-based thinking and collaboration across sectors and professions. The two case studies are investigations of the ways in which researchers balance the need to interact with societal partners while upholding ethical principles.

Article III is an exploration of the meaning of co-creation in practical researcher-company settings and how such co-creative methods enhance universities' responsibility. The focus of the article arises from an interest in understanding the elements that are necessary for co-creation to occur, and the reasons such collaboration is pursued in universities. The results suggest that co-creation is first and foremost a goal-oriented tool and learning device rather than a result. It is a cross-cutting operational mode, instead of part of the so-called third mission only, as it facilitates learning across the university. Dialogue is an essential enabler of mixing different perspectives of actors, of building trust between them and ensuring reciprocity of sharing knowledge. The study also shows that researchers' personal

epistemic responsibility is a central element in knowledge production even in co-creative settings. However, the same epistemic responsibility may be what drives researchers to co-create knowledge with companies and to appreciate their own research work in a broader societal role.

In Article IV the aim was to study the innovative societal interaction practices and capacities that research groups utilise in Strategic Research funded projects in Finland. The article examines the core capacities of dynamic governance which research groups identify as being necessary to work in close collaboration with non-academic experts. The findings suggest that a defining element of successful societal interaction is its deep integration with research from the early planning stages throughout the life of the project. All partners, including research groups, are deemed to be stakeholders in that they have a stake in the knowledge production and utilisation processes. Productive interaction rests on understanding and balancing the needs of research groups and societal partners in a manner that keeps the requirements of knowledge production at the centre. The results show that another key criterion for success is the capacity to recognise and acknowledge the different processes that partners may have in their organisations, and an ability and willingness to reconcile these. Furthermore, researchers are aware of the risks to scholarly practices unless they uphold the boundaries and principles of research ethical standards and manage to clarify their significance to non-academic partners.

I have endeavoured to understand the ways in which researchers balance these NPM-based performance demands with the requirement to uphold research integrity through good research practice and the increasing calls to serve the knowledge needs of society. The two research questions serve this aim by linking the management structure and environment related responses of researchers with their need to increase societal interaction and in essence, network governance approaches. As a whole, the four original articles shed light on this phenomenon with a holistic approach from different angles, thus providing a view of how researchers attempt to align the seemingly contradictory reflections of accountability that are present in the modern university environment.

Table 1: The articles, main research questions, and perspectives of the whole

Topic	Research question(s)	Perspective
Article I: National Performance-Based Research Funding Systems: Constructing Local Perceptions of Research?	How do national performance metrics affect local perceptions of research, as organisational actors make sense of these novel forms of resource allocation? How do people interpret and categorise their daily experiences to make sense of disorderly reality?	Processes of coping with research work in a changing funding model environment.
Article II: External Research Funding and Authority Relations.	How does increasing external research project funding affect the authority over research for managers and researchers in Nordic universities?	Relationships and experience of freedom of academic professional groups
Article III: Co-creation with companies: a means to enhance societal impact of university researchers?	How does co-creation between universities and companies enhance the responsibility of universities?	The role of the responsibility agenda in reviewing working perspectives
Article IV: Better research impact through societal interaction plans. The case of Strategic Research in Finland.	What are the solutions for better societal interaction, as proposed by researcher groups? How do the Strategic Research Council (SRC)-funded projects reflect the core capacities of dynamic governance? What kinds of new practices emerge in implementation?	Adaptation and renewal of research working practices

3.   Theoretical framework

The study of higher education is multi-disciplinary and brings together scholars from several fields and theoretical backgrounds. It encompasses researchers from various fields, such as administrative sciences and management, politics, economics and business, sociology, education and psychology, and is characterised by a certain fuzziness with regard to the borders between research and consultation, evaluation and administrative work (Teichler, 2015). The field of research is diverse and includes a broad spectrum of research ranging from teaching and learning related issues, governance and management issues, and issues related to the higher education systems and its links to society (Macfarlane, 2012), as well as studies into the academic profession (Siekkinen, 2019). While relations with the surrounding society have been part of higher education research for some time and developments regarding societal stakeholders have been well covered in recent research (Benneworth & Jongbloed, 2010; Bleiklie, Enders, & Lepori, 2015; Etzkowitz, 2001; Muhonen, Benneworth, & Olmos-Penuela, 2019; Stilgoe, Lock, & Wilsdon, 2014), aspects on how the new forms of joint knowledge production work in an NPM and performance management based university environment have been paid less attention. Yet, researchers as professionals respond to developments around them as objects of change, and pioneer new practices (Noordegraaf & Steijn, 2013). Hence, the renewal of scholarly practices and its value creation is also based on the abilities of individuals (Pekkola, et al., 2020) to identify and develop strategies of coping and creating innovative practices, which allow them to function professionally in changing circumstances. Such issues of co-production of knowledge and professional capacity building aimed at improving ability to meet the increasing pressures fall at the border between higher education studies and innovation studies. Thus, in this dissertation my approach is multi-disciplinary and combines innovation and STS studies with administrative and management sciences.

The theoretical foundation of this dissertation consists of two main sections. Each of these is based on two of the articles comprising this dissertation but extends beyond their parameters to tie them together. The theoretical foundation is guided by a two-tier approach. The first section centres on the ways in which researchers perceive and respond to the exceedingly competitive and result-oriented funding environment. As such, it links articles I and II, and focuses on how researchers at the micro level respond to pressures emanating from the macro and institutional levels. This is done by utilising theories on how performance metrics affect researchers' behaviour and perceptions of the system, and how increases in external funding

influence authority relations between researchers and academic managers. The second section moves beyond the institutional frames and looks at how researchers endeavour to build capacity to tackle the challenges of engaging with society in new ways. It uses knowledge co-production and dynamic governance theories to investigate the efforts that researchers take within a system encouraging the application of an entrepreneurial spirit (Clark, 1998) but which also hinders its implementation through resource constraints, such as lack of personal incentives, and bottlenecks such as lack of measurement and inclusion in assessments (Pinheiro, 2015). It links articles III and IV to explore the ways in which researchers exercise strategic thinking to identify new skills, practices, and capacities to manage the competitive knowledge-producing environment. Finally, in the theory synthesis, the two sections are tied together to form a coherent whole.

3.1 Section 1

3.1.1 *Performance-based funding and researchers' perceptions of professional roles (Article I)*

Performance systems and measures function as tools for university management to follow academic activity and intensity, as well as their developments across faculties and at the organisational level. They are constructed to provide information for leadership to direct organisational attention, and to incentivise actors to act in particular ways. As such, performance measurements are aimed at facilitating decision-making and enhancing accountability in new ways, and thus renewing previous practices by complementing or replacing them (Dahler-Larsen, 2014; Espeland & Stevens, 1998). (Dahler-Larsen, 2014; Espeland & Stevens, 1998). As incentives, they measure and monitor everyday work in compartmentalised ways, neglecting undefined aspects and introducing the risk of displacing holistic assessments. They can renew decision-making by providing more transparency and decreasing the risk of biases, but they may also replace qualitative assessments and professional review practices. This may cause indicators to reduce trust between people and professional groups (Porter T. , 1995) While performance metrics align the accountability expectations, types and measurement needs of the political/bureaucratic (macro) and managerial (institutional) forums, they may be in conflict with professional norms against which researchers weigh the meaningfulness of the accountability and measurement systems (Hansen, et al., 2019). The political/bureaucratic and managerial accountability relations are hierarchical in nature, while the professional accountability – that which lies at the heart of how academic researchers view their work conditions – is network-based (Bovens, 2007; Bovens, Schillemans, & Goodin, 2014).

Metrics enable clear comparisons and can induce action. These are benefits for the organisation in an environment of increasing competition and where various expectations mean that universities must show evidence of performance (Arbo &

Benneworth, 2007). However, these benefits are shadowed by their potential ill-effects to de-contextualise the phenomenon being measured. As a result, they may structure reality in undesirable ways (Dahler-Larsen, 2014; Espeland & Stevens, 1998; Rottenburg, Merry, Park, & Mugler, 2015) and cause rifts in trust between professional groups within universities (Hansen, et al., 2019). This is likely to affect the behaviour of researchers and the rationales of how they make decisions in their working lives. In order to investigate how researchers perceive such disorderly reality and how it affects the research work capabilities of academics, analysis needs to focus on the level of actors rather than institutional or managerial perspectives. Hence, three factors are used to uncover how the effects of metrics are caused: actionability, legitimacy and institutionalisation.

Actionability is a concept that describes the ability of indicators to induce an action in a group. If indicators are tied to incentives, they may influence decision-making by arbitrating between alternative routes and make the measured subjects motivated to choose between options. (Aagaard, 2015) As such it is akin to nudging, which is planned action aimed at providing positive reinforcement in particular groups towards a preferred choice (Marchiori, Adriaanse, & Ridder, 2017). Combining incentives with performance indicators offers a powerful tool to direct the behaviour of individuals (Espeland & Sauder, 2007) and to structure action, as the existence of measurement systems causes the subjects of measurement to react. The incentives can vary from financial to normative and between levels of formality, but they tend to influence the allocation of material resources. In the case of researchers, the financial incentive often refers to research funding while the normative includes more symbolic gains and losses, in relation to status in the academic community, for example.

Performance metrics are sets of data used to demonstrate results of action to internal and external actors. As they are used to highlight particular aspects of the organisation, they have the ability to impart legitimacy. However, to be able to utilise this potential the indicators need to be accepted as valid in a technical and/or normative sense. While technical legitimacy refers to the correspondence between the indicator and object and needs to resonate with the audiences as a valid description of reality (Bowker & Star, 2000), normative legitimacy occurs when an indicator is deemed appropriate to use for the action. An indicator may enjoy normative legitimacy even when its technical legitimacy is low. In such cases, the need to measure outweighs the accuracy of the indicator, causing it to influence behaviour by reproducing the demand for numbers (Power, 2004) In academic communities, researchers may criticise the use of publication or citation metrics as reflections of quality but continue to use them to convey prestige (Aksnes & Rip, 2009). On the other hand, researchers may also doubt the absence of measurement when only parts of the desired work are included in the metrics and hence bear financial consequences. Public engagement activities which are increasingly

required by academic staff fall within tasks that researchers may not know what is being measured and evaluated. nor for what purpose (de Jong, Smit, & van Drooge, 2016). Investment of time and effort is expected of researchers, but its outputs are not measured or considered in the allocation of research funding. Failure to acknowledge the need for long-term commitment by individuals and departments is therefore also reflected on the measurement systems (Watermeyer, 2016) and in particular their normative legitimacy in a new public management culture.

Over time, indicators and the performance measuring systems become solidified and established courses of action. Institutionalisation occurs when metrics are taken for granted (Scott, 1987; Zucker. L, 2009). Once accepted as representations of reality, their limitations and flaws are forgotten and their ability to guide decision-making strengthens. Habituation occurs when people get used to an indicator. Reification solidifies an indicator as it is translated into practical organisation and allocation of labour and resources in the form of offices directed to deal with rankings and their communication (Espeland & Stevens, 1998) or the establishment of research services aimed at increasing acquisition of external funding or business collaboration. Further, indicators may alter the notion of the indicated objects through reification, by the system of measuring redefining the phenomenon itself for example (Woolgar, 1991).

To sum up, metrics have an ability to induce action by using numerical indicators to describe a complex reality. They help to rank the work of researchers in a manner that facilitates the work of decision-makers and causes the subjects of measurement to adjust their behaviour to fit the measuring system better. Furthermore, performance measures can impart organisational legitimacy if they manage to convey technical and normative legitimacy in a way that proves them to be useful. Finally, performance metrics can affect an organisation through institutionalisation if they come to be accepted as valid descriptions of reality by staff and built into the structures of the university. However, performance measures do not automatically impose actionability, legitimacy or institutionalisation, but may emerge while academics interpret the measures in relation to their own work and professional environment. The influence depends on how academics *perceive* organisational actors and relations among them as groups and through their work. If academics *interpret* performance measures as being valid tools describing their work, they may reconfigure their understanding of research work and hence reconstruct their own behaviour as researchers. Whether metrics turn out to be actionable, legitimate and institutionalised is dependent on these perceptions and interpretations.

3.1.2 Authority relations: reflections of power and responsibility? (Article II)

Traditionally, universities have been described as loosely coupled organisations (Weick K. , 1976), which avoid hierarchical control while preserving professional autonomy. With the introduction of new public management practices in universities

the idea was to free them from direct control by the state and allow universities to organise their own hierarchy and rule systems. This included regulatory reforms and rearrangements of funding closer to those associated with the market (Bleiklie, Enders, & Lepori, 2015), aimed at making universities more productive and attentive to society's needs (Ferlie, Musselin, & Andresani, 2009). The developments transformed universities into penetrated hierarchies, which balance between multiple, even contradicting, pressures from a variety of stakeholders who hold power over universities (Bleiklie, Enders, & Lepori, 2015). In such an environment, stakeholder interests need to be considered to an increasing degree (Jongbloed, Enders, & Salerno, 2008). With simultaneous decreases in national block funding, these changes have meant more complex resource dependencies and a need to create flexible processes to allow adaptation and responsiveness to external demands (Pinheiro & Stensaker, 2014). External research funding constitutes one major aspect of this. While the reforms aimed at creating more uniform and hierarchical organisations, changing the funding arrangements also created side effects that increased the relative authority of external funding agencies (Whitley, 2011; Whitley & Gläser, 2014). The growing complexity and competition over research funding have implications also for the authority relations among researchers and between researchers and managers.

Authority relations refer to actors' legitimate power and their connections to those of others. Analysing them directs attention to 'the relative authority of a set of interdependent actors' (Gläser, 2010, p. 359). Conceptually it is closely related to governance, but allows a more specific and inclusive perspective to the interconnections and dimensions of power and interests at the level of actors (Whitley, 2011). A governance perspective focuses instead on the macro and institutional levels, on the processes of regulation of activities and the systems. It functions as background information (Gläser, 2010) while a focus on the authoritative relations allows analysis to concentrate on the actors who have power over specific processes regardless of formal roles in governance bodies.

The investigation of how external funding has affected authority relations between researchers requires analysis of the linkages between decision processes and the conduct of research. This includes how research freedom is viewed by researchers in a time of proliferating external project funding. Power and authority in institutional theory are deemed to be a relational phenomenon, rather than private commodities a person can possess (Clegg, 1989; Lawrence, 2008). Hence, understanding developments of authority relations requires a focus on how different actors *experience* their professional authority and connection to others.

As stated above, authority reflects power and it can come in multiple forms. Episodic power is more discreet and includes strategic acts by self-interested actors, while systemic power refers to institutionalised routines and practices that are ingrained in cultural systems (Lawrence, 2008) (Lawrence, Malhotra, & Morris,

2012). As such, episodic power includes a variety of approaches an actor or group of actors can use to exercise power and attempt to further their own interests. It is a type of strategic actorhood, through which individual actors utilise their social position to enable the meeting of particular goals, and calculate risks against opportunities and rewards (Pinheiro & Stensaker, 2014).

An analysis of episodic power of researchers implies a focus on the strategies that the 'bottom-uppers' in the university system use to further their position and the attainment of their goals (Sabatier, 2005) in the midst of the pressures related to new public management practices. This suggests proactive, target-oriented and potentially organised action by the researchers. Episodic power can be accomplished through controlling critical resources (Pfeffer & Salancik, 2003) or through having privileged access to knowledge (Clark, 1979). However, it can also entail engaging in struggles aimed at defining what is appropriate. Hence, episodic power can be harnessed to promote institutional change in a proactive manner and is therefore related to systemic power (Lawrence, 2008). Such organised and goal-oriented action by a collective of like-minded actors could also constitute an active advocacy operation (Sabatier, 2005). Systemic power refers to a situation in which cultural systems and practices become taken for granted and work in less obvious ways. The exercise of systemic power cannot be attributed to specific actors, but it still holds power over them.

Actors within a university system do not want authority over the same aspects of research. Researchers want authority over the actual conduct of research, while managers are interested in authority over the broader direction of research and are more focused on resource generation and management of academic work in their unit. Managers and external stakeholders such as funders, must exercise their authority over research through others, by affecting researchers' choices or influencing who is allowed to do research. Researchers, on the other hand, exercise authority over research by limiting the authority of other actors, through ethical principles relating to research and related rule systems which uphold research integrity and the core conditions of what constitutes research. This asymmetry comes from the professional knowledge and skills that only researchers have and the basic unpredictability of the academic endeavour (Clark, 1979; Whitley & Gläser, 2014). Hence, for researchers, authority over research becomes a question of protecting their research freedom, the social norms that govern the research community and researchers' professional autonomy (Bleiklie, Enders, & Lepori, 2015). Investigating how researchers perceive their authority over research and their professional autonomy places attention on the way actors exercise authority over *content* (research themes and methods used), *time* (time frames for doing research) and *people* (who gets involved in the research).

To sum up, section one of the theoretical framework provides a structure through which to understand how researchers perceive their funding environment, related work conditions and their roles in the system. Utilising concepts that capture

researchers' sensemaking of performance-based research funding systems (PRFS) and authority relations within the university community allows the investigation of the conditions that enable or inhibit the development of dynamic working methods. Next, in Section 2, attention is moved from researchers' perceptions of their funding and academic freedom and directed to the mechanisms and capacities that govern the knowledge production and interaction. Therefore, the conceptual focus lies in the processes of capacity building that researchers are confronted with in a rapidly-changing work environment.

3.2 Section 2

As the role of the state has decreased through changes in funding structures and increases in university autonomy, more room simultaneously emerged for other external stakeholders. The vertical accountability once strongly controlled by the state funder has been accompanied by horizontal accountability (Jongbloed, Enders, & Salerno, 2008). This has created pressure on universities to manage the ever more complicated external stakeholder relations and legitimacy on multiple fora, which in turn has strengthened the pressure for renewal (Arbo & Benneworth, 2007) and displaying not only research excellence but also societal relevance. Universities have to face the challenge to develop a form of corporate social responsibility, while avoiding mission overload (Enders & de Boer, 2009).

In the last three decades or so, the status of researchers and universities as the dominant producers and disseminators of knowledge has changed gradually as consultancy companies and think tanks have entered the field. Moving from the traditional mode 1 practices and understandings of what constitutes good research (Gibbons, et al., 1994) to a co-productive and more innovation-oriented mode 2 knowledge production approach presented a constitutive change, as the operating models of both academics and other institutions began a transformation towards joint knowledge creation (Nowotny, Scott, & Gibbons, 2003). Universities started to be envisioned as one societal actor among many and the separation of knowledge creators and problem solvers blurred. However, researchers' responses in the new situation have shown great variation from coping, complying and alienation (de Jong, J., & van Drooge, 2016) to harnessing old skills to new uses (Spaapen & van Drooge, 2011). Here, the focus is on the attitudes and actions of those researchers who are interested in and able enough to try new methods.

3.2.1 *Tools for co-production and sharing of knowledge (Article III)*
One of the ways that researchers seek to create new knowledge-based value the midst of multiple pressures (Stilgoe, Owen, & Macnaghten, 2013) is finding ways to interact proactively with non-academic stakeholders in working towards knowledge

producing goals. Adopting market-like mechanisms to knowledge production and adapting them to university contexts (Etzkowitz, 2001) provides one avenue for such endeavours. Knowledge co-production is not a new phenomenon, but is part of the development of participatory approaches, where researchers work interactively with academic actors (Norström, Cvitanovic, & Löf, 2020). In order to manage the risk of commodifying research and prioritising the private good character over the public (Jongbloed, Enders, & Salerno, 2008), the pursuit of research-based innovation must rest on the quality of societal interaction rather than the number of interactions. In the academic community, societal responsibility of the 'engaged university' is, thus, portrayed by adopting a central, or active, role in the search for solutions to complex and topical issues of the surrounding society (Benneworth, 2013). As such, responsibility implies actions beyond communication and focuses on creating processes through which universities tackle societal challenges with other experts. Not only do they produce new knowledge, but they also participate in finding solutions by connecting with others tackling similar problems.

Co-creation provides an avenue for this as it is inherently inter-specialist interaction (Karvonen, 2014) between expert actors. This entails the need for researchers to uphold high research quality and integrity, i.e. their professional core standards and develop their skillset within these parameters to remain relevant in society. Inter-specialist interaction is not just academic expertise or the transferal of such knowledge, but a process created through joint action, which is based on extensive knowledge within a field. As such, it is a dimension of co-generated and contextual learning and knowledge creation (Klev & Levin, 2012; Carlile P. R., 2004), but with an essential difference in understanding the significance and role of inclusion. While co-generated learning and knowledge creation differentiate between insiders and outsiders, such a separation is superfluous and harmful to the building of shared visions in co-creative knowledge production. Instead, all stakeholders (Kazadi, Lievens, & Mahr, 2016) are insiders in a shared process and context they jointly create. Experts from different fields communicate ideas to each other with the intention of learning, but their language, interaction styles and perspectives differ.

The operating models which universities use in the interplay with surrounding societal landscapes vary. Universities apply a dynamic operational logic in their external relations while retaining an organic model in the internal environment (Ståhle & Åberg, 2012). The democratic aspects of internal university working environments reflect the academic heartland (Clark, 1998), and entail a responsiveness to those who are directly affected by the running of the university core functions. While this can be understood to mean that dialogue and exchange of perspectives is inherent in the working habits of researchers and their development within a university environment (Ståhle & Åberg, 2012), it also entails a critical stance to arguments posed by others. Applying a critique-

based model which is suitable in internal, intra-professional contexts, may prove to be counterproductive for purposes in inter-professional settings. It hinders constructive collaboration with potential partners who are unaccustomed to such practices (Strober M. , 2010), can hamper the building of trust needed for discussion, and ultimately alienate the potential partners. Hence, researchers face a need to identify and develop new methods to suit co-creation challenges, while preserving their research integrity.

Co-creation is a buzzword that is often marketed as a solution that can bring academia and companies closer. The phenomenon provides an approach to tackle knowledge development in a manner that includes learning and problem-solving functions, aims to meet the complex challenges of society, and does this through collaboration with multiple partners of different sorts (Regeer & Bunders, 2009). Depending on the context, this working method is referred to as trans-disciplinarity (Thompson Klein, et al., 2001), knowledge co-production as a socially constructive format (Jasanoff, 2004), or mode 2 knowledge production (Gibbons, et al., 1994) stressing the development of science-society relations. Regardless of the term, the phenomenon refers to a working method which emphasises the reciprocal character of the interaction taking place between different types of experts, and a realisation that no one holds all aspects needed to solve unstructured problems (Regeer & Bunders, 2009).

But how can co-creative practices be used to produce academically viable knowledge that is usable to profit-seeking companies, while respecting the intellectual property rights and interests of all concerned parties? The SECI model developed by Nonaka and others (Nonaka & Konno, 1998; Nonaka, Konno, & Toyama, 2001) provides a structure for conceptualising co-creation across the boundaries that separate the academic world and business. Such crossing requires participants both to share their own domain-specific knowledge and assess each other's knowledge (Carlile P. R., 2004). This model focuses on converging tacit and explicit knowledge dimensions, which are particularly potent in expert organisations. Tacit knowledge is internalised in experiences, values and ideals and is difficult to formalise, which makes it hard to communicate to others explicitly in words or graphs. It is experiential knowledge, something we know but cannot verbalise (Polanyi, 1966). The research ethical principles that are inherent in an academic work culture can be understood as tacit knowledge. Explicit knowledge, on the other hand, is expressed in words and numbers. It can be communicated through data, formulae, manuals etc. and "be readily transmitted between individuals formally and systematically" (Nonaka & Konno, 1998, p. 42). Such explicit knowledge includes performance metrics in university contexts.

In the SECI model, knowledge creation is illustrated through a circle that first links the socialisation of the participants – taking place through shared experiences, joint activities and physical proximity – to externalisation. During the

externalisation phase, individual participants fuse their ideas to form a new dynamic whole. They articulate their own tacit knowledge and interpret that of others. This tacit knowledge has been translated to understandable forms using metaphors, examples, diagrams etc (Nonaka, Konno, & Toyama, 2001). The process continues to the combination phase, in which the pools of explicit knowledge start to converge into more complex and systematic explicit knowledge. Participants communicate them through documents, meetings and conversations. While participants sort, combine and categorise existing knowledge they reconfigure it to create new knowledge (Nonaka & Konno, 1998). In order to succeed with the process, how the differences in the amount and type of knowledge between participants affects the sharing actions needs to be considered: the bigger the differences are, the more effort it takes for participants to cross the boundaries and to create new, combined knowledge (Carlile P. , 2004). Furthermore, the search for shared understanding and new knowledge should not lead to avoiding difficult issues. Refraining from the controversial could risk turning the intended inclusion of different expertise into a mere consultation, which reinforces existing, and excluding, power structures instead of creating shared platforms (Valkenburg, Mamidipudi, Pandey, & Bijker, 2019).

To apply the SECI model to university-company co-creations, an understanding of the difficulties of bridging academic disciplines is needed. As noted above, in academic communities, discussion rests on critiquing the work of others and testing them through counter-arguments. The conventional peer review process follows this format, which Myra Strober (2010) calls the 'doubting game'. Here competition and rivalry between researchers, their frameworks and results form the basis, which makes trust an inherently difficult feature to gain (Elbow, 1973). While this style of discussion is justified in academic circles that consist of experts from similar fields, it is ill-suited in inter-disciplinary and multi-professional contexts. To achieve constructive and solution-oriented discussion, the 'believing game' is needed (Strober M. , 2010). In such a setting, participants follow and develop, rather than criticise the ideas and approaches that others present in the dialogue. This type of dialogue still entails a critical approach, but the focus is directed at trying to understand the reasoning and perspectives of other participants. Practising the believing game for a longer period may lead the participant to discover new creative potential and avenues of thought that they would not have found in their conventional setting (Strober M. , 2010). This, in turn, facilitates a move towards connecting their own specialised, disciplinary knowledge to that of others, for example by forming and testing hypotheses (Hakkarainen, Palonen, Paavola, & Lehtinen, 2004). The synthesis that follows is a result of the mixing of separate worlds. It is not likely to be found without verbalisation of thoughts and trust in other discussants.

3.2.2 Planning societal interaction (Article IV)

The Responsible Research and Innovation (RRI) framework has been proposed to guide research in a direction of increasing societal impact. The rise of new funding instruments with a specific focus on societal interaction between researchers and other stakeholders reflects a Europe-wide evolution of science-society relations. Today's researchers function in a rapidly changing environment and operate between multiple pressures, with norms and expectations arising from innovation policy changes in European and national contexts. (Stilgoe, Owen, & Macnaghten, 2013)

This turns attention from deductive reasoning to more risk-accepting work methods, which also acknowledge non-academic expertise as valid in knowledge production. Yet, in exploring new methods for collaboration it is important to note that not all societal stakeholders are of equal value to universities. Universities – and by proxy, researchers – do not prioritise stakeholder interests equally, nor can they easily reconcile their differing interests at the institutional level (Benneworth & Jongbloed, 2010). Also, the complexities that exist at and between the macro and institutional levels do not necessarily determine societal engagement practices at the micro level. Moving towards a broader understanding of public engagement as an element of RRI, focus has changed from ends and products to the means through which researchers and other stakeholders build and uphold interaction. Increasing attention should be paid to the process of engagement and interaction (Stilgoe & Wilsdon, 2009).

Dynamic governance of research and innovation refers to reciprocal interactions between researchers and non-academic stakeholders such as industry, civil society organisations, government and citizens. It is the ability to handle issues in a rapidly-changing environment and to adjust policy formulation and action continuously in order to serve particular collective interests (Porter M. , 2007). In such a multidimensional governance setting (Rask, et al., 2018) actors can influence performance of instruments and intensity of their actions. A dynamic governance approach allows attention to be placed on the micro level actors, who are at the core of knowledge production and the development of new practices. Through dynamic governance the creation and exchange of knowledge is multi-directional and open-ended. Interaction takes place as an exploratory, inductive process and sets performance standards for responsible research and innovation (Guldbrandsen, 2014). From a dynamic governance perspective, societal interaction with science is not only an instrument for making research more impactful or societally responsible, but a tool for making better context-specific, proactive and sustainable decisions (Rask, et al., 2018; Valkenburg, Mamidipudi, Pandey, & Bijker, 2019).

The focus of the dynamic governance framework is on adaptive policies and continual evaluation of action. These are ways to ensure that organisations and actors can anticipate future developments, to appraise and revise them critically, and to utilise expertise across boundaries. These three preconditions – thinking

ahead, again and across – form the basis of an open and participatory environment that produce dynamically capable people and agile processes (Neo & Chen, 2007). However, combining expertise across boundaries opens up potentials as well as tensions when participants bring forth differing viewpoints. While some capacities support dynamism, others inhibit it in the interaction between different types of actors (Gómez & Ballard, 2013). In order to tap into pools of extended expertise, the ability of people to reflect on their knowledge and its relation to others is essential. This means going beyond the networks that consist of similar types of actors or knowledge.

Dynamic governance provides capacity-based criteria for exploring the elements of interaction: anticipation, reflexivity, trans-disciplinary resource mobilisation and continuity (Neo & Chen, 2007; Rask, et al., 2018). Each of these is reflected through interaction practices aimed at serving the goals of projects, such as user-centric open innovation frameworks where public and private actors collaborate to meet jointly shared goals.

Anticipation refers to the ability to plan actions in a strategic manner for the home institution of an actor and partner the institutions. It refers to foresight capacities to prepare wisely for future developments, from both a researcher and other stakeholder perspectives. Reflexivity rests on the will and skill of actors to analyse issues from different points of view, and to allow their own perspectives to be challenged while challenging those of others. Slightly different from the first two which focus on goal-seeking deliberation, trans-disciplinarity reflects a scholarly approach that not only sees a phenomenon studied with the tools of several disciplines, but goes further to mix these under a shared approach (Rask, et al., 2018). As such, trans-disciplinarity encourages researchers to shake the foundations of their traditional disciplinary boundaries in order to grasp a complex phenomenon with a holistic approach (Strober M. , 2010). It focuses on problems that cross disciplinary boundaries and cannot be solved with the tools of one discipline or through lighter multi-disciplinary actions (Neo & Chen, 2007). Finally, continuity breaks many familiar timeframes of researchers as well as other stakeholders. It refers to the need and ability of research projects to link actions to a longer chain of events, and to allow for evolution within a project. It also provides a necessary factor to balance rapid changes and to ensure longer term sustainability of actions (Stilgoe, Lock, & Wilsdon, 2014; Rask, et al., 2018).

From a dynamic governance point of view, societal interaction should support the solving of jointly defined problems in a manner that promotes learning by all participants through the use of continual feedback loops to evaluate actions (Romme & Endenburg, 2006). The approach places attention on the capacities of participants and their ability to use these capacities as catalysts in the development of context-wise practices. Using dynamic governance as an approach allows the exploration of the interaction governance of those who associate together in changing circumstances.

Furthermore, it emphasises the role of aims as guiding principles in the interaction and in-built negotiation of interests, as well as practices to serve these aims. It sheds light on the processes that support the resilience and sustainability of solutions and follows the impact pathways which lie behind dominant mechanisms of interaction (Muhonen et al. 2019). This means tapping into mechanisms through which societal impacts arise over time.

3.3 Theory Synthesis

To synthesise, while the re-examination of the role of universities in society, their identity and foundations as well as their expected impact and accountabilities are a worldwide phenomenon (Olsen, 2007), the situation of European universities is also peculiar. The reforms of the past two decades have increasingly resulted from European-level pressures, which have emphasised the increasing significance of higher education in social, economic, political as well as educational roles. As universities are expected to provide solutions for a growing array of societal sectors and challenges, the claims of requiring special governance structures due to their institutional uniqueness have become less legitimate (Maassen, et al., 2012). In essence, universities are considered bottom-heavy and resistant to change as they protect the 'academic heartland' (Clark, 1998), while at the same time they show ability to adapt to changing circumstances.

The process and depth of changes at different levels of the governance system is intriguing. There have been major shifts in the governance structures of universities as part of NPM-related reforms and these have had consequences for the professional relations and practices of academic staff. The reforms have included the introduction of performance management and result-based performance indicators, more competition and new funding arrangements. As the concept of performance is highly ambiguous by nature and can include actions, tasks and processes as well as outputs and outcomes, it is strongly subject to various kinds of interpretations. Due to this, measurement is an inseparable part of performance (Kivistö, et al., 2019). This, in turn, is inevitably instrumental as the measuring is done in order to serve a particular purpose, be it to demonstrate success towards a particular goal, verify accountability towards a particular body or to make the abstract more concrete (Christense, Lægreid, & Stigen, 2007).

Performance-based funding is designed on the belief that performance will improve if results are linked to direct financial incentives. In the case of universities as public institutions, the value of performance draws attention to results and outcomes but also to the inputs and processes that lie behind (Alford & Hughes, 2008). The situational factors, context and nature of the tasks ought to be reflected in the management approach in order for them to be deemed legitimate.

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Pulkkinen: Managing Contradiction –
Researchers' practices in balancing performance, research integrity and societal interaction

Performance measurements are aimed at enhancing accountability in new ways and thus renewing practices by either complementing or replacing them (Dahler-Larsen, 2014). However, even if they serve the managerial needs, they may be considered illegitimate by the core staff if the measurement systems do not align with professional norms against which researchers weigh their meaningfulness. (Hansen, et al., 2019) In other words, although several accountability types may be interwoven, they may emphasise different criteria which are based on differing realities of professions within universities.

The goals of performance measurement and accountability verification may be multiple and vague, depending on the perspective of the profession. As major source of unintended consequences often lies in the complexities of defining indicators that are considered valid by different professions whose work is affected by the use of measurement indicators. Intentions and actual consequences are not automatically aligned, perhaps due to a high number of stakeholders whose intentions may not correspond with those of others. Intentions may be incoherent, their internal significance in the whole may vary or they may change over time. (Dahler-Larsen, 2014) In university settings, the performance indicators may cause institutional lock-in effects, a type of self-fulfilling prophecy, if incentives or sanctions are strongly connected to indicators. By strongly objectifying a particular measurement, the parts of a phenomenon not captured by the indicator are made less real (Espeland & Sauder, 2007). Societal interaction is an example of contemporary academic work that is given little attention in the performance management systems. A seemingly lacking ability of university management to translate general ideas of NPM-inspired performance measurement systems to local and institutional contexts relevant to academics risks missing problems of actionability and legitimacy of indicators in core staff. In other words, when the general performance indicators are translated to university-specific contexts, the translation process should pay attention to how the indicators are understood by those whose actions are being measured. (Krog Lind, 2019) The better managers engage in such adaptive tasks to boost the usefulness of an indicator, the more its appropriateness and legitimacy are affected. Conversely, leaving out parts of academic work, which are stressed as significant in the renewal processes of work practices, is likely to cause eruptions in how legitimate the indicators are considered to be.

As the performance management systems have evolved, changes in the roles and influence of external stakeholders in the governance structures of universities have contributed to the dynamics of relations with academic staff. In addition, they have also altered the internal relations within universities (Bruckmann, 2015). Reforms have opened universities more to society by giving higher influence to societal stakeholders. Universities have also been faced with a need to balance the professional perspectives of academic staff and those of external and managerial groups. In addition to allowing access to internal academic matters, closer collaboration with

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societal stakeholders have functioned as a push to discuss the use of performance metrics and transparency-increasing measures related to societal interaction of researchers. In essence, societal interaction has become not only a purpose in itself but also an instrument to increase visibility of academic work in society.

While the vision of the entrepreneurial university (Clark, 1998) exploits the strengths of universities to achieve maximum political and financial gains at institutional levels, it relies on the initiative and risk-taking of individual academics and groups (Koryakina, Sarrico, & Teixeira, 2015). However, the role of such entrepreneurial and societal interaction focused activities are given little attention in the performance measurements, and hence the risk-taking of researchers is not backed up by university systems. This imbalance raises puzzling questions as to the meaning of accountability of the university institution in a context where verification of accountability is expected of academic staff in the form of performance measurement.

The concepts regarding both performance management and societal interaction have evolved during the past twenty years, particularly over the last decade. While these developments reflect rapid changes in the operating environment of universities and the academic profession, the conceptual discussions have remained separate despite the apparent linkages that both have on the working realities of researchers. Studying developments in the societal development practices that researchers apply in an environment governed by performance management measures and a strengthening accountability ethos shows the intertwined nature of the conceptual tracks. Societal interaction of researchers is not a separate development but rather part of the same whole, and thus efforts to understand its dynamics require a more holistic approach. In the contemporary university environment, curiosity-driven research is no longer enough, although its place remains as a cornerstone for upholding research integrity. In addition to the traditional research skills and virtues, researchers require new capacities, which allow them to function as academic professionals in the rapidly changing environment. The interests and needs of knowledge as an academic endeavour can no longer be treated as a separate trajectory from broader societal developments. Thus, it is necessary to combine performance management and societal interaction concepts to understand how different types of partnerships and networking efforts define research work.

4.   Data and methods

The theoretical framework used in this study has allowed me to approach the situation and dynamics at work from two perspectives: first from an institutional level which is heavily influenced by the macro level, and then from the micro level. The social embeddedness of universities is implicit in both perspectives and emphasises the need for universities and research communities to adhere to social and societal expectations. The data for this dissertation were collected at the micro level of universities, focusing on researchers' perceptions and their working logic. The research design for this dissertation applied a mixed methods approach (Bryman, 2006), and comprises qualitative interviews and observation data as well as some quantitative survey data. These were complemented by desk-top analysis of documentary data.

By focusing on the micro level of universities the aim was to understand researchers' sensemaking processes and working logic in a changing institutional context. To grasp the dynamics that drive researchers to adjust to the changing work conditions and multiple pressures posed on academic work, I pursued a multi-angle approach. My intention was firstly to investigate how the introduction of performance-based management has influenced researchers' own understanding of their work, roles and relationships with other researchers and managers, and secondly, to unravel the arguments and logic of researchers who are interested in societally interactive working methods.

I argue that the study of researchers' perceptions and working logic is important, because their responses to the increasing, multiple pressures of their work are crucial for the development of robust, resilient and societally responsive universities. These responses are based on perceptions of their own work realities and conditions, while the managerial decisions at the institutional and macro levels provide the context for the responses. Considering that universities are traditionally bottom-heavy organisations in which academics have historically held strong autonomy, and hence their professional history is that of directing their own activities and strategies to change (Bleiklie, Enders, & Lepori, 2017; Fumasoli & Stensaker, 2013), it is unlikely that they would be mere recipients of reform agendas when it comes to societal interaction either.

Qualitative interviews provided an appropriate method for data collection, as semi-structured interviews can offer a holistic and in-depth reflection of the phenomena under study. Qualitative interviews also acknowledge the social and temporal contexts (Miles & Huberman, 1994) in which the phenomenon takes

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place. Article III differs from the others in that its data were collected through action research methods and were comprised of observation data. Participatory action research allowed the capturing of the process of constructing meanings in an interactive setting. As a method, it combines exploration, experimentation and elaboration of the interaction which produces knowledge (Lawson, Caringi, Pyles, Jurkowski, & Bozlak, 2015; McIntyre, 2008; Reason & Bradbury, 2008). Qualitative data served the aim of attempting to understand the phenomenon under study from the micro level perspective of researchers, to draw a picture of why they perceive the situation as they do and how they construct new working strategies (Miles & Huberman, 1994). As such, the choice of methodology reflects the social character of knowledge production and the residence of knowledge not so much in the individuals but in the interactions between individuals (Longino, 1990).

The data were collected during three projects. The focus of the projects differed, but all were related to the overall theme of how university-based researchers make sense and innovatively adjust in a rapidly changing work environment.

The data and methods are summarised below in Table 2. As regards the respondents, in Articles I and II, the numbers on qualitative data relate to the Finnish data which I analysed, rather than the overall scope of the Nordic data on which the comparison was performed.

Table 2 Articles, data, respondents and methods.

Article	Research questions	Data	Respondents
Article I National Performance-Based Research Funding Systems: Constructing Local Perceptions of Research?	How do national performance metrics affect local perceptions of research as organisational actors? How do they make sense of these novel forms of resource allocation? How do people interpret and categorise their daily experiences to make sense of disorderly reality?	FINNUT qualitative interview data. Interviews of academics, managers and administrators (2015)	N=24 Academics, managers and administrators at two Finnish universities.
Article II External Research Funding and Authority Relations.	How does increasing external research project funding affect the authority over research for managers and researchers in Nordic universities?	FINNUT quantitative and qualitative data, academics and managers.	Qualitative N=18 Academics (10) and managers (8) at two Finnish universities, one flagship and one regional. Quantitative N=757 Academics at Finnish universities, systematic random sample
Article III Co-creation with companies: a means to enhance societal impact of university researchers?	How does co-creation between universities and companies enhance the responsibility of universities?	COHU project (Co-creation model for the University of Helsinki), qualitative data. (2017)	N=13 Seven SSH researchers, and six representatives from five companies
Article IV Societal interaction and change in governance of science. The case of Strategic Research in Finland.	What are the ideas and solutions for better societal interaction as proposed by researcher groups? How do the SRC funded projects reflect the core capacities of dynamic governance?	The first few SRC funded projects (13 of 16), as one of seven pilot projects. Societal interaction plans and a semi-structured interview with the person responsible for interaction and/or project leader (i.e. representatives of the research group). Four categories of questions.	N=18 Team leaders 10, and interaction leaders 8 of 13 funded projects

My role varied between the projects, but all included responsibility for research design, and collecting and analysing the data. A description of my role in co-authoring the articles is provided in Annex 1. The projects and their data and methodology are described below in separate sections, followed by analysis of the data and choice of methodology.

4.1 Dataset 1: Articles I and II

The project "Does it really matter? Assessing the performance effects of changes in leadership and management structures in Nordic Higher Education" funded by the Norwegian Research Council ran between 2014 and 2017 (referred to as the FINNUT Perfect study). The study focused on the relationship between changes in formal leadership structures and performance shifts. The main research problem was stated as follows: To what extent have changes in leadership and management structures been related to shifts in teaching and research performance in public universities across the Nordic countries (Norway, Sweden, Denmark and Finland) in the last decade? The study was comparative in its research design and applied a mixed methods approach which consisted of desk top analyses, surveys and interviews (Pulkkinen K. , et al., 2019). Despite the comparative approach used in FINNUT Perfect studies (Articles I and II), this dissertation focuses on the Finnish part. As such, it is not a comparative study but rather limits its focus on the perceptions of Finnish researchers.

The data consists mainly of the Finnish interviews (N=24), collected from one flagship and one regional university, both of which were multi-disciplinary, offering programmes in both the natural sciences (and medicine) and the social sciences. The interviewees were selected strategically according to their positions in the system, and included representatives from the senior research and teaching staff (academics), academic leaders from a range of levels (managers), and professionals in central administrative positions dealing with issues relating to research and teaching (administrators). The interviews were semi-structured and followed a common interview guide. Since the interviewees represented a group of highly educated experts, an elite interviewing approach was used. This emphasises the need to provide space for the interviewees to express their views freely on the selected themes and following the structure of the guide but adjusting the questions to the knowledge of the interviewees. This ensured comparison across the cases (Pulkkinen K. , et al., 2019). The qualitative data were analysed with the help of NVivo software, according to principles of systematic content analysis. In Article I, the qualitative data were analysed first inductively, using the entire data set. and later according to refined coding, to categorise the findings. In Article II, the qualitative analysis includes sections relating to autonomy and academic freedom and limiting it to cover managers and academics only.

In addition, specific parts of the quantitative survey data have been included (Article II). The target groups in the full survey were full-time managerial and academic staff employed at publicly run universities in Denmark, Finland, Norway and Sweden, of which the Finnish parts were used. The survey was conducted at the turn of 2014-15. The national samples were planned to allow for Nordic comparisons, and subsamples included respondents working in senior positions (European career levels III and IV) in both official management positions and academic positions. The Finnish survey population was census-based for managers and a systematic random sample for academics. Distinctions between academics and academic managers were based on the respondents' own reporting, due to differences in positions between the countries. The variable "do you hold an official management position" was used to categorise variables (Pulkkinen K. , et al., 2019).

From a large survey covering eight themes (Table 3), the material relating to autonomy was used (Article II). The quantitative data were used alongside the qualitative, to obtain an overall understanding of how academics experience their research freedom. Furthermore, the interview data were used to qualify and explain the findings of the survey data, which seemed to raise contradictory remarks on experiences of the realities of academics and managers. The triangulation of data offered a solution to making sense of the numerical findings through the explanatory power of qualitative data.

Table 3. Themes for data collection in the FINNUT study (Pulkkinen K. , et al., 2019).

Survey themes	Interview themes
Perceived performance	Goal specificity and degree of autonomy
Goal specificity and autonomy	Decision-making and strategy
Decision-making and strategy	Control and evaluation
Control and evaluation	Support structures
Support structures	External stakeholders
External stakeholders	Trust and accountability
Trust and accountability	Incentives/recognition
Incentives	

4.2 Dataset 2: Article III

The second dataset was derived from an experimental project "The Co-creation model of Helsinki University" (referred to as the COHU project) that took place in 2017 and was funded by the Finnish agency for innovation, Tekes (now Business Finland). The project was conducted at the University of Helsinki and was led by the Research Services' Business Collaboration Team. The project was part of a larger Innovation Scout (iScout) programme, the aim of which was to support research-

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based innovation, and as such its target was to develop and test a functional co-creation model for the university.

The project team was transdisciplinary. Despite being implemented by the research services section of the university, my role was that of a researcher. Since the intention was to design a sustainable model the project included a research component which focused on two things in particular: 1) what are the core characteristics that differentiate co-creation from conventional collaboration, and 2) which formats or tools work in researcher-company co-creation? (Article III).

Participants were selected by purposive sampling. The project did not aim at generalisability and followed co-creation principles (Regeer & Bunders, 2009). This meant that participants were purposefully selected from a range of backgrounds to complement existing knowledge (Hakkarainen, Palonen, Paavola, & Lehtinen, 2004). Participants consisted of representatives of five companies of several sizes, levels of maturity and sectors, as well as seven post-doctoral or associate level researchers from the social sciences and humanities (SSH). The data were collected during six facilitated half-day workshops which were held fortnightly during spring 2017. The data collection was done with participatory action research principles (Reason & Bradbury, 2008). Workshop discussions were recorded to support the written notetaking, and as the researcher, I did not participate in the discussions at all. In the data, attention was given to verbal communication as well as body language, gestures, tones and speaking style. Content analysis was performed on the data, utilising NVivo software and a conceptual hierarchy. (Article III)

4.3 Dataset 3: Article IV

The third dataset consists of a pilot study which was conducted as part of the "Public Engagement Innovations for Horizon 2020" (referred to as the PE2020 project), which ran between 2014 and 2017. The project was funded by the EU's 7th Framework Programme (FP7). The data comprised projects funded by the first-year cohort (2015) of the Strategic Research Council funding instrument. This included 13 out of the 16 funded projects. In particular, the data included the societal interaction plans of the projects as well as interview data of each of the 13 projects. The interviews were held with consortia and/or interaction leaders, and they were semi-structured. The interviewees consisted of questions organised into four categories: capacities aimed at serving dynamic science governance, the focus of project objectives, interaction practices, and stages of research and decision-making processes where interaction was aimed.

The interviews were recorded and transcribed verbatim. The data were systematically analysed with NVivo software, following the principles of inductive

content analysis. The codes used to conduct the analysis followed the conceptual thinking used in the interviews.

4.4 Data analysis

In the sub-studies of this dissertation, emphasis of the analysis lies on the one hand on researchers' perceptions of what performance management has meant for their understanding of research and their relationships with peers and managers, and on the other, on the working methods and practices that researchers interested in societal interaction utilise. In this setting, researchers as individuals are seen as active agents in their environment. They are actors who are able to attach meaning to the phenomena they identify in their work context and who participate in constructing the realities of research work at the micro level of universities.

The data collection and methodology for this dissertation were chosen to allow the tracing of these complex dynamics. Epistemologically, the approach rests on a social constructivist research tradition by attempting to understand the realities of researchers as they are constructed in the interactions between people (Gergen, 1994). The methodology used triangulation as the phenomenon under study is multi-dimensional – as highlighted in the research questions. Triangulation provided a channel to investigate multiple angles empirically and allowed juxtaposition and comparison of the data. This enabled closer investigation of potential contradictions and revealed paradoxes that could otherwise go unnoticed (Bryman, 2004). The approach is also consistent with the focus of new institutional theory on collective norms and ideas acting as filters that help individuals and groups form perceptions on the world around us.

The analysis of data followed systematic data collection and critical analysis in all sub-studies.

Since two of the sub-studies (data set 1, Articles I and II) used what is called 'elite interviews' in the academic literature (Aberbach & Rockman, 2002; Goldstein, 2002), a few thoughts are in order about what this method means in practice. Despite using a different method to select interviewees in data set 3 (Article IV) and some of the interviews being groups of two, the same kind of interview tactic was used in those interviews as well. Interview methods are heavily reliant on the interaction between the interviewer and the interviewee. In 'elite interviews', particularly in data set 1 (Articles I and II), the interviewee is seen to be in a higher position of power than others but how this higher position of power is defined or who the elites are depends on the context. In the case of dataset 1 (Articles I and II) the elites can be defined as a person who holds a position that is difficult to obtain, requires particular merit and thus holds a status of exclusion. In dataset 3, the status is even more restrictive and includes only those in specific leadership positions in a strictly defined set of projects.

The level of success of the interview methods is dependent on the amount and quality of interaction between the interviewer and the interviewee. This is particularly the case in situations in which the interview is longer and the topic is difficult for the interviewee to discuss, thus requiring special sensitivity from the interviewer (Aalto, 2001). In-depth interviews were performed for dataset 1 in a context in which the national government had announced radical cuts to research funding only a few weeks previously. Due to the heated situation and concerns in research communities, the invitations to be interviewed were delayed by a few weeks to allow the situation to calm down at least to some degree. For dataset 3, the situation was also politicised but for a different reason: the funding for the new Strategic Research Council had been gathered from state research centres and Academy of Finland funding, and pooled to provide the basis for the new, thematically oriented competitive funding instrument. The debates about the nature of the new instrument, its function as managed funding and the consequences of the pooling of funds for the organisations for which it meant cuts, had caused a heated situation. The interviewees from the first-funded projects were highly aware of this sensitive context.

Acknowledging the feelings of worry and to build trust in the interview situation, I emphasised the funding base of the research projects at the beginning of the interview when giving the background information on the projects. For the FINNUT project, the funding being entirely international seemed to bear special significance for the interviewees whose trust in the national state funder had suffered due to the funding cuts. For the PE2020 project, the funding was provided by the EU's 7th Framework Programme, also separate from the national research funding schemes. In both situations, emphasising the funding for the project helped reassure the interviewees of the neutral position of the interviewer.

To highlight the professionalism in the process of data collection and analysis, and in order to establish trust and credibility in the projects, the invitations to be interviewed were designed to provide the basic information about the projects as well as the themes and focus of the interviews (Goldstein, 2002). Anonymity of the interviewees was assured in the invitation letters as well as at the beginning of each interview, when the interviewees were requested to sign a consent form further explaining the usage of the data and its anonymity.

Gaining access to the interviewees required organisation but getting interviewees to accept the invitation was not difficult. For data set 1, the universities were first sent a formal request for permission to undertake a comparative study. Both Finnish universities provided this permission without delay. Once the invitation email letters were sent, only a small number of interviewees declined, mainly due to tight schedules. The interviewees represented the chosen disciplines, roles within the university system and genders in a balanced manner. For data set 3, the process began with discussions with the SRC secretariat who consulted the whole of the first-funded project leadership collectively. The consultation to partake in the study

was backed with an information letter from the interview team, providing the basic information about the project, the research design for the collection and analysis of data and its anonymity.

For data set 2, the selection of participants differed due to the experimental nature of the project. Potential participants were informed about the research component of the project, including the action research methodology and anonymity of data. The research design was presented to the participants at the beginning of the process in more detail, explaining the style of data collection and that as the researcher, I would not be participating in the discussions or intervening in the process during the workshops, but would be present at all times and observing the development of the discussions with another researcher. A non-disclosure agreement was signed at the first session, but it did not exclude the use of observation data for research purposes provided that the data were anonymised, and no intellectual property rights were violated. The effort put into explaining the design of the research component turned out to be well-placed and strengthened credibility in the process for both the company and the research participants. The participants could forget about the research presence in the room during discussions but were intrigued about the observations during common coffee and lunch breaks. The open approach also supported mid-term review of the process, when I approached all participants with a short survey requesting their comments and input on the process, again with anonymity. The feedback was critically constructive and gave valuable input about both the well-functioning parts as well as those that were considered to hamper discussions. The feedback helped develop the process mid-way as well as analysis of the data at the end of the set of sessions.

To be successful with interviews requires extensive advance preparation. This includes doing background research on the institutions, the context in which they function, and the academic literature on the issues at hand. As noted by Leech (2002), the selection of interview themes, formulation of questions and the order in which they are presented to the interviewees is of high importance. Gathering a solid foundation and understanding about the context in which the interviewees function is important, and particularly highlighted in situations in which the issues being discussed may be sensitive in nature. This was the case with all three data sets, as the political atmosphere at the time of data collection was tense due to cuts and major funding reforms that were coupled with demands to increase societal interaction. In all data collection endeavours, the advance preparation supported the discussions in interview and observation situations, in particular as it sensitised the interviewer to the context of the interviewees. Furthermore, it helped keep a neutral position as I could anticipate some of the parts when additional explanation could be needed.

Interview formats for datasets 1 and 3 were designed to begin with issues that were easier for interviewees to grasp, and thus focused first on questions that interviewees could approach through practical work. Interviewing established researchers was

challenging and rewarding because the analytical working habits of researchers were also extended to the interview situation. It was common for the interviewees to comment at some point about the formulation of questions or the order of the themes. In data set 1 the opening question intended to be light ("what does performance mean to you") sparked various thoughts that highlighted disciplinary differences. Most managers and natural scientists provided practical and pointed, almost list-like answers, while nearly all social scientists pondered first around the meaning of performance as a concept and the ways in which this concept reflects changes in academic work. In several cases the interviewees realised the existence of such a split. Most interviewees in research positions also noted that they found the chance to be interviewed about their work realities and the interest in their perceptions, in particular by higher education scholars, to support their coping in the midst of an insecure situation. Most openly commented that the chance to be interviewed helped them structure the disorderly realities in the midst of change. As the interviewer, these comments highlighted the need to remain neutral and not engage in discussion as such or to allow the interview situation to become therapy-like, and to be vigilant about potential persuasive dynamics of the situation. This is a typical risk of 'elite interviews' in which the interviewees are experts in the field and aware of their positions and their abilities in articulation and argumentation (Berry, 2002).

For data set 3 the interview situations were quite different. The interviewees were highly aware of their elite positions and it was expected that some might not want to share knowledge which they felt was the core that upholds their status. However, most of the interviewees were excited about the new projects and their innovative nature in ways that were visible in the interview situations. Again, the advance preparation of studying both the funding instrument and its background as well as the project material provided by each project prior to the interviews, paid off and helped build an interview situation in which the interviewees could trust the interviewer and the process of data collection and analysis. The interviews ran smoothly, and it was quite common to run slightly over time due to the eagerness of interviewees to ponder their work methods and interaction practices. However, in this case it was also necessary for me as the interviewer to maintain a certain distance and to avoid engaging in discussion that could lead to losing control of the interview (Berry, 2002).

The open-ended questions of semi-structured interviews were somewhat more focused in the case of data set 3 than in data set 1, and hence easier to manage from this perspective. The challenge came from trying to read when the apparent eagerness of the interviewees hid arguments aimed at convincing me as the interviewer of their excellence. The validity of the interview could have been jeopardised if the interviewer were to be lured into such selling tactics. Similar situations also occurred in data set 2, but they were different in character. In this case, the observation during

the workshop sessions was relatively easy to uphold as neutral and analytically distanced. However, the persuasive argumentations could present themselves during joint coffee and lunch breaks with the participants and it was necessary to balance the trust-building openness and safe distance that was necessary for reasons of validity (Reason & Bradbury, 2008). Similar situations also occurred in the internal discussions with the project team, which due to the experimental nature of the project, included development of the facilitation methodology and structure of the workshop sessions. As the researcher analysing the running of the sessions as well as the discussions themselves, these internal discussions included critically constructive elaboration which at times necessitated diplomatic approaches.

The semi-structured interview format allowed the interviewer not only to explore the ways in which the interviewee made sense of issues, but also to discover where the journey the interviewee took me on could lead. Such probing (Berry, 2002) required very focused work in the interviews as it meant balancing between open and closed-ended questions as well as being careful not to lead the interviewee by commenting on their answers too much. Again, the in-depth advance preparation helped manage the situations, even when some interviewees could express rather strong frustrations and concerns over the future of their profession.

The analysis was data driven and followed an inductive approach. Despite having a theoretical foundation that guided the data collection, I was open to letting the data speak to me and attentive to the material; I was conscious of not letting the theoretical foundation guide my first interpretation of the data too much. The data collection and first reading took place simultaneously. I took quick notes during the interviews and marked concise answers on a paper copy of the interview guide in data sets 1 and 3. These allowed me to construct an understanding of the data and refine the questions where confusion arose systematically, without changing the design itself. The method kept me sensitive to the data during the collection phase. In data set 2 this was done through a quick analysis of the workshops directly after them. I had a rough structure for each of the sessions, outlining which developments and/or issues I anticipated would surface at each of the sessions. After the sessions I wrote brief notes on each that occurred and thoughts on why some did not. In the second phase of the analysis, the recorded interviews were transcribed. These transcriptions (data sets 1 and 3) and the observation notes (data set 2) were investigated with systematic content analysis in stages. This helped structure the material. After the first stage, during which analysis was inductive, a refined coding was made in the second stage to categorise the findings according to the analytical framework. Conceptual trees were formed based on the analytical frameworks for this purpose. The refined coding was cross-analysed as the work continued and allowed me to compare seeming contradictions and paradoxes in the material. In doing this, I could access the deep-lying understandings of the interviewees and hence identify the logics that constructed their behaviour and strategic choices.

There are some limitations to the data, which warrant consideration. Regarding the case studies (data sets 2 and 3, Articles III and IV), it should be noted that the informants were generally interested or at least intrigued by the development of societally interactive research working methods. This limits the generalisability of the analysis but provides a valid understanding of how researchers representing such a societally curious group perceive the situation and strategise in choosing how they respond to the challenges posed from the institutional and macro levels. On the other hand, selection of the data from the FINNUT study (data set 1, Articles I and II), was strategically based on their official position in the university systems of the two institutions, and they represented a broad range of views. Triangulation (Creswell & Clark, 2007) of the data allowed greater sensitivity to the complexity and variety of multiple sources of data, hence strengthening the validity and reliability of the study. Through triangulation I could explore the rich data comparatively, paying specific attention to both complementary and contradictory aspects. In analysing the four articles which comprise this dissertation, I was able to build a comprehensive understanding of the perceptions and response strategies that researchers have on societally interactive research and apply in their work methods, in the midst of a rapidly changing funding environment and between multiple, even directly contradictory pressures.

In conclusion, the choice of a qualitative interview and observation methodology for the topics and studying work practices proved sound. The reforms and policy encouragements that had changed the conditions and work realities of researchers turned out to be highly ambiguous to academics and dependent on the perspective and position of the interviewees. Researchers attached very different meanings to the concepts and strategic choices that lay behind the situations in which they worked. The use of semi-structured interviews and action research methods allowed me to dig into these meanings and logic that researchers utilised to make sense of the situation and to build strategies for their future careers.

While the survey data used in data set 1 were also highly useful in understanding the bigger trends and dynamics at work, they could not provide avenues that would lead to understanding why paradoxes and seemingly contradictory forces were at play. The qualitative interviews allowed me access to these meanings and the logic that created such contradictory views, and paradoxid decision situations for researchers. In addition, due to the vast experience of the interviewees, they could attach meanings to the complex concepts and structure these in intricate ways during the interviews (Weick K. , 1995). This led them to construct and articulate their own meanings, and some attempted to persuade me as the interviewer of the rightness of their interpretation of meaning. Such persuasive tactics became evident particularly with managers and academics at the top level of the career ladder. Due to this, I approached the interviewees as political actors of sorts, rather than passive recipients of reforms agendas or actors that simply adjusted to the changes around

them. Seeing the interviewees as political actors allowed me to acknowledge that they may try to influence my perceptions and those of others, by disseminating their own ideas and visions in vocal ways (Rouleau & Balogun, 2011).

The strength of the qualitative data and method was particularly evident in datasets 1 and 3. It was clear early on in the data collection that the understanding of the core concepts and the ways in which interviewees attached meaning to the changes in their work environments differed drastically. In utilising qualitative methods and data triangulation, I was able to delve into these complex understandings and the dynamics that lay behind them and that influenced the logic of strategising. In data set 2, the choice of qualitative methodology allowed me to go beyond the statements and articulated thoughts of the participants, and further into the ways in which they communicated ideas, perceptions and even feelings of excitement, confusion and frustration to each other. This proved to be a strength of the action research method, which required intricate and multiple rounds of work with the data during the data analysis phase.

5.   Findings

This chapter presents the main findings of each of the four articles in a condensed form. The summaries have been structured to focus on the core of the findings, thus facilitating the understanding of the arguments which are drawn from the analysis.

In the first two articles, attention was focused on the findings from the Finnish data. In addition, results of the comparative analyses were used in parts in which Finland forms an exception or otherwise stands out from the other Nordic countries examined in the study. Furthermore, the focus of the findings was particularly on researchers and their ways of understanding their role in the changing funding environment. Managers' perceptions were dealt with to a lesser degree and limited to how they differ from those of researchers and how these differences affect the perceptions of researchers.

5.1 The contradictory influence of performance metrics

The research metrics used in the national PRFSs are clearly actionable. Primarily, they facilitate managerial decision making and serve their needs, but the formalisation in the use of metrics and the incentives vary. In Finland, performance-based management has pushed universities to make strategic choices on how they allocate funding internally and prioritise academic fields, which influences researchers' perceptions of how they should organise and prioritise their work. Publication practices have been influenced notably. The incentives of the PRFS clearly affect research practices by enhancing the pressure on academics to strive for high-quality and impactful research, by considering where they choose to publish. This is particularly potent in the Finnish case, where incentives are coupled with high performance metrics, which researchers consider to be pressure to perform – and conform.

For many academics, the coupling of incentives and high performance has also presented opportunities for positive career developments at personal levels, and they have accepted the changes as something that drives research forward. However, despite the coupling of remuneration and performance in Finland, which creates a stronger tool (Espeland & Sauder, 2007) than in the other countries, researchers across all four countries emphasised the symbolic rewards and reputational gains. Respect of peers and other traditional forms of academic merit are valued above the remuneration incentives, which are deemed to be superfluous. Against expectations, Finland does not stand out from the other countries in the study despite the heavier

coupling of incentives and performance. The actionability of the effort to nudge researchers seems to be weakened by counterpressure, whereby researchers protect the traditional academic value of peers and reinforce their professional autonomy (Bleiklie, Enders, & Lepori, 2015). Yet, the visibility that metrics offer for high performers operates as a motivational tool across countries. The formalisation of metrics has contributed to the technical legitimacy of performance measures by providing a way to convey success and to capture research performance in an accurate manner.

According to the Finnish interviewees, the previous systems in which performance was tracked to a lesser degree allowed problems of academic units and departments to be overlooked. In the current PRFS, this is no longer the case. Now, as issues causing low performance are more visible, university management can detect and act on the problems before they become too difficult to handle. This encourages managers to provide the necessary academic leadership to overcome the situation and support researchers in bringing out the best of their ability. Issues related to poor human resource management, weak academic leadership and favouritism in the current system are a call for action. Thus, the PRFS induces action in researchers through pressure to show performance while encouraging managers to provide structures and processes to better support the work of researchers.

Although there are some concerns about the ability of performance measures to capture the relevant aspects of research, performance measurement is generally accepted. This is emphasised particularly in Finland, where the PRFS is seen to be an inseparable part of a modern university. Measuring academic performance generally enjoys high normative legitimacy but suffers from a somewhat lower technical legitimacy. Despite concern over how well the PRFS actually increases the quality of research, most academics perceive the system as constructive and forward-looking. However, the normative legitimacy is strongly coupled with the transparency of the indicators, which – if used fairly and properly – can thwart arbitrary decision-making and thus enhance equity. Academics value the openness and transparency of the PRFS but remain cautious about trusting the administrative managers to uphold expectations of high standards in the use of metrics. The lack of trust (Hansen, et al., 2019) is directed at managers' application of data and concern over whose interests are being served. Therefore, the researchers' critique of the system is less focused on the way data are collected. In the eyes of academics, the legitimacy of the system is coupled with systematic, fair and open application of the performance measures. The normative legitimacy and the controlling function of metrics seems dependent on management upholding their end of the strategic bargain, particularly the academic leadership. Researchers are aware that opposition from academics would pose a threat to leadership power (Bleiklie, Enders, & Lepori, 2015), and appear to position themselves as negotiators rather than as objects of action. The demand for better human resource management also resonates with the development of strategic

management of universities, in which a cultural change towards better performance and competitiveness must include an appreciation of the human capital (Pinheiro & Stensaker, 2014) and management's dependency on the academics as their greatest asset (Musselin, 2007). The Finnish data emphasises that the PRFS is also understood as being an essential tool for university managers to identify and handle internal issues relating to human resource management, which affects the working environment of researchers directly, and to hold academics accountable.

Performance metrics are largely seen as established indicators of research performance and hence technically legitimate. The use of bibliometric indicators is perceived to align well with the logic of academia and academic conventions. However, there is concern that the system does not serve the interests of high-quality research and that they may legitimise increasing the number of publications at the cost of quality. This poses a threat to research integrity and is the main reason for the mistrust of metrics. As such, Finnish researchers' perceptions resonate well with the concerns that the focus of metrics directs attention in ways that can harm the core of academic research through decontextualisation (Dahler-Larsen, 2014).

The most interesting differences between the countries sees the reconstitution of research (Dahler-Larsen, 2014; Woolgar, 1991) as a result of the PRFSs. There are clear examples of this in the form of the importance of the publication outlets (Norway), the language chosen (Denmark), and how sabbaticals are understood as rewards for a job well done (Norway). A similar pattern appears in the Finnish interviews, but the focus differs in that the measurement logic embodied in the PRFS has reconstituted the perception of research activities within universities. The efficiency and measurability of results are now considered to be important aspects of research. Novel ways of collecting and analysing data, such as the publication forum in Finland, have been put in place in ways that not only increase the strength of incentives but also create a new academic authority channel in the form of being selected as a member in the defining working groups. Although new in its set-up, the publication forum represents a professional rather than an entrepreneurial aspect of the academic profession (Siekkinen, 2019) and continues to utilise the collegial structures to uphold research quality.

In conclusion, all the countries studied have adopted versions of PRFSs, and over the course of roughly two decades, they have modified their systems to suit the national context and their role in the changing global working environment. The increasingly competitive environment and the systems put in place to monitor the performance and accountability of academic staff have been internalised locally to varying degrees. Yet, there has been failure in considering properly the potential side effects of institutional lock-in. When researchers make everyday choices strategically to maximise performance according to the PRFSs, the system may instead unintentionally inhibit the dynamic development of practices. Thus, the system which should encourage the search for novelty and high research quality, including

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the high risk – high gain funding for research, may rest too heavily on providing homogenising incentives and decontextualising metrics. This can lead researchers in the opposite direction than was intended and towards certain conventions.

5.2 External funding as a double-edged sword

Analysing the influence of external funding on authority relations in research is complex, not least because many other factors, such as performance-based management systems, can interfere with how researchers perceive the effects. Generally, the analysis shows that external funding has become increasingly important for conducting research and, interestingly, for preserving academic freedom in a university environment of growing managerialism. External funding has changed the authority relations between researchers and managers, but also the standing of research groups and disciplines.

Autonomy refers to a relational measure of authority over research. If researchers report having high autonomy, the authority of others is equally lower. The cross-country comparison clearly shows that external funding has become increasingly important for the conduct of research and has changed the authority over research of different actors. It is increasingly hard to do research without external funding. Budget-maximisation logic has become prevalent amongst managers, which directly affects the researchers' perceptions of their authority over research.

In the survey, researchers were asked whether they had autonomy regarding the research topic, methods and project partners. The results showed that on average, researchers report having fairly high autonomy over research, and while Finland scores the highest on all three aspects, the differences between countries were small. On average, the autonomy level is slightly higher across countries for research methods (average 4.46, Finland 4.57), which could indicate that research funding mostly affects the topics covered (average 4.27, Finland 4.46) and the people who are involved (average 4.23, Finland 4.38). This is consistent with the way external funding usually is managed: restrictions often apply to topics or demands in terms of project partners. Requirements relating to methods are rare. However, somewhat contradictory to the high scores on research autonomy, researchers also report tensions between their academic freedom and manager priorities. In this case also, the variations between countries were quite small.

Researchers adjust the content of their research to some degree to meet the demands of funders or to improve their chances of getting funded. This is particularly salient in the Finnish case, where university strategies contribute to the effect by pointing out areas where more support is available. The research integrity of researchers has not been broken in any of the countries, but Finnish researchers perceive a decline in academic freedom when it comes to how much managerial

strategic priorities are emphasised. In this regard, there is a strong consensus across disciplines and universities that researchers' authority over research has steadily decreased. This development is linked to the rise of external funding and how it is linked to performance-based funding and results-based management. The enhanced focus on requiring external funding is considered problematic if research work is valued first and foremost through the economic output (de Jong, J., & van Drooge, 2016), even if the pursuit of such revenue is focused on securing research excellence. For academic staff, this represents a move from research being at the centre of the university to being moved into a peripheral position. Researchers must now weigh the risks and consider the options for publication and meeting performance requirements more strategically than before.

The researchers' responses reflected changes in the funding structure and its control functions. External demands play a stronger role in university governance (Olsen, 2007), which affects the researchers' work environment. While the value of research excellence has not diminished, it has been complemented with broader dimensions of accountability (Jongbloed, Enders, & Salerno, 2008). Finnish researchers recognise these tensions in their work, and struggle to align the seemingly contradictory pressures.

Another issue in which Finland deviated from the other Nordic countries concerns the way Finnish academic staff consider the acquisition of external competitive funding to represent a double-edged sword. Simultaneously it is a way to secure and risk their freedom: freedom from management decisions on strategic prioritisations, because their work is secured by external funding, yet a risk to freedom through potentially steered funding. According to Finnish interviewees, funders have taken a more active role and are increasingly opening thematically focused calls or setting parameters for research areas through participatory processes. Academic staff consider that funders knowingly limit researchers' authority and the space for curiosity-driven research by directing funding towards particular (often societally relevant) fields. The preconditions for doing research were seen to set boundaries for choosing which research topics are wise and which are not. When requiring external funding becomes an important goal in itself, the content of the research is one of the parameters which the researchers can choose to compromise. Yet, most Finnish informants agreed that a strategic touch and demand for well-planned projects is a positive and inherent mechanism in research because it functions as quality assurance. The responses highlighted the relational aspects of authority and the struggle to integrate opposing demands in their work. The need to acquire external funding and preserve scholarly freedom both resonate with professional values (Bleiklie, Enders, & Lepori, 2015), but in contradictory ways. Researchers are attempting to balance the dimensions of power and interests (Whitley, 2011) in a strategic manner, in order to serve their own complex self-interest (Sabatier, 2005).

Regarding *time*, external funding is increasingly necessary simply to have the time to conduct research. The Finnish interviewees stressed that time frames have become shorter because of external funding. Results are wanted quicker, leading academics to look for new ways of working. Managers contribute to the process of tightening timeframes and the demands for more strategic behaviour from researchers. By using performance management rhetoric, the managers are understood to further stress the managerial logic over that of scholarship, thus creating further tension in the authority relations (Pinheiro, Geschwind, & Aarrevaara, 2014). Time is also coupled with an increase in workloads because researchers are required to allocate more time to writing (winning) funding proposals. Yet, despite feelings of frustration (the drafting of competitive proposals is not only time-consuming, but also highly demanding), researchers also see benefits. Planning a good proposal requires a goal-oriented tapping of their creativity and, in practice, more cooperation with colleagues that can provide valuable input and support. Their critique towards tighter schedules is directed mainly at a need to have time to think and discuss properly. In other words, as the role of external funding has risen, so too has a new form of collegiality that can balance competition with support. This seems to suggest that a perceived external demand increases competition among academics but, somewhat surprisingly, is also facilitating the development of a new kind of collegiality, removed from the traditional format.

A similar effect arises regarding *people*, the rise of external funding has generally made cooperation between researchers necessary. Most national funders demand collaboration in the project funding they offer. To obtain international funding, such as the EU framework programme, international cooperation is often mandatory. Often this is seen as a natural development which aligns with how academic norms have developed. In the Finnish case, influence over partnerships is limited to general requirements for collaboration across disciplines or professional groups (e.g. with non-academic societal stakeholders) and managers' authority is restricted to recruitment practices. They have little say in who gets involved in projects or with whom researchers form partnerships. Managers exercise authority over which kinds of external funding are being applied for by hiring academic staff they believe will get external funding in areas that managers prioritise. A strategic logic of appropriateness seems to guide action, with researchers applying issues of recognition, identity as well as rules of action on how to achieve set goals (Christensen & Lægreid, 2007).

The ways external funding affects the authority over research for researchers is more systemic than episodic in nature. Instead of episodic power, which would entail direct instruction from managers, the increasing amount of external funding incentivises action in more subtle ways through systemic power. The systemic nature of the power exercised by research funders may be one of the explanations for why the survey revealed relatively high research freedom while researchers reported great freedom in research, when asked directly. Systemic power works in ways that are felt

like intrusions into a researcher's agency. However, researchers are not defenceless against systemic powers. Across the cases, a range of 'defence mechanisms' was identified. The traditional Mertonian values (Merton, 1973) of scientific integrity are a systemic power that shields researchers from an excessive surrender to the incentives presented by funding opportunities. Secondly, researchers use a strategy of choosing to apply for funding from programmes that fit their research agenda. This aligns with the conclusion of Whitley and Gläser (2014) that high funding flexibility and diversity would lead to more protected space for researchers to conduct research.

External funding being concentrated on specific units or researchers – the Matthew effect (Kwiek, 2016; Langfeldt, et al., 2015) – cuts across all themes of *content*, *time* and *people*. This affects the authority over research for both managers and researchers and seems to reinforce existing patterns particularly in the Finnish and Norwegian cases: The talented and well-funded researchers receive even more funding, which polarises researchers by providing more authority over research than others. A group of very well-funded researchers is less dependent on being in the strategically prioritised fields of the university while another of (externally) less well-funded researchers experience a more precarious reality (Kwiek, 2016; Langfeldt, et al., 2015). This division becomes even more pronounced, when external funding success is also connected to career advancements through the performance measurement systems.

5.3 Co-creation to enhance sustainable knowledge co-production

Co-creation that serves a purpose in a university setting is a crosscutting operational mode, which facilitates learning individually as well as between professional groups. Dialogue holds a *core* position in the learning that constitutes the essence of co-creation (Regeer & Bunders, 2009). The data show that in bridging co-creation the externalisation and combination phases dominate, i.e. the more social levels, where also the sharing of experience (skills) happens. It is also learning process, in which explicit knowledge is internalised at a personal level. These characteristics are highlighted in the data through four aspects.

First, dialogue is particularly essential in the enabling of several perspectives, building of trust between participants and reciprocity of sharing, which produce the central building blocks of the externalisation and combination phases of the SECI model. A dialogical approach centres on building understanding about others' views and on constructing meaning to the issues at hand. Instead of aiming for a debate-like approach of proving oneself right and another to be wrong, dialogue focuses on enhancing discretion across boundaries, alleviating value contradictions in order to increase understanding of different perspectives on the whole (Bohm,

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1996). Creating dialogue in researcher-company co-creation leaned strongly on the facilitator, who acted as a knowledge broker. As such, the facilitator performed translation tasks (Hakkarainen, Palonen, Paavola, & Lehtinen, 2004) in micro-format and mediated the meeting of worlds. Striving for Strober's 'believing game' (Strober M. , 2010) was a premise for interaction in the discussions. The discussions followed the pattern of interdisciplinarity with trust functioning as a prerequisite for productive conversations, but this required an intermediary. The facilitator functioned as a guarantor of equality between participants and ensured that participants could trust this fairness of process (Norström, Cvitanovic, & Löf, 2020). It precedes trust between participants which, as noted by Valkenburg et al. (2019), reflects the challenge of reconciling different types of knowledges and allowing all participants access to the *governance process* of knowledge production.

During the discussion around problems, most participants realised that they could only provide a partial view of an issue and other parts beyond their expertise were needed to find feasible solutions. This reflected Bohm's (1996) idea that people become aware of their cognitive models in (dialogic) interaction with others. Such patterns of realisation highlighted the creative nature of the discussion. What took the form of throwing ideas into discussion at the beginning developed into a focus on diversifying the idea categories, not the quantity of ideas (Strober M. , 2010). This allowed participants to generate more flexible and original ideas and solutions, rather than only lists. Furthermore, utilising creativity pushed participants to understand the other's habits of mind (Strober M. , 2010), that is the assumptions and methods of evaluating and reporting 'truth', or tacit knowledge as it appears in the socialisation-externalisation interface of the SECI model.

Secondly, co-creation revealed untrue assumptions that inhibit the sharing of knowledge, and can produce inspirational new pathways. In contrast to what was expected, companies emphasised the role that researchers' academic knowledge plays in challenging their usual frames of thought: companies were not after 'quick-fixes' or consultancy on everyday problems, but instead sought partnerships with researchers with a goal of finding solution paths to complex wicked problems. What they desired from collaboration with researchers was deeper discussion on issues they found important in the longer term. For researchers, co-creation was a way of showing they are willing to face the claims of responsibility not only to serve the needs of others but also those of their own. Against their expectations, researchers found that discussions with companies provided a chance to focus on thinking, joint reflection, and finding new dimensions to their research work. These revelations epitomised a clash of ontologies in a manner that resonates with the externalisation phase of the SECI model, particularly how open dialogue can enhance inductive reasoning in participants and hence crystallise tacit knowledge and underlying assumptions in a constructive manner (Nonaka, Konno, & Toyama, 2001). An asymmetry of knowledge seemed to be something all participants recognised but

there was an expectation on both sides that this imbalance would cause a power struggle. When the asymmetry proved manageable, non-threatening and potentially a source of innovative ideas, the discussions could continue. Recognising and respecting the differences and limits of ontologies built the basis for equal dialogue (Valkenburg, Mamidipudi, Pandey, & Bijker, 2019).

Both companies and researchers communicated visions of wanting to serve a purpose. While talk at the beginning constituted separate utterings of their own thoughts and based strongly on preconceived assumptions or debate-like provocations, the visions began to converge through discussions that the facilitator structured. Deeper dialogue emerged when the participants felt comfortable verbalising their underlying hesitations and confusions. These became visible through discussions focused on substance but structured through tensions between participants' views or avenues for finding solutions. This made their value structures more visible, allowing their tacit knowledge to become understandable to others (Nonaka, Konno, & Toyama, 2001) and as such, helped advance the process. Participants started to reflect more critically, which included questioning even the basis of the experimentation and the terminology of co-creation/-development/- design itself. While this made some uneasy, allowing such constructive critique of the set-up of the experimentation increased trust among the participants and provided a much-needed chance to vent concerns alongside positive expectations. In questioning the role and meaning of co-creation per se, the critical researchers claimed an epistemological agency by demanding that their knowledge position also be deemed legitimate (Valkenburg, Mamidipudi, Pandey, & Bijker, 2019).

The working logic of co-creation showed a linkage between such clashes and collective learning. 'Eureka' moments occurred systematically in response to conflicts in the discussions, which made 'the believing game' tricky to uphold at times. Often these originated between researcher and company representatives, but also among researchers who debated the meaning of a concept or an academic work habit. The clashes exacerbated differences in underlying value and ideal structures. The most critically-minded researchers could frustrate others but managed to push the group to the biggest breakthroughs. By managing to work across the professional and knowledge boundaries the participants learned to interpret the context-specific aspects of transferring knowledge, but simultaneously were faced with making their differences explicit (Carlile P. , 2002).

Thirdly, the co-creation process crystallised the importance of distinguishing between exploration and exploitation as a means to balance portfolios (Strober M. , 2010; March, 1991). This arose in the efforts to find shared visions. Exploitation is action that utilises existing knowledge, while exploration takes people outside that which is already known to look for something new. In the discussions, this effort meant that participants needed to adopt the perspectives of others when looking at their own perceptions. Throwing ideas around led the participants to realise they

were not as far from each other in their thinking as they thought. They began to face the core assumptions behind their interests, visions and fears.

The second unexpected issue appeared in relation to the use of concepts and reflects the meeting of epistemic communities (Haas, 1992). To support the building of a shared language the project team had fallen victim to generally-held notions of companies not being interested in hearing conceptual talk. Somewhat surprisingly, companies found the avoidance of concepts unnecessary in the context of discussing complex phenomena. They requested more specific and pointed use of words, without reverting to professional jargon that would exclude the company participants. In contrast, a second pattern emerged in relation to discussing internal issues of relevance only to similar actors. On a few occasions, researchers debated the rightfulness of the responsibility agenda and the push for more interactive working methods in a manner that bypassed the company participants. This had the same effect as using professional jargon but in a more explicit sense. However, instead of pushing them apart, the wish to use proper concepts seemed to bind the participants together, as it highlighted a shared need to bring analytical perspective into the discussions.

Finally, researchers' expectations of and responses to co-creation varied and were tied to the role of research integrity. The facilitator played an essential role of safeguarding the research ethical principles in researcher-company co-creation. This resonates with the growing evidence that pluralistic processes such as co-creation, can be improved by knowledge brokers who possess broad knowledge and skills across several domains. They are able to enhance learning and trust, aptly also labelled 'epistemediators' (Norström, Cvitanovic, & Löf, 2020). A visible understanding about the meaning and importance of research integrity and researchers' virtues (Banks, 2018) are necessary for the building of the kind of trust that bridging co-creation rests on. These virtues include not only application of reliable methods of research but being curious and critically minded, conscientious, open, honest, and willing to listen to other researchers.

Researchers' personal epistemic responsibility is central in research and knowledge creation (Code, 1987), and seems to extend to co-creation with non-academic partners. The need for safeguards was shown in some of the research participants being concerned about losing their integrity and academic freedom, becoming mere commissioned researchers in a master-servant setting, or feeling unappreciated as research professionals. However, in contrast, many also realised their knowledge could be used for other than academic purposes and that in a changing working environment it was up to them to decide how they wanted to tackle the situation. Most research participants had an interest in broadening their skillset, and co-creation provided new employment opportunities. However, alongside this pragmatic viewpoint, researchers also considered co-creation to support their 'purely' scientific endeavours as interaction with non-academics challenged their mindsets and their

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scientific thinking. It seems that in allowing themselves to be open to the co-creative knowledge production process, researchers found new meaning and value in their own knowledge and skills. As such, new avenues of thought and action became visible to them, highlighting potential hybrid value they could create alongside the purely academic (Pekkola, et al., 2020).

In conclusion, by playing 'the believing game', participants in the co-creation process managed to highlight deficiencies in existing operating methods and in alleged truths. This realisation led to re-evaluations of the problems or finding new, unanticipated solutions as the participants began to converge their thinking in the combination phase. In the combination phase the participants played 'the believing game', as noted by Strober (2010) and Elbow (1973), to the fullest as they tried to understand the interpretations that were foreign to themselves but implied opportunities to succeed.

5.4 Societal interaction plans for sustainable impact

The Strategic Research Council introduced a new approach, which constitutes a shift in the development from a linear form of knowledge dissemination and communication to active and long-term interaction focused on knowledge production (Owen, Macnaghten, & Stilgoe, 2012). An important element of societally interactive research is continuous collaboration between those who produce new knowledge and those who benefit from it. The study showed that the SRC projects not only enhance co-creation but generate *favourable conditions* in which collaborating partners are able to utilise new types of joint forum and open data. They encourage exchanges between researchers and stakeholders in order to co-produce new knowledge (Spaapen & van Drooge, 2011). From the data, four identifiable strategies appear in the ways that research groups organise their actions in their efforts to utilise societal interaction.

The first main finding relates to the working methods of projects. The partners in different combinations had previous experience of close cooperation across professional borders. As a result, cooperation with societal partners was considered to be a self-evident part of the research project. Similarly, research groups viewed the challenging of their familiar working methods as a positive push towards integrating knowledge and skills to find solutions to grand societal challenges. They used a holistic and goal-oriented approach to interaction. Project leadership did not expect all researchers to adopt interactive working methods, but ensured that those in crucial tasks, such as work package leaders, were both willing and able to utilise them. Furthermore, internal on-the-job training was used to strengthen interaction skills and share knowledge of how to use them. The application of reflexive capacities was not only focused on the substantial issues but also the more practical working habits,

such as time-management skills and tacit processual knowledge regarding working practices and procedures of other types of actors. The research groups' working logic towards increasing interaction and stakeholder participation reflects their interest to enhance dynamism in the way they govern science (Muhonen, Benneworth, & Olmos-Penuela, 2019; Trencher, et al., 2014).

The research groups recognised the limits of their own expertise and sought to complement it with other perspectives. Hence, the consortia mixed multiple types of expertise from various professional backgrounds, but relied on their own innovativeness, and ability to adjust and pool skills to handle interaction. As the funding instrument was entirely new, these consortia had both the freedom and pressure to act as pioneers. Their working model follows the logic of open innovation and the use of dialogical methods that spurs contextual learning (Spaapen & van Drooge, 2011; Alhanen, 2013). The research groups shared an interest in influencing development of their field through practical action, *in addition* to having an impact through purely scholarly work. Furthermore, since the research groups had won the projects in a highly competitive context, they appear to consciously apply methods to increase their competitive advantage also during the project by mixing multiple expertise. This is done in order to form a broader absorptive capacity to manage the knowledge production process (Kazadi, Lievens, & Mahr, 2016). The logic is highlighted in the heavy emphasis on balancing the needs of multiple partners – both researchers and non-academic ones.

The second main finding relates to how the capacities of dynamic governance appear in research groups. These form two wholes rather than four separate types. First, reflexivity and trans-disciplinarity are strongly coupled, and cohere around solution-based research. Reflexivity is viewed as negotiation that takes place in the processes of knowledge creation and circulation (Delanty, 2001; Brown & Duguid, 2001). A vision of co-design as a working method and a dialogic governance of the knowledge production process (Stilgoe, Lock, & Wilsdon, 2014) is a key defining element in how reflexivity is manifested in the projects: research groups perceive the knowledge exchange to be a type of trade of 'field' data and analysis. The coupling between reflexivity and trans-disciplinarity is further indicated by the diverse backgrounds of many of the researchers. Several had multi-sectoral experience and had not followed a clear academic career path. This allowed them to apply different working methods and networks naturally and eased the interpretation of others.

Second, anticipation and ability to envision continuity is needed to find persuading arguments with which to convince partners (including other researchers) of the continued benefits of close collaboration. Yet, the analysis shows that continuity leans heavily on upholding mutual exchange. While the research groups felt expectations of creating societal impact to fall mainly on them, they directed similar expectations back on their societal partners, be they policy makers, business actors or civil society organisations. The meaning of reciprocity is highlighted in

how research groups understand the core assumption of equal partnership. This is linked to an overarching additional capacity that the research groups identified as a necessity for constructive societal interaction: attitude. Research groups stress the importance of an open and confident attitude as a cornerstone for being able to access their own creativity and knowledge, and for encouraging their partners to do the same. However, this is seen to include a sound protection of their own interests to have the knowledge used by the societal partners.

The way that consortia formed their working approaches and defined research questions constitutes the third main finding. The research groups utilised network society principles in their working and interaction practices (Hakkarainen, Palonen, Paavola, & Lehtinen, 2004). Rather than proceeding through the traditional academic way, they took a more straight-forward approach and asked the partners directly for their needs, gaps in knowledge and ideas. Societal interaction came into the planning at such an early stage that research and interaction became strongly integrated and inseparable. Despite the societally oriented approach, the research groups also applied science advocacy-based methods to interaction. The interviewees refer to this approach as 'drizzling'. It takes place throughout the lifespan of the project, rather than at points in the process only. It epitomises a move away from phase-based thinking, in which activities with partners are timed to specific periods in the project. The carrying idea of 'drizzling' is that knowledge is created and used through the interactive working methods of the project in small parts. It resembles a leaking tap: absorbable amounts of knowledge are dropped often, as a continuous flow and in a way that links to the working realities of the partners. 'Drizzling' represents an opportunity to implement interventions in a living lab type of environment, which allows for continuous adjustments. As such, the research groups attempted to overcome the knowledge asymmetries, which existed between expert partners that each held domain specific knowledge (Carlile P. , 2004). But this was also a planned advocacy strategy (Sabatier, 2005) with identified objectives to push for change in how societal partners understand and use verifiable evidence in their work.

The capacities of dynamic governance were implemented through networks, and hence the societal interaction plans (SIP) designs appear as ecosystem platforms, rather than traditional project management models. As such, the consortia seemed to aim at societal transformation (Schneider, Buser, Keller, & Tribaldos, 2019), and going beyond the parameters of research. In most cases the SIP implementation also served as the source for the collection of complex data. The SIPs are part of the research design but with an approach where societal partners are active subjects in the process, instead of being treated as objects of study. This close collaborative relationship based on mutual gain crystallises in the term 'stakeholder'. Instead of being viewed as an interest group outside the consortium, the societal partners and the research groups are all seen as involved actors who have a valid 'stake' in the

project, its methods, findings and applications. In other words, the knowledge is created in context (Karvonen 2014) and is mutually owned. The societal interaction practices are built to a high degree on the logic and goal of utilising contextual learning (Kazadi, Lievens, & Mahr, 2016; Spaapen & van Drooge, 2011), in which societal interaction is integrated into the research, rather than being a separate part of activities. This core notion follows the logic of open innovation, which stresses the intentional inflows and outflows of knowledge across the borders of organisations and which aims to leverage external sources of knowledge for a particular goal (Chesbrough & Bogers, 2014). The SRC research groups embrace the limits of their expertise and perspective and reach out to societal partners in order to not only engage them but to truly *exchange* knowledge, skills and perspectives in order to produce new ones. As such, the approach rests on a practical understanding of relational knowing (Österlund & Carlile, 2003)

Societal interaction plans committed knowledge producers and utilisers in a way that implemented transparency and accountability in a new policy context (Olssen, 2016; deBoer, et al., 2015). Instead of emphasising the importance of academic performance through indicators, the research groups argued for the importance of interaction in the knowledge production process. The emerging relational practices constitute the fourth main finding. A differentiating issue between the projects relates to whether interaction is considered to be an inherent part of the project or an external addition. This is strongly coupled with who are counted as members of the core consortium and those who are mere target groups. Forming a shared understanding is emphasised in the projects, and the term stakeholder is used to stress that they all have a *stake* in the project, including the researchers.

This change should not be seen merely as a change in policy, but more broadly as a change in the legitimacy of the research community for society. Once legitimacy of the research community becomes a key factor, its verification forms an essential part of the research process and is defined in the interaction between scholars and societal stakeholders. The analysis shows that the design of interaction is context-specific, and hence, no single model for societal interaction is present. Instead, creativity and flexibility are core defining elements in them. The 13 approaches that emerged are already characterised by the commitment of key actors and project beneficiaries at the planning stage. When all actors had the opportunity to influence project objectives and interaction practices, the operational agenda and the results of the studies became inseparable. Societal interaction is primarily a concept defined by key actors, which includes both the core research group and the closest societal partners. For this reason, the societal interaction plan determines the process and goals for societal impact, not only the activities. In conclusion, the requirement to include societal interaction plans in the research proposal and adding sizeable financial incentives to its implementation, has proven to be a success.

6.   Discussion and conclusions

The focus of analysis has been on the perceptions of researchers at Finnish universities about the funding and performance system which places multiple pressures on them, and on how they adjust their working methods in a changing environment demanding more societally interactive action and impact. The relationship between researchers and universities is complex, and tensions from several directions are felt by not only researchers but also academic managers and administrators. (Pinheiro, Geschwind, & Aarrevaara, 2014) Changes to science policy and the structures of universities have affected all these core professional groups of universities and required changes at multiple levels of the system. Researchers as academic professionals reflect changes in their working environment (Musselin, 2007). Hence, studying how they make sense of and respond to new challenges, which place yet another layer of pressure and expectations on them, provides significant knowledge on both their sources of adaptability but also on what kinds of support mechanisms researchers require in their work.

The empirical data used in the dissertation were mainly qualitative, comprising semi-structured thematic interviews and observation in a structured experimentation. The analysis shows 1) how performance management systems and changes in funding structures have affected the ways researchers perceive their work, role and authority in Finnish universities; and 2) what mechanisms and capacities researchers utilise to identify more societally interactive working methods that align with research integrity requirements. In doing that, the analysis demonstrates that university-based researchers can adjust to changing circumstances in a constructive, forward-looking manner. They are able to identify coping mechanisms which allow them to pursue their academic goals. They can do this despite the contradictory signals that their institutional setting provides for them.

It is argued that in response to the changes in the funding environment and increasing pressures in their working conditions, Finnish university researchers are taking control of the situation to enhance stability and renewal of their work. Rather than succumbing to circumstances that are managed at macro or institutional levels, researchers are applying their academic expertise to learning, creativity and critical analysis to adjust their own work environment. This reflects a new public governance (NPG) approach and a more complex mixing of accountability that extends beyond the formal structures. It allows researchers to respect codes of ethical research conduct while extending collaboration to societal partners. There continues to be much concern over the state of academic freedom and the integrity of research in

the midst of continuous reforms (Altbach, 2001; Berman, 2012) and increasing discussions over the need to bring universities closer to the surrounding societies (Musselin, 2007; Delanty, 2001; Clark, 1998). Universities as institutions have been shown to be resilient against changing governance arrangements and researchers in this traditionally bottom-heavy system managed to cope with the changes with rather small adjustments until the early 1990s. (Pulkkinen K. , et al., 2019; Bleiklie, Enders, & Lepori, 2017; Pietilä, 2018) However, the past few decades have put increasing pressure on researchers as the performance-based management and funding systems have been introduced, and the role of external funding has increased (Pinheiro, Geschwind, & Aarrevaara, 2014). Simultaneously, researchers have increasingly felt the need to guard their professional values and academic freedom (Siekkinen, Pekkola, & Carvalho, 2019).

In this study, researchers were found to perceive the new situation as an incoherent system in which they are faced with a need to show evidence of accountability to academic leadership, senior management of universities as well as the taxpayers who provide the public funding for their work. Yet, the analysis also suggests that despite the mounting pressures and feelings of frustration, researchers have learnt to not only adapt but also to utilise the creativity inherent in research work to build a transformant new modus operandi. This is characterised by a quest for dynamic new capabilities that can integrate the standards of scholarly endeavour and the need for adaptable academic knowledge in society. Rather than merely adjusting to circumstances beyond their control, researchers are using their skills for critical analysis and ability to construct reality through understanding, to mould existing circumstances to fit their needs better. This interpretation is based on four main findings arising from the analysis.

First, although researchers protect their discipline or academic profession and its practices, they also master the art of learning. This ability to interpret information of different kinds allows researchers to identify gaps in their own knowledge and skillsets. Hence, faced by pressures to interact more actively with societal partners, the researchers who are intuitively intrigued by new funding opportunities can recognise where potential partnerships could be utilised to serve both scholarly and societal needs. These researchers direct their learning abilities to develop new dynamic capabilities (Kazadi, Lievens, & Mahr, 2016) that can cross the binary divide between professional and managerial demands and values (Whitchurch, 2008). The process of defining the public value of research and professional service is affected by the interplay between different levels of value definition, from the micro to the macro level (Pekkola, et al., 2020). Researchers are affected by this nestedness but are also aware that the core of the value of universities – the human capital and scientific knowledge – is held by the researchers. They embrace hybridity as the co-existence of competing logics, whether they are professional-managerial or professional-societal (Noordegraaf, 2015). They seem to be restructuring the

apparent contradictions in order to transform their professional work to controlled, managed or even organising professionalism which exceeds hybridity (Pekkola, et al., 2020). As such, they are utilising the interactions with societal partners to learn in a contextual setting, with the intention of strengthening their own value creation process.

Secondly, researchers recognise that while their knowledge is valuable and has specific significance for societal development, it can only provide one approach to the wicked problems they are trying to tackle. By engaging in co-creative interaction with other societal experts they can connect with other types of knowledge and understandings that otherwise would be beyond their reach. I argue that in engaging in such interaction and integrating it into the knowledge production process, researchers cross knowledge boundaries and apply practice-based learning tools (Klev & Levin, 2012). They adjust the governance of knowledge production and evidence. The processes of interaction between researchers and their societal partners are inherently relational and take place in a knowledge production setting. They reflect professional identities and ideals, which affect the ways in which learning takes place in communities of practice, in this case universities (Österlund & Carlile, 2003). In a relational sense, interaction is not merely facilitation of bodies of knowledge but rather, and in particular, an elongated exercise of crossing boundaries while upholding a shared sense that knowledge matters to all involved parties – just in different ways.

The relational character of interaction is highlighted in researchers' understanding of their knowledge as an investment that is created over time and requires effort and resources. They bring this investment into the interaction with others. Exchanging it or acquiring new kinds of knowledge is associated with costs that increase as the difference between the amount and type of knowledge grows between actors (Carlile P. , 2004; Carlile P. , 2002). This means that researchers need to put in more effort to share and assess the knowledge of societal partners – but also the chance that the interaction may bring them equally big returns. While the realisation may cause some researchers to avoid a situation they perceive as uncomfortable, those intrigued by societally engaged research practices seem to be driven by similar reasons that lie behind the constitutive logic of free inquiry and search for truth (Olsen, 2007). However, this includes a curiosity for the knowledge, understandings and perspectives of other societal actors. These researchers seem to approach societal interaction as a channel to broaden their understanding of issues they find important and improve their possibilities to influence societal development.

The effort to cross knowledge boundaries entails costs of not only time, resources and prioritisations but also of tolerating uncertainty. By co-producing knowledge with non-academic societal partners, researchers move into a liminal space where the asymmetry of knowledge is constantly present. It forces all participants – researchers and societal partners alike – to face new concepts, meanings and habits

of thought, but simultaneously provides a chance to transition from familiar ways of seeing things to something new, yet undefined (Articles III and IV) (Land, Rattray, & Vivian, 2014). In essence, the liminal space of societal interaction both transforms and is transformed by the participants taking part in the knowledge co-production process. The liminal character of societal interaction and co-creation practices that are integrated into research suspends the usual order of things for all participants and replaces them with new rites and working methods developed jointly during the interaction (Czarniawska & Mazza, 2003). Interestingly, researchers who are intrigued by societal interaction of research per se approach the liminality as a dimension of research and learning, as new avenues for tracing interesting data or angles to research questions they had previously not found. The interaction also provides a chance to view university managerial and strategic developments from another angle, giving a necessary fresh perspective to complex needs and developments of broader society.

Thirdly, in crossing knowledge boundaries, researchers are stretching academic power relationships and as such adjusting the principle-agent relationship that exists between the state funder and the universities. In doing this, they are implicitly pushing to transform the core of power relations, between the macro and institutional level control bodies and the micro level. Despite concern for the managerial turn and that changes in funding structures could transform the university into a service enterprise (Olssen, 2016) or an entrepreneurial institution (Clark, 1998), the change in environmental conditions seems to have pushed researchers to develop new strategic skills. In increasing their external funding, first and foremost they seem to create more freedom to do their research and in effect, create more space between them and the principle state funder and/or the strategic management of the university. In addition, by engaging in close interaction with societal partners, they are creating new career opportunities for themselves and stimulating new ideas worthy of broader societal attention. (Article III) This contributes to reducing further the ability of managers to control their behaviour (Whitley & Gläser, 2014). Researchers seem to be using societal interaction and external funding to increase authority over their work while relatively reducing that of managers.

The legitimacy aspects that arise ultimately guide researchers to seek ways to transcend the contradictory demands in an effort to manage their work situation. For academics, upholding research integrity is a key driver as they mould their ways to manage the whole and try to interpret the demands. Despite the seeming contradictions, they are able to identify societal interaction tools that respect academic freedom (Olsen, 2007), while external competitive funding provides them with relatively more freedom from university strategies. In this complex situation, accountability appears in a three-fold manner. Firstly, as a new public management-based performance measurement system stressing effectiveness and efficiency towards the university institution and its core funders. Secondly, as a reflection of a new

public governance-based approach which takes into account the societal interaction aspects and broader interests. (Bleiklie, Enders, Lepori, & Musselin, 2011). Thirdly, as an inherently academic quality assurance system, in which research integrity and codes of ethical research conduct are the driving force. Interestingly, despite the performance management demands and changing in operating environments, research integrity continues to be the defining one on which the success or failure of the other two depend.

While researchers accept the NPM-based reforms and performance measurement systems to a reasonable degree and see positive effects in increased transparency, they continue to struggle with legitimacy issues. According to the results of this dissertation, the NPM-based reforms have emphasised competition in an inefficient manner, as they have incentivised weakened rather than strengthened renewal and innovativeness of practices. The renewed and societally innovative practices appear to be attributed more to researchers' ability and willingness to acknowledge the different types of values that are present in the contemporary university system. They emphasise dialogue and alignment of these differing values in a way more akin to new public governance, and seem to use a competitive collaboration approach.

This may be an unintended consequence of the reforms but entails a turn in building the capacities of researchers. In making their tacit and explicit knowledge available and learning to take hold of those of their societal partners, researchers are strengthening their knowledge co-management and co-development skills. Furthermore, they are building capacities to recognise and manage the conflicts that the meeting of different cognitive and ontological worlds entails (Valkenburg, Mamidipudi, Pandey, & Bijker, 2019). Through gaining such skills and access to new contexts, their professional identities (ways of thinking, language) and understandings of their roles as researchers in society are affected (Land, Rattray, & Vivian, 2014). They are likely to transfer and refine the capacities within research groups and further within the organisation, thus implicitly promoting responsible research and innovation practices. Generally, governance rules are controlled by funders. The RRI approach instead brings to this a sustainability aspect that functions as a sort of revolution of accountability, with societally responsible values at its core: participatory and responsive practices, diversity of perspectives, transparency and anticipation. It entails an inherent focus on the process instead of the result or outcome. The capacity for reflective and reflexive thinking inherent in researchers' professional identities provides a basis for tolerating the uncomfortable understanding of incompleteness of their knowledge. Yet, this same attitude of perseverance is what supports researchers' quest to improve their knowledge base constantly and ensure that they have enough freedom to do this despite changes in managerial and funding structures.

Finally, a major driver for researchers to make strategic decisions and prioritise their work and methods lies in performance management. Despite managers and

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funders having little interest in accessing the core of research, their influence and communication on performance management is perceived as pressure by researchers. Yet rather than succumbing to the pressures, researchers are learning to play the game and are building the necessary capacity to strategise for their own benefit. (Article II). While performance management was intended to make academic work more effective and accountable, the university organisations also include the ways people in the organisation interpret and categorise their everyday realities. Their sensemaking processes constitute a major driver of action (Weick K. , 1995). In an unclear situation in which contradictory pressures cause confusion, researchers use these sensemaking abilities to guide their action. Instead of encouraging researchers to search for innovative and societally more relevant approaches, the managerial reforms seem to guide researchers to conform by playing it safe and following conventions that are built into the performance management systems. The drivers of innovative solutions are derived from elsewhere.

The current system provides researchers with strong drivers to choose tasks that produce the type of results that are measured and counted in the system, hence strengthening their chances of future academic work. As a result, researchers have too little time to think and to collectively reflect with academic colleagues. Time is limited and incentives push to make this as productive as possible. Yet, new societally interactive research funding provides a channel to utilise and develop a methodology and practices that particularly require the tapping of tacit knowledge, opening of logic and collective pondering. In other words, societal interaction practices provide a chance to get time for the missing parts of academic work: to reflect and think without constant pressure to produce and appreciation for the ability to analyse in trustworthy manner. This contradiction raises puzzling questions about the legitimacy of the performance management system. If the system guides researchers to resort to "safe" and even stagnating practices that raise effectiveness indicators, instead of renewal, the actionability of the indicators is called into question, particularly in relation to the long-term goals of universities. Similarly, a performance management system that indirectly incentivises researchers to seek funding that gives more freedom from university strategies, the legitimacy of the indicators is counter-productive in the light of guiding behaviour in the long-term.

Researchers' means of managing the contradicting pressures is a mixture of reactive and proactive responses. Some seek possible reactive pathways while struggling with confusion and trying to make sense of demands they feel are at least partly beyond their control. A potentially resulting policy alienation characterises a survival tactic, rather than an active strategy. Yet, it reflects the complexities of the principle-agent relationship where researchers are selective in complying with changes they deem to be potential threats to their academic freedom (de Jong, Smit, & van Drooge, 2016). While there are some indications of such stagnation-driven responses, they are not particularly dominant. The policy convergence processes that built

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pressures to increase societal interaction of researchers (Stilgoe, Lock, & Wilsdon, 2014) is changing the discourse, rules and practices as they are adapted to local levels. Ultimately, they are leading to behavioural changes in research communities (Moisio, 2018), but not all of these are leading to more societal interaction. The push factors originating from the macro levels are causing feelings of confusion more strongly as researchers struggle to balance the pressures in a manner that helps them identify scholarly functional and inspiring future career paths. In most cases they can identify coping strategies which help them govern their own academic work through the structural and cultural changes at a manageable pace.

In contrast to the reactive responses, researchers are using multiple proactive strategies as responses to pull factors originating from the broader societal context. These originate only partly from the macro and institutional pressures. Researchers show capacities to combine the ability to identify societal developments, synergetic benefits of mixing different types of knowledge and the needs of societal partners. However, these management strategies do not follow a master-servant relationship in which researchers would provide a service to non-academic clients. Societal stakeholders' interests are complicated and often contradictory, which in a situation of decreasing block funding and increasing external funding is creating highly complex governance, and ultimately ever more difficult prioritisations for university management (Benneworth & Jongbloed, 2010). The reconciliation of this puzzle has been given relatively little attention and efforts have been directed to developing research services of different sorts, re-structuring of departments and units. New working methods, such as co-creation, have been marketed with external arguments like pressure to increase revenue or provide knowledge support for companies' product development. Yet, they have failed to tackle researchers' practical need for functional tools to manage the desired closer collaborative relations, and the inherent contradiction between expectations of societal interaction and the need to protect the intellectual property rights of researchers. The needs academics have about leadership stem from a perceived gap between performance management demands and their legitimacy in the eyes of the academic staff. When the gap is not addressed or the needs are ignored, academics seek solutions elsewhere. This risks de-legitimising the performance management further. To balance the situation, researchers are building societal interactive methods that function in a partnership-like equal setting, rather than a consultancy-like master-servant relationship. They appear to use new forms of collaboration to manage the growing competition better.

While the new services have provided much-appreciated support for researchers, these have not managed to provide enough support to manage the whole. Yet, or perhaps because of this, the effects of the pull factors appear strong. In crossing knowledge boundaries and integrating societal interaction with their research, researchers are building capacity to influence other processes. Their knowledge advocacy efforts are directed at influencing societal development through new

knowledge in the everyday partnerships across professions. While engaging in such efforts, in addition to the scholarly benefits, researchers are also strengthening their capacity to affect researchers' working conditions in universities by broadening their funding base and highlighting the broad relevance of their work. As such, by including relationship management in their scholarly work, researchers are creating potentially far-reaching consequences for not only their income streams and scientific careers, but also academic identities and working cultures. These structured relations may potentially introduce Mertonian values and public good characteristics into the discourses with external stakeholders (Brorström, Feldmann, & Kaulio, 2019).

On the whole, academics have accepted the performance management system, but criticised it for placing too much emphasis on quantity over quality. Furthermore, they have called for a more balanced approach, which includes relative weight for the societal interaction activities that are increasingly required as part of academic work. (Dahler-Larsen, 2014; Jongbloed, Enders, & Salerno, 2008) Does the normative and result-oriented demand to be more entrepreneurial and open to society imply that researchers seek legitimacy for the actions from university management? Or could they be interpreted to act as a result of outside pressure? The data of this dissertation suggest that researchers apply sim9lar drivers in curiosity-driven research, combined with the precariousness of academic work, which encourages researchers to seek new ways of working and collaborating with societal partners. The performance management systems are an inherent part of contemporary universities, but they are not the sole driver of change. Quite the contrary, the data show that the incentives most valued by academics continue to be essentially academic in nature and reflect the significance of their peers, students and the system that upholds research integrity. However, they are complemented by new opportunities that can provide novel insight to increasingly complex phenomena, intriguing data and more diverse funding and career prospects. The existence of differing normative demands – the entrepreneurial and societally interactive versus the traditional academic – are not automatically deemed contradictory. Rather, the loosely-coupled (Weick K. , 1976; Maassen & Stensaker, 2019) nature of universities allows researchers to seek ways to interact with societal stakeholders in an effort to define the rules of engagement, based on their academic needs and demands for research integrity. The ambiguity of accountability and legitimacy relations appears to entail a chance to uphold academic freedom in new ways.

In conclusion, this dissertation underscores that researchers can shape their working methods in a changing environment. In realising the dimensions of their professional autonomy, they are also able to influence the development of their working environment by utilising and moulding the ways in which research communities are structured. Despite working under multiple pressures, they can harness their creativity to manage this complexity in their environment, although not without stress and feelings of frustration. This resilience (Pinheiro, Geschwind,

Kekäle, & Sörensen, 2019) underscores the adaptability of researchers in a changing environment. They manage both external and internal pressures by searching for new collaborative methods both within the academic communities as well as with external partners. In a university setting, the development of such adaptive capacities and hybrid abilities (Pekkola, et al., 2020) may also cause internal ruptures if a powerful academic actor with social capital utilises common knowledge to constrain the novel practices, which other academic colleagues are exploring (Carlile P. , 2004). Resilience helps researchers' endeavour to exploit existing resources and competencies to search for innovative alternatives (Pinheiro, Geschwind, Kekäle, & Sörensen, 2019) but it entails a need to acknowledge the potential conflicts that the emergence of new capacities incurs.

In the current situation, researchers perceive that Finnish universities do not have solid operating strategies to balance the needs and demands of different types of stakeholders. These multiple needs cause tensions within the universities and research communities, which in turn materialise in internal ruptures. This causes a need to develop a functioning system to help researchers manage the perceived disorder in a way that both supports research excellence and academic quality as well as meets the demands set by performance management and the needs of multiple societal stakeholders. The lack of clear and operationalisable strategy at university level has a dual effect on researchers: on one hand, it allows researchers to exercise their academic freedom more, but on the other, they also must make strategic decisions on shaky ground. For researchers, balancing these two creates confusion and insecurity, but also pushes them to take control of the situation by identifying which path best serves their needs. Yet, it simultaneously weakens the legitimacy of the performance management system, which cannot cohere with the goals it claims to work towards.

Because of this lack of a university-level operating strategy researchers are left to choose whether 1) to ignore the stakeholder needs and focus on the 'purely' academic work, hence increasing the risk of limiting their funding options but enhancing their scientific career development, or 2) to choose which stakeholders could enhance their societal interaction in constructive ways, hence potentially broadening their funding base and employment opportunities but having to prioritise their time management. Both options entail benefits and risks in ways that push researchers to make strategic choices which can have long-term effects on their career development and in the academic working culture. If researchers manage to increase their external funding in optimal ways and build productive partnerships with external stakeholders, they can also take hold of the situation in a manner in which they are 'untouchable' and can induce universities into making competing offers to them. In short, with well-planned strategies, long-term plans and skilful utilisation of broad networks, researchers can strengthen their own positions in an insecure environment, and in effect nudge universities into improving their own working conditions.

The emphasis of this dissertation is to understand how and why researchers modify and develop their working methods in an era of structural changes in the management culture and funding environment as well as the increasing societal demands posed on the research community. The research system and its working logic are pushed by macro level drivers to a high degree. However, the evidence shows that many of the micro-level practices and changes in working methods are driven by phenomena which are not derived from the macro-level structures and decisions but are partly separate from them. Rather than being mere objects of change, researchers are acting as subjects who also shape the system from the bottom-up, following a conventional academic idea of universities as self-governing communities of scholars (Olsen, 2007) but adapting it to the current climate. Yet, while this is partly done as an effort to protect research integrity and traditional structures, the main drivers are derived from an interest in controlling the science renewal process themselves. By harnessing their power as the owners of the principal intellectual capital, i.e. the core value of universities, researchers acknowledge the transformation of university communities into penetrated hierarchies (Bleiklie, Enders, & Lepori, 2015) and act in accordance with strategic actorhood at the micro level (Pinheiro & Stensaker, 2014). This constitutes a channel to adapt to external demands and top-down managerial decisions to the degree necessary to continue working, but particularly a way to translate the managerial logic to their advantage.

The situation is characterised by a capacity building ethos. This dissertation presents an argument that researchers are building and broadening their capacity as a coping strategy to secure the attainment of their goals in the research communities. They are seeking to ensure their future career developments and control of their working conditions. Researchers' coping strategies acknowledge that survival in the current system requires an acceptance and management of paradoxes caused by internal tension pairs (Brorström, Feldmann, & Kaulio, 2019) – i.e. contradictory pressures on high academic excellence and acquirement of competitive external funding, high performance on that which is measured as well as that which is not, prioritisation and specialisation, as well as active engagement with broad societal stakeholders. These elements are contradictory but entangled and exist simultaneously (Brorström, Feldmann, & Kaulio, 2019). Their management lies at the core of researchers' coping strategies. It is argued that these strategies are driven more by the professional (academic) and emerging (societally interactive) practices rather than directly by the economic or managerial boundary conditions. Researchers are building their capacities with a micro-level and future-oriented approach, and less so regarding functionality within the performance management system. This capacity building effort is to a high degree detached from the macro-level agendas and institutional goals and instead is geared towards securing the integrity of research even in societally interactive modes of work.

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APPENDICES

Annex 1

Author contribution in original articles

Article	Contribution
Article I: National Performance-Based Research Funding Systems: Constructing Local Perceptions of Research?	Johan Söderlind is the main author and lead the development of the theoretical and analytical framework. All other authors contributed equally to the article. Kirsi Pulkkinen contributed to the contextualization, theoretical and analytical framework, methodology and to the argumentation and comparative analysis of the paper. She wrote the Finnish policy description and the Finnish part of the empirical analysis.
Article II: External Research Funding and Authority Relations.	Jonas Krog Lind is the main author and lead the development of the theoretical and analytical framework. All other authors contributed equally to the article. Kirsi Pulkkinen contributed to the contextualization, theoretical and analytical framework, methodology and to the argumentation and comparative analysis of the paper. She wrote the Finnish policy description and the Finnish part of the empirical analysis.
Article III: Co-creation with companies: a means to enhance societal impact of university researchers?	Kirsi Pulkkinen is the main author and lead the development of the conceptual and analytical framework. She wrote the first draft of the article, including the introduction, conceptual framework, methodology and data, empirical analysis, discussion, and conclusion. Antti Hautamäki contributed to the contextualisation and analytical framework as well as the argumentation and analysis of the paper.
Article IV: Societal Interaction Pland – a Tool for Enhancing Societal Engagement of Strategic Research in Finland.	Kirsi Pulkkinen is the main author and lead the development of the conceptual and analytical framework. She wrote the first draft of the article, including the introduction, conceptual framework, methodology and data, empirical analysis, discussion, and conclusion. Timo Aarrevaara participated in the collection and analysis of empirical data, and contributed to the contextualisation, and conceptual and analytical framework as well as the argumentation and analysis of the paper. Mikko Rask and Markku Mattila contributed to the contextualisation, the analytical framework as well as the argumentation and analysis of the paper.

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Articles I and II have been published in an edited volume by Palgrave Macmillan. Kirsi Pulkkinen was one of the four editors of the volume, with all others holding professorships in Nordic universities. The editorial board divided the chapters of the volume, assigning a main and support editor for each of them. The referee practice consisted of multiple rounds of feedback, with each round providing comments and suggestions for further improvements. The level of quality required of the chapters was commonly agreed upon with the editorial board at the beginning of the process, and rigorously upheld throughout. None of the editors provided peer review feedback on chapters where they were one of the authors, with exception for the chapters authored by the editorial board alone or the entire group of authors. The entire volume and each of the final chapters were also reviewed by editors from the publisher, leading to a decision not to require an additional, external blind peer review.

Topic		Academics main questions	Academics sub/support questions	Managers main questions	Managers sub/support questions	Administrators main questions	Administrators sub/support questions
Topic 1: Goal specificity, degree of autonomy	1	What does performance mean to you?		What does performance mean to you?		What does performance mean to you?	
	2	How much freedom do you have to decide what you do when it comes to teaching? What about research (eg. What projects you participate in)?		How much freedom does the staff in your unit have when it comes to teaching? What about research (eg. what projects they participate in)?		How much freedom do you have to decide what you do?	
	3	Do you teach in the areas where you have research expertise?	Are the tasks linked to each other when it comes to goals and performance?	Is there coherence between a staff member's teaching and research?	Are the tasks linked to each other when it comes to goals and performance?	To what extent are your tasks coherent with those of academic staff?	Are they linked to each other when it comes to goals and performance?
	4	Do you experience conflicting demands for academic work? (eg. From managers, academic staff, research groups)	Are performance targets pre-set or negotiated?	Do you think there are conflicting demands for academic work? (eg. From managers, academic staff, research groups)	Are performance targets pre-set or negotiated?	Do you experience conflicting demands for administrative work? (eg. From managers, academic staff)	Are performance targets pre-set or negotiated?

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Topic 2: Decision-making and strategy	5	How familiar are you with the content of strategies at different levels in your university?	Are the strategies aligned?	How familiar are you with the content of strategies at different levels in your university?	Are the strategies aligned?	How familiar are you with the content of strategies at different levels of your university?	Are the strategies aligned?
Strategy refers to a formal, written document.	6	How important is strategy for your behaviour in teaching? What about research?	To what extent does quality play a role?	How important is strategy for decision-making in your unit (eg. the ways in which you work with teaching and research related issues)?	To what extent does quality play a role?	How important is strategy for your work?	
	7	Has there been change in the role or content of strategy in the past decade?	In what way?	Has there been change in the role or content of strategy in the past decade?	In what way?	Has there been change in the role or content of strategy in the past decade?	In what way?
Decision-making refers to formal structures but also to the informal ones that are considered to have a real effect.	8			To what extend are you free to make strategic choices on the research/education profile of the department/unit?	What are the most important factors that hamper/boost your freedom? (eg. Upper management, internal distribution, external funding, national steering, academics)		
	9	Who gets involved in strategy formulation? Who has influence in the process?	How does the consultation work (formal, informal, written, dialogue)?	Who gets involved in strategy formulation? Who has influence in the process?	How does the consultation work (formal, informal, written, dialogue)?	Who gets involved in strategy formulation? Who has influence in the process?	How does the consultation work (formal, informal, written, dialogue)?
	10	To what extent are strategic goals linked to performance targets on teaching and research?	Are there differences between teaching and research?	To what extent are strategic goals linked to performance targets on teaching and research?	Are there differences between teaching and research?	To what extent are strategic goals linked to performance targets on administrative tasks?	What about teaching and research?

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Topic 3: Control and evaluation	#						
➤ *Formal vs informal - This refers to universities' internal systems, not external ones from eg. the Ministry*	11	Are personal performance targets formulated for your teaching? What about research?	Is a quality dimension included?	Are personal performance targets formulated for teaching? What about research?	Is a quality dimension included?	Are personal performance targets formulated for your work? Are they somehow linked to teaching and research activities?	Is a quality dimension included?
	12	Who ascertains whether these targets are met?	Who has the power to decide?	Who ascertains whether these targets are met?	Who has the power to decide?	Who ascertains whether these targets are met?	Who has the power to decide?
	13	How is your performance measured in teaching? And research?	Who has influence on how the measuring is done? (Formal and/or informal channels?)	How is your performance measured in managerial aspects? What role to evaluation results play in this?	Has there been change in the emphasis of evaluations during the past decade?	How is your performance measured?	
	14	To what extent is performance data useful for improving your academic work?	If it is, how?	To what extent is performance data useful for improving academic work?	If it is, how?	To what extent is performance information used for improving administrative work?	Eg. How administrative work is structured or offered.
	15	What kind of rewards are high performing units and individuals provided with? Are sanctions posed on low performing ones?		What kind of rewards are high performing units and individuals provided with? Are sanctions posed on low performing ones?		What kind of rewards are high performing units and individuals provided with? Are sanctions posed on low performing ones?	

	#				
Topic 4: Support structures	16	How would you describe the administrative support you receive, related to your teaching? What about research?		How would you describe the administrative support you receive?	How well do you think the existing support structures provide support for academic performance?
➤ *Research office, educational development, quality assurance etc.*	17	To what extent do you get the help you need? Can you given an example on how support structures have helped you reach your academic performance targets?	What kind of help is missing or particularly useful?	What types of support structures and services do you find important with regard to teaching performance? What about research performance?	In your experience, what types of support structures do you think the academic staff need?
➤ *Not part of the academic structure, separate but there to support the academic work*	18	To what extent has there been an emphasis on developing support structures?	Have they become more sophisticated in the last decade?	To what extent has there been an emphasis on developing support structures?	Have they become more sophisticated in the last decade?

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Topic 5: External stakeholders ➤ *Reference to actors outside of the university and scientific community (policy-makers, funders, industry etc.)*	**19** To what extent do you cooperate with external stakeholders (outside academia)?	How, and why, is contact with external stakeholders established?	To what extent do you cooperate with external stakeholders?	How, and why, is contact with external stakeholders established?	To what extent do external stakeholders have impact on university rules and regulations, procedures and resource allocation?
	20 Do external stakeholders have an impact on your academic work (research/teaching)?		What kind of impact do external stakeholders have on the academic work of your unit?		What kind of impact do external stakeholders have on academic staff?
	21 In what ways do external stakeholders affect the internal relations within the university?		In what ways do external stakeholders affect the internal relations within the university?		In what ways do external stakeholder affect the internal relations within the university?
	22 To what extent do external stakeholders influence your time schedules or priorities?	Do these choices have an effect on teaching and research performance?	To what extent do external stakeholders influence your time schedules or priorities?		To what extent do external stakeholders influence your time schedules or priorities?
	23 How well do the demands from management, external stakeholders and academic colleagues align?	Can you provide examples?	How well do the demands of management and external stakeholders align with the needs of academic staff?	Can you provide examples?	Seen from your point of view, how well do the demands of management and external stakeholders align with the needs of administrative staff?

Topic	No.						
Topic 6: Trust /accountability ➤ *Reference to being responsible for something in relation to others; transparency and documentation of action*	24	Who do you feel you are accountable to?	Please elaborate on how and why?	Who do you feel accountable to?	Please elaborate on how and why?	Who do you feel accountable to?	Please elaborate on how and why?
	25	Who are you formally accountable to?	(If there is a difference), why do you think these differ?	Who are you formally accountable to?	(If there is a difference), why do you think these differ?	Who are you formally accountable to?	(If there is a difference), why do you think these differ?
	26	Has there been change, in the last decade, in the importance attributed to accountability by the university?	If so, to what extent and how?	Has there been a change (last decade) in the importance attributed to accountability by the university?	If so, to what extent and how?	Has there been change, in the last decade, in the importance attributed to accountability by the university?	If so, to what extent and how?
	27	Can, and do, you freely express your views on the ways in which your university is run or with regard to teaching and research, in your working environment?	Are there situations where you feel your freedom is constrained or enhanced?	Can, and do, you freely express your views on the ways in which your university is run or with regard to teaching and research, in your working environment?	Are there situations where you feel your freedom is constrained or enhanced?	Can, and do, you freely express your views on the ways in which your university is run in your working environment?	Are there situations where you feel your freedom is constrained or enhanced?
Trust / control is a mediating mechanism leading to incentives for higher/lower performance.	28	To what extent is your behavior influenced by performance demands?	Reference to eg. Plans, evaluations, bibliometrics	To what extent is your behavior influenced by performance demands?	Reference to eg. Plans, evaluations, bibliometrics	To what extent is your behavior influenced by performance demands?	What about the academic staff?
	29	Is the culture in your unit better described by collegialism or individualism?	Is the environment competitive and hampering internal cooperation, or generous and supportive of cooperation?	Is the culture in your unit better described by collegialism or individualism?	Is the environment competitive and hampering internal cooperation, or generous and supportive of cooperation?	Is the culture in your unit better described by collegialism or individualism?	
	30	How important are meritocratic criteria for promotion in your unit?		How important are meritocratic criteria for promotion in your unit?		What issues or merits do you feel play an important role in the atmosphere of your working unit?	

Topic	#						
Topic 7: Incentives / recognition (career, HR, dialogue)	31	Which types of recognition do you find important? [Note: after the general question, go through the list on the right for the parts not mentioned in the open answer.]	o peer recognition o publication points o student feedback o management recognition o financial o media attention	Which types of recognition do you find important for the performance of your unit?	o peer recognition o publication points o student feedback o management recognition o financial o media attention	Which types of recognition do you find important from a (academic) performance perspective?	o peer recognition o publication points o student feedback o management recognition o financial o media attention
	32	Does your salary have a performance-dimension (eg. % of salary)?	If so, to what extent does that affect your daily tasks and priorities? Can you provide an example?	Does your salary have a performance-dimension (eg. % of salary)?	If so, to what extent does that affect your daily tasks and priorities? Can you provide an example?	Do you have a performance dimension in your salary (eg. %)?	If so, to what extent does it affect your daily tasks and priorities?
	33			Does the university have promotion schemes in place (eg. tenure track)?	If so, is it linked to performance? How?	Does the university have promotion schemes in place (eg. tenure track)?	If so, is it linked to performance? How?
	34	Do incentives have an effect on your overall academic performance?		Do incentives have and effect on the overall performance of your unit?		In your opinion, does recognition have an effect on your performance? What about overall academic performance?	
	35	Has there been change in your teaching loads in the past 10 years? What about publishing?	If so, has this had an impact (positive/negative) on research productivity? What about quality?	Has there been change in your managerial work loads in the past 10 years?	If so, has this had an impact (positive/negative) on research productivity? What about quality?	If you think about the past decade, has there been change in the administrative work loads?	If so, has this had an impact (positive/negative) on research productivity? What about quality?
	36	What do you think are the key accomplishments that will secure your academic career?	Formally? What about informally?	What do you think are the key accomplishments that will secure an academic career?	Formally? What about informally?		
	37	Who treats you with courtesy?	Eg. Academic staff, managers, administrative staff, external stakeholders?	Who treats you with courtesy?	Eg. Academic staff, managers, administrative staff, external stakeholders?	Who treats you with courtesy?	Eg. Academic staff, managers, administrative staff, external stakeholders?

Round up					
38	How would you describe the overall tendencies and development of university policy and management during the last decade?	For example: - More/less autonomy? - More/less competition?	How would you describe the overall tendencies and development of university policy and management during the last decade?	For example: - More/less autonomy? - More/less competition?	How would you describe the overall tendencies and development of university policy and management during the last decade?	For example: - More/less autonomy? - More/less competition?
39	Is there something you would like to add which hasn't been covered in the questions before?		Is there something you would like to add which hasn't been covered in the questions before?		Is there something you would like to add which hasn't been covered in the questions before?	
40	Can we use the answers from this interview in other related projects and for educational purposes, if we find it useful?		Can we use the answers from this interview in other related projects and for educational purposes, if we find it useful?		Can we use the answers from this interview in other related projects and for educational purposes, if we find it useful?	
	A consent form will be provided for the interviewees to sign.		A consent form will be provided for the interviewees to sign.		A consent form will be provided for the interviewees to sign.	

Pulkkinen: Managing Contradiction –
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FINNUT-PERFECT

Dear scholar,

How is your daily life as a teacher/researcher/manager in higher education affected by:

- strategic work at different levels;
- evaluations of teaching and research;
- resource allocation?

In this study, funded by the Norwegian Research Council, the aim is to investigate the relationship between changes in leadership and managerial structures, and shifts in teaching and research performance. Little is known about this, and the results will be relevant for employees, policy makers, managers and those involved with higher education issues.

There are 20 scholars engaged in the research consortium and the study compares higher education institutions across the Nordic region. The study follows ethical guidelines in the respective countries to assure anonymity.

For more information on the project:

http://www.uia.no/om-uia/fakultet/fakultet-for-samfunnsvitenskap/institutt-for-statsvitenskap-og-ledelsesfaq/effects-of-changes-in-leadership-and-management-structures-in-nordic-higher-education

The survey takes about 20 minutes and begins by asking questions of background information.

The survey closes on 15th October 2015.

Your participation is truly appreciated, and we thank you in advance!

**

Background information

Please write your birth year (e.g. 1968)?

_____

Gender:
☐ Female
☐ Male
☐ Other

The country in which you work (for your primary job):

☐ Denmark
☐ Finland
☐ Norway
☐ Sweden
☐ Other, please specify_____

Please select your nationality.

☐ Danish
☐ Finnish
☐ Norwegian
☐ Swedish
☐ European (outside of Scandinavia)
☐ Other, please specify_____

Levels of employment

Universities in the Nordic countries are organised in different ways. When we ask questions related to your employment, we distinguish between three formal levels at which there is a separate tier of management:

1. University level (level 1);

2. Faculty level/level above departments (e.g; schools) (level 2);

3. Department level/equivalent (e.g. research centre/group, institute, groups with a formal structure and official manager) (level 3).

**

Please select your university.
☐ Aalto University
☐ Hanken School of Economics
☐ Lappeenranta University of Technology
☐ Tampere University of Technology
☐ University of Helsinki
☐ University of Eastern Finland
☐ University of the Arts Helsinki
☐ University of Jyväskylä
☐ University of Lapland

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☐ University of Oulu
☐ University of Tampere
☐ University of Turku
☐ University of Vaasa
☐ Åbo Akademi University

Please select your university.
☐ Norwegian School of Economics
☐ Norwegian University of Life Sciences
☐ Norwegian University of Science and Technology
☐ University of Agder
☐ University of Bergen
☐ Universitety of Nordland
☐ Universitety of Oslo
☐ Universitetey of Stavanger
☐ Universitetey of Tromsø - The Norwegian arctic university

Please select your university.
☐ Chalmers University of Technology
☐ Karlstad University
☐ Karolinska Institutet
☐ KTH Royal Institute of Technology
☐ Linköping University
☐ Linnaeus University
☐ Luleå University of Technology
☐ Lund University
☐ Mid Sweden University
☐ Stockholm School of Economics
☐ Stockholm University
☐ Swedish University of Agricultural Sciences
☐ Umeå University
☐ University of Gothenburg
☐ Uppsala University
☐ Örebro University

Please select your university.
☐ Aalborg University
☐ Aarhus University
☐ Copenhagen Business School
☐ IT University Denmark
☐ Roskilde University
☐ Technical University Denmark

☐ University of Copenhagen
☐ University of Southern Denmark

Are you affiliated to more than one official academic unit (department, research centre/institute/school, or equivalent)?

☐ Yes
☐ No

In international statistics, universities are classified by "Field of Education" or "Field of Science". Please select the category under which your teaching (your academic degree programme) falls, and the broad category under which your research and publications **primarily** fall.

For more information about the field of education, follow the link:
http://edutechwiki.unige.ch/en/Fields_of_science_and_technology_classifications

For more information about the field of science, follow the link:
http://eqracons.eu/sites/default/files/Isced%2020013%20fields%20of%20education%20code%20list.pdf

My teaching/field of education is classified as:

☐ 00. Generic programmes and qualifications
☐ 01. Education
☐ 02. Arts and humanities
☐ 03. Social sciences, journalism and informations
☐ 04. Business, administration and law
☐ 05. Natural sciences, mathematics and statistics
☐ 06. Information and communication technologies
☐ 07. Engineering, manufacturing and construction
☐ 08. Agriculture, forestry, fisheries and veterinary
☐ 09. Health and welfare
☐ 10. Services
☐ 99. Other, please specify_____

My research/field of science is classified as:

☐ 01. Natural Sciences

☐ 02. Engineering and Technology
☐ 03. Medical and Health Sciences
☐ 04. Agricultural Sciences
☐ 05. Social Sciences
☐ 06. Humanities
☐ 99. Other, please specify

Please select your employment level.

☐ Assistant professor: (universitetslektor)
☐ Associate professor: (førsteamanuensis, førstelektor, post doc)
☐ Professor (professor, dosent)
☐ Other, please specify _____

Please select your employment level.

☐ Lecturer (adjunkt)
☐ Assistant professor (meriteringsanställning)
☐ Associate professor (lektor)
☐ Professor (professor)
☐ Other, please specify _____

Please select your employment level.

☐ Yliopistonlehtori (uraporrastaso/level III)
☐ Yliopistotutkija (uraporrastaso/level III)
☐ Erikoistutkija (uraporrastaso/level III)
☐ Kliininen opettaja (uraporrastaso/level III)
☐ Akatemiatutkija (uraporrastaso/level III)
☐ Professori (uraporrastaso/level IV)
☐ Akatemiaprofessori (uraporrastaso/level IV)
☐ Tutkimusprofessori (uraporrastaso/level IV)
☐ Tutkimusjohtaja (uraporrastaso/level IV)
☐ Other, please specify _____

Please select your employment level.

☐ Assistant professor (adjunkt, forsker)
☐ Associate professor (lektor, klinisk lektor, senior forsker)
☐ Professor (professor, professor MSO, klinisk professor)
☐ Other, please specify _____

Do you have a PhD?

☐ Yes
☐ No

What type of employment contract do you have?

☐ Permanent position
☐ Tenure track
☐ Temporary teaching and/or research position
☐ Temporary management position
☐ Other, please specify _____

Is this a full time (100%) position?

☐ Yes
☐ No
☐ I don't know/not applicable

Please state what per-centage (of fulltime hours) you are contracted to work.

_____

How long have you worked in the higher education sector?

☐ 0-5 years
☐ 6-10 years
☐ 11-15 years
☐ 16-20 years
☐ 21-30 years
☐ More than 30 years

Do you have an official management position at university-, faculty- or department level (e.g. head or deputy head of an official unit)?

☐ Yes
☐ No

My management position is

☐ Rector
☐ Vice-rector

☐ Dean
☐ Vice-dean
☐ Head of department
☐ Deputy-Head of department
☐ Other, please specify _____

Does your current position include decision making on the areas stated below?

	1 to a low degree	2	3	4	5 to a high degree	I don't know/not applicable
Budgetary matters	☐	☐	☐	☐	☐	☐
Staff recruitment	☐	☐	☐	☐	☐	☐
Strategies	☐	☐	☐	☐	☐	☐
Performance indicators	☐	☐	☐	☐	☐	☐

How long have you been an academic manager?

☐ 0-5 years
☐ 6-10 years
☐ 11-15 years
☐ 16-20 years
☐ 21-30 years
☐ More than 30 years

Based on your contract/approved work plan, and in an average week, how is your working time divided (please write numbers, add up to 100%):

Teaching _____

Research _____

Administration/management _____

Other _____

Based on your average week; what percentage of time do you actually spend on (please write numbers, add up to 100%):?

Teaching _____

Research _____

Administration/management _____

Other _____

How many hours do you work in an average week?

_____

Organisational structures

How many people are employed in your unit?

☐ 1-5
☐ 6-15
☐ 16-30
☐ 31-50
☐ 51-100
☐ More than 100

We offer:
☐ Bachelor's programmes
☐ Master's programmes
☐ PhD-programmes

I am a member of a research group.

☐ Yes
☐ No
☐ I don't know/not applicable

Participation in decision-making and strategy

I participate in:

	1 no participation	2	3	4	5 strong participation	I don't know/not applicable
Strategy formulation at university level	☐	☐	☐	☐	☐	☐
Strategy formulation at faculty level	☐	☐	☐	☐	☐	☐
Strategy formulation at unit level	☐	☐	☐	☐	☐	☐
Resource allocation at university level	☐	☐	☐	☐	☐	☐
Resource allocation at faculty level	☐	☐	☐	☐	☐	☐
Resource allocation at unit level	☐	☐	☐	☐	☐	☐

I have influence on:

	1 no influence	2	3	4	5 strong influence	I don't know/not applicable
Strategy formulation at university level	☐	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐	☐

Strategy formulation at faculty level

Strategy formulation at unit level

Resource allocation at university level

Resource allocation at faculty level

Resource allocation at unit level

I align my academic behavior to meet the goals in the strategies:

	1 strongly disagree	2	3	4	5 strongly agree	I don't know/not applicable
University strategies (level 1)	☐	☐	☐	☐	☐	☐
Faculty strategies (level 2)	☐	☐	☐	☐	☐	☐
Unit strategies (level 3)	☐	☐	☐	☐	☐	☐

I align my managerial behavior to meet the goals in the strategies:

	1 strongly disagree	2	3	4	5 strongly agree	I don't know/not applicable
University strategies (level 1)	☐	☐	☐	☐	☐	☐
Faculty strategies (level 2)	☐	☐	☐	☐	☐	☐
Unit strategies (level 3)	☐	☐	☐	☐	☐	☐

The following actors have influence on the development of educational programmes (e.g. bachelor programmes):

	1 no influence	2	3	4	5 strong influence	I don't know/not applicable
University board	☐	☐	☐	☐	☐	☐
Faculty board	☐	☐	☐	☐	☐	☐
Study board	☐	☐	☐	☐	☐	☐
Department council/equivalent	☐	☐	☐	☐	☐	☐
Academic staff collectively	☐	☐	☐	☐	☐	☐
Academic staff individually	☐	☐	☐	☐	☐	☐

The following actors have influence on the content of educational programmes (e.g. bachelor programmes):

	1 no influence	2	3	4	5 strong influence	I don't know/not applicable
University board	☐	☐	☐	☐	☐	☐
Faculty board	☐	☐	☐	☐	☐	☐
Study board	☐	☐	☐	☐	☐	☐
Department council/equivalent	☐	☐	☐	☐	☐	☐
Academic staff collectively	☐	☐	☐	☐	☐	☐
Academic staff individually	☐	☐	☐	☐	☐	☐

Performance management

Compared with other units in the university:

	1 below average	2	3 average	4	5 above average	I don't know/not applicable
My unit's teaching performance is	☐	☐	☐	☐	☐	☐
My unit's research performance is	☐	☐	☐	☐	☐	☐

Compared with colleagues within my unit:

	1 below average	2	3 average	4	5 above average	I don't know/not applicable
My teaching performance is	☐	☐	☐	☐	☐	☐
My research performance is	☐	☐	☐	☐	☐	☐

Performance is a significant factor in internal resource allocation at faculty level.

	1 strongly disagree	2	3	4	5 strongly agree	I don't know/not applicable
Teaching performance	☐	☐	☐	☐	☐	☐
Research performance	☐	☐	☐	☐	☐	☐

Performance is a significant factor in internal resource allocation at unit level.

	1 strongly disagree	2	3	4	5 strongly agree	I don't know/not applicable
Teaching performance	☐	☐	☐	☐	☐	☐
Research performance	☐	☐	☐	☐	☐	☐

Incentives/motivations/encouragements

What motivates you as a manager?

	1 of no importance	2	3	4	5 of high importance	I don't know/not applicable
Acknowledgement from the university-/faculty-/unit-management	☐	☐	☐	☐	☐	☐
Acknowledgement from the academic staff in my unit	☐	☐	☐	☐	☐	☐
Acknowledgement from external colleagues	☐	☐	☐	☐	☐	☐
Acknowledgement from external stakeholders	☐	☐	☐	☐	☐	☐
Acknowledgement from students	☐	☐	☐	☐	☐	☐

	1 of no importance	2	3	4	5 of high importance	I don't know/not applicable
Financial incentives	☐	☐	☐	☐	☐	☐
Media attention	☐	☐	☐	☐	☐	☐

What do you think motivates academics in your unit?

	1 of no importance	2	3	4	5 of high importance	I don't know/not applicable
Acknowledgement from the university-/faculty-management	☐	☐	☐	☐	☐	☐
Acknowledgement from me as their unit manager	☐	☐	☐	☐	☐	☐
Acknowledgement from academic staff in the unit	☐	☐	☐	☐	☐	☐
Acknowledgement from external colleagues	☐	☐	☐	☐	☐	☐
Acknowledgement from students	☐	☐	☐	☐	☐	☐
Financial incentives	☐	☐	☐	☐	☐	☐
Media attention	☐	☐	☐	☐	☐	☐

What motivates you as an academic?

	1 of no importance	2	3	4	5 of high importance	I don't know/not applicable
Acknowledgement from the university-/faculty-/unit-management	☐	☐	☐	☐	☐	☐
Acknowledgement from my unit manager	☐	☐	☐	☐	☐	☐
Acknowledgement from the academic staff in my unit	☐	☐	☐	☐	☐	☐
Acknowledgement from external colleagues	☐	☐	☐	☐	☐	☐
Acknowledgement from external stakeholders	☐	☐	☐	☐	☐	☐
Acknowledgement from students	☐	☐	☐	☐	☐	☐
Financial incentives	☐	☐	☐	☐	☐	☐
Media attention	☐	☐	☐	☐	☐	☐

Measurements increase my performance in:

	1 Strongly disagree	2	3	4	5 Strongly agree	I don't know/not applicable
Teaching	☐	☐	☐	☐	☐	☐
Research	☐	☐	☐	☐	☐	☐

Performance measurements have a positive impact on the atmosphere surrounding academic work.

	1 Strongly disagree	2	3	4	5 Strongly agree	I don't know/not applicable
Teaching	☐	☐	☐	☐	☐	☐
Research	☐	☐	☐	☐	☐	☐

I have regular dialogue with my manager regarding my career progression.

1 disagree	2	3	4	5 agree	I don't know/not applicable
☐	☐	☐	☐	☐	☐

I have regular dialogue with my staff regarding their career progression.

1 disagree	2	3	4	5 agree	I don't know/not applicable
☐	☐	☐	☐	☐	☐

Compared with colleagues in similar positions in my unit, in the last three years I have

	1 strongly disagree	2	3	4	5 strongly agree	I don't know/not applicable
Published more	☐	☐	☐	☐	☐	☐
Had more teaching	☐	☐	☐	☐	☐	☐
Supervised more Master's/PhD students	☐	☐	☐	☐	☐	☐

Funding arrangements

The funding my unit receives from the university is based on:

	1 low degree	2	3	4	5 high degree	I don't know/not applicable
Annual negotiations	☐	☐	☐	☐	☐	☐
Previous budgets	☐	☐	☐	☐	☐	☐
Measured performance	☐	☐	☐	☐	☐	☐
Earmarked funding	☐	☐	☐	☐	☐	☐
Other, please specify	☐	☐	☐	☐	☐	☐

My unit has:

	1 low degree	2	3	4	5 high degree	I don't know/not applicable
External funding for teaching	☐	☐	☐	☐	☐	☐
External funding for research	☐	☐	☐	☐	☐	☐
Extraordinary funding from the university/faculty	☐	☐	☐	☐	☐	☐

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My unit decides on its own resource allocation model.

1 not at all   2   3   4   5 to a large extent   I don't know/not applicable

Strategic goals affect the allocation of resources:

	1 not at all	2	3	4	5 to a large extent	I don't know/not applicable
At university level						
At faculty level						
At unit level						

The study programmes at my unit have:

1 low level of applicants   2   3   4   5 high level of applicants   I don't know/not applicable

In the last five years, the number of applicants to my unit's study programmes have:

1 decreased   2   3   4   5 increased   I don't know/not applicable

Support services

It is easy to get access to support services:

	1 strongly disagree	2	3	4	5 strongly agree	I don't know/not applicable
Teaching support						
Research support						
Administrative support/secretarial support						

Support services have a positive effect on my:

	1 strongly disagree	2	3	4	5 strongly agree	I don't know/not applicable
Teaching performance						
Research performance						
Administrative/managerial work						

Autonomy and control

Evaluation and quality assurance procedures at my university have a positive impact on:

	1 strongly disagree	2	3	4	5 strongly agree	I don't know/not applicable
My unit's teaching performance						
My unit's research performance						
My own teaching performance						
My own research performance						

I have autonomy in the following areas:

	1 strongly disagree	2	3	4	5 strongly agree	I don't know/not applicable
Teaching content						
Pedagogical approach in teaching						
Learning outcomes of my teaching						
Research topic						
Research methods						
Partners in research projects						

There is a tension between managerial priorities and academic autonomy.

1 strongly disagree   2   3   4   5 strongly agree   I don't know/not applicable

These tensions negatively affect:

	1 strongly disagree	2	3	4	5 strongly agree	I don't know/not applicable
My teaching performance						
My research performance						

These tensions negatively affect:

	1 strongly disagree	2	3	4	5 strongly agree	I don't know/not applicable
My teaching performance						
My research performance						
My managerial performance						

I experience a high level of expectations from my unit's manager regarding:

	1 strongly disagree	2	3	4	5 strongly agree	I don't know/not applicable
Teaching performance						
Research performance						

Pulkkinen: Managing Contradiction –
Researchers' practices in balancing performance, research integrity and societal interaction

I experience a high level of expectations from my academic colleagues regarding:

	1 strongly disagree	2	3	4	5 strongly agree	I don't know/not applicable
Teaching performance	☐	☐	☐	☐	☐	☐
Research performance	☐	☐	☐	☐	☐	☐

Control and evaluation of my work:

	1 strongly disagree	2	3	4	5 strongly agree	I don't know/not applicable
Is a legitimate task	☐	☐	☐	☐	☐	☐
Has a positive impact on my teaching performance	☐	☐	☐	☐	☐	☐
Has a positive impact on my research performance	☐	☐	☐	☐	☐	☐

Internal procedures for measuring academic performance:

	1 strongly disagree	2	3	4	5 strongly agree	I don't know/not applicable
Are in accordance with my understanding of academic performance	☐	☐	☐	☐	☐	☐
Have an impact on my decisions regarding academic work	☐	☐	☐	☐	☐	☐

In my opinion:

	1 strongly disagree	2	3	4	5 strongly agree	I don't know/not applicable
Performance measurements are signs of mistrust	☐	☐	☐	☐	☐	☐
Performance measurements increase transparency and fairness	☐	☐	☐	☐	☐	☐

Local atmosphere, unit level (level 3)

In my academic unit:

	1 strongly disagree	2	3	4	5 strongly agree	I don't know/not applicable
My manager is fair	☐	☐	☐	☐	☐	☐
Gender balance is recognized	☐	☐	☐	☐	☐	☐
Excellence in teaching is recognised	☐	☐	☐	☐	☐	☐
Excellence in research is recognised	☐	☐	☐	☐	☐	☐
High quality of publications is recognised	☐	☐	☐	☐	☐	☐
Academic freedom is recognised	☐	☐	☐	☐	☐	☐

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	1 strongly disagree	2	3	4	5 strongly agree	I don't know/not applicable
Societal relevance and outreach is recognised					☐	☐
Hard work is recognised					☐	☐
Acquisition of external funding is recognised					☐	☐

In my academic unit:

	1 strongly disagree	2	3	4	5 strongly agree	I don't know/not applicable
The roles and responsibilities are clear	☐	☐	☐	☐	☐	☐
The division of labour is fair	☐	☐	☐	☐	☐	☐
I can influence decision-making	☐	☐	☐	☐	☐	☐
Performance measurement contributes to work overload	☐	☐	☐	☐	☐	☐

In my academic unit:

	1 strongly disagree	2	3	4	5 strongly agree	I don't know/not applicable
Individuals are rewarded	☐	☐	☐	☐	☐	☐
Groups are rewarded	☐	☐	☐	☐	☐	☐
Collaboration between groups within the unit is rewarded	☐	☐	☐	☐	☐	☐
Collaboration amongst different units in the university is rewarded	☐	☐	☐	☐	☐	☐
Collaboration with individuals from other universities is rewarded	☐	☐	☐	☐	☐	☐

My unit has:

	1 strongly disagree	2	3	4	5 strongly agree	I don't know/not applicable
A friendly and supportive atmosphere	☐	☐	☐	☐	☐	☐
An open and constructive climate	☐	☐	☐	☐	☐	☐
A low degree of conflict	☐	☐	☐	☐	☐	☐
A culture of sharing information amongst academic staff	☐	☐	☐	☐	☐	☐
An inclusive culture	☐	☐	☐	☐	☐	☐
A multidisciplinary nature	☐	☐	☐	☐	☐	☐
A culture of talking negatively about absent colleagues	☐	☐	☐	☐	☐	☐

The relationship between academic and administrative staff in my unit is:

1 very bad	2	3	4	5 very good	I don't know
☐	☐	☐	☐	☐	☐

Thank you for sharing your answers with us!

COHU, structure for session observation

1. Dialogue session: introduction and orientation (dialogical approach, aims)
   - how participants introduce themselves
   - how participants position themselves in relation to others
   - how participants profile their own expertise and that of others
   - what (types of) issues they place on the agenda
   - how participants listen to other introductions and suggestions for ideas to discuss
   - how participants relate to the facilitator, the working methods and dialogical approaches

2. Dialogue session: search and definition of shared problems and themes
   - shared or separate
     - compatible?
     - do they change during the process?
   - in what stage / how soon are they expressed
     - do they stick to generic levels or delve into the concrete issues
     - how does trust reflect in their courage (or lack of it) to bring issues to discussions
   - how are issues approached / how is shared interest constructed
   - motivation for collaboration in the beginning, during the process and in the end
   - commitment to dialogue and collaboration
   - how participants split into groups (thematic): naturally by themselves or do they require guidance? If they are guided, do participants express their own wishes and are these taken into account in the split to groups?

3. Dialogue session
   - as in session 2

4. Dialogue session
   - as in session 2
   -

5. Dialogue session: identification of solutions
   - on a generic level with all participants AND thematically and more specifically in smaller groups
   - how are solution proposals approached and investigated
   - how participants select solution proposals to focus on from the pool (integration, prioritization)
   - how participants construct a shared vision
   - do participant roles shaped during the search for solutions
   - does trust between participants modify
     - including risk taking (eg. feeling embarrassed in the group, corporate secrets)
   - is dialogue equal and based on the principle of dialogic approaches
   - how are conflicts managed and solved

- o   including participants' willingness to solve them
- o   attitudes on tensions: positive, neutral, negative
- who "owns" the process / dialogue / collaboration
- is personal/institutional benefit present in the communication ("what's in it for me?")

6. Dialogue session: presenting and analysing results
- are results presented coherently, as collaboration efforts or driven by self-interest
- how is a joint vision of solutions constructed

Conclusions and follow-up action
- is collaboration planned to continue with company-researcher pairs
- have participants' views on collaboration changed or become more concrete
- have their views and experiences of their own expertise changed
- have their views and understanding on other participants' ("the counterpart") expertise changed

Annex 5

Strategic Research Council, cohort 2015 - Interview Guide

- What is the goal of the project?
- How does the societal interaction plan serve this goal?

- Who are your societal interaction partners?
- How did you choose this composition?
- Did the importance of societal interaction influence the composition of the research team?
- How is trans- or multi-disciplinarity reflected in the composition?

- What types of interaction activities did you choose?
- How was the decision made?
- What are the goals of the interaction activities?
- What kinds of effects do you expect the activities to have?

- At what stage in the planning of the project did you start to process the societal interaction issues?
- On what phases of the project are the societal interaction activities timed?
- What types of benefits do you foresee the societal interaction to have on the broader impact of the project?
- How does the societal interaction support the end-users' foresight abilities?

- What kinds of expertise do the societal interaction activities require from the research group?
- Does the research group have previous experience of using the chosen interaction practices? (science communication, citizen hearings, participatory planning, deliberative decision-making, societal activism)