Strategi, Innovasjon og Internasjonal Forretningsutvikling (SFU) Fordypningen 2024/2025

Strategi og Internasjonal Forretningsutvikling (SFU) tilbys av faggruppen for Strategi og Forretningsutvikling.

Læringsmålene for fordypningen er:

Studentene skal kunne analysere og løse problemstillinger knyttet til strategi, innovasjon og utvikling av bedrifters internasjonale forretningsaktiviteter. Det er forventet at studentene skal ha oversikt over relevant litteratur på området og kunne løse praktiske ledelsesutfordringer med en vitenskapelig og troverdig metode. Emnet skal gi studenter ferdigheter i å sette seg inn i litteratur samt anvende og utvikle kunnskap innen SFUs temaområder basert på eksisterende forskning. Andre viktige læringsmål: Studentene skal få trening i å diskutere og presentere teoretiske konsepter innen strategi og internasjonal forretningsutvikling.

Utgangspunktet er at det har fundamental betydning for alle bedrifter å kontinuerlig forbedre sin konkurranseevne. Da må en både ta mest mulig riktige beslutninger, samtidig som en faktisk evner å sette dem ut i livet. For de fleste norske bedrifter vil dette også handle om evnen til å arbeide i internasjonale markeder både oppstrøms og nedstrøms. Med andre ord gir SFU fordypningen muligheten å studere de helt fundamentale ledelsesutfordringer knyttet til bedrifters strategier, konkurranseevne og internasjonale aktiviteter.

Veilederne på fordypningen arbeider i tett samarbeid med en rekke norske industribedrifter.

Fagområder
De aktuelle veilederne underviser og forsker innenfor
- Strategi
- Innovasjon
- Internasjonal markedsføring
- Internasjonalt entreprenørskap
- Produktutvikling
- Bærekraftig næringsliv og sirkulærøkonomi
- Digitalisering og digital transformasjon

Veilederteamet er bredt sammensatt med kompetanse innenfor et bredt felt - noe som også er gjenspeilet i fagstabens forskning og undervisning. Dette gir SFU studentene muligheter til å skrive oppgaver som kombinerer innsikt fra flere felt og som dermed kan gi større praktisk relevans og faglig bidrag. Noen av oppgavene er faglig sett i grenseland mellom flere fordypninger og kan derfor også være ført opp som oppgaveforslag i andre fordypninger.

Mulige veiledere
Professor Arild Aspelund, koordinator for fordypningen
Professor Øystein Moen,
Professor Elsebeth Holmen
Professor Alf Steinar Sætre

Professor Ann-Charlott Pedersen
Professor Roger Sørheim
Professor II Per Jonny Nesse
Førsteamanuensis Marta Morais-Stortz
Førsteamanuensis Nhien Nguyen
Førsteamanuensis Øyvind Bjørgum
Førsteamanuensis Dag Håkon Haneberg
Førsteamanuensis Håkon Thue Lie
Førsteamanuensis Elli Verhulst
Førsteamanuensis II Jørgen Veisdal
Førsteamanuensis II Erik Sæter
Stipendiat Liv Håland
Stipendiat Meike Siefkes
Stipendiat Pankaj R. Gode
Stipendiat Serinha Murgorgo
Stipendiat Alae Ajraoui
Stipendiat Jessica Steppe
Stipendiat Nuria Herati

Dersom dere ønsker en samtale rundt mulige prosjektoppgaver så ta gjerne kontakt med fordypningskoordinator Arild Aspelund eller de fagpersonene som står oppført på det prosjektet dere ønsker å diskutere direkte. Å ta direkte kontakt med veilederne er lurt! Det er i praksis studentinteresse som bestemmer hvem som får hvilken oppgave.

Forutsetninger for å velge Strategi og Internasjonal Forretningsutvikling
De studentene som skal ta fordypningen i Strategi og Internasjonal Forretningsutvikling må ha tatt:
• TIØ4265 Strategisk Ledelse og
• TIØ4235 Industriell Markedsføring og Internasjonal Handel
Emnet TIØ4180 Innovasjon- og Informasjonsledelse anbefales.
Studenter som har vært på utveksling må ha tatt kurs med tilsvarende innhold.

Prosjektoppgaver høsten 2022 og våren 2023 innen Strategi og Internasjonal Forretningsutvikling

Tildeling av prosjektoppgaver skjer på grunnlag av kvalifikasjoner og interesse. Veiledningskapasitet vil også være et viktig kriterium. Sistnevnte fører også til at stor belastning på en veileder kan føre til at noen prosjekter ikke vil gå. Beskrivelsene av oppgavene under er veiledende og i de fleste tilfeller vil det være nødvendig å spisse en mer spesifikk problemstilling før arbeidet settes i gang. Dette gjøres i samarbeid mellom studenter, veileder og eventuell ekstern kontaktperson.

Det er også mulighet for å ta med egne prosjekter inn i fordypningen. I så fall må dette avklares med en veileder på forhånd (se SFU01 under). Selv om studenten har et egendefinert prosjekt skal en

velge flere enn ett. Dersom dere ønsker mer informasjon om prosjektene under ta kontakt med SFUs veileder først. Ikke ta kontakt med ekstern kontaktperson før det er avklart med veileder.

Oppgavene er i utgangspunktet laget for at studenter skal jobbe 2 eller 3 sammen. Unntaksvis kan oppgavene også løses individuelt. Avvik fra denne regelen vil fremkomme i teksten. **Alle oppgavene kan videreføres til masteroppgave i vårsemesteret**.

Her er en kort liste av valgbare prosjekter. Mer informasjon om hvert prosjekt følger under.

SFU01 Egendefinert prosjekt
SFU02 Designing digital strategy / digital transformation
SFU03 Implementation of AI innovations
SFU04 Human-AI Collaboration for Creativity & Innovation
SFU05 Responsible AI Implementation
SFU06 IMPACT på leverandørkjeder – hvordan bedrifter jobber med bærekraft og samfunnsansvar i forholdene til deres leverandører og underleverandører
SFU07 Strategisk omstilling i etablerte norske industribedrifter og i konteksten rundt bedriftene
SFU08 Sustainability Strategies, Circular Economy and Firm Competitiveness in International Firms
SFU09 International Marketing Strategies
SFU10 Corporations as investors (CVC) in emerging green technologies
SFU11 Climate risks in Norwegian firms
SFU12 Firm investment strategies in the Norwegian oil & gas industry
SFU13 Digitale verktøy og internasjonal vekst
SFU14 Harnessing the power of heterogeneity
SFU15 The Role of Collaboration in Circular and Sustainability-Oriented Business Model Innovation
SFU 16 The role of discovery-driven approach in innovation and performance
SFU17 The role of human problem formulation in AI solutions
SFU18 Generating Breakthrough Innovation by Abduction
SFU19 The Role of Social Integration Mechanisms is Innovation
SFU20 Circular Economy in Offshore Wind Energy
SFU21 Impact from disruptive innovations in rural communities – Forestry 4.0
SFU22 Digitale plattformer og sirkulære verdikjeder
SFU23 Innovation Readiness, Openness, Access and Knowledge Flow
SFU24 Innovation, trade secrets, psychological mechanisms and workforce mobility
SFU25 Collaboration in the transition towards circular/sustainable business models

Beskrivelse av valgbare oppgaver:

SFU01 Egendefinert prosjekt

Studentene kan definere egne prosjekt utenom de som er lagt ut her. Dette kan være en god løsning for de av dere som er opptatt av andre problemstillinger enn de som det legges fokus på i de påfølgende prosjektforslagene, eller dere som ønsker å jobbe i samarbeid med en spesiell organisasjon. Det eneste vi krever er at dere har gjort en avtale med en veileder og at veileder har godkjent oppgaven og sagt seg villig til å veilede den. For spørsmål angående egendefinerte

prosjekter, ta gjerne kontakt med koordinator for fordypningen Arild Aspelund –
arild.aspelund@ntnu.no – så kan han hjelpe dere med å komme i kontakt med en veileder som
passer oppgaven.

SFU02 Designing digital strategy / digital transformation

As digital technologies become inevitable for today business, companies are required to come up
with a well-designed digital strategy to compete in a turbulence world. Firms who want to transform
need to rethink their assumptions in key domains of strategy, such as customers, competition, data,
innovation, and value in the digital economy (Rogers, 2016). To be successful, digital strategy should
be an integral part of companies' overall business strategy.

In this project we seek to understand how firms initiate and design their digital strategies for
supporting their business model innovation. Some relevant research questions could be: What are
the priorities and challenges to consider in designing digital strategies? How do companies utilize
digital technologies to transform their business model? How do firms drive their digital
transformation process?

The students can review literature related to the topic of digital transformation, business model
innovation, digital strategy and conduct interviews with companies to gain a better understanding of
the digital journey. Students who are interested in this project can contact the supervisor listed
below for more information and to define more specifically what this project can entail for you.

The project is a theoretical pre-study for the Master thesis and is open for two to three students
working together. There is an opportunity to connect the Master thesis to on-going projects at the
Norwegian Research Center for AI innovation (NorwAI), hosted by NTNU, regarding data collection
through interviews with AI companies.

Supervisor: Associate Professor Nhien Nguyen (nhien.nguyen@ntnu.no)

References:

Rogers, D. L. (2016). *The digital transformation playbook: Rethink your business for the digital
age*. Columbia University Press.

McGrath, R., & McManus, R. (2020). Digital Transformation: Learning your way to a new business
model. *Harvard Business Review, 98*(3), 125-133.

Correani, A., De Massis, A., Frattini, F., Petruzzelli, A. M., & Natalicchio, A. (2020). Implementing a
Digital Strategy: Learning from the Experience of Three Digital Transformation Projects. *California
Management Review, 62*(4), 37-56. https://doi:10.1177/0008125620934864

SFU03 Implementation of AI innovations

AI is fundamentally redefining how companies work, how they operate, and how they compete
(Füller et al., 2022). AI applications will enable more than just efficiency and efficacy improvements

for businesses; they will create the basis for powerful new capabilities for firms (Chui et al., 2022). Many firms, however, clearly struggle to successfully implement AI innovations. Recent surveys show that the vast majority of AI initiatives fail to take off (Browder et al., 2022). Moreover, firms lack guidance in managing these implementation processes.

In this project, we seek to understand how companies effectively implement AI innovations. Potential research questions could be: What are the drivers and challenges of implementing AI innovations? How do companies effectively implement AI innovations? How do organizations continuously learn and adapt when implementing AI innovations?

The students can review literature related to the topic of AI innovation, digital innovation, strategy implementation, and conduct interviews with companies to gain a better understanding about how AI innovations are implemented. Students who are interested in this project can contact the supervisors listed below for more information and to define more specifically what this project can entail for them.

The project is a theoretical pre-study for the Master thesis and is open for two to three students working together. There is an opportunity to connect the Master thesis to ongoing projects at the Norwegian Research Center for AI innovation ([NorwAI](https://www.ntnu.no)), hosted by NTNU, regarding data collection through interviews with AI companies.

Supervisor: Associate Professor Nhien Nguyen (nhien.nguyen@ntnu.no) and Doctoral Student Alae Ajraoui (alae.ajraoui@ntnu.no)

References:

Browder, R.E., Koch, H., Long, A., Hernandez, J.M. (2022). Learning to innovate with big data analytics in Interorganizational relationships. *Academy of Management Discoveries 8* (1), 139–166

Chui, M., Roberts, R., Yee, L. (2022). Generative AI Is here: How Tools like ChatGPT Could Change your Business. *McKinsey QuantumBlack*.

Füller, J., Hutter, K., Wahl, J., Bilgram, V., & Tekic, Z. (2022). How AI revolutionizes innovation management—Perceptions and implementation preferences of AI-based innovators. *Technological Forecasting and Social Change*, *178*, 121598.

SFU04 Human-AI Collaboration for Creativity & Innovation

Businesses are significantly increasing their adoption of Generative Artificial Intelligence (GenAI) applications, leading to a transformation of various aspects of knowledge work (Benbya et al., 2023). More and more, GenAI is being utilized in creative work to assist in generating ideas considered novel and useful (Amabile, 2020). Instead of replacing human creativity, GenAI is seen as enhancing it. These new possibilities of collaborating with AI for creativity offered by GenAI may provide companies with a competitive advantage, particularly when these creative ideas are translated into innovations. This is why organizations are urged not only to implement GenAI but also to ensure that employees can effectively work with it (Bouschery et al., 2023).

In this project, we aim to understand how companies can utilize GenAI for their creative work and how this utilization can lead to innovation. Students can explore questions such as: What are the fundamental characteristics of AI creativity, and how might they differ from human creativity? How does AI creativity impact the creativity of those collaborating with artificially intelligent systems? How can creative ideas generated in collaboration with AI lead to innovations?

The project serves as a theoretical pre-study for the Master's thesis and is ideal for two to three students working together. For the subsequent Master's thesis, there's an opportunity to gain access to AI companies for data collection purposes, such as interviews, by connecting it to ongoing initiatives at the Norwegian Research Center for AI Innovation (NorwAI), located at NTNU.

This project is connected to a Ph.D. project researching AI-augmented creativity in innovation teams. We encourage interested students to contact the supervisors listed below for further details about the project's possibilities and to clarify more precisely what this project can entail for you.

Supervisor: Associate Professor Nhien Nguyen (nhien.nguyen@ntnu.no), Associate Professor Marta Morais-Storz (marta.morais-storz@ntnu.no), Doctoral Student Jessica Steppe (jessica.a.steppe@ntnu.no)

References

Amabile, T. (2020). GUIDEPOST: Creativity, Artificial Intelligence, and a World of Surprises Guidepost Letter for Academy of Management Discoveries. *Academy of Management Discoveries*. https://doi.org/10.5465/amd.2019.0075.

Benbya, H., Strich, F., Tamm, T. (2023). Navigating Generative AI Promises and Perils for Knowledge and Creative Work. *Journal of the Association of Information Systems*, forthcoming., Available at SSRN: https://ssrn.com/abstract=4584101.

Bouschery, S. G., Blazevic, V., & Piller, F. T. (2023). Augmenting human innovation teams with artificial intelligence: Exploring transformer-based language models. *Journal of Product Innovation Management*, 40(2), 139-153. https://doi.org/10.1111/jpim.12656.

SFU05 Responsible AI Implementation

Artificial Intelligence (AI) presents organisations with the potential to improve decision-making, streamline operations, and solve important real-world challenges at scale (Berente et al., 2021). Generative AI has taken the world by storm, generating results based on historical data and future predictions. However, issues arise mainly from the opacity associated with organisations' adoption of AI. These systems can perpetuate biases present in data, lack interpretability in decision-making processes, and be costly to train and maintain. Responsible AI has gained significant importance in ensuring trust in AI systems, addressing ethical and legal issues and fostering ethical decision-making (Brumen et al., 2023; Dignum, 2019).

Despite the growing literature on responsible AI and numerous guidelines and initiatives, a significant gap remains in translating responsible AI principles into practice within organisational settings. This disconnection between the principles and their practical application is greatly attributed to the

ambiguity of ethical principles and their perceived inadequacy in effectively addressing the full range of potential negative consequences associated with AI technologies (Rakova et al., 2021). Responsible AI is more than just ticking ethical boxes or adding features to AI systems (Dignum, 2019); it takes into consideration: responsibility, regulation and control, ethics, transparency, design, and socioeconomic impact.

In this master's thesis project, students can explore the following areas in translating responsible AI principles to practice in organisations: how organisations conceptualise and operationalise responsible AI within organisational practices; how companies enhance employee understanding and engagement in responsible AI; how implementing responsible AI can create competitive advantage.

This project is connected to a PhD project that is researching responsible AI implementation. Interested students are welcome to contact the supervisors listed below for more information about the possibilities of the project.

Supervisors; Associate Professor Nhien Nguyen (nhien.nguyen@ntnu.no) and Doctoral Student Serinha Murgorgo (serinha.murgorgo@ntnu.no)

References

Berente, N., Gu, B., Recker, J., & Santhanam, R. (2021). Managing artificial intelligence. *MIS Quarterly*, *45*(3).

Brumen, B., Göllner, S., & Tropmann-Frick, M. (2023). Aspects and Views on Responsible Artificial Intelligence. In G. Nicosia, V. Ojha, E. La Malfa, G. La Malfa, P. Pardalos, G. Di Fatta, G. Giuffrida, & R. Umeton (Eds.), *Machine Learning, Optimization, and Data Science* (pp. 384–398). Springer Nature Switzerland.

Dignum, V. (2019). *Responsible artificial intelligence: How to develop and use AI in a responsible way* (Vol. 2156). Springer.

Rakova, B., Yang, J., Cramer, H., & Chowdhury, R. (2021). Where Responsible AI Meets Reality: Practitioner Perspectives on Enablers for Shifting Organizational Practices. *Proc. ACM Hum.-Comput. Interact.*, *5*(CSCW1).

SFU06 IMPACT på leverandørkjeder – hvordan bedrifter jobber med bærekraft og samfunnsansvar i forholdene til deres leverandører og underleverandører

De seneste årene har det vært økende oppmerksomhet på næringslivets samfunnsansvar, og i 2022 ble Åpenhetsloven innført i Norge med formålet å «fremme virksomheters respekt for grunnleggende menneskerettigheter og anstendige arbeidsforhold i forbindelse med produksjon av varer og levering av tjenester. Loven skal også bidra til å sikre allmennheten tilgang til informasjon om hvordan virksomhetene håndterer negative konsekvenser på disse områdene».

Det har også kommet nye regler som regulerer hvordan bedrifter skal rapportere om bærekraftforhold. EU vedtok i 2022 Direktivet om Corporate Sustainability Reporting som skal innføres i 2024 med første rapportering i 2025.

Begge lover innebærer at bedrifter må jobbe systematisk med å gjøre tiltak rettet mot miljø- og samfunnsansvar i deres egen produksjon og levering av tjenester. De innebærer imidlertid også at bedrifter må 1) få oversikt over deres leverandørkjeder og 2) å gjøre tiltak når bedriften ser at den påvirker miljøet og sosiale forhold negativt gjennom sine leverandører og underleverandører. Se for eksempel https://www.micromatic.no/artikkel/apenhetsloven

Ikke bare jobber bedrifter aktivt med disse problemstillingene, det er også et stort antall konsulentselskaper som retter seg mot å tilby tjenester knyttet til kartlegging av bærekraft og samfunnsansvar i leverandørkjeder, for eksempel Holte Consulting, PwC Norge m.fl.

Denne oppgaven fokuserer på *hvordan norske bedrifter jobber med bærekraft og samfunnsansvar i deres leverandørkjeder*. Teoretisk er oppgaven rettet mot hvordan bedrifter jobber med å skape *oversikt* over og *innsikt* i operasjonene til deres nettverk av leverandører og underleverandører, og hvordan bedrifter jobber med å *påvirke* og *utvikle* leverandørene og underleverandørene henimot mer bærekraftige og ansvarlige operasjoner i tråd med bedriftens strategi.

Prosjekt- og masteroppgaven vil både omfatte litteraturstudie og studie av bedrifter. Metodisk kan oppgaven innrettes med kvalitative studier av flere bedriftscaser, eller kvantitative spørreskjemaundersøkelser. Oppgaven kan rettes mot ulike industrier og tilpasses studentenes ønsker.

Oppgaven er knyttet til instituttets strategiske forskningssatsing innen: Grønn verdiskaping og Sirkulærøkonomi

Oppgaven veiledes av Elsebeth Holmen (elsebeth.holmen@ntnu.no).

SFU07 Strategisk omstilling i etablerte norske industribedrifter og i konteksten rundt bedriftene

I lyset av FNs bærekraftmål og den raske teknologiske utviklingen, jobber mange etablerte norske bedrifter med strategisk omstilling av deres virksomhet, både knyttet til grønn omstilling, digital omstilling, energiomstilling osv. Omstillingen omfatter ofte hva de tilbyr (produkt- og tjenestetilbud), hvem de tilbyr deres produkter og tjenester (kundeportefølje og forretningsområder), deres interne operasjoner og kompetansene til de ansatte, samt deres forsyningskjede og leverandørbase.

Omstillingen innebærer ofte at bedriften på lang sikt vil slutte med de nåværende operasjonene og kun beskjeftige seg med nye operasjoner. Imidlertid vil de eksisterende og de nyere operasjonene sameksistere og samspille, over en lang periode, ofte flere tiår. Gjennom omstillingsperioden vil det være høye krav både til innovasjon, men også til effektivitet og kostnadsreduksjon knyttet til de etablerte operasjonene. For eksempel vil bedrifter som Equinor, Aibel og Siemens Energy i en lang periode både være aktive innen olje og gass samtidig som de omstiller seg til andre virksomhetsområder som havvind, hydrogen, CCS, sol osv. På samme måte vil Norcem tilby tradisjonell sement samtidig som de utvikler sement med lavere klimaavtrykk via CCS teknologi.

Spørsmålet blir da hvordan bedrifter skal operere i perioder preget av strategisk omstilling og tosidige forretningsmodeller, hvor de skal balansere eksisterende systemer med oppbygging av nye systemer, med krav til resultater både på kort og på lang sikt.

Når bedriften fortsatt skal gjennomføre etablerte operasjoner samtidig som de skal tilby nye produkt- og tjenestetilbud, fører det til endringer av interne operasjoner og interne kompetanser.

Strategisk omstilling innebærer imidlertid ikke kun interne endringer, men også i konteksten rundt bedriften. Det kan føre til endringer i kundeporteføljen, for eksempel endring av relasjoner til eksisterende kunder eller etablering av relasjoner til nye kunder. Videre kan det føre til endringer i leverandørbasen, gitt behov for nye leverandører, endring av samspillet med og mellom eksisterende leverandører, utvikling av leverandører, flytting av forsyningskjeder til andre deler av verden osv. Det kan også føre til endringer av andre samarbeidspartnere, herunder forskingsinstitusjoner mv.

Oppgaven setter fokus på samspillet mellom endring av interne operasjoner og endring av samspillet med leverandører, kunder og andre samarbeidspartnere i perioder preget av strategisk omstilling.

Prosjekt- og masteroppgavearbeidet vil både omfatte litteraturstudie og studie av bedrifter. Oppgaven kan tilpasses studentens ønsker, og vi oppfordrer de som vurderer denne oppgaven til å ta kontakt for en samtale. Eventuelle reisekostnader dekkes av prosjektet.

Oppgaven er knyttet til instituttets strategiske forskningssatsing innen Ledelse i overgangstider: Samskaping av en bærekraftig framtid.

Oppgaven veiledes av Elsebeth Holmen (elsebeth.holmen@ntnu.no) og Ann-Charlott Pedersen (ann.pedersen@ntnu.no).

SFU08 Sustainability Strategies, Circular Economy and Firm Competitiveness in International Firms

Industry is facing two natural challenges that require imminent change – the climate challenge and the resources challenge. The first refers to challenges related to carbon emissions and requires that industry adopt sustainable low-carbon solutions. The resource challenge refers to the global society's overuse of planetary resources and requires that industry adopts circular economy practices to.

As these natural challenges inevitably requires change, they also represents a business opportunity. According to strategy guru Michael Porter *"… the biggest business opportunity of our time"*. This project deals with how the Norwegian industry will deal with sustainability challenges and simultaneously increase competitiveness and profitability.

We will study how to identify potentially profitable sustainability strategies and sustainability innovations, how they are effectively implemented, and their impact on firm performance. Firmly grounded in practice, we seek to understand the strategies of how industrial companies can change their activities towards more sustainability.

In this project, the students can tap into resources from a broad range of ongoing research projects and the project can be solved either quantitatively or qualitative dependent on the chosen research design and the wishes of the students. We collaborate with a broad range of Norwegian companies on these issues, and they can be made available for the students for case studies. In addition, we have quantitative survey data that can be used for a quantitative approach.

We invite interested students to contact supervisors listed below for more information about the possibilities in the project and to define more specifically what this project can entail for you.

This project is in collaboration with the research initiative Green Value Creation/Circular Economy at IØT.

The project is open for two groups of two or three students.

Supervisor: Arild Aspelund, arild.aspelund@iot.ntnu.no

SFU09 International Marketing Strategies

The Norwegian economy is becoming ever more internationalized. Which also means that Norwegian firms are seeking to exploit international business opportunities. Currently, two trends are shaping international competition, and hence, international marketing strategies for Norwegian companies. That is digitalization and sustainability. Digitalization provides firms with a completely new toolbox for international expansion including digital market platforms, digital communication and visualization tools, blockchain technologies and digitally enabled mass customization systems. The global focus on sustainability provides Norwegian industry with an opportunity to export sustainable business solutions. As strict environmental regulations have been the norm in Norway for decades, and similar regulations are currently being implemented abroad, it renders Norwegian industry with a competitive advantage (Porter and Van Der Linde, 1995).

In this project we study how digitalization and sustainability shape international growth strategies of Norwegian companies and seek to establish best practice – how do the best actors build sustainable, digital international marketing strategies?

The project is a collaboration with two ongoing research projects at the department. The first is in collaboration with Innovation Norway, which are currently rethinking their approach to internationalization strategies. The other is "Fremtidens Forsystemer" – a project to investigate the potential internationalization of advanced digital feed systems. Hence, your study will be valuable input in shaping Norwegian policies and for the internationalization strategies of individual firms. This is a good opportunity to make real impact!

The project can be solved both qualitatively through case studies, or quantitatively through survey data. This is up to you. The project can make both case firms and survey data available and can cover costs of new data collection if needed.

We invite interested students to contact supervisors listed below for more information about the possibilities in the project and to define more specifically what this project can entail for you.

This project is in collaboration with the research initiative Green Value Creation/Circular Economy at IØT.

The project is open for two groups of two or three students.

Supervisors: Arild Aspelund, arild.aspelund@iot.ntnu.no and Øystein Moen, oeystein.moen@ntnu.no

SFU10 Corporations as investors (CVC) in emerging green technologies

Green technologies are necessary to reduce emissions, and there is an urgency to accelerate the development from emerging to mainstream technologies through diffusion and market commercialization. Green ventures, referring to entrepreneurs who bring forward green technology, have increasingly raised investments from Venture Capital (VC) to finance their commercialization phase. Among the VCs, Corporate Venture Capital (CVC) is perceived as having great potential in accelerating technology commercialization. It provides startups with access to corporate resources such as R&D capabilities, market knowledge, and distribution channels, thereby aiding them in commercializing innovations. The heightened focus on the green transition has resulted in increased pressure on corporations from both external and internal stakeholders to invest more in green technology. However, this might lead to an increase in tensions from between stakeholders in the corporations because there are different expectations regarding long-term innovation and short-term profitability. Particularly, the green elements might create additional tensions since pursuing sustainable innovation might affect the firm's short-term profitability.

In this master thesis project, we would like to explore CVC investors, and especially the interplay between different stakeholders in the CVC green investment, including the parent firm, CVC unit, and co-investors (other VCs), and how this impacts their strategies and green technology commercialization.

The project can take the perspective of the **parent firm**: How do they diversify their investment portfolio? How does the green transition influence their risk approach? How do they balance tensions between long-term innovation and short-term profitability? Another perspective can be from **the CVC unit:** How do they develop their investment strategies? How do they collaborate with other VCs as co-investors?

This project is connected to a PhD project researching green CVC investors. We invite interested students to contact the supervisors listed below for more information about the project's possibilities. The project is suitable for a group consisting of 2 to 3 students.

Supervisors: Øyvind Bjørgum, oyvind.bjorgum@ntnu.no, Roger Sørheim, roger.sorheim@ntnu.no, Nurina Heratri, nurina.heratri@ntnu.no

SFU11 Climate risks in Norwegian firms
Climate change confronts our society with substantial risks. In this project, we will focus on how climate risk not only poses threats but also opportunities for firms and industries. Climate risks can be *physical risks* that arise from the physical effects of climate change (e.g., less/more precipitation, higher ocean temperatures). Climate risks can also come as *transition risks* which follow from the societal, technological, and economic transformation associated with a low-carbon future (e.g., changes in customer preferences, changes in access to finance, or regulative changes).

This project seeks to enhance our understanding of climate risk, how firms assess it, and how it affects their decision-making. For instance, climate risk might, sooner or later, directly impact firms' existing products and markets, which might induce (or force) them to explore new business opportunities in new markets and/or technologies.

Potential research questions might be:

- What is climate risk and how does it affect businesses?
- How does climate risk affect short- and long-term strategic responses and investments decisions?
- How does climate risk impact firms' innovation strategies?

In the autumn, student(s) will focus on writing a literature review on climate risk for firms, while there is a need to collect empirical data for the master thesis.

Supervisors: Øyvind Bjørgum (oyvind.bjorgum@ntnu.no), Marta Angelica Oliveira Morais Storz (marta.morais-storz@ntnu.no)

SFU12 Firm investment strategies in the Norwegian oil & gas industry
The Norwegian oil & gas industry are experiencing a surge in production and investments, in large parts due to the war in Ukraine. However, changes are sooner or later bound to happen, and the industry faces increasing pressure to reduce carbon footprints due to, for example, environmental concerns and Norway's commitment to the Paris Agreement.

This assignment focuses on how companies in the Norwegian oil & gas industry balance their innovation strategies between current and future business areas. More specifically, we want to study the development of their innovation strategies, and how they balance between current investments within oil & gas and innovation activities linked to green industries such as renewables where the profit potential is uncertain and in the future.

This is highly relevant, as we currently see huge profitability among O&G supplier firms, while relevant renewables industries such as for example offshore wind and hydrogen-solutions are facing uncertainties related to regulations, markets, and technologies that influence their investment attractiveness. Also, we know from earlier research that to enter new and complex industries such as renewables, having a long-term perspective is important.

Thus, we will investigate how firms balance between exploiting today's highly profitable business activities in O&G and innovation activities within highly uncertain industries, and also how they do this over time.

The empirical context will be Norwegian suppliers ("underleverandører") to the O&G industry. They are present all over Norway and are extremely important for our economy and job creation, not only on a national, but specifically also on a local level.

In the autumn, student(s) will focus on writing a literature review on a topic chosen together with supervisors, while there is a need to collect empirical data for the master thesis. This assignment is part of the research center FME NTRANS and potential costs for data collection can be covered. Both

quantitative and qualitative methods are possible in this project, please contact me for more information.

Supervisors: Øyvind Bjørgum ([oyvind.bjorgum@ntnu.no)](oyvind.bjorgum@ntnu.no)

SFU13 Digitale verktøy og internasjonal vekst

Digitalisering gir en rekke nye muligheter for små og mellomstore bedrifter når det gjelder organisering av gjennomføring av internasjonale vekststrategier. Blant disse er bruk av ulike typer sosiale media for profilbygging, kundekontakt, salg samt service og support. Samtidig som det eksisterer muligheter, kan bedrifter også oppleve negative kampanjer eller utpressing knyttet til omtaler på digitale kanaler. I tillegg vil automatisering av bruk av AI-løsninger inngå i det totalbilde en ser.

I denne oppgaven tenkes det først i prosjektoppgaven å utvikle en forståelse av state-of-the-art når det gjelder bruk av sosiale media som en del av internasjonale vekststrategier. I masteroppgaven tenkes kombinasjon av casestudier av virkelige situasjoner samt innhenting og bruk av datasett for statistiske analyser av det som faktisk skjer. Dersom det vurderes hensiktsmessig kan det å profilere elementer relatert til bærekraft som konkurransefortrinn i internasjonale markeder gjennom bruk sosiale media vektlegges særskilt.

Veiledere vil være førsteamanuensis II Erik Sæther (erik@6am.no) og professor Øystein Moen (oystein.moen@ntnu.no).

SFU14 Harnessing the power of heterogeneity

Harnessing the power of heterogeneity is more than a matter of policies to assure diversity; it is about making sure that diverse voices are heard and that their unique contributions are appropriately integrated into solutions. The challenge of integrating diverse perspectives is not simply a moral imperative of interest only to those groups that are historically marginalized. It is a challenge for managers seeking to leverage diversity to drive innovation and increase their organization's sustainability and competitiveness, and it is a challenge for breaking down many obstacles to devising sustainable solutions globally (George et al., 2016).

In this project we seek to understand how heterogeneity of perspectives can be fruitfully harnessed for innovative outcomes (Baer et al., 2013). Relatedly this project seeks to understand the role of belongingness (Bryer, 2020; Shore et al., 2011, p. 1265) in innovation in teams and organizations.

The project is open for one group of students. Interested students are welcome to contact the supervisor listed below.

Supervisor: Associate Professor Marta Morais-Storz marta.morais-storz@ntnu.no

SFU15 The Role of Collaboration in Circular and Sustainability-Oriented Business Model Innovation

Collaboration, as a way to share knowledge, is increasingly important for organizational innovation and performance (Hansen, 1999; Hansen & Nohria, 2004). Collaboration has also been identified as a key element in achieving sustainable business model innovation (Bocken & Geradts, 2020; Foss & Saebi, 2018). Nevertheless there are tradeoffs to collaboration that must be addressed (Heiman & Nickerson, 2002).

In this project we see to understand the role of collaboration in sustainability-oriented and/or circular business model innovation, and to build knowledge about the specific ways in which collaboration influences circular/sustainability-oriented business model innovation.

For the empirical portion of this project, it may possible to connect with NTNU's AluGreen consortium of companies.

The project is open for one group of students (max. 3 members). Interested students are welcome to contact the supervisor listed below.

Supervisor: Associate Professor Marta Morais-Storz marta.morais-storz@ntnu.no

References:

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SFU 16 The role of discovery-driven approach in innovation and performance

In an increasingly dynamic competitive environment where advantages are progressively transient (McGrath, 2013), it is important to be able to envision the unknown and imagine the scenarios where new ventures will create anticipated value. In such a context, a discovery-driven approach (mindset or orientation) where experimentation and learning is emphasized, is important (McGrath, 2019). While research has suggested that returns on innovation are inverse to the resource allocation (Nagji & Tuff, 2012), organizations seem to persistently under invest in transformative innovation and in managing a portfolio of options that will allow them to learn and adjust investments in the future accordingly (McGrath, 1999).

In this project we seek to investigate discovery approaches (mindsets or orientations), how options reasoning is manifest in practice, and whether and how they foster innovation and competitive advantage.

The project is open for one group of students. Interested students are welcome to contact the supervisor listed below.

Supervisor: Associate Professor Marta Morais-Storz marta.morais-storz@ntnu.no

SFU17 The role of human problem formulation in AI solutions

Albert Einstein is often credited with stating that "the formulation of a problem is often more essential than its solution, which may be merely a matter of mathematical or experimental skill". Problem formulation involves defining the problem space, understanding and taking account of stakeholder's needs, and delineating constraints. While a diversity of perspectives is essential for arriving at a comprehensive understanding of a problem (Morais-Storz, 2019; Morais-Storz et al., 2021), there are several impediments that derive from heterogeneous information sets, objectives, and cognitive structures (Baer et al., 2012).

Given that the quality of the solutions that AI is able to generate is determined by how the problem requiring a solution was formulated (Brynjolfsson & Mitchell, 2017), it is important to understand how those problems are being defined and generated in organizations (and their teams) where AI has been introduced in integrated in work processes.

In this project we seek to understand the role of human problem formulation in AI solutions, and in particular explore problem formulation methodologies (Buyukdamgaci, 2003; Ellspermann et al., 2007; Vernon & Hocking, 2014) and investigate their appropriateness for use in a context of human-AI collaboration.

The project is open for one group of students. Interested students are welcome to contact the supervisor listed below.

Supervisor: Associate Professor Marta Morais-Storz marta.morais-storz@ntnu.no

References:

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SFU18 Generating Breakthrough Innovation by Abduction

In an increasingly dynamic world with rapid technological developments and shifting consumer preferences, generating new solutions is more important than ever. Several theories of entrepreneurial creation (innovation) have been postulated. One is that entrepreneurial opportunities are created, a second is that entrepreneurial opportunities are created (Alvarez & Barney, 2007; 2010), whereas others have argued that the truth is somewhere in between, and innovation is a result of entrepreneurial judgment (Foss & Klein, 2012; 2017). Yet another explanation is that innovation is the result of a design process (Roger, 2009; Simon, 1969).

What is left largely unexplored is how now solutions are created through abductive thinking. Abduction is a form of inference that differs from inductive and deductive inferences. Whereas deduction shows what must be true if the major and minor premise both are true (climbing down the latter of inference, moving from the general to the specific), and induction shows what is empirically true (climbing up the latter of inference, moving from up the specific towards the general) (Sætre & Ven de Ven, 2021, 2024). Abductive inferences are the weakest form of inference and only show what may be true (Peirce, 1998). Abduction is a process for being systematic about discovery, and for generating and evaluating multiple plausible hunches (Sætre & Van de Ven, 2021; 2024). Abductive thinking fits hand and glove with the notion of entrepreneurial judgment.

This project and master thesis project consists of two main parts. First, is to review the literature on abduction and translate it into an innovation context. And second, is to go into one or more organizations and study an actual innovation or new product development process through observation and interviews.

We have ongoing collaboration with the following companies, (though I have not yet approached any of them about this project):

- Elkem
- DNB
- Norsk Helsenett
- Norconsult
- Sparebank 1 SMN
- Equinor

However other organizations may also be considered suitable data collection sites.

This project is suitable for one group of 2-3 students (but alas not for single students).

Advisor: Professor Alf Steinar Sætre

References
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SFU19 The Role of Social Integration Mechanisms is Innovation

Among the intra-organizational drivers of absorptive capacity (Cohen & Levinthal, 1990) and innovation (Van de Ven 1986), various mechanisms that enable and enhance social interactions among members of the organization – labeled *social integration mechanisms (SIMs)-* have been proposed to be of critical importance (e.g. Zahra & George, 2002; Todorova & Durisin, 2007; Enkel et al., 2018; Vega-Jurado et al., 2008; Distel, 2019; von Briel et al., 2019). As the four processes – acquisition, assimilation, transformation and application of the knowledge – that are typically seen as core dimensions of absorptive capacity (Zahra & George, 2002; Todorova & Durisin, 2007) - in essence are made up of social interactions among individuals (Todorova & Durisin, 2007; Spithoven et al., 2010), it is reasonable to expect that enhancing such interactions should be fundamental for improving organizations' absorptive capacity and hence innovation. Social integration mechanisms are also of particular interest from a practical perspective, as they include mechanisms that are mostly within the direct control of managers and thus might represent an "easier-to-fix" driver of innovation. However, our knowledge of how exactly social integration mechanisms influence innovation activities in organizations is still limited.

This project is an extension of recent quantitative analyses of SIMs role in absorptive capacity (Davila, Andreeva & Sætre), and involves a qualitative study of SIMs in innovation projects in organizations.

We have ongoing collaboration with the following companies, (though I have not yet approached any of them about this project):

- Elkem
- DNB
- Norsk Helsenett
- Norconsult

-   Sparebank 1 SMN
-   Equinor

However other organizations may also be considered suitable data collection sites.

This project is suitable for one group of 2-3 students (but alas not for single students).

Advisor: Professor Alf Steinar Sætre

References

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SFU20 Circular Economy in Offshore Wind Energy

Offshore wind energy is one of the key renewable technologies that is developing at an unprecedented rate. However, there have been concerns over its end-of-life scenarios, as several offshore wind farms are approaching their end-of-life in the 2030s. Presently, the waste produced at end-of-life of offshore wind farms is managed by a 'take-make-use-dispose' or linear economy, which has only economic benefits. However, to protect human well-being and return the resource use within the acceptable limits, transition to a 'closed-loop system' which maintains the technical value of the material, is necessary. These kinds of 'circular' systems achieve not only economic benefits but also offer social and environmental benefits (Velenturf & Jopson, 2019).

Despite offering a range of benefits, the academic literature on circular economy in the offshore industry is limited (Jensen et al., 2020; Velenturf, 2021). The sustainable solutions to manage the waste generated by the offshore wind industry are under-developed (Velenturf, 2021), and related standards and legislations are found to be highly country-specific (Beauson et al., 2021). In addition to that the business case of circular economy strategies was found to be affected by lack of volumes, technology-

scaling related issues, developing localized supply chains and local markets to sell the processed good. Cumulatively, it can hinder development of circular economy in the offshore wind industry.

This master thesis project aims to investigate what barriers different actors face while developing the circular value chain, and which of these actors must take the central role to increase the adoption of circular economy strategies in offshore wind industry. The project is open for one group of two or three students.

Supervisors: Pankaj Ravindra Gode   Pankaj.r.gode@ntnu.no   and   Arild   Aspelund, arild.aspelund@iot.ntnu.no

References

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SFU21 Impact from disruptive innovations in rural communities – Forestry 4.0

The success (financial, social and environmental) of radical and disruptive innovations is challenging to validate since they differ from existing portfolios of technologies, customer needs and business models. To perform early validation of innovation projects is vital because of their large impact on success, but at the same time challenging because of the high technological and commercial uncertainly and fuzziness.

Telenor in an international corporation providing tele, data and media communication in eight markets in two regions: Nordic and Asia. Telenor wants to be a driving force within digitalization using state of the art 5G, IoT and AI technologies. Currently, Telenor is engaged in the research and innovation project COMMECT with the aim of supporting the forestry industry with 5G/IoT and AI enables solutions (Forestry 4.0). This industry is characterized by low degree of digitalization, low degree of innovation, employees with low level of education, low-income level, and male dominance – all in all creating barriers for recruitment to the industry. Moreover, it typically is found in rural areas, where the wireless broadband availability is low.

The pre-thesis assignment (fordypningsprosjekt) should preferably cover the following topics:

- A literature review on the radical and disruptive innovation concept and its significance. Describe preferred models for development and implementation of radical/disruptive innovations.

- A literature review on methodologies for validation of radical and disruptive innovations. Address a broad set of validation parameters such as technological performance, user acceptance and well as social, economic and environmental impact etc.

- Suggest method for validating success of radical and disruptive innovations at early stages of the development and implementation process. Discuss how the method could be applicable for Forestry 4. use-cases

The assignment is open for three-four students:

- Supervisor: Prof. II, Per J. Nesse, NTNU Indøk. and Telenor Research and Innovation, e-mail: per.nesse@ntnu.no, Mobile: 90830948

SFU22 Digitale plattformer og sirkulære verdikjeder

Flersidige plattformer har blitt stadig mer anerkjent som en muliggjørende teknologi for sirkulære verdikjeder. Dette til tross for at forskere fortsatt sliter med en manglende dyp forståelse av de ulike rollene flersidige plattformer kan spille for å muliggjøre samarbeid mellom organisasjoner i verdikjeder for å fremme skapelsen av sirkularitet. Dette fordypningsprosjektet omhandler litteratursøk omkring teori om flersidige plattformer og sirkulære verdikjeder, med mulighet for masteroppgave med fokus på å undersøke empirisk hvordan flersidige plattformer kan bidra til å muliggjøre sirkulære verdikjeder.

Veileder: Førsteamanuensis Jørgen Veisdal - jorgen.veisdal@ntnu.no

Referanse: Franzò & Urbaniti (2023) - Managing resource loops in circular supply chains: A taxonomy of multi-sided platforms in the B2B setting. *Industrial Marketing Management* 115, pp. 185-197.

SFU23 Innovation Readiness, Openness, Access and Knowledge Flow

The public is funding innovation through research from universities and with funding to R&D projects. Contribution to innovation, through knowledge transfer and commercialization of research results, is a core objective for universities. Collaboration between universities, industry and the public sector is crucial to ensure the utilization of the research. The Norwegian government spends around 15 billion NOK on sponsoring firms' R&D with public grants, loans, advice, and other services.

A question is to what regard the tax-payers' money is used to create knowledge monopolies - where one firm alone profits – or open science where the knowledge can be used by all for more innovation. Another question is that research shows that open science can be a profitable strategy for a firm, independent of possible public funding.

The contracts between the parties frame how they control access to the R&D results. Intellectual property such as patents, copyright and trade secrets are key mechanisms in controlling and leading transitions. The understanding of open innovation and collaboration between universities, research institutes, firms and the public sector is essential for creating circular economies and technology standards. Developing technology platforms as diverse as the 5G mobile networks and the gene-editing CRISPR technology depends on successfully managing openness and thus the related

intellectual property. Openness, access and knowledge flow from public-funded research can be studied both on an innovation system level or at the firm level. There is a rich material of publications from the supervisors. Data can be analysed further or enhanced with qualitative studies (see https://www.fpol.no/dehns/ and https://hdl.handle.net/11250/3054379).

The project connects to developing practical tools for R&D project managers, steering groups and sponsors with a base in NTNU Technology Transfer AS www.ntnutto.no and Dehns www.dehns.com An interesting option is to create an add-on to the KTH innovation readiness level tool, see KTH Innovation Readiness Level™ – A method, visual tool, and resource library guiding the development from early stage idea to innovation on the market

The project can be solved qualitatively through case studies with interviews or quantitatively through surveys and public data. We invite interested students to contact the supervisors listed below for more information about the possibilities in the project and to define more precisely what this project can entail for you. The project is open for one group of two or three students.

Supervisor: Haakon Thue Lie, haakon.thue.lie@ntnu.no / htlie@dehns.com and optionally Head of IPR at NTNU Technology Transfer, Knut Jørgen Egelie, PhD knut.egelie@ntnu.no. This project suggestion relates to the department's strategic research initiative *Leading transitions: Co-create a sustainable future*

SFU24 Innovation, trade secrets, psychological mechanisms and workforce mobility

Firms control their innovation through what the research literature calls "appropriation mechanisms". These mechanisms are primarily intellectual property such as copyright, trade secrets, patents, designs and trademarks – but combined with, for example, human resource management, lead time advantages and revealing strategies. Whereas patents and copyright are legal constructions, trade secrets are more dependent on mechanisms such as psychological contracts.

There is rich literature on each of these mechanisms used separately. However, firms use the mechanisms in combination. For example, a crucial part of an artificial intelligence solution could be controlled by copyright to the software, database rights to the collection of data used for machine learning combined with trade secrets in the form of the researchers' skills in selecting the datasets for training. There are few publications on how firms manage this mix of appropriation mechanisms, how the managers decide on their blend of openness and secrecy and how this affects the personal knowledge of employees.

A theoretical foundation is in the knowledge-based view of innovation and in the framework "Profiting from Innovation" by David Teece. At the core is value creation and the interaction of the firms' processes with the available appropriation mechanisms. However, in the future **the technology-based organizational design** that creates the appropriation mechanisms will be supported by artificial intelligence. In parallel our understanding of the psychological mechanisms evolve.

There is data that can be analysed further or be enhanced with qualitative studies (including a 2021 survey for the Department of Trade and Fisheries). The workforce mobility issues are discussed in

Chapter 19 of "Norsk arbeidsliv mot 2050", see
https://oa.fagbokforlaget.no/index.php/vboa/catalog/view/6/7/39

The project can be solved qualitatively through case studies – both in entrepreneurial firms or established enterprises - or quantitatively through surveys and public data. I invite interested students to contact me for more information about the possibilities in the project and to define more precisely what this project can entail for you.

The project is open for a single student or one group of two or three students.

Supervisor: Haakon Thue Lie, haakon.thue.lie@ntnu.no / htlie@dehns.com .

This project suggestion relates to the department's strategic research initiative
Technology-based organization design

SFU25 Collaboration in the transition towards circular/sustainable business models

The change from a linear to a sustainable, circular economy is a necessity for staying within planetary boundaries. Businesses play a significant role in this transition: they are the ones making sustainable production possible and supporting sustainable consumption within their markets. With its high overall presence worldwide and in Europe, and thus a cumulative large impact on economic, social and environmental issues, also start-ups and small businesses need to take their responsibility. In recent years, attention has grown for the development and implementation of sustainable business models (SBM). These "aim at solutions for sustainable development by creating additional monetary and non-monetary value by the pro-active management of multiple stakeholders and incorporate a long-term perspective" (Geissdoerfer et al., 2018). Different studies have looked at available methods and practices that support small business to shift from traditional to SBMs (Tsvetkova et al., 2020) and mapped supporting and hindering factors for the development and implementation of SBMs. Literature shows that a lack of interdisciplinary collaboration and coordination comes forward as the largest barrier, hindering the establishment and growth of SBMs in start-ups or small businesses and their supply chains. However, collaborations and partnerships that bring together multiple stakeholders in the development and implementation of SBMs remain underexplored (Pedersen et al., 2020). In addition, working with SBMs asks for interdisciplinary approaches, integrating different perspectives and knowledge from different fields, as well as a variety of skills that are needed to shed light on social, economic and ecological aspects of SBMs. An overarching research question within this topic is: How can interdisciplinary collaboration support start-ups and small businesses in the transition towards sustainable business models?

Students are welcome to work in pairs and can choose a specific industry or industrial value chain to focus on, such as battery or other renewable energy, textile, construction, or another industry in agreement with the supervisor.

Supervisor: Associate professor Elli Verhulst (elli.verhulst@ntnu.no)

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