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IRISgroup

Was UNIK Unique?

Evaluation of effects from the Danish research excellence initiative UNIK

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1.1 ENGLISH SUMMARY

UNIK (Investment Capital for University Research) was an ambitious research excellence initiative launched in October 2009 by the Danish Ministry of Science, Technology and Innovation[1].

The initiative funded four interdisciplinary research programmes at three Danish universities – the so-called "UNIKs". It had the combined aim of promoting new challenge-driven, cross-disciplinary and excellent research, as well as enhancing the capacity of Danish universities to implement large-scale, cross-disciplinary research programmes.

The grants expired in 2014 after having funded the research activities for five years. During the spring of 2015, an international expert panel conducted a final evaluation. The panel had originally selected the four UNIKs and subsequently followed the implementation and progress of the initiatives continuously[2]. The evaluation of the international expert panel assessed the effects of the individual UNIKs in terms of:

- Science and scientific output, i.e. publications, PhD-output, patents and international collaboration.
- Organisation, i.e. the organisational layout, governance-structures as well as departments and faculties participating.
- Embedment, i.e. the continuation of the activities, employment of faculty members, etc.

The final evaluation pointed out that, *"(…) the four UNIK initiatives (…) have excelled in both quantity and quality in a wide range of parameters such as novel approaches, high quality research, internationalisation and promotion of cross-disciplinarity".*

However, while the international experts concluded that UNIK was an *effective* funding mechanism in terms of producing science outputs, it did not document whether UNIK's effects could have been achieved through other forms of research funding.

Moreover, there is a need to evaluate in further details how UNIK – as a new, experimental research funding scheme – created value to the host universities as well as for thoses universities that applied for the initiative, but did not host a UNIK.

[1] The current Ministry of Higher Education and Science.

[2] Ministry of Higher Education and Science (2015): "Annual report 2014 and final evaluation from the UNIK Expert panel"

This evaluation will qualitatively assess the added, distinctive effects of the UNIK-initiative. It also answers the question: If so, in which way was UNIK unique as an instrument of research funding? In doing this, it also compares UNIK to other, existing sources of research funding.

Five questions will guide the evaluation at hand:

- What forms of value creation did the UNIK-grants entail for the host universities besides the direct research result?
- What implications did UNIK entail for the host institutions, e.g. strategy development, strategy implementation and internal organisation?
- How does the impact of the UNIK-initiatives reflect itself in the embedment of the initiatives?
- Do the effects of the UNIK-grants differ from effects of other large research grants? If yes, in what way?
- What effects did the UNIK-process entail for institutions that applied for a UNIK-grant but did not receive it?

The evaluation is based on qualitative interviews with key stakeholders at all eight Danish universities. Hence, universities that hosted a UNIK, as well as those that did not. Furthermore, the interviews have been conducted both at the university management level and at the level of researchers. This in order to get a full picture of the effects at the institutional level and on research.

1.1.1 Key findings

This evaluation generally confirms the positive effects of UNIK found by the international expert panel. The analysis indicates that the initiative:

- Was instrumental in strengthening the institutional coherence and capacity of the host universities. Especially for universities, which underwent mergers at the time, UNIK bridged organisational, cultural and academic gaps between research environments and furthered advanced interdisciplinary collaboration.
- Strengthened academic leadership and administrative capacity to work with large, complex, interdisciplinary research programmes.
- Helped the universities to focus their research strategies.
- Provided a competitive, “high-risk-high-gain” arena in which the universities were compelled to focus strategically on their excellent, interdisciplinary research spearheads.
- Was a highly successful instrument of research funding in terms of creating a basis for novel, ground-breaking, interdisciplinary research with a focus on grand societal challenges. Furthermore, the evaluation indicates that UNIK fostered scientific results that would not easily have emerged through other instruments of research funding.

- Fostered a significant number of young researchers equipped with the skills and mindset to work in cross-disciplinary settings.
- Enhanced international exposure and international networks of the participating research environments vis-à-vis excellent peer environments abroad.

The evaluation shows how these effects can be attributed to UNIK's distinctive scope and form as a funding instrument:

- Scale, i.e. large grants, which compelled the university management, in unison with researchers, to think ambitiously and strategically about the university's comparative strengths and potential cross-disciplinary synergies.
- Scale, which made it possible to finance the high transaction costs of venturing into high-risk interdisciplinary research, e.g. in terms of planning and creating a common language across academic disciplines.
- Scope, i.e. UNIK's focus on novelty, which initiated a process of identifying the research flagships of the institutions and possible cross-disciplinary synergies between them.
- Flexibility and many degrees of freedom, i.e. few ex-ante requirements, regarding topics, conditions, allocation and few requirements regarding documentation. Overall, this entailed a high level of autonomy for the academic leadership.
- Formally, the university management was lead of the application and recipient of the grant, allowing the management to use UNIK as a financial boost for the research priorities of the university and consequently focus the institution's research strategy.
- The role of the international expert panel in monitoring the implementation and progress of the UNIKs as well as providing advice to the university management and researchers.

These features and their resulting effects illustrate that UNIK addressed a gap in the existing Danish research funding system, which no other public or private research-grants currently fill.

In some instances, UNIK constituted a bridge between smaller, novel science projects, currently addressed through the Danish Council for Independent Research, and large-scale, excellence-driven research programs, for example funded by the Danish National Research Foundation, ERC (European Research Council) and certain private grants.

Moreover, some UNIKs functioned as a cross-disciplinary superstructure on top of existing (or former) Centre of Excellences.

Moreover, it created a playground for young researchers that enabled them to work across academic fields.

In addition, UNIK also carried positive effects on – among other things – research excellence, organizational change and the attraction of external funding. However, the magnitude of these effects was more influenced by contextual factors, e.g. pertaining to individual research environments and the institutions they were embedded in. Such contextual factors include:

- The governance structure. That is, the organizational framework and decision-making structure surrounding the individual UNIK at various levels at the university. The specific governance-structure especially influenced the institutional effects, e.g. the subsequent embedment of interdisciplinary collaboration-models.
- The motivation and skills of the individuals who participated. Especially, the academic leadership and research coordinators played a very important role in making UNIK successful.
- The context of institutional mergers played a significant role, constituting a window of opportunity for initiating cross-disciplinary initiatives at some universities.

1.1.2 Challenges and Perspectives

The interviewees were generally in favour of initiating a research excellence initiative like UNIK in the future. There is a shared perception that UNIK "made a difference" in fostering novel science and strengthening institutional capacity. Consequently, it is possible that similar effects could be achieved again.

However, the interviewees emphasised a number of potential challenges and improvements if a similar initiative should be considered in the future.

Originally, UNIK was a policy instrument devised to underpin a broader focus in Denmark on institutional policy. The political impetus was the desire to create strong, capable universities, which could compete with excellent universities worldwide and at the same time support national competitiveness.

It is crucial to ascertain to which extent the original objective of UNIK is still relevant in the current context before taking any decisions on future research excellence programmes.

The answer to this question is not unequivocal. On one hand, the Danish universities have matured significantly during the last decade. Their management and managerial apparatus are more capable than 7-8 years ago. Moreover, all universities have clear and well-defined research strategies.

On the other hand, the process of enhancing the interdisciplinary coherence between academic traditions, research-groups, departments etc. is still a work in progress – and will continue to be so. Interdisciplinary, challenge-driven research is crucial in order to address the grand societal challenges of the future as well as paving the way for tomorrow's industries. In the current Danish research funding landscape there are few public policy instruments available that encourage the type of big-scale, high-risk, novel science that serves these purposes.

Interviews with researchers and respondents from the university managements point to the following:

- It should be considered whether future research excellence initiatives should focus more clearly on fostering novel excellent interdisciplinary research areas, and less on institutional capacity building.

- Some universities (especially those that did not host a UNIK) expressed how the assessment criteria of UNIK – namely the weight of excellence vis-à-vis novelty – were unclear. Hence, some interviewees felt that the applications in the end were evaluated more on the basis of traditional criteria rather than novelty and cross-disciplinarity. Although there is not per se a contradiction between excellence and interdisciplinarity, future calls should be more explicit on which assessment criteria will be emphasised in the evaluation.
- A key issue, brought up by all UNIKs (and the international expert panel), concerns the time frame of five years. The time-horizon is generally viewed as being too short for ambitious, original research programmes. The first two years were typically spent on preparations e.g. facilities, research programmes, management, recruitment etc., leaving only a few years to the core research activities. According to the universities, this led to a situation in which researchers at an early stage began focusing on possible jobs after the expiration date of the UNIKs, thereby making the progress of research more volatile.
- Consequently, the interviewees expressed the desire to continue the successful elements and activities of the UNIK, by being able to apply for an extension after the five-year period. Future initiatives should feature the option of extending (parts of) the grant following an evaluation and re-application. The 6+4 year model of the Danish National Research Foundation could, in that regard, serve as a template.
- Likewise, whereas UNIK had a positive effect on the internal coherence of the host universities, it did not encourage a collaborative culture among research environments across universities. Hence, future research excellence initiatives should consider fostering inter-institutional collaboration as a mean to enhance scientific research objectives.
- The size of grants were well suited to support research programs anchored in natural science, health or technical science. But, as our interviews with non-UNIK universities indicate, the size is generally too large for programs anchored within humanities or social science. It is, however, important to note that the call did not specify a specific size of the grants, and applicants were free to apply for smaller grants.
- The universities unanimously problematize what they perceive as the "hollowing out" of institutional core funding relative to external funding. There exist a general trend where universities are required to fund more activities from external funding without a proportional increase in institutional core funding. Initiatives such as UNIK require large investments in laboratories, conferences, organization, facilities etc., which strains core funding. Future research excellence initiatives should consider the spin-off costs (in addition to the 44 pct. overhead, which was provided) associated by hosting such an initiative.
- The expert panel played a key role in making UNIK a success. Future initiatives should also use this or a similar model. Future panels could consider involvement from non-academic members.

- One host university emphasised the difficulties of establishing a well-functioning governance-model supporting the UNIK. Future initiatives could require a more detailed specification of the governance-model, so a suitable organisation is in place for both the university management and scientific researchers from the beginning.
- One university pointed out that it could be useful with a small associated pool of money to finance feasibility studies before making the application. According to the university, this could secure a better identification of research topics. In connection with future initiatives this could be considered as a possible add-on to the scheme.
- Likewise, it could be considered whether it should be possible to apply for smaller grants to examine the business potential of an idea or a patent emerging from the research activities.

1.1.3 UNIK compared to other funding sources

This evaluation shows that UNIK generally created a combination of effects, which are distinctive for this instrument of research funding.

Therefore, UNIK did indeed create added value for the universities, and any other instruments of research financing could most likely not have achieved the totality of UNIK's effects.

Key observations include that:

- Institutional core funding is typically disbursed much more evenly across the universities' activities. Furthermore, it is to a large extent tied to technical-administrative costs and salaries leaving a little room for the same degree of strategic focus present in UNIK.

  As the Interdisciplinary Centres at the University of Aarhus as well as the 2016-pool at the University of Copenhagen show, it is to some extent possible to prioritise basic funding for similar initiatives. However, the scale and scope of these internally financed grants are significantly lower than UNIK.
- The Danish National Research Foundation's Centres of Excellence or the European Research Council's (ERC) grants are generally narrower in scope, focusing on specific, excellent research environments. Generally, they do not contain the same level of involvement from different levels of the institution and across academic fields.
- Large private endowments are at times significantly larger than UNIK[3]. Therefore, such grants also become strategic priorities for the university management. However, they do usually not involve the same level of intra-institutional collaboration. Furthermore, they are often to a great extent earmarked for specific purposes.
- The Danish Council of Independent Research generally disburse much smaller grants, among other things with the purpose of supporting the broad base of young researchers

[3] In some cases, significantly larger. For example, the Novo Nordisk Foundation granted 1.1 billion DKK for use over ten years to the Center for Biosustainability at DTU in 2010-12.

in their careers. These grants do not have the same strategic, institutional impact, nor interdisciplinary inclination as UNIK.

- The toolbox of Innovation Fund Denmark is generally much more focused on academia-business collaboration with clear short-term milestones and deliverables that more directly can be transformed into value for businesses etc. In comparison, UNIK carries a more long-term potential, supporting novel challenge-driven research that in time could lead to the development of industries or business opportunities, which do not exist today.

1.2 DANSK SAMMENFATNING

UNIK (UNiversiteternes Investerings Kapital) var et ambitiøst forskningspolitisk initiativ, der blev lanceret i oktober 2009 af det daværende Ministerium for Videnskab, Teknologi og Innovation[4].

Det primære formål med initiativet var at fremme forskning i verdensklasse på de danske universiteter. Desuden havde initiativet til formål at styrke universiteternes institutionelle kapacitet – herunder institutionernes autonomi, ledelseskraft og evne til at gennemføre tværdisciplinær forskning – på et tidspunkt, hvor universitetssektoren gennemgik en række omfattede forandringer.

UNIK-midlerne blev udmøntet til excellente, nyskabende forskningsprogrammer (de såkaldte "UNIKer"), der havde stor strategisk betydning for det enkelte universitet såvel som betydning for dansk forskning generelt. Derudover blev der lagt vægt på, at de enkelte UNIKer skulle munde ud i synergiskabende, excellent og internationalt anerkendt forskning på et lovende forskningsområde.

Der blev afsat 480 mio. kr. til UNIK. Efter en konkurrence mellem 28 projektansøgninger blev puljen fordelt på i alt fire forskningsprogrammer på tre forskellige universiteter (KU, DTU og AU);

- Forskning i at forstå hjernen bedre (MINDLab)
- Design af kunstige biologiske systemer (Centre for Synthetic Biology)
- Lagring af vedvarende energi via katalyseteknologi (CASE)
- Forebyggelse af livsstilssygdomme (Food, Fitness and Pharma for Health and Disease).

Bevillingerne udløb i 2014. I foråret 2015 blev de enkelte UNIKer evalueret af et internationalt ekspertpanel. Panelet var i sin tid blevet nedsat til at evaluere ansøgningerne og udvælge de UNIK'er, der blev indstillet til at opnå finansiering, og har løbende fulgt deres udvikling og resultater.

Panelets afsluttende evaluering konkluderede, at UNIK var en succes målt på en lang række kvantitative parametre som fx publikationer, ekstern finansiering, antal ph.d.er, post.docs, patenter mv. Herudover pegede evalueringen bl.a. på, at UNIK medvirkede til at fremme excellent, tværdisciplinær forskning samt internationaliseringen af værtsinstitutionerne.

Men selv om evalueringen viste, at UNIK resulterede i et stort videnskabeligt output, så blev det ikke kortlagt, hvorvidt effekterne kunne have været opnået gennem andre, eksisterende typer forskningsfinansiering.

Derudover er der behov for i nærmere detaljer at evaluere, hvordan UNIK – som et nyt, eksperimentelt instrument til forskningsfinansiering – har skabt værdi for værtsuniversiteterne og ansøgere.

[4] I dag: Uddannelses- og Forskningsministeriet

Formålet med denne effektevaluering er således at skabe et kvalitativt supplement til ekspertpanelets slutevaluering. Effektevalueringen skal belyse UNIK-virkemidlet holdt op mod andre store forskningsbevillinger, samt hvorvidt og hvordan UNIK-initiativet har påvirket de ansøgende institutioner (inkl. de institutioner, der ikke modtog midler) strategisk og organisatorisk.

Fem spørgsmål ligger til grund for denne evaluering:

- Hvilken værditilførsel har UNIK-bevillingerne medført for værtsinstitutionerne – ud over de forskningsmæssige resultater?
- Hvilken betydning har UNIK haft for værtsinstitutionerne, fx i forhold til strategiudvikling, strategiimplementering og organisering?
- Hvordan afspejles UNIK-initiativernes betydning i indlejringen af initiativerne?
- Adskiller effekten af UNIK-bevillingerne sig fra effekten af andre store forskningsbevillinger? Hvis ja, hvordan?
- Hvilken effekt har UNIK haft i forhold til de institutioner, der ikke modtog bevilling?

Evalueringen tager udgangspunkt i en række kvalitative interviews med ledelsesrepræsentanter og nøgleaktører på alle danske universiteter – inklusive de universiteter, som ikke modtog bevillinger.

1.2.1 Hovedkonklusioner

Overordnet bekræfter denne effektevaluering de hovedresultater, som det internationale ekspertpanel også identificerede.

Vores konklusion er, at følgende effekter entydigt kan tilskrives UNIK:

- Medvirkede til at styrke den institutionelle kapacitetsopbygning og organisatoriske sammenhæng på de deltagende universiteter. Især for de institutioner, der havde gennemgået fusioner, fungerede UNIK som et middel til at bygge bro mellem forskningsmiljøer og fremme tværdisciplinær forskning.
- Skabte grundlag for stærkere ledelse og styring af store, tværdisciplinære forskningssatsninger.
- Medvirkede til at fokusere universiteternes forskningsstrategier.
- Var medvirkende til at etablere et solidt grundlag for nyskabende, banebrydende og tværdisciplinær forskning – med fokus på store samfundsmæssige udfordringer. Effektevalueringen peger endvidere på, at UNIK skabte forskningsresultater, som sandsynligvis ville have være vanskelige at opnå i samme omfang via andre, eksisterende instrumenter i det offentlige forskningsfinansieringssystem.
- Stillede universiteterne i en risikofyldt – men potentielt udbytterig – konkurrencesituation, hvilket fordrede, at universiteterne selv fokuserede strategisk på deres excellente, tværfaglige spydspidser.

- Udklækkede et betragteligt antal unge forskere, der udviklede tværdisciplinære kompetencer samt et tværfagligt mindset.
- Styrkede de deltagende universiteters internationale eksponering og netværk ift. excellente miljøer i udlandet.

Evalueringen viser desuden, at disse effekter i høj grad er et resultat af en række særlige egenskaber ved UNIK vis-a-vis andre typer forskningsfinansiering. Disse særtræk omfatter:

- **Skala**. Det vil sige store bevillinger, der medførte, at universitetsledelsen og forskerne tænkte ambitiøst og strategisk omkring universitetets komparative styrker og potentielle tværfaglige synergier.
- **Skala.** UNIKs størrelse gjorde det muligt at finansiere de store transaktionsomkostninger, der er forbundet med at igangsætte tværdisciplinlre forskningssatsninger, fx i form af organisering, planlægning og udfordringer forbundet med at skabe et fælles "sprog" på tværs af akademiske siloer.
- **Tværdisciplinær spændvidde.** Det vil sige, at UNIKs fokus på nyskabende forskning fremmede en proces fokuseret på at identificere institutionernes forskningsmæssige flagskibe og potentielle synergier mellem forskningsområder.
- **Fleksibilitet og store frihedsgrader**. Initiativets relativt få tildelingskriterier, fx i forhold til emner, afrapportering, dokumentation og udbetaling af tilskud, skabte en betydelig autonomi for den akademiske ledelse.
- **Universitetsledelsens rolle som bevillingsmodtager og bevillingshaver.** Muliggjorde at ledelsen kunne benytte UNIK til at understøtte universitetets forskningsstrategiske prioriteringer.
- **Det internationale ekspertpanel** spillede en central rolle i etableringen og udmøntningen af de enkelte UNIKer, fx i forhold til rådgivning af forskningsledelsen.

Disse særtræk kombineret med de opnåede resultater indikerer, at UNIK udfyldte et "hul" i det danske forskningsfinansieringssystem.

I nogle tilfælde fungerede UNIK som en brobygger mellem nyskabende, eksperimenterede projekter, som primært finansieres via Det Frie Forskningsråd, og større excellencefokuserede forskningsprogrammer som fx Danmarks Grundforskningsfonds Centres of Excellence (CoE), visse ERC-bevillinger og private fondsmidler.

Andre UNIKer fungerede som en tværdisciplinær overbygning på eksisterende eller tidligere CoE.

Derudover udgjorde UNIK en slags "sandkasse" for unge forskere, som gjorde det muligt for dem at arbejde på tværs af akademiske siloer.

UNIK havde også en positiv indvirkning på tre andre områder – forskningskvalitet, organisatoriske forandringer samt tiltrækning af eksterne midler. Men omfanget af disse effekter varierer på tværs af UNIKerne og er i høj grad påvirket af *kontekstuelle* faktorer. De kontekstuelle faktorer omfatter bl.a.:

- **Styringsmodeller.** Der var på tværs af UNIKerne forskelle i de organisatoriske rammer, forankring af ansvar, organisering af beslutningskompetence samt forankringen i universitetsledelsen. De varierende styringsmodeller havde især betydning for de institutionelle effekter, fx i forhold til indlejring af aktiviteter – og dermed om UNIKerne skabte varige organisatoriske forandringer.
- **Ledelseskompetencer og motivation blandt deltagerne i UNIK-projekterne.** Især kvaliteten af forskningsledelsen og de administrative koordinatorers kompetencer og engagement spillede en central rolle for effekterne på forskningskvalitet vis-a-vis andre finansieringsinstrumenter**.**
- **Fusioner.** For universiteter, der havde undergået fusioner, skabte UNIK et vindue for at stimulere samarbejde og organisatoriske forandringer.

1.2.2 Udfordringer og perspektiver

Interviewpersonerne var generelt positivt stemt for en eventuel relancering af UNIK eller et nyt UNIK-lignende initiativ. Der er blandt interviewpersonerne en fælles opfattelse af, at UNIK har gjort en væsentlig forskel, både for forskningen og den institutionelle kapacitet på universiteterne. Det er ligeledes opfattelsen, at lignende effekter med en vis sandsynlighed ville kunne opnås i et nyt initiativ.

Ikke desto mindre pegede interviewpersonerne på en række potentielle udfordringer og forbedringspotentialer ift. potentielle fremtidige initiativer.

UNIK var oprindeligt et politisk redskab, som blev lanceret med henblik på at understøtte et bredere politisk fokus på institutionspolitik. Der var et mål om at skabe handlekraftige, autonome universiteter, som af egen drift kunne konkurrere med eliteuniversiteter globalt samt medvirke til at understøtte Danmarks konkurrencedygtighed. I forbindelse med et fremtidigt UNIK-lignende initiativ er det naturligvis væsentligt at vurdere, hvorvidt dette behov fortsat er til stede.

Svaret på dette spørgsmål er ikke entydigt. På den ene side har de danske universiteter gennemgået en stor udvikling i løbet af det seneste årti. Institutionernes ledelseskraft og styringskapacitet er i dag væsentligt stærkere end for 7-8 år siden, og alle institutioner arbejder i dag med udgangspunkt i ambitiøse forskningsstrategier.

På den anden side er der stadig brug for at bygge bro og skabe sammenhæng mellem de klassiske akademiske "siloer" – også inden for hovedområderne. Interdisciplinær, udfordringsdrevet forskning er en afgørende forudsætning for at adressere store samfundsmæssige udfordringer, fx inden for klima og aldring, samt for opdyrkningen af fremtidens industrier. I det nuværende offentlige forskningsfinansieringssystem er der ingen finansieringsredskaber, der har et interdisciplinært fokus sammenkoblet med en volumen, der fuldt ud kan sammenlignes med UNIK.

Vores interviews peger på følgende læringspunkter, som bør overvejes i forbindelse med lignende initiativer i fremtiden:

- Forskningsexcellenceprogrammer som UNIK bør fremadrettet fokusere mere på at fremme nye, tværdisciplinære forskningsområder og mindre på institutionel kapacitetsopbygning.
- Nogle universiteter (især dem, der ikke var værter for en UNIK) giver udtryk for, at vægtningen mellem henholdsvis excellence og interdisciplinaritet/originalitet var uklar i det oprindelige opslag. Enkelte interviewpersoner oplevede, at ansøgningerne i sidste ende blev bedømt mere ud fra traditionelle excellence-kriterier end på originalitet og tværdisciplinaritet. Om end der i udgangspunktet ikke er modstrid mellem excellence og tværdisciplinaritet, bør fremtidige initiativer præcisere den relative betydning af de forskellige kriterier.
- Alle universiteter og UNIKer – samt det internationale ekspertpanel – problematiserer tidshorisonten på fem år. Tidshorisonten er i de fleste tilfælde for kort til for alvor at løfte ambitiøse, nyskabende forskningsprogrammer i samme skala som UNIK. De første to år bruges typisk på forberedelse af fx forskningsinfrastruktur, underprojekter, administration, rekruttering osv., hvilket kun levner et par år til kerneaktiviteterne. Ifølge interviewpersonerne medførte dette, at nogle forskere på et relativt tidligt tidspunkt begyndte at fokusere på deres næste job, hvilket medførte ustabilitet og usikkerhed omkring forskningsprojekterne.
- Desuden har interviewpersonerne udtrykt et ønske om bedre rammer for fortsættelse/indlejring af de succesfulde elementer af den enkelte UNIK. Fremtidige initiativer bør indbefatte muligheder for at forlænge aktiviteterne efter endt bevilling. Danmarks Grundforskningsfonds 6+4 ordning kan evt. benyttes som model.
- Om end UNIK har haft en positiv effekt på den interne sammenhæng på værtsuniversiteterne, har UNIK ikke medført en større grad af samarbejdskultur mellem forskningsmiljøer fra forskellige universiteter. Det bør overvejes, hvorvidt fremtidige initiativer bør fremhæve muligheder for projekter på tværs af universiteterne.
- UNIK-tilskuddenes størrelse har været velegnet til at understøtte forskning inden for de "våde" områder, dvs. naturvidenskab, sundhedsvidenskab og teknisk videnskab. Interview med universiteter, som ikke opnåede en UNIK-bevilling, indikerer, at størrelsen på de potentielle UNIK-satsninger blev oplevet som for store til humaniora og samfundsvidenskab, om end der i opslaget ikke var angivet nogen nedre grænse for det beløb, der kunne søges om.
- Universiteterne problematiserer generelt, hvad de beskriver som "udhulingen af basismidlerne" i forhold til ekstern konkurrenceudsat finansiering. Det vil sige tendensen hen imod, at en større andel af universiteternes forskning finansieres af eksterne midler uden, at basismidlerne vokser proportionalt. Initiativer som UNIK kræver typisk betragtelige investeringer i fx laboratorier og andre faciliteter, som ifølge universiteterne kun delvist dækkes af overheadfinansieringen. I fremtidige initiativer bør det overvejes, om de indirekte omkostninger i tilstrækkelig grad er dækket via overhead.

- Det internationale ekspertpanel spillede en central rolle i at gøre UNIK til en succes. Fremadrettede initiativer bør også tage denne model i anvendelse. Men i lyset af et evt. justeret formål og fokus, bør panelets sammensætning overvejes nøje, fx med hensyn til medlemmernes akademiske baggrund og evt. inddragelse af andre typer af eksterne aktører.
- Et værtsuniversitet betonede vanskelighederne ved at etablere en velfungerende governance model for UNIK. Fremtidige initiativer kunne indeholde et krav om en nærmere beskrivelse af styringsmodellen for den enkelte UNIK.
- Et universitet fremhævede, at det kunne være fordelagtigt med en mindre pulje til finansiering af forundersøgelser forud for ansøgningen. Ifølge universitetet kunne det sikre en bedre afsøgning af egnede forskningsemner og synergimuligheder, hvilket kunne højne kvaliteten af de endelige ansøgninger.
- Der kunne indføres en mulighed for at søge mindre tilskud til at undersøge det forretningsmæssige potentiale i en idé eller et patent (undervejs i UNIK-projektets forløb).

1.2.3 UNIK sammenlignet med andre finansieringskilder

Evalueringen peger på, at UNIK som instrument skabte en kombination af effekter, som adskiller sig væsentligt fra andre finansieringskilder. UNIK medførte en klar merværdi for de deltagende universiteter, og meget tyder på, at det ville have været vanskeligt at opnå de samme virkninger gennem mere traditionel forskningsfinansiering:

- Basismidler til forskning spredes typisk mere ligeligt ud over institutionernes forskningsområder, hvilket ikke giver mulighed for den samme grad af strategisk prioritering som UNIK. Basisfinansiering er desuden i høj grad knyttet til teknisk-administrative omkostninger samt lønninger.

  Ikke desto mindre illustrerer andre satsninger (som Aarhus Universitets interdisciplinære centre og 2016-puljen ved Københavns Universitet), at det til en vis grad er muligt at prioritere basismidler til lignende initiativer. Disse initiativer har dog ikke den samme skala eller grad af tværdisciplinær inddragelse som UNIK.
- Danmarks Grundforskningsfonds Centres of Excellence og de forskellige typer af ERC-bevillinger (European Research Council) er generelt mere fokuserede på specifikke, excellente forskningsmiljøer. Det vil sige, at det snarere er faglig dybde end bredde, der er formålet med disse typer bevillinger. Sammenlignet med UNIK er disse bevillinger således typisk uden den samme grad af tværdisciplinær og tværinstitutionel involvering.
- Private fonde uddeler undertiden bevillinger i en størrelsesorden, som er sammenlignelig med UNIK[5]. Disse store bevillinger får naturligt strategisk betydning for universitetets

[5] Eller væsentlig større – som eksempel kan nævnes Novo Nordisk Fondens bevilling på 1.1 mia. DKK over 10 år (fra 2012) til Center for Biosustainability på DTU.

ledelse på samme vis som UNIK. Men de involverer sjældent det samme niveau af samarbejde på tværs af institutter og fakulteter. Desuden er de typisk betydeligt mere bundet til øremærkede formål, der har strategisk betydning for fondens virke.

- Det Frie Forskningsråds bevillinger har typisk en betydeligt mindre størrelse end UNIK, og formålet er normalt at understøtte vækstlaget af unge forskere tidligt i deres karriereforløb. Disse tilskud medfører derfor ikke de samme strategiske, institutionelle eller tværdisciplinære effekter som UNIK.
- Bevillingsinstrumenterne i Innovationsfonden er generelt meget mere markedsnære og dermed fokuseret på erhvervssamarbejde og teknologiudvikling med klart specificerede milepæle og projektleverancer. Fonden understøtter generelt forskning som mere "direkte" kan omdannes til værdi for virksomheder. UNIK har et mere langsigtet potentiale, qua initiativets fokus på udfordringsdreven grundforskning, der med tiden kan føre til udvikling af industrier eller forretningsmuligheder, som ikke eksisterer i dag.

Chapter 2

Background

2.1 INTRODUCTION

UNIK (Investment Capital for University Research) was an ambitious Danish research excellence initiative launched in October 2009 by the then Danish Ministry of Science, Technology and Innovation.

The primary aim of UNIK was to further the advancement of world-class research at Danish universities. Secondly, the initiative aimed at strengthening the institutional capacity of the universities. Thirdly, UNIK was conceived in order to enhance the impact of research on national competitiveness.

Following a competition among 28 applications from all eight Danish universities, UNIK allocated approximately 64m Euro (480m DKK) to four interdisciplinary research programmes at three Danish universities. The four programmes, coined “UNIKs”, included:

- “MindLab” at the University of Aarhus focused on interdisciplinary research leading to a better understanding of the mind.
- “Food, Fitness and Pharma for Health and Disease” at the University of Copenhagen focused on interdisciplinary prevention of lifestyle diseases.
- “Synthetic Biology” at the University of Copenhagen focused on design of artificial biological systems.
- “Catalysis for Sustainable Energy” (CASE) at the Technical University of Denmark focused on storage of renewable energy by using catalytic technology.

These four initiatives were the final results of an extensive application and review process. First, the process consisted of an internal selection process at the universities resulting in 28 applications. Secondly, a review process, where an international expert panel peer reviewed the applications and provided recommendations on the selection of the scientific research projects to receive funding. Lastly, the Minister selected the grants eligible for funding on the basis of the recommendations.

The UNIK applications were reviewed in light of their potential for "large, long-term research in areas academically important for the university and for Danish research”, as well as their “quality and relevance for society". Furthermore, few overarching criteria were used to assess the UNIKs. They included:

- Potential for development of excellent research and maturity of research at the highest international level.
- Novelty regarding ambition and potentials for ground-breaking research results.

- International collaboration.
- Relevance for society, research or education.
- Fostering young researchers (PhDs and PostDocs).

The international panel subsequently supported and followed the progress and implementation of UNIK throughout its five-year history.

From the outset, the character and criteria of the UNIK-scheme were different from most other forms of public research funding. The individual grants were relatively large in scale and were provided as grants to the universities as institutions – with relatively few strings attached.

The logic behind this approach was that the grants would enable the recipient universities to support large interdisciplinary, high-risk research-programmes – grounded in research strategies and excellent research environments at the universities.

At the same time, UNIK would require extensive engagement and cooperation from many levels of the institutions. It would entail significant demands on both the university management, as well as the academic management. Thus, UNIK was designed to strengthen the institutional steering capacity of the university management.

It is important to note that the introduction of UNIK happened at a time of substantial, structural changes in the Danish university sector.

During the last decades, universities globally have been subject to a debate on their role in supporting national competitiveness. In particular, the quality and impact of publically financed research have been viewed as key factors in enhancing universities' societal impact.

Since the early 1990s, Denmark has pursued a number of wide-reaching reforms of the university sector and the national funding mechanisms for research. The general aim of these changes has been to develop more autonomous and capable universities, and concurrently create a more coherent funding system for high-impact excellent research. The impetus has been to enhance research's impact on society, business and innovation.

Among other things, this has entailed a substantial managerial reform of the universities' boards and management structures, following the University Act of 2003. The reform aimed at strengthening the institutional capacity and coherence of Danish universities. In 2006, the Danish "Globalization Strategy" led to a number of mergers of universities and government research institutions during 2006-2009. These changes were supported via substantial funding through the Globalisation Pool[6].

Additionally, changes in the funding landscape involved the establishment of the Danish National Research Foundation (DNRF) in 1991, The Danish Council for Independent Research in 2004, The Danish Council for Strategic Research in 2004, and finally, in 2014, the establishment

[66] The globalisation pool allocated approximately 5.7 billion euro to a wide range of public investments in research, education and innovation during the period 2007-2012. The aim was to help make Denmark the most competitive nation by 2015. The pool allocated around 3.1 billion euro to research. Out of these, around 40 per cent was disbursed to institutional core funding at the universities.

of the Innovation Fund Denmark. The latter merged three former public funding councils of strategic research and innovation, including the Danish Council for Strategic Research.

The UNIK grants expired in 2014. An extension of the initiative has not been launched. In 2015, the international expert panel delivered its final evaluation of the four UNIK-programmes focusing on research results and their output. Those conclusions will be presented in section 2.4.

2.2 PURPOSE OF THE EVALUATION

This effect-evaluation builds upon, and complements, the results of the evaluation panel, but seeks to achieve a better qualitative understanding of the effects, focusing on UNIK as a research policy instrument.

Thus, this evaluation aims to examine the effects of the UNIK-funding instrument, and compare these effects with other key modes of research funding. In other words, is UNIK a "unique" research funding initiative, or could the effects have been accomplished through other forms of research funding?

Five questions will guide the evaluation:

- What forms of value creation have the UNIK-grants entailed for the host universities besides the direct research results?
- What implications did UNIK entail for the host institutions, e.g. concerning strategy development and organisation?
- How does the impact of the UNIK-initiatives reflect itself in the embedment of the initiatives?
- Does the effect of the UNIK-grants distinguish itself from the effects of other big research grants? If yes, how?
- What effects did the UNIK-process entail for the institutions, which applied but did not receive a grant?

Initially, the report will consider UNIK in a comparative light vis-à-vis the broader landscape of research funding (chapter 3). Subsequently, it will sketch out the methodological approach used to assess the distinctive effects of UNIK (chapter 4). Following that, the report will examine the effects of the UNIK application process, which also involved the universities that did not succeed in obtaining a UNIK grant (Chapter 5). The following chapters will assess the institutional (6), research-related (7) and derived effects of UNIK (8) as well as the causal factors behind.

2.3 UNIK IN RELATION TO OTHER FORMS OF RESEARCH FUNDING

UNIK was a Danish "Research Excellence Initiative" (REI). It belongs to a family of research policy instruments, which in various shapes and sizes have been launched across a number of countries during the last decades. Examples abound, elements of the German Excellence Initiative and the

Swedish Linnaeus Initiative featured similar objectives and characteristics[7]. Across countries, REIs share the generic traits illustrated in box 2.1.

Box 2.1 Research Excellence Initiatives

- *The national government finances selected research units and institutions.*
- *Focus on exceptional quality in research and research-related activities.*
- *Long-term funding (a minimum of four years).*
- *Funds are competitive and are distributed based on peer-reviewed applications.*
- *Applicants are required to participate in selection processes with fixed time frames.*
- *Institutions (instead of individuals) apply for the fund as an entity.*
- *Funding is substantially larger than for individual project-based funding (a general lower limit of approximately 1 million euro a year per centre).*

Source: OECD (2014); "Research Excellence Initiatives: A new form of competitive research funding"

On a more general level, REIs distinguish themselves by combining features from both institutional core funding (Danish: "basismidler") and competition-based project funding.

Similar to institutional core funding, REIs have a strong focus on strengthening the institutional steering capacity of universities. They provide an ample volume of research funding to be used over a medium- to long-term period to designated research units of importance. Hence, the research funding supports and enhances the research agenda as well as the competiveness of the university. Futhermore, REIs are designed to support outstanding, interdisciplinary and problem-driven research programmes.

The table below illustrates how REIs, such as UNIK, are placed between institutional core funding and project-based funding.

[7] See OECD (2014):"Promoting Research Excellence: New Approaches to Funding" for an elaborate overview of the many models for Research Excellence Initiatives across OECD-countries.

Table 2.1 Comparison of research funding instruments

	Institutional core funding ("Basismidler")	REI funding (e.g. UNIK)	Project funding
Purpose	Institutional capacity	Research excellence and institutional capacity	Varying
Recipients	Universities	Universities	Researchers and groups of researchers
Time-frame	Annual (national budget line)	Finite and minimum four year	Finite and varying
Size of grants	Very large	Medium-Large	Small-Medium (with exceptions)
Allocation	Ex-post, Non-competitive, but may be linked to institutional performance	Ex ante, competitive	Ex ante, competitive
Allocation criteria	Few	Few	Varying depending on scheme

Source: OECD (2014): Promoting Research Excellence: New Approaches to funding.

The left side column of the table depicts the attributes associated with institutional core funding. Core funding enables the universities, as institutions, to allocate and prioritize funds internally according to their own strategic research agenda. Thus, it is a flexible funding mechanism with few strings attached for the university to uphold.

As such, the impact on research and the institution depends on the university's own funding priorities and allocation systems. A substantial share of core funding is in reality disbursed to costs, which are only indirectly linked to research, i.e. administration, rent, salaries, technical infrastructure, consumption of electricity, water etc.

In contrast, project funding comes in many different forms, but is generally aimed at researchers or research groups receiving funds over finite time periods for specific projects, programs or research centres[8]. The box describes a number of key project funding sources that carry a *research excellence focus*:

[8] OECD (2014):"Promoting Research Excellence: New Approaches to Funding".

Box 2.2. Research funding sources

- *The Danish National Research Foundation (DNRF) has since 1991 focused on supporting research excellence at the highest international level. The primary funding instrument of the foundation is the "Centres-of-Excellence". The instrument supports large, excellent research programs. The grants are typically at the level of 7m-13m euros spread over 6+4 years.* The grants are allocated to research groups directly.
- *Grants from private research foundations/endowments. E.g. the Novo Nordisk Foundation, Gates Foundation etc. provide long-term and very large grants to excellent research units or areas. The foundations are especially active in areas where Danish research and/or businesses have certain strengths and/or where the foundations have special interests.*
- *Grants from the European Research Council (ERC). The objective is to support excellent frontier research. The program features a variety of different funding instruments, typically around 1.5-3-5m Euro per annum. ERC's largest grants are the Synergy Grants, supporting excellent research environments with up to 15m Euro over six years.*
- *Grants from the former Danish Council for Strategic Research (today Innovation Fund Denmark) and especially the Danish Council for Independent Research are smaller than UNIK and Centres of Excellence. The new Innovation Fund Denmark funds more strategic challenge-driven, interdisciplinary research, featuring involvement and co-financing from the private sector. The Danish Council for Independent Research supports bottom-up independent research projects and provides support for young researchers. These grants have often served as a starting point for building up excellent research environments and attracting additional funding*[9].

Source: Danish Ministry of Higher Education and Science and IRIS Group.

Project funding naturally focuses on the specific project rather than the host institution at large. Some forms of project funding are provided to bottom-up research, whereas other grants are disbursed to more thematic, strategic research projects.

Research Excellence Initiatives, including UNIK, strike a balance between these two forms of research funding. On one hand, they are based on competition and focused on specific research programmes within a limited period. They are furthermore allocated ex ante in line with project funding. On the other hand, they have a strong focus on enhancing institutional capacity and research excellence as a means to improve national competitiveness – similar to institutional core funding.

UNIK's template of a research excellence initiative is similar. In a Danish context, it was a novel research policy instrument. Some of the specific features that made "UNIK unique" include:

- Applications for UNIK had to be coordinated and administered by the institution's management rather than individual researchers. Hence, the research of the individual UNIKs had to be of importance for the university research from a strategic perspective.
- Consequently, the lead recipient of the grant was the institution rather than e.g. an individual researcher or group. The administration of the grant was thus left to the university management.

[9] Evaluation of the Danish Council For Independent Research

- There were very few application criteria and strings attached with regard to administrating the funds (e.g. reporting, monitoring etc.) and to the content of the research. This allowed the institutions to prioritize more risk-prone research. However, research projects eligible for UNIK-funding should emphasize interdisciplinarity and strive for research excellence at the highest international level.
- The grants were relatively large and had to be disbursed within a limited time frame (5 years).

2.4 THE INTERNATIONAL EXPERT PANEL

A panel of international experts assisted the establishment and implementation of the UNIK-initiative. Furthermore, the panel has continuously followed the status and progress of the individual UNIKs. The expert panel submitted their final evaluation in the spring of 2015.

Box 2.3 Members of the international expert panel

The panel was comprised of the following experts;

- Professor Jarle Aarbakke, (Former) Rector of the University of Tromsø, Norway
- Professor Bart de Moor, Belgium
- Professor Geoffrey Channon, United Kingdom
- Professor Harriet Wallberg-Henriksen, Sweden
- Professor Emeritus Helga Haftendorn, Germany
- Professor Lennart Hjalmarsson, Sweden
- Professor Martin J. Kropff, the Netherlands
- Professor Olli Ikkala, Finland
- Professor Pär Omling, Sweden
- Professor Pirjo Nuutila, Finland

Findings of the international evaluation panel were based on a combination of qualitatively based site visits at the individual UNIKs as well as quantitative data. It was reported in a number of reports and minutes. The panel particularly focused on three elements in the valuations of the individual UNIKs:

- **Scientific output** (publications, research impact and educational achievements).
- **Organisation** (the internal set-up and outreach of the UNIKs and how the four individual initiatives have been managed by the responsible host institutions).
- **Embedment** (continuation of the activities and financing).

The table below sums up some of the key outputs reported by the international evaluation panel. It illustrates, among other things that the UNIK initiative, as such, has resulted in a substantial number of scientific publications, PhDs and Postdocs, as well as attracting funding from external sources. It also shows a number of differences between the UNIKs, e.g. the number of departments that have been involved during the UNIK process and the number of patents filed:

Table 2.2 Selected scientific outputs from UNIK

	Synthetic Biology	FFP	MindLab	CASE
Publications	317	230	536	121
PhDs	60	50	48	33
Postdocs	43	30	23	24
Departments involved	5	18	21	8
External funding (million DKK)	399	200	291	238
Patents (+ additional applications)	9	2	5 (1)	4 (11)

These numbers alone say relatively little about the actual impact and quality of the scientific output. However, the conclusions of the international panel were also provided on the basis of qualitative measures through their site visits and discussions with the UNIKs. The panel found that UNIK as a scientific research initiative has been a major success when looking at the Danish research landscape overall. The box sums up the main findings from the final evaluation of the panel:

Box 2.4 Main findings of the international expert panel

The evaluation concluded that:

- *UNIK has fostered sustainable and excellent cross-disciplinary research undertakings.*
- *UNIK has furthered the internationalisation of the host institutions by encouraging high researcher mobility and by raising the international reputation of the funded environments.*
- *UNIK has boosted the growth layer of young researchers within the research areas of the initiatives, and many young talented scientists are continuing their carrier in research positions at the involved universities or at other Danish or international research institutions.*
- *UNIK has laid the ground for professionalization and advancement of the research administrations at the host universities, leading the initiatives to be optimal platforms for strategic planning and attraction of third party funding.*
- *UNIK has provided the right amount of trust and instrumental flexibility to allow for individual initiatives to adapt and structure the organisation. This in accordance with their ambitious strategies and the main principles of UNIK, e.g. cross-disciplinarity and internationalisation.*
- *UNIK has had a substantial organisational impact on the host institutions and contributed to forming new synergies by encouraging the universities to prioritise their research agendas and carry out their main priority.*
- *UNIK has secured continuity and progress in the initiatives by tying the funding to the initiative instead of the researcher.*
- *The grantees' experience in academic management and management combined with scientific excellence is a pivotal premise for the successful outcome of the initiatives.*
- *The UNIK initiative would have benefitted considerably from a longer funding period.*
- *UNIK is coherent with the general Danish research funding landscape, e.g. as a continuation of the centres of excellence funded by the Danish National Research Foundation.*

However, on its own the international evaluation does not document, whether the effects are particular for the UNIK funding instrument, or whether the effects could have been achieved through other means, e.g. an internal allocation of institutional core funding to relevant research environments.

Moreover, the international evaluation does not isolate the effects of UNIK vis-a-vis other factors that could have played a role in what was achieved. Thus, it is not entirely clear, to which extent UNIK was a particularly effective public research-funding scheme in its own right, and which specific features of the scheme that led to the effects.

This evaluation will go deeper into the qualitative effects of UNIK, and the context linked to these effects. Furthermore, it will examine whether these effects could have been achieved through other research funding instruments. The next chapter will describe the approach and methods used.

Chapter 3

Approach and methodology

3.1 INTRODUCTION

This evaluation examines the effects of UNIK – and the causal factors behind – through a qualitative approach. The primary empirical basis consists of a number of group interviews with key stakeholders at the universities. Finally, we have drawn on desk research – in particular the extensive material compiled by the international expert panel.

The methodology will focus on three key questions:

- What are the (realised and expected) effects of UNIK on institutions, on research and derived effects, e.g. education, business collaboration etc.?
- What are the causal factors behind, i.e. the specific characteristics of the UNIK financing instrument that led to these effects?
- To what extend could these effects have been achieved through other forms of research funding?

The outcome of the interviews will be analysed by using a transversal approach. Hence, the effects and causal factors, observed through the interviews, will be assessed by comparing the reflections and statements across universities as well as between the university management level and researchers participating in the UNIKs.

This approach is necessary in order to ascertain individual effects of UNIK – also vis-à-vis other forms of funding - in light of a number of methodological challenges:

- **Memory.** The evaluation will cover events that have taken place within the last seven years. The time dimension plays an important role in the assessment of the effects. Besides the questionable reliability of long-term memories, key stakeholders' job positions may have changed in the meantime.
- **Time lag of effects.** Organising and implementing large research initiatives such as UNIK take time to establish and function properly. This implies that the full scale of the effects is still to unfold.
- **Causality.** The apparent effects of a specific financing instrument for research funding might be caused or amplified by other possible causal factors. For example, the impact of additional external funding or parts of what came to constitute the UNIKs were already initiated beforehand.
- **Context.** The historical, organisational and cultural environment in which the UNIK-initiatives occurred, e.g. institutional mergers and the experience of the academic leadership etc., which also influenced the specific effects of the UNIK.

3.2 INTERVIEWS

The evaluation has examined the effects of UNIK on three levels at host universities:

- Firstly, stakeholders from the university management, who were involved in the UNIK-process. The university management has been interviewed in order to gain insight into the broader strategic, organizational, and institutional implications of UNIK for the university.
- Secondly, key actors from the research environment, including the academic leader as well as key researchers from the four UNIKs, were interviewed in order to get perspectives on the effects more closely linked to the research environments.
- Thirdly, actors with responsibility for knowledge exchange, e.g. business collaboration and research communication.

Almost all interviews were conducted as qualitative group interviews. The purpose was to create a setting in which the memories and perspectives of each interviewee would be mutually reinforcing and facilitate a more dynamic and qualified conversation. The following interviews were carried out:

- Three group interviews in total with university management representatives at each host university. One university wished to conduct the interview as an individual interview.
- Six group interviews were conducted with key actors of the four UNIKs. Two group interviews were conducted for each of the two most complex and interdisciplinary UNIKs (Food, Fitness and Pharma at the University of Copenhagen and MindLab at the University of Aarhus).
- An interview with one representative from the University of Copenhagen responsible for knowledge exchange, research communication etc. At the other universities, the necessary information about this aspect was extracted at the other levels.
- An interview with a representative from the international expert panel.

Finally, a number of interviews were conducted with the universities that did not receive a grant. The purpose of these interviews is to illuminate whether the application process made a difference at these universities.

In the case of the latter, the evaluation has drawn on individual interviews with researchers who were directly involved in the application process, as well as one key actor from the university management (or research support function at the larger universities).

3.3 ASSESSING THE EFFECTS

The extent to which an effect and its underlying cause is emphasised amongst several stakeholders substantiates the likelihood of it.

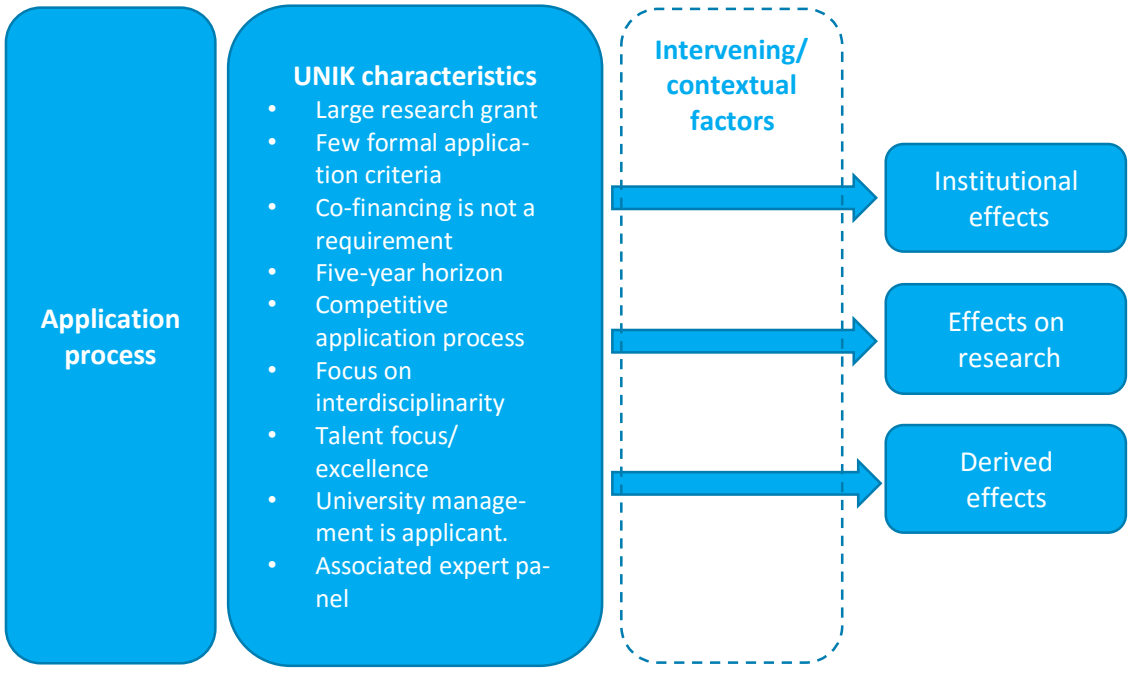
The figure below is a schematic illustration of UNIK's cause-effect-chains. On the left side, the specific attributes of the UNIK scheme as well as the application process, serves as the causes, while the effects shown on the right side manifest themselves on three levels:

- Effects on the institution as such, e.g. strengthening the managerial functions of the university, driving organizational changes, etc.
- Effects on research, e.g. increasing excellence, international collaboration, attraction of external funds, interdisciplinarity etc.
- Derived effects, e.g. education, embedment, societal impact, outreach, communication of research results, business collaboration, commercialization etc.

The effects of the application process are covered in a separate chapter (chapter 8).

An apparent effect can on the one hand also be (partly) due to other factors than mentioned above. On the other hand, effects may at some universities be limited due to specific contextual factors that constitute barriers to harvesting these effects. This is illustrated as "intervening" factors in the figure.

Figure 3.1 Cause-effect chains



To establish whether an effect is due to UNIK and/or can be generalized (e.g. is valid regardless of time and type of institution), we distinguish between three categories of effects:

1. Effects that are generic for all host universities and UNIKs and with certainty can be attributed to the UNIK-funding instrument.
2. Effects that are probably associated with the UNIK-scheme, but where the isolated significance of UNIK and the generalizability of the effects is uncertain.
3. Effects that are specific for an individual university and only to a limited extent can be generalised.

To begin with, an effect belongs to the first category if it is identified by the majority of stakeholders (across the UNIKs) and if the actors point to the same UNIK-related causes.

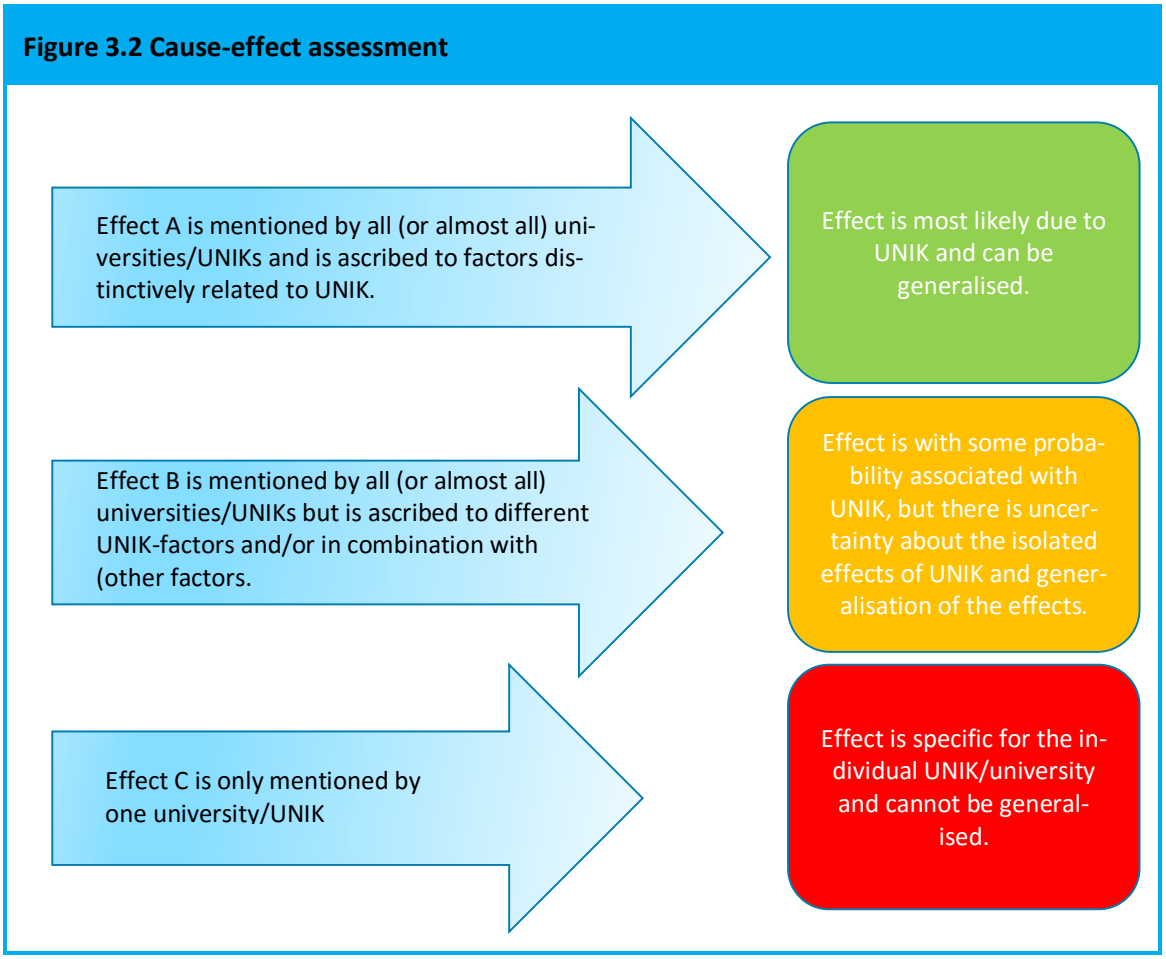
If the latter is not the case, both reliability and generalization of the findings appear more uncertain. It enhance the likelihood that factors unrelated to UNIK also play a role, and that the perceptions of the interviewees are of a more subjective nature.

Moreover, effects detected at only one university may be linked to institution-specific conditions (e.g. the university already embarked on a strategy, which UNIK was compatible with). In such cases, the effects are observable, but the basis for generalization is limited.

If, for example, increased research quality is highlighted as an effect by all the universities – and attributed to the same combination of UNIK-specific causes (e.g. interdisciplinarity and embedment in the university management) the effect is most probably linked to UNIK.

Correspondingly, the effect and its cause will appear weaker if universities emphasize different underlying factors, or where only a single university mentions an effect. Figure 3.2 illustrates the three categories of effect assessments.

Figure 3.2 Cause-effect assessment



The colour code (green, yellow, red) will be used in assessing the effects. The tables in the chapters summarize the observations from the qualitative analysis. A green dot denotes an effect that, with high likelihood, can be attributed directly to UNIK.

A yellow dot points out that the effect most likely can be attributed to UNIK. However, the generalization of the effect is less certain, for example due to specific institutional contextual factors. Finally, a red dot denotes effects that can be attributable to UNIK, but is heavily influenced by institution-specific factors.

In addition, the effects will be accompanied by an assessment of whether the effects could have been achieved through other forms of (excellent) research funding instruments. The scale features four levels:

Table 3.1. UNIKs effects compared to other forms of research funding instruments

Level	Description
Highly unique	The effect is distinctive for UNIK as a funding instrument
Partially unique	UNIK was effective, but the effect could partially have been achieved through other funding instruments, e.g. centres of excellence.
Modestly unique	UNIK did create the effect, but it may have been partially or entirely achieved through many other funding instruments.
Not unique	The effect could have been achieved well through other forms of research funding instruments.

Chapter 4

Effects of UNIK – the institutional level

4.1 INTRODUCTION

This chapter explores the effects of UNIK on the university level. From the outset, UNIK was an instrument of research policy aimed at strengthening the institutional capacity of universities by providing the grants to the university management, which subsequently administered the UNIK grants.

The international expert panel concludes in its evaluation that UNIK has had a number of positive effects on the host institutions:

"UNIK has had a substantial organisational impact on the host institutions and contributed to forming new synergies by encouraging the universities to prioritise their research agendas and carry out their main priority."

This evaluation generally draws the same overarching conclusion, but will go deeper into the contextual factors which influenced the outcome of UNIK on the institutions.

This chapter initially illustrates the main results from the qualitative study – using the colour code system described in chapter 3. It subsequently elaborates the effects, starting with the institutional effects that are most distinctively related to UNIK. Furthermore, these effects will be compared to other key modes of research funding. Afterwards, the evaluation will assess effects, which are affected by other UNIK-factors or contextual factors.

4.2 INSTITUTIONAL EFFECTS FROM UNIK

Table 4.1 provides an overview of the observations from the interview, which will be elaborated below:

Table 4.1 Institutional effects of UNIK

Identified positive effects	Effects can be attributed to UNIK and can be generalized	Effects unique for UNIK
University management's willingness and ability to support large strategic and interdisciplinary research programmes.	🟢	Highly unique.
Focusing research strategy.	🟢	Highly unique
University management's strategic steering capacity and experience in relation to handling large grants.	🟢	Partially unique
Encouraged establishment of research infrastructure.	🟡	Modestly unique
Driving organisational change.	🟡	Modestly unique
Ex post allocation of institutional core funding to research programs.	🔴	Not unique

Firstly, the green dots will be elaborated, including causes and which other forms of research funding could lead to the same effects. Subsequently, the yellow dots will be elaborated.

4.2.1. "Green" effects

As the green dots in the table illustrate, almost all interviewed UNIK host universities pointed out that UNIK contributed positively to the institution. Although the separate effects could have been achieved through other means, UNIK seems to have been quite efficient in achieving the combination of effects found through the interviews.

The positive, and distinctively UNIK-related, effects include:

- An increase of the institutional coherence and dialogue between the university management, faculties and departments.
- An increase in the university management's ability and willingness to drive large interdisciplinary research programmes.
- An impetus for the institutions to focus their research strategy, by providing a financial injection to strategic research areas.

UNIK was a large financial injection for the institutions, making it possible – in some areas – to pursue **interdisciplinary research programs of strategic importance**. The UNIK host universities

generally note that this was something "new" at a time where the institutional reforms from 2003-2009 were still unfolding.

The initiative compelled the university managements to rise above the day-to-day administration of the institutions and act strategically and selectively based on the individual university's comparative research strengths.

The university managements benefitted from the instrumental flexibility of the UNIK-grants in order to prioritise strategic research areas that could contribute to reducing cultural, academic and organisational barriers between the merged institutions. It strengthened the university management's capabilities and visibility vis-à-vis the research environments. As described by one interviewee: "UNIK made it possible for the university management to show that it was ambitious and capable". Consequently, the universities point out that UNIK helped implement the **research strategy of the university** by boosting specific research programs to a level, where they would carry importance for the institution at large.

These effects are in particular due to UNIKs distinctive combination of:

- The university management's role as the lead of the application and recipient of the grant, allowing for the allocation of resources in accordance with the research priorities of the university.
- Scale, i.e. large grants, which forced the management to think ambitious and strategically about the university's comparative strengths, also in view of attracting additional external funding, e.g. for research infrastructure.
- Scope, i.e. UNIK's focus on interdisciplinarity, which initiated a process of identifying the research flagships of the institutions and promoting synergies between them.
- Flexibility, i.e. few ex-ante requirements regarding disbursement and allocation, which allowed the institutions to channel resources from UNIK to the most promising, high-potential research parts of the programmes. Furthermore, there were relatively few requirements regarding reporting and documentation. Instead, the international expert panel monitored the progress.

Compared to other forms of research funding

Furthermore, these combined distinctive characteristics, made UNIK different compared to other instruments of research funding:

- CoEs or ERC-grants are generally more narrow in terms of academic scope, focusing on specific research environments and without the same level of involvement from all organisational layers of the institution.
- Large private endowments are sometimes of such a magnitude, that they become a strategic priority for the university management. However, they do usually not involve the same level of intra-institutional collaboration.

- Institutional core funding is generally disbursed more evenly across the institution, and does generally not allow for the same level of strategic focus as UNIK. However, following UNIK, some universities have allocated pools of basic funding to finance cross-disciplinary programmes.

4.2.2. "Yellow" effects

In addition, there are a number of institutional effects, which appear to be results of UNIK, but where generalization, or the isolated influence of UNIK, is less evident. These effects are marked by a yellow dot and include:

- **Research infrastructure**. E.g. through a number of "core facilities" at the universities with Food Fitness and Pharma at the University of Copenhagen establishing a Biobank, and MindLab procuring scanners for brain research.

  However, it is normal that large external grants prompt the construction of research infrastructure. The novel feature of UNIK was that the infrastructure was to be used in a cross-disciplinary setting. The Ministry of Higher Education and Science has earlier disbursed significant grants for financing research infrastructure. Likewise, private endowments occasionally co-finance research infrastructure.

- **Organisational change**. Especially, the University of Copenhagen experienced that the UNIKs contributed positively to the merger process. This effect was not strongly emphasised at the two other host universities. During the period, the University of Aarhus underwent a number of wide-reaching organisational changes, in which UNIK's role was relatively limited.

- **Allocation of core funding.** As shown in chapter 3, all universities allocated internal funding to the UNIKs, but only one university (Copenhagen) has subsequently allocated substantial basic funding, among other things, to secure the embedment of the well-functioning organisational elements of UNIK[10]. The interviewees at the University of Copenhagen, however, point out that this would most likely not have happened without the previous "icebreaker" constituted by UNIK.

  At the other universities, UNIK did not lead to a significant re-allocation of institutional core funding.

[10] The University of Copenhagen has allocated 400m DKK (approx. 53m Euros) internally to 18 interdisciplinary platforms. The initiative is known as the 2016-pool.

4.3 FINAL REMARKS

Despite this general picture of the institutional effects, the UNIK-hosting universities' judgement of the institutional effects did vary. This variation indicates that it is crucial to examine the institutional context in which UNIK took place. The analysis shows that the variation especially depends on:

- The views of the individuals within the university management as well as the academic and administrative coordinators.
- UNIK's integration with concurrent organisational changes, e.g. institutional mergers or changes in the university management structure.
- The governance structure built around the individual UNIK.

Firstly, it is crucial not to ignore the importance of individuals – and how their professional motivation as well as leadership and organisational skills affected the institutional outcome of UNIK. This is the case for the university management level, as well as the academic leaders and coordinators. The assessment is that all UNIKs had very skilled and highly engaged academic leaders and coordinators, while the analysis indicates that the commitment of the university management level differed.

The engagement from the university management is especially important in relation to the institutional embedment of the successful elements of the UNIK. That is, the long-term sustainability of, e.g. the networks, infrastructure and cross-disciplinary collaborative platforms, following the expiry of the UNIK. Where the UNIK had strong anchoring and attention at the management level – e.g. among the deans – the prospects of long-term embedment was more salient.

Secondly, concerning the organisational context the universities differed, which influenced the perception of the UNIK's coherence with the rest of the institution. At the Universities of Copenhagen and Aarhus, the contexts of the ongoing mergers were quite important. The way that the university managements instrumentally chose to use UNIK in light of the mergers played a significant role for the success of the UNIKs. Whereas the University of Copenhagen actively used UNIK as one out of many steps to promote collaboration across the merged institutions, this strategic-instrumental use of UNIK was less evident at the other universities, while for different reasons.

Thirdly, the governance model supporting the individual UNIK – i.e. who had the responsibility at the various institutional levels, what was the chain of command, how would the grant be disbursed and who would be in charge etc. – similarly played an important role. As the universities were free to construct their own governance structures, the UNIKs differed substantially.

At one university, the governance model faced a number of challenges. The chain of command meant that the faculties and departments, which normally plays a key role in financing e.g. research infrastructure etc., was bypassed. According to the interviews, this led to much confusion about the anchoring of responsibility and affected both the interdisciplinary collaboration and the institutional embeddedness of activities negatively.

Generally, the institutional embeddedness of the UNIKs was most successful in the cases where the governance model delegated as much of the day-to-day decision power and financial autonomy to the academic leader of the UNIK; and combined with a strong visibility from the university management and faculty leadership, e.g. through conferences, meetings with the researchers etc.

In sum, it is safe to say that UNIK was a research-financing instrument that entailed a combination of distinctive institutional effects for the host institutions, which no other existing research-financing instrument can generate in totality. Namely, the institutions' motivation and capacity to establish high-risk, novel interdisciplinary research platforms, serving as strategic flagships for the institutions.

Chapter 5

Effects of UNIK on research environments

5.1 INTRODUCTION

In addition to the effects at the institutional level, we have also evaluated UNIK's distinctive effects on the research environments.

The international expert panel did also evaluate UNIK's effects on research outcome and quality (see chapter 2). The final evaluation of the panel concluded that:

"In general, the four UNIK initiatives (…) have excelled in both quantity and quality in a wide range of parameters such as novel approaches, high quality research, internationalisation and promotion of cross-disciplinarity".

Specifically, the panel concluded that UNIK resulted in the following positive effects on research:

- UNIK has fostered sustainable and excellent cross-disciplinary research undertakings.
- UNIK has boosted the growth layer of young researchers within the cross-disciplinary research areas of the UNIKs. Many young talented scientists are continuing their carrier in research positions at the involved universities or at other Danish or international research institutions.
- UNIK has laid the ground for professionalization and advancement of the research administrations at the host universities, leading the initiatives to be optimal platforms for strategic planning and attraction of third party funding.

This chapter further explores the effects of UNIK on research output. Like in chapter 4, it starts by assessing the distinctive effects and causes of UNIK and subsequently relates these effects to other forms of research funding. Finally, it explores effects, which are influenced by other UNIK factors.

5.2 EFFECTS OF UNIK ON RESEARCH

This evaluation generally confirmed the findings of the international expert panel. The table (5.1) below sums up – based on the interviews – the research-related effects of UNIK and our conclusions regarding UNIK's added value vis-à-vis other instruments.

Tabel 5.1 Research-related effects of UNIK

Effects	Effects can be attributed to UNIK and can be generalized	Effects unique for UNIK
Advancing experimental interdisciplinary research	🟢	Highly unique
Improved interdisciplinary research collaboration	🟢	Partially unique
Fostering a new generation of researchers oriented towards interdisciplinarity.	🟢	Partially unique
Creating international research flagships and increasing international collaboration	🟢	Modestly unique
Strengthening academic leadership	🟢	Modestly unique
Focusing the research profile of departments and faculties.	🟡	Modestly unique
Strengthening research excellence	🟡	Not unique
Attracting additional external research funding	🟡	Not unique

Firstly, the effects denoted by green dots will be elaborated including causes and additionally vis-à-vis other forms of research funding. Secondly, the effects denoted by the yellow dots will be elaborated.

5.2.1. "Green" effects

The most distinctive effects on research due to UNIK, shown in the above table with green dots, relates to the instrument's ability to foster experimental, cross-disciplinary science, thereby reducing cultural, organisational and academic barriers among faculties and researchers. Almost all universities, researchers and the representative from the expert panel are unequivocal in considering these the foremost effects of UNIK. To elaborate, UNIK:

- **Fostered interdisciplinary research collaboration and networks** both within faculties (e.g. physics and biology) as well as between faculties (e.g. health sciences and humanities) that did not exist before.

- **Fostered cross-disciplinary research in new areas** not covered by traditional academic disciplines, thus making it possible to address joint research challenges focused on grand societal challenges.
- **Fostered young researchers, both at the PhD-level and postdocs**, who became accustomed and motivated to work in an interdisciplinary setting. Under normal circumstances, this can be challenging for young researchers due to the emphasis on "deep" academic excellence.

UNIK is described by the majority of researchers as a flexible financing instrument that allows researchers to pursue "real" **cross-disciplinarity**. It is a financing instrument that is well-suited to establish ground-breaking, cross-disciplinary research areas, e.g. aimed at addressing societal challenges (climate, energy, obesity etc.). UNIK made it possible for the universities to prioritize collaboration between excellent research environments, which may not have taken place otherwise, due to institutional priorities, lack of resources and time, researchers' career paths, and various cultural constraints.

One interviewee describes this form of research as having a radical transformative potential for tomorrow's industry, innovation and society, whereas most other funding sources are described as having an "incrementally" focused outlook.

However, transcending academic borders and utilizing the synergies in different academic insights and methods is in any case challenging. It requires researchers from various disciplines to engage the complexity of different academic traditions, concepts and perspectives. Thus, the transaction costs of venturing into cross-disciplinary research are often higher than focusing on excellence within an established, narrow academic discipline.

In addition, cutting-edge, cross-disciplinary research does not necessarily benefit younger researchers in their academic careers vis-à-vis focusing their research on classical excellence (see below). The researchers point out that interdisciplinarity often risks becoming "half-hearted" within other forms of financing schemes. Thus, cross-disciplinary collaboration often appears more of a "formal" requirement than an aim that actually contributes to the advancement of science.

Within UNIK, the interviewees emphasised how this constraint was significantly reduced. The researchers actively sought to bridge the academic boundaries to foster novel ground-breaking research. One such case was Synthetic Biology at the University of Copenhagen, which was an entirely new academic discipline at the university (and with few "peers" globally). It merged insights from natural sciences as well as social sciences and the humanities. MindLab brought together researchers from all faculties.

In that regard, the interviewees especially point to the fact that UNIK also made it possible for PhD-students as well as postdocs to work in an interdisciplinary setting, thus enhancing their propensity to work with other academic disciplines around common challenges.

In addition, UNIK also carried distinctive effects linked to:

- International collaboration with excellent cross-disciplinary research environments abroad.

- Strengthening academic leadership by equipping the academic leaders and administrative coordinators with the skills to organise and steer large, complex research platforms across academic disciplines.

However, some universities point out that excellence – rather than novel interdisciplinarity – was emphasised in the call and in the review process. The interviewees pointed out that this made it more difficult for the "experimental", truly novel research areas to stand a chance in the competition.

Most universities and researchers point out that UNIK was particularly efficient in **fostering internationally visible research flagships**, which would be viewed as potential partners by excellent peer environments outside Denmark. Thus, all the UNIKs established international collaborations, e.g. CASE at DTU with Berkley University in California. Other examples of "international" effects were joint summer schools, and the creation of strong platforms from which Denmark's research environments can influence the topics and calls of Horizon 2020.

UNIKs isolated effects on **academic leadership** were clearly present, although the universities differed slightly when assessing its magnitude. UNIKs prompted the institutions to select very skilled academic leaders and administrative coordinators who played an important role in making UNIK a success. Conversely, the scale of UNIK and the degree of interdisciplinarity was something unusual for most of the academic leaders and/or the administrative coordinators. This meant that UNIK did entail a distinctive "learning process" for the academic leaders.

The interviewees all emphasise how this type of research funding is particularly efficient in advancing ground-breaking, cross-disciplinary research vis-à-vis other research funding mechanisms. The main characteristics of UNIK leading to these positive effects can be summarized as follows:

- Scale (large grant), which entails financial freedom to initiate large research programs requiring substantial investments in e.g. staffing and research infrastructure.
- Degrees of freedom (combined with scale) constituting a "playground" for young researchers, creating financial stability for a five-years time-horizon and easing requirements on young researchers regarding fundraising etc.
- Focus on "real" cross-disciplinarity, making it desirable and feasible to explore novel, innovative science combining insights and methods from several academic traditions.
- Competition-based application process that compelled the universities to bring together the most excellent research environments.
- The timeframe of five years creating a stable period and making it possible to plan in a medium-to-long-term perspective. However, most interviewees emphasise a wish for a longer time-horizon.
- The associated expert panel, which gave valuable support and guidance through the entire implementation of the UNIKs.

Compared to other forms of research funding

The interviewees were furthermore asked to compare UNIKs research-related effects to other forms of research funding:

- In principle, the same effects could have been achieved through ample institutional core funding, but in practice, core funding is largely bound to technical-administrative costs and salaries, making it difficult to prioritise initiatives of UNIKs magnitude.
- Most other forms of existing Danish research funding instruments are not conducive to the same level of experimental novelty. Centres of Excellence, for example, are much more focused on excellence than interdisciplinarity. Research grants from Innovation Fund Denmark do to some extent award interdisciplinarity. However, they are characterized by far more specific requirements on participation, topic etc. and more focused on clear deliverables.
- ERC-grants do also emphasise interdisciplinarity, but the grants do not have the same scale as UNIK, and are usually less flexible in nature, carrying many requirements regarding documentation, milestones and deliverables.
- Research funding instruments providing primary priority to excellence, such as the DNRF's Centres of Excellence, can be even more efficient in achieving excellence, but within a narrow field and without the same level of experimental interdisciplinarity as UNIK.

5.2.1. "Yellow" effects

Finally, there are a number of research related effects, which appear to have been a result of UNIK, but where generalization or the isolated influence of UNIK is less evident. These effects are marked by a yellow dot in table 5.1 and include:

- Strengthening research excellence.
- Focusing the research profile of departments and faculties.
- Attracting additional external research funding.

With respect to research excellence, all universities/researchers participating in a UNIK acknowledge that the grant lead to significant high-impact, excellent research. However, the reason why the effect is denoted with a yellow light follows from the following factors:

- The UNIKs were generally built on top of research environments that were already excellent, e.g. former Centres of Excellence etc. The universities and researchers argue that UNIK's distinctive additional effect on excellence is debatable. On one hand, the size of the grant – and its time frame – created some fundamental underpinnings for advancing excellent research. On the other hand, the interviewees tend to emphasise UNIK's impact on cross-disciplinary research, rather than classical academic excellence.
- Moreover, research excellence and novel cross-disciplinarity are not always easily compatible goals, as review criteria for excellent research are not always specified in detail

for novel, innovative research. Some interviewees pointed out that the incentive to do cross-disciplinary research is often low for young researchers as their careers usually depends on bibliometric impact within a well-established academic field.

- Generally, many existing funding streams emphasise excellence as their main distribution criterion. This is, for example, the case with CoE from the Danish National Research Foundation as well as ERC's various grants.

The interviewees also differ in terms of the extent UNIK was instrumental in focusing the research profile of departments and faculties. In some UNIKs, the departments played a key role in organising the UNIK. However, the UNIKs also worked across the framework of the established departments, leading to varying involvement from the departments.

Concerning attraction of external funding, the evaluation of the international panel states that the four UNIK in total attracted approximately DKK 1100 m (Euro 150 m) from national and international research funding sources.

However, the question is whether this would have happened without UNIK. To this point, the interviewees have differing perspectives. On one hand, it is normal that large flagship initiatives such as UNIK attract external funding. On the other hand, one interviewee points out that the research environments might actually have attracted a larger total volume of external funding had the research groups applied individually.

5.3 FINAL REMARKS

The research-related effects of the individual UNIKs and their continued embedment played out in very different ways. A number of contextual factors can account for this. Key factors include:

- The extent to which UNIK was grounded in research environments already characterised by excellence or interdisciplinarity. Most UNIKs were based on research environments that had already received funding from the Danish National Research Foundation or ERC.
- Furthermore, the University of Copenhagen had already established a number of interdisciplinary platforms (theme-packages), which served as an organisational foundation for the final two UNIK grants.
- The institutional governance-structures of the UNIKs. This especially relates to the organisational relation between the university management, faculties and academic leadership as well as the administrative coordinators. As elaborated above, the organisational embedment of the UNIK and the involvement from the university leadership differed, which could cause confusion and a lack of motivation at the level of researchers.

Chapter 6

Derived effects from UNIK and embedment

6.1 INTRODUCTION

The evaluation has examined derived effects from UNIK. Derived effects mean possible effects coming out of the research activities of UNIK, while they are not directly part of the core research-activities of the UNIKs.

The interviewees generally did not put much emphasis on derived effects. This may be attributed to the fact that the UNIKs were only recently finalized, why we have probably not seen the effects manifest themselves fully yet.

This chapter will elaborate on the derived effects, their causes and subsequently relate them to other forms of research funding. Furthermore, the chapter focuses on the embedment of UNIK-activities.

6.2 DERIVED EFFECTS OF UNIK

Table 6.1 provides an overview of the conclusions from the interviews when it comes to derived effects.

Table 6.1 Derived effects from UNIK

Effects	Effects can be attributed to UNIK and can be generalized	Effects unique for UNIK
New educational programs or courses at Bachelor's or Master's or PhD level.		Modestly unique
Enhanced external communication on research.		Modestly unique
Increased business collaboration		Not unique
Increased commercialization of research results (IPR)		Not unique

As shown in the table, the derived effects include:

- New educational programs or courses.

- Increased business collaboration.
- Enhanced external communication on research.
- Increased commercialization of research results.

Based on our interviews, it is possible to conclude that all universities have experienced these effects, but they do not seem to be strongly distinctive for the UNIK-scheme. According to the university managements and the researchers, other large research funding schemes usually carry these types of effects also.

All UNIKs had research activities that were passed on through various educational elements for use - both at PhD-level and at other levels. Furthermore, the UNIKs contributed to new angles of research communication. The table below illustrates some examples.

Table 6.2 Examples of effects on education and research communication

Technical University of Denmark	• No new courses, but research results from CASE incorporated in existing courses. • Educational book and video for children/public school
University of Copenhagen (Synbio and FFP)	• New interdisciplinary PhDs • Interdisciplinary courses at B.Sc. and M.Sc.-level, e.g. Public Health. • Summer school: "Obesity in a cross-disciplinary perspective" • Installation at the ESOF-conference on the social responsibility of research. • Conference on the social responsibility of research • Educational videos.
University of Aarhus	• New BA programme in cognition science

The table shows that UNIK does carry various effects in terms of education, though the content vary from new educational programs to incorporating elements of research into existing educational programs. It is not unusual that large research programmes have derived effects on education and research communication.

However, the specific content of the UNIK-effects and research communication is of course characterised by new interdisciplinary knowledge, which is – as mentioned above – something unique for UNIK.

Business collaboration and commercialization was generally not particularly emphasised, although all the UNIKs had business-related research activities as well as filed patents. However, the managements and researchers primarily saw UNIK as a basic science initiative, where the broader effects on businesses would not be evident in the short term.

With regards to business collaboration, a number of interviewees pointed to the fact that the UNIKs addressed societal challenges, and while the tangible effects on business might be limited at this point, the long-term value creation could prove significant in terms of new industries and business opportunities in the future. Therefore, it is important not to perceive UNIK in the same manner as for example grants from Innovation Fund Denmark, which have a shorter timeframe and usually a more tangible outcome.

6.3 EMBEDMENT OF THE UNIKS

Embedment has been a pressing question during the entire existence of the UNIKs. The issue arises from the typical challenge of project funding: How to secure continuation of (the well-functioning) parts of an initiative after project funds dry out. The question becomes even more relevant in light of the scale of UNIK.

The research activities demand substantial up-front investments in equipment, laboratories, recruitment of staff etc. If activities are not carried on, the universities risk being left with idle research infrastructure and excellent researchers without funding.

All UNIKs were required to compose a plan/an agreement before their expiry on how they would embed the "successful" elements of the individual UNIK. Furthermore, the international expert panel had to discuss the issue with the individual UNIKs as to identify the activities, which were to be embedded. The conclusion in the evaluation is that:

"(…) looking into the future it is opaque whether all the initiatives will sustain as top research environments without the funding from UNIK. This is a matter of great concern to the panel. It judges it to be a shared responsibility of the researchers involved and the management at the host universities to find a solution that will secure the successful outcome of the UNIKs in a long term perspective."

This evaluation shares the same assessment. The universities and researchers have all embedded parts of the UNIKs in very different ways. For example by financing PhDs, employing researchers in fixed positions, attracting external funding and/or creating intra-institutional, interdisciplinary grants. Others have sought to embed the basic interdisciplinary, collaborative structure as a framework for future programs.

Generally, however, embedment has posed a significant challenge for the host universities and the results are diverse. Three elements have been of importance:

- The governance-structure, which has already been discussed above. In terms of embedment, this factor influenced the anchoring of responsibility after the expiry of the grant. Hence, whether the university management specifically had focus on the continuation of the relevant activities.
- The academic leaders. Some leaders focused on embedding the concrete research activities, i.e. by attracting fresh funding, whereas others sought to embed the interdisci-

plinary organisational structure, which could then serve as the "framework" or a template for new research activities. It appears as if the latter model has been more successful in terms of embedment.

- Finance, including the university managements' own willingness to continue to fund the activities in an interdisciplinary setting, or through external funding. Importantly, all universities stress that a five years period is too short to construct a sustainable interdisciplinary research environment of this magnitude. The interviewees voice a desire to extend the well-functioning parts of an UNIK for additional years after an evaluation and additional funding.

Chapter 7

The application process

7.1 IMPACT OF THE APPLICATION PROCESS

The application process itself entailed significant organisational demands on the institutions and university management. For many of the universities, composing the applications for UNIK was a process that differed from most other research funding applications.

Overall, the application process was something unique compared to other forms of research funding. It created an impetus for cross-disciplinary, cross-institutional dialogue and collaboration to an extent, which was only somewhat present in other forms of research applications. The sections below will elaborate on the results from our analysis, starting with the most distinctive characteristics of the application process, which subsequently will be compared to other forms of research funding. Hereafter, other characteristics will be examined.

The table below sums up observations from the qualitative analysis.

Table 7.1 Characteristics of the application process

Effects	Characteristics can be attributed to UNIK and can be generalized	Characteristics unique for UNIK
Strengthened dialogue between academic fields	🟢	Highly unique
Promoting interdisciplinary collaboration between faculties and departments.	🟢	Partially unique
Strengthened university management's capacity to support large funding applications.	🟡	Modestly unique
Furthered focus and implementation of the university's research strategy	🟡	Modestly unique
Strengthened university management's willingness and ability to support large strategic and interdisciplinary research programmes.	🔴	Partially unique
Created the basis for interdisciplinary platforms at the non-UNIK universities.	🔴	Partially unique

As illustrated in the table, the application process had a distinctive influence on a few factors at the universities (denoted with green dots). In particular, it fostered dialogue and collaboration between academic fields.

Following points from the interviews summarize key experiences of the unique application process of UNIK:

- The potential prospects of achieving a UNIK grant resulted in a number of internal processes and organisational arrangements devised to identify and select cross-disciplinary research topics, which would be incorporated in the applications.
- Generally, the application process was characterized by a combination of bottom-up and top-down approaches. Researchers were encouraged to submit their ideas openly, while the university leadership and faculties coordinated the process and selected the eligible applications.
- The application process fostered a close dialogue between university management, faculties and researchers. This vertical dialogue focused on identifying synergies between the proposals, focusing the content of the final applications and facilitating interdisciplinary collaboration.

The combination of these experiences can be attributed due to the following aspects of the UNIK-scheme:

- The size of the UNIK grant – and the fact that the university management was the lead of the application – made it a strategic priority for the universities to pursue the competition.
- The call's emphasis on excellence and interdisciplinarity compelled the university management and researchers to initiate cross-institutional dialogue.
- The application process meant that only few applications would be eligible in the competition. The relatively high transaction costs of composing an application automatically ensured that only the most motivated researchers with the best ideas initiated work on the application.

To a varying degree, all the UNIKs built upon existing research platforms. In particular, a number of the research groups, which created the groundwork of the UNIKs, had hosted Centres of Excellence before UNIK. However, it also stands clear from the interviews that the application process of UNIK was something special. Compared to other forms of applications for research funding, the respondents emphasize the following:

- Although a number (or elements) of UNIK applications were partly grounded in previous Centres-of-Excellences (Danish National Research Foundation), the applications for UNIK were markedly more interdisciplinary than what is normally the case with respect to applications for CoEs. The UNIKs involve a larger number of research areas, faculties and departments and emphasize challenge-driven interdisciplinarity.

The application process also produced a number of characteristics, which are less straightforward to generalize. In table 7.1 the effects have been denoted by a yellow or red dot.

- To some extent, UNIK strengthened some universities' capacity to support large funding applications. However, many non-UNIK universities point out that the UNIK-process (in itself) did not have any distinctive implications. Furthermore, other universities already had a strong administrative apparatus concerning research-funding applications.
- The application process' impact on focus and implementation of the university's research strategy was most relevant for the universities, which eventually received a UNIK. However, one non-UNIK university subsequently incorporated the research topic of the application in its research strategy.
- Furthermore, the impact of the university management's willingness and ability to support large strategic and interdisciplinary research programs mostly had relevance for the UNIK-universities, whereas some non-UNIK universities in the short-term experienced the opposite: that the rejection reduced the motivation for participating in similar activities.
- UNIK did to a limited extent inspire a few non-UNIK universities to launch similar initiatives internally. However, it is possible that this would have happened despite UNIK, as these universities were already apt at working cross-disciplinary.

The interviews also point to a number of challenges regarding the application process:

- The call emphasised excellence as well as novel interdisciplinarity. The nature of experimental, novel, interdisciplinary research cannot always live up to classical excellence criteria, as the research fields have not yet been properly established. Some interviewees point out that the review process and judgement, eventually was based more on classical criteria of excellence (impact in journals) rather than on the originality and cross-disciplinarity of produced scientific research.
- Finally, some non-UNIK universities problematize what they view as a structural bias in the UNIK-scheme. The size of the grants, and its strong emphasis on interdisciplinarity and excellence made it – according to the critics – from the outset difficult for smaller, less academically, diverse, and less research-heavy universities to win a UNIK.

7.2 DESCRIPTION OF THE TYPICAL APPLICATION PROCESS

The majority of universities describe the UNIK application process as a combination of bottom-up and top-down approaches.

Following the call from the ministry, the generic approach resulted in a process, where the university management invited researchers to submit short descriptions ("one-pagers") of research topics. This process was generally open for all researchers/research groups at the universities, although the university management to some extent "nudged" research groups that from the outset were believed to carry a special potential.

Subsequently, the university management (both at the institutional level and at the faculty level) initiated a screening procedure where they identified and selected the topics carrying the biggest potential for receiving a UNIK in accordance with the call's emphasis on interdisciplinarity, excellence and internationalisation. In that way, they narrowed down the possible competitors.

Generally, the universities describe this approach as novel. It forced the university managements to be selective and strategic about the UNIK-applications in relation to the comparative research strengths of the institutions.

Furthermore, the university management examined potential synergies between the individual descriptions as well as the interplay between the research topics and the strategic context of the university. This was especially the case for the universities significantly affected by the university mergers, e.g. the University of Copenhagen and the University of Aarhus. At these institutions, researchers were "forced" to collaborate across former institutional boundaries, in cases where the potential for synergies existed. One researcher describes it as "an unprecedented strong management style".

For research topics that carried a high potential, but needed additional adjustments and focus, a dialogue with the researchers in question was carried out before initiating the composition of the application itself.

However, there were also differences in the way individual universities handled the UNIK-application process. In particular, the way that the universities organised the governance-structure around the application process played an important role.

For example, at the University of Copenhagen the application process gained extra momentum from the on-going mergers between the University of Copenhagen, the former Danish University of Pharmaceutical Sciences and the Royal Veterinary and Agricultural University. In relation to the mergers, the university had already initiated 13 cross-disciplinary "theme-packages" to strengthen coherence and dialogue between excellent research areas from the merged institutions.

These packages came to serve as the organisational framework for the UNIK-process. Once the call was announced, the university had already prepared an interdisciplinary organisational platform and a governance structure. Subsequently, the university management could more easily identify the cross-disciplinary research areas, which held the biggest potential.

It is also important to note, that a number of the applicants had previous experiences with Centres of Excellence and/or large private endowments, providing them with the organisational experience and skills regarding large research programmes.

Despite these contextual factors, most interviewees point out that the UNIK application process was not business-as-usual when applying for large research grants. The process featured a much more extensive cross-disciplinary dialogue than normally, compelling scientists from very different academic fields to be accustomed to each other's "language" and scientific paradigms – eventually merging the fields in a collective application. For the participating researchers, the process helped bridge academic fields around common research challenges.

Especially when looking at the non-UNIK universities, the long-term embedment of the application varied, but most non-UNIK universities did try to carry on parts of the application, e.g. by attracting external funds or by embedding the research topics in the university strategy. Table 7.2 provides an overview of the activities that followed from the application process at the non-UNIK-universities.

Table 7.2 Non-UNIK universities: Activities embedded after the application process

	Activities
University of Southern Denmark	• Embedded in research strategy • Research attracted subsequent external funding. • Internal allocation of core funding.
University of Aalborg	• Elements of applications were subsequently continued in other research projects.
Copenhagen Business School	• Establishment of new interdisciplinary platforms
University of Roskilde	• Embedded in research strategy • Research attracted subsequent external funding • Internal allocation of core funding. • New educational program
IT University of Copenhagen	• Embedded in research strategy • Elements of applications subsequently attracted external funding

However, these universities are generally less unequivocal as to whether the UNIK-process played a decisive role in embedding these activities. A few universities furthermore emphasise how the rejection to some extent discouraged the researchers', hence reduced motivation for engaging in large interdisciplinarity programs in the short term.

One important issue in this regard is the fact that the call put much emphasis on cross-disciplinary research, while the review process to a great extent did focus on traditional research criteria. At some universities, this mismatch was regarded as a disincentive to engage in cross-disciplinary research, especially within new research areas.