Vetenskapsrådet

UTVÄRDERING AV VERKSAMHETEN VID NATIONELLT CENTRUM FÖR LIVSVETENSKAPLIG FORSKNING (SCILIFELAB)

VETENSKAPSRÅDETS RAPPORTER 2015

UTVÄRDERING AV VERKSAMHETEN VID NATIONELLT CENTRUM FÖR LIVSVETENSKAPLIG FORSKNING (SCILIFELAB)

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FÖRORD

Regeringen gav Vetenskapsrådet i uppdrag (U2014/866/F, U2013/6974/F) att utvärdera verksamheten vid Nationellt centrum för livsvetenskaplig forskning (Science for Life Laboratory (SciLifeLab)) vid Kungliga Tekniska Högskolan (KTH). SciLifeLab är en samverkan mellan KTH, Karolinska institutet (KI), Stockholms universitet (SU) och Uppsala universitet (UU).

Utvärderingen belyser tre områden: SciLifeLabs organisatoriska och finansiella förutsättningar, SciLifeLabs tekniska plattformars vetenskapliga kvalitet och affilierad vetenskaplig produktion, samt SciLifeLabs samhälleliga relevans. Under hösten 2014 rekryterades två internationella paneler till uppdraget att utvärdera SciLifeLab, varav den ena med ett organisatoriskt fokus och den andra med ett mer vetenskapligt fokus. Panelerna genomförde en hearing med bland annat företrädare för SciLifeLab mellan den 10-15 maj 2015. Som ett stöd inför panelernas hearings med SciLifeLab, har projektet genomfört ett antal delprojekt, vilkas syfte var att ta fram och sammanställa information som beskriver SciLifeLabs verksamhet och omfattning som nationell resurs för storskalig molekylärbiologisk forskning.

Den här utvärderingsrapporten inleds med en svensk rapport som innehåller en beskrivning av utvärderingsuppdraget och dess genomförande, bakgrundsbeskrivning av etableringen av SciLifeLab, en sammanfattning av panelernas rapport samt Vetenskapsrådets rekommendationer till regeringen. Panelernas rapport kan läsas i sin helhet i Bilaga 1.

Det är Vetenskapsrådets förhoppning att denna utvärdering kommer att kunna användas för att förstärka och förbättra den redan framgångsrika satsning som etableringen av SciLifeLab redan inneburit för storskalig molekylärbiologisk forskning i Sverige.

Vetenskapsrådet vill tacka de två panelerna som gjort ett utomordentligt arbete med att utvärdera SciLifeLab med stort engagemang och konstruktiva förbättringsförslag. Vetenskapsrådet vill också tacka alla som bidragit med bakgrundsinformation till de delstudier som gjordes inledningsvis som underlag till utvärderingen.

Stockholm i november 2015

Sven Stafström
Generaldirektör Vetenskapsrådet

INNEHÅLL

SAMMANFATTNING

Regeringen gav Vetenskapsrådet i uppdrag (U2014/866/F, U2013/6974/F) att utvärdera verksamheten vid Nationellt centrum för livsvetenskaplig forskning (Science for Life Laboratory (SciLifeLab)) vid Kungliga Tekniska Högskolan (KTH). SciLifeLab är en samverkan mellan KTH, Karolinska institutet (KI), Stockholms universitet (SU) och Uppsala universitet (UU).

Utvärderingen belyser tre områden: SciLifeLabs organisatoriska och finansiella förutsättningar, SciLifeLabs tekniska plattformars vetenskapliga kvalitet och affilierad vetenskaplig produktion, samt SciLifeLabs samhälleliga relevans. Under hösten 2014 rekryterades två internationella paneler till uppdraget att utvärdera SciLifeLab, varav den ena med ett organisatoriskt fokus och den andra med ett mer vetenskapligt fokus. Panelerna genomförde en hearing med bla. företrädare för SciLifeLab mellan den 10-15 maj 2015. Som ett stöd inför panelernas hearings med SciLifeLab, har projektet genomfört ett antal delprojekt, vilkas syfte var att ta fram och sammanställa information som beskriver SciLifeLabs verksamhet och omfattning som nationell resurs för storskalig molekylärbiologisk forskning.

Panelernas övergripande bedömning av SciLifeLab är att det är en imponerande satsning inom ett område som har stor potential att bli en världsledande satsning inom livsvetenskaperna. För att säkerställa att SciLifeLab fortsätter på den framgångsrika väg som etableringen inneburit, behöver SciLifeLab en tydligare och mer samlad målbild, struktur, styrning och finansiering.

Panelerna anser vidare att SciLifeLab ännu inte fullt ut är en nationell resurs. Panelerna menar att om SciLifeLab ska kunna bli ett nationellt centrum för storskalig molekylärbiologisk forskning så är det väsentligt att alla plattformar håller högsta kvalitet och är exklusiva i svenskt forskningshänseende, samt att alla plattformar och faciliteter som organiseras under SciLifeLabs namn har samma status och erkännande oavsett vilket universitet som är värd för den.

Panelerna anser att det är viktigt att SciLifeLab fortsatt är integrerat i värduniversiteten, och att SciLifeLab inte ska bli en fristående organisation eller institut i förhållande till värduniversiteten.

Panelerna anser att den finansiella styrningen behöver stärkas, framförallt när det gäller avrapportering och redovisning av hur medlen som tillställts SciLifeLab har använts, men också avseende utfallet för viktiga resultatindikatorer som saknas idag.

Panelerna bedömer att den vetenskapliga kvaliteten på SciLifeLabs plattformar är mycket hög och det är imponerande att SciLifeLab har lyckats samla och organisera plattformar och service med så avancerad teknik och hög kvalitet på så kort tid. Strukturer och processer vid plattformar är av högsta internationella nivå avseende instrument och pågående projekt. En generell iakttagelse är att plattformarna saknar strategisk styrning och mål, och att detta bör vara en prioritet att utveckla för var och en av dem.

Plattformen för läkemedelsutveckling har haft en direktfinansiering från regeringen. Plattformen är under uppbyggnad och avser att omfatta tidig fas av läkemedelsutveckling, från identifiering till ”proof of principle”. Panelerna anser att utvecklingen ser lovande ut hittills men att den behöver förstärkas rejält för att nå full samhällsnytta.

SciLifeLab bör också, enligt panelerna, driva ett par större egna flaggskeppsprojekt som fokuserar på större samhällsutmaningar inom medicin- eller miljöområdet.

Panelerna anser att det är viktigt att det finns kommunikationsaktiviteter som direkt syftar till att översätta och förklara betydelsen av forskning som härrör från SciLifeLab till allmänheten för att öka förståelsen för den viktiga satsningen.

Vetenskapsrådets rekommendationer:

Mot bakgrund av vad som angetts i panelernas utvärderingsrapport lämnar Vetenskapsrådet följande rekommendationer till regeringen rörande SciLifeLabs utveckling:

1) Regeringen bör ta fram en målbild för SciLifeLab som innefattar samhällsutmaningar inom hälso- och sjukvårdsområdet samt inom miljöområdet.
2) Regeringen bör ändra förordningen som styr SciLifeLab (Nationellt centrum för livsvetenskaplig forskning, 2013:118) med avseende på följande punkter:
   a. Tydliggöra styrelsens roll i att ansvara för organisation, styrning och övergripande och långsiktig budget för SciLifeLab. Detta inkluderar även direktörens roll och ledningsresurser.
   b. Tydliggöra styrelsens roll i att utveckla kvalitetsindikatorer som avser att mäta dels hur SciLifeLabs status utvecklas, dels hur den nationella etableringen och utvecklingen fortskrider. Det senare bör också innefatta administrativa och ekonomiska uppföljningsmått. Dessa ska återrapporteras till regeringen.
   c. Regeringen bör se över styrelsens tillsättning och sammansättning så att det nationella inflytandet stärks.
3) Utvecklingen av plattformar både på och utanför KTH, KI, SU och UU bör ges samma förutsättningar och styras på likartat sätt inom hela centrumbildningen.
4) De infrastrukturer vid SciLifeLab som idag delfinansieras av Vetenskapsrådet bör underställas SciLifeLabs styrelse så att denna ansvarar för intern prioritering, strategisk styrning och uppföljning.
5) SFO-medlen för molekylär biovetenskap används idag för verksamhet vid SciLifeLab i enlighet med KTH:s och UU:s regleringsbrev. Dessa medel bör även i fortsättningen tilldelas och användas i enlighet med nuvarande regleringsbrev. Styrelsens inflytande över hur SFO-medlen används bör öka i enlighet med punkt 2a ovan.
6) För att möjliggöra för SciLifeLab att sluta avtal, samt söka internationellt konkurrensutsatta medel och som medelsförvaltare kunna ingå i internationella samarbeten behöver SciLifeLabs förhållande till KTH förtydligas.
7) En ny utvärdering av SciLifeLab bör genomföras inom 3-4 år. Denna utvärdering bör vara fokuserad på SciLifeLabs utveckling till ett nationellt centrum.

SUMMARY

The Swedish government has mandated the Swedish Research Council (U2014/866/F, U2013/6974/F) to carry out an assessment of the Science for Life Laboratory (SciLifeLab) hosted by the Royal Institute of Technology (KTH). The SciLifeLab is a joint effort between the Royal Institute of Technology (KTH), Karolinska Institutet (KI), Stockholm University (SU) and Uppsala University (UU).

The assessment focuses on three areas: The organisational and financial environment of the SciLifeLab, the quality of the scientific facilities and scientific output, and the societal relevance of the SciLifeLab. Two international review panels were recruited in the fall of 2014 to evaluate the SciLifeLab. One of the panels was given an organisational focus, and the other a more scientific focus. The panels each held a hearing with i.a. representatives of the SciLifeLab on 10-15 May 2015. A number of sub-projects were also carried out within the project to provide support in the run-up to the panels' SciLifeLab hearings. The aim of these hearings was to collect and compile information on the SciLifeLab activities and significance as a national resource for large-scale molecular biology research.

The panels' overall assessment of the SciLifeLab is that it is an impressive investment in an area that has great potential to become world leading in the life sciences. A clearer and more comprehensive vision, structure, governance, and financial framework is however needed to ensure that the successful process launched with the establishment of the SciLifeLab can continue.

To the panels the SciLifeLab is still not a fully-fledged national resource. The panels argue that for the SciLifeLab to become a national centre for large-scale molecular biology research, all platforms must be of top quality and unique in the Swedish research landscape. Furthermore, all platforms and facilities organised under the SciLifeLab umbrella must be given the same status and level of recognition, regardless of the host university in question.

The panels are also of the opinion that it is important that the SciLifeLab remains an integrated part of the host universities. It should not become an organisation or institute with an independent status vis-à-vis the host universities.

According to the panels, the financial governance of the SciLifeLab must be reinforced, especially in terms of financial reporting and accountability, but also in terms of important financial performance indicators that are missing today.

The panels deem the scientific quality of the SciLifeLab platforms to be very high, which is impressive given that the SciLifeLab centre has managed to bring together and organise such technically advanced and high-quality platforms and services in such a short period of time. The platform structures and processes are of the highest international quality when it comes the instruments and ongoing projects. A general observation made however is that the platforms lack strategic direction and objectives, and that the development of each of these two aspects should be prioritised.

Direct state funding has been given to the drug development platform. This platform is under construction and is intended to cover the early drug development stages, from the identification up to the proof-of-principle phase. The panels note the positive development achieved so far, but underline the need for it to be significantly strengthened to fully benefit society.

The SciLifeLab should also, as planned, be given a few own flagship projects focusing on grand societal challenges in the pharmaceutical or environmental area.

In order to increase the understanding of this important investment, the panels consider it important to have communication activities in place that aim directly at translating and explaining the importance of the SciLifeLab research to the public.

The Swedish Research Council's recommendations:

In view of what has been presented by the panels in the assessment report, the Swedish Research Council wishes to submit the following recommendations on the SciLifeLab development to the government:

1) A clearer vision of the SciLifeLab as a national centre for large-scale molecular biology research should be established.
2) The Science for Life Laboratory ordinance (2013:118) should be amended with regard to the following points:
   a. The board's role and responsibility in terms of the organisation, governance and long-term financing of the SciLifeLab. This also includes the role of the director and the management resources.
   b. The role of the board when it comes to the development of quality indicators, and its reporting mandate to the government.
   c. The composition and appointment of the board.
3) Equal conditions should apply to the development and management of platforms within the entire SciLifeLab structure.
4) The SciLifeLab infrastructures that are current co-financed by the Swedish Research Council should be placed under management of the SciLifeLab board.
5) The Strategic Research Area funding for molecular biology should be continued as it is today, directed to the host universities, but with more influence on the dispersement of the funding from the board and the director of SciLifeLab according to what is said in section 2a above.
6) SciLifeLabs relation to KTH needs to be clarified in order to enable SciLifeLab to conclude agreements, apply for competitive funding on the international level, and engage in international collaborations.
7) SciLifeLab needs to be evaluated again in 3- 4 years, in order to assess SciLifeLabs progress in developing into a fully national centre for molecular biology.

VETENSKAPSRÅDETS UTVÄRDERING AV VERKSAMHETEN VID NATIONELLT CENTRUM FÖR LIVSVETENSKAPLIG FORSKNING (SCILIFELAB)

Uppdrag

Regeringen gav i mars 2014 Vetenskapsrådet ett uppdrag (U2014/866/F, U2013/6974/F) att utvärdera verksamheten vid Nationellt centrum för livsvetenskaplig forskning (SciLifeLab) vid Kungliga Tekniska Högskolan. Uppdraget redovisas till regeringen senast den 30 november 2015. SciLifeLab är en samverkan mellan Kungliga Tekniska Högskolan (KTH) (ansvarig för centrumbildning), Karolinska institutet (KI), Stockholms universitet (SU) och Uppsala universitet (UU). I utvärderingsuppdraget ingår också att utvärdera genomförandet av uppdraget om läkemedelsutveckling (Kungl. Tekniska Högskolans regleringsbrev för 2014, U2013/7507/UH).

Vetenskapsrådet [1] har, mot bakgrund av regeringens uppdrag (Bilaga 5a, 5b), formulerat följande fem utvärderingsfrågor, vilka belyser tre områden: SciLifeLabs organisatoriska och finansiella förutsättningar, vetenskaplig kvalitet hos faciliteter och vetenskaplig produktion, samt SciLifeLabs samhälleliga relevans;

1) Har SciLifeLab den strategiska styrning, förvaltning och organisation som krävs för att etableras som en nationell resurs med internationellt erkännande som ett forskningsinstitut (el. motsvarande) av världsklass?
2) Bör SciLifeLab utvecklas till ett oberoende forskningsinstitut eller bör det förbli integrerat i värduniversitetens institutioner?
3) Är SciLifeLabs fokusområde, tekniska plattformar, vetenskapligt stöd, forskare, samt vetenskaplig produktion av högsta internationella standard?
4) I vilken utsträckning samverkar SciLifeLab med hälso- och sjukvården i att utveckla nya kliniska behandlingar/metoder, och är SciLifeLab en viktig samarbetspartner till läkemedelsföretag och andra berörda parter?
5) Har SciLifeLab utvecklats i rätt riktning och omfattning i förhållande till de mål, syften och finansiering som angivits av regeringen?

Genomförande

Utvärderingen, som genomfördes som ett projekt på Vetenskapsrådet, inleddes med att utarbeta Terms of Reference (ToR) (Bilaga 4) för utvärderingsuppdraget som kommunicerades både med regeringen och SciLifeLab, där utvärderingens ingående frågeställningar samt utvärderingsprocessen presenterades.

Under hösten 2014 rekryterades två internationella paneler till uppdraget att utvärdera SciLifeLab, den ena med ett organisatoriskt fokus och den andra med ett vetenskapligt fokus. Inför rekryteringen genomfördes en nomineringsprocess där alla lärosäten i Sverige som bedriver relevant forskning inbjöds att nominera personer till panelerna. Därefter gjordes ett urval av projektets styrgrupp och panelerna bemannades. (Bilaga 2)

Som ett stöd inför panelernas hearings med SciLifeLab, har projektet genomfört ett antal delprojekt, vilkas syfte var att ta fram och sammanställa information som beskriver SciLifeLabs verksamhet. Dessa delprojekt sammanfattas i tabellen nedan, som också redovisar delprojektens syfte. (Bilaga 3).

[1] Internt på Vetenskapsrådet har utvärderingen letts i projektform med en styrgrupp bestående av Sven Stafström (beställare), Jonas Björck, Juni Palmgren och Mats Ulfendahl. Projektgruppen har letts av Maria Bergström (projektledare) och Maria Starborg, och i projektgruppen har också ingått Anders Hellström, Gwendolyn Schaeken, Per Helldahl, Tomas Gustavsson, Maud Quist och Ulrica Horwath.

Tabell 1.

Delprojekt/uppgift	Syfte
Intervjuundersökning*	Att fastställa SciLifeLabs etablering som organisation, dess mål och omfattning.
Fokusgruppsintervjuer med extern referensgrupp*	Diskussion om SciLifeLabs translationella forskning och dess betydelse för den kliniska praktiken och läkemedelsindustrin samt miljöforskning.
Självutvärdering till teknikplattformar och enkäter till faciliteter, forskare och företag*	Beskrivning av SciLifeLabs faciliteter avseende verksamhet, kvalitet och tillgänglighet.
Bibliometrisk analys*	Beskrivning av SciLifeLabs vetenskapliga produktion.
Finansiell och organisationsanalys av oberoende konsult/DAMVAD**	Beskrivning av SciLifeLabs finansiella tillgångar från olika finansiärer.
Förutvärdering***	Förbedömning av SciLifeLab med stöd av underlag från VR inför utvärderingsvecka med site visits och hearings.

* Underlag som skickades till panelledamöterna inför deras förutvärdering av SciLifeLab.
** Den finansiella analysen av DAMVAD publiceras i Bilaga 6.
*** Ingår inte i bakgrundsdokumentationen.

Panelernas hearing med företrädare för SciLifeLab, samt med forskare inom fältet, genomfördes mellan den 10 och 15 maj 2015. Under panelveckan gjordes två platsbesök, ett i Stockholm och ett i Uppsala, där panelerna fick träffa ansvariga för de nio tekniska plattformar [2] som utgör SciLifeLabs verksamhet. Panelerna fick också under en dag träffa forskare verksamma vid andra universitet utanför SciLifeLab i Sverige samt SciLifeLabs ledning både från noderna och från styrelsen.

Panelerna påbörjade sitt arbete med att enas om bedömningar och rekommendationer under den senare delen av utvärderingsveckan. De två panelerna fick i uppdrag att skriva en gemensam rapport med ansvar för olika delar i rapporten.

Bakgrund till initiativet till ett nationellt centrum för livsvetenskaplig forskning (SciLifeLab)

I en gemensam skrivelse till regeringen juli 2008 föreslog de tre dåvarande rektorerna för KI, KTH och SU uppbyggnaden av ett nationellt centrum inom det livsvetenskapliga området, Stockholm Science for Life Laboratory. De tre rektorerna föreslog ett institut gemensamt ägt av de tre universiteten. Stockholm Science for Life Laboratory beskrevs att bli ett nav för forskning med högsta internationella klass inom området. I förslaget anger man Uppsala universitet som en tänkbar och viktig partner.

I forskningspropositionen samma år uttrycks ett stöd från regeringen för en sådan satsning och att satsningen kan bli en viktig bas för forskning inom området även för andra universitet utöver de tre universitet som inkom med ursprungsförslaget. I samma forskningsproposition föreslogs satsning på strategiska forskningsområden (SFO) och att Stockholm Science for Life Laboratory skulle söka medel i konkurrens inom området molekylär biovetenskap. Propositionen föreslog även en utredning om en nationell satsning av livsvetenskaperna vilken

[2] En teknisk plattform är ett samlingsnamn för en grupp faciliteter inom ett teknik/vetenskapsområde. Faciliteterna är spridda geografiskt inom vissa plattformar, se nedan.

kom att ledas av Per Unckel, då landshövding i Stockholms län, i samarbete med värduniversiteten i Stockholm.

I samband med utlysningen av SFO inom området för molekylära biovetenskaper, inkom ansökningar från bland andra Stockholm Science for Life Laboratory med Kungliga tekniska högskolan som huvudsökande och Karolinska institutet och Stockholms universitet som medsökande och från Centrum för medicinsk genomik och proteomik med Uppsala universitet som huvudsökande. Efter en internationell sakkunniggranskning beviljades endast dessa båda miljöer SFO-medel inom området molekylära biovetenskaper. Målet, vilket både Stockholm och Uppsala uttryckte i sina ansökningar, var att utveckla en nationell resurs i världsklass tillgängligt för forskare vid alla universitet i Sverige. I respektive ansökan angavs också att diskussioner hade inletts för att slå samman dessa två SFO-miljöer till en gemensam satsning.

Under åren 2010-2012 samarbetade de fyra värduniversiteten KTH, KI, SU och UU under ett gemensamt namn SciLifeLab med två noder, en Stockholm och en i Uppsala, med att utveckla en mer sammanhållen struktur för att möjliggöra en nationell tillgång för svenska forskare och andra intressenter till storskalig teknik för molekylär biovetenskap, med fokus på hälsa och miljö.

Efter förslag i regeringens forsknings- och innovationsproposition 2012, beslutade regeringen att inrätta Nationellt centrum för livsvetenskaplig forskning, (SciLifeLab). Regeringen tilldelade ytterligare 150 miljoner kronor för uppbyggnaden av det nationella centrumet tillsammans med 40 miljoner kronor i extra medel för tidig läkemedelsforskning. En särskild förordning (2013:118) om Nationellt centrum för livsvetenskaplig forskning inrättades vilken reglerar SciLifeLabs organisation med en nationell styrelse. En formell överenskommelse om samverkan gjordes 2 april 2013 mellan de fyra värduniversiteten där de åtar sig att samverka i enlighet med förordningen 2013:118.

Tabell 2. SciLifeLabs nuvarande årliga statliga finansiering utgörs utgörs av[3]

SFO-medel (2010 -2016)	145 MSEK	
Nationell centrumbildning[4]	150 MSEK (juli 2013-2015)	200 MSEK (2016)
Plattform för läkemedelsutveckling	40 MSEK (juli 2013-2015)	50 MSEK (2016)

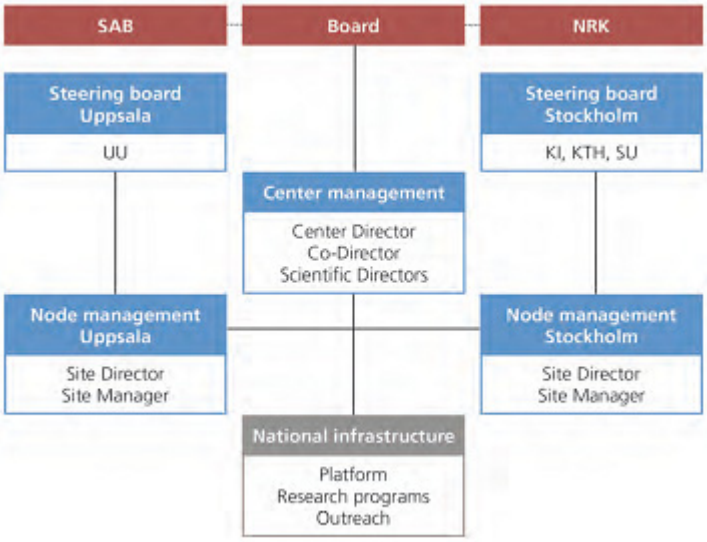
Från och med juli 2013 blev SciLifeLab en nationell resurs med en egen styrelse. KTH fick uppdraget att förvalta medel för den nationella centrumbildningen. Utgångspunkten var redan från början att etablera en nationell resurs med forskning av högsta internationella kvalitet inom det storskaliga molekylärbiologiska fältet i Sverige.

Organisation och ledning av SciLifeLab

SciLifeLab leds av en styrelse bestående av ordförande, representanter från de fyra värduniversiteten, andra svenska universitet samt en representant för industrin. Ordföranden och företrädaren för industrin utses av regeringen. SciLifeLab leds operativt av en direktör och en vicedirektör tillsammans med fyra vetenskapliga direktörer. Till den operativa ledningen finns också en strategisk ledningsgrupp. Direktören rapporterar om verksamheten till styrelsen. En internationell Strategic Advisory Board (SAB) och en nationell referenskommitté (NRK) har inrättats för att ge råd till styrelsen och direktören.

[3] Ej PLO (pris- och löne) -uppräknat.

[4] Budgetnivå för SciLifeLab som nationell centrumbildning finns angiven i Prop 2012/13:30 sid 83.



Figur 1. Organisation av SciLifeLab

Källa: Rapport till Scientific Advisory Board Science for Life Laboratory, 2015

Ekonomisk styrning av SciLifeLab

SciLifeLab erhöll nationella medel direkt från regeringen 2013, utöver de medel som tillförts värduniversiteten i form av stöd till de två strategiska forskningsområdena (SFO-medel) inom molekylär biovetenskap. Styrelsen beslutar om tilldelningen av nationella medel inom SciLifeLab. Stockholms- respektive Uppsalanoden har vardera sina lokala styrkommittéer. Styrkommittén i Uppsala fattar beslut om SFO-medel som tillförts UU medan i Stockholm beslutar respektive universitet om sin del av de tilldelade SFO-medlen. (Se finansiell analys Bilaga 6.)

Plattformar och faciliteter vid SciLifeLab

Det finns idag nio plattformar som totalt innefattar 35 faciliteter (se Tabell 3). Därutöver finns det nio regionala faciliteter av nationellt intresse, som inte bedömdes hålla nationell status av NRK när de utvärderade vilka plattformar och faciliteter som skulle få nationell status vid etableringen av SciLifeLab.

Tabell 3. Plattformar och faciliteter enligt SciLifeLab´s websida 2015-03-26.

Platform	Facility	Location
Affinity Proteomics (7)	• Biobank Profiling • Cell Profiling • Fluorescence Tissue Profiling • Mass Cytometri • PLA Proteomics • Protein and Peptide Arrays • Tissue Profiling	Uppsala Stockholm Stockholm Stockholm and Linköping Uppsala Stockholm Uppsala
Bioimaging (2)	• Advanced Light Microscopy • Fluorescence Correlation Spectroscopy	Stockholm Stockholm
Bioinformatics (3)	• Bioinformatics Compute and Storage (SNIC@UPPMAX) • Bioinformatics Long-term Support (WABI) • Bioinformatics Short-term Support and Infrastructure (BILS)	Stockholm Stockholm and Uppsala (and other universities) Stockholm and Uppsala, (and other universities)
Chemical Biology Consortium Sweden (3) (CBCS)	• Laboratories for Chemical Biology Umeå (LCBU) • The Laboratories for Chemical Biology at Karolinska Institutet (LCBKI) • Uppsala Drug Optimization and Pharmaceutical Profiling (UDOPP)	Umeå Stockholm Uppsala
Clinical Diagnostics (3)	• Clinical Biomarkers • Clinical Genomics • Clinical Sequencing	Uppsala Stockholm Uppsala
Drug Discovery and Development (8) (DDD)	• ADME (Absorption Distribution Metabolism Excretion) of Therapeutics (UDOPP) • Biochemical and Cellular Screening • Biophysical Screening and Characterization • Human Antibody Therapeutics • In Vitro and Systems Pharmacology • Medical Chemistry – Hit2Lead • Medicinal Chemistry – Lead Identification • Protein Expression and Characterization	Uppsala Stockholm Uppsala Stockholm Uppsala Stockholm Uppsala Stockholm
Functional Genomcis (4)	• Eukaryotic Single Cell Genomics • Karolinska High Throughput Center (KHTC) • Microbial Single Cell Genomics • Single Cell Proteomics (in start-up phase)	Stockholm Stockholm Uppsala Uppsala
National Genomics Infrastructure (4) (NGI)	• NGI Stockholm (Genomics Applications) • NGI Stockholm (Genomics Production) • NGI Uppsala (SNP&SEQ Technology Platform) • NGI Uppsala (Uppsala Genome Center)	Stockholm Stockholm Uppsala Uppsala

Platform	Facility	Location
Structural Biology (1)	• Protein Science Facility	Stockholm
Regional Facilities (9)	• Array and Analysis Facility • Biological visualization (BioVis), • Bioinformatics and Expression Analysis (BEA) • BioMaterial Interactions (BioMat) • Mutation Analysis Facility (MAF) • Advanced Mass Spectrometry Proteomics • Clinical Proteomics Mass Spectrometry Proteomics, Mass Cytometry • Mass Spectrometry-based Proteomics, Uppsala • Zebrafish	Uppsala Uppsala Stockholm (KI) Uppsala Stockholm (KI) Stockholm (KI) Stockholm (KI) Uppsala Uppsala

Slutsatser och rekommendationer från de vetenskapliga panelerna

Nedan är en sammanfattning av den utvärderingsrapport som panelerna har författat. Den kan läsas i sin helhet i Bilaga 1 i denna utvärderingsrapport.

Panelernas övergripande bedömning är att etableringen av SciLifeLab har varit mycket framgångsrik, framförallt har man visat på stark vetenskaplig produktion samt på kort tid byggt upp forskningsmiljöer och infrastrukturer som är internationellt konkurrenskraftiga. Panelerna har också identifierat vilka åtgärder som är mest angelägna för att ytterligare utveckla SciLifeLab, vilket framförallt gäller ledningsstrukturer och utövandet av ledning och styrning.

De vetenskapliga panelerna har gjort följande bedömningar avseende de fem utvärderingsfrågor som har varit centrala för uppdraget:

1. **Har SciLifeLab den strategiska styrning, förvaltning och organisation som krävs för att etableras som en nationell resurs med internationellt erkännande och rykte som ett forskningsinstitut (el. motsvarande) av världsklass?**

Panelens bedömning är att SciLifeLab har en komplicerad och komplex struktur med många olika finansieringsströmmar, vilket inte är ovanligt när man etablerar en stor satsning som involverar många universitet. För att säkerställa att SciLifeLab fortsätter på den framgångsrika väg som etableringen inneburit, behöver SciLifeLab en tydligare och mer samlad målbild, struktur, styrning och finansiering.

Panelerna anser att SciLifeLab inte fullt ut har den organisation, strategier och förvaltning som krävs för att nå de ambitiösa mål som de själva och regeringen har uppställt. SciLifeLab saknar tydliga långsiktiga planer som innefattar strategier för att prioritera forskningssatsningar, rekrytering och kriterier samt planer för utveckling/avveckling av dess tekniska plattformar.

En viktig del i den fortsatta utvecklingen av SciLifeLab är att ta fram resultatindikatorer för att kunna följa utvecklingen och etableringen till att bli ett nationellt centrum för storskalig molekylärbiologisk forskning som inkluderar de främsta forskarna i landet inom fältet.

En fråga att ta ställning till är också hur SciLifeLabs framtida finansiering ska utformas. Idag är det tydligt hur pengarna fördelas till respektive värduniversitet men det är oklart och svårt att bedöma hur dessa medel används för att effektivt bygga ett gemensamt sammanhängande nationellt centrum av världsklass. Det är panelernas bedömning att all finansiering till SciLifeLab ska underställas dess styrelse med stöd och input från

SciLifeLabs director, vilket också innefattar SFO-medlen. Panelerna anser vidare att den finansiella styrningen behöver stärkas, framförallt när det gäller avrapportering och redovisning av hur medlen som tillställts SciLifeLab har använts.

2. Bör SciLifeLab utvecklas till ett oberoende forskningsinstitut eller bör det förbli integrerat i värduniversitetens institutioner?

Panelerna anser att det är viktigt att SciLifeLab fortsatt är integrerat i värduniversiteten och anser inte att det ska bli en fristående organisation eller institut. Det är panelernas mening att om SciLifeLab ska kunna bli ett nationellt centrum så är det väsentligt att alla plattformar håller högsta kvalitet och är exklusiva i svenskt forskningshänseende, samt att alla plattformar och faciliteter som organiseras under SciLifeLabs namn har samma status och erkännande oavsett vilket universitet som är värd för dem.

Panelerna menar att SciLifeLabs styrelse har gjort ett utmärkt arbete i att etablera ett samlat SciLifeLab och koordinerat de fyra universitetens roller i detta, men det finns ytterligare steg som måste tas för att SciLifeLab ska få en nationell status. Det finns idag oklarheter kring SciLifeLabs styrelses mandat att styra utvecklingen av SciLifeLab i förhållande till de fyra värduniversitetens ledningar.

Angående den fortsatta ledningen och styrningen av SciLifeLab anser panelerna att det bör klargöras vilka intressen som de olika ledamöterna i SciLifeLabs styrelse representerar och vad de ser som sitt uppdrag. Det är idag otydligt om det är värduniversitetens, läkemedelsindustrins eller det allmänna nationella intresset för SciLifeLab som är utgångspunkten för ledamöternas uppdrag.

Panelerna anser att SciLifeLab borde se över vissa kriterier och resultatmått, vid till exempel rekrytering, expandering och utvärdering. Bland annat borde rekrytering av forskare ske enligt tydligare kriterier som bör innefatta oberoende finansiering och ett tydligt intresse för SciLifeLabs forskningsinriktning.

Kriterier för att bli fakultetsmedlem i SciLifeLab varierar också beroende på om man verkar vid något av värduniversiteten, eller vid ett annat svenskt universitet. Dessa kriterier bör vara enhetliga över hela landet.

3. Är SciLifeLabs fokusområde, tekniska plattformar [5], vetenskapligt stöd, forskare, samt vetenskaplig produktion av högsta internationella standard?

Panelerna anser att den vetenskapliga kvalitén på SciLifeLabs plattformar generellt sett är mycket hög, dock varierar det mellan faciliteter inom plattformarna, och det är imponerande att SciLifeLab på kort tid har lyckats samla och organisera plattformar och service med så avancerad teknik och hög kvalitet. En generell iakttagelse är dock att den strategiska styrningen samt målformulering för varje plattform kan utvecklas.

Strukturer och processer vid plattformar är av högsta internationella nivå avseende instrument och pågående projekt. Men det behövs resursförstärkningar både finansiellt och personellt. Det behöver bli större synergieffekter av de samlade plattformarna inom SciLifeLab. Strategier för kunskapsöverföring, utbildning samt rekrytering av forskare i anslutning till plattformar/faciliteter är också väsentligt för att utveckla SciLifeLab.

Plattformen för läkemedelsutveckling har haft en direktfinansiering från regeringen. Plattformen är under uppbyggnad och avser att omfatta tidig fas av läkemedelsutveckling, från identifiering till ”proof of principle”. Panelerna anser att utvecklingen ser lovande ut, men att plattformen behöver förstärkas rejält för att nå full samhällsnytta.

Panelerna anser att den vetenskapliga produktionen som affilierats till SciLifeLab är mycket imponerande. Till viss del är det forskning som bedrivits innan etableringen av SciLifeLab som en nationell resurs. Panelerna

[5] Plattformarna på SciLifeLab erbjuder state-of-the-art teknik för storskalig molekylär biovetenskap. Teknikplattformarna erbjuder tjänster till både akademi och industri. Dessutom utför de teknikutveckling och undervisning för att säkerställa att svenska forskare har tillgång till senaste metoder och kunskap inom området. Varje teknikplattform innehåller ett antal olika faciliteter som är geografiskt spridda i landet. Faciliteterna innehåller både infrastrukturer och stödkapacitet.

anser det därför svårt att redan nu bedöma den vetenskapliga produktionen som härrör specifikt från SciLifeLab.

Panelerna framhåller att det är viktigt att den utbildnings- och seminarieverksamhet som bedrivits inom SciLifeLab bör fortsätta. Dessa fyller en viktig funktion, dels i att vidareutveckla och utbilda fler inom bristområden som t.ex. inom bioinformatik, dels genom att dessa aktiviteter sprider kunskap och acceptans för SciLifeLabs verksamhet.

4. I vilken utsträckning samverkar SciLifeLab med hälso- och sjukvården i att utveckla nya kliniska behandlingar/metoder, och är SciLifeLab en viktig samarbetspartner till läkemedelsföretag och andra berörda parter?

Satsningen på SciLifeLab har stor potential att generera samhällsnytta. Detta gäller framförallt samarbete med läkemedelsindustrin, miljöforskning och hälso- och sjukvården. Panelerna anser att SciLifeLab bör fortsätta att stärka och utveckla samarbeten med läkemedelsindustrin, kliniska forskare och hälso- och sjukvårdens organisationer, där de redan nu gör betydande insatser. Det är också viktigt att nyetablerade små företag hittar samarbeten med forskare i SciLifeLab och att företrädare för industrin ses som viktiga samverkanspartners för SciLifeLab.

SciLifeLab bör också, enligt panelerna, driva ett par större egna flaggskeppsprojekt som fokuserar på större samhällsutmaningar inom medicin- eller miljöområdet.

Panelerna anser att det är viktigt att det finns kommunikationsaktiviteter som direkt syftar till att översätta och förklara betydelsen av forskning som härrör från SciLifeLab till allmänheten för att öka förståelsen för den viktiga satsningen.

5. Har SciLifeLab utvecklats i rätt riktning och omfattning i förhållande till de mål, syften och finansiering som angivits av regeringen?

Regeringens mål med SciLifeLab är att det bör bli ett forskningscentrum för nationell samverkan kring storskaliga molekylära analyser inom livsvetenskapen (Prop. 2012/13:30 s 84). I propositionen anges vidare att ”Regeringen ser det som mycket angeläget att SciLifeLab får möjligheter att utvecklas till ett världsledande centrum för storskalig molekylärbiologisk forskning på högsta internationella nivå för att kunna attrahera de allra främsta forskarna i världen inom området”. I propositionen står det också att SciLifeLab ska utvecklas som en samlad resurs för livsvetenskaplig forskning för att stärka Sveriges roll som en betydande aktör inom modern genomik, proteomik och liknande metoder. Propositionen lyfter också fram Sveriges styrkeområden; ”framförallt forskning med hjälp av register, longitudinella befolkningsstudier och biobanker, kan Sverige genom SciLifeLab få en konkurrensmässig fördel och skapa bra förutsättningar för den svenska forskningen.”

Mot bakgrund av ovanstående mål är panelernas bedömning att SciLifeLab har byggt upp en imponerande sammansättning av högteknologiska plattformar för storskalig molekylärbiologisk forskning på kort tid genom samarbeten mellan flera universitet.

Den bedömning som panelerna gjort är att SciLifeLab inte ännu fullt ut är ett nationellt centrum, och att målsättningen nu behöver vara att ytterligare involvera övriga universitet i det arbetet. Efterfrågade och högklassiga faciliteter vid universitet utanför de fyra värduniversiteten ska kunna få nationell status och stöd genom att ingå i SciLifeLab. SciLifeLab behöver utveckla en femårsplan med tydliga mål för SciLifeLabs framtida utveckling. Miljöforskningen behöver också få ett förstärkt fokus.

Panelerna anser att målet att bli världsledande är brett och ambitiöst. Målet behöver dock förtydligas. Är det tillräckligt att SciLifeLab utvecklar högteknologiska plattformar för storskalig molekylärbiologisk forskning samt bedriver erkänt framstående forskning inom området? Eller ska målet också innebära att SciLifeLab etablerar sig internationellt och exempelvis inbjuder till utbildningar, symposier, och/eller utvecklar ett internationellt postdoc-program?

Panelerna menar också att de resurser som tillställs SciLifeLab via SFO-medel bör användas för fortsatt utveckling och/eller för rekrytering på fakultetsnivå. Ytterligare medel kan användas för att bedriva några

flaggskeppsprojekt som ett led i att göra SciLifeLab internationellt erkänt som ett världsledande forskningscentrum.

Slutligen menar panelerna att SciLifeLab fortsatt behöver arbeta för att nå ut till och skapa samarbeten utanför akademien, som hälso- och sjukvården och företagen via bland annat de AIM-days som genomförts. Det är också viktigt att stärka samarbetet och visa på möjligheterna med SciLifeLab för industrin.

Vetenskapsrådets rekommendationer

Vetenskapsrådet stödjer de slutsatser och rekommendationer som panelerna för fram i sin utvärderingsrapport. Insatsen som KTH, KI, SU och UU gjort för att etablera SciLifeLab har varit mycket framgångsrik. Sverige har också många framstående forskare inom området storskalig molekylärbiologi samt relativa fördelar genom bland annat forskning med stöd av register, longitudinella befolkningsstudier samt biobanker. Värduniversitetens engagemang samt den höga nationella forskningskompetensen utgör tillsammans en förutsättning för den framtida utvecklingen av SciLifeLab.

Samtidigt är det tydligt från utvärderingsrapporten att det finns brister som måste åtgärdas för att satsningen ska kunna nå sin fulla potential som nationell resurs för storskalig molekylärbiologisk forskning. SciLifeLab behöver en mer ändamålsenlig och samlad styrning innefattande långsiktig planering av såväl forskningsprioriteringar som av SciLifeLabs totala budget. Det krävs också strategier för att utveckla och avveckla plattformar samt för att utveckla SciLifeLab som samarbetspartner till hälso- och sjukvårdens aktörer och industrin.

Mot bakgrund av vad som angetts i panelernas utvärderingsrapport lämnar Vetenskapsrådet följande rekommendationer till regeringen rörande SciLifeLabs utveckling:

1) Regeringen bör ta fram en målbild för SciLifeLab som innefattar samhällsutmaningar inom hälso- och sjukvårdsområdet samt inom miljöområdet.
2) Regeringen bör ändra förordningen som styr SciLifeLab (Nationellt centrum för livsvetenskaplig forskning, 2013:118) med avseende på följande punkter:
    a. Tydliggöra styrelsens roll i att ansvara för organisation, styrning och övergripande och långsiktig budget för SciLifeLab. Detta inkluderar även direktörens roll och ledningsresurser.
    b. Tydliggöra styrelsens roll i att utveckla kvalitetsindikatorer som avser att mäta dels hur SciLifeLabs status utvecklas, dels hur den nationella etableringen och utvecklingen fortskrider. Det senare bör också innefatta administrativa och ekonomiska uppföljningsmått. Dessa ska återrapporteras till regeringen.
    c. Regeringen bör se över styrelsens tillsättning och sammansättning så att det nationella inflytandet stärks.
3) Utvecklingen av plattformar både på och utanför KTH, KI, SU och UU bör ges samma förutsättningar och styras på likartat sätt inom hela centrumbildningen.
4) De infrastrukturer vid SciLifeLab som idag delfinansieras av Vetenskapsrådet bör underställas SciLifeLabs styrelse så att denna ansvarar för intern prioritering, strategisk styrning och uppföljning.
5) SFO-medlen för molekylär biovetenskap används idag för verksamhet vid SciLifeLab i enlighet med KTH:s och UU:s regleringsbrev. Dessa medel bör även i fortsättningen tilldelas och användas i enlighet med nuvarande regleringsbrev. Styrelsens inflytande över hur SFO-medlen används bör öka i enlighet med punkt 2a ovan.
6) För att möjliggöra för SciLifeLab att sluta avtal, samt söka internationellt konkurrensutsatta medel och som medelsförvaltare kunna ingå i internationella samarbeten behöver SciLifeLabs förhållande till KTH förtydligas.
7) En ny utvärdering av SciLifeLab bör genomföras inom 3-4 år. Denna utvärdering bör vara fokuserad på SciLifeLabs utveckling till ett nationellt centrum.

BILAGOR

Bilaga 1	Panel Report
Bilaga 2	Vetenskapliga paneler
Bilaga 3	Background Documentation
Bilaga 4	Terms of Reference
Bilaga 5a	Regeringsuppdrag
Bilaga 5b	Ändringsbeslut
Bilaga 6	Financial Analysis

Bilaga 1:
Panel Report

OVERALL SUMMARY, CONCLUSIONS AND RECOMMENDATIONS FROM THE EXPERT PANEL

The panels recognize that the overall objective of SciLifeLab (hereafter, SLL) – to become a world-leading national resource center for large-scale bioscience research – is both broad and ambitious. Achievements since the establishment of the national lab in 2013 have been remarkable: very strong science and technology, a very strong research record in so short a time, and facilities supported by highly motivated, well-trained staff. SLL has indeed developed and implemented specialized infrastructure required for internationally competitive genome-scale biology. This investment is extremely important and timely, and will be the foundation for all major advances in the biosciences in the next decade. The emphasis on technology development and delivery during the ramp-up phase of the program has provided a unifying "vision" for the various platforms and centers. Also, the benefits of geographic concentration of platforms and activities in "nodes" with a critical mass of researchers during the establishment of the lab are clear, and have clearly facilitated the recruitment of an outstanding cadre of young researchers (SLL Fellows) and enabled many new and exciting projects.

SLL has been in existence for just a few years as a unified entity. By and large, it looks successful and appears to have the potential to be a cutting-edge entity. Therefore, the overall organizational format where SLL exists as a collaborative enterprise between the host Universities should be continued. The integration of universities and research institutes into a common unit, providing critical mass for state-of-the-art and internationally leading research, is a trend that can be observed worldwide. SLL is pioneering such an effort, but a number of changes in management structure and practices are needed to enhance effectiveness and increase the probability of sustained success.

Main recommendations

1) Clarify and improve mission statement, for long term buy-in across Sweden
2) Develop explicit goals for activity areas, both short- and long-term
3) Retain SLL's current organizational structure, rather than form an independent institute
4) Extend inclusivity by adding further platforms from outside Stockholm and Uppsala, supported by SLL budget and under SLL management
5) Improve clarity of management structure: identify governance, management, advisory roles
6) Establish clear guidelines for faculty appointment process within SLL across Sweden
7) Establish strategy for long-term maintenance and development of platforms
8) Improve transparency in finance, including a 3 to 5 year plan
9) Improve transparency of prioritization of jobs in the platforms, and in career paths for staff scientists in service-oriented roles
10) Increase outreach and branding to improve international visibility
11) Develop SLL/user relationships better, using the new development of a communication office
12) Focus on a wider range of topics around bioinformatics, with greater involvement of the mathematical sciences
13) Develop performance measures to assess the goals and objectives
14) Train clinical scientists, an important medium/long term aim

Introduction

The Swedish Research Council commissioned two expert panels to evaluate the functions of the Science for Life Laboratory (SciLifeLab or SLL) during Spring 2015. One panel evaluated operational aspects (Operational Panel) and the other panel science issues (Scientific Panel). The Operational Panel was chaired by Professor Olli A. Jänne (University of Helsinki, Helsinki, Finland) and the Scientific Panel by Professor Simon Tavaré (Cancer Research UK Cambridge Institute, Cambridge, UK). The composition of the panels is given in Appendix 1. Prior to the on-site visits that occurred from May 10 until May 15, 2015 (this program is in

Appendix 2), the panel members were provided with extensive background documentation from the Swedish Research Council, together with the 2013 and 2014 Annual Reports of SLL.

The key evaluation questions that the panels were asked to assess during their visit and comment on in their report were the following:

1) Does SLL have the required strategic and sustainable management and organization to establish itself as a national resource with international recognition and reputation as a world-class research institute or equivalent?
2) Should SLL evolve into an independent research institute or equivalent or should it remain within the host universities´ boundaries and management?
3) Are SLL's area of focus, technical facilities, scientific support and researchers, as well as scientific production, of the highest international standard?
4) To what extent is SLL a crucial partner in developing new clinical therapies/methods using sequencing technologies, for example, in health care provision and for the pharmaceutical industry and other relevant partners?
5) Has SLL managed to develop in the right direction and scope in relation to the goals and objectives outlined in the government proposals addressing its remit purpose, and funding?

Each of these key questions were addressed by the expert panels prior to the on-site visits through pre-evaluation protocols and during the visits through interviews (see the program) and multiple meetings of the panels. This written evaluation report addressing the five key questions set forth by the Swedish Research Council is approved by all members of the two panels.

Key Question 1. Management and organization of SciLifeLab for establishing itself as national center and resource with international recognition and world-class research

General Comments

The Organizational Panel (OP) of the External Review team was charged with assessing the structure and management of SLL with respect to its mandate to become a national resource center of international repute for collaborative molecular biosciences and for interactional collaboration. The OP members focused discussion on the structural and practical aspects of SLL organization, without specific reference to individual scientific projects or platforms.

Not surprisingly – given the participation of four Universities, an SLL-specific management team (the Director, platform Directors, etc.) and a structure with several funding streams – the management structure of SLL is quite complex. Now that the lab is established, SLL stakeholders should embrace the opportunity to restructure the organization to ensure that SLL remains at the forefront of molecular bioscience research, and provides the best possible support to Swedish scientists. We summarize our assessment of SLL management and organization below, and provide some recommendations for the future related to this assessment.

Assessment

The OP was asked to assess whether SLL had the strategic and sustainable management required to fulfill its mandate. As noted above, SLL has clearly launched an impressive infrastructure in a very short time, and strategic recruitments and relocation of key personnel have already generated a great deal of excitement and new projects in the Swedish life sciences community. However, it is clear that the current management and financial structure is highly complex, making it difficult to provide cogent feedback and advice. At present, KTH receives the national SLL funding from the Swedish Government and distributes the funds to the two nodes (70% to Stockholm and 30% to Uppsala). The strategic SLL funds are, in turn, directed to the two nodes

directly from the Government. In Stockholm, the funds are split in such a way that each of the three Universities gets a third. Additional funding attributed to SLL derives from multiple sources of 'matching' funds, including the Wallenberg Foundation, the Universities and research grants to scientists affiliated with the SLL. This structure made it extremely difficult to assess the financial management of SLL even with a report from outside experts.

The OP made several specific observations regarding the overall management of the SLL, which are summarized below:

1) The SLL management team has no multi-year plan outlining the projected budget, research priorities and strategic recruitment, and plans for updating/replacing key equipment. The lack of planning in such a complex organization means that it is unclear how decisions are made through the multiple levels of management, including the central management, platform and facility directors, University-based Steering Boards, and so on.
2) The lack of clear goals and plans for the organization mean that there are no clear performance indicators to enable assessment of the effectiveness of SLL as a catalyst of collaborative research at Swedish universities.
3) The commitment to develop SLL as an internationally recognized entity, rather than as a national resource for Swedish scientists, is not entirely clear.
4) The SLL is not yet operational as a truly national resource, and the plans to achieve this status and the role of proposed regional facilities are not well articulated.
5) In some cases, the organization of the platforms is too complex, thus limiting their utility. For example, the Affinity Proteomics platform features many sub-divisions, reflecting its origins in the Human Protein Atlas project, but not necessarily emphasizing the development and implementation of the most innovative proteomics platforms for Swedish scientists. In a similar vein, the Structural Biology platform, which evolved from the former Structural Genomics Consortium, has become an under-utilized protein production facility.
6) Some of the platforms and facilities are not of an international standard, and their continuous support appears to withhold resources from the state-of-the-art ones.

Recommendations

1) SLL management should make a multi-year plan with clear goals for platform performance and strategic research programs. Performance evaluation will then be based on achieving the goals. The OP was pleased to see the recent plan from the National Board to simplify the management structure of SLL and to clarify the mandate and roles of the director, site-directors and other staff, which must be made clear to stakeholders.
2) Platforms should provide regular (annual) reports to board. Plans for development of new methods (if appropriate) should be made clear – SLL platforms should only be high-end developers and implementers of major infrastructure for molecular biosciences. In this regard, there must be clear protocols for closing platforms that are no longer useful to the research community or are performing poorly. In view of this, the OP enthusiastically endorses the upcoming external review of SLL platforms.
3) A plan for the professional development of platform staff should be created and implemented, to ensure that SLL can continue to recruit and retain the very best researchers.
4) In keeping with the national mandate of SLL, any facility that receives SLL funding should be a 'full' national facility, as opposed to having a tiered structure with 'regional' or 'satellite' facilities.
5) SLL should aim to achieve a more balanced approach to key activities including education and knowledge translation.
6) Efforts should be made to clearly justify user fees to research community – clear communication is important.
7) SLL should work to fulfill its translational medical research mandate by integrating clinical diagnostics into clinical research settings, as opposed to supporting an independent platform that performs only a fraction of the activities necessary for successful clinical diagnostics and new therapies.

Key Question 2. Future organization in relation to the host universities

SLL started as university-initiated efforts with three Stockholm universities jointly and Uppsala University submitting separate proposals for development of organizational vehicles that would house cutting-edge technologies in molecular biosciences for use by faculty members. Eventually, the two separate efforts were merged into what is characterized as a national enterprise for cutting-edge high-throughput omics technologies as well as other high-end technologies that would be difficult to maintain in individual research laboratories. The different technologies are organized as nine platforms, with genomics and bioinformatics in both Stockholm and Uppsala and other platforms based either in Stockholm or Uppsala. Each platform may contain several facilities that can, in turn, be located at both nodes or even outside the four host Universities. Although the primary focus of SLL is technology and service, there is also an effort to support high-quality research by enabling the use of SLL technology platforms. This support is in two forms. In Stockholm, selected faculty members from the three participating Universities are relocated, in part, to laboratories in the new SLL building. This relocation is envisaged to be time-delimited for a period of about six years, after which the faculty member would return to her/his home department. Second, all four Universities have a robust SLL Fellows recruitment program to build critical mass of faculty that will use the SLL facilities for their research projects.

The rapid pace of growth and the state-of-the-art sequencing facilities in both Stockholm and Uppsala are very impressive. The technical staff members running the facilities are well trained and appear to be service oriented. The facility is a full service facility with intake of DNA and RNA and output such as exome or genome characterization or DEGs supported by standard bioinformatics. Waiting times for sequencing have been long, currently averaging eight weeks, which indicates the need for process optimization. Such process optimization should part of the management structure within the host university boundary.

During a course of the review process, the OP identified a number of issues that merit further attention.

Financial organization

Assessment

The financing of SLL through its host university is very complex, which made it difficult to assess given the information provided to the OP. Complexity reflects direction from the National Board and KTH to support operations of platforms, Wallenberg Foundation funding the Director to purchase platform equipment, and SRA funding to host universities for faculty recruitment and other activities. It is not clear how, and by whom and by what process, decisions concerning coordination of the various SLL functions are made. Likewise, it is unclear how the platform directors and staff can identify a leadership chain through which to request further support and/or changes to current operations. It is also unclear whether inclusion of research funding of the SLL faculty members provides a useful picture of the scope of SLL operations.

Recommendations

1) The governing board and host institution officials develop a transparent financial reporting format that can be easily understood by all the stakeholders as well as external evaluating panels.
2) KTH, as the institution responsible for receipt and disbursement of a large portion of SLL funds, should identify a financial official who has fiduciary responsibility for SLL. This individual could report to the SLL Board as part of her/his duties for SLL.
3) Only that portion of the research grant funds awarded to SLL faculty members that are related to platform usage (user fees) or directly related to platform development should be counted as SLL funds.
4) All funds for SLL, including the strategic funds (SRA funds), should be directed through the National Board with the Director’s input. This would exclude individual research grants to faculty members that would be overseen by the relevant department of the host institutions.
5) There should be separate funds for the Director’s discretionary use.

6) The annual report should include clear data on finances (revenues; expenses), clear summaries of platform usage, and data on how key performance indicators have been met in the past year.
7) Transparency in distribution and definition of indirect costs across the four institutions need to be made clear.

Governance

Assessment

The current SLL National Board should be commended for doing an excellent job of integrating the interests of multiple universities and develop and executing a plan for rapid development of the physical plant and operations of the various platforms. However, there is room of enhancement in the operation of the Board so that SLL can be viewed by all as functioning as a national resource entity. In addition, the ambiguities in the functioning of the Governing Board of SLL and several aspects of faculty relationship to SLL are unclear. Moreover, the criteria for becoming a SLL faculty member are not the same in Stockholm and Uppsala. In view of this, easily accessible guidelines of operations are likely to be very valuable as SLL grows and becomes a stable operating entity in Sweden.

The SLL building in Stockholm is already fully occupied by SLL faculty members. The current tentative plan is that a faculty member can have his/her space for six years (4 + 2 years?), but there are no concrete agreements or guidelines to this effect. Many of the SLL faculty members have only a part of their group located in the SLL building, with the rest of the group working in other premises of the three Universities. Moreover, it was not clear whether the space allocation in the SLL building was carried out on the basis of themes or by some other criteria.

In consideration of whether SLL should become a free-standing entity, there was uniform agreement on the part of the SLL faculty that it should not. Likewise, there was a clear consensus among both expert panels that SLL could be best improved through modification, not through redefinition and rebranding. As mentioned above, the current structure represents the historical origins of SLL, which is viewed as having significant high-value information that needs to be retained. However, a number of considerations need to be addressed, including the definition of the SLL faculty, the determination of which labs in Stockholm occupy the SLL building, and the presence of additional platforms outside Stockholm and Uppsala.

Recommendations

1) The roles of the members of the governing board should be clearly identified as to whether they represent the host universities, the general interests of the SLL or other stakeholders such as foundations and industry representatives.
2) Given the desire for national stature, the appointment of one or two qualified members of the non-scientific public should be considered. These members could serve as ambassadors to society.
3) Criteria for appointment to SLL should be clear and consistently applied across institutions. These should include independent research funding and clear interests in research areas associated with SLL.
4) Appointment letters for faculty members should clarify responsibilities and privileges associated with being a member of the SLL faculty.
5) Clear and transparent criteria for space allocation in the SLL building in Stockholm need to be established, and principles of relocation and continued occupancy of SLL space must be developed.
6) Clear metrics for success in SLL space must be developed; annual evaluation of performance of individual faculty members with respect these criteria must be conducted.
7) When SLL expands to other universities, uniform criteria for SLL faculty appointments should used across all Swedish universities. Inclusivity should be a guiding principle.
8) SLL should retain its current structure and not become a free-standing organization or institute.
9) Branding of SLL is very important. The leadership should look into the possibility of SLL having a legal entity status that would potentially be of great importance, for example, for EU applications and contracts with industry.

Key Question 3. SciLifeLab's Scientific Quality

In view of the fact that SLL has existed in its present structure less than two years, its platform services and research represent an excellent achievement. The lists of SLL publications in top-tier international journals along with commendable citation frequencies to articles with a SLL affiliation are indeed impressive. However, given the nature of large-scale molecular bioscience research, it is conceivable that most of the research resulting in 2013 and 2014 SLL publications was actually conducted prior to the existence of SLL. It is, therefore, difficult to judge the extent to which the SLL functions have contributed to these publications. Undoubtedly, more attention needs to be paid to the role SLL platform services play in facilitating high-quality bioscience and environmental science research in years to come, not only within the SLL faculty but also in Sweden at large.

The expert panels cannot express specific comments on scientific production of SLL because none of the interviews that were conducted addressed this issue, and no SLL faculty members were interviewed in relation to their research projects and/or goals. An in-depth assessment of scientific production needs to be addressed through a future evaluation process.

We have provided detailed comments on each of the nine platforms, with recommendations for each.

Structural biology

Assessment

The platform (5 FTEs) presently provides the scientific community with recombinant protein production services in the context of the Protein Science Facility (PSF). It has evolved from the former Structural Genomics Consortium. The uniqueness of the protein production lies in the high-throughput process, which enables time and cost effective production of proteins in E. coli. PSF offers in addition to the national protein production also access to instrumentation for biophysical characterization and a protein crystallography platform. Later this year, the platform will expand with a cryo-electron microscopy facility in each of Umeå and Stockholm, which development is required to justify the existence of this platform. It seems that the platform is currently able to fulfill the demand for their services. The PSF facility is nearly completely used by groups from the host universities.

Recommendations

1) It is important that the facility handles a substantial proportion of their projects with groups outside SLL's host universities to ensure that this facility is really a national infrastructure.

Affinity Proteomics

Assessment

Seven facilities with a total of approximately 25 FTEs offer access to resources for characterizing the protein composition of biological specimens. Several of the facilities take advantage of technologies, reagents, and biological information generated within the Human Protein Atlas project (~40,000 antibodies), including resources for imaging proteins in situ, measuring proteins in solution, and protein or peptide arrays. These resources are complemented by proximity ligation and proximity extension services, where DNA modified affinity reagents are used to specifically image proteins or protein interactions and modifications in cells and tissues. These facilities can also assist in establishing highly sensitive and multiplex assays for proteins in plasma and other liquid samples. A facility for CyTOF technology was the latest addition to this platform. In all, more than 300 projects were performed since mid-2013, of which about one-half were collaborative. It seems that the facilities are currently able to fulfill the demand for their services.

Some of the facilities have worked on a substantial number of projects with groups outside the SLL's host universities while others are nearly completely used by groups from the host universities.

Recommendations

1) All facilities should handle a substantial proportion of their projects with groups outside the SLL's host universities to ensure that all facilities in this platform are really national infrastructures.
2) Consider, in this platform, but also in general, the balance between providing routine laboratory services and cutting edge technology development as well as high-end services.
3) Consider how to cater for large customer base in certain areas versus domains with a smaller scientific user base.
4) With increasing user numbers and complexity of the processes to generate data, the communication and agreement on workflows and protocols between users and the facility may require more attention.

Chemical Biology Consortium Sweden (CBCS)

Assessment

The goal of the Chemical Biology Consortium Sweden (CBCS) is to provide small molecules for life science applications. A number of the platform components are similar to those needed in the Drug Discovery and Development (DDD) platform, making a close cooperation between CBCS and DDD essential in order to avoid redundancy and ensure efficient management and use of the facility. The components currently envisaged are assay development, computational chemistry, cheminformatics, chemical library screening and development, medicinal chemistry and target identification and preclinical profiling.

Of great importance for the success of the CBCS are the small molecule and antibody collections that can be provided to individual labs and organizations.

The Laboratories for Chemical Biology at Karolinska Institutet (LCBKI) and Uppsala Drug Optimization and Pharmaceutical Profiling (UDOPP) presented a highly optimistic profile. UDOPP contributed significantly to two important projects published in 2014. The MTH1 project identified and tested an inhibitor of the MTH1 protein that is important in DNA repair, and demonstrated that this small molecule inhibitor selectively killed cancer cells. LCBKI contributed to a project involving glioblastoma, demonstrating vulnerability of glioblastoma cells to massive vacuolation induced by a small molecule.

The management and organization seem to function very well and engage in a service-oriented manner across the academic community. Similar to the DDD platform, medicinal chemistry has been identified as an important bottleneck to remedy. Also approaches using state-of-the-art cheminformatics seem to be lacking at the current time. Due to the heterogeneity of the projects it will be important to develop for each project clear criteria and guidelines by which individual projects are transferred from individual laboratories into the domain and responsibility of the CBCS. Unlike primary assay development, aspects of miniaturization and standardization might have to be transferred to the CBCS to carry out large screens. The challenge of the platform will be the selection and prioritization of the most promising projects.

Recommendations

1) Strengthen medicinal chemistry
2) Strengthen computational chemistry
3) Maintain close exchange and synchronization with the DDD, Functional Genomics and Structural Biology platforms
4) Develop clear guidelines, criteria and processes for prioritization and evaluation of the projects carried forward by the CBCS platform

Bioinformatics

Assessment

The Bioinformatics Platform is composed of three facilities: the Bioinformatics Compute and Storage (UPPNEX), the Bioinformatics Long-term Support (WABI, projects up to 6 months), and the Bioinformatics Short-term Support and Infrastructure (BILS, up to 60 h free of charge). UPPNEX handled with three FTEs around 700 projects since mid-2013, BILS with 41 FTEs at 11 sites in Sweden was involved in close to 700 projects while WABI's 15 FTEs handled around 30 projects.

WABI was not able to keep up with demand (more than 170 applications were received since mid-2013), while BILS could deal with nearly all requests the facility received. UPPNEX was not able to keep up with demand and shortage of storage capacity led to serious delays in bringing new sequencing equipment into production mode.

The Bioinformatics platform of SLL has the potential to become a successful national infrastructure resource, providing the basis for world-class data-driven research across Sweden. The pre-evaluation report, interviews and assessments have revealed that one area with the greatest demand for infrastructure and services is 'bioinformatics'. Overall, all of these facilities are seen as crucial to the success of SLL and the uptake by the user communities was very good.

In the current organizational structure, the term 'bioinformatics' is used for a broad range of themes that may be better addressed with clear conceptual distinctions. This could include:

- Hardware and software requirements for core IT-based data management, primarily focusing on the secure storage and effective transfer of data.
- The development and provision of tools, workflows and methodologies for the pre-processing, visualization, analysis and interpretation of data.

Recommendations

1) Future strategic developments should distinguish between needs related to software development, implementation and integration, and needs related to statistical and mathematical methodologies (e.g. simulation, modeling), systems biology and systems medicine.
2) With cutting-edge technologies for data generation, the boundary between services and research will inevitably blur. This leads to different needs for short- and long-term services, the latter being more of a project-embedded nature, while the former can more easily be realized as a central service.
3) A key challenge for SLL related research is the integration of data. This includes the integration of data from different technologies (e.g. omics technologies, microscopy, imaging), and the integration of conventional patient data with clinical data generated with state-of-the-art technologies (e.g. sequencing). These aspects require long-term strategic engagement to appropriately address data security and privacy protection, standardization and interoperability.
4) The lack of certain bioinformatics skill sets and overall capacity will be a challenge for years to come and needs attention as a crucial topic for many data-driven platforms and research activities of SLL.
5) The career development for 'software and data scientists' needs attention. It is essential to see software and data scientists as equally valuable team members in a cooperative research environment.

6) Interfacing between core-IT services and providing key contributions to the analysis and interpretation of data.
7) It will be beneficial to ensure a unified overall leadership of the three streams of complementary bioinformatics infrastructure.
8) In general, it would be good to develop for SLL as a whole an IT strategy from hardware and networking requirements and systems and network support to data production and data user bioinformatics support and training. Creation of the post of a Chief Data Officer overseeing the development and creation of the IT strategy should be considered.
9) We also encourage the ongoing engagement of the Bioinformatics Research Infrastructure with their European counterparts through ELIXIR, as well as the close interaction with other biomedical research infrastructures (biobanks, imaging, biodiversity, structural biology, marine biology, etc.) to contribute through standardization and interoperability efforts the necessary backbone to facilitate data integration of various data types in the rapidly growing fields of medical and environmental research.

Drug Discovery and Development Platform (DDD)

Assessment

Established in 2013, the Drug Discovery and Development Platform is a recent, important addition to the SLL infrastructure platforms. The goal is to provide support to academic as well as industrial partners for promoting projects from the discovery towards proof-of-principle phase.

Eventually the platform will be composed of the following parts:

- ADME
- Biochemical and Cellular Screening
- Biophysical Screening and Characterization
- Human Antibody Therapeutics
- In Vitro and Systems Pharmacology
- Medicinal Chemistry - Hit2Lead
- Medicinal Chemistry - Lead Identification
- Protein Expression and Characterization
- National Infrastructure for Compound Logistics and data management (jointly with Chemical Biology Consortium Sweden)

A number of highly promising first results have been produced using the DDD platform. The platform has been set up and the outreach to potential users in Sweden has been initiated. Competence from pharmaceutical industry with the relevant experience has been integrated into the management of the DDD platform, ensuring industrial standard and quality control. The major challenge of the DDD platform lies in the integration of the different activities, expertise and projects in an efficient coordinated manner. There is no doubt that this platform fills a great need in order to bridge the translational gap that exists and is one of the major limiting factors in bringing life science projects successfully into the pharmaceutical industry. At this point it was not obvious how the prioritization, selection and support over time will be provided in the context of a “National DDD infrastructure”.

Currently, only a small part of the finally envisaged DDD platform is in place, so it is too early to judge the performance and uptake by the academic community. Whereas protein production, assembly of a human antibody collection and biochemical and cellular screenings have been established, medical and computational chemistry, ADME studies, as well as systems pharmacology are more or less absent. Advanced methodologies from mathematics, statistics and computer science are largely absent.

The biggest bottleneck seems to be the absence of expertise and critical mass in medicinal chemistry. This will certainly become more severe once the Chemical Biology Consortium Sweden will be more widely used

and initial hits and leads need to be further developed. Systems pharmacology approaches, for example, in the area of target identification, ADME, and computer-based modeling have not entered center stage.

Recommendations

1) Strengthen medicinal chemistry
2) Strengthen systems pharmacology (PK/PD, network biology) training and research
3) Develop clear guidelines, criteria and processes for prioritization and evaluation of the projects carried forward by the DDD platform
4) Assess critical mass, functions and interactions for success of this important platform

Clinical Diagnostics

Assessment

The clinical diagnostics platform has the potential to be outstanding, with highly motivated and well-trained staff. The platform meets a vital societal need as it strives to bring ever more tests online and then transfer those protocols to hospitals for routine testing. The current strategy has the platform straddling the space between implementing previously discovered tests to developing the methods into high throughout, highly reliable tests. Closeness between scientists and clinicians is an important strength in this platform in Uppsala, but not at university hospitals in Stockholm.

A number of challenges exist for the platform as reflected in the comments and recommendations below. The platform is clearly under-resourced. Primary challenges include how to expand the core and determine future priorities in a changing “personal genomics” landscape; bioinformatics needs, communication with hospitals and to manage expansion.

The platform currently offers a modest number of tests that focus on a limited number of disorders (leukemia) that are sequence or array based. The platform also makes a large number of TMAs as part of clinical diagnostics activities. As tests are optimized and quality controlled, they are turned over to hospitals to run as part of their core activities. While some tests are now standard offers (i.e. mutation detection for about 40 oncogenes), this means the roster of tests offered is ever changing and always undergoing optimization, which is a challenge. In addition, because the core does not know what its future funding is, it is unable to do future planning. The platform clearly struggles with bioinformatics needs, with a desire to play a bigger role in genetic epidemiology and family based research while lacking the IT and bioinformatics support to do so. These considerations need to be addressed in a timely fashion, as they will likely be part of the new director’s agenda.

Recommendations

1) The leadership of SLL should develop a strategic plan for this platform, whose usage will likely expand in a significant way in the coming three years. The discussions should include platform leadership and clinical/translational scientists who are well apprised of the platform strengths and weaknesses as well as future demands.
2) Leadership should develop and present a clear and transparent budget that will accommodate the expanding needs of the platform, particularly as it relates to increased sample size and sequencing for `personalized medicine’.
3) Platform personnel needs to develop a methods strategy for genomic sequencing of large numbers of individuals for both research and disease focused needs within six months that will be presented to the leadership.
4) Microbiome science needs to be addressed and the role of the DDD, if any, should be spelled out clearly.
5) The core needs to move more quickly to transfer tests to the hospitals so that they are able to accommodate increasing and changing needs with alacrity. Timelines should be set for each test and milestones documented.

6) Leadership, together with the platform leadership, need to be decisive regarding what bioinformatics they will perform and what will be handed off to the Bioinformatics platform.
7) The platform needs to clarify how much bioinformatics assistance will be offered to hospitals once tests are passed off to the clinic.
8) The engagement of clinical and translational scientists is essential.

Sequencing

Assessment

The National Genomics Infrastructures at Uppsala and the platform at Stockholm are outstanding. The platforms are well resourced and include equipment and trained staff for a variety of genomic needs including RNA-seq, microarray, DNA sequencing, bioinformatics, etc. Presentations by staff revealed a well-trained group of outstanding technicians who are highly motivated. Tours of facility demonstrated that the Genomics Platforms have been well resourced. Uppsala has three HiSeq X Tens which are not currently on line, reflecting storage issues.

Space was adequate and for each need a variety of equipment was available. For instance, DNA sequencing at Uppsala, the largest part of the platform, has five sequencing platforms (Sanger, Illumina, Ion Torrent, SOLiD, PacBio) and on site assistance from Illumina, all designed to meet client sequencing needs. Also, sequencing center in Uppsala is designed to do human, model organism and metagenomic sequencing, which is a marked advantage over many other centers worldwide. However, as sequencing technologies evolve, it is clear that equipment needs will change. A small standing committee that assesses technologies and timing for replacing instruments would allow the platform to undertake better resource planning.

Challenges for the Genomics platform occur largely in the area of communicating with clients and a lack of clarity regarding what the platform handles in terms of bioinformatics. While the platform was evolving in 2012–2014, users experienced frustration in queue times and delays in receiving data, particularly as it relates to DNA sequencing. That has largely been resolved with an excellent LIMS system that allows clients to obtain information on where their projects are at any time. It would be a simple and useful addition to have an online Help Desk, on which users could email their requests, problems, issues, with a guaranteed response from a real person within 24 hours. This would reduce many of the communication issues the platforms have experienced and will continue to experience. Additional issues to which recommendations are responsive include differing contracts that clients are required to sign at Stockholm versus Uppsala, and confusion about how the online portals that shunt projects to either site are managed. A primary issue that remains confusing is to what degree the platform should assist clients with bioinformatics. This seems to be decided on an ad hoc basis. Standardization is needed.

Recommendations

1) A small permanent committee, with representation from Uppsala and Stockholm and other Swedish scientists in the field, be developed to continually assess changing genomics technology and needs, and to make recommendations regarding changes in instrumentation, technical support, etc. The same committee should consider and standardize to the degree possible the Bioinformatics role of the platform.
2) An online Help Desk should be developed with a 24-hour turn-around time that will ease communication issues.
3) A uniform contract should be offered by Stockholm and Uppsala to reflect the unified status of the platforms.
4) The decision regarding whether or not platform staff should be listed as authors on papers should be the joint decision of the client and the platform staff. Contracts should be reflected to indicate such.
5) Plan for the expanding IT needs and develop a cohesive model across all platforms.
6) Clarity in terms of process and timing should be more directly available via the primary web site.

Bioimaging facility

Assessment

This platform runs two facilities: (i) advanced light microscopy. The STED super-resolution microscopy system has been running since 2011 and has completed 57 projects. (ii) Fluorescence correlation spectroscopy. Almost all the services provided by this facility were based on collaborative research projects.

The platform is focused on very specialized techniques not undertaken elsewhere in Sweden, and they completed 20 projects in 2014. The managers noted that they are close to maximum capacity. There is a high investment in equipment, but an apparent shortage of personnel. The platform is engaged in education and outreach (2 PhD courses) that should help spread their technology. The platform is expected to become a flagship node of EuroBioImaging once the government commits funds to ESFRI. Good connections to IT department imagers in SLL.

Recommendations

1) Facility is very inventive, but should increase head-count to develop the service side of its mission.

Functional Genomics facility

Summary

The Functional Genomics (FG) platform is composed of four parts: The Karolinska high-throughput center (KHTC); eukaryotic single cell genomics (ESCG); single cell proteomics (SCP); and microbial single cell genomics (MSCG). KHTC offerings include high-throughput robotic system, flow cytometry, analysis of biomolecular interactions, microbial colony picking and arraying systems, and next-generation sequencing. They also have a large chemical compound collection, siRNA libraries, an ORFeome clone collection, and CRISPR lentiviral guide-RNA libraries. Twenty-six projects were completed in 2014, 18 being run as service projects. The ESCG facility provides transcriptomic and genomic service to the community. They focus on single-cell RNA-seq and whole-genome sequencing, and have extensive robotics and Fluidigm systems. It is intended to be operational by May 2015. SCP exploits local technological developments in protein analysis of single cells, and will combine with the ESCG technologies. The MSCG facility provides single-cell FACS sorting of microorganisms, amplification of single genomes, sequence-based screening and identification, and whole-genome sequencing of single cell genomes. This facility is world-leading in its technological developments in single cell work.

Recommendations

1) Needs careful decisions about balance between core service and research.
2) Should be supported to keep competitive.
3) Should assess how to price large screens, as their funding is hard to get from typical Swedish grants.
4) Increase training and support for bioinformatics in the single-cell world, where they can produce data for thousands of cells quickly. Likely applications, for example, in cancer will exacerbate this problem.

Training and Education

Assessment

Training and Education are taken seriously by the SLL group, with multiple activities underway, and this is seen as a major strength that should not be diminished. SLL offers classes to users, particularly in bioinformatics that will, in the long run, enable users to handle more data analysis at their own end. In addition, SLL has done a number of `Road Shows' to inform Swedish universities outside the group regarding the

services and infrastructure that SLL offers. Outside Universities commented specifically that this was a major strength and they felt informed by the presentations.

The Evaluation Panels were not given outlines of any course presentations. But it is expected that the bioinformatics ones are offered frequently and include the myriad programs available for data analysis, variant detection, etc. While Clinical Diagnostics appears overburdened and under- resourced, it is the duty of this platform to explain how to interpret personalized genomic data. This may be offered as continuing education courses. Finally, as faculty is constantly turning over throughout Sweden, it is the job of SLL to continue to offer road shows to outside Universities.

Recommendations

1) Continue to offer presentations to Universities outside of SLL on available resources. Include clear information on queues and pricing.
2) Provide resources for Clinical Diagnostics to facilitate interaction with clinicians and clinical scientists.
3) NGI users should work to assume analysis of their own data. They should have access to continuing education regarding programs and software for handling their data as they strive for independence.
4) Market the new Master's programme in Molecular Techniques in Life Science.

Key Question 4. SciLifeLab's societal relevance and role as crucial partner for relevant non-academic partners

Assessment

The SLL initiative has excellent potential to generate substantial gains for the pharmaceutical industry, environmental research and applications pertaining to healthcare practices and patient care (e.g., personalized or precision medicine) in Sweden and internationally. Most of the platforms and facilities have been built up at a high-end technical level, and there is good technical expertise related to these platforms. SLL also appears to have excellent reputation in both Sweden and internationally.

It is clear that the continued development of cutting-edge infrastructure and highly trained people for the molecular biosciences is of high societal relevance already right now, but also in years to come. Societal relevance of SLL functions include, but are not necessarily limited to issues such as availability of data and resources, developing trained experts, research communication, stimulation of the economy through job creation, new products, changes in practices related to health care/environments. SLL is already making clear contributions in many of these areas.

It should also be pointed out that relevance on the global research landscape demands continued investment in the areas represented by SLL functions.

Recommendations

1) SLL should develop and strengthen within the next few years the forms of collaboration with the pharmaceutical industry, with translational clinical scientists and with health-care providers (e.g., university hospital laboratories).
2) SLL should function as a liaison organization and focus on promoting interactions with small, start-up biotech companies, to stimulate their research and ensure their future success.
3) An important means for SLL to facilitate its visibility would be establishment of one or two 'flagship projects' of near-term societal relevance that are funded by SLL. These initiatives could be translational research projects in the biomedical and/or environmental sciences or both.
4) SLL should adopt a leadership position pertaining to the ethical issues, such as those associated with personalized or precision medicine, genetic engineering, and post-industrial use of chemicals.
5) The annual AIMday events have been an important way to enable face-to-face contacts and discussions between academics and representatives from industry, potentially fostering collaborations. It is important

to continue these kinds of events on a regular basis. In addition, it will be of great importance for SLL to host regular public events to educate lay audience about SLL's functions and to highlight scientific advances for layperson stakeholders.

Key Question 5. SciLifeLab's development in relation to the goals and objectives set by the government

The goals and objectives set by government are contained in the following paragraph, taken from the founding bill of SLL:

> "The government considers it important that SciLifeLab be afforded opportunities to develop into a world-leading centre for large-scale molecular bioscience research at the highest international level in order to be able to attract the very foremost researchers in the world in this field. An important step in strengthening Sweden's role as a major player in modern genomics, proteomics and similar methods is to further develop SciLifeLab as a central resource for life science research with a focus on large-scale biological and biomedical analysis. With Sweden's strengths, primarily research with the aid of registers, longitudinal population studies and biobanks, Sweden can, through SciLifeLab, attain a competitive advantage and create good prerequisites for Swedish research. For the venture to also play an important role in an industry perspective, good possibilities to establish collaborations with trade and industry are needed."

Assessment

According to the above goals and objectives set by the Swedish Government, SLL should be (i) national center for research in life sciences; (ii) national resource center for biosciences that require large infrastructure; and (iii) world-leading research organization in biomolecular science in health. With regard to these goals, we find that SLL has built up an impressive array of platforms for cutting-edge molecular biosciences in a very short time period, through collaboration between several universities. Likewise, establishment of a high-quality research environment around the technology services is currently underway, albeit not necessarily always in a transparent fashion. We also note the inclusion by SLL of an environmental focus, later approved by the Government.

Recommendations

1) Now that SLL has completed its initial build-up phase, it should be challenged to become a truly national platform, also involving other universities in Sweden and bringing high-end technology services at these universities to national use through SLL. Moreover, this gives SLL the opportunity to develop a revised mission statement to motivate its activities in the next five years. The most important aims of SLL need to be clearly spelled out in this long-term plan. The second focus area of SLL, environmental research, will need more attention.
2) The goal to become world-leading is ambitious and broad. In view of this, it would be helpful to the SLL to define what this means to the organization. In addition to providing cutting-edge technology services and performing internationally renowned research, what else will be involved? For example, would it entail teaching internationally, organizing international symposia and/or establishing an international postdoctoral fellows program?
3) In the future, SRA funds should be used to support continued faculty development and/or recruitment; additional funds could be used to support flagship projects (see above) dedicated to fulfilling SLL mission to become a world-leading research organization.
4) SLL needs to continue working to reach out more to other beneficiaries of the research, including clinicians/hospitals and industry, by organizing events such as such as the AIMS days. Industrial stakeholder survey suggests that improved efforts to clarify what SLL might offer to industry should be undertaken.

Prerequisites, SWOT analysis

Strengths

- Establishment of high-quality technology platform services with advanced instrumentation in many platforms combined with an effort to make them widely available. Some of the platforms (especially NGI, bioinformatics, CBCS) have been proven to be highly successful with a wide user base.
- New facilities (the new buildings) in Stockholm and Uppsala that serve as spearheads and showcases of SLL.
- Karolinska Institutet is a world-known brand.
- The Human Protein Atlas project is an internationally recognized flagship project.
- Preexisting facilities and faculty with capacity for high quality and quantity of research services at four host institutes.
- Existence of individual university based knowledge transfer programs.
- Established educational programs leading to advanced degrees.

Weaknesses

- The national status is not clear; the program begun as a regional effort, and its national role and even focus are still unclear (health and environment, the former overshadowing the latter).
- Complex and cumbersome governance and management structure.
- Complex funding structure and low input of host universities to SLL's budget.
- Imbalance in services favoring gene sequencing vs. other services.
- Unclear set of objectives; consequently, the output indicators of SLL are unclear.
- No decided-upon performance measures of research output at individual investigator or host institution levels.
- No assessment of return on incremental investment to the consortium.
- No performance criteria for knowledge transfer.
- Lack of new cross-university education programs or if such exist, their visibility is poor.

Opportunities

- These are huge – investment in SLL by the Swedish government recognizes the future of biomedicine.
- Definition of the mission and aims more clearly.
- Build the national dimension by involving the other major centers to complement the platforms and to connect the best scientists in Sweden to SLL.
- Identify spearhead projects where SLL is the true leader/coordinator at national level both technically and scientifically. These should aim at building SLL's international visibility as one of the leading center's in the world.
- Establishment of more Nordic or other international collaborations.
- New Director can facilitate/bring new input to the changes needed for further development.
- Identify possible low-hanging fruits in the area of environment.
- Increased access of high quality, reasonably priced research services for host institutions, smaller HEI's, Swedish industry, and global partners.
- Setting up of novel, multidisciplinary education and training program providing research workforce with up-to-date skills in molecular bioscience.
- Coordination and dissemination of knowledge transfer to science stakeholders, including the public.
- Build a model administrative system that is efficient and timely and fosters innovation and collaboration.

Threats

- Investment in the SLL will decline, at a time that is best described as a revolution in human genomics research.
- Global and regional competition for research services at comparable quality but much reduced cost (e.g., BGI whole genome sequencing).
- SLL's investment of funds may not be large enough to create synergistic and non-linear growth.
- Competition from other near-by regions, such as Copenhagen-Malmö-Lund and Gothenburg, with their major pharmaceutical operations will weaken the position of the Stockholm-Uppsala region.
- No increment in research by host universities or individual faculty members despite increase in funds spent.
- Lack of training programs that can adapt to changing needs of contemporary science including trainee skills (e.g., technology, team science) and newer scientific disciplines (e.g., biomedical informatics, drug development).
- Lack of public image for SLL as an exciting new approach to molecular bioscience.
- Cumbersome administrative structure that inefficiently distributes resources and reacts slowly to scientific opportunities compared to competitors.

Scientific Quality, SWOT analysis

Strengths

- Excellent platforms
- Excellent research
- Development of SLL identity

Weaknesses

- Not enough inclusion of non-host university groups
- Shortage of clinician scientists engaged with SLL
- Communication among various boards
- Too many decision boards and unclear decision paths and lack of separation of governance, management and advisory roles
- Platform user communication
- Lack of transparency of the budget situation
- No overarching IT and data strategy
- Long-term planning, e.g. for sustaining platform equipment, platform choice
- Lack of transparent, uniform quality metrics. Go beyond bibliometrics such as journal IFs.

Opportunities

- Develop into the Swedish hub for integrative and interdisciplinary data-driven biomedical research
- New technology developments
- Research breakthroughs due to excellent interdisciplinary platforms and researchers
- Facilitating the translation of research results and tech developments into the healthcare sector, biotech and pharma
- Training of clinical researchers in integrative and interdisciplinary data-driven biomedical research

Threats

- Funding running out
- Lack of trust due to exclusion of non-host university groups
- Platform customer dissatisfaction
- Limited resources will likely require further focus in research aims

Relevance for Society, SWOT analysis

Strengths

- Excellent potential for translational outcomes, e.g. in clinical diagnostics
- Training of high-quality scientists
- Multi-institutional consortium large and diverse enough to address a broad range of life science and environmental problems relevant to society.
- Large and high quality population datasets, patient records systems, cohort studies, and patient registries (e.g., twin registries, biobanks) in Sweden that can be linked to genomic, molecular data through SLL activities.
- Excellent Swedish healthcare system with academic clinicians able to participate in translational and applied research using products of SLL research.
- Some continued pharmaceutical company presence that could partner in translational research to develop commercially successful drugs and employers.
- Training programs currently supply skilled workforce to jobs in bioscience.

Weaknesses

- Industry involvement limited
- Inability to guarantee deliverables
- Insufficient clinician scientist participation
- Complex management and organizational structure may hinder growth in jobs, discovery, and commercial application.
- Sharing key resources may be difficult between institutions, impeding bringing benefits to needy consumers and employees.
- Little evidence that non-scientists (e.g., patients, students, industry managers) have been brought into discussion and planning for SLL programs and services.
- It is not clear if SLL trainees are being trained for jobs in the present and in the future.

Opportunities

- Develop of integrative and interdisciplinary data-driven biomedical research
- Translation of research results and tech developments into the healthcare sector, biotech and pharma
- Knowledge transfer across scientific fields
- Development of approaches and best practice for personalized medicine in hospitals across Sweden
- Enhancement of Sweden's international reputation as an internationally recognized leader in Molecular Medicine and Environmental Science.
- Presence of partnering medical schools and bioscience programs provides opportunities to SLL to partner in clinical trials, drug development and other steps to licensure and sale.
- Breadth of programs widens the chance of discovery of unique products relevant for clinical use and environmental impact.
- Major asset for Swedish drug discovery.
- Potential improvements in health and science literacy of Swedish population.

Threats

- Potential lack of long-term support threatens sustainable infrastructure
- Data security, protection, privacy
- The mission and products of SLL will remain unclear to Swedish population, reducing Swedish governmental and popular support for funding, programs, and molecular medicine in general.

Bilaga 2:
Vetenskapliga paneler

Vetenskapsrådet

Datum
2015-03-23

Diarienummer
3.2-2015-49

Handläggare
Maria Bergström

Ordförande samt ledamöter till vetenskapliga paneler för utvärderingen av SciLifeLab

Paneler för utvärderingen av SciLifeLab mellan den 10-15 maj 2015

Vetenskaplig panel

Ordförande	***Position***	***Institution***
Simon Tavaré	Director	Cancer Research UK Cambridge Institute (CRUK CI)

Ledamot	***Position***	***Institution***
Rolf Apweiler	Dr. Joint Associate Director of EMBL-EBI	Wellcome Trust Genom Campus, Cambridge/EMBL
Rudi Balling	Director	Luxembourg Centre for Systems Biomedicine
Jórunn Erla Eyfjörd	Professor	University of Iceland
Karen Nelson	Professor/President of the J. Craig Venter Institute	J. Craig Venter Institute
Elaine Ostrander	Chief & NIH Distinguished Investigator	NHGRI
Olaf Wolkenhauer	Professor	Systems Biology Bioinformatics, Rostock

Vetenskapsrådet

Organisatorisk panel

Ordförande	***Position***	***Institution***
Olli A. Jänne	Director	Biomedicum, Helsinki

Ledamot	***Position***	***Institution***
Brenda J. Andrews	Professor and Director	Terrence Donnelly Centre for Cellular and Biomolecular Research, University of Toronto
Ravi Iyengar	Professor and Director	Systems Biology Center New York (SBCNY)
Taina Pihlajaniemi	Professor	Bio center Oulu
Thomas A Pearson	Professor/Executive Vice President for Research and Education	University of Florida Health

Bilaga 3:
Background Documentation

CONTENTS

INTRODUCTION

This report serves as background documentation for the evaluation of Science for Life Laboratory (SciLifeLab), and it provides contextual information for the understanding of SciLifeLab's establishment in the Swedish research community.

This document should be read in conjunction with the terms of reference for the evaluation.

The evaluation of SciLifeLab was commissioned by the Ministry of Education and Research of the Swedish Government in March 2014. The purpose of the evaluation is primarily to assess the progress of SciLifeLab in establishing itself as a world leading and national resource for large-throughput molecular biology in Sweden from its start in July 2013 until the present. The purpose is also to give recommendations for future development of the centre, for securing its international status, and for ensuring its national recognition as a hub for researchers in the field. The evaluation will be reported to the Government no later than November 30 of 2015.

The following table gives a quick overview of the content in this report:

Chapter	Evaluation process - timeline
The Swedish research system	February–March 2015
SciLifeLab board and management – interviews	November 2014–March 2015
Societal stakeholder perspective – focus group	March 2015
Surveys	November 2014–March 2015
Bibliometric study of SciLifeLab	February–March 2015

Another study that also is part of the background documentation for the evaluation of SciLifeLab is the financial analysis of SciLifeLab that was conducted by the consultant DAMVAD. (Appendix 6 in the overall evaluation report.)

The studies that are reported here were undertaken solely for this evaluation.

The Swedish Research Council (Vetenskapsrådet, VR) has produced all of the reports in this document.

The following persons at VR have been part of the project team: Anders Hellström, Gwendolyn Schaeken, Maria Bergström (project manager), Maria Starborg (co-project manager), Maud Quist, Per Helldahl, Tomas Gustavsson, and Ulrica Horwath (administrator). The bibliometric study was conducted by Andreas Augustsson and Henrik Aldberg from VR.

SUMMARY

The following bullet points are extracted from the different chapters and should be seen as highlights from the content, thus they are not comprehensive nor conclusive regarding the results presented in this report.

The Swedish Research System

- The overview in the beginning includes an introduction to the Swedish research system with a focus on governance, autonomy, and management at higher education institutions. In this chapter, a description of SciLifeLab's history, organization, and management is also included.

SciLifeLab Board and Management:

- Many participants pointed out the importance of viewing SciLifeLab as a single unit and not as two separate nodes. Nobody wants SciLifeLab to become a separate institute and lose its connection to the host universities.
- There seems to be a general view that Uppsala and Stockholm need to be "combined" to an even greater degree than today, and it is important to present SciLifeLab as one entity. It was pointed out in several interviews that SciLifeLab is heading in the right direction to create a more unified SciLifeLab. One example in this respect is that SciLifeLab for the first time has presented a common operational plan for its national funds for 2015.
- Some of the people interviewed stated that there is a broad scope of platforms and facilities at SciLifeLab and that it might be necessary in the future to focus on fewer platforms than today. The importance of continuing to evaluate the platforms at regular intervals, and preferably by international review, was raised in several interviews. The importance of this is that the combination of platforms has to satisfy the demands of the research community and be of the highest quality.
- The most important objective raised is that SciLifeLab should be seen as a world-leading research centre with world-class and cutting-edge instrumentation for conducting large-scale molecular bioscience.
- SciLifeLab should also be attractive for the most prominent researchers in the world to come to Sweden and be part of our research community. If such an environment can be achieved, it would also attract biotech industries and pharmaceutical companies to work in close collaboration with and alongside academia to discover new therapies for complex and rare diseases, as well as ways to deal with many of the major global challenges facing us today.
- Overall, the greatest challenge in developing SciLifeLab in the right direction is the lack of trust and commitment to establish a hub for molecular biosciences in Sweden outside the four host universities, which was implied but perhaps not clearly expressed by the people interviewed.

Societal Stakeholder Perspektive

- SciLifeLab needs a clearer organisation with a managing director (or equivalent), a board, a budget, and a clearly defined assignment.
- SciLifeLab should strive to be a world-leading centre for molecular bioscience technologies that can be used to resolve complex issues linked to disease, health, and the environment.
- SciLifeLab should offer bioinformatics support of the highest quality.
- SciLifeLab should have one or two flagship projects at the very forefront of research.
- SciLifeLab should strengthen its collaboration between the pharmaceutical industry, clinical research, and healthcare.

Survey

Self-evaluation Survey of Platforms

- All platforms report that they are taking measures to make facilities more accessible and attractive to researchers from higher education institutions (HEI) outside the Stockholm-Uppsala area so as to increase the status of SciLifeLab as a national centre.

- Making facilities accessible to non-academic users (such as private companies) does not appear to be a priority for most platforms. Companies are generally charged full cost for the services.
- All platforms report that they collaborate with other platforms within SciLifeLab. To give an example, Bioinformatics coordinates their work with the National Genomics Infrastructure (NGI) because they are next in line for use by researchers using NGI.
- Some platforms coordinate the work at their respective facilities to a high extent, while in some platforms facilities operate more independently from each other.
- The level of competition to gain access to facilities varies greatly from platform to platform. Some platforms have significant competition and thus a need to make prioritizations, whereas others admit projects on a first-come-first-served basis.
- Internal quality measures vary between platforms, with some emphasizing the technical capacity of platforms and others the volume (in terms of number of projects taken on) or publications resulting from projects related to the platform.
- Platforms uniformly state that their facilities are relevant for translational research such as drug development, clinical diagnostics, and/or environmental analysis.

Survey of SciLifeLabs facilities:
- The size of each facility when measured in full-time employees varies a great deal, from 1 employee at the smallest facility to 41 at the largest facility.
- Most facilities are cooperating with each other, which is confirmed by 78% of the respondents.
- Most applications to the facilities are directed towards genomic sequencing and bioinformatics.

User survey, Researchers:
- A large majority (82%) of the users of the facilities were very satisfied with the quality of the services received.
- The equipment available in the facilities was rated at a high level by 76% of the users.
- The competence at the platform was regarded as high by 82% of the respondents.
- A third of the respondents stated that their research could not have been published without access to the facilities and the services at SciLifeLab.

User Survey, Companies:
- A questionnaire was sent to more than 400 life-science companies with operations in Sweden. Of the 73 complete replies, only four indicated that they had used any of the platforms at SciLifeLab. The general picture of the answers is that the awareness of what SciLifeLab is and what it can offer to companies is very low. The companies requested easier access to SciLifeLab. Some companies are also concerned about the potential negative consequences of publicly funded services being in direct competition with private suppliers.

Bibliometric Study of SciLifeLab:
- The number of publications from SciLifeLab has increased steadily since its creation in 2010, and in 2013 there were 387 publications that had an affiliation to SciLifeLab.
- The publications were cited well above the global average, and SciLifeLab's share of highly cited publications is also above the global average.
- The SciLifeLab-affiliated researchers mostly collaborate with researchers from Swedish universities, and the four founding universities are the most common organizations to collaborate with.

Swedish name	English name
Blekinge tekniska högskola	Blekinge Institute of Technology
Chalmers tekniska högskola	Chalmers University of Technology
Högskolan Dalarna	Dalarna University
Gymnastik- och idrottshögskolan	GIH – the Swedish School of Sport and Health Sciences
Högskolan i Halmstad	Halmstad University
Högskolan i Jönköping	Jönköping University
Kungl. Musikhögskolan i Stockholm	KMH – Royal College of Music in Stockholm
Kungliga Tekniska högskolan	KTH Royal Institute of Technology
Karlstads universitet	Karlstad University
Karolinska institutet	Karolinska Institute
Konstfack	University College of Arts, Crafts and Design
Högskolan Kristianstad	Kristianstad University
Linköpings universitet	Linköping University
Linnéuniversitetet	Linnaeus University
Luleå tekniska universitet	Luleå University of Technology
Lunds universitet	Lund University
Malmö högskola	Malmö University
Mittuniversitetet	Mid Sweden University
Mälardalens högskola	Mälardalen University
Kungliga Konsthögskolan	Royal Institute of Art
Sveriges lantbruksuniversitet	SLU – Swedish University of Agricultural Sciences
Stockholms universitet	Stockholm University
Stockholms dramatiska högskola	Stockholm University of the Arts
Södertörns högskola	Södertörn University
Umeå universitet	Umeå University
Högskolan Väst	University West
Högskolan i Borås	University of Borås
Göteborgs universitet	University of Gothenburg
Högskolan i Gävle	University of Gävle
Högskolan i Skövde	University of Skövde
Uppsala universitet	Uppsala University
Örebro universitet	Örebro University

Table 1. Swedish Higher Education Institutions.

THE SWEDISH RESEARCH SYSTEM

Sweden is one of the top nations in the world when it comes to spending money on research relative to its population. Research and development received SEK 32.87 billion in central government appropriations in 2014, which was equivalent to 0.84% of the GDP. Swedish industry is research intensive and accounts for around 70% of research spending in Sweden. Most of the state research funds go to higher education institutions (HEIs), and almost two thirds of publicly funded research in Sweden is conducted at HEIs.

Higher education institutions

Sweden has 31 state HEIs, and the revenue they received for research and postgraduate education totalled about SEK 36 billion in 2013. Around 40% of the total funds come from direct appropriations, and the remainder comes from the research councils, The Swedish Governmental Agency for Innovation Systems (Vinnova), research foundations, the EU, municipalities, and county councils.

Governance, autonomy, and management at HEIs

State HEIs are public authorities and are subject to the same legislation and regulations as other public authorities in Sweden, as well as to the particular statutes, ordinances, and regulations relevant to the higher education sector.

The Swedish Government has overall responsibility for higher education in Sweden and is responsible for granting university status, enacting legislation regulating the higher education sector, funding a large proportion of research, appointing vice-chancellors of HEIs, and regulating the agencies involved in the higher education sector. The government decides on the preconditions for every government agency, and this is implemented in the annual appropriations directives and through ordinances. Among other things, the appropriation directives set out the goals an agency is to attain in its operations, how much money the authority has at its disposal, and how the money is to be distributed among its different activities. The ordinances contain various general administrative provisions concerning how the agencies are to carry out their work.

HEIs nonetheless enjoy a great deal of autonomy within the framework of the statutes, ordinances, and regulations laid down by the government. HEIs can make decisions about the organisation of the HEI into units and decision-making bodies, the allocation of government funding within the organisation, quality assurance procedures, new professorships, and research focus. Each university and HEI is obligated to formulate its own research strategy, and recent reform suggestions from the government are intended to strengthen the HEIs' independence from the state. An HEI is governed by a board that consists of a chair and no more than 14 members. Eight of the members are external members appointed by the government at the proposal of the HEI. The government always appoints the chair, and a vice-chancellor is also appointed by the government.

Organisation forms within the HEIs

There are many different organisational forms that cluster research initiatives within the universities, but they vary in terms of their formal legal status in relation to their host universities, however most are still owned and governed by the host universities. These organizations can be called centres, research institutes, or the equivalent.

Other research performers

Some publicly funded research is also conducted at industrial research institutes, but such research institutes account for only a small share, and this distinguishes Sweden by international comparison. Central Government ownership of these institutes is channelled via RISE Holding, which consists of four corporate groups with a total of 16 institutes. The institutes within RISE conduct industrial research and innovation and some also perform testing and certification. The research institutes cooperate with universities, industry, and society.

Prerequisites in Sweden

Compared to other countries, the business sector in Sweden invests substantial sums in research. The life science industry is an important segment that has economic and political significance for Sweden. According to a report from The Swedish Governmental Agency for Innovation Systems, Vinnova,[1] the life science industry declined by approximately 4,000 employees between 2007 and 2012, which is almost 10%, mainly because of the large decline in large companies like AstraZeneca. Despite this negative trend, the report's authors conclude that Swedish actors have had a long tradition of successfully bringing radical life science innovations to worldwide markets. Non-hierarchical organisations, excellent research, an innovation-friendly healthcare system, and traditions of multi-disciplinary collaboration between different sectors in society are all integral parts of such a successful system. In order to achieve a positive trend again, they conclude that Sweden needs to be an attractive country for performing excellent collaborative science and that there need to be incentives for clinicians to do research and to collaborate with industry.

In addition to investments in SciLifeLab, two other initiatives to strengthen research in the life sciences have been launched in recent months. In Gothenburg, the Knut and Alice Wallenberg Foundation, the University of Gothenburg, AstraZeneca, and Region Västra Götaland have decided to invest at least SEK 620 million in a new centre for molecular medicine at the University of Gothenburg. A similar initiative was presented in February 2015 at the University of Lund. A new Wallenberg Centre for Molecular Medicine will be established in collaboration with Lund University and Region Skåne and funded by the Knut and Alice Wallenberg Foundation.

Teachers' exemption

In Sweden, teachers at universities, colleges of higher education, and other institutions with the right to teach are exempt from the legislation relating to the right to employee inventions, which regulates to what extent an employer may be entitled to take over the rights to an employee's patentable inventions. This means that teachers, researchers, and doctoral students in Sweden own the right to their own patentable inventions even if they are made during working hours. However, teachers, researchers, and doctoral students may agree to give up this right.

Science for Life Laboratory

In July 2008, the Vice-chancellors of Karolinska Institute (KI), Stockholm University (SU), and the Royal Institute of Technology (KTH) jointly applied to the government for funding in order to establish a National Institute for Research in Life Science in Stockholm, called the Science for Life Laboratory (SciLifeLab). The universities proposed to establish SciLifeLab as a research institute owned by the three universities within the framework of a foundation. Uppsala University (UU) was mentioned as a potential collaborative partner. The government expressed its support for SciLifeLab in its Research Bill the same year:

"[SciLifeLab] has the potential to be a very strong research setting in the international arena in some areas of molecular bioscience. It also has prerequisites to be a base for expanding and widening Sweden's capacity in the life sciences field. It can thereby become a significant driving force as regards innovations and industrial applications in broad areas where world-leading research in the life sciences is a necessary prerequisite."

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[1] Global trends with local effects - Swedish Life Science Industry 1998-2012, Vinnova, 2014

"The government considers the plans for such an initiative to be of interest in a national perspective, where it can also constitute an important base for research in this area at other universities and higher education institutions."

In December 2008, the government appointed former governor of Stockholm County, Council Per Unckel, to investigate the need, timing and relevance of establishing a national center like SciLifeLab in the Stockholm Uppsala region, and to analyse how SciLifeLab could develop into this. This work was done in collaboration with the host universities. The application from KTH, KI, and SU was then evaluated within the government's Strategic Research Area (SRA) initiative, which was launched in a Government Bill in 2008, where SciLifeLab was evaluated in competition with other strategic research environments. After an international peer review, two centres were selected within 'molecular biosciences': SciLifeLab in Stockholm and the Center for Genomic and Proteomic Medicine in Uppsala. The latter received funding for collaboration between the faculties of medicine and pharmacy and the faculty of technology and science. The aim of SciLifeLab according to the application, is as follows:

"The intention of this proposal is to establish a new national resource centre in Sweden – the Science for Life Laboratory (SciLifeLab) – devoted to high-throughput bioscience with a focus on biomedicine, including genome and proteome profiling, bioimaging and bioinformatics. SciLifeLab will be formed jointly by the three universities in Stockholm, the Royal Institute of Technology (KTH), the Karolinska Institute (KI) and Stockholm University (SU), thus combining the different profiles and strengths of the three. Academic research as well as the health care system and the life science industry in Sweden, will benefit from SciLifeLab by active collaborations, access to advanced instrumentation and active programs for knowledge transfer. Gathered research groups at SciLifeLab will reach a critical mass and create an internationally outstanding research environment for high-throughput biosciences and translational medicine."

"The vision is to make SciLifeLab one of the top-five centres in the world for high-throughput bioscience - focusing on large-scale DNA sequencing, expression analysis, protein profiling, cellular profiling, advanced bioinformatics, biostatistics and systems biology - by providing an internationally competitive resource for multi-disciplinary research with advanced technological infrastructure."

"SciLifeLab will act as a national resource centre providing advanced infrastructure, possibilities for scientific collaboration, technology transfer and education. The Swedish universities and life science industries will have access to advanced instrumentation, know-how and data analysis support at SciLifeLab. New scientific networks will be created and new collaborations will be promoted."

In 2010, SciLifeLab in Stockholm and the Center for Genomic and Proteomic Medicine at Uppsala University (UU) decided to collaborate under a common name, Science for Life Laboratory, with both centres committed to develop, use, and provide access on a national basis to large-scale technologies for molecular biosciences with a focus on health and the environment. In order to achieve this, the four host universities requested additional funding from the government in 2012.

Following the government's decision in the 2012 Research and Innovation Bill, the four universities in Stockholm and Uppsala formally joined forces in a national centre – SciLifeLab – in July of 2013. The government also allocated an additional SEK 150 million along with SEK 40 million in extra funding for drug discovery research. Government Research Proposal/Bill 2012:

"One of the main goals of SciLifeLab, which primarily concentrates on research in molecular bioscience and medicine, is to explain the molecular basis of complex diseases. SciLifeLab maps the genomes of humans and other living organisms and describes the structures and characteristics of proteins and their location in cells. Different causes of diseases can thereby be determined and new methods of treatment and new drugs developed. Large-scale experiments where large quantities of samples of biological material, for example from

biobanks, are analysed together, enable genetic and biochemical linkages to be discovered. These linkages enable biological and medical processes and functions to be better understood."

"SciLifeLab should be a research centre for national collaboration around large-scale molecular analyses in the life sciences. The equipment available in the infrastructure is of interest for much of the research done in Sweden in this area and it is therefore considered vital to keep it together. High-quality analyses and interpretations of research findings can thereby be made accessible to researchers throughout the country."

"The government considers it important that SciLifeLab be afforded opportunities to develop into a world-leading centre for large-scale molecular bioscience research at the highest international level in order to be able to attract the very foremost researchers in the world in this field. An important step in strengthening Sweden's role as a major player in modern genomics, proteomics and similar methods is to further develop SciLifeLab as a central resource for life science research with a focus on large-scale biological and biomedical analysis. With Sweden's strengths, primarily research with the aid of registers, longitudinal population studies and biobanks, Sweden can, through SciLifeLab, attain a competitive advantage and create good prerequisites for Swedish research. For the venture to also play an important role in an industry perspective, good possibilities to establish collaborations with trade and industry are needed."

Ordinance

In February 2013 the Swedish Government issued an ordinance about SciLifeLab stipulating, among other things, that SciLifeLab should be a centre for large-scale molecular biosciences, it should be accessible for researchers at other HEIs and other research performers, and it should be governed by a board.

Organization and management

SciLifeLab is led by the National SciLifeLab Board, which is currently chaired by Göran Sandberg (as of April 2015). The board includes representatives from the four host universities, other Swedish universities, and industry. The chair and the industry representative are appointed by the government. SciLifeLab is operationally led by a management team consisting of a centre director, a co-director, and four scientific directors (two each from Uppsala and Stockholm). The director reports to the National SciLifeLab Board. An international Strategic Advisory Board (SAB) and a National Reference Committee (NRC) have been established to advise the board and the centre director and co-director.

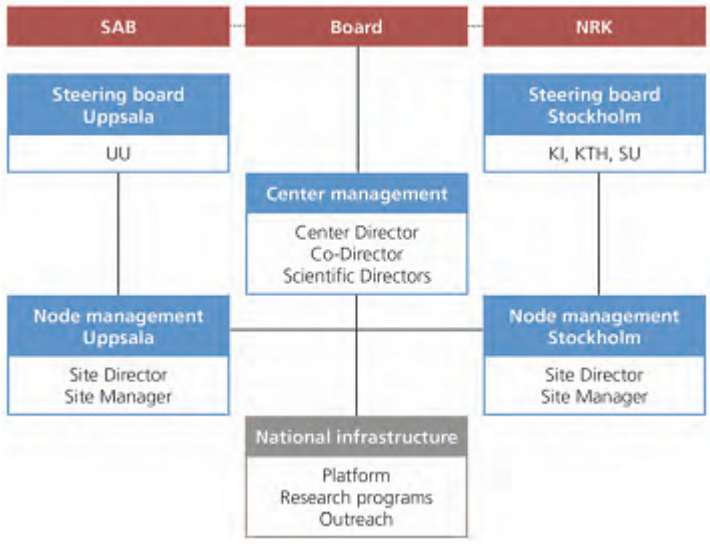

Figure 1. Organisation of SciLifeLab.

Source: Report to the Scientific Advisory Board of the Science for Life Laboratory, 2015

Financial management

SciLifeLab started receiving national funds directly from the Swedish Government in July 2013, in addition to the SRA funding, and the National SciLifeLab Board decides on the allocation of the national funds. The Stockholm and Uppsala nodes each have local steering boards. The steering board in Uppsala makes decisions about the local SRA budget. In Stockholm, SRA budget decisions remain with the respective Stockholm universities. (See *Financial Analysis of SciLifeLab* by DAMVAD for a more comprehensive analysis of the financial aspects of SciLifeLab).

Platforms and facilities

SciLifeLab has nine platforms with a total of 35 national facilities and nine regional facilities of national interest. See Table 2 below for a list of all platforms and facilities within SciLifeLab. Two facilities, Single Cell Proteomics and Eukaryotic Single Cell Genomics, had not started yet when this evaluation was conducted and did not receive the surveys.

Platform	Facility	Location
Affinity Proteomics (7)	• Biobank Profiling • Cell Profiling • Fluorescence Tissue Profiling • Mass Cytometry • PLA Proteomics • Protein and Peptide Arrays • Tissue Profiling	Uppsala Stockholm Stockholm Stockholm and Linköping Uppsala Stockholm Uppsala
Bioimaging (2)	• Advanced Light Microscopy • Fluorescence Correlation Spectroscopy	Stockholm Stockholm

Platform	Facility	Location
Bioinformatics (3)	• Bioinformatics Compute and Storage (UPPNEX/SNIC@UPPMAX) • Bioinformatics Long-term Support (WABI) • Bioinformatics Short-term Support and Infrastructure (BILS)	Stockholm Stockholm and Uppsala (and other universities) Stockholm and Uppsala (and other universities)
Chemical Biology Consortium Sweden (CBCS) (3)	• Laboratories for Chemical Biology Umeå (LCBU) • The Laboratories for Chemical Biology at Karolinska Institute (LCBKI) • Uppsala Drug Optimization and Pharmaceutical Profiling (UDOPP)	Umeå Stockholm Uppsala
Clinical Diagnostics (3)	• Clinical Biomarkers • Clinical Genomics • Clinical Sequencing	Uppsala Stockholm Uppsala
Drug Discovery and Development (DDD) (8)	• ADME (Absorption, Distribution, Metabolism, Excretion) of Therapeutics (UDOPP) • Biochemical and Cellular Screening • Biophysical Screening and Characterization • Human Antibody Therapeutics • In Vitro and Systems Pharmacology • Medical Chemistry – Hit2Lead • Medicinal Chemistry – Lead Identification • Protein Expression and Characterization	Uppsala Stockholm Uppsala Stockholm Uppsala Stockholm Uppsala Stockholm
Functional Genomics (4)	• Eukaryotic Single Cell Genomics (opened in May 2015) • Karolinska High-Throughput Center (KHTC) • Microbial Single Cell Genomics • Single Cell Proteomics (in start-up phase)	Stockholm Stockholm Uppsala Uppsala
National Genomics Infrastructure (NGI) (4)	• NGI Stockholm (Genomics Applications) • NGI Stockholm (Genomics Production) • NGI Uppsala (SNP & SEQ Technology Platform) • NGI Uppsala (Uppsala Genome Center)	Stockholm Stockholm Uppsala Uppsala
Structural Biology (1)	• Protein Science Facility	Stockholm
Regional Facilities (9)	• Array and Analysis Facility • Biological visualization (BioVis) • Bioinformatics and Expression Analysis (BEA) • BioMaterial Interactions (BioMat) • Mutation Analysis Facility (MAF) • Advanced Mass Spectrometry Proteomics • Clinical Proteomics Mass Spectrometry Proteomics, Mass Cytometry	Uppsala Uppsala Stockholm (KI) Uppsala Stockholm (KI) Stockholm (KI) Stockholm (KI) Uppsala Uppsala Uppsala

Platform	Facility	Location
	• Mass Spectrometry-based Proteomics, Uppsala • Zebrafish	

Table 2. Platforms and facilities at SciLifeLab according to their website 2015-03-26.

More details can be found on www.scilifelab.se

INTERVIEW STUDY: SCILIFELAB BOARD AND MANAGEMENT – SCOPE, BOUNDARIES, AND FUTURE DEVELOPMENT

Background

In order to better understand the start-up and development of SciLifeLab as a designated research environment for large-scale molecular biosciences, the evaluation team at the Swedish Research Council conducted an interview study with SciLifeLab board members and core management personnel. The purpose was also to gather information about the organizational set-up and the technical platforms' areas of focus and to see if there is a coherent view of SciLifeLab's purpose, objectives, and future development.

Method

The interviews were conducted in November and December of 2014. Two members of the evaluation team conducted the interviews, which were organized around a semi-structured set of questions on the following themes:

- History and definition
- Challenges for SciLifeLab's organization and operations and the technical platforms' areas of focus
- Objectives, current processes for establishing SciLifeLab, and future development

Some of the interviews were held at SciLifeLab's different sites, some at the offices of the Swedish Research Council, and some were telephone interviews.

In all, 18 people were interviewed, 8 of whom are members of the SciLifeLab National Board. Interviews were also held with the director and co-director of SciLifeLab, three additional members of the executive management team, the site managers at two sites, two members of the National Reference Committee, and one external researcher who has used SciLifeLab's services. The interviews were held individually and lasted approximately one-and-a-half hours each. They were recorded and have been transcribed. See Table 2 for a list of all persons interviewed.

Results

No distinction has been made in relation to the different responsibilities of the interviewed persons in SciLifeLab when analysing the results of the interviews. However, the results include and describe the variation in the interviewees' views. The only exception to this is when describing the interviewees' ideas for the future development of SciLifeLab.

History of the Science for Life Laboratory

Several members of today's management team were involved in the application process when SciLifeLab applied for and received its initial funding through the Governmental SRA in 2009. The funding to the Uppsala and Stockholm nodes through the SRA was considered by all interviewees to have initiated the start-up of SciLifeLab. A few also mentioned the important work of Per Unckel (a former Minister of Education in the Swedish Government and the former governor of Stockholm County Council), who in his report to the government in 2009 stressed the importance of research in the life sciences and the key role of the Stockholm-Uppsala region in Sweden.

In the interviews, many pointed out that the aim from the beginning was to establish a leading research centre for molecular biosciences, with the aim of building communities with access to large-scale technologies.

Although SciLifeLab initially was not a national research centre, the focus from the beginning has been on activities that are nationally relevant. The collaboration between the two nodes has been intensive since the application process in 2009, and from 2010 the vice-chancellors of the host institutions have held regular meetings to coordinate the activities of the two nodes. They have also maintained close communication with the government during this time.

Many of the interviewees wished to emphasize that SciLifeLab has experienced rapid development since 2009. The two SciLifeLab nodes had different organizations, management, and strategies, and it has not been easy to merge the previous separate organisations into one and to establish new technological platforms and facilities. In this process, the NRC)has played a key part in evaluating the facilities.

Nevertheless, according to many of the persons interviewed there is still work to be done in order to find a more suitable organizational structure.

One of the people interviewed pointed out that the establishment of SciLifeLab should not be viewed as a reaction to AstraZeneca's closure of its Södertälje R&D site in 2012 because work to develop a national research centre for molecular biosciences had been going on since long before that date.

What is SciLifeLab?

SciLifeLab is referred to in many ways, including as a research centre, an institute, a network, or a national infrastructure. Many of the people interviewed agree that none of these terms cover all of the functions and activities of SciLifeLab, and that a combination of some of them is probably the most adequate way to describe SciLifeLab. Instead, they chose to focus on SciLifeLab's aim, goals, and activities to explain what SciLifeLab is today and how it should evolve.

The aim to develop SciLifeLab into a national resource or infrastructure and to make the platforms accessible to Swedish researchers in a transparent and predictable manner was highlighted by many of the interviewees. Without this national dimension, they argued, SciLifeLab would soon lose its legitimacy. In addition to providing access to large-scale technologies, the interviewees described how SciLifeLab also needs to focus on research activities. The technology platforms and providing state-of-the-art technologies are perhaps the centre's cornerstone, but a strong research community around SciLifeLab through educational and collaborative exchanges is equally important according to many of those interviewed. The community should consist of both researchers associated with SciLifeLab and external stakeholders from health care, industry, and government. A common them in the interviews was that SciLifeLab needs to provide access to these platforms and enable innovation opportunities related to health care and the environment. Many pointed out the importance of viewing SciLifeLab as a single unit and not as two separate nodes. None of the interviewees wanted SciLifeLab to become an independent institute and to lose its connection to the host universities.

Challenges for SciLifeLab´s organization and steering

Overall administration

We asked the interviewees to explain how they viewed the current organizational set-up at SciLifeLab.

There seemed to be a general belief among the people interviewed that SciLifeLab's current organization is not optimal. It is still somewhat polarized between Uppsala and Stockholm – and to some extent even between the host universities in Stockholm – and a more harmonized administration is needed and was asked for in the interviews. For example, today there are four different financial systems at the host universities, which makes it difficult to follow up SciLifeLab's budget.

Some of those interviewed stated that the management can be perceived as unclear and that the organization is not considered transparent, for example, when decisions are made. Another common view was that the administration needs to be more strategic and holistic and more coherent than it is today. One suggestion that came up in one interview was to appoint a head of administration who would work closely with the director. Furthermore, several interviews described how members of SciLifeLab in Uppsala report to the co-director in

Uppsala and members of SciLifeLab in Stockholm report to the director in Stockholm, which added to the somewhat muddled impression of management.

There seems to be a general view that Uppsala and Stockholm need to be "combined" to an even greater degree than today and that it is important to present SciLifeLab as one entity. It was pointed out in several interviews that SciLifeLab is heading in the right direction to create a more unified SciLifeLab. One example in this respect is that in 2015 SciLifeLab has for the first time presented a common operational plan for its national funds.

Management

One point that was put forward in some interviews was that SciLifeLab currently has many positions that are called 'director'. This can be a little confusing when viewed from the outside, and in several interviews it was suggested that only the actual director of SciLifeLab should have that title.

SciLifeLab is about to appoint a new director, which the people interviewed see as an opportunity to redesign SciLifeLab's organizational set-up and operations to suit the next phase in developing SciLifeLab into a world-class research centre. For this new phase of SciLifeLab's organisational development, several interviewees said that the new director needs to be a very strong leader. The new director also needs to maintain close communication with the heads of the universities and must work together with them towards a national strategic plan for developing SciLifeLab.

SciLifeLab has a strategic management team with nine scientific directors who represent the host universities. Some of the interviewees stressed that when the new director is in place, it is important that he or she can influence the members of the strategic team more directly and that a smaller team than today might be preferable.

Since July 2013, SciLifeLab has had a national board responsible for the national platforms and the national budget. The national board consists of representatives from the four host universities, representatives from three other Swedish universities, one representative from industry, and the chairman of the Knut and Alice Wallenberg Foundation. The chair is appointed by the government. Two different views regarding the composition of the members of the national board were raised during the interviews. One view was to have a representative board and the other was to have a more expert board based on functions and expertise rather than the university affiliation of its members.

The board has no influence on the actual decision on the disbursement from the SRA, which is made from the host university funding for SciLifeLab. Several of the people interviewed pointed out the challenge of having two major budget lines.

Despite the problem of the separate funding decisions, some of the people interviewed stated that it would most probably have a negative effect on the universities' commitment to, and engagement in, SciLifeLab if the host universities were not able to influence the disbursement of the SRA budget earmarked for SciLifeLab. Having said that, the point was also made that part of the SRA could perhaps be transferred to the national board. The disbursement of the SRA budget could also be regulated by instructions from the government to the universities.

Focus areas – the platforms, research, and translation to society

The SciLifeLab platforms are collections of technical facilities for large-throughput technologies of outstanding quality that cannot be built up by one university on its own in Sweden. Today, SciLifeLab has 9 platforms with a total of 35 national facilities and 9 regional facilities of national interest. The NRC, consisting of 10 members from universities from the whole country, evaluated a number of platforms and advised the national board as to which platforms should have national status and be included in SciLifeLab. As mentioned by one of the interviewees, the relevance of the platforms was evaluated from a rather more technical perspective than when the application to develop SciLifeLab was first produced. Furthermore, the NRC was also important in introducing SciLifeLab to the research community outside the host universities.

In addition to the national platforms, the universities also have a set of regional facilities of national interest that are affiliated with SciLifeLab. In the evaluation made by the NRC, these regional facilities were evaluated but did not reach national status. There is still an option that they might achieve national status in the future if the facility develops in the right direction. In some of the interviews, it was said that in some cases the combination of national and regional platforms is confusing, especially when viewed from the outside.

Some of the people interviewed stated that there is a broad scope of platforms and facilities at SciLifeLab and that it might be necessary in the future to focus on fewer platforms than today. The importance of continuing to evaluate the platforms at regular intervals, and preferably by international review, was raised during several interviews. The important challenge with this is that the combination of platforms still has to satisfy the demands of the research community and still be of the highest quality.

The Clinical Diagnostics, Clinical Genetics and DDD platforms have a more translational focus than the other platforms. Clinical Diagnostics is a recently developed platform, and clinical research groups are presently being integrated into the platform. According to one of the interviews, Clinical Genomics works with patient material that sometimes raises ethical issues, and for this reason a collaboration with the Swedish Association of Local Authorities and Regions, which is responsible for handling such issues, is crucial. SciLifeLab needs to seriously consider important questions regarding ethics, security, and law and must develop a strategy to tackle these questions.

Even though the Clinical Diagnostics and DDD platforms have a more translational focus, it was said at several interviews that the focus for SciLifeLab's services should be on basic academic research. However, at the same time, it was said that SciLifeLab can improve its collaboration with industry and clinics. Companies can use the platforms at full-cost price, but academia usually has priority. The opinion in some interviews was that companies would often like to meet the researchers and are more interested in the researchers' competences than in using the facilities at SciLifeLab themselves, and it is the quality of research and the competence of its researchers that are the attraction and that can allow SciLifeLab to act as a bridge between academia and industry.

Objectives, current processes for establishing SciLifeLab, and future development

The objectives of SciLifeLab

We asked the interviewees to give their view of the objectives for SciLifeLab. The questions were ”What is the objective for SciLifeLab?” and ”How would you go about realizing it?”. The answers varied around two themes. The first theme concerned the dynamics between building a reputation for SciLifeLab as an internationally recognized and world-class research centre for large-scale molecular biosciences and at the same time establishing SciLifeLab as a national centre and a hub for large-scale molecular biosciences in Sweden. The second theme concerned SciLifeLab being a research environment on the one hand and being a partner for industry, health care, and other societal organizations on the other.

These themes are interconnected and interdependent. The most important objective that came up in the interviews was that SciLifeLab should be seen as a world-leading research centre with world-class cutting-edge instrumentation for conducting large-scale and high-throughput molecular biosciences. In order to be at that level, the interviewees stressed that the Swedish research community needs to be more collaborative and must share and use the advantages that are present in Sweden, such as access to longitudinal national health care records and biobanks, and should use the Swedish health care system for conducting clinical research in close contact with patients throughout the entire country.

It was also stated that SciLifeLab should be attractive for the most prominent researchers in the world to come to Sweden and be part of our research community. If such an environment were achieved, it would also attract biotech industries and pharmaceutical companies to work in close collaboration with and alongside academia to discover new therapies for complex and rare diseases and as well as ways to deal with the major global challenges facing us today.

Processes for establishing SciLifeLab

We asked the interviewees to describe the current processes for establishing SciLifeLab as a national resource and world-class research centre. The most important task for SciLifeLab, which was mentioned by almost all people interviewed, is to promote SciLifeLab's current outreach activities outside the host universities in order to inform, educate, and invite researchers in the whole of Sweden to join the SciLifeLab community and form new research partnerships both within and between the academic disciplines in the life sciences.

Another important task is SciLifeLab's communication strategy and activities. In order to attract a larger research community, SciLifeLab is also working to develop its technical platforms and services for them to be of the highest quality and to make them attractive and accessible to the large molecular bioscience research community in Sweden. SciLifeLab is also engaged in educational activities, especially regarding courses in bioinformatics, which are currently in great demand in Sweden.

In terms of gaining greater recognition and commitment to SciLifeLab as a hub for molecular biosciences in Sweden, SciLifeLab has begun a SciLifeLab Fellowship programme in order to recruit future scientific leaders to SciLifeLab. Upon acceptance of their application, distinguished researchers are given grants to perform research at SciLifeLab technical platforms while still being based at their home universities.

SciLifeLab is also developing satellite platforms at universities outside the host universities in order to engage and recognize notable research environments in Sweden. Furthermore, SciLifeLab has established a forum for connecting researchers and the biotech industry – called Aim Days – that are held twice annually at the Uppsala node.

Future development of SciLifeLab

When asked how they would like to see SciLifeLab develop as a research centre in the coming years, the interviewees described both what they did not want to happen as well as what they would like to see SciLifeLab develop into. Depending on the interviewees' current position and role at SciLifeLab, they responded in slightly different ways. Those who represented the host universities at SciLifeLab were reluctant to see SciLifeLab develop into something of a more independent organization, and they would also like to continue to be responsible for deciding on the dispersal of the SRA funding to the facilities and research activities at each host university. The SciLifeLab personnel and board members from the Uppsala node, as well as some of the board members at the Stockholm node, were strong advocates of this view. A different view in Stockholm, and from some of the other board members, was that SciLifeLab today has a very complex financial decision-making model and hence is difficult to govern and develop in a coherent way. However, most (including the Uppsala node) agreed that dispersal of a portion of the SRA funding should be decided by the SciLifeLab board and that the director needs to have a strong influence on how the budget is used in day-to-day operations as well as on the development of the SciLifeLab platforms.

The interviewees almost all agreed that it would be an advantage for SciLifeLab to have a joint administration officer and a joint communications officer. A more coherent organization and clearer leadership were also sought by most of those who were interviewed.

In order to attract distinguished researchers to a more established Swedish community for world-class life science research with SciLifeLab as the hub, SciLifeLab should continue to build partnerships with other strong molecular bioscience research departments at other Swedish universities. This will allow it to be able to draw fully upon Sweden's advantage of having access to health care records, high-quality biobanks, and clinical research panels. Today there is a lot of competition between the different universities to acquire public grants for research and education, and such a situation does not support increased collaboration between researchers from different universities.

Much of the funding and activities in Sweden are currently focused on rebuilding the clinical research platforms at Sweden's top university hospitals, which will benefit from the outcomes of the research done at SciLifeLab.

SciLifeLab needs to develop more educational activities, in particular regarding bioinformatics, which is in great demand from research communities within the life sciences throughout Sweden.

One area that still needs to be developed is environmental research, and there is huge potential for this area. This is an important challenge for SciLifeLab, and a workshop was held with relevant authorities earlier this year for discussions on how to develop this research focus.

Overall, the greatest challenge in developing SciLifeLab in the right direction appears to be a lack of trust and commitment to establish a hub for molecular biosciences in Sweden outside the four host universities, which was implied but perhaps not clearly expressed by the people who were interviewed.

Interviewee	**Organization**	**Role at University**	**Role at SciLifeLab**
Bertil Andersson	Nanyang Technological University, Singapore	President	Chair, Science Advisory Board
Fredrik Sterky	KTH Royal Institute of Technology		Site manager, Stockholm
Göran Sandberg	The Knut and Alice Wallenberg Foundation	Executive Director	Chair, National Board
Hans Adolfsson	Stockholm University	Pro Vice-Chancellor	National Board member
Hans Gustav Ljunggren	Karolinska Institute	Dean of Research	National Board member
Jens Nielsen	Chalmers University of Technology	Professor, Department of Biology and Biological Engineering	Member, National Reference Committee
Karin Dahlman Wright	Karolinska Institute	Professor, Department of Biosciences and Nutrition	Scientific director. Member, Executive management team
Karin Forsberg Nilsson	Uppsala University	Professor, Department of Immunology, Genetics and Pathology	Scientific director. Member, Executive management team
Karl- Erik Magnusson	Linköping University	Professor of Medical Membrane Biophysics	National Board member. Chair, National Reference Committee
Kerstin Lindblad Toh	Uppsala University	Department of Medical Biochemistry and Microbiology	Co-director
Margareta Olsson Birgersson	Roche		National Board member, Industry representative
Maria Anvret	University of Gothenburg	Senior Advisor	National Board member
Maria Sörby	Uppsala university	Director at Office for SciLifeLab in Uppsala	Site manager, Uppsala
Mathias Uhlén	KTH Royal Institute of Technology	Professor of Microbiology	Director
Per Jensen	Linköping University	Professor of Ethology	
Sophia Hober	KTH Royal Institute of Technology	Dean of Faculty	National Board member
Stefan Bertilsson	Uppsala University	Professor, Dept. of Ecology & Evolution,	Scientific director. Member, Executive management team
Stellan Sandler	Uppsala University	Pro Vice-Chancellor	National Board member

Table 3. Interviewees

FOCUS-GROUP STUDY: SOCIETAL STAKEHOLDER PERSPECTIVE

Focus-group meeting, External Reference Group, 6 March: Summary

Present at the focus group meeting:
Johanna Adami, Director of the Health Division at VINNOVA
Johan Brun, Medical Director at Pfizer Pharmaceuticals
Anders Ekblom, Chairman of the Board of Karolinska University Hospital, (Anders Ekblom was previously at EVP Global Medicines Development, and CEO of AstraZeneca AB Sweden)
Jonas Ekstrand, Director General of SwedenBIO
Kerstin Nilsson, Chairman of the Swedish Society of Medicine
Johan Rockström, Executive Director of Stockholm Resilience Centre
Ewa Ställdal, Director General of the Swedish Research Council for Health, Working Life and Welfare

From the Swedish Research Council:
Maria Bergström and Maria Starborg acted as moderators. Per Helldahl and Anders Hellström took notes.

Purpose of the External Reference Group

The members of the External Reference Group were invited as representatives of external stakeholders of SciLifeLab (including hospitals, pharmaceutical companies, research funding organizations, and research centres). They were invited to share their perspectives on and experiences of SciLifeLab as a centre for large-scale research in molecular biology, in particular to what degree SciLifeLab has been able to cooperate with health care, the pharmaceutical industry, and other stakeholders. More broadly, topics discussed included the role of SciLifeLab in strengthening the position of Sweden in the life sciences area generally and in what direction SciLifeLab needs to develop in order to better fulfil this role.

SciLifeLab's aim and goals

The focus group agreed that SciLifeLab has great potential to strengthen the life sciences in Sweden and to increase Sweden's international competitiveness. The initiative also has great potential to generate substantial gains for both the pharmaceutical industry and the development of new technologies and applications to improve health care and the environment in Sweden and internationally. The focus group also agreed that SciLifeLab has already come part of the way thanks to the fact that the availability of funding has hitherto been good and that platforms and facilities have been built up at a very advanced technical level and that good technical competence is related to these platforms. This is also reflected in the good reputation that SciLifeLab has in the international arena – perhaps the picture of SciLifeLab and its activities is even more positive internationally than inside Sweden.

The focus group equally agreed that much remains to be done for SciLifeLab to be able to fully exploit this potential in practice. One very important step is for the government to clarify what SciLifeLab's most important aim should be. The venture has perhaps too many aims today – to conduct world-class research, to act as a national resource for Swedish researchers in the life sciences, to contribute to pharmaceutical development in Sweden, to develop new methods in healthcare as well as new applications in the area of the environment, and in the long term to contribute to new remedies for major diseases. First, it must be realised that all these goals might not be able to be attained simultaneously and that priorities might need to be set. Second, a more thoroughly prepared analysis and strategy is required to be able to determine how the

prioritised goals interact and how they can best be attained. One solution might be to create a separate unit for, for example, drug development.

One goal formulation that was proposed was that SciLifeLab should be a world-leading centre for molecular bioscience technologies that can be used to resolve complex issues related to disease, health, and the environment. To achieve this, SciLifeLab must also be able to offer bioinformatics support of the highest quality and in the quantities necessary. The group also emphasised the importance of SciLifeLab having one or two flagship projects at the very forefront of research that will be linked to SciLifeLab and strengthen the brand.

The group further emphasised the possible conflict between conducting world-class research while at the same time acting as a nationally accessible resource. (However, not all were of the opinion that such a conflict exists.) It might be necessary, therefore, to give national accessibility lower priority in order to sustain a world-class level and instead only be accessible to the best research groups.

The focus group also strongly emphasised the need to strengthen and develop SciLifeLab's collaborations with the pharmaceutical industry (including large, medium-sized, and small companies), with clinical researchers, and with healthcare.

Organisation and management

It goes without saying that the organisation of SciLifeLab must reflect the aims and goals that are prioritised for the organization. The group agreed that today's organisation is too complex, if not muddled, and constitutes a serious hindrance to the clear, unifying leadership that is needed. This complex organisation partly reflects SciLifeLab's history, both the fact that it is spread over four host universities (Karolinska Institutet, KTH Royal Institute of Technology, Stockholm University, and Uppsala University) and that its sources of funding are many and linked to partly different goals and follow-up processes. The organisation's lack of clarity also contributes to an introspectiveness that makes it difficult for actors in industry and healthcare, for example, to know whom to approach in order to collaborate with SciLifeLab. The focus group agreed that in order to lead an organisation of SciLifeLab's size, it should have a clear mandate and vision, a strong leader (a managing director or equivalent), a board, and a single budget.

The group discussed whether SciLifeLab ought instead to develop into a centre of excellence in the form of an independent institute and disengage from its host universities. In this regard, the reflection was made that "research institute" is not a legal concept and that SciLifeLab should be able to be developed into a research institute in its own right without breaking its linkage to the host universities. The advantages of this, as opposed to a solution with a fully independent institute, are a more efficient use of resources (e.g. overhead costs and administration) and that a fully independent institute would be perceived by the rest of the research community as a potential threat given the culture of competition between research settings that characterises Swedish academia. The group therefore recommended a pragmatic solution where SciLifeLab remains established at a number of host universities to which its research staff are affiliated, while at the same time the organisation is centralised and its mission made clearer than is the case today. A centralised organisation would enable stronger leadership. The host universities do not necessarily need to be the same as today – and the idea that SciLifeLab should simply be located at "the principal universities" was one idea put forward.

The group commented with a degree of scepticism on the development that appears to be taking place at SciLifeLab, where new facilities are constantly being set up at more universities throughout the country. Risks in this regard might be that SciLifeLab will become even more difficult to run and that compromises will begin to be made that will negatively impact the ability of the platforms to conduct world-class research. The most important thing is that SciLifeLab benefits Sweden and is "owned" by the country's leading universities, and thus it might not be necessary that its operations be spread throughout the entire country. Another disadvantage of spreading SciLifeLab around the country might be that it will be difficult to recruit top researchers of world-class standing to a "centre" that is too dispersed and partly located in places that are less attractive to colleagues from abroad.

To create a functional research setting, the focus group emphasised that it is important that researchers meet in real life – SciLifeLab should not be developed into a "virtual centre". The addition of the SciLifeLab

buildings next to Karolinska Institute was held up as a good initiative. However, to enhance the feeling that SciLifeLab is a creative meeting-place for researchers and staff at the platforms, it was proposed that the buildings be filled to a greater extent with top researchers from the host universities' departments. How this physical concentration is to be achieved at the same time that SciLifeLab is based at several host universities is a matter that remains to be resolved. One suggestion from the focus group was that efforts should be made to achieve a "physical critical mass" of staff to enable interaction and development at a main site.

Work methods, priorities, and accessibility

SciLifeLab's technological platforms for, among other things, sequencing are today on a very high technological level and function adequately within the framework of their assignment. However, to develop its full potential, SciLifeLab should not only be a set of platforms that researchers can approach to have specific technological tasks carried out, but it should be a collaborative partner that can also be approached to resolve problems of a more sweeping nature. It is therefore important to have technical staff with a background in research employed at SciLifeLab. Special emphasis was given to the crucial role that bioinformatics plays in helping researchers process and analyse the material that has been sequenced, for example, by the Genomics platform. It is important that the platforms have "soft" competence in the form of the ability to train and collaborate with researchers from different fields, to see needs, and to contribute to common solutions to problems, while at the same time SciLifeLab must continue to have its base in technological platforms that maintain a high level with regard to both equipment and technological competence.

It is important to maintain a very high standard on the platforms that are provided. As soon as a platform becomes a "common instrument", its priority at SciLifeLab should be lowered. The focus group was sceptical to the idea of specific "clusters" at SciLifeLab, i.e. that research there should be developed according to certain specific guidelines. Such a set-up could become too dependent on certain specific researchers and teams of researchers, which in the long term is not a satisfactory proposition because there is the risk that SciLifeLab would lose its ability to operate at the forefront of the research field. It is not SciLifeLab's task to coordinate research, but instead to specialise in being a collaborative partner and being able to adapt to the needs of different teams of researchers.

The focus group felt that the goal of contributing to world-class research should permeate all work methods and the technologies that are developed. Activities should be designed in line with leading research, even if this might mean that accessibility is reduced for some teams of researchers that are not at that level and that SciLifeLab's assignment to be a national resource is not completely fulfilled. "You're not making a Ferrari engine for a Lloyd", was one metaphor used in the focus group.

The focus group questioned the activities of the DDD platform, which helps research teams with guidance and experiments in relation to candidate drugs in the early stages of development, because these activities often compete with commercial activities. All of SciLifeLab's platforms should instead be focused to a greater extent on meeting the needs of the pharmaceutical industry and life sciences companies as well as in relation to healthcare and clinical applications overall.

Health and the environment

The focus group was to some extent unaware that one of SciLifeLab's focus areas is environmental research. In order to meet the growing challenges of effects on health related to environment and climate issues, the group proposed that SciLifeLab should focus on laying the foundation for molecular bioscience research that contribute to sustainable food production and health. Success in this area will also require greater collaboration with other stakeholders in the area.

Summary

- SciLifeLab needs a clearer organisational structure with a managing director (or equivalent), a board, a single budget, and a clearly defined assignment.
- SciLifeLab should be a world-leading centre for molecular bioscience technologies that can be used to resolve complex issues linked to disease, health, and the environment.
- SciLifeLab should offer bioinformatics support of the highest quality.
- SciLifeLab should have one or two flagship projects at the very forefront of research.
- SciLifeLab should strengthen its collaboration with the pharmaceutical industry and with clinical research and healthcare.

SURVEYS

This report summarizes the findings of four distinct surveys carried out by the Swedish Research Council as a part of the evaluation of SciLifeLab. The following surveys are included:

1) A *self-evaluation survey* directed at SciLifeLab's nine platforms. The purpose of the survey, which featured open-ended questions, was to make it possible for the platform directors to express their perspectives on the governance, management, operations, and quality of their respective platforms.
2) A *survey* directed at all *facilities* within SciLifeLab, the intention of which was to supplement information gathered in the self-evaluation survey.
3) A *user survey* directed at *researchers* working in the life sciences who are either actual or potential users of SciLifeLab. The purpose was to gather information about the researchers' experiences of, and attitudes to, SciLifeLab and its platforms and facilities.
4) A second *user survey* directed at *companies* in the life sciences area that are either actual or potential users of SciLifeLab to gain knowledge of their experiences and attitudes vis-à-vis SciLifeLab.

Details about each survey are found under the respective headings.

Self-Evaluation Survey of Platforms

SciLifeLab has nine national platforms based mainly at the four Higher Education Institutions (HEIs) of Royal Institute of Technology (KTH), Karolinska Institute, Stockholm University, and Uppsala University. Each platform comprises a number of facilities (see Table 1 in the introduction for an overview). The platforms themselves can be described as administrative bodies in that they bind together the work at the respective facilities. The platforms host technical research infrastructure in the form of facilities, but they also perform other activities related to this infrastructure, such as educational activities, and the platform management has some responsibilities in making strategic decisions. Facilities might be geographically concentrated or dispersed, and some platforms comprise facilities at more than one HEI. In addition, some facilities are found at HEIs other than the host universities.

A self-evaluation survey was sent to the directors of the nine national platforms at SciLifeLab with the intention of allowing the platform directors to express their perspectives on the governance, management, operations, and quality of their respective platforms. The survey consisted of 39 questions, 37 of which were open-ended (with no limit as to the number of characters). The Drug Discovery and Development (DDD) platform was given two extra questions to answer. All nine platforms responded, and the following sections summarize some of the main observations in the survey answers.

Background

Several (although not all) platforms include facilities that were operational before the founding of SciLifeLab as a national resource in 2013, and some also include facilities that were operational before SRA funding was applied for in 2008. For example, the NGI platform includes three facilities that have existed more than 15 years as service facilities in the field of genetics and genomics, and the establishment of SciLifeLab as a strategic research environment made it possible to expand the sequencing capability at the three facilities. DDD, for its part, included two pre-existing facilities while the other six facilities in the platform were created when SciLifeLab's National Reference Committee and board approved the plan to establish a platform dedicated to early-stage drug discovery. The Functional Genomics platform consists of four facilities, three of which were only added to the platform in January of 2015 – thus the platform is still in a start-up phase. It is clear that the history (and, to some extent, structure) of SciLifeLab's different platforms presents a diverse picture.

Resources

The survey also included questions about financial resources. However, because these questions largely overlap with the analysis made by DAMVAD, we refer to the results presented in their report. (Appendix 6 in the overall evaluation report.)

Platform Organization

Several questions concerned the respective duties and responsibilities of the steering board, the platform director(s), and the facility manager(s) at each respective platform. Specific responsibilities of the *steering board* include, for many but not all platforms, the approval of the platform budget (subsequently to be decided upon by the SciLifeLab board), evaluation and prioritization of applications (especially for projects that take a large share of a facility's capacity), and more generally to strategically oversee the development of the platform.

Each facility in SciLifeLab has a *platform director*; therefore, each platform that has more than one facility has several platform directors. According to the survey answers, the responsibilities of the platform directors vary between platforms. For example, the platforms for Functional Genomics, Affinity Proteomics, and Structural Biology emphasize the role of the platform directors in the strategic, long-term planning of the platforms. Three platforms (Functional Genomics, Affinity Proteomics, and Clinical Diagnostics) state that they each have an *executive platform director* who has more wide-reaching responsibilities than the other platform directors, and the DDD platform has one full-time platform director with similar duties.

Furthermore, each SciLifeLab facility also has a *facility manager*. The facility manager generally has a more operational (as opposed to strategic) role than the platform directors, but there are significant differences between platforms. At Bioimaging platform, the facility manager's role is highly operational and is to "support users, run the microscopes and maintain the equipment". Most of the other platforms stated that the facility manager has more of a coordinating role, for example, the facility managers in the Structural Biology platform are instructed to "supervise day-to-day activities [and] maintain state-of the-art international standards" while those of the Affinity Proteomics platform are to "direct the day-to-day planning of activities and short-term priorities" and are responsible for "communication with all potential and current users". The DDD platform gives a more wide-ranging role for its facility managers: "the facility managers are running the facility on an operational level and are part of the platform leadership team, i.e. having intellectual input on the projects and performing practical work".

Gender Equality

The following question on gender equality was included: "How do you secure equal opportunities/gender equality regarding the governance and management of your platform? (Please, describe if and how your platform works with securing gender-balanced management and operations of your platform.)" Six platforms gave answers indicating that the proportions of men and women in key positions such as platform directors, facility managers, and steering board members are generally even. However, for one platform there is apparently a discrepancy between the proportion of men and women given in the survey answers and those indicated by the SciLifeLab webpage. Bioinformatics reported that gender representation is skewed reflecting the fact that the majority of scientists in this field are male, but that they have undertaken efforts to employ more women. Other answers were less specific but indicated that the platform gives weight to gender and equal opportunity aspects in decision-making and that host HEIs' gender equality plans are adhered to.

Collaboration within SciLifeLab

Platforms were asked in what way facilities within the platforms collaborate with each other. Most platforms mentioned several such avenues of collaboration, including the following: shared use of instruments, knowledge exchange, cooperation on technology development, mutual assistance in user support, and the exchange and training of staff across facilities. DDD and Chemical Biology Consortium Sweden (CBCS)

described the work at their respective platforms as highly integrated because projects need service from more than one facility, and DDD added that the division of the platform into facilities could be seen as "artificial". All platforms responded that they collaborate with other platforms within SciLifeLab in one or more ways. For example, Bioinformatics stated that they "collaborate with the Genomics platform since we are the next-in-line platform helping the researchers analyse genomics samples. We coordinate what standard bioinformatics analyses are done at the Genomics platforms so that we can provide tailored bioinformatics analyses at our platform". Further examples of collaboration were given in the responses from the Clinical Diagnostics platform, including, common use of instruments, technology development, complementary sample preparation and image analysis, courses and training efforts aimed at users, and platform-level meetings where common strategic questions are discussed

Availability and Fees

In terms of user fees, eight out of the nine platforms responded that companies are charged higher fees than academics. The Bioimaging platform answered, "Academic users only pay for reagents needed in their experiments. Non-academic users, companies, pay the full cost, including instrument depreciation, salaries, and rent." The platform for Clinical Diagnostics is a partial exception because their Clinical Sequencing Facility has the same guidelines for charging all external users (although the precise meaning of "external" is not defined). Further, the platform for Affinity Proteomics and NGI state that non-Swedish users, along with companies, are charged more than Swedish academic users.

The platforms unanimously responded that they each have a strategy to attract researchers throughout the whole of Sweden (i.e., also at non-host HEIs) to use the facilities within their respective platform, and this reflects SciLifeLab's mission as a national resource. Examples of strategies mentioned include such activities as outreach tours to HEIs ("road-shows"), workshops, courses, symposia, and generally maintaining a "high visibility at international and national conferences").

The answers were more diverse for the question of whether the platform has a strategy for attracting biotech companies in Sweden to use the facilities. Five platforms answered that they have no specific strategy, whereas six platforms (partly overlapping with the five just mentioned) answered that contacts with and outreach activities directed to biotech companies are taking place, but they do not form a coherent strategy. CBCS reported that "being a VR supported infrastructure", they "prioritize academic projects over projects of a commercial nature". DDD expressed the need for "guidance on how active we should be in this respect to avoid debate about competition with CRO [contract research organization] companies". Despite a lack of overall strategies, several platforms reported that commercially driven organizations make use of their facilities to some extent.

Prioritization of Projects

Two questions in the survey were related to the criteria for prioritizing between projects in cases where there is competition for access to the platform's services. Functional Genomics and Affinity Proteomics answered that they currently see no competition as such and that applications are dealt with on a first-come-first-served basis so long as they pass a basic feasibility evaluation. At the other end of the spectrum, DDD reported that competition for use of their facilities is very intense and that all applications are thoroughly scrutinized by the platform management team and (at a later stage) by the steering board, after which a small number of projects are selected for further support. Bioinformatics stated that while all applications can be granted on the Compute and Storage side (UPPNEX, now SNIC@UPPMAX), the Long-term Support facility (WABI) can only take on about 15% of the applications received and these are prioritised by an external committee.

The prioritization criteria mentioned most often by the platforms were technical feasibility and scientific relevance and potential. Judgments on scientific quality are either based upon pre-existing evaluations – for example, peer-reviewed projects or projects funded by the Swedish Research Council or VINNOVA are prioritized – or on evaluations made by the platform itself, most often by the platform steering board. In addition to the criterion of scientific quality, Bioinformatics reported that applications to the platform for

Bioinformatic Short Term Support (BILS) facility are prioritized if the BILS staff has the appropriate competence and/or if the BILS efforts are expected to have a large impact on the success of the project. DDD and Clinical Diagnostics apply selection criteria that stand out from the rest, and DDD prioritizes projects with a high potential for drug discovery while Clinical Diagnostics prioritizes those with a high potential for developing new methods in diagnostics. Clinical Diagnostics added that they frequently refer projects to a more suitable SciLifeLab platform (for example, NGI) if the projects do not meet the criteria of translatability.

In relation to selection criteria, the survey also included the question of whether the platform discriminates between academic and commercially driven projects in case of competition. CBCS answered that academic projects are prioritized before projects of a commercial nature, while Functional Genomics stated that "academic users have priority over non-academic users, but we do not discriminate against an academic research project which has a commercialization component or aim". Three other platforms answered that they have thus far been able to accommodate both types of users, while Affinity Proteomics stated that "so far this has not been an issue, but priority is given to academic scientists, although we also see it as an important mission to support companies". DDD stated, "We only agree to work on projects with a clear drug discovery rationale […] By definition such projects need to be commercially driven (not necessarily profitable in terms of market potential […] but realistic in terms of how to further fund the project through development)". Clinical Diagnostics answered, "Since we have focused on clinical/translational research projects, there has been no need to discriminate between academic and commercial-driven research".

Quality Assurance

The platforms were asked which quality measures they use when assessing operations at their facilities and how they would assess the quality of their respective facilities based on these measures. The types of measures mentioned by platforms fell into five categories – perhaps reflecting underlying differences in terms of perceived goals. First, measures of the *technical performance at the facility* were referenced. Clinical Diagnostics reported that "all facilities […] are working using quality assurance systems that have been established according to international standards for accreditation", and Bioimaging responded that "all the instruments perform close to the theoretical limits of the technique". Second, the Functional Genomics and Affinity Proteomics platforms reported the importance of *research output in terms of publications* related to analyses done at the facilities. Third, the *number of projects* taken on was mentioned by several platforms. Fourth, DDD reported that the *number of patent applications* resulting from projects processed at the platform will be an important yardstick in the future. Fifth, three platforms mentioned *user satisfaction* (for example, as measured through surveys).

A further question was asked as to how the platforms reach and/or maintain the level of quality they are aiming for. Several platforms emphasized in their answers the importance of training their staff and keeping them up-to-date with technological developments. Affinity Proteomics and Clinical Diagnostics referred to continuous evaluation of services and/or internal and external audits. NGI stated that "a major part of [the platform] is operated in accordance with the international quality standard ISO/IEC17015".

The platforms unanimously stated that their facilities continuously develop the quality of the technology they are using. For example, Affinity Proteomics stated that "there are constant efforts to further evolve the services, and 20% of the budget is applied for such technology development", while Bioinformatics reported that "we have a team of system developers aimed at setting up infrastructure needed by the researchers and providing user-friendly tools, enabling them to do more analyses on their own".

Functional Genomics, Structural Biology and Bioinformatics responded that they are not aware of any other research organization in Sweden that has the same type or similar equipment that they host at the facilities within their respective platform. Affinity Proteomics, NGI and Clinical Diagnostics reported that similar instruments exist elsewhere – for at least one of their facilities – but that there is no research organization in Sweden that can perform analyses equivalent to theirs in terms of scale or range. DDD and CBCS responded that AstraZeneca and/or other large pharmaceutical companies have similar capacities as they do, which means that the DDD platform serves a more vital role for Swedish SME´s.

Bioimaging reported that "some of the microscope equipment can be found at other universities".

Societal Impact

The final section of the self-evaluation addressed questions about the translatability of research at the platforms to societal use or application. One question regarded whether facilities at the platform are relevant for translational research, for example, for clinical diagnostics, drug development, or environmental analysis. All platforms responded in the affirmative. NGI, for example, stated, "We have a large number of projects in clinical research that are of translational nature. A number of projects also involve development of new diagnostics methods based on sequencing and metagenomics of environmental samples", while Bioimaging reported, "Several projects at the platform use super-resolution imaging to test and validate binding, uptake and metabolism of drug candidates".

The translational focus of the work done at DDD and Clinical Diagnostics is a given because they are dedicated to drug discovery and the development of diagnostics, respectively. DDD stated that "we conduct service at an early pre-clinical stage [and] offer advice and strategic input from idea to clinical trials". They further explained (in questions that were directed exclusively to DDD) that for each project they have a continuous dialogue with the innovation office of the project group's HEI, and that they also seek "new and improved ways to facilitate the interaction with venture capital and licensing partners". During the first year of the platform's existence, one project was "spun out into a new pharmaceutical company – Glionova Therapeutics – that received venture capital funding from both private and public sources."

Main Observations

- All platforms report that they are taking measures to make facilities more accessible and attractive to researchers from HEIs outside the Stockholm-Uppsala area, reflecting the status of SciLifeLab as a national centre.
- Making facilities accessible for non-academic users (such as private companies) does not appear to be a priority for most platforms. Companies are generally charged higher fees than academics.
- All platforms report that they collaborate with other platforms within SciLifeLab. To give an example, Bioinformatics coordinates their work with the NGI because their services are usually used by researchers after they have used the NGI's facilities.
- Some platforms coordinate the work at their respective facilities to a high extent, whereas facilities operate more independently at other platforms.
- The level of competition to gain access to facilities varies greatly from platform to platform. Some platforms have significant competition and thus a need to make prioritizations, whereas others admit projects on a first-come-first-served basis.
- Internal quality measures vary between platforms, with some emphasizing the technical capacity of platforms, others the volume (in terms of the number of projects taken on), and still others the publications resulting from projects related to the platform.
- Platforms uniformly state that their facilities are relevant for translational research such as drug development, clinical diagnostics, and/or environmental analysis.

Survey of SciLifeLab facilities

The technologies, knowhow, and support to researchers provided by SciLifeLab are organized into platforms and facilities, each of which represents a certain area of expertise. The survey was aimed at gaining information regarding operational activities, accessibility, management, and demand from the researchers. At the time of the survey, there were 33 national facilities and nine regional facilities of national interest. Each facility is located at a so-called host university, and the facilities are financed in various ways (see *Financial Analysis of SciLifeLab* by DAMVAD Appendix 6.). All but one facility completed the entire questionnaire consisting of 23 questions.

The regional facilities of national interest received the same questions as the national facilities; however, they had their own track in the questionnaire so that we could look at the answers separately. Each facility was asked to provide respondent information, background information on the facility, and answers to questions regarding resources as well as accessibility of the services of SciLifeLab.

Employees at SciLifeLab´s facilities

The size of each national facility, when measured in full-time equivalent employees, varies a lot and ranges from one employee at the smallest facilities, Flourescence Correlation Spectroscopy and Advanced Light Microscopy, to 41employees at the largest facility, Bioinformatics Short-term Support and Infrastructure (BILS). The vast majority of the facilities employ less than five full time equivalent (22 out of 33).The total number of employees at the national facilities are 229 full time equivalent. See figure 2 below.

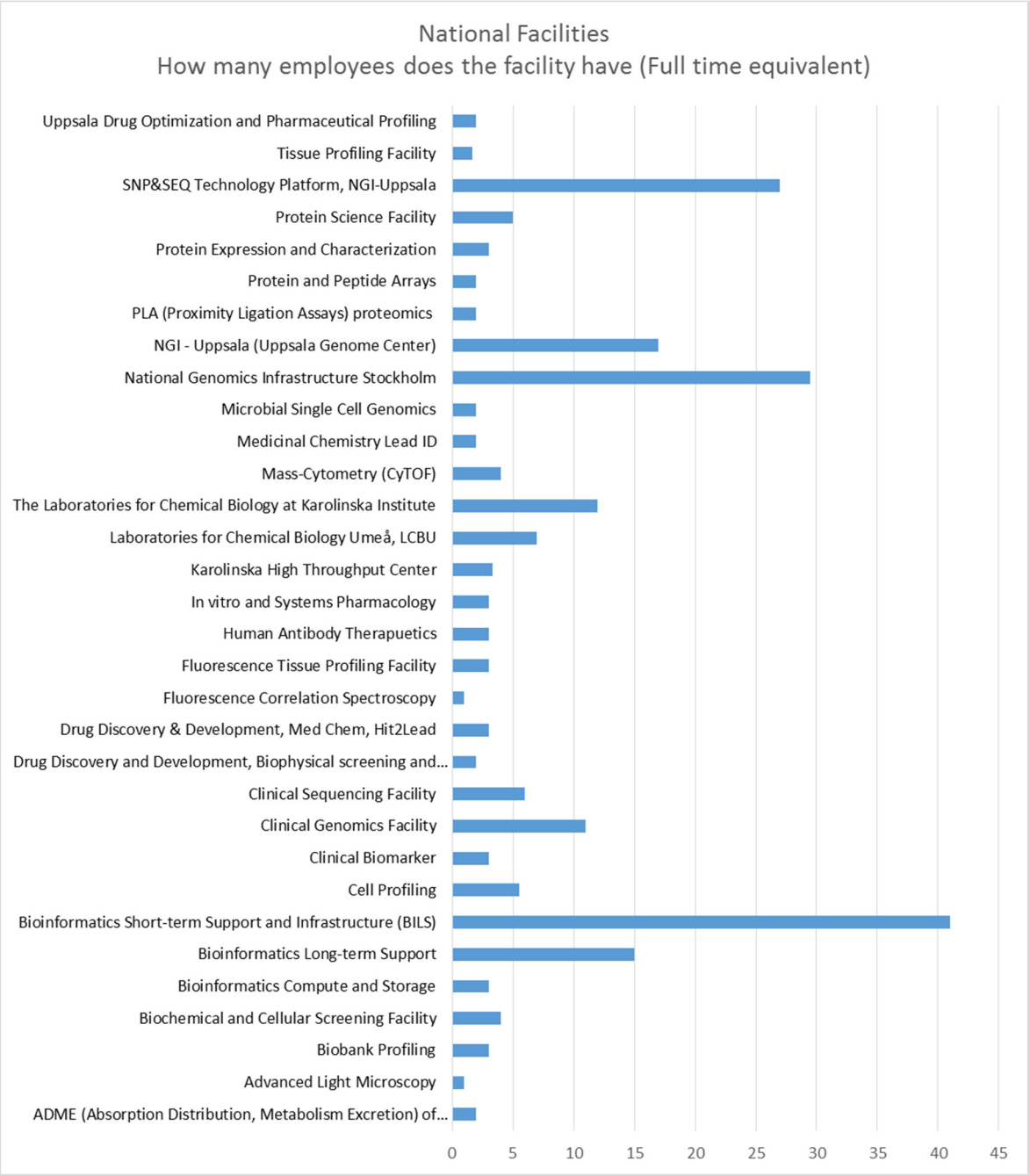

Figure 2. Number of employees at national facilities. (32 out of 33 facilities responded to this question.)

As for the regional facilities of national interest shown in figure 3, the number of employees differs less, from one to eight full-time equivalents, where Mutation Analyses Genomics Core Facility has most employees. They are overall smaller facilities with six out of nine employing less than five or less personell.

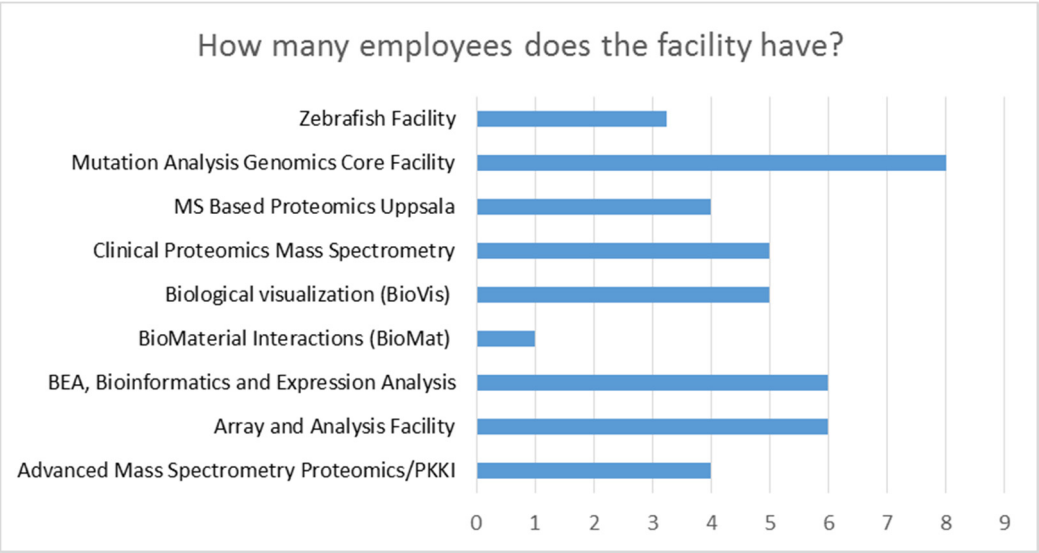

Figure 3. Number of employees at regional facilities. (9 out of 9 regional facilities responded to this question.)

The facilities were also asked to indicate the proportion of men and women working at the facility, illustrated in figure 4. Overall the proportion of men and women were almost equal, approximately 48% of the employees at national and regional facilities are women, but the proportion differs between the different facilities. Facilities of five or fewer employees are not taken into account in the graph.

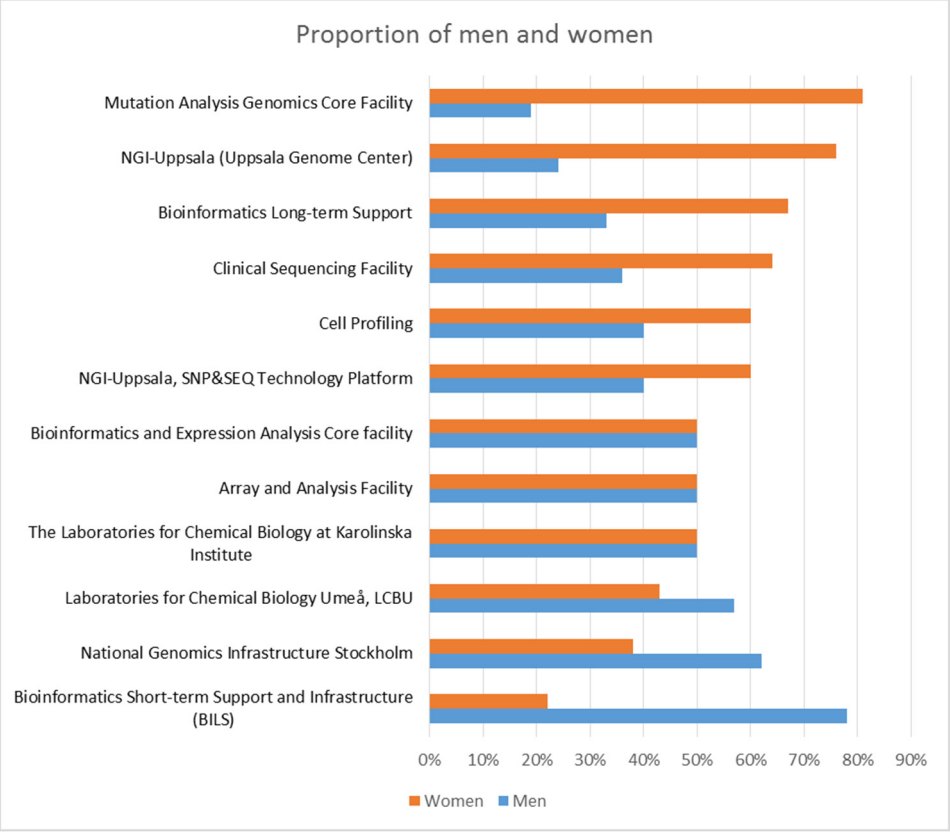

Figure 4. Proportion of men and women working at the national and regional facilities.

Resources

One question regarded the financial resources of the facility were asked. According to the answers provided, the majority of the funding for the national facilities is provided by SciLifeLab's national funds and for the regional facilities by the host universities, which is shown in table 4. Please keep in mind that funding sources as well as budget decisions are different for individual facilities.

Resources	**National facilities**	**Regional Facilities**
SciLifeLab's national funds	57%	-
Strategic Research Area funds	10%	24%
The host university	4%	41%
Other universities	1%	0%
Other private financiers	9%	1%
VR	9%	1%
Other public financiers	4%	9%
Companies	0%	1%
Other	6%	23%

Table 4. Proportion of funding at the national and regional facilities.

The national facilities were also asked if they can get access to additional financial resources, from resources allocated to SciLifeLab, in order to develop the facilities? More than two thirds of the facility managers answered that they either didn´t know (55%) or "No" that they can´t (12%) access any additional funding. Only a third responded "Yes". They were also asked to indicate by whom the additional funds were disbursed. The facilities could give multiple answers to this question. About one third of the respondents answered that they don't know followed by "The platform's steering board" by 15% of the respondents, indicating that disbursement of additional funds is decided in many ways. See figure 5 for the distribution of answers. Since more than half of the facilities don´t know if it is to get additional resources from SciLifeLab there seems to be low transparency regarding the possibility of access of additional resources.

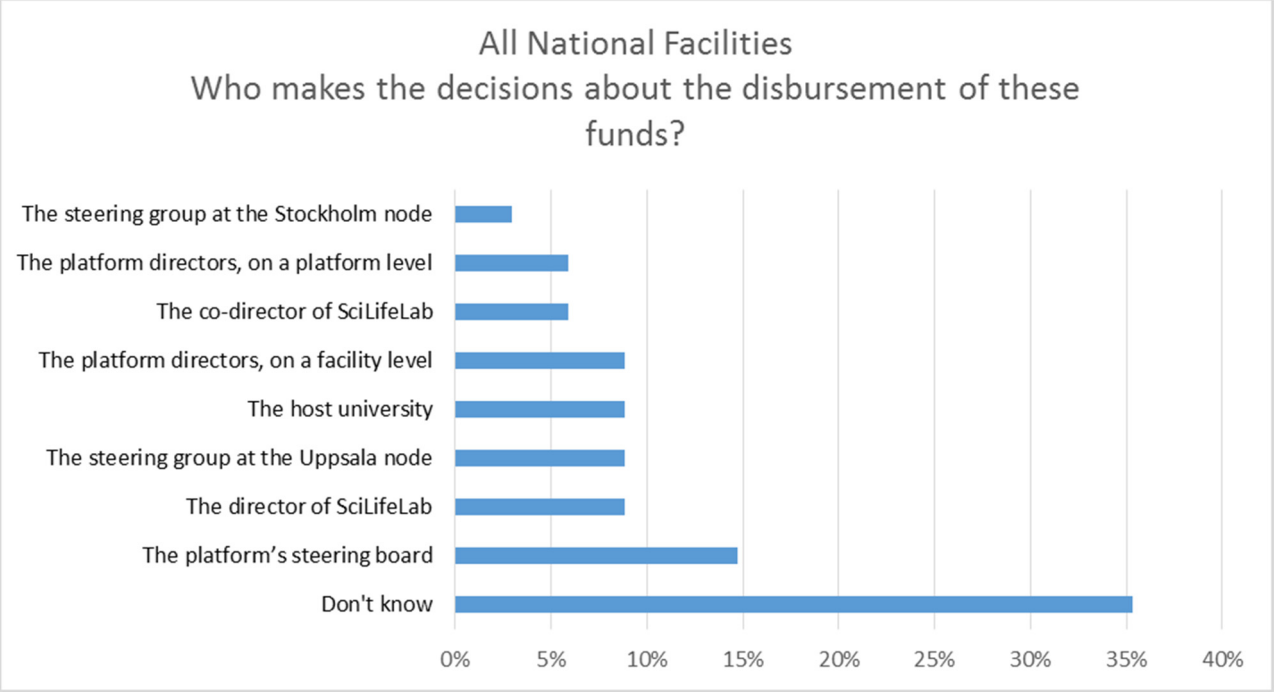

Figure 5. Distribution of answers regarding decision of disbursement of additional funds at national facilities. (22 out of 33 facilities responded to this question.)

The regional facilities were asked a similar question; "Can the facility get access to additional financial resources to upgrade the technology and/or the instruments of the facility?" with 44% answering "Yes", 33% "Don't know", and 22% "No". The facilities were also asked to indicate by whom the additional funds were disbursed. Answers from the regional facilities is presented in figure 6 below. The facilities could give multiple answers to this question. The regional facilities mainly responded to the question of disbursement with "Don't know" (22%), "Other" (22%), and "The steering group at the Uppsala node" (22%). Please keep in mind that there are only nine regional facilities of national interest, which means one vote can have a great impact on the result.

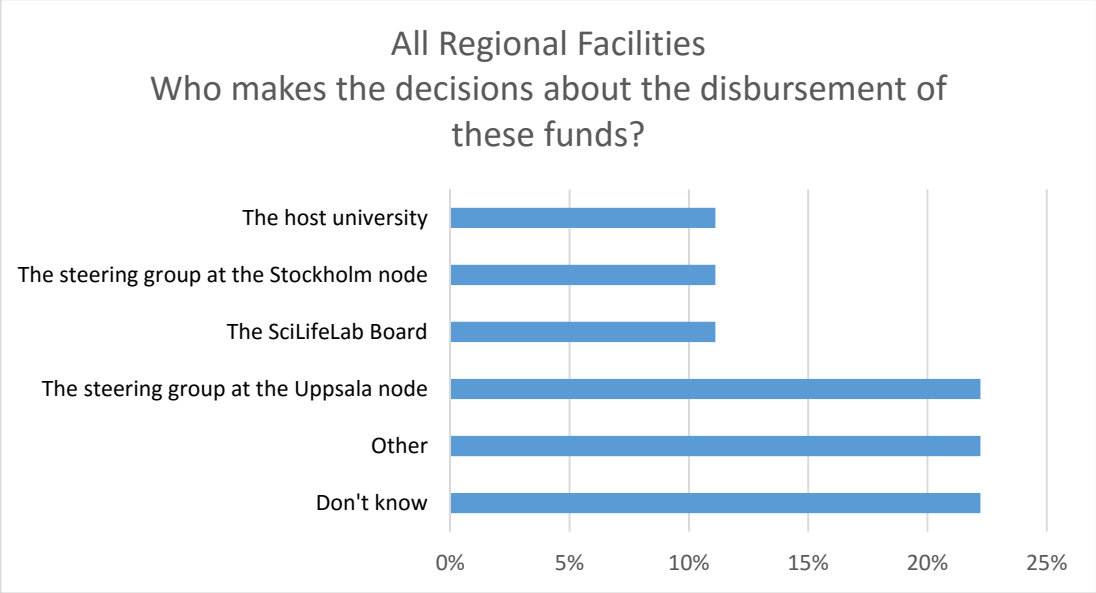

Figure 6. Distribution of answers regarding decision of disbursement of additional funds at regional facilities. (5 out of 9 regional facilities responded to this question.)

Cooperation

To address whether the facilities have the personnel resources needed to technically develop the facility, the question "Does the facility have access to resources in terms of personnel for the technical development of the facility?" was asked. The national facilities answered affirmatively by 84%, ("Yes, to some extent" by 48%, and "Yes" by 36%), while 12% answered "No" and 3% answered "Don't know". On the regional level, 77% gave an affirmative answer ("Yes, to some extent" by 44%, and "Yes" by 33%), while 22% answered "No".

The question concerning cooperation with other facilities was to the largest extent (78%) answered with "Yes, with SciLifeLab facilities both at your and other platforms", showing that the majority of the facilities collaborate with other facilities at SciLifeLab. 16% answered "Yes, with SciLifeLab facilities at your platform", 6% answered with "Yes, with SciLifeLab facilities at other platforms". Only 3% answered that they don´t collaborate with another facility. On the regional level, this question was to the largest extent (56%) answered with "Yes, with SciLifeLab facilities both at your and other platforms", while 22% answered with "Yes, with SciLifeLab national platforms", 6% answered with "Yes, with other regional SciLifeLab facilities", and 11% answered "No". This shows that SciLifeLabs national facilities are more active in terms of cross collaboration with other facilities at SciLifeLab in comparison to the regional facilities.

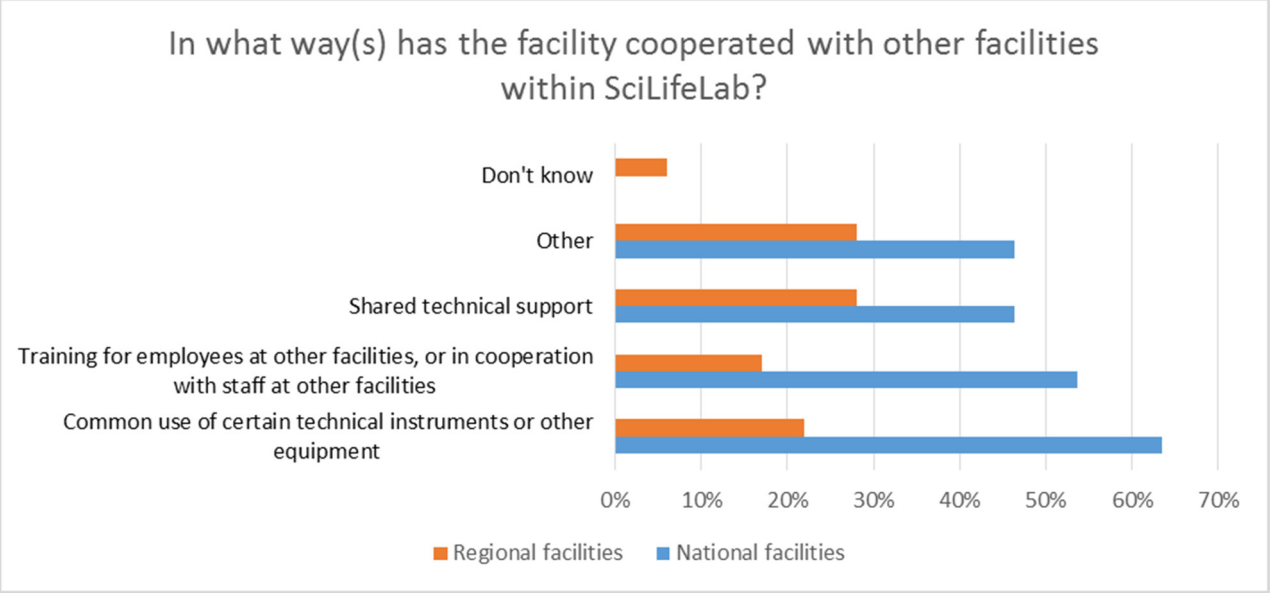

Figure 7. Cooperation between facilities at SciLifeLab. (32 out of 42 facilities responded to this question.)

To better understand the nature of the collaboration, the facilities were asked about how they collaborate. On the national facility level, the cooperation was to a large extent reported as "Common use of certain technical instruments or other equipment" (63%) followed by "Training for employees at other facilities or in cooperation with staff at other facilities" (54%). On the regional level, the answer was mainly "Shared technical support" (28%) as well as "Other" (28%) followed by "Common use of certain technical instruments or other equipment" (22%).

Accessing services at SciLifeLab

Regarding accessibility to the facilities, the question of who selects which applications are given priority was asked. The most common answer among the national facilities was "The platform's steering board" (44%) followed by "The platform directors on the facility level" (33%), "The platform directors on the platform level" (11%), "Others" (10%), and "The SciLifeLab Board" (2%). On the regional level, 89% answered "Other" and 11% answered "The host university", the only two options provided to this target group.

Two questions asked about the number of applications/data/projects being processed. Some facilities answered that they do not keep records of such data, while others were unsure and provided an estimated number. Therefore, the following figures are only to be seen as indicative. There seems to be that the number of projects being processed at the different facilities differs, being that the some of the largest facilities have handled between 600 and 700 projects since the start of the center. The vast majority of the facilities have processed less than 100 projects since the start of the SciLifeLab as a national lab.

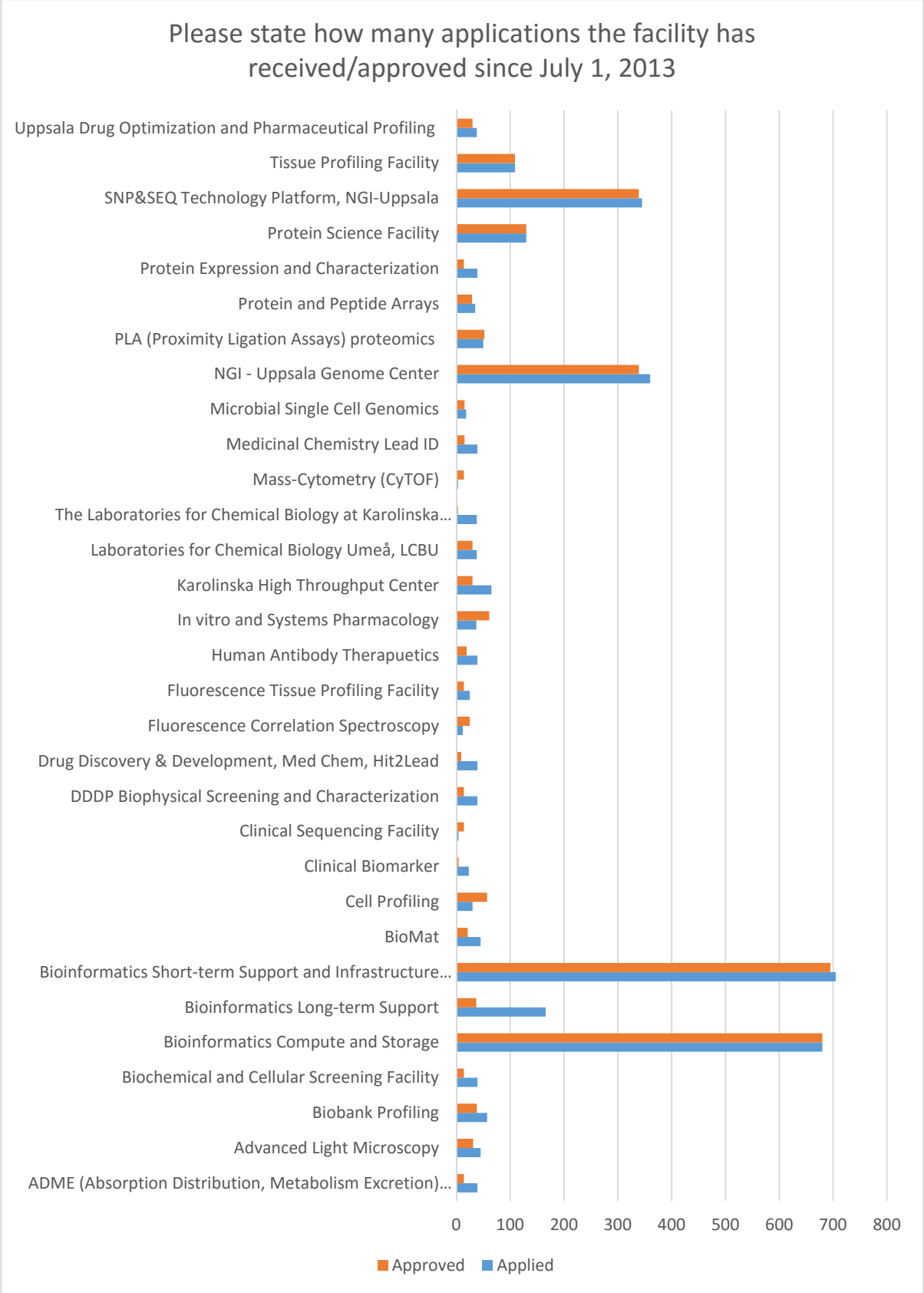

Figure 8. Number of applications received/approved at the facilities. (31 out of 33 facilities responded to this question.)

We asked the facility managers to state the proportion of the approved applications originating from SciLifeLab´s host universities, other universities in Sweden, universities abroad, other public research organisations, private companies and other relevant users. The results showed the most frequent users of SciLifeLab´s facilities where researchers at the host universities and that only a small proportion where from other universities or private companies.

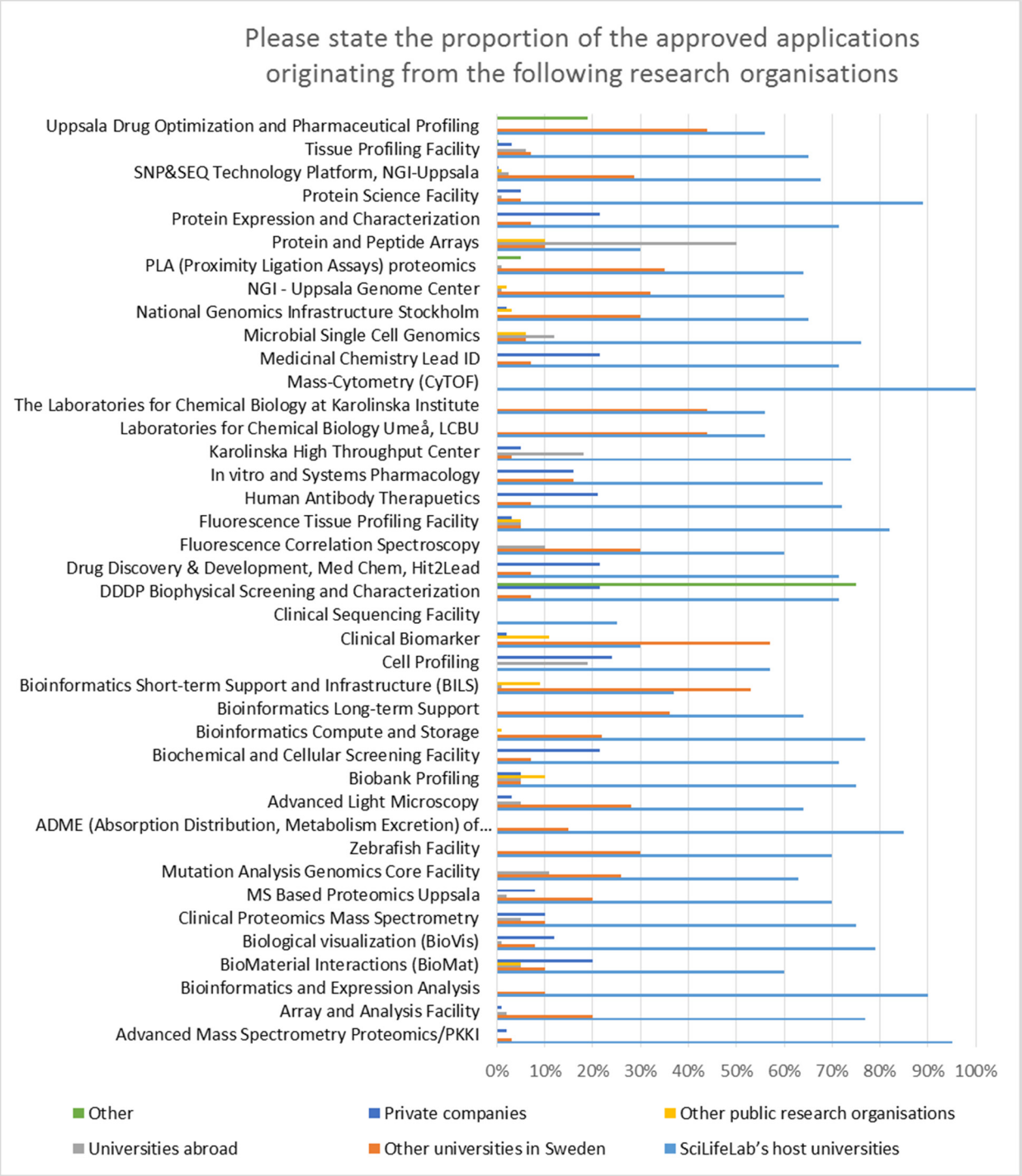

Figure 9. Proportion of approved applications between research organizations. (40 out of 42 national and regional facilities responded to this question.)

One question regards the average time period from the reception of the application to the point when the researcher is informed of whether the application has been granted or not. Not all facilities keep records of this information, something that would be expected from a national facilitiy. The answers received in large proportion state that the average time period from the reception of the application to the point when the researcher is informed is 1 to 2 weeks.

National facilities	**answers**
1 week	11
2 weeks	2
1 to 2 weeks	2
2 to 3 weeks	3
3 to 4 weeks	1
4 to 6 weeks	7
Regional facilities	**answers**
0 weeks	1
1 week	3
2 weeks	3
1 to 2 weeks	1
NA	1

Table 5. Time to answer from SciLifeLab to researcher if an application is granted or not. (29 out of 33 national facilities and 9 out of 9 regional facilities responded to this question.)

Another question addressed the average time period from the submission of the samples/data to the delivery of the results. The situation was similar with this question that not all facilities keep records of this information – which would be expected of them. The answers received state 3 to 7 weeks, or variable depending on the project. One facility answered 3-110. On regional level the answers also very between 3-8 weeks or not applicable.

User survey – Researchers

Researchers perceived knowledge and need of SciLifeLab´s resources and services

The task for SciLifeLab is to evolve into a national resource for molecular biology research, especially regarding high throughput techniques. In order to measure to what extend this is in fact was happening, a study was conducted whith the objective of gaining responses from as many researchers as possible that perform research that have or can benefit from SciLifeLabs resources and support.

The project group collected names[2] from the universities by contacting relevant faculties and by collating names from the universities websites. The scope was broad in order to find as many researchers as possible that

[2] The heads of the HEIs were asked to provide names of researchers who are users of SciLifeLab services as well as those who conduct research in molecular biology but who are not users of SciLifeLab services. In order to obtain a comprehensive picture, the heads of the HEIs were asked to submit as many names of principal investigators as possible. The number of names provided varied, and thus the Swedish Research Council complemented the lists with the above-mentioned selection criteria in mind.

The number of possible respondents varied significantly among the HEIs. The largest absolute number of selected researchers were from Karolinska Institute, and the lowest number were from Karlstad University and Mid-Sweden University. Where only a few researchers were selected, the reply frequency can therefore seem to be a much higher percentage than where a large group has been selected, whereas in absolute numbers this is not the case.

have or could benefit from the establishment of SciLifeLab as a national resource for molecular biology research. We gathered as many as 3134 researchers that where sent a web questionnaire, with 38 questions. The researchers would be targeted within four possible groups;

- Group 1 targeted researchers not working within the life sciences and who we mistakenly had put in our database.
- Group 2 targeted researchers working within the life sciences, but who did not apply to any of the SciLifeLab facilities or platforms.
- Group 3 targeted researchers who applied and had their application approved.
- Group 4 targeted researchers who applied for SciLifeLabs services but were declined for some reason.

The survey was divided into three sections focusing on introductory questions, the application procedure, and the quality of services.

A total of 1,114 replies were received, of which 1,068 were complete (for a total response rate of 34%). Most of the respondents were in group 3 (respondents who applied and were approved, 461 respondents) followed by group 2 (those who did not apply, 275 respondents), group 1 (those not working within life sciences, 240 respondents), and group 4 (those who applied but were declined, 59 respondents). The remaining 33 replies were from researchers who were unsure if they had applied and therefore did not have to answer all of the questions. The responses are therefore not representative of Swedish researchers in general within this field. We are aware of that these answers only represent the view of the respondents without any analysis of whether or not they are biased in some unforeseen way.

	Replied	**Not replied**	**Total**	**Response rate**
Chalmers University of Technology	29	29	58	50%
University of Gothenburg	88	196	284	31%
University of Skövde	2	5	7	29%
Kristianstad University	2	2	4	50%
Karlstad University	1	1	2	50%
Karolinska Institutet	346	499	845	41%
KTH Royal Institute of Technology	10	98	108	9%
Linköping University	18	159	177	10%
Linnaeus University	5	4	9	56%
Luleå University of Technology	5	0	5	100%
Lund University	82	175	257	32%
Malmö University	1	2	3	33%
Mid Sweden University	1	1	2	50%
Abroad	46	264	310	15%
Stockholm University	63	140	203	31%
SLU – Swedish University of Agricultural Sciences	80	30	110	73%
Södertörn University	2	3	5	40%
Umeå University	70	59	129	54%
Uppsala University	252	305	557	45%
Örebro University	11	48	59	19%

Table 6. Survey answers from HEIs.

The host HEI response rates varied. Based on the number of researchers addressed, Karolinska Institute had a response rate of 41%, Stockholm University 31%, Uppsala University 45%, and the KTH 9%.

On the facility level, a large proportion of the replies indicated having used Bioinformatics Compute and Storage (UPPNEX/SNIC@UPPMAX) as well as NGI Uppsala (SNP&SEQ Technology Platform) and NGI Uppsala (Uppsala Genome Center), as seen in the table 7. They could give multiple answers to this question. The most-used facility of the regional facilities of national interest was Bioinformatics and Expression Analysis (BEA). The greatest proportion of the researchers replied having used the NGI and Bioinformatics platforms. The following platforms had the most users: NGI, CBCS, and Bioinformatics, shown in table 8.

National Platform/Facility	Proportion of users
Affinity Proteomics	
Fluorescence Tissue Profiling	0.3%
Cell Profiling	0.4%
Mass Cytometry	0.4%
Biobank Profiling	0.6%
Tissue Profiling	0.7%
Protein and Peptide Arrays	1.3%
PLA Proteomics	1.8%
Bioimaging	
Fluorescence Correlation Spectroscopy	0.6%
Advanced Light Microscopy	2.2%
Bioinformatics	
Bioinformatics Long-term Support (WABI)	3.7%
Bioinformatics Short-term Support and Infrastructure (BILS)	7.0%
Bioinformatics Compute and Storage (UPPNEX)	16.1%
Chemical Biology Consortium Sweden	
Laboratories for Chemical Biology Umeå (LCBU)	1.7%
The Laboratories for Chemical Biology at Karolinska Institutet (LCBKI)	3.1%
Uppsala Drug Optimization and Pharmaceutical Profiling (UDOPP)	7.0%
Clinical Diagnostics	
Clinical Biomarkers	0.9%
Clinical Genomics	1.3%
Clinical Sequencing	1.4%
Drug Discovery and Development	
Human Antibody Therapeutics	0.2%
In Vitro and Systems Pharmacology	0.3%
Biophysical Screening and Characterization	0.3%
Medicinal Chemistry – Hit2Lead	0.3%
Medicinal Chemistry – Lead Identification	0.7%
Protein Expression and Characterization	0.7%
Biochemical and Cellular Screening	0.9%
ADME (Absorption Distribution, Metabolism, Excretion) of Therapeutics (UDOPP)	1.1%
Functional Genomics	
Microbial Single Cell Genomics	0.2%
Single Cell Proteomics	0.3%

National Platform/Facility	Proportion of users
Karolinska High-Throughput Center (KHTC)	0.4%
Eukaryotic Single Cell Genomics	2.3%

National Platform/Facility	Proportion of users
National Genomics Infrastructure	
NGI Stockholm (Genomics Production)	4.9%
NGI Stockholm (Genomics Applications)	6.7%
NGI Uppsala (SNP&SEQ Technology Platform)	9.0%
NGI Uppsala (Uppsala Genome Center)	9.4%
Structural Biology	
Protein Science Facility	2.2%

Table 7. The usage of national facility respectively.

Regional Facilities of National Interest	Proportion of users
BioMaterial Interactions (BioMat)	0.0%
Clinical Proteomics Mass Spectrometry	0.3%
Zebrafish	1.1%
Mutation Analysis Facility (MAF)	1.5%
Advanced Mass Spectrometry Proteomics	1.5%
Array and Analysis Facility	2.1%
Biological Visualization (BioVis)	2.6%
Mass Spectrometry-based Proteomics, Uppsala	2.8%
Bioinformatics and Expression Analysis (BEA)	3.1%

Table 8. The usage of regional facility respectively.

In order to understand if SciLifeLabs facilities offered instruments and/or support not present at other universities in Sweden in general, we asked the researchers “Would you have been able to access a similar facility and service elsewhere in Sweden?”. The majority answered “No” (47%), 31% answered “Don’t know”, and 21% answered “Yes”. The responses gives support to the need of SciLifeLabs services among Swedish researchers within this field.

Application procedures for accessing SciLifeLab facility services

We wanted to know how the selection process for accessing the services at SciLifeLab facilities where processed and selected, and if this process was known to the researchers. The question in the survey was, “Do you know the grounds for this selection?” The majority answered “No” (56% for host universities and 53% for other universities), 23% host universities and 26% other universities answered “Don’t know”, and 21% host universities and 22% other universities answered “Yes”. Since only a fifth of the researchers answered that they are aware of the selection process for accessing services at SciLifeLab, there seems to be a great need for making this process more transparent and accepted by researchers in Sweden in this field.

Quality of the selection process and of services at SciLifeLab

We asked the researchers if they had confidence in the quality assurance process at SciLifeLab regarding how they give priority to the best research for accessing SciLifeLab facilities, The question was: “In some cases a selection is made regarding which projects gain access to the facility. Do you have confidence that the best applications are given priority?” The majority answered “Don’t know” (40%), 27% answered “Yes, to a fairly high degree”, 12% answered “Yes, to a high degree”, and 22% answered “No”. The majority of the researchers answered that they didn´t know or didn´t think that the best projects where given priority, which means that the trust and transparancy for selection of projects at SciLifeLab needs to be addressed and strengthened.

We also asked how the researchers that had used the facilities rated the quality of the services given, and a total of 82% of the users answered that the overall quality of the services received was of a high level (“Highest national level”, “Highest international level”, and “High level”), while 5% answered that the service was of “Low level”.

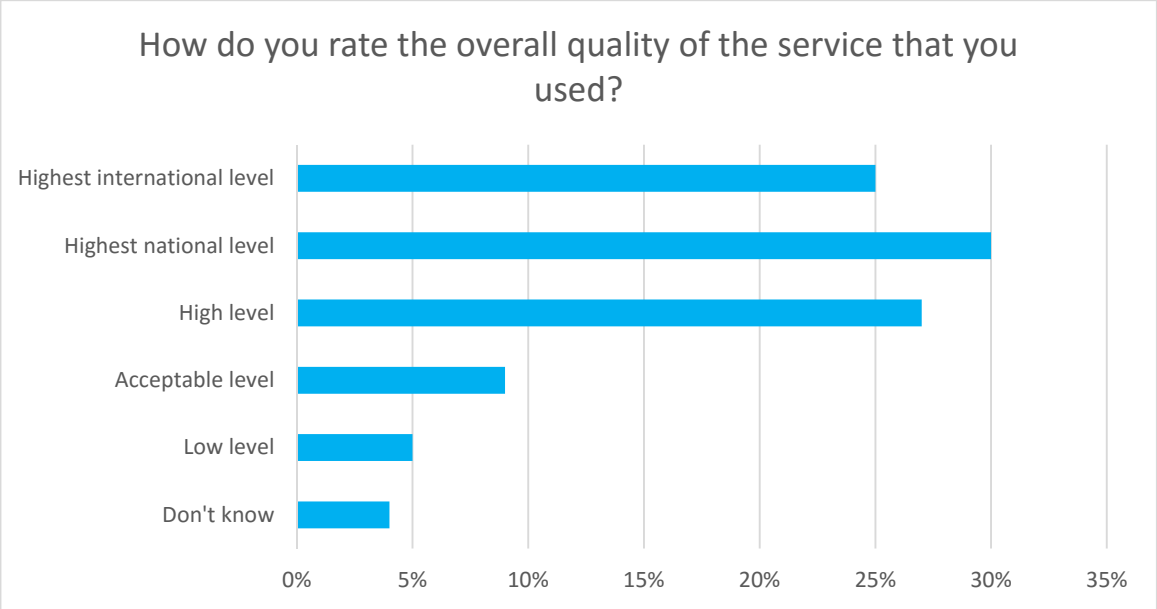

Figure 10. The rating of the quality of service at the facilities. (N= 448)

Furthermore, regarding the performance of the equipment used, the majority (76%) said that it was of a high level (“Highest national level”, “Highest international level”, and “High level”), while 14% replied “Don’t know” and 1% rated the performance of the equipment at a “Low level”.

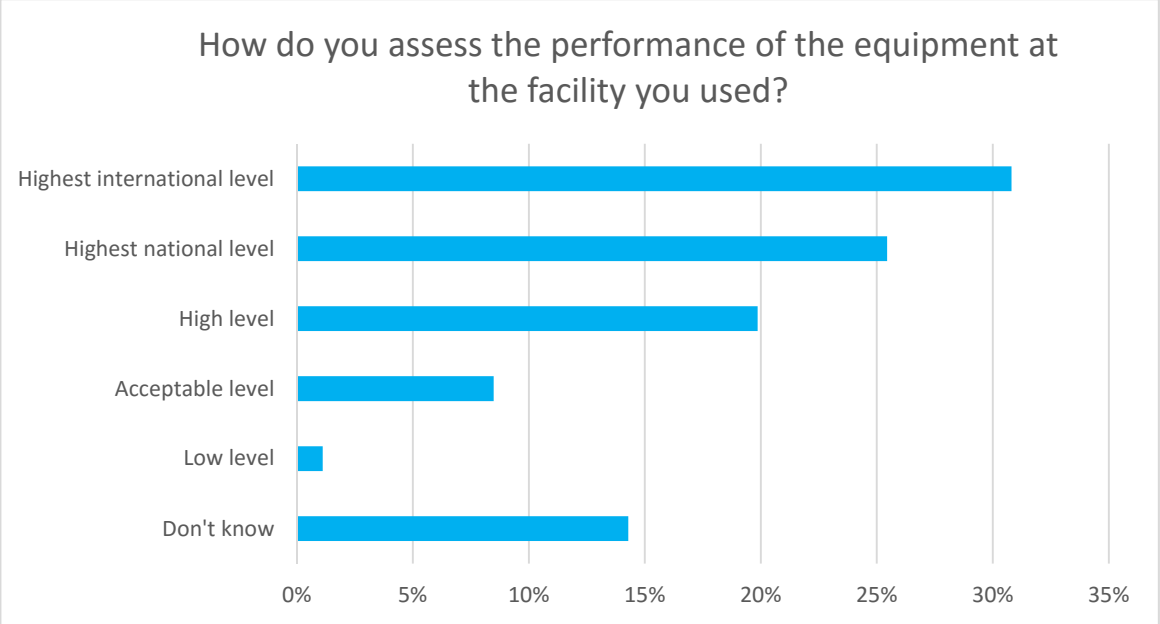

Figure 11. Respondent rating of the performance of the equipment at the facility used. (N= 448)

As for the competence of the personnel at the facility/facilities the respondent had used, the overall assessment was high (82%) (32% rated it at the "Highest national level", slightly more than 25% rated it at the "Highest international level", and slightly more than 25% rated it at a "High level"), while 8% answered "Acceptable", 6% answered "Don't know", and 3% answered "Low level".

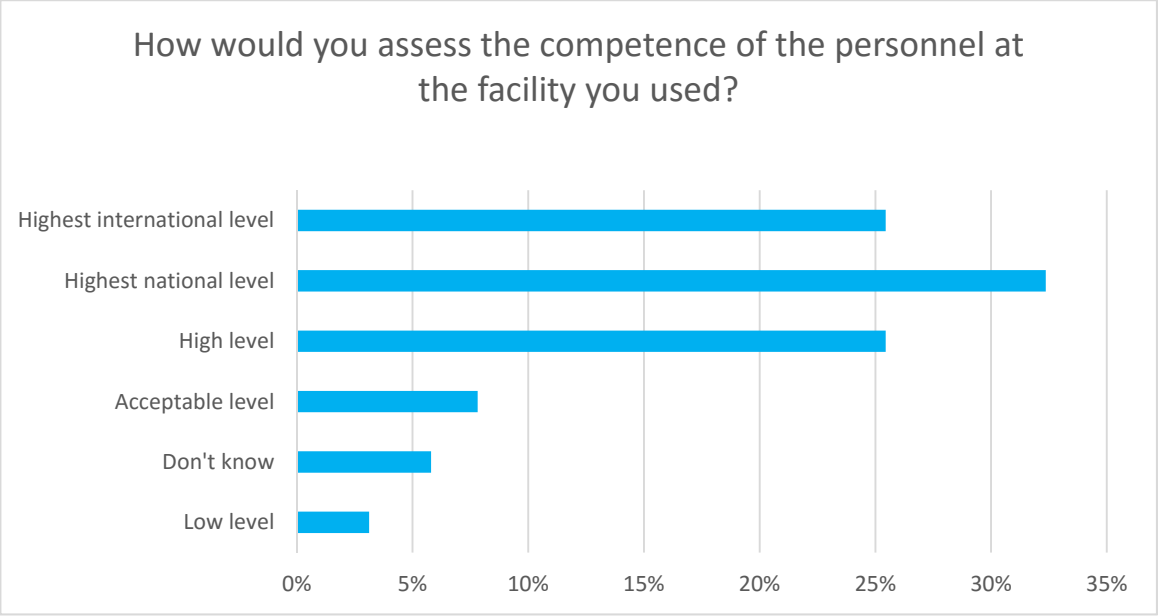

Figure 12. Respondent assessment of the personnel at the used facility. (N=448)

The assessment regarding the reliability of the results from the facilities also had an overall high/very high assessment (78%) (40% rated the reliability as "Very high" and 38% rated it as "High"). A total of 11% answered that the reliability was "Acceptable", 9% replied "Don't know", and 2% found the reliability to be "Low".

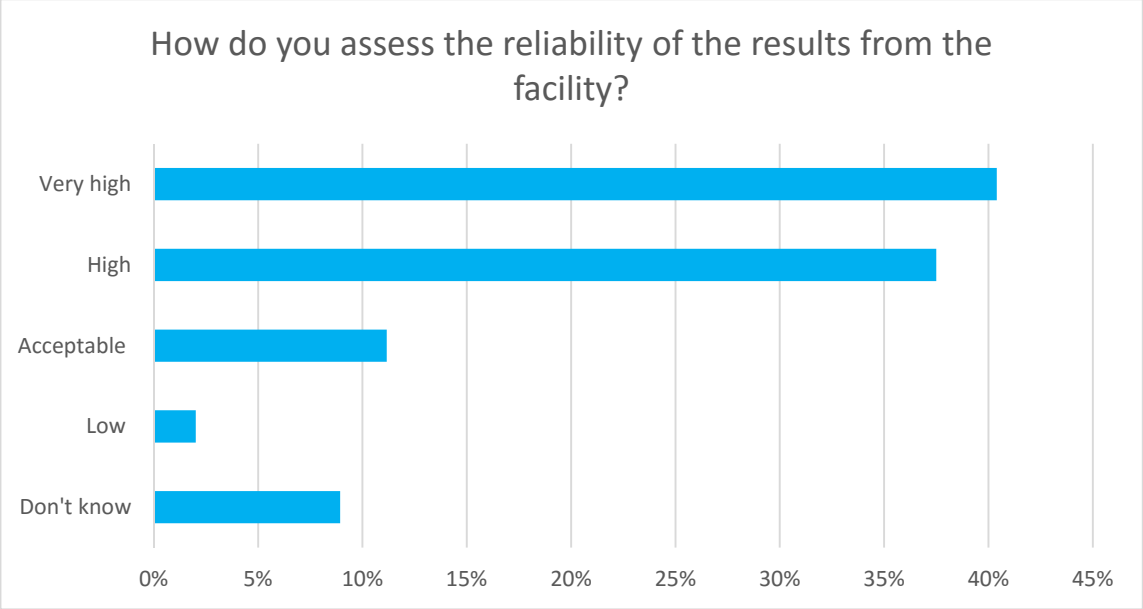

Figure 13. Respondent assessment of the reliability of the results obtained from the facility. (N=448)

The overall impression is that the services of SciLifeLab met the high expectations from the researchers when they had used them.

Waiting times for approved application until receiving results

Two questions were asked regarding the waiting time between applying and receiving a reply from the facility and the waiting time between the approval of the application until the results were received. The majority answered that the waiting time from when they applied for the service until the facility answered was "Reasonable" (34%), "Very reasonable" (29%), or "Acceptable" (20%), while 8% replied "Don't know" and 9% found the waiting time to be "Poor".

For the waiting time between the approval of the application until they received their results, the majority of the researchers stated that it was "Very reasonable" (20%), "Reasonable" (25%), or "Acceptable" (25%), while 14% replied "Don't know" and 16% found the waiting time to be "Poor".

What do you think about the waiting time…	**Very reasonable**	**Reasonable**	**Acceptable**	**Poor**	**Don't know**
…from when you applied for the service until the facility replied?	29%	34%	20%	8%	8%
…between the approval of the application until you received your results?	20%	25%	25%	16%	14%

Table 9. Response time after submission of an application and waiting time until receiving results after approval. (N=448)

To the question, "Did the service meet your expectations?", 63% answered with "Completely", 34% with "Partly", and 4% answered with "Not at all". The time period from submission of samples/data to the delivery of results depended on the technology used and the size of the project.

The follow-up question was, “In what respect did the service not meet your expectations?” Besides “Other reasons” (19%), the three aspects indicated most frequently were “The waiting time from request to response was too long (17%), “It was difficult to get in touch with the facility’s staff” (16%), and “Expected more help in analyzing the results” (15%).

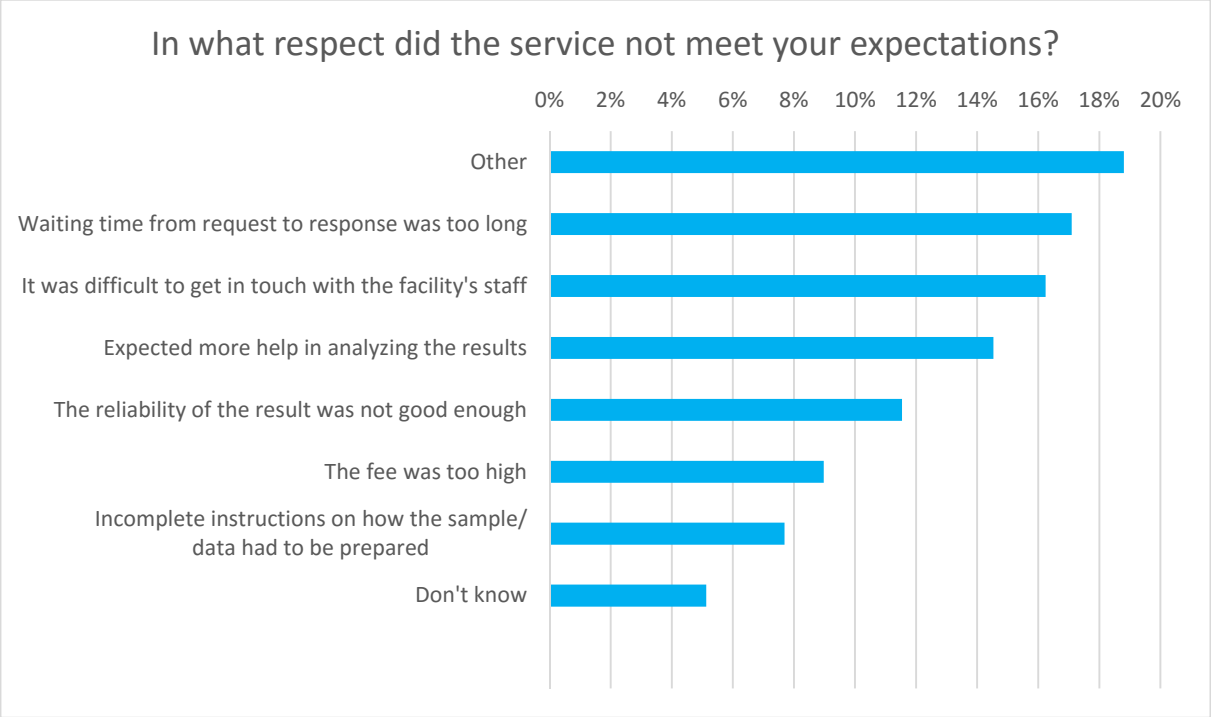

Figure 14. Respondent answers regarding if the service met their expectations. (N=448)

In order to understand the impact of the service at SciLifeLAb, a question was asked to the researchers to specify the degree to which SciLifeLab services played a role in their research illustrated in figure 15. The main three aspects mentioned that SciLifeLabs service played a role to a high degree were “Articles that could not be published without access to SciLifeLab service” (42%), “Publications in journals with higher impact factors than would have been the case without access” (32%), and “For the basic research performed in the project” (41%). The aspects where the SciLifeLab services had no role in their research (the reply was “Not at all”) were “Formation of a company” (83%), “Registration of patents” (77%), and “Drug development” (69%).

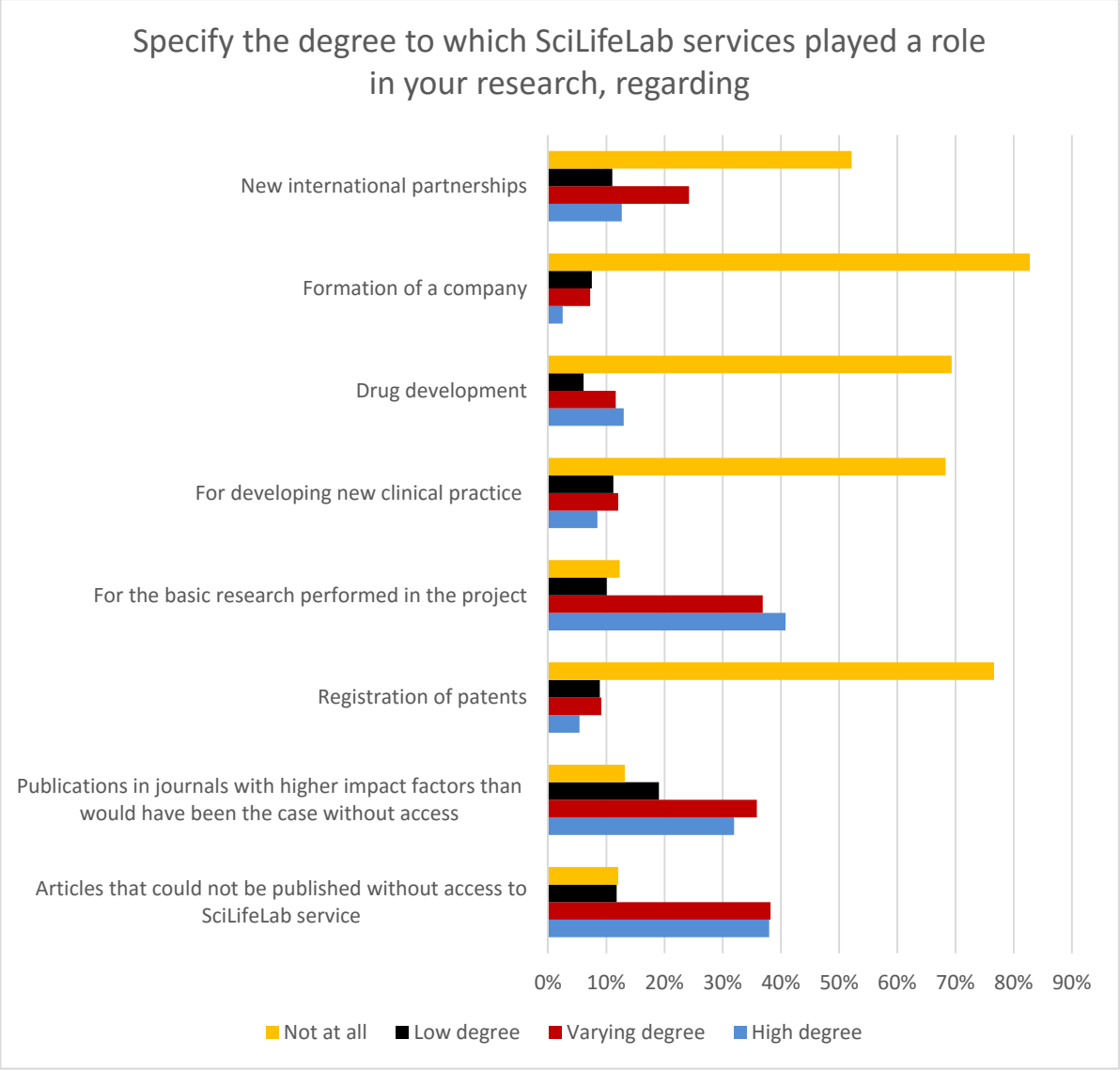

Figure 15. The role of SciLifeLabs service in the respondents' research.

To the question of whether it would have been possible to carry out the research project without access to SciLifeLab facilities, 24% answered "Yes", 47% answered "Yes, partly", 28% answered "No", and 1% answered "Don't know".

When asked if they would recommend the service to their colleagues, 86% answered "Yes", 5% answered "No", and 8% answered "Don't know".

This means that researchers really depend upon accessing SciLifeLabs resources when it comes to preforming basic research, and when it comes to finally presenting the results and getting them published, having had the opportunity to access SciLifeLabs services and support have been of vital importance for a third of the researchers that have used the services.

Two questions were only asked to group 4 (those who applied and were declined): "Did you get access to an equivalent facility elsewhere in Sweden or abroad" and "Was it possible to carry out your research project without access to SciLifeLab facilities?"

To the question "Did you get access to an equivalent facility elsewhere in Sweden or abroad?", 41% answered "Yes, abroad", 10% answered "Yes, in Sweden", and 41% replied "No".

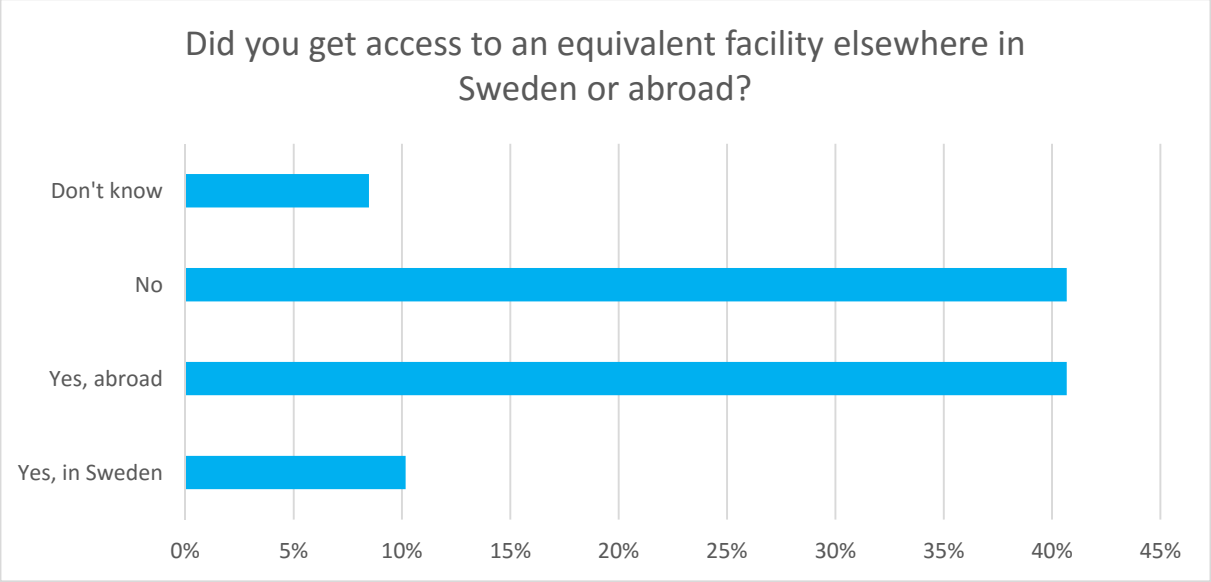

Figure 16. Access to an equivalent facility outside SciLifeLab. (N=60)

To the question of whether it was possible to carry out their research project without access to SciLifeLab facilities, 15% answered "No", 46% answered "Yes, partly", and 34% answered "Yes".

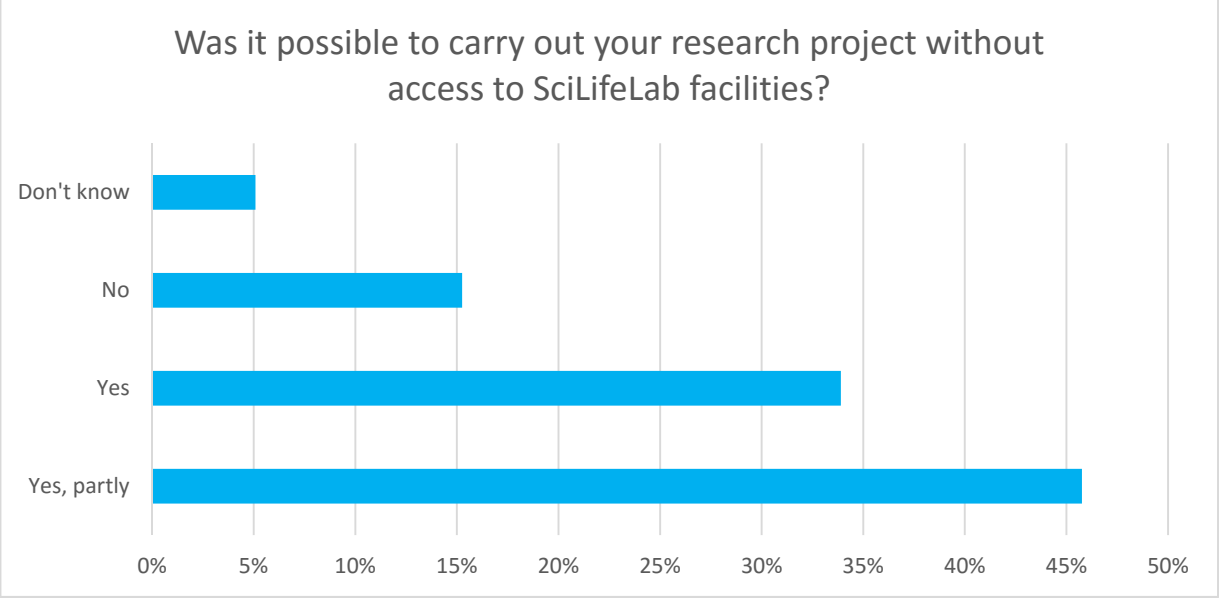

Figure 17. The possibility to carry out research project without SciLifeLab. (N=448)

Two questions regarding the focus of SciLifeLab were asked to groups 2, 3, and 4: "In what respect do you think SciLifeLab has the right focus" and "In what respect do you think SciLifeLab does not have the right focus?" Multiple answers were possible for both questions.

The answers were divided into those from the host HEIs and those from other HEIs. No significant differences were seen between host HEIs and other HEIs regarding the first question "In what respect do you think SciLifeLab has the right focus?" The most frequent responses were "SciLifeLab gives researchers access

to advanced technology platforms" (76% host HEIs, 71% other HEIs) and "SciLifeLab has qualified and professional staff" (58% host HEIs, 55% other HEIs).

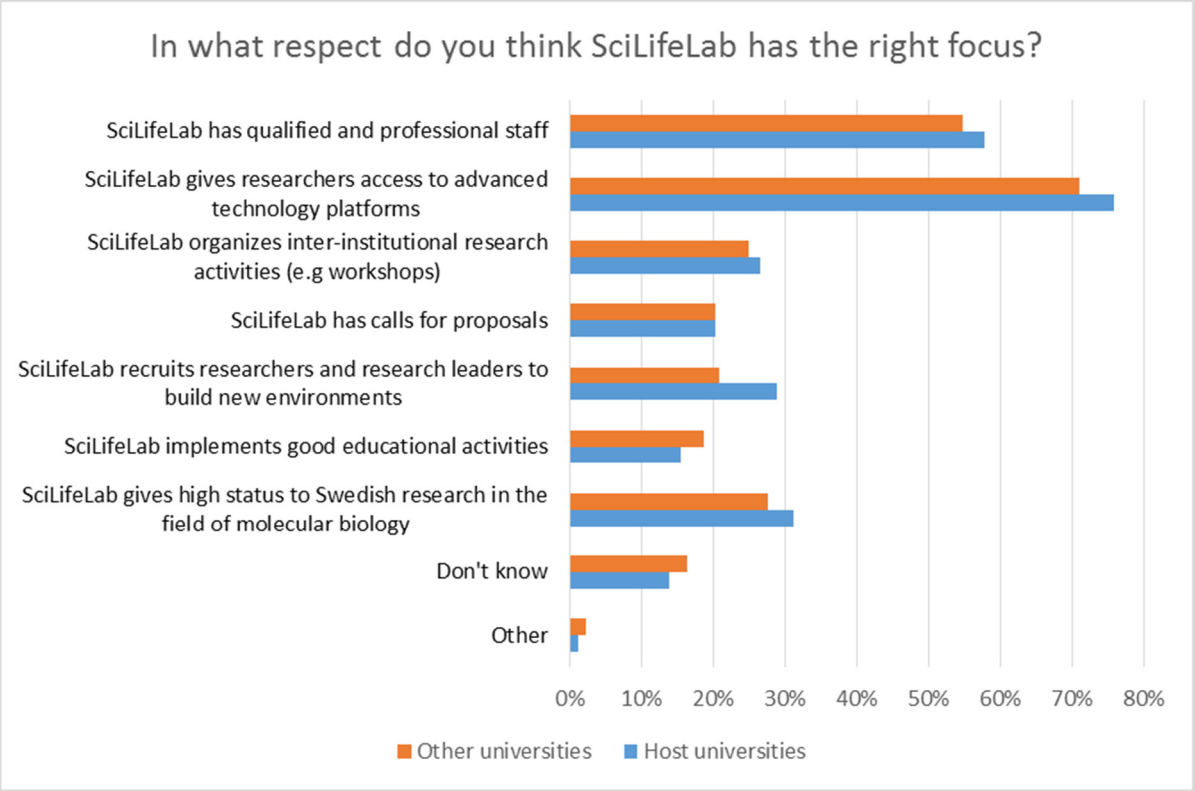

Figure 18. Respondents answers regarding the focus of SciLifeLab. (N=827)

The question "In what respect do you think SciLifeLab does not have the right focus?" did show a difference in answers for the two categories. Only 16% of the other HEIs answered that SciLifeLab has an unclear purpose compared to 30% of the host HEIs, while 32% of the other HEIs answered that SciLifeLab is overly centralized to the Stockholm-Uppsala region compared to 4% of the host HEIs.

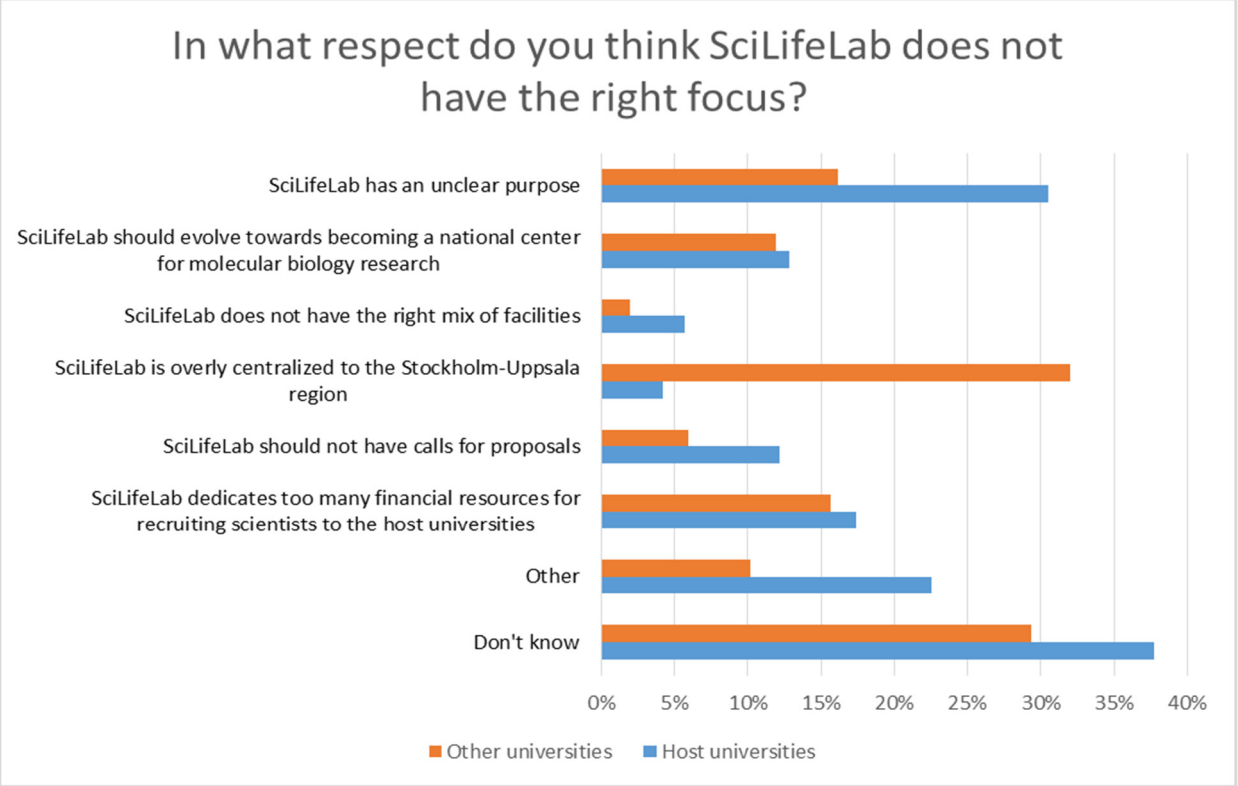

Figure 19. The respondents' answers regarding in what respect SciLifeLab does not have the right focus. (N=827)

Comments

The final question to the researchers was whether they would like to bring forward any other thoughts or aspects to the evaluation of SciLifeLab. A total of 307 persons chose to write a comment.
When looking at the responses per group, there was no clear division in whether the comments were positive or negative.

Comments on potential for improvement/flaws:

- The access to the facilities is limited.
- SciLifeLab is too concentrated in the Stockholm/Uppsala region.
- Fewer investments should be made in infrastructure, and more individual grants are needed.
- It is difficult to understand the structure of SciLifeLab.
- The waiting times are too long before the results are received.
- The application process is unclear, and feedback regarding declined applications is requested.
- It is hard to get in touch with SciLifeLab.
- It is too expensive, and it is not internationally competitive.
- It is too bureaucratic.
- There seems to be a lack of long-term strategy/vision at SciLifeLab.
- The roles of VR, the host universities, and SciLifeLab are unclear.
- It is not transparent.
- SciLifeLab shouldn't have calls for proposals.

Supportive comments:

- SciLifeLab is important to Sweden.
- SciLifeLab is a fantastic resource.
- It is a great asset to Sweden's life sciences.
- It is a great place for high-level research on an international level.
- The seminars are very good.
- Something to be proud of.

User survey – Companies

In order to measure to what extend SciLifeLab was known to potential industry partners and if they have used the services provided at SciLifeLab facilities, a questionnaire was sent to 409 life science companies, five agencies, and four museums that operate mainly in Sweden. The questionnaire consisted of 37 questions targeting four possible groups.

- Group 1 consisted of companies that are not working within the life sciences.
- Group 2 consisted of companies working within the life sciences but that did not apply to any of the facilities or platforms.
- Group 3 consisted of companies that applied and had their application approved.
- Group 4 consisted of companies that applied but were declined.

The selection of respondents was made by merging information from three sources. List number one was provided by SciLifeLab and consisted of 34 companies and agencies that had used their facilities. List number two was provided by SwedenBIO (a trade organization for the life science sector) and consisted of 133 affiliated companies within the life sciences. List number three was the result of a database search in Biotechgate and consisted of 257 companies with operations in Sweden. The search was performed by personnel at SwedenBIO. Each company in the third list was already tagged with one of the following categories: Pharma, Biotechnology R&D services, Biotechnology Therapeutics and Diagnostics, and Biotechnology Other. The latter category was excluded due to the fact that the companies within that category were considered to be beyond the scope of the questionnaire.

Only 73 complete replies were received for a response rate of 17%. One reason explaining the relatively low response rate could be that a large proportion of the companies in the lists do not carry out research and development within molecular biosciences with a focus on health and the environment, which are SciLifeLab's focus areas. Another possible reason that appeared in the comments and the answers of the companies that *did* respond is that awareness of SciLifeLab is low among Swedish companies. Another reason could possibly be that the questionnaire was not addressed to the right unit at some companies. The questionnaire was open for 18 days, and two reminders were sent out during that period.

Of the 73 complete replies, most came from group 1, respondents not working within the life sciences (31 respondents), followed by group 2 (those that did not apply, 30 respondents), group 3 (those that applied and were approved, 4 respondents), and group 4 (those that applied and were declined, 2 respondents). The remaining six companies that answered the survey were unsure if they applied, so they did not have to answer all of the questions. Due to the low number of complete replies and the fact that few of the respondents had used SciLifeLab facilities, the reliability of the results of the questionnaire is uncertain. Consequently, only a selection of relevant results will be highlighted below.

Background

A majority (74%) of the respondent companies reported that they have 1–9 employees, and the other 26% of the companies reported 10–250 employees. In total, 95% of the respondents indicated that they are a for-profit organization. The respondent companies are mainly operating in the Stockholm (29%) and Uppsala (24%) region followed by Skåne (24%) and Västra Götaland (17%).

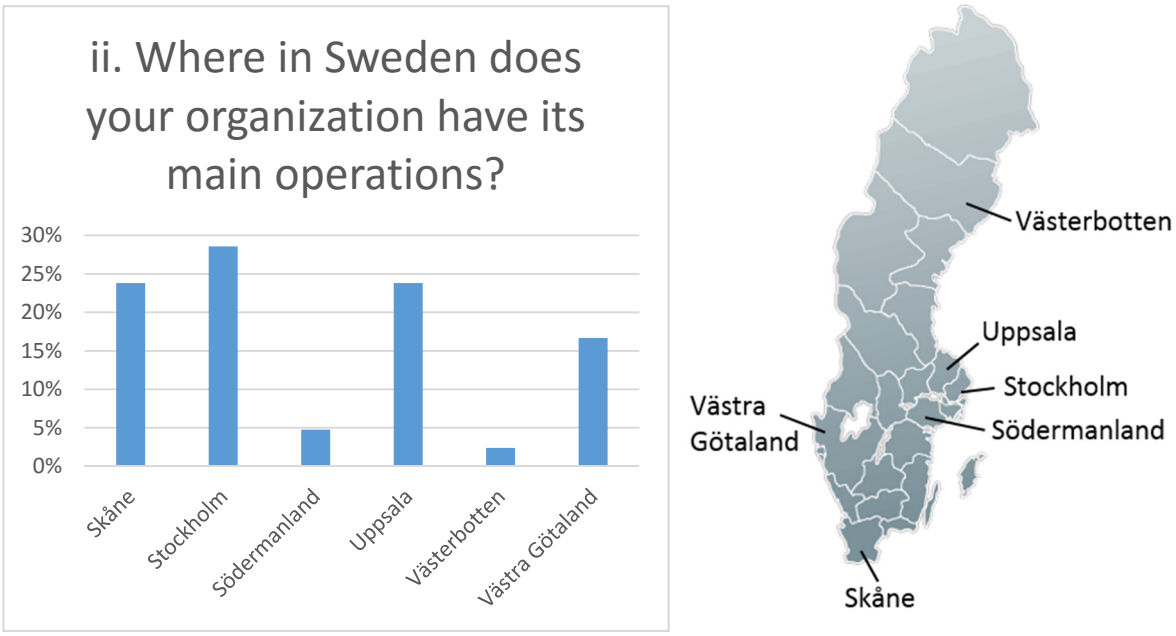

Figure 20. Distribution of respondent companies in Sweden.

A majority of the respondent companies reported that their area of focus is on Drugs (42%) or Biotech (28%).

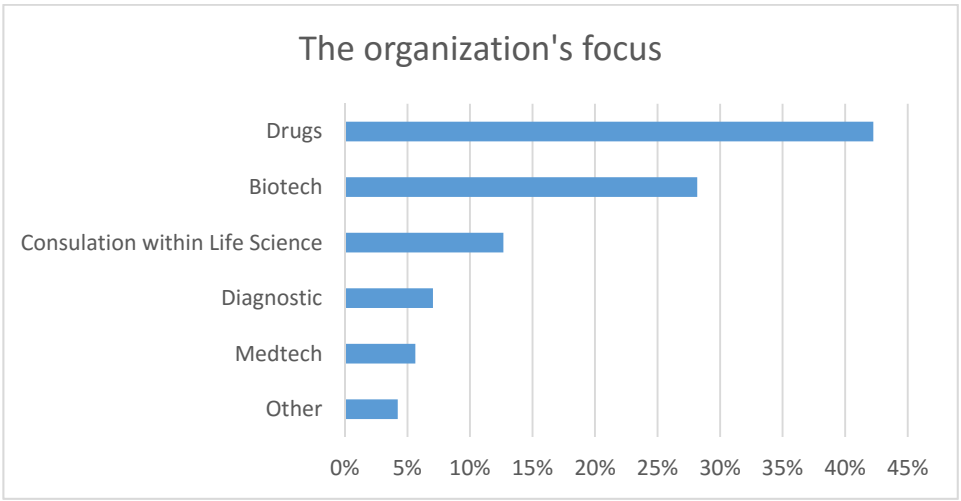

Figure 21. Focus areas for companies.

Introductory question

We asked the companies if they knew about SciLifeLab, and more than 80 % indicated that they knew of the center. The facility at SciLifeLab that was most widely known was Absorption Distribution Metabolist Excreasion (ADME). We then asked if the companies had applied to have access to ScilifeLabs services and support, and only 14 % responded that they had. ATo better understand the need of SciLifeLAbs resources from Swedish companies, we asked "Which facility would be of interest for your company?" Almost half of the respondents answered that they would be interested in using the Clinical Biomarkers facility.

In order to understand the reason for not using the services and support of SciLifeLab we asked why the company did not use any of SciLifeLab's facilities. A total of 14% of the respondents said that they believed that it is too expensive, 14% said that they believe that their application would not have been granted, and 32% indicated "Other". The second most frequent answer was "Don't know" (19%).

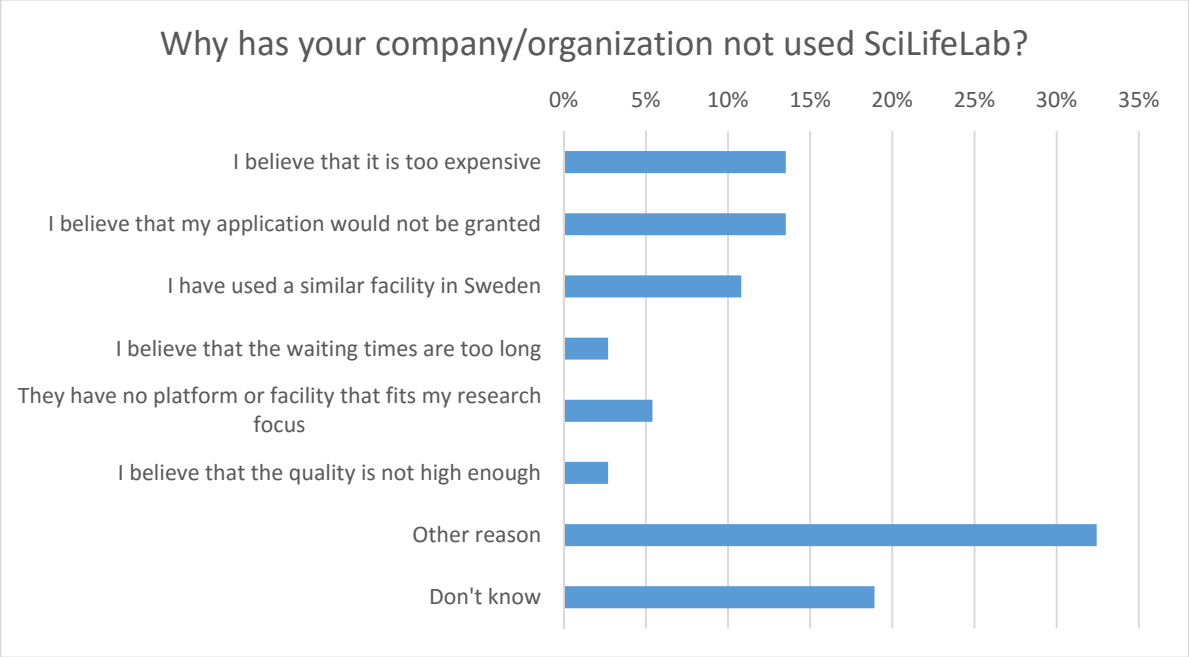

Figure 22. Why the respondent companies have not used the services of SciLifeLab.

Quality of the selection process and of services at SciLifeLab

We asked the respondents if they had confidence in the selection process in that the best project where given priority in accessing SciLifeLab services. Twenty-five per cent of the respondents said they had no confidence that the best applications are given priority and 20% said that they had confidence that the best applications are given priority, but the majority (55%) replied "Don't know". There seems to be low trust in the operations of SciLifeLab that the best project will be given priority.

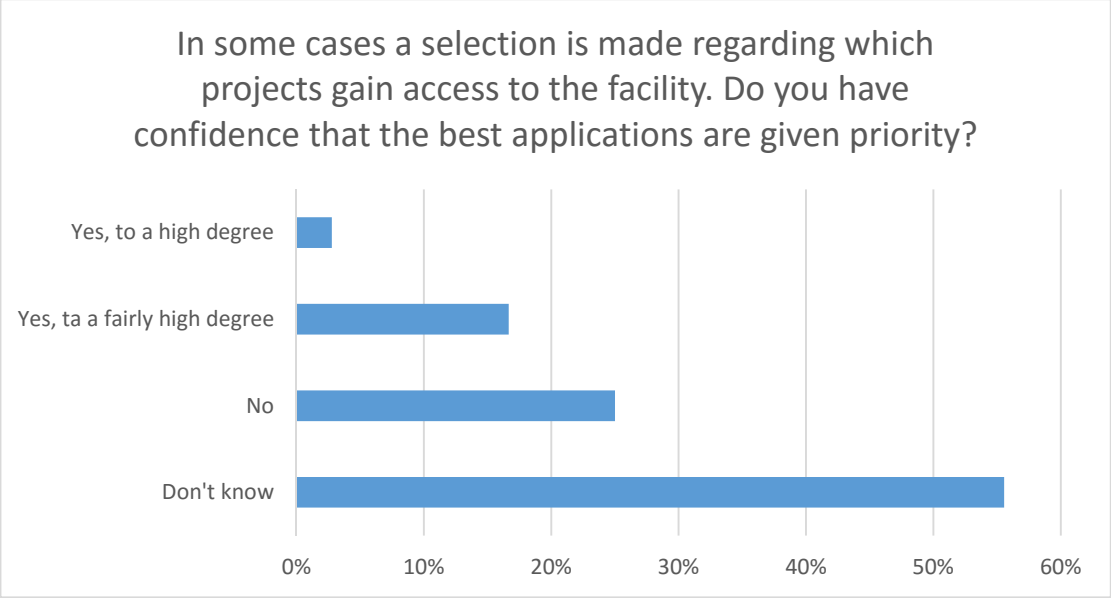

Figure 23. Degree of confidence in the process of how selection procedures for projects are performed at SciLifeLab.

We wanted to know if the companies thought that SciLifeLab has the right focus regarding the need from researchers and companies in this field.The question was: “In what respect do you think SciLifeLab has the right focus”, 22% answered that “SciLifeLab gives researchers access to advanced technology platforms” and 18% answered that “SciLifeLab has qualified and professional staff”, while 22% replied “Don’t know”. Given that few companies has used the services from the SciLifeLab, they still have a good view of who they benefit.

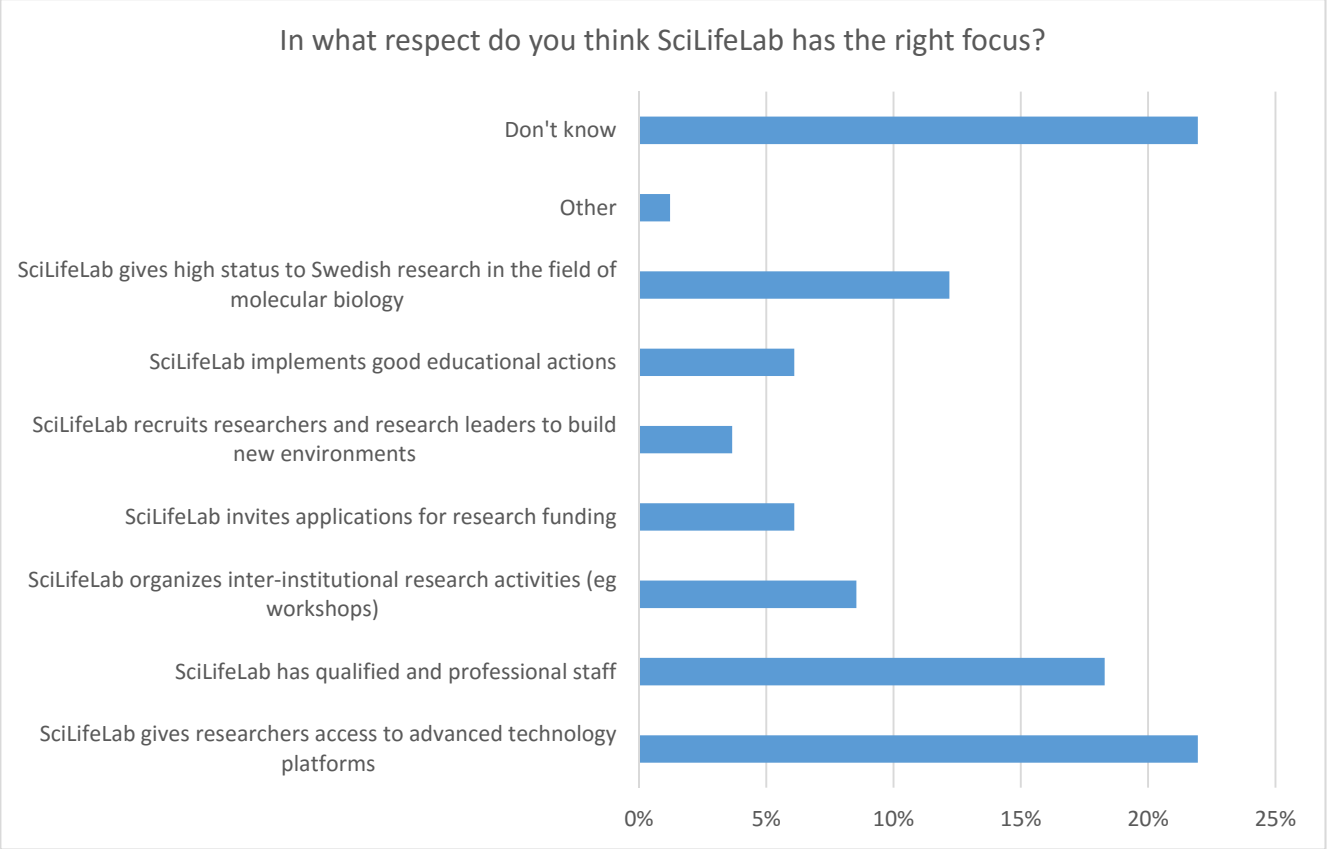

Figure 24. The respondent companies answers regarding the focus of SciLifeLab.

To the multiple choice question "In what respect do you think SciLifeLab does not have the right focus", 22% responded "Can't answer", while 19% answered that "SciLifeLab has an unclear purpose", 16% responded that "SciLifeLab does not provide sufficient support or services to companies/organizations outside the academic research community", and 16% answered that "SciLifeLab is overly centralized to the Stockholm-Uppsala region".

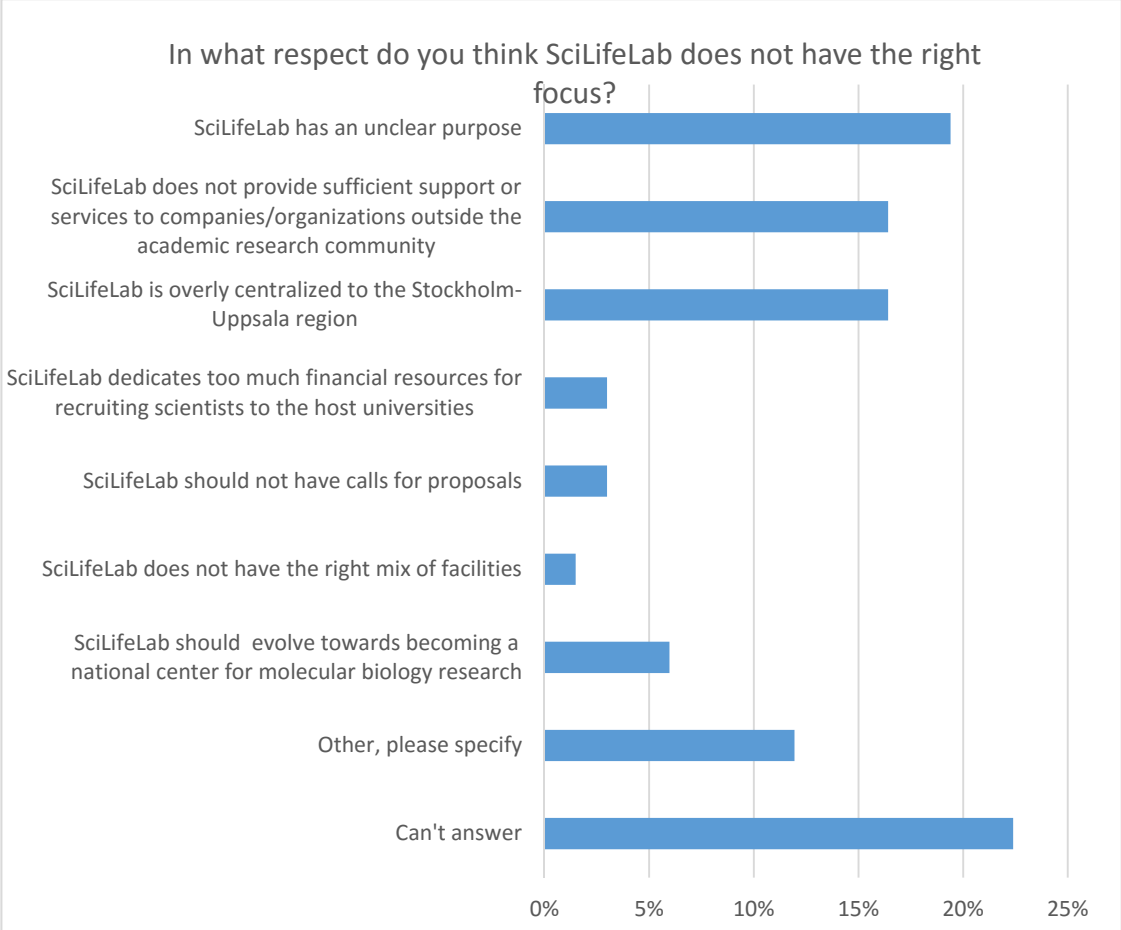

Figure 25. The companies answers regarding in what aspect SciLifeLab do not have the right focus.

Comments

The final question to the companies was whether they would like to bring forward any other thoughts or aspects to the evaluation of SciLifeLab. Of the 73 responding companies, 36 answered the question. The respondents' comments regarded the following:

- The awareness of what SciLifeLab is and what it can offer to companies and contract research organizations is very low.
- There are negative consequences of publicly funded services that are in direct competition with private suppliers.
- It is hard to get information about fees for accessing facilities.
- Funds to support collaboration between SciLifeLab and small start-up companies are needed.
- It must be made easier for small companies and industry to access the facilities at SciLifeLab.
- It is currently easier to establish collaborations abroad than with SciLifeLab.
- There is no link between pharmaceutical businesses and SciLifeLab.
- The concentration of SciLifeLab to the Stockholm/Uppsala region is too strong.
- Companies with previous good connections with researchers at the host universities have easier access to SciLifeLab.
- There is the risk of conflicts of interest if a single board is responsible for the prioritizing of projects.
- Small and Medium Enterprises with limited resources should have equal access and the same fees as the academic researchers.

BIBLIOMETRIC STUDY OF SCILIFELAB

Summary

This part of the report presents various statistics based on the publications of researchers affiliated with the Science for Life Laboratory (SciLifeLab). The data in this report came from the bibliometric database at the Swedish Research Council whose contents approximately correspond to the contents of *Web of Science*. The publications used in the study were found by searching for SciLifeLab affiliations in the address fields of the authors in the database.

The number of publications from the centre has increased steadily since its creation in 2010, and in 2013 there were 387 publications that had an affiliation to SciLifeLab. The publications were cited well above the global average, and the centre's share of highly cited publications was also above the global average. The SciLifeLab-affiliated researchers mostly collaborate with researchers from Swedish universities, and the four founding universities are the most common organizations to collaborate with.

This report begins with an explanation of the terminology and the data that are used. It then presents statistics on the number of publications and how these publications are cited. The next section studies the centre's collaborations, and the section after that focuses on the publication profile of the SciLifeLab researchers. The final section contains statistics about the publications that give credit to SciLifeLab in their acknowledgements.

Data and terminology

The data for this study came from the bibliometric database at The Swedish Research Council, which, except for the *Conference Proceedings Citation Index* and the *Book Citation Index*, has the same content as Web of Science.[3] In the database, every issue of a journal is classified by Thomson Reuters as belonging to between one and six of around 250 subject areas. Every article in the issue gets the same subject area as the issue it comes from. Publications in journals that are classified as multidisciplinary are reclassified by the Research Council based on the contents of their reference lists and based on the articles that cite them.[4] The database at the Swedish Research Council is updated in May annually. This means that for the present report, the database contained publications from 1982 to 2013 and from the first quarter of 2014.

When we talk about the number of publications, we mean fractionalized publications if not stated otherwise. Every publication is fractionalized with respect to the number of author addresses and the number of subject areas the publication belongs to. For example, if a publication has 3 author addresses and 2 subject areas, it is divided into 6 equal parts. If one of the addresses comes from Sweden and two addresses come from Singapore, Sweden is accredited with two parts of the publication and Singapore with four parts of the publication. So in total Sweden would be accredited with 1/3 of the publication and Singapore with 2/3 of the publication. When we talk about collaborations, we are talking about non-fractionalized publications (whole counts).

The citations in the report were calculated using a three-year window, meaning that if an article was published in 2009 we counted citations to this article made by articles published in 2009, 2010, and 2011. When an author name with the exact same spelling (last name and initials) was found among the authors of the cited and citing publication, the citation was considered to be a self-citation and was removed from the calculations.

The citations were field normalized, which means that the number of citations to a publication was divided by the mean citation value for all publications in the same subject area, from the same year, and of the same publication type. In this report, we only considered publications of the type *Article* and *Review*. If a publication had the same number of citations as the average publication of the same type, from the same year, and in the same subject area, it would get a mean normalized citation rate equal to 1.

The distribution of citations among publications was in general very skewed. There was a small number of publications that had a lot of citations while the majority only had a few citations or were not cited at all. This means that the citation impact of a unit is dominated by a few highly cited publications and that most of the other publications are cited below the average. If the number of publications studied are too small, the notion of mean citation becomes unstable. Because of this, it is customary in bibliometrics not to calculate citation-based indicators if the number of publications is lower than 50.[5]

For the mean normalized citation rate, we sometimes present a simulated confidence interval. This is calculated in the following way. We assume that the organization in question has *n* publications. From these publications a sample of size *n* is drawn with replacement. This is repeated 1000 times, which gives us 1000 samples. We then calculate the mean normalized citation rate for each of the 1000 samples and order the results from the smallest to the largest. From this ordered set, we then take the 2.5th and the 97.5th percentile and call them the lower and upper bounds.[6]

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[3] Certain data included herein are derived from the Science Citation Index Expanded, the Social Science Citation Index, and the Arts & Humanities Citation Index, prepared by Thomson Reuters®, Philadelphia, Pennsylvania, USA,© Copyright Thomson Reuters® 2015. All rights reserved.

[4] See *Subject classification of publications in the ISI database based on references and citations* at www.vr.se for an in-depth description of the reclassification process.

[5] See Guidelines for using bibliometrics at the Swedish Research Council and The bibliometric database at the Swedish Research Council – contents, methods and indicators at www.vr.se for more thorough descriptions and discussions of the concepts in this section.

[6] See Waltman et. al., *The Leiden Ranking 2011/2012: Data Collection, Indicators, and Interpretation*, Journal of the American Society for Information Science and Technology (2012), Vol. 63, Issue 12, p. 2429 for a more thorough description of stability intervals.

The publications that are attributed to SciLifeLab in this report came from a search against the complete author address using the search terms *scilifelab*, *sci life lab*, and *sci for life lab*.[7] Thus the data collection depended heavily on how the authors wrote their addresses. SciLifeLab divides publications that are in some way connected to their facilities into three different categories:[8]

1) Publications related to the platform – service: Authors that use the facilities but are not connected to SciLifeLab. In this case the authors shall make a reference to SciLifeLab in the acknowledgement.
2) Publications related to the platform – technical development: Work within the SciLifeLab facilities that leads to technical development or requires a scientific engagement from the platform. In this case people affiliated with SciLifeLab are listed as authors.
3) Researcher community-related publications: Scientific publications where at least one author belongs to the SciLifeLab faculty[9]. Note that publications from this category do not necessarily implicate the use of SciLifeLab facilities.

For the second and third case, the affiliation with SciLifeLab should be written in either of the following ways:

- Science for Life Laboratory, Department, Home University, Address.
- Department, Science for Life Laboratory, Home University, Address.

For the main part of this report, we focus on publications of type 2 and 3, where the authors have an actual affiliation to SciLifeLab. These addresses are not fractionalized, meaning that we do not divide them between SciLifeLab and the home university; instead, the whole address fraction goes to SciLifeLab. As an example, if a publication had the following two addresses

1) Uppsala Univ, Sci Life Lab, Dept Immunol Genet & Pathol, Uppsala, Sweden,
2) Uppsala Univ, Childrens Hosp, Oncol Unit, Uppsala, Sweden,

the first address would go to SciLifeLab and the second address to Uppsala University giving them 1/2 a publication each.

As a reference, we compared the publications from SciLifeLab with publications from the Broad Institute and the European Molecular Biology Laboratory (EMBL). These were chosen because they are examples of world leading organizations – one European and one American – that have research profiles similar to the research profile of SciLifeLab.

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[7] Thomson Reuters abbreviates some words (for example science – sci or laboratory – lab) when they scan the author addresses from the publications. Therefore, the search string “science for life laboratory” was not used.

[8] E-mail correspondence with Maria Sörby 2015-01-26.

[9] There are currently 121 members of the SciLifeLab faculty. See www.scilifelab.se/faculty/.

Publications and Citations

Since 2010 when the first publications related to SciLifeLab appear in the database, the facilities have produced 854 publications (whole counts) or 294 publications when they are fractionalized. Table 10 shows the number of publications attributed to SciLifeLab for each year. We see that the numbers of publications are rising for each year, which is natural because there is a time lag between the research and the publications resulting from it. Please note that for 2014 the database only contains publications from the first quarter.

Publication year	Whole counts	Fractionalized
2010	23	6
2011	140	45
2012	248	93
2013	387	132
2014	56	18

Table 10.Number of publications, whole counts and fractionalized, for each year. For 2014, the database only contains publications from the first quarter. (Data from Science Citation Index - Thomson Reuters)

The EMBL and Broad Institute have been around for a longer time, since 1974 and 2004, respectively. Figure 26 shows how the numbers of publications have developed since 2004.

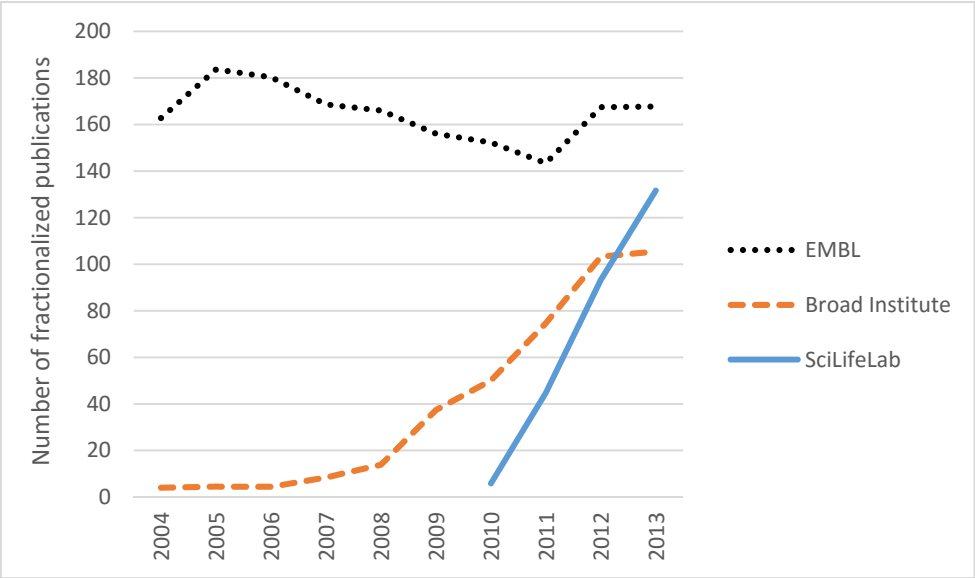

Figure 26. Number of fractionalized publications (Data from Science Citation Index - Thomson Reuters)

As mentioned above, we counted the number of citations using a three-year window, which means that publications from 2013 can be cited by other publications from 2013 and by publications from the first quarter of 2014. Hence the actual publication date will be of great importance because a publication from January will have had almost a year more to attract citations compared to a publication in December. Therefore, we have only calculated citations for publications from 2012 or earlier. Also, because of the threshold of 50 publications, we only calculated citation-based indicators for the years 2011 and 2012 for SciLifeLab. In table 11 we see the mean normalized citation rate for the SciLifeLab publications. The global average is 1, which means that the publications from 2011 are cited 130% above the global average and the publications from 2012

are cited 56% above the global average. The third column in the table contains a simulated confidence interval for the mean normalized citation rate. This shows to what extent the mean normalized citation values are dependent on a few highly (or lowly) cited publications. We see that for both years the interval is quite wide and that the mean normalized citation is closer to the lower limit than to the upper limit. This means that there are a few highly cited publications that have a large influence on the mean normalized citation rate. In the fourth column, we see the share of SciLifeLab publications that are among the 10% most cited in their respective subject area. The world average is 0.1, so in 2011 the SciLifeLab share of highly cited publications was 60% above the global average.

Publication year	Mean normalized citation	Simulated confidence interval for the mean normalized citation	Share of publications among the 10% most cited
2011	2.30	1.12-4.33	0.16
2012	1.56	1.04-2.42	0.14

Table 11. Mean normalized citation rate and the share of highly cited publications. For the mean normalized citation, the global average is 1 and for the share of highly cited the global average is 0.1. (Data from Science Citation Index - Thomson Reuters)

Both the EMBL and the Broad Institute have a higher mean normalized citation rate than SciLifeLab. Between 2007 and 2012, the EMBL had a mean normalized citation rate between 2 and 3 and a share of highly cited papers between 0.2 and 0.3, and the corresponding numbers for the Broad Institute were between 4 and 5 and 0.4 and 0.5, respectively. In figure 27 we see the distribution of the mean normalized citations of the publications from the three organizations. Twenty per cent of the SciLifeLab publications from 2010 through 2012 were cited twice as much as the global average, and 17% of the publications were not cited at all. Compared to the Broad Institute and EMBL, SciLifeLab had higher shares of lowly cited (and uncited) publications and lower shares of highly cited publications.

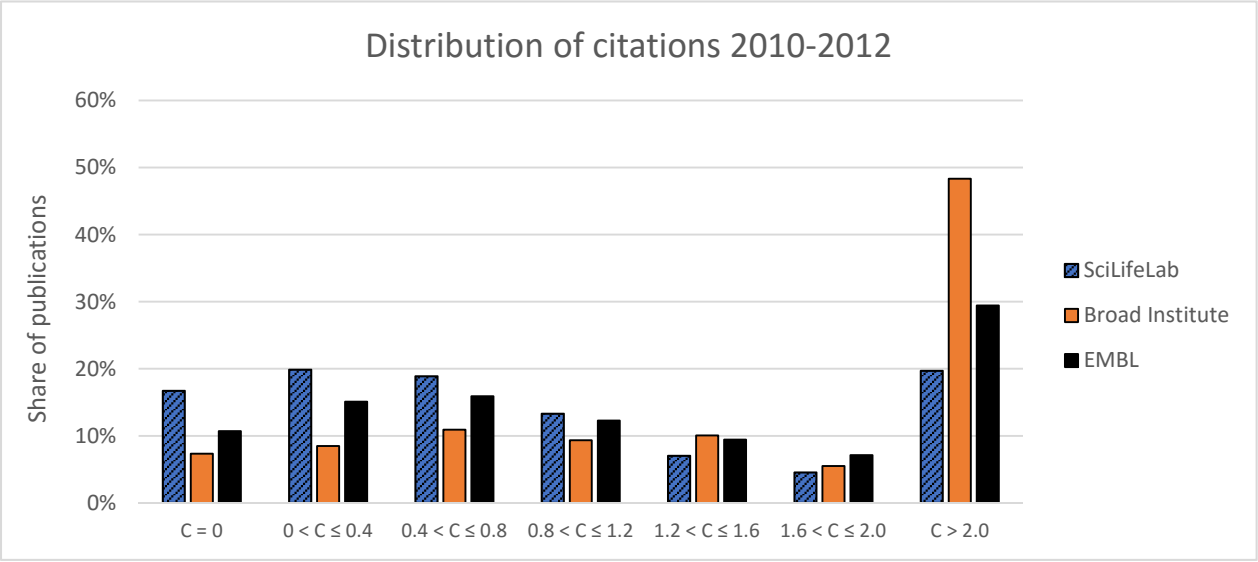

Figure 27. Distribution of citations to publications from 2010 to 2012. On the x-axis the label C > 2.0 under the last stack to the right indicate that twenty percent of the SciLifeLab publications were cited twice as much as the global average, and the leftmost stack indicates that 17% of the SciLifeLab publications were not cited at all. (Data from Science Citation Index - Thomson Reuters)

Collaboration

In this section, we look at the number of authors on the publications and which countries the three organizations tend to collaborate with. Figure 28 shows the percentage of the publications with different numbers of authors. Note that the figure only contains publications with up to 20 authors.

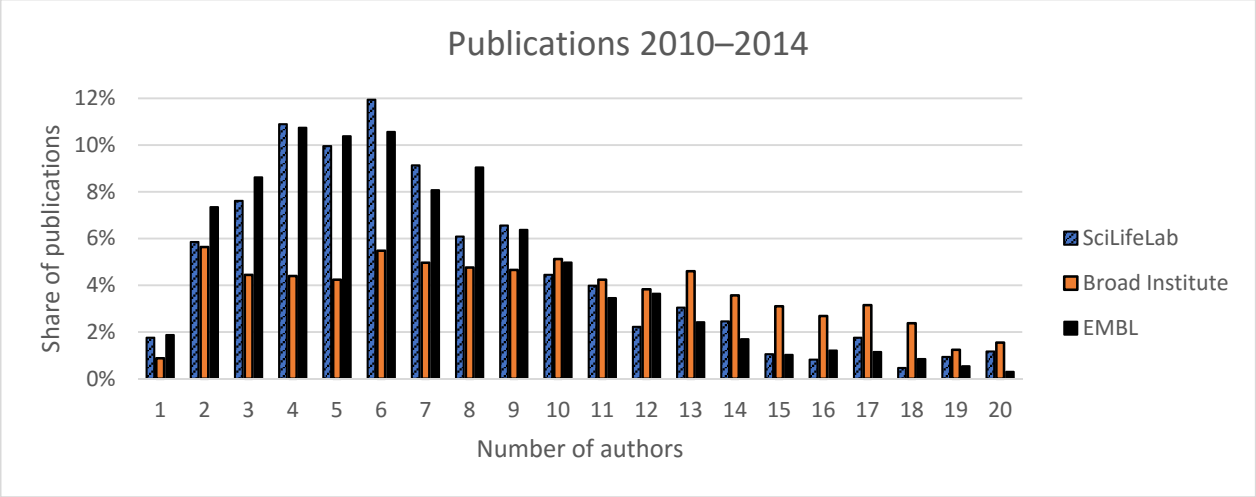

Figure 28. Percentage of publications with a certain number of authors. (Data from Science Citation Index - Thomson Reuters)

For SciLifeLab, 8% of the publications had more than 20 authors. The corresponding numbers for the Broad Institute and EMBL were 25% and 6%, respectively. While SciLifeLab and EMBL had a similar pattern, the Broad Institute tended to have more authors on its publications. For SciLifeLab and EMBL, publications with between three and nine authors constituted 62% and 64% of all publications, respectively, while for the Broad Institute this share was 33%.

In table 12 we see the eleven countries that SciLifeLab had the most collaborations with. Organizations from Sweden were by far the most common collaboration partners, followed by those from the United States. The table is based on non-SciLifeLab addresses.

Country	Sum of fractionalized publications	Number of publications – whole counts
Sweden	277	620
United States	66	186
United Kingdom	32	132
Germany	24	108
Finland	24	77
France	15	70
Netherlands	11	63
Denmark	11	48
Switzerland	9	41
Spain	7	36
China	7	31

Table 12. The eleven largest collaborating countries on SciLifeLab publications from 2010 to 2014. (Data from Science Citation Index - Thomson Reuters)

For the Broad Institute, the majority of addresses came from the United States, while researchers from EMBL were collaborating with researchers from Germany, France and Great Britain, which is natural because the EMBL has facilities in those countries.

Publication profile

As mentioned above, each issue of a journal is classified by Thomson Reuters as belonging to between one and six subject areas, and the articles in the journals inherit the subject classification of that issue of the journal. These subjects can then be aggregated into larger research areas. One such aggregation is called Spru 14, which was developed at the University of Sussex. It maps the subjects in Web of Science to 14 research areas. Table 13 shows the share of each institute's publications in the four largest research areas for the publication years 2010–2014.[10]

Research area	SciLifeLab (%)	Broad Institute (%)	EMBL (%)
Biomedicine	69	70	78
Clinical Medicine	17	20	8
Chemistry	6	5	6
Biology	4	2	4
Other 8 areas	4	3	4
Total	100	100	100

Table 13. Each institute's share of publications in the four largest research areas for the years 2010–2014. (Data from Science Citation Index - Thomson Reuters)

For all three institutes, Biomedicine was the largest research area followed by Clinical Medicine. The only significant difference in the distribution between research areas was that EMBL had a stronger focus on Biomedicine and a smaller proportion of Clinical Medicine. Figure 29 shows which subject areas within the research area of Biomedicine the publications from the institutes belong to. SciLifeLab and EMBL had their strongest focus in Biochemistry & Molecular Biology while the Broad Institute had its highest share of publications in Genetics & Heredity. The publications in figure 29 are from 2010–2014. For counting citations, we would have to narrow the selection to the years 2011–2012, which would make the number of publications too small to produce stable mean normalized citation values.

[10] The other areas are Agriculture, Art, Engineering, Geosciences, ICT, Materials Science, Mathematics, Physics, Social Sciences, and Other.

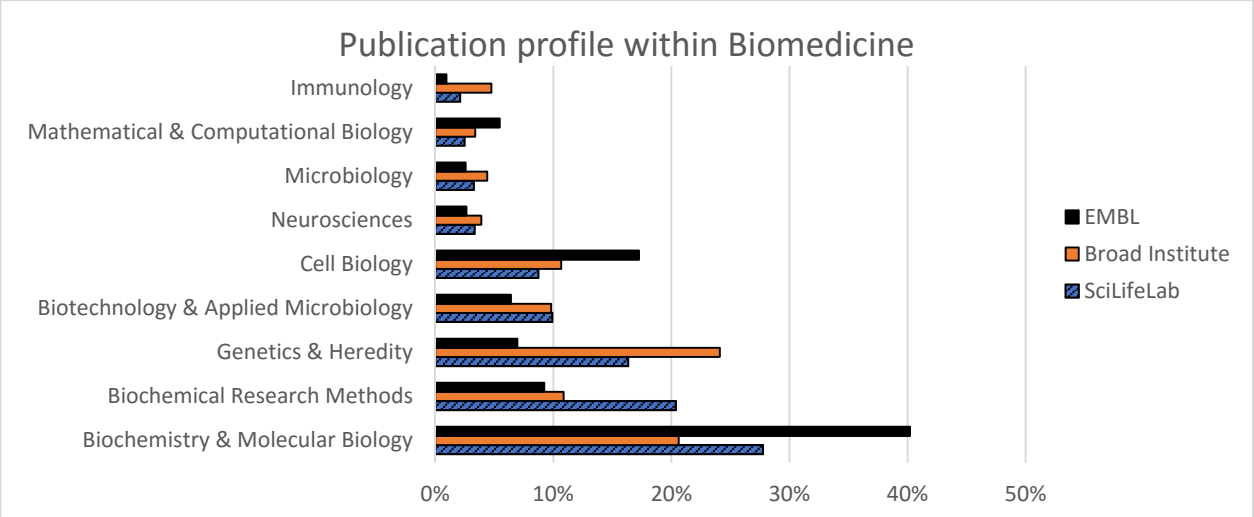

Figure 29. Each institute's share of publications in the subject areas within the research area Biomedicine from the years 2010–2014. (Data from Science Citation Index - Thomson Reuters)

Next, we looked at the journals in which the SciLifeLab researchers published. The 854 publications to date are spread out over 342 different journals. Table 14 shows the ten most popular journals. Of these, three are open access journals: *Plos One*, *Nucleic Acids Research*, and *BMC Bioinformatics*. In total, 24% of the SciLifeLab publications have been published in open access journals compared with 11% for the Broad Institute and 23% for the EMBL. Among the publications that are classified as Biomedicine in the database, 9% are open access. *Plos One* is by far the most popular journal among the SciLifeLab researchers, and it is the second most popular journal for both the Broad Institute and the EMBL researchers.

Journal	Number of publications	Share (%)
Plos One	99	12
PNAS	26	3
Journal Of Proteome Research	20	2
Molecular & Cellular Proteomics	19	2
Plos Genetics	18	2
Journal Of Biological Chemistry	18	2
Nature	15	2
Nucleic Acids Research	13	2
BMC Bioinformatics	12	1
Nature Communications	11	1

Table 14. The ten most common journals for the SciLifeLab researchers to publish in. (Data from Science Citation Index - Thomson Reuters)

Comparison with the collaborating universities

In this section we compare publications in Biomedicine from SciLifeLab to publications in Biomedicine from the collaborating universities: Karolinska Institute, KTH Royal Institute of Technology, Stockholm University, and Uppsala University. Between 25% and 30% of the SciLifeLab publications in Biomedicine also have addresses from one of the four collaborating universities. When looking at the publications in Biomedicine from these universities, we have excluded publications that have a SciLifeLab address. Figure 30 shows the number of fractionalized publications in Biomedicine for the collaborating universities and SciLifeLab.

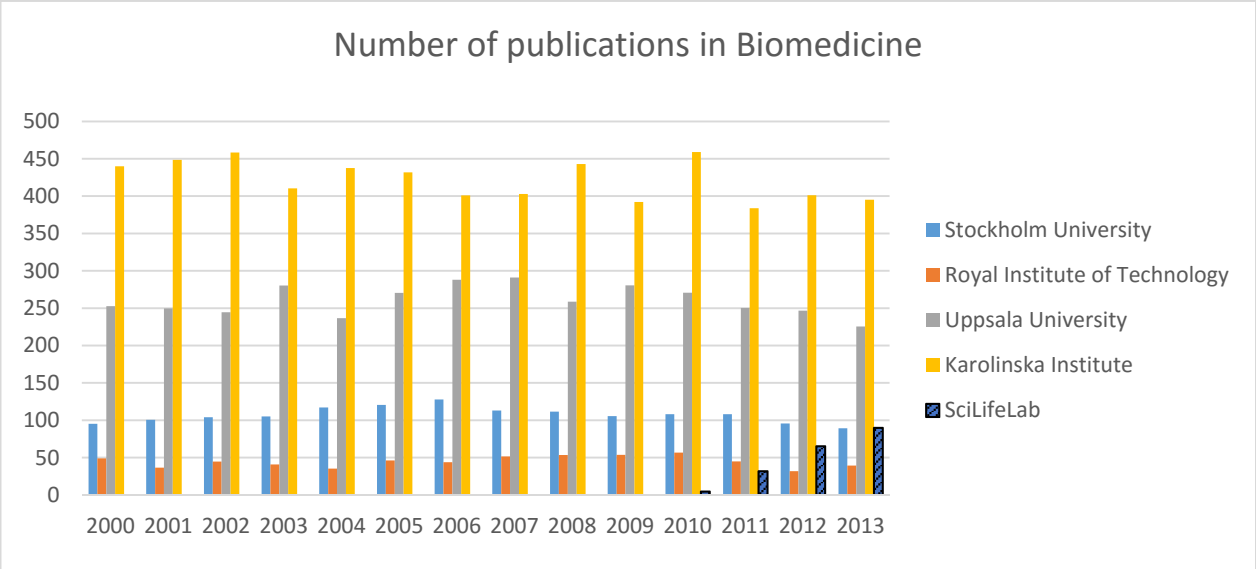

Figure 30. Number of fractionalized publications in Biomedicine. (Data from Science Citation Index - Thomson Reuters)

Karolinska Institute and Uppsala University have produced significantly more publications in Biomedicine than Stockholm University, Royal Institute of Technology, and SciLifeLab. From figure 31 we see that the publications in Biomedicine with SciLifeLab-affiliated authors have a much higher mean normalized citation rate than Biomedicine publications from the four collaborating universities.

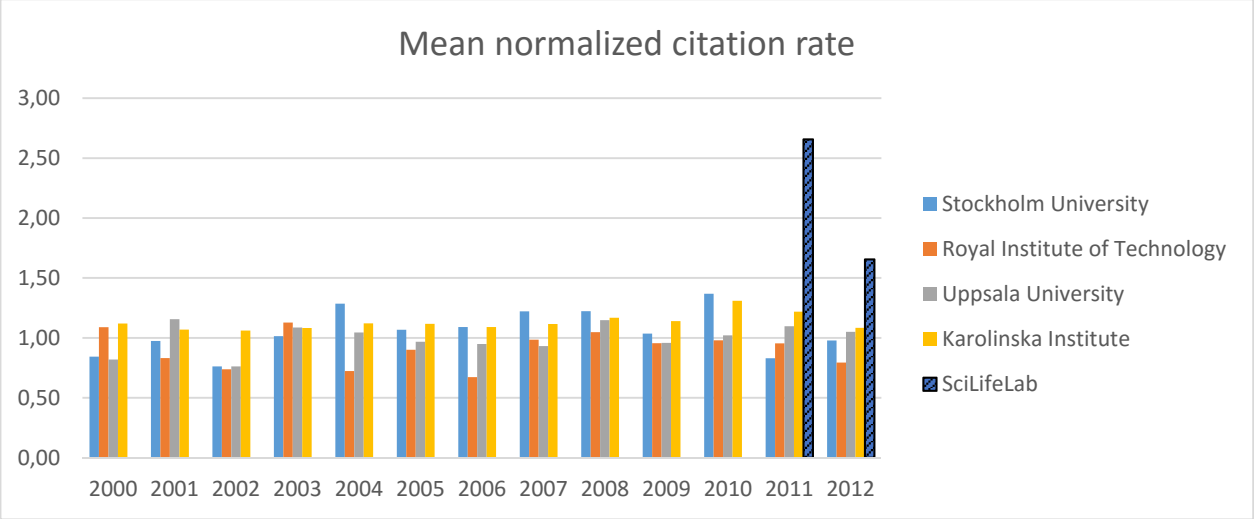

Figure 31. Mean normalized citation rate for publications in Biomedicine from the four universities and SciLifeLab. (Data from Science Citation Index - Thomson Reuters)

Finally, in figure 32 we see the share of highly cited publications. SciLifeLab has a higher share and is well above the global average (which is 0.1).

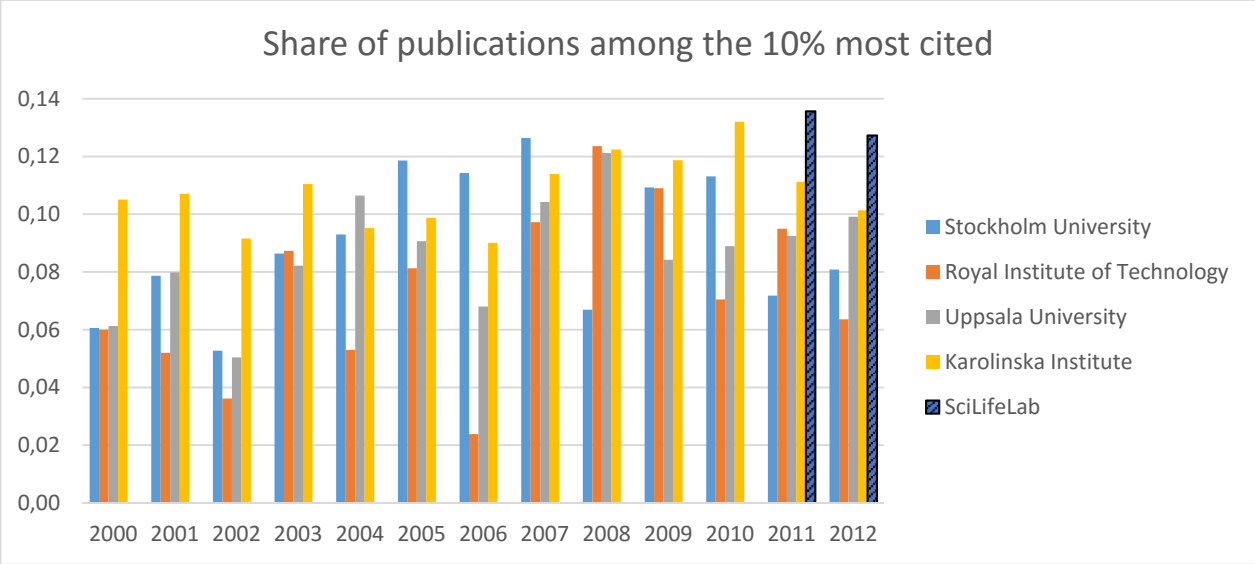

Figure 32. The share of publications in Biomedicine that are among the 10% most cited. (Data from Science Citation Index - Thomson Reuters)

We do not know if an address like

Uppsala Univ, Sci Life Lab, Dept Immunol Genet & Pathol, Uppsala, Sweden

means that funding for the author when producing this publication came from SciLifeLab only or from both SciLifeLab and Uppsala University. Therefore, Figure 33 and Figure 34 present graphs corresponding to Figure 31 and 32 but with the aggregated results for the four universities (blue curve) and the aggregated results for the four universities plus SciLifeLab (orange curve).

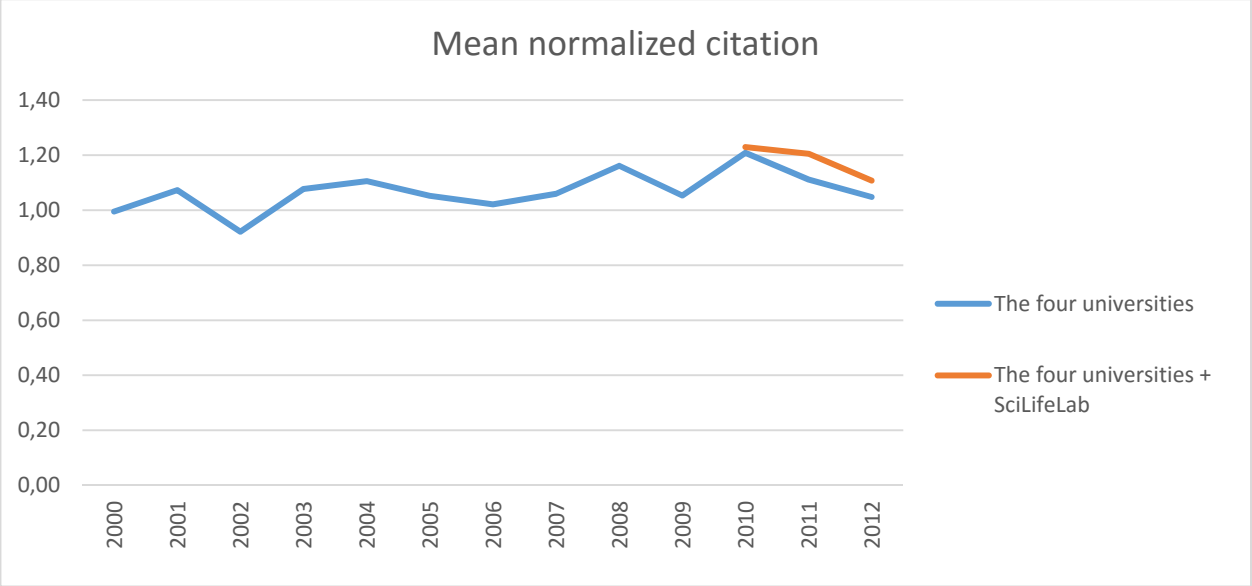

Figure 33. Mean normalized citation rate for the aggregated publications in Biomedicine from the four universities and SciLifeLab. (Data from Science Citation Index – Thomson Reuters)

We see that even though the number of SciLifeLab publications only constitutes a small share of the total number of publications, their impact is still visible in Figure 33 and Figure 34.

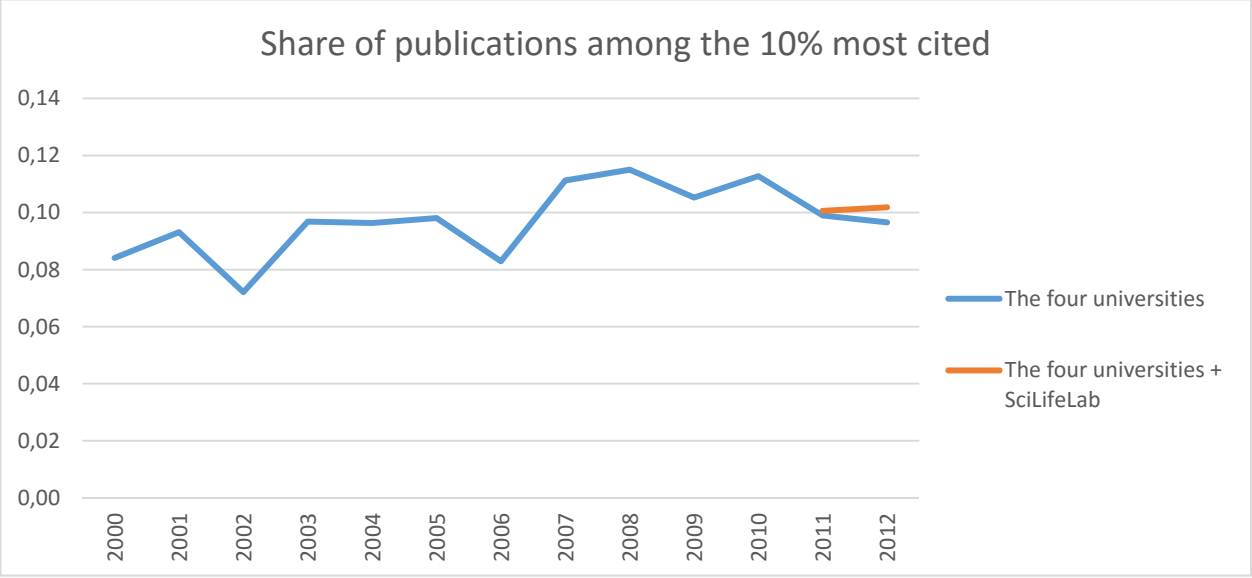

Figure 34. The share of publications in Biomedicine from the four universities and from the four universities plus SciLifeLab that are among the 10% most cited. (Data from Science Citation Index – Thomson Reuters)

Acknowledgements

We used the same search terms as above and searched against the acknowledgement field in the database, which yielded 105 publications. When we removed the publications that had one or more SciLifeLab-affiliated authors, 44 publications remained. These were all publications of type 1 as described above. For these publications, Uppsala University was the most common organization to acknowledge SciLifeLab.

Bilaga 4:
Terms of Reference

Vetenskapsrådet

Datum
2014-09-17

Diarienummer
3.2-2015-49

Handläggare
Maria Bergström

Terms of Reference for the Evaluation of Science for Life Laboratory (SciLifeLab)

Introduction

The Swedish Research Council (VR) is an agency under the auspices of the Ministry of Education and Research, and is responsible for funding and developing basic research in all academic disciplines, with an emphasis in achieving the highest scientific quality and to bring about development and renewal in research.

SciLifeLab is a center for molecular biosciences. The aim for the center is to increase the understanding of the molecular mechanisms behind developing long term illnesses, using proteomics and genomic high throughput sequencing and bioinformatics. The focus of the center is also to use these findings for related drug discovery research and translational research, as well as collaboration with the health care system in Sweden. The center is also involved in environmental research. Finally, the aim of the center is also to create a world leading research community that is able to attract the most prominent researchers in the world.
In short, the SciLifeLab center is a national infrastructure for high throughput molecular biosciences, a research community with advanced educational facilities, a collaborating partner for developing new drugs, and new therapies in clinical practice, and with advanced environmental research.

The SciLifeLab center started in 2010 as a collaboration between four universities in Stockholm and Uppsala, with the aim of developing a national resource for high throughput molecular research. The program for developing the center was addressed in the Government Research Proposal/Bill in 2008 and received an initial funding of 145 million SEK through a Government Strategic Research Funding Area initiative (SRA) where the program received the grants in competition with other strategic research environments. SciLifeLab was again addressed in the following Government Research Proposal/Bill in 2012 where the Government allocated an additional funding of 150 million SEK specifically for the development of SciLifeLab into a world leading and

united national organization/institute for molecular sciences, and also with an extra funding for drug discovery research with 40 million SEK. The yearly turnover for SciLifeLab was 1 billion SEK in 2013, including public and private funding.

The four host universities involved in running SciLifeLab are Karolinska insitutet, KTH Royal Institute of Technology, Stockholm University and Uppsala University. SciLifeLab is currently based at two nodes, Stockholm and Uppsala. The centers top management is located at the KTH Royal Institute of Technology in Stockholm and is set up as a collaboration between different boards, reference committee and executive and strategic management functions both for the overall national center and for the different nodes in Stockholm and Uppsala. Furthermore, SciLifeLab consists of nine national technical platforms where each has their own steering board for the operational management. Each technical platform is organized under a specific focus area within the molecular biosciences, drug discovery and clinical diagnostics, and has a selection of facilities for sequencing, bioinformatics, screening and so forth. Each facility has its own scientific and technical staff supporting the use and the management of the facility. There are also twelve facilities within the SciLifeLab organization/community that are considered to be regional rather than national with specific funding, and therefore not part of the national resource. Currently there are 43 different infrastructures/facilities in total within SciLifeLab.

At present, there is an ongoing evaluation of the SRA where SciLifeLab will be evaluated as two separate strategic research environments within their host universities, amongst 41 other strategic research environments in Sweden. The focus of the SRA evaluation is primarily on strategic management and scientific output of the research milieus/environments at the different universities, directed towards the universities management team and not directly to the research environments as such. Therefore the evaluation of SciLifeLab needs to be coordinated in relation to the evaluation of the SRA environments so that the evaluation activities regarding the SciLifeLab evaluation doesn’t collide with those from the SRA evaluation.

Evaluation purpose and objectives

The evaluation is commissioned by the Ministry of Education and Research at the Swedish Government, and VR is the designated evaluation agency.

The purpose of the evaluation is primarily to assess the progress of SciLifeLab in establishing itself as a world leading and national resource from its onset in July 2013 until the end of 2014. For this, the evaluation needs to assess and to describe the extent of collaboration between the founding universities within SciLifeLab.

The collaboration between SciLifeLab and the overall Swedish molecular bioscience research community is also essential to assess, and

if it is sufficient for establishing SciLifeLab as a national hub for molecular research and if it has this recognition among the collaborating partners. Finally, the purpose is also to assess if this collaboration is conducive in retaining or regaining world class research of today as well as for the future.

Key evaluation questions

The evaluation key questions are:

- Does SciLifeLab have the required strategic and sustainable management and organization for establishing itself as a national resource with international recognition and reputation as a world class research institute/or the equivalence?
- Should SciLifeLab evolve into an independent research institute or should it remain within the host universities' boundaries and management?
- Is SciLifeLabs area of focus, technical facilities, scientific support and researchers, as well as scientific production, of the highest international standard?
- To what extent is SciLifeLab a crucial partner in developing new clinical therapies/methods with the use of sequencing technologies for example, the health care provision and for pharmaceutical industry and other relevant partners?
- Has SciLifeLab managed to develop in the right direction and scope in relation to the goals and objectives outlined in the government proposals addressing its remit, purpose and funding?

The evaluation assignment covers three different themes; prerequisites, scientific quality and relevance for society.

Prerequisites

The first theme of the evaluation is to assess the prerequisites regarding the setup of SciLifeLab. This theme establishes scope and boundaries for SciLifeLab as well as defines clear objectives for present and future strategic management.

Scientific quality

The second theme is to assess the centers scientific quality especially regarding the quality and the relevance of the collection of facilities at each technical platform, but also regarding processes and criteria's for deciding to fast forward certain research projects in getting access to the facilities in a timely manner. The scientific theme also includes assessing the scientific output from SciLifeLab from the start of the collaboration in 2010 until today. Finally, the overall question for the second theme is to establish SciLifeLabs international status as a world leading research community within the biosciences.

Relevance for society

The final theme focuses on SciLifeLabs translational research and collaboration with the pharmaceutical industry, with clinical practice in research hospitals, and other relevant stakeholders. The third theme also concerns SciLifeLabs outreach activities, position and recognition in the overall Swedish society.

These three themes of the evaluation assignment can be further described by dividing each theme into four organizational dimensions/perspectives. The dimensions are SciLifeLabs resources, structures, processes and results.
The table below shows the themes and the organizational dimensions of the evaluation assignment:

	Prerequisites	Scientific quality	Relevance for society
Resources	A comprehensive analysis of the centers private and public funding, from its onset until present	Financial analysis of technical platforms and facilities regarding maintaining highest scientific quality Scientific prominence of researchers within and outside SciLifeLab, and graduate students affiliated to SciLifeLab	Financial allocation within center for developing translational and environmental research in relation to potential and needs within Swedish society
Structures	A description and analysis of the centers administrative and operational management Aims and objectives of center Scope and boundary for center	Area of focus for center infrastructure regarding the selection of technical platforms and facilities and their scientific quality and national relevance Access to Scientific and	Technical platforms and facilities directed towards translational and environmental research regarding developing new drugs, clinical therapies, and environmental practices Formal agreement and

		technical competence Overview of associated institutions and researchers	joint ventures with industry and private and public stakeholders
Processes	Administration of center Coordination and collaboration within and outside SciLifeLab	Criteria for accessing facilities and scientific support General description of ongoing scientific production Forms and quality of collaboration with the Swedish scientific community as well as the international scientific community Advanced education	Collaborations with industry, hospitals and other public and private stakeholders Ongoing translational and environmental research Communication of findings to non-scientific communities and stakeholders
Results	National relevance of technical platforms The centers development from a collaborative strategic research environment based on two nodes to a national center	Scientific publications in high impact journals/ Bibliometrics International status of center regarding scientific and societal impact	Implementation of technical platform for drug discovery Reported achievements of translational research regarding developing new drugs, clinical therapies, and environmental practices

The evaluation needs to elaborate on the key questions, themes and organizational dimensions in order to assess SciLifeLabs present and future merit, worth and value and the evaluation report should reflect this in its key findings and conclusions.

The overall evaluation will be conducted by two independent international scientific expert panels performing a peer review of SciLifeLab.

The first panel will be evaluating SciLifeLabs scientific set up and production as well as its position as an internationally leading research environment. The questions for the peer review will focus on the two themes of scientific quality and relevance for society.

The second panel will evaluate SciLifeLab regarding its organizational and financial composition as well as strategic visions and objectives. The question for this peer review will focus on the evaluation theme of prerequisites for SciLifeLab.

The two panels should also advice VR on recommendations for the future development of SciLifeLab in establishing itself as an internationally recognized center and as a world class research institution/or equivalence.

The evaluation will be carried out partly through site visits to different parts of SciLifeLab and partly by a hearing with personnel from SciLifeLab and from a subset of stakeholders.

The first scientific expert panel will consist of eight panel members with excellent knowledge and experience within the scientific field of molecular biology and high throughput research, especially regarding proteomics, genomics, bioinformatics, bio imaging, related clinical research and drug discovery. They will also need to be internationally recognized scholars within this research field.

The second scientific expert panel will consist of five panel members with excellent knowledge in financial and organizational management of research collaborations, and preferably also with experience or in depth knowledge of research centers established with different geographical nodes and with state of the art research infrastructures, within the molecular biology area of research.

The evaluation recommendations from the expert panels should reflect the overall purpose and objectives of the evaluation, and key evaluations questions as well as respond to the themes and organizational dimensions outlined in the table above.

Evaluation stakeholders

The primary stakeholders to the evaluation are:

- The Government
- The Board and the strategic and operational management of SciLifeLab
- The founding universities
- Other universities regarding high throughput molecular bioscience research
- Stockholm and Uppsala County Councils
- The molecular bioscience research community

The secondary stakeholders to the evaluation are:

- County Councils with medical educational research (Skåne, Västerbotten, Västra Götaland, Östra Götaland, Örebro)
    - Medical research society
    - Research hospitals
- Pharmaceutical companies
- Other life science SMEs
- Stakeholder organizations
- Patient driven organizations
- Research funding organizations
- International collaborating partners and research institutes within the molecular bioscience field

Both the evaluation process as such and the result of the evaluation are of interest for the above mentioned stakeholders.

Evaluation plan/methodology

The evaluation plan and methodology responds to the three themes in the evaluation framework.

The evaluation process can be divided into two parts. The first part of the evaluation will be gathering different kinds of information about SciLifeLab that will inform the second part of the evaluation where this information will be used as background material for conducting a peer review of SciLifeLab by two independent scientific panels. Within these two parts the evaluation will be carried out as eight sub-projects where each will produce information for use in later stages of the evaluation process. The eight sub-projects will be covering the tree themes outlined above:

Part 1:

1. Pre- interview with key management personnel (prerequisites)
2. Survey and self-evaluation of technical platforms and research (scientific quality)
3. Bibliometric study of research production (scientific quality)
4. Focus group interview with key stakeholders (relevance for society)
5. In depth financial analysis (prerequisites)

Part 2:

6. Pre evaluation
7. Hearing with international scientific expert panels, and pre evaluation report (prerequisites, scientific quality and relevance for society)
8. Drafting and writing final evaluation report

Part 1

Pre- interview with key management personnel (prerequisites)

The first sub-project of the evaluation process will be about outlining a descriptive analysis of SciLifeLabs history from its early onset until present day with a main task of establishing a clearer view of the centers scope, boundaries and objectives. The prerequisites for establishing SciLifeLab will be investigated by VR personnel, through an interview study with key management personnel at SciLifeLabs board, strategic and operational management. The findings of this first sub project of the evaluation will be presented in the evaluation report annex 1.

Survey and self-evaluation of technical platforms and research (scientific quality)

The second sub-project of the evaluation process will be focusing on gathering information about the technical platforms and facilities, both from a managerial and a scientific perspective. This information will be gathered partly by conducting a survey directed towards management, technical staff and to researchers, both within and outside the SciLifeLab community, and partly by a self-evaluation by the technical platforms. The survey will be conducted and analyzed by VR personnel, as well as the results from the self-evaluation and presented in the evaluation report annex 2.

Bibliometric study of research production (scientific quality)

The third sub-project of the evaluation concerns conducting a bibliometric study of research output from SciLifeLabs production from its onset as a strategic research area until present. The scope of the bibliometric study will be determined in the first part of the evaluation where SciLifeLabs present and future mission will serve as a basis for this definition. The results will be carried out by VR personnel and be presented in the evaluation report annex 3.

Focus group interview with key stakeholders (relevance for society)

In order to assess SciLifeLabs outreach activities and collaborating efforts with medical and health care research and practice, and with industry and other relevant stakeholders, an independent reference group representing these stakeholders will be appointed in order to give important input to the evaluation. This input will be organized as focus group activities where the reference group discusses and elaborates on SciLifeLabs present and future role in society fostering an open research community, advanced health care practice, and a thriving drug industry. An effort will be made to discuss environmental benefits of SciLifeLabs research for Swedish society. These focus groups activities will be transcribed, analyzed and presented in the evaluation report annex 4, and conducted by VR personnel.

In depth financial analysis (prerequisites)

The fifth sub project of the evaluation is to conduct an in depth financial analysis of SciLifeLabs private and public funding. This analysis will use the definition of SciLifeLab established in the first part of the evaluation in assessing the financial conditions for a sustainable financial foundation for an internationally leading research center. The financial analysis should also be assessed in connection to the strategic management capabilities of the center. This part of the evaluation will be carried out by an expert financial analyst and presented in annex report 5.

Part 2

Hearing with international scientific expert panels, and pre evaluation report (prerequisites, scientific quality and relevance for society)

The overall evaluation will finally be conducted by two independent international scientific expert panels performing a peer review of SciLifeLab. The first panel will evaluate SciLifeLab regarding its organizational and financial composition as well as strategic visions and objectives. The second panel will be evaluating SciLifeLabs scientific set up and production as well as its position as an internationally leading research environment. The panels should also advice VR on recommendations for the future development of SciLifeLab in establishing itself as an internationally recognized center and as a world class research institution/or equivalence. The evaluation will be carried out partly through site visits to different parts of SciLifeLab and partly by a hearing with personnel from SciLifeLab and from a subset of stakeholders.

Pre evaluation

The scientific expert panels are expected to perform a pre evaluation based on information from the financial analysis, the interview study, the survey, the bibliometric report, and the focus group report. The pre evaluation should reflect the questions and perspectives addressed and outlined previously in this ToR. The pre evaluation will be presented in the evaluation report annex 6.

Drafting and writing final evaluation report

The final sub project of the evaluation process concerns drafting and writing the final report and for VR to establish the results and recommendations to the Government. The expert panels will also be commissioned to write the first draft of the final report and VR will establish the recommendations and finalize the report to the Government by the 30 November 2015.

Vetenskapsrådet

Evaluation organization

The evaluation management team consists of:

Sven Stafström, Director General at Vetenskapsrådet
Mats Ulfendahl, Secretary General for Medicine and Health, Vetenskapsrådet
Juni Palmgren, Secretary General for Research Infrastructure, Vetenskapsrådet
Jonas Björk, Head of Research Policy Department at Vetenskapsrådet

The evaluation operational team at VR are:

Maria Bergstrom, project manager
Anders Hellström
Maria Starborg
Per Helldahl
Evaluation advisers at VR are:
Elin Swedenborg
Margareta Eliasson

External reference group:

7-10 members
For nomination:
Johanna Adami, Vinnova
Cecilia Schelin Seidegård, Province Governor of Gotland and Chair of Göteborgs university board
Kjell Asplund, former Director General of The Swedish National Board of Health and Welfare
Johan Bruhn, Medical Director at Pfizer Sweden
Anders Blanck, CEO of LIF
Anders Ekblom, former CEO at Astra Zeneca Sweden
Nina Rehnqvist, former Director General of Swedish Council on Health Technology Assessment
Johan Rockström, Professor and Director of Stockholm Resilience Centre
Ingrid Pettersson, Director General of Formas
Eva Ställdahl, Director General of Forte

Specific expert competence outside Vetenskapsrådet:

Financial analysts and organizational expert:
For nomination: Curt Karlsson, former director of Linköping University

Vetenskapsrådet

Scientific expert panels:

Scientific panel

Chair	***Position***	***Institution***
Simon Tavaré	Director	Cancer Research UK Cambridge Institute (CRUK CI)

Member	***Position***	***Institution***
Rolf Apweiler	Dr. Joint Associate Director of EMBL-EBI	Wellcome Trust Genom Campus, Cambridge/EMBL
Rudi Balling	Director	Luxembourg Centre for Systems Biomedicine
Jórunn Erla Eyfjörd	Professor	University of Iceland
Karen Nelson	Professor/President of the J. Craig Venter Institute	J. Craig Venter Institute
Elaine Ostrander	Chief & NIH Distinguished Investigator	NHGRI
Juan Valcarcel Juarez	Research Professor	Centre de Regulació Genòmica, Barcelona
Olaf Wolkenhauer	Professor	Systems Biology Bioinformatics, Rostock

Organizational panel

Chair	***Position***	***Institution***
Olli A. Jänne	Director	Biomedicum, Helsinki

Member	***Position***	***Institution***
Brenda J. Andrews	Professor and Director	Terrence Donnelly Centre for Cellular and Biomolecular Research, University of Toronto
Ravi Iyengar	Professor and Director	Systems Biology Center New York (SBCNY)
Taina Pihlajaniemi	Professor	Bio center Oulu
Thomas A Pearson	Professor/Executive Vice President for Research and Education	University of Florida Health

Vetenskapsrådet

Evaluation milestones, deliverables, and timelines

The milestones of the Evaluation are:

- Establishing the ToR
- Appointing scientific expert panels
- Appointing other expert competences
- Establishing SciLifeLab mission and objectives based on findings in annex report 1 in order to establish scope and boundaries for commissioning a bibliometric study of SciLifeLabs scientific output
- Approving pre evaluation report
- Approving the first draft of final evaluation report
- Establishing conclusions and key findings of evaluation
- Establishing recommendations
- Approving final version of evaluation report for delivery to Government by the 30 November 2015

The deliverables of the evaluation are:

- ToR
- Annex report 1-6
- Pre evaluation report 1 and 2 (one from each panel group)
- Evaluation report

Timeline
The evaluation process in short:

1. Pre- interview with key management personnel
2. Survey of technical platforms and research
3. Bibliometric study of research production
4. Focus group interview with key stakeholders
5. In depth financial analysis
6. Pre evaluation and hearing with international scientific expert panels
7. Drafting and writing final evaluation report

The approximate schedule for evaluation activities and deliverables:

	3 quarter 2014	4 quarter 2014	1 quarter 2015	2 quarter 2015	3 quarter 2015	4 quarter 2015
Part 1	X	X				
Part 2		X	X			
Part 3			X			
Part 4		X	X			
Part 5			X			
Part 6				X		
Part 7					X	X

Bilaga 5A:
Regeringsuppdrag

Utvärdering av utveckling och processer
Vetenskapsrådet ska också utvärdera följande delar av verksamheten vid centrumet:

- utvecklingen till ett nationellt centrum,
- samarbeten med näringslivet, hälso- och sjukvården och andra berörda aktörer,
- former för att sprida och kommunicera resultat,
- genomförandet av uppdraget om läkemedelsutveckling (Kungl. Tekniska högskolans regleringsbrev för 2014, U2013/7507/UH),
- val av fokusområden i förhållande till svenska nutida och framtida styrkeområden, och
- centrumets internationella status.

Resultatet av utvärderingen ska redovisas i en rapport till Regeringskansliet (Utbildningsdepartementet) senast den 30 juni 2015.

Bakgrund

Nationellt centrum för livsvetenskaplig forskning (SciLifeLab) är ett forskningscentrum för storskalig molekylärbiologisk forskning. SciLifeLab är en central resurs för att Sverige ska kunna stärka sin roll som plattform för samarbeten inom livsvetenskaperna mellan universitet och högskolor, hälso- och sjukvården och näringslivet. Centrumets uppgifter och organisation regleras i förordningen (2013:118) om Nationellt centrum för livsvetenskaplig forskning. Centrumet finns vid Kungl. Tekniska högskolan, och verksamheten drivs gemensamt med Karolinska institutet, Stockholms universitet och Uppsala universitet. Vidare leds centrumets verksamhet av en styrelse.

Med anledning av satsningen på strategiska forskningsområden som presenterades i propositionen Ett lyft för forskning och innovation ska medel för det strategiska forskningsområdet Molekylär biovetenskap användas för centrumets verksamhet (U2013/7507/UH m.fl., U2013/7501/UH m.fl., prop. 2008/09:50, bet. 2008/09:UbU4, rskr. 2008/09:160). Medel ska också användas för vidare uppbyggnad av infrastrukturen vid centrumet och för att finansiera forskning inom läkemedelsutveckling (U2013/7507/UH m.fl., prop. 2012/13:30, bet. 2012/13:UbU3, rskr. 2012/13:151). Staten satsar för närvarande omkring 335 miljoner kronor årligen i basanslag för forskningsverksamhet, infrastruktur och läkemedelsutveckling vid centrumet. Forskning som är knuten till centrumet har även omfattande finansiering från statliga och privata forskningsfinansiärer. Centrumets totala årliga omsättning är omkring 1 miljard kronor.

Medel för forskning i fråga om det strategiska forskningsområdet Molekylär biovetenskap har utbetalats till dels Uppsala universitet, dels Kungl. Tekniska högskolan i samarbete med Karolinska institutet och Stockholms universitet. Medel har också utbetalats till Kungl. Tekniska

Umeå universitet
Linköpings universitet
Luleå tekniska universitet
Karlstads universitet
Linnéuniversitetet
Örebro universitet
Mittuniversitetet
Sveriges lantbruksuniversitet
Blekinge tekniska högskola
Högskolan i Borås
Högskolan Dalarna
Högskolan i Gävle
Högskolan i Halmstad
Högskolan Kristianstad
Högskolan i Skövde
Högskolan Väst
Malmö högskola
Mälardalens högskola
Södertörns högskola
Forskningsrådet för hälsa, arbetsliv och välfärd
Forskningsrådet för miljö, areella näringar och samhällsbyggande
Verket för innovationssystem
Chalmers tekniska högskola
Högskolan i Jönköping
Göran Sandberg

Bilaga 5B:
Ändringsbeslut

Lunds universitet
Göteborgs universitet
Umeå universitet
Linköpings universitet
Luleå tekniska universitet
Karlstads universitet
Linnéuniversitetet
Örebro universitet
Mittuniversitetet
Sveriges lantbruksuniversitet
Blekinge tekniska högskola
Högskolan i Borås
Högskolan Dalarna
Högskolan i Gävle
Högskolan i Halmstad
Högskolan Kristianstad
Högskolan i Skövde
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Forskningsrådet för hälsa, arbetsliv och välfärd
Forskningsrådet för miljö, areella näringar och samhällsbyggande
Verket för innovationssystem
Chalmers tekniska högskola
Högskolan i Jönköping
Göran Sandberg

Bilaga 6:
Financial Analysis

DAMVAD
COPENHAGEN . OSLO . STOCKHOLM

23/04/15

Financial Analysis of SciLifeLab

By DAMVAD for the Swedish Research Council

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damvad.com

Contents

1 Introduction

1.1 The mandate for the financial analysis

The Swedish Research Council has requested DAMVAD to conduct a financial analysis of the national center for molecular biosciences SciLifeLab. The specific purpose of this financial analysis is to:

i. Identify and analyse all public and private funding of SciLifeLab and how host universities, the Board of SciLifeLab and other financiers administer the funds.
ii. Map the distribution of funding to technology platforms and facilities and analyse the management and criteria for accessibility and prioritization.
iii. Map funding of research and education from SciLifeLabs budget.

The financial analysis will provide a factual basis for a larger-scale evaluation by a scientific panel appointed by the Swedish Research Council. The purpose of the Panel's evaluation is to investigate the following questions:

i. Does SciLifeLab have the necessary management control and organization to develop into a world leading research institutes (or equivalent) and a national resource for large-scale molecular biological research?

ii. Should SciLifeLab develop into an independent research institute or equivalent or just function as a collaboration between the four host universities?

iii. Is SciLifeLab's composition of technology platforms, technical support, research support at the platforms, and scientific production of the highest scientific standard?

iv. To what extent is SciLifeLab an important partner in developing new drugs, new clinical practice to the pharmaceutical, healthcare and other relevant partners?

v. Has SciLifeLab developed in accordance with the government's expressed goals and guidelines for activities?

The financial analysis serves as one of several information sources for the scientific panel´s evaluation, and as such, DAMVAD aims to provide an extensive financial insight into SciLifeLab.

The financial analysis has been conducted between December 2014 and March 2015.

1.2 Background to SciLifeLab

This section gives a short background description to the formation of the national research infrastructure SciLifeLab (hereafter referred to as SciLifeLab). This is deemed necessary to be able to understand the complex financial funding flows and how funding is allocated within SciLifeLab.

2010-2012

SciLifeLab was formed in 2010, through a joint application by the three universities in Stockholm; KTH Royal Institute of Technology (KTH), Karolinska Institutet (KI), Stockholm University (SU), and a separate application from Uppsala University (UU). The applications involved the establishment of two separate efforts, SciLifeLab in Stockholm and a similar effort (named Center for Genomic and Proteomic Medicine, which, however, immediately changed its name to SciLifeLab in Uppsala) in Uppsala. These efforts were assigned a certain faculty funding (hereafter SRA funding) from the governmental

budget (2010-2014) with the specific purpose to provide strategic research in the field of molecular life science according to the applications. KTH became the host university for SciLifeLab in Stockholm and thereby responsible for administration and allocation of the SRA funding to KTH, KI and SU. A collaboration agreement was signed between KTH/KI/SU to govern the relationship between the parties. A common steering committee was established in Stockholm to address specific issues for KTH, KI and SU, where the effort was led by the Director Mathias Uhlén. In Uppsala, the center was headed by the Director Kerstin Lindblad-Toh and her management group, under control of a Program Board.

Since 2010, significant investments have also been made to SciLifeLab, by host universities and other external sources.

2013

In July 2013, SciLifeLab was transformed into a national centre for life science research. Additional funding was distributed by the Swedish government to establish a national centre for molecular research (infrastructure) and a specific investment in drug development. A collaboration agreement was made between the UU and KTH/KI/SU nodes that governs the responsibility of each party.

As a result of the organisational changes, the Program Board was replaced by a steering committee in Uppsala.

In the spring 2013, a national board was set up and Göran Sandberg (Knut and Alice Wallenberg Foundation) was appointed Chair. The national board also has two advisory committees, the National Reference Committee and Scientific Advisory Board. The National Reference Committee works advises the national board in scientific and strategic issues as well as issues concerning the platforms. The Scientific Advisory Board is commissioned to review SciLifeLabs scientific orientation and to advise on strategic future issues.

National SciLifeLab funding:
The purpose of the funding is to establish and maintain the SciLifeLab center for molecular research. The funding is determined in the Government Bill on Research Policy. The National Board decides on the allocation of the national SciLifeLab funding.

Strategic Research Area (SRA) funding:
The purpose of the funding is to enhance research in strategic research areas as the Swedish Government designated in the Government Bill on Research Policy. The SRA funding should be distributed according to a 30/70 percent division between UU and KTH/KI/SU. The steering committee at Uppsala and Stockholm decides on the allocation of SRA-funding.

National funding designated to drug development:
The purpose is to enhance research on drug development. The funding is determined in Government Bill on Research Policy. The National Board decides on the allocation of the drug development funding.

The center SciLifeLab has been led by Director Mathias Uhlén and Co-Director Kerstin Lindblad-Toh and their management teams (members from all four universities).

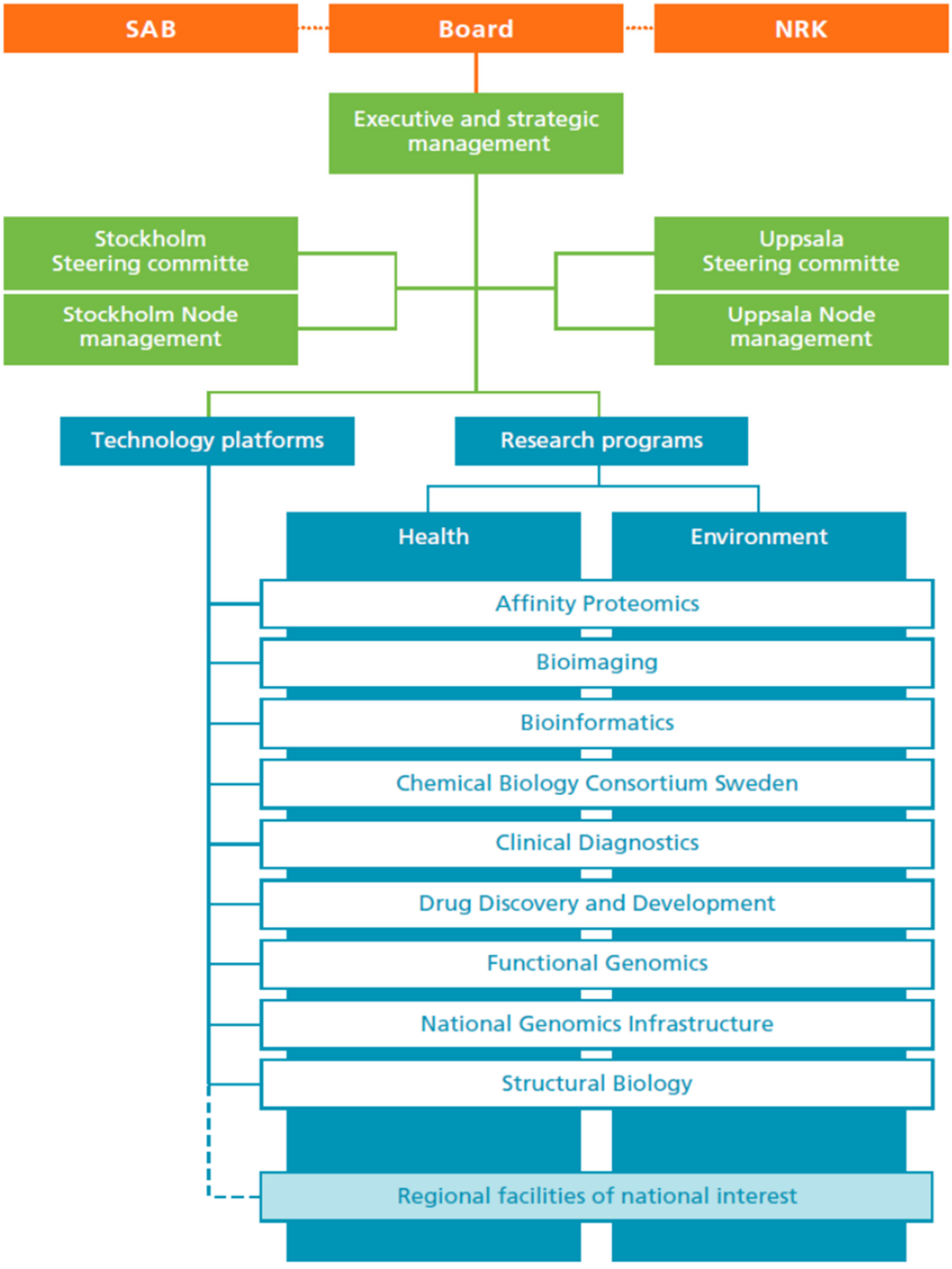
SciLifeLab's technologies and services are provided by facilities, which each represent a certain area of expertise. The facilities are organised into platforms

that represent areas of research where a combination of technologies is generally used. There are in total 9 platforms, each consisting of 1- 8 facilities. As of today there are 44 facilities including regional facilities.

Each national platform is managed by an Executive Platform Directors with a Vice Executive Platform Director when applicable who take part in the Platform Steering Board meetings.Each facility is managed by a Platform Director and a Facility Manager. The Platform Director ensures the scientific leadership of the platform. The Facility Manager is responsible for the every day operation of the facility.

SciLifeLab organisation is illustrated in Figure 1.1 below.

FIGURE 1.1
The SciLifeLab organisation



Source: SciLifeLab Annual Report 2013

1.3 Delimitations

Conducting financial analyses of universities and large R&D initiatives is a complex and demanding task, mainly due to the presence of many funding sources and funding mechanisms linked to even more research groups, actors and activities. This is also the case for SciLifeLab, with its relatively complex institutional set-up.

The purpose of this financial analysis has been to identify and analyse all funding (to the extent possible) to SciLifeLab, and how the funding is distributed within the organization. To enable the mapping of the financial structure of SciLifeLab it has been necessary to break down the activities into basic elements. This also represents the delimitations and will be explained briefly below and summarized in Table 1.1 below.

A detailed description of data approach and quality of data is provided in Appendix 5.1

Periodization

SciLifeLab was formed in 2010 by SRA-funding. However, the formal operations of the national centre started in July 2013 with funding for national infrastructure and drug development. DAMVAD's ambition has been to distinguish funding from 1 July 2013 and onwards but this has proven to be impossible as data is based on annual reports. Thus, the financial analysis data covers the three periods 2010-2012, 2013 and 2014. Data from the period 2010-2012 is merged as funding was limited during this period and the national centre was not yet formally established.

Sources of funding

To distinguish sources of funding to SciLifeLab the funding is divided into four main categories summarized in Table 1.1 and described below:

Public funding which refers to funding from the Swedish national government. An essential division is made between three types of national funding from the Swedish national government:

- National SciLifeLab funding;
- Strategic Research Area (SRA) funding and;
- National funding designated to drug development

In addition, we also refer to funding from governmental agencies (such as VR, Formas) and other public sources.

External funding which refers to funding from foundations, private companies or international organisations and SciLifeLab user fees.

University co-funding which refers to co-funding by Swedish Universities. Note that university co-funding by definition is public funding. However, we have chosen to separate university co-funding from public funding to be able to provide a more transparent overview of the financial flows.

Faculty member funding which refers to university funding for research led by faculty members connected to SciLifeLab. Faculty Member funding comprises the SciLifeLab research environment, thus the funding is treated as one single category, separate from the others.[1]

[1] Funding to faculty members consist, per definition, of various type of public and private sources.

TABLE 1.1

Category of funding	Type of funding source
Public funding	National government Governmental agencies Other public sources
External funding	Foundations / funds Private companies EU/ International organisations User fees
University Co-funding	Host universities Other universities
Faculty member funding	National government Governmental agencies Foundations / funds Private companies EU / International organisation University co-funding

See Appendix 5.3 for a complete list of all sources of funding identified in this financial analysis.

Financial Flow

Funding may be granted to SciLifeLab via host universities and/or directly to the research programs, individual facilities, the research teams as well as to the individual researchers. Thus, the funding can flow through different recipients at SciLifeLab.

To grasp the financial flows, this financial analysis has focused on mapping the following recipients of funding:

- Host university (KTH, KI, SU and UU)
- National facilities (32)
- Regional facilities (12)
- Individual Faculty Members (143[2])

For an extensive list of the facilities and individual faculty members, see Appendix 5.4

A facility that belongs to several universities has been asked to provide data that covers the facility as a whole[3]. The financial analysis does not cover external funding granted to researchers that are using the facilities but are not faculty members.

Categorisation of purpose and usage of resources

The financial analysis also identify the volume of total funding divided by the following pre-defined categories:[4]

- Scientific Service
- Research
- Knowledge Transfer
- Education
- Personnel / Administration / Communication
- Strategic Recruitments and Fellows (only university level)
- Other

Scientific Services - the service (in the form of using scientific equipment and trained personnel) provided by SciLifeLabs platforms and facilities to the research community, academia and industry.

Research – refers to the following categories:

- Basic research is defined as the experimental or theoretical work undertaken primarily to acquire new knowledge of the un-

[2] The total number of faculty members connected to SciLifeLab is 143, however, only 115 of these have received external funding. Therefore, data in this analysis only covers funding to 115 faculty members. Note that some faculty members have received external funding to their facilities instead.

[3] This has been the case for WABI which is divided between Uppsala and Stockholm

[4] It should be noted that we have asked the recipients at universities and facilities to provide information on allocation of funding according to categories predefined by DAMVAD.

derlying foundation of phenomena and observable facts, without any particular application or use in view, and;

- Applied research is defined as the original investigation undertaken in order to acquire new knowledge. It is, however, directed primarily towards a specific practical aim or objective, and;
- Experimental development is defined as systematic work, drawing on existing knowledge gained from research and/or practical experience, which is directed to producing new materials, products or devices, to installing new processes, systems and services, or to improving substantially those already produced or installed. R&D covers both formal R&D in R&D units and informal or occasional R&D in other units. (Frascati Manual 2002, page 30).

Knowledge Transfer - Outreach activities such as seminars, workshops, conferences etc.

Education **-** Education on M.Sc./Ph.D.-level, other education or courses

Personnel / Administration / Communication resources assigned to administrate and maintain the facility. This includes overhead costs such as administrative staff, repairs, telephone bills etc. This category does not include the costs of researchers or staff maintaining the scientific service.

Strategic recruitments and Fellows **-** Recruitments of SciLifeLabs Fellows and other strategic, scientific recruitments.

Other **-** Resources not possible to assign to the other categories.

TABLE 1.2

Element	Delimitation
Period	2014 2013 2010-2012
Category of funding	Public funding University co-funding External funding Faculty member funding
Financial Flow	University National facility Regional facility Individual Faculty Member
Allocation of resources	Scientific Service Research Education Knowledge Transfer Personnel/Administration/Communication Strategic recruitments & Fellows Other

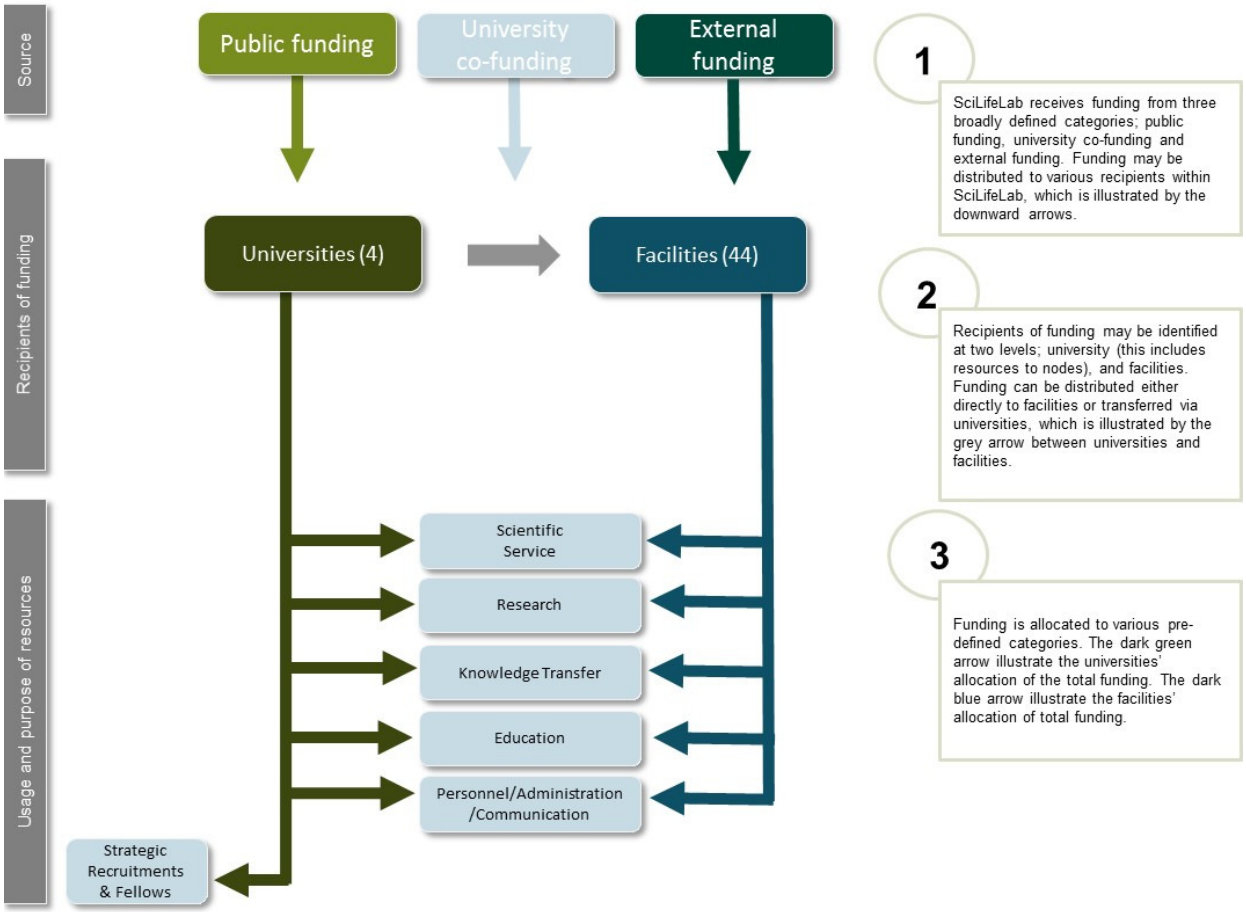
Depreciation

Due to the large amount of instruments purchased within SciLifeLab, we have used depreciation values for instruments instead of granted values earmarked for the purchase of instruments. By using this method, we are able to avoid extreme values due to single large disbursements used for instruments, which might distort comparisons between platforms, facilities, or periods.

The principle for depreciation varies between units and type of purchase. For instance, if an instruments is purchased for 10 MSEK in 2013, with depreciation over a 5 year period, the depreciation costs each year is 2 MSEK.

In Figure 1.2 below, we provide an overview of the funding sources, financial flows and recipients covered in DAMVAD's financial analysis. Note that this is not directly comparable to the organisational chart in Figure 1.1 above but rather an illustration of the financial flows identified in this financial analysis of SciLifeLab. Note that funding to faculty members is treated as a separate category, not included in the flows in the figure below.

FIGURE 1.2
Overview of funding sources, recipients of funding and purpose of resources



Source: DAMVAD 2015
Note: This is not an organisational chart but rather an overview of the funding sources, financial flows and recipients of funding covered in this financial analysis

2 Summary of results of the financial analysis

The Swedish Research Council has requested DAMVAD to conduct a financial analysis of the national center for molecular biosciences SciLifeLab. This financial analysis is the first attempt to map the total funding and spending structures of SciLifeLab.

The financial analysis aims to provide a factual basis for the larger-scale evaluation which will be conducted by an external scientific expert panel. The specific purpose of the financial analysis is to:

i. Identify and analyse all public and private funding of SciLifeLab and how host universities, the Board of SciLifeLab and other financiers administer the funds.
ii. Map the distribution of funding to technology platforms and facilities and analyse the management and criteria for accessibility and prioritization.
iii. Map funding of research and education from SciLifeLabs budget.

Due to the complexity of the financial flows, DAMVAD has used a combination of methods to collect data, including desk research, qualitative in-depth-interviews and self-report schemes.

To grasp the financial flows, the analysis has focused on mapping the funding from four broadly defined funding sources;

- Public funding
- University co-funding[5]
- External funding
- Funding to faculty members

These various sources of funding are distributed to several recipients in SciLifeLab. This analysis identifies funding flows to the following recipients within SciLifeLab as well as funding to faculty members affiliated to SciLifeLab:

- Host universities (KTH, KI, SU and UU)[6]
- National facilities (32)
- Regional facilities (12)
- Individual faculty members (143)[7]

The financial analysis has produced a detailed and varied insight into the funding and financial flows of SciLifeLab. Below we present the main results of the financial analysis. Due to the complexity of the funding and spending structures of SciLifeLab, we have decided to complement the report with a clickable Tableau web based database. Link to database and instructions are provided in addition to this report. The database can be used interactively by the evaluation panel to read and understand the results in further detail.

The total funding to SciLifeLab

SciLifeLab attracts substantial funds

The total amount of funding to SciLifeLab during the period 2013 to 2014 was 1.131 MSEK, see Table 2.1 below. This includes public funding, external funding and university co-funding. When including funding to faculty member affiliated to SciLifeLab, the total funding to SciLifeLab increases substantially, amounting to 1.270 MSEK in 2014 (622 MSEK excluding faculty funding).

[5] Note that university co-funding by definition is public funding. However, we have chosen to separate university co-funding from public funding to be able to provide a more transparent overview of the financial flows.

[6] KTH Royal Institute of Technology (KTH), Karolinska Institutet (KI), Stockholm University (SU) and Uppsala University (UU)

[7] Within the resources and framework of this project, it has only been possible to make data covering faculty members available for 2014.

External funding contributes with one quarter of total funding to SciLifeLab

While public funding is the largest source of funding to SciLifeLab over the entire period, external funding makes up for 26 percent of the total funding. During 2013 and 2014, the total amount of public funding was 317 MSEK and 408 MSEK respectively, while external funding amounted to 133 MSEK and 160 MSEK in 2013 and 2014. In addition, it is worth noticing that university co-funding has slightly decreased during 2013 and 2014 from 58 MSEK to 54 MSEK.

TABLE 2.1
Overview of total funding to SciLifeLab, by year

Category of funding	2010-2012	2013	2014	Total
Public	389 (50%)	317 (62%)	408 (66%)	1.114 (58%)
External	279 (36%)	133 (26%)	160 (26%)	572 (30%)
University co-founding	117 (15%)	58 (11%)	54 (9%)	229 (12%)
Grand total	785	509	622	1.915

Source: DAMVAD 2015
Note: This excludes funding to faculty members affiliated to SciLifeLab

Large variations in university co-funding

More than half of the total university co-funding to SciLifeLab came from KI during 2010-2012 and 2013. In 2013, almost 2/3 of the co-funding came from KI. In 2014, KIs share of the co-funding decreased, while Uppsala University´s share increased. Together, Uppsala and Karolinska covered more than 80 % of the co-funding. KTH cover for 5 % of total university funding in 2010-2012, 5,8 % in 2013 and 8,3 % in 2014. A relatively small share of total university co-funding came from SU during 2010-2012 (3%) and 2013 (3%) and 2014 (4%).

Funding to faculty members affiliated to SciLifeLab major funding source

In 2014, funding to individual faculty members amounted to 649 MSEK. This corresponds to more than half of the total funding to SciLifeLab in 2014. The Swedish Research Council is the largest financier and has allocated 135 MSEK to faculty members in 2014. It is followed by The Knut and Alice Wallenberg Foundation who financed almost 134 MSEK within this category during 2014. Public research funding are the third largest source of funding. It is equally interesting that international funding; including funding from framework programmes within the European Union now covers a large part of the funding of SciLifeLab through the faculty members. It is however also worth noticing that funding from private companies is rather limited.

User fee revenues finance 20% of activities within facilities – most is used for reagents within a single platform

More than 400 MSEK have been distributed to SciLifeLab in the form of user fees during 2010-2014. This makes up approximately 20% of the total revenues to SciLifeLab. The revenue from user fees primarily cover the costs for reagents. During 2010-2012, the user fees amounted to 208 MSEK. During 2013 and 2014, the two years SciLifeLab has been a national center, the user fees amounted to 91 MSEK and 104 MSEK respectively. Worth noticing though is that the platform *National Genomics Infrastructure* covers a significant part of user fees (300MSEK) SciLifeLab 2010-2014), which is explained by the fact that the reagents for this type of analysis are expensive (even though they have declined significantly in recent years).

Large increase in number of funding sources

The total number of funding sources (from grants and organisations) to SciLifeLabs infrastructure environment from 2010 until 2014 was 28. The number of sources have increased during the entire period from 17 in 2010-2012, to 22 in 2013 and to 25 in 2014. These numbers exclude the sources of funding to faculty members, which is more diverse.

The purpose and usage of total funding

The largest share of total funding goes to scientific service – the smallest share goes to education and knowledge transfer

Almost 600 MSEK, equivalent to 60%, of total funding distributed to SciLifeLab (including funding later directed to facilities) has been allocated to scientific service related to SciLifeLab during 2010-2014. 146 MSEK (14%) has been allocated to personnel, administration and communication. 86 MSEK (8%) has been allocated to strategic recruitments and SciLifeLab fellows, while 77 MSEK (8%) has been allocated to research within SciLifeLab. Education and knowledge transfer are two relatively small posts, as about 17 MSEK (2%) has been allocated to these activities respectively during the period. When observing the allocation of total funding limited to the funding to facilities there is an equivalent allocation.

Varied responsibility for allocation of national funding

The responsibility for distribution varies between different types of SciLifeLab funding. While the National Board of SciLifeLab is responsible for the allocation of national SciLifeLab funding and national funding designated to drug development, the steering committees at each host university decides on the allocation of the SRA-funding.

The distribution of funding to SciLifeLab

Increased funding to facilities

Total funding to facilities has increased from 368 MSEK in 2013 to 437 MSEK in 2014. During this period, the number of facilities increased. As SciLifeLab was turned into a national center in 2013, the amount of public funding increased both in absolute and relative terms.

Regional facilities make up for a quarter of the total funding to facilities

The regional facilities receives most of its funding from user fees and SRA funding. The regional facilities make up for a quarter of the total funding to platforms and facilities.

The Platform National Genomics Infrastructure represents a large part of total funding

Funding to facilities within the platform National Genomics Infrastructure comprises a rather large part of SciLifeLab funding assigned to facilities, although the relative size of the platform has decreased slightly during 2010-2014. In 2010-2012, the platform covered half of the total funding to facilities. In 2014, the platform represented a third of the total funding. The vast majority of the funding to facilities within this platform comes from user fees (normally payment for the reagents used in an analysis). The platform has received 300 MSEK in user fees during 2010-2014. In 2014, the second largest source of funding was national SciLifeLab funding (58,2 MSEK). Other important sources of funding to the facilities within the platform in 2014 was the Swedish Research Council and The Knut and Alice Wallenberg Foundation contributions.

Large variation between facilities in relation to total amount of funding and funding sources

Facilities within the largest platform National Genomics Infrastructure, received 368 MSEK in 2013

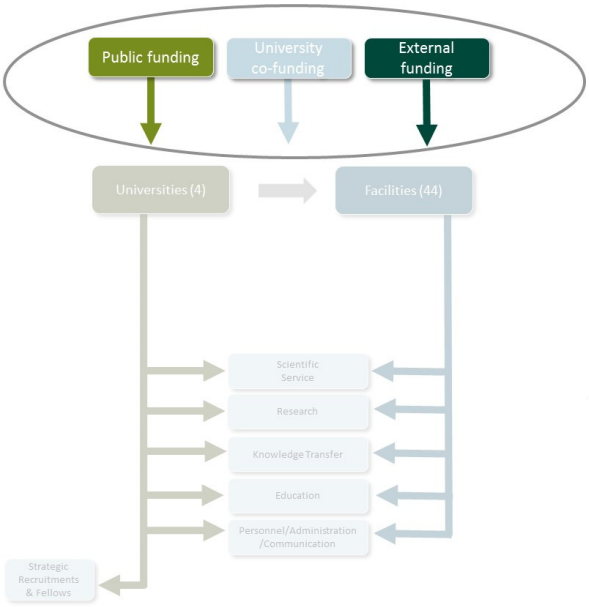
and 437 MSEK in 2014, from a total of 9 different sources. Facilities within the platform Affinity Proteomics has received 33 MSEK and 36 MSEK in funding in 2013 and 2014 respectively, from 14 identified and 1 additional unspecified source. Some platforms have received far less total funding from relatively few sources, such as facilities within the Bioimaging platform (4 and 8 MSEK in 2013 and 2014 respectively from 3 different sources) and facilities within the Structural Biology platform (10 and 7 MSEK in 2013 and 2014 respectively from 4 different sources).

The funding to individual facilities also shows large variation. The largest facilities have received more than 60 MSEK on a yearly basis, while the smallest have received less than 1 MSEK. The mean amount of resources to facilities were 9 MSEK 2013 and 10 MSEK 2014.

3 Funding to SciLifeLab

In this section, we present the total funding to SciLifeLab. This includes public funding, external funding, university co-funding, see Figure 3.1 below for an illustration. Separately, we also provide data over funding to faculty members affiliated to SciLifeLab.

FIGURE 3.1
Analytical model – total funding



The total funding to SciLifeLab (nodes, platforms and facilities) amounted to 785 MSEK 2010-2012, 509 MSEK 2013 and 622 MSEK 2014. The total amount of funding to SciLifeLab was 1.131 during 2013-2014. When including funding to faculty members[8] affiliated to SciLifeLab the total amount of funding to SciLifeLab was 1.270 MSEK in 2014.[9]

The total funding to SciLifeLab is visualised in Figure 3.2.[10] We separate the funding to SciLifeLab into three main categories – public funding, external funding, and university co-funding.[11] In 2014, we also cover funding to faculty members affiliated to SciLifeLab.

3.1 Total funding to SciLifeLab

The largest type of funding to the SciLifeLab is public funding. During 2013 and 2014, the total amount of public funding was 317 MSEK and 408 MSEK respectively, while external funding amounted to 133 MSEK and 160 MSEK. The funding to SciLifeLab is summarized in Table 3.1.

TABLE 3.1
Total amount of funding to SciLifeLab, by category of funding and year (MSEK)

Category of funding	2010-2012	2013	2014	Total
Public	389 (50%)	317 (62%)	408 (66%)	1.114 (58%)
External	279 (36%)	133 (26%)	160 (26%)	572 (30%)
University co-founding	117 (15%)	58 (11%)	54 (9%)	229 (12%)
Grand total	785	509	622	1.915

Note: Share of funding per year in parenthesis.
Source: DAMVAD (2015) based on data from SciLifeLab host universities and facilities

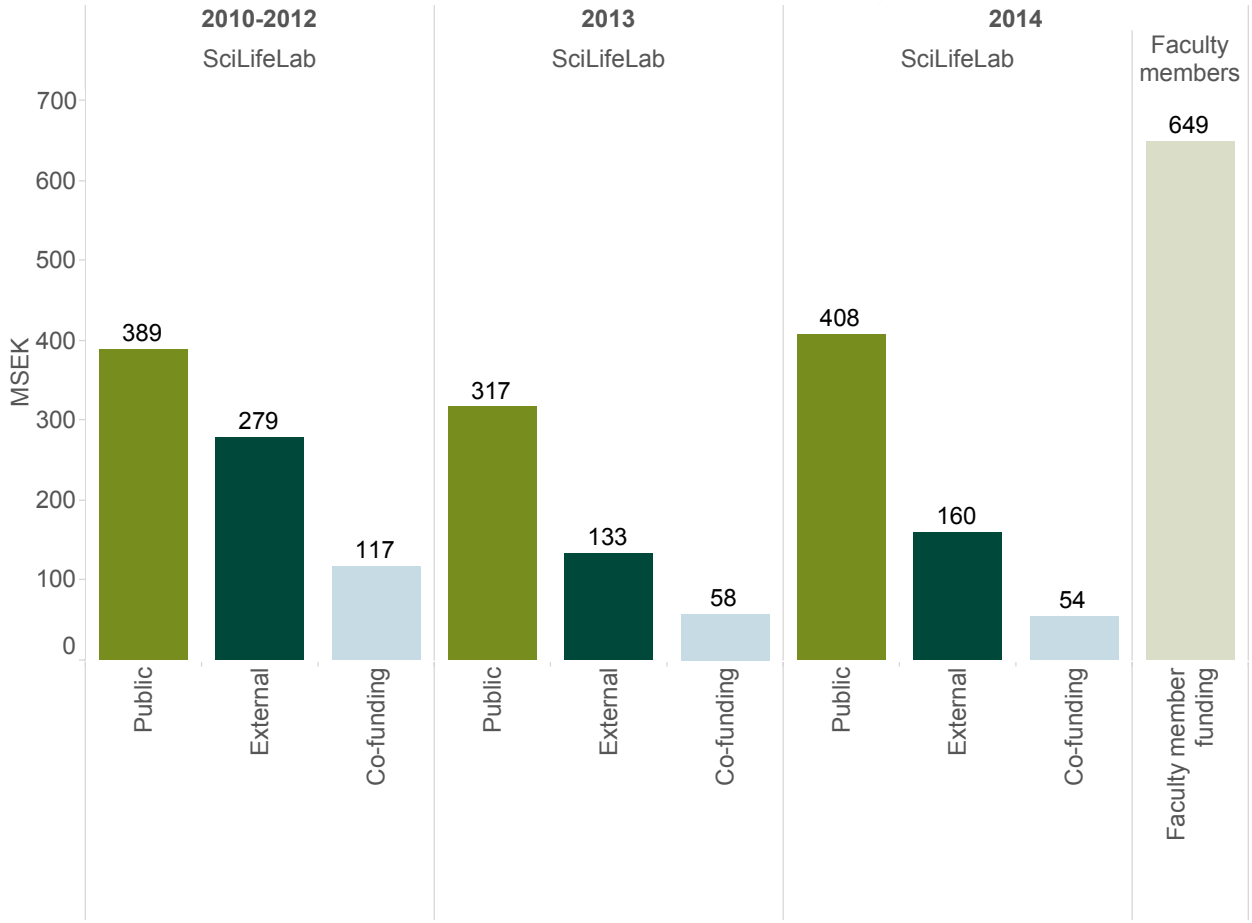
The share of external funding to SciLifeLab has been constant between 2013-2014, 26%. Before becoming a national center, the share of external funding was relatively large (c.f. Figure 3.2), which

[8] Due to data limitations, we have only covered funding to faculty members 2014.
[9] See Appendix for a list of all financiers
[10] Note that the data covering 2010-2012 includes 3 years of funding, which implicates that the graphs describing this period is not directly comparable to the other periods, 2013 and 2014, which consists of single years. This distinction is relevant to acknowledge in most of the graphs in this chapter.
[11] By definition, university co-funding is public funding. However, we have chosen to separate the co-funding to a separate category to enable a more transparent review of the universities role of the funding of SciLifeLab.

mainly was due to a lower amount of public funding. User fees cover a large part of the external funding to the facilities. More than 400 MSEK has been distributed to SciLifeLab in the form of user fees during 2010-2014. Worth noting is that the platform National Genomics Infrastructure covers a large part of total user fees to SciLifeLab.

There is a large variation between host universities in relation to university co-funding. Figure 3.3 shows the university co-funding to Sci-LifeLab 2010-2012, 2013 and 2014. More than half of the university co-funding came from KI during 2010-2012 and 2013. In 2013, almost 2/3 of the co-funding came from KI. In 2014, KIs share of the university co-funding decreased, while Uppsala University´s share in-

FIGURE 3.2
Total funding to SciLifeLab (including faculty members) by year and category of funding (MSEK)

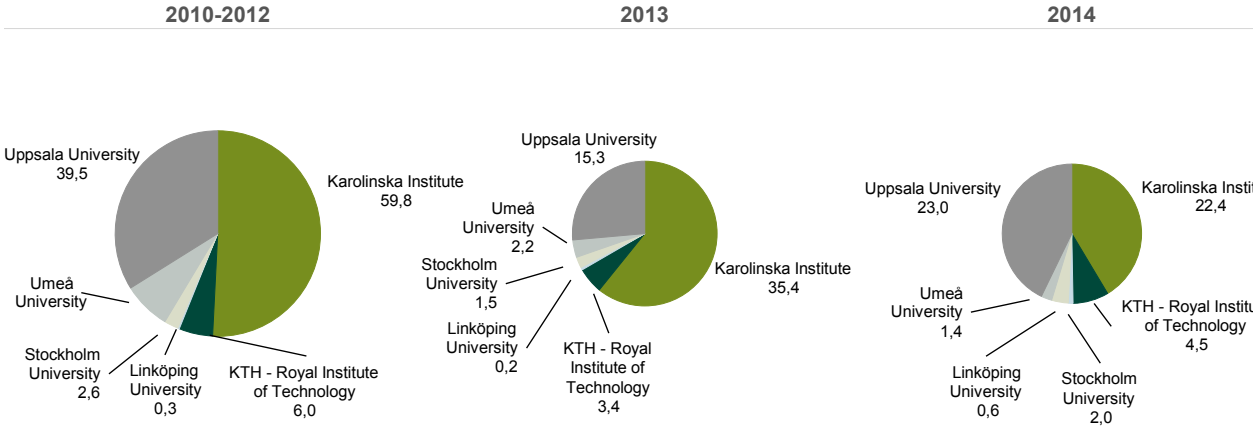


Note: Funding to faculty members only included in 2014.

Source: DAMVAD (2015) based on data from SciLifeLab host universities and facilities

creased. Together, Uppsala and Karolinska covered more than 80 % of the university co-funding in 2014. KTH covered 5 % of total university funding in 2010-2012, 5,8 % in 2013 and 8,3 % in 2014. A relatively small share of total university co-funding came from SU during 2010-2012 (3%) and 2013 (3%) and 2014 (4%).

FIGURE 3.3
University co-funding to SciLifeLab, by university and year (MSEK)



3.2 Funding faculty members affiliated to SciLifeLab

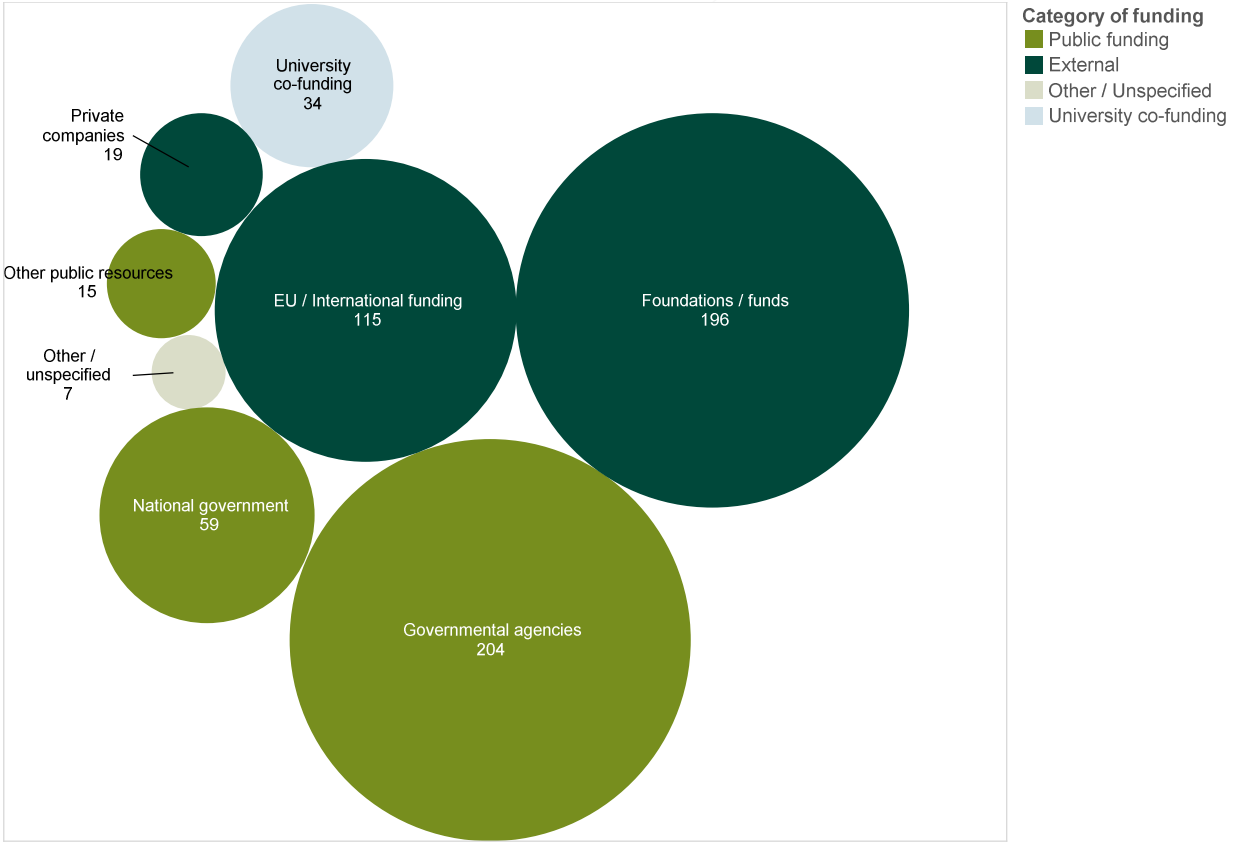
SciLifeLabs faculty members are part of the research environment around SciLifeLab. A total of 115 faculty members affiliated with SciLifeLab have received funding during 2014.

In Figure 3.4 we describe the amount of funding to faculty members in 2014, by type of funding source. We map the funding by category of funding and a further specification of the following funding sources:

- National government (Public research grants for research, education and other activities)
- Governmental agencies
- Other public resources
- Foundations / funds
- Private companies
- EU / International funding
- University co-funding

The largest source of funding is governmental agencies, which comprises 204 out of 649 MSEK. Fi-

FIGURE 3.4
Distribution of total funding to faculty members, by type of funding source (2014, MSEK)



Source: DAMVAD (2015) based on data from SciLifeLab host universities and facilities

nancing from the Swedish Research Council represents a large part of this funding, namely 135 MSEK.

Foundations and funds provide the second largest funding source. Out of almost 196 MSEK, Knut and Alice Wallenberg's Foundation (KAW) has provided almost 134 MSEK within this category during 2014.

The third largest funding source is international funding, where framework programmes within the European Union cover a large part of the funding.

The data in this section differs from the funding data reported in SciLifeLabs annual report 2014 for the category "SciLifeLab Faculty". During the period between the completion of the annual report and this report, a correction has been made as to which projects that should be included in the funding to faculty members affiliated to SciLifeLab. This correction has resulted in an increase of this type of funding by 84 MSEK, which is why it amounts to 649 MSEK in this report compared to 565 in the annual report.

In Table 3.2, the top 10 funding sources to faculty members are shown.

TABLE 3.2
Top 10 type of funding sources of faculty members (2014, MSEK)

Name of financier	Funding, (MSEK)
Swedish Research Council	135
Knut and Alice Wallenberg Foundation (KAW)	134
Public research grants	59
EU - Framework Programmes	48
European Research Council	38
Strategic Research Foundation	29
Swedish Cancer Society	24
Swedish Research Council Formas	24
Karolinska Institute	17
Stockholm County Council	11

Note: *A total of 649 MSEK have been distributed to faculty members.*
Source: DAMVAD (2015) based on data from SciLifeLab host universities and facilities

4 Distribution of funding to SciLifeLab

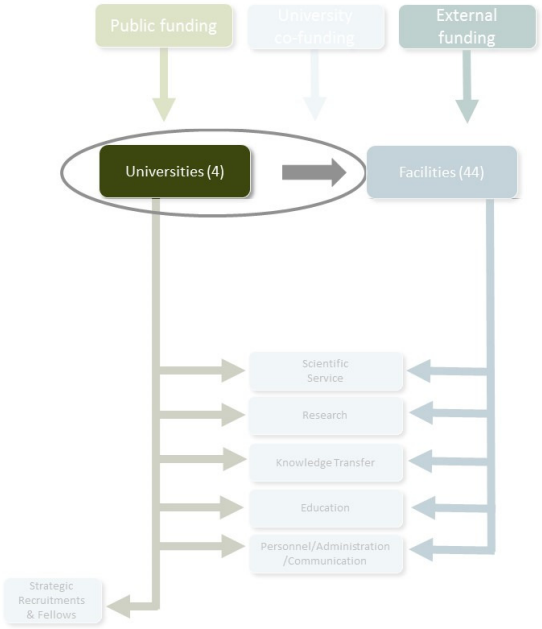
In this chapter, we analyse how the funding to SciLifeLab is distributed to various recipients in the infrastructure.

As SciLifeLab is hosted by the four host universities, funding is to a large extent directed via the host universities to the operation and activities of SciLifeLab. This means that funding designated to activities other than specific facility funding (administration, nodes and investments in strategic recruitments and fellows) is distributed to host university level. In addition, funding to the facilities can be distributed directly to the facilities or forwarded via host universities. As platforms are a composition of several facilities, funding is only directed to facilities.

As such the results in this chapter is based on recipients at two levels[12] – 1) university, 2) facility.

This first section analyses funding distributed at host university level within SciLifeLab, as illustrated in Figure 4.1 below.

FIGURE 4.1
Analytical model – university level



4.1 Funding to SciLifeLab activities in addition to specific facility funding

As mentioned above, a vast majority of the distributed public funding at the university level is directed to facilities. This means that there is a difference between distributed and allocated funding. This section reports on the allocated funding while the distributed funding is described in Appendix 5.2.

Since 2010, 411 MSEK, equivalent to 40 percent, has been distributed to activities in SciLifeLab, in addition to funding of facilities. Public funding, consisting of national SciLifeLab funding, SRA funding and national funding designated to drug development, stand for a substantial share of the total funding. Taken together, public funding has increased over the entire period.

[12] The analysis is based on data provided at university level and facility level. The mapping of the distribution of funding to platforms is based on an aggregation of data provided by the individual facilities connected to the platform.

As shown in Figure 4.2, the public funding (National SciLifeLab funding, SRA-funding, National funding designated to drug development) amounted to 101 MSEK during 2010-2012, 110 MSEK 2013 and 137 MSEK 2014. The co-founding amounted to 25 MSEK, 24 MSEK and 14 MSEK the same years. Co-funding remained almost constant between the period 2010-2012 and 2013 but decreased with almost 50 percent in 2014, from 24 MSEK in 2013 to 14MSEK in 2014.

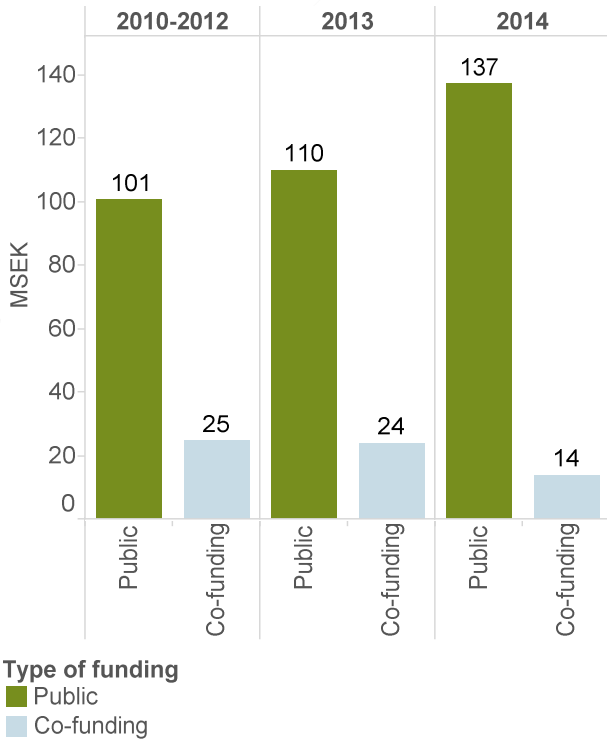
Figure 4.3 below describes the funding at university level divided by source of funding. During the period 2010-2012, SRA funding to SciLifeLab were 101 MSEK, while the co-funding amounted to 25 MSEK. In 2013, SciLifeLab was transformed into a national center, which increased the amount of national funding. In addition to SRA funding, national SciLifeLab funding and national funding designated to drug development, were distributed to SciLifeLab during 2013. The SRA funding at university level amounted to 85 MSEK, national SciLifeLab funding and national funding designated to drug development, amounted to 21 and 4 MSEK respectively. The co-funding from universities amounted to 24 MSEK.

In 2014, SRA funding amounted to 103 MSEK, national SciLifeLab funding amounted to 27 MSEK, and national funding designated to drug development to 7 MSEK. The co-funding from universities decreased slightly, to 14 MSEK.

Table 4.1 describes the distribution of public funding and co-funding by host university. KTH has taken the main responsibility for administration and rent distribution for SciLifeLab in Stockholm, and therefore has received the largest amount of national SciLifeLab funding, both during 2013 and 2014, 9,2 and 17,5 MSEK respectively.

In 2010-2012, SRA funding amounted to 101 MSEK. SU received the largest amount of funding, 31,5 MSEK. In 2013, UU received the largest amount of SRA funding, 27 MSEK. In 2014, KTH received the largest amount of resources at university level, 29,2 MSEK

FIGURE 4.2
Funding to SciLifeLab activities in addition to the specific facility funding (MSEK)



Source: DAMVAD (2015) based on data from SciLifeLab host universities and facilities

Most of the national funding designated to drug development is allocated to facilities, but a small share is used at university level at KTH and UU.

In 2010-2012, UU provided the largest share of the co-funding that remained at the university level, 15,6 MSEK. In 2013, KI co-funded the largest

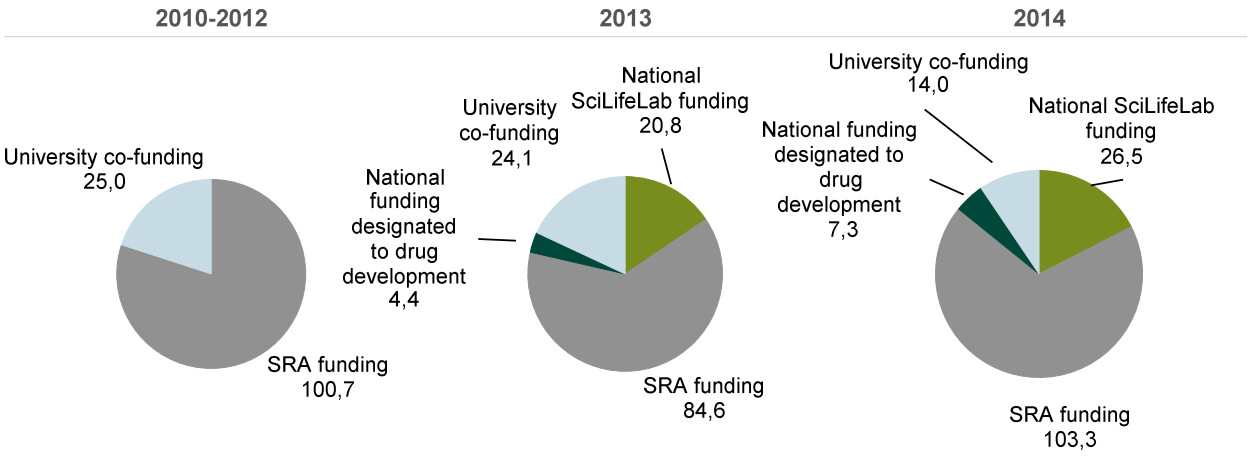
amount, 14 MSEK. In 2014, the total amount of co-founding was relatively small. UU provided the largest amount of co-funding 2014, namely 7,4 MSEK.

TABLE 4.1
Funding to SciLifeLab activities in addition to the specific facility funding, by university and year (MSEK)

Source of funding	University	2010-2012	2013	2014
National SciLifeLab funding	KTH	-	9.2	17.5
	KI	-	0.0	0.6
	SU	-	3.9	4.6
	UU	-	7.7	3.8
	Total	**-**	**20.8**	**26.5**
SRA-funding	KTH	22.3	11.6	29.2
	KI	21.4	22.2	17.2
	SU	31.5	23.8	28.4
	UU	25.4	27.0	28.5
	Total	**100.7**	**84.6**	**103.3**
National funding designated to drug development	KTH	-	2.5	4.7
	KI	-	0.0	0.0
	SU	-	0.0	0.0
	UU	-	1.9	2.6
	Total	**-**	**4.4**	**7.3**
Co-funding	KTH	-	0.0	1.7
	KI	6.8	14.0	2.9
	SU	2.6	1.5	2.0
	UU	15.6	8.6	7.4
	Total	**25.0**	**24.1**	**14.0**
Grand total		**125.7**	**133.8**	**151.1**

Source: DAMVAD (2015) based on data from SciLifeLab host universities and facilities

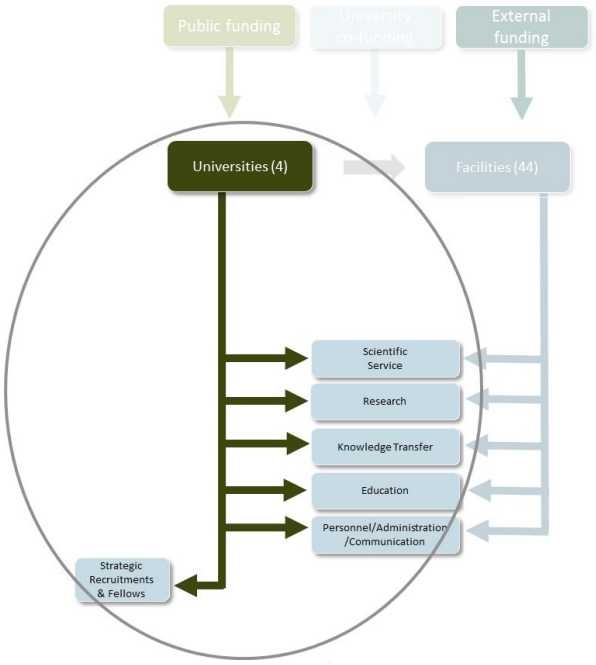
FIGURE 4.3
Funding to SciLifeLab activities in addition to the specific facility funding, by type of funding source (MSEK)



4.2 Purpose and usage of the funding distributed to SciLifelab

In this section, we focus on how the funding has been used and for which purpose. We follow the funding on university and facility level, illustrated in Figure 4.4 below.

FIGURE 4.4
Analytical model – purpose and usage of funding



In addition to declare the amount of resources distributed among units within SciLifeLab, the respondents were also asked to estimate for what specific purpose the funding was used. The categories available were:[13]

- Scientific Service
- Research
- Knowledge Transfer
- Education
- Personnel/Administration/Communication
- Strategic Recruitments/ SciLifeLab Fellows (only university level)
- Other

The allocation of resources is primarily based on estimates, and should be regarded as an indication of how the resources are used, rather than exact figures.

The universities were asked to categorise the allocated, transferred resources to SciLifeLab, analogue to the data in Table 5.1 in the Appendix. We have calculated the amount of resources distributed to each category. Each university allocated each type of funding (National SciLifeLab funding, SRA funding, National funding designated to drug development and co-funding) to the different categories.[14] Each university allocated each funding source into the categories depicted above.

The usage of the resources at university level is depicted in Figure 4.5. From the categorisation of resources at university level, we find that almost 600 MSEK (equivalent to 60% of the funding) is estimated to have been allocated to scientific service related to SciLifeLab during 2010-2014. 146 MSEK (14%) was allocated to personnel, administration and communication. 86 MSEK (8%) has been allocated to strategic recruitments and SciLifeLab fellows, while

77 MSEK (8%) is allocated to research within SciLifeLab. Education and knowledge transfer are two relatively small posts, as about 17 MSEK (2%) has

[13] See section 1.3 for definitions of each category.

[14] Uppsala University´s allocation of funding was based aggregated values – no division between different types of funding where made.

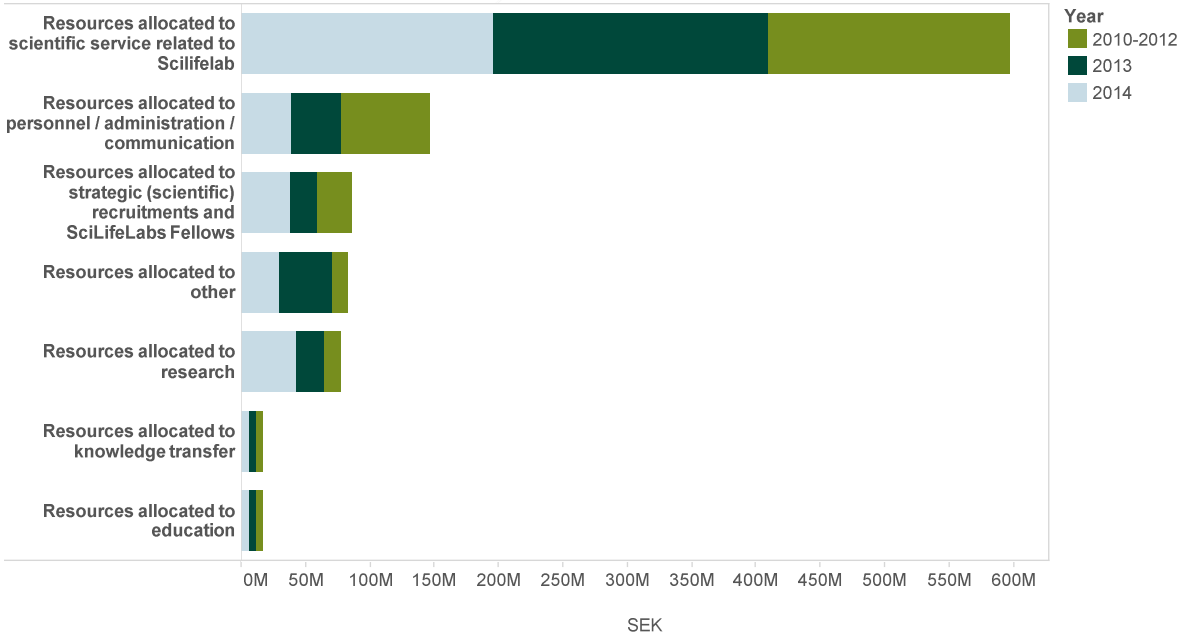
been allocated to these activities respectively during the period.

4.3 Funding distributed to individual platforms

In this section, we describe the total funding to each of SciLifeLabs platforms. The data is based on aggregated data reported by facilities. While this section focus on the platforms, we expand the analysis further in section 4.4, where the total funding to individual facilities and the properties of the funding is described.

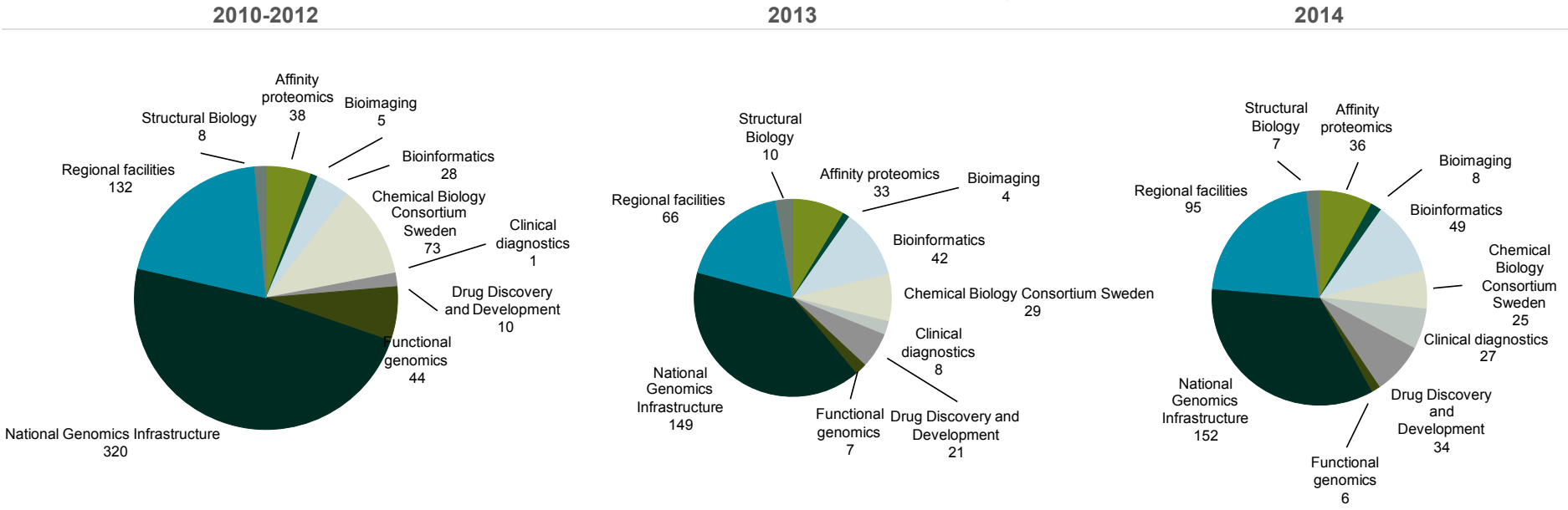
In Figure 4.6, the aggregated funding to platforms is presented. The data can also be regarded as a proxy for the relative size of each platform. Funding to facilities within National Genomics Infrastructure covers a large part of SciLifeLab funding, although the relative size of the platform has decreased slightly during the period. In 2010-2012, the platform made up half of SciLifeLabs infrastructure environment. In 2014, the platform represented a third of the total funding. The regional facilities are regarded as a single entity in Figure 4.6. Together, they receive almost a quarter of the total funding to facilities within SciLifeLab.

FIGURE 4.5
Purpose and usage of allocated at university level, by year (MSEK)



Source: DAMVAD (2015) based on data from SciLifeLab host universities and facilities
Note: Estimated values – not to be regarded as exact figures.

FIGURE 4.6
Total funding to individual platforms (and regional facilities), by year (MSEK)

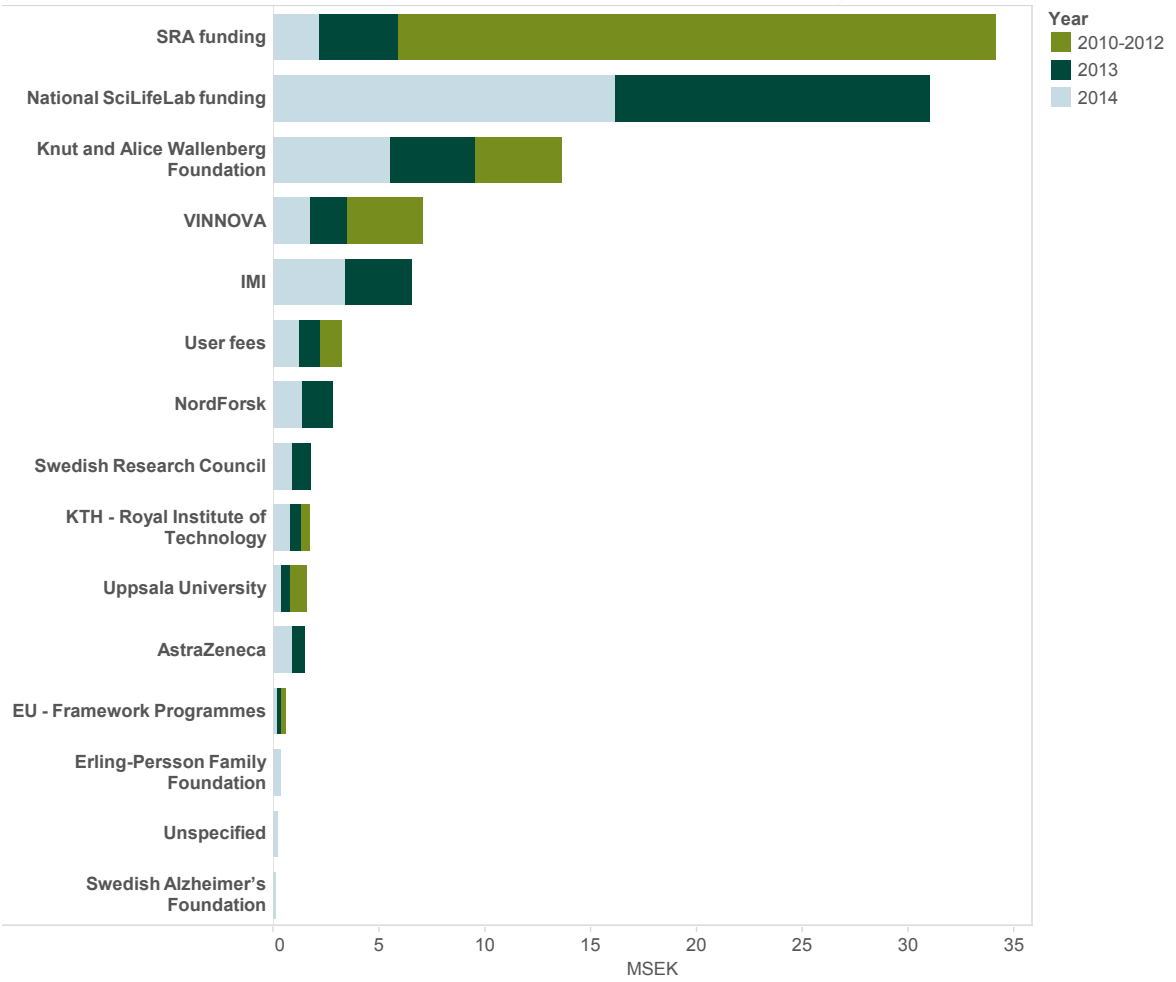


Source: DAMVAD (2015) based on data from SciLifeLab host universities and facilities

Figure 4.7 - Figure 4.24 describes the amount of funding distributed at the platform level, by year and type of funding source.

Affinity Proteomics is described in Figure 4.7, and has received funding from a relatively large number of financiers, 14 identified and 1 additional unspecified source. The largest amount of funding has been granted in form of SRA funding and national SciLifeLab funding, although a change through the years can be seen. A large amount of SRA funding was granted during 2010-2012, 28 MSEK. The SRA funding have decreased substantially since then, and both during 2013 and 2014 national SciLifeLab funding was the largest source of funding. The platform has also received 15 MSEK from Knut and Alice Wallenberg's foundation during the period 2010-2014. A small source of financing is user fees, which amounts to 3 MSEK during 2010-2014. Among the

FIGURE 4.7
Total funding to the platform Affinity Proteomics, by year (MSEK)



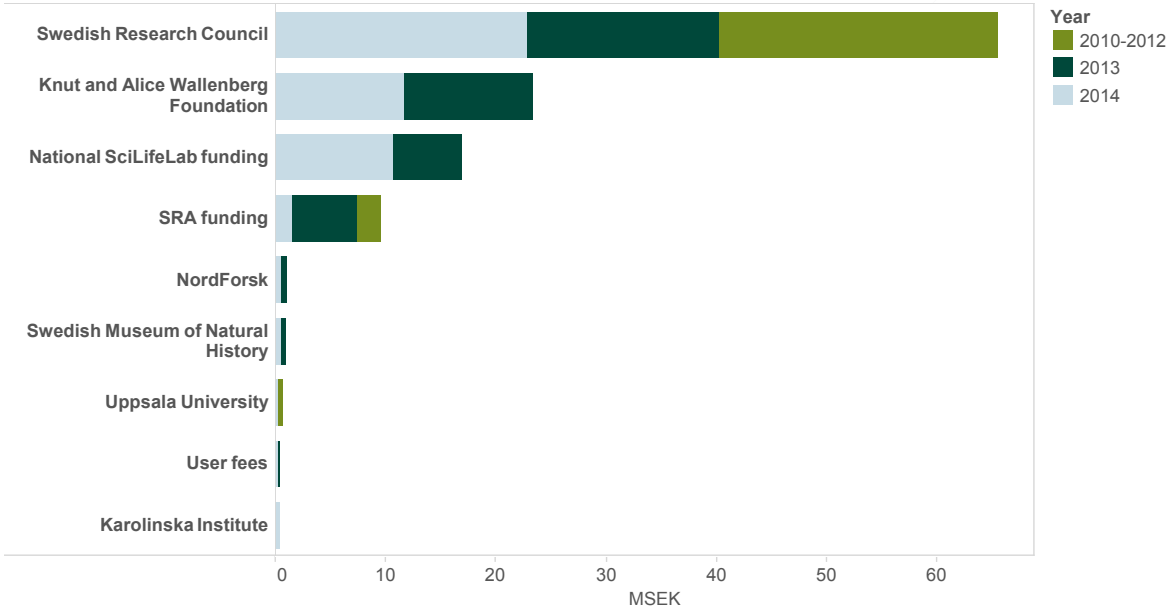
Source: DAMVAD (2015) based on data from SciLifeLab host universities and facilities

other financiers we find VINNOVA, IMI, Nordforsk and the Swedish Research Council.

Bioimaging is a relatively small platform, which has received funding from three sources during 2010-2014 - national SciLifeLab funding, SRA funding and funding from the Swedish Research Council. Most of the funding has been received in form of SRA funding, although the largest source during 2014 was national SciLifeLab funding.

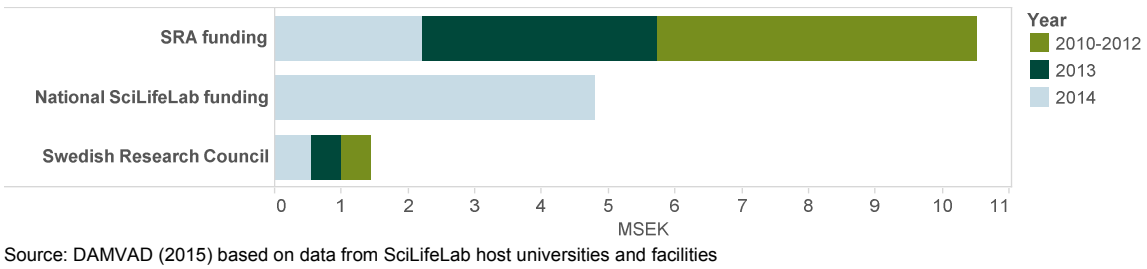
Bioinformatics has received most of its funding from the Swedish Research Council, 65 MSEK during the period 2010-2014. Another large contributor is Knut and Alice Wallenberg Foundation, which has funded

FIGURE 4.8
Total funding to the platform Bioinformatics, by year (MSEK)



Source: DAMVAD (2015) based on data from SciLifeLab host universities and facilities

FIGURE 4.9
Total funding to the platform Bioimaging, by year (MSEK)



Source: DAMVAD (2015) based on data from SciLifeLab host universities and facilities

the platform with an amount of 23 MSEK during the same period.

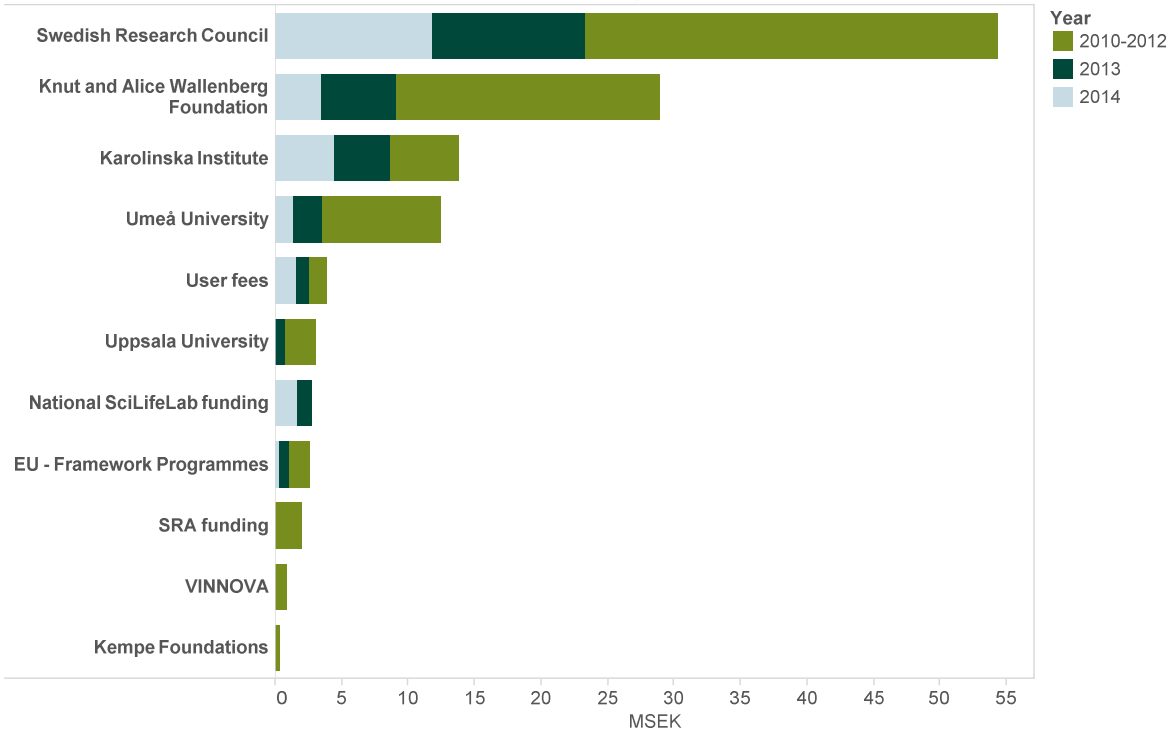
Chemical Biology Consortium Sweden is a platform with a relatively large number of financiers. Some of the funding is provided by national SciLifeLab funding and SRA funding, but the largest contributor to the platform has been the Swedish Research Council, which has contributed with 54 MSEK during 2010-2014.

Another large contributor is Knut and Alice Wallenberg Foundation. The foundation has funded the platform with 29 MSEK during the period.

The platform has received university co-funding from Karolinska Institute, (14 MSEK) Umeå University (13 MSEK) and Uppsala University (3 MSEK) during the period.

Among the other financiers we find EU framework programmes, VINNOVA and the Kempe Foundations.

FIGURE 4.10
Total funding to the platform Chemical Biology Consortium Sweden, by year (MSEK)



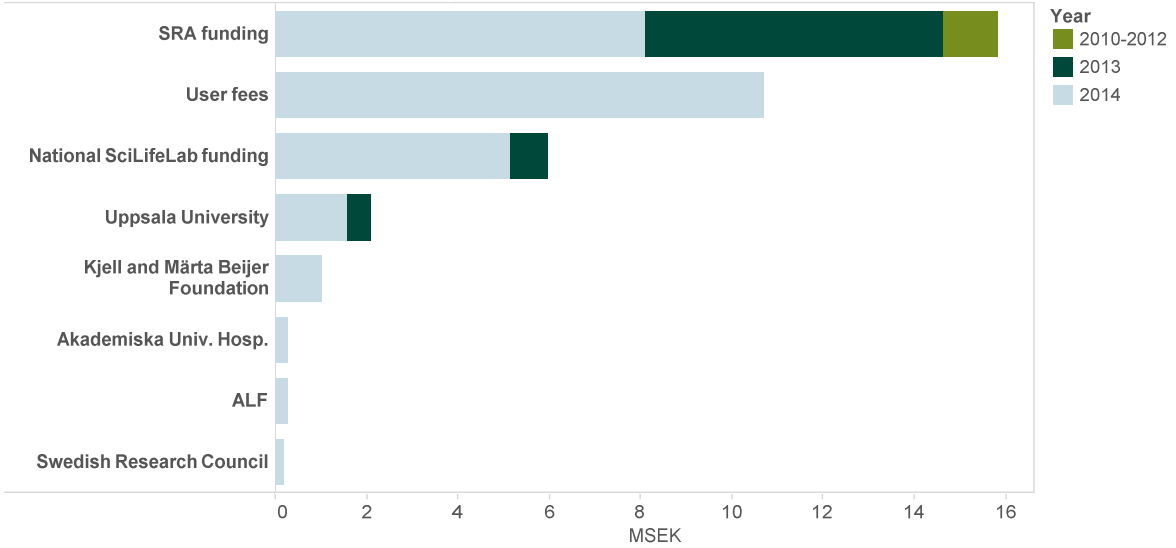
Source: DAMVAD (2015) based on data from SciLifeLab host universities and facilities

Clinical Diagnostics, which started its operation in 2013, has expanded its operations during 2014. In 2013, the main type of funding was SRA funding. A total of 8 MSEK was provided in the form of SRA funding during the period. During the same period, some funding was provided from national SciLife-Lab funding and university co-funding from Uppsala University.

In 2014, SRA funding (8 MSEK) and national SciL-ifeLab funding (5 MSEK) are important sources of funding, although user fees is the largest source of funding for the platform (11 MSEK).

In addition to the mentioned financiers, funding has been provided by Kjell and Märta Beijer Foundation, Akademiska University Hospital, ALF and the Swe-dish Research Council.

FIGURE 4.11
Total funding to the platform Clinical Diagnostics, by year

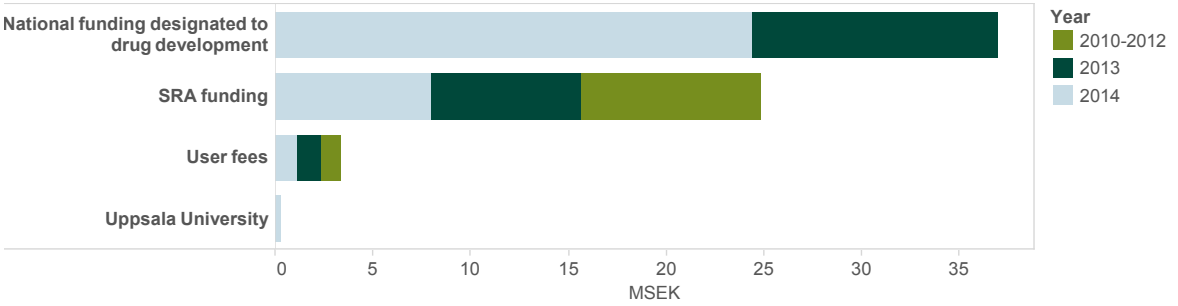


Source: DAMVAD (2015) based on data from SciLifeLab host universities and facilities

Drug Discovery and Development, which started its operations in 2013, is mainly funded by National funding designated to drug development, 37 MSEK during 2013-2014. Another important source of funding is SRA funding, 25 MSEK during 2013-2014. Some of the funding is received in the form of user fees and university co-funding from Uppsala University.

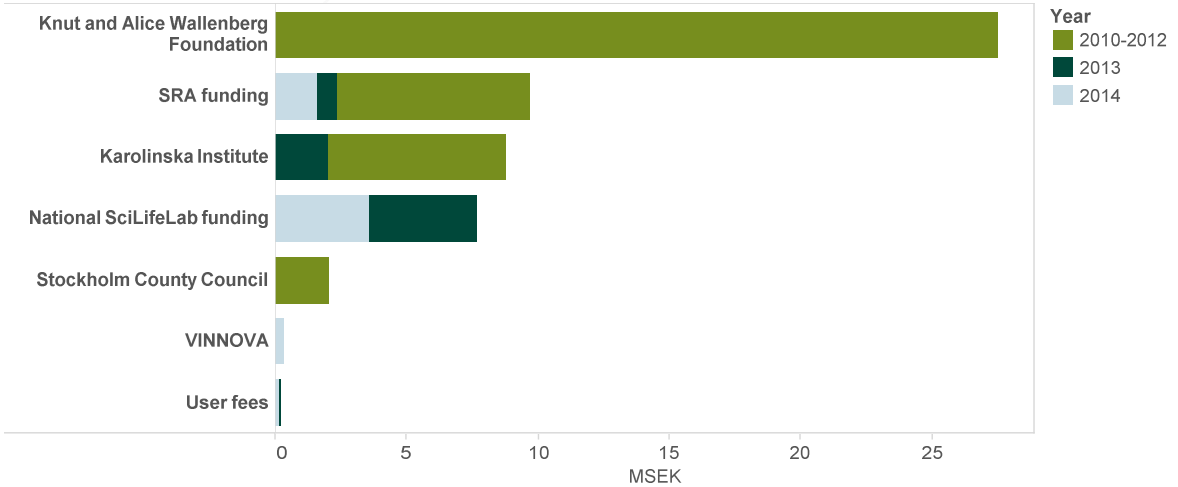
Functional Diagnostics received a large amount of funding from Knut and Alice Wallenberg Foundation 2010-2012, 27,5 MSEK. During the same period, the platform received 7 MSEK in the form of SRA funding, and 7 MSEK from Karolinska Institute. Today, the largest source of funding is National SciLifeLab funding, which covered 4 MSEK during 2014.

FIGURE 4.12
Total funding to the platform Drug Discovery and Development, by year



Source: DAMVAD (2015) based on data from SciLifeLab host universities and facilities

FIGURE 4.13
Total funding to the platform Functional Diagnostics, by year

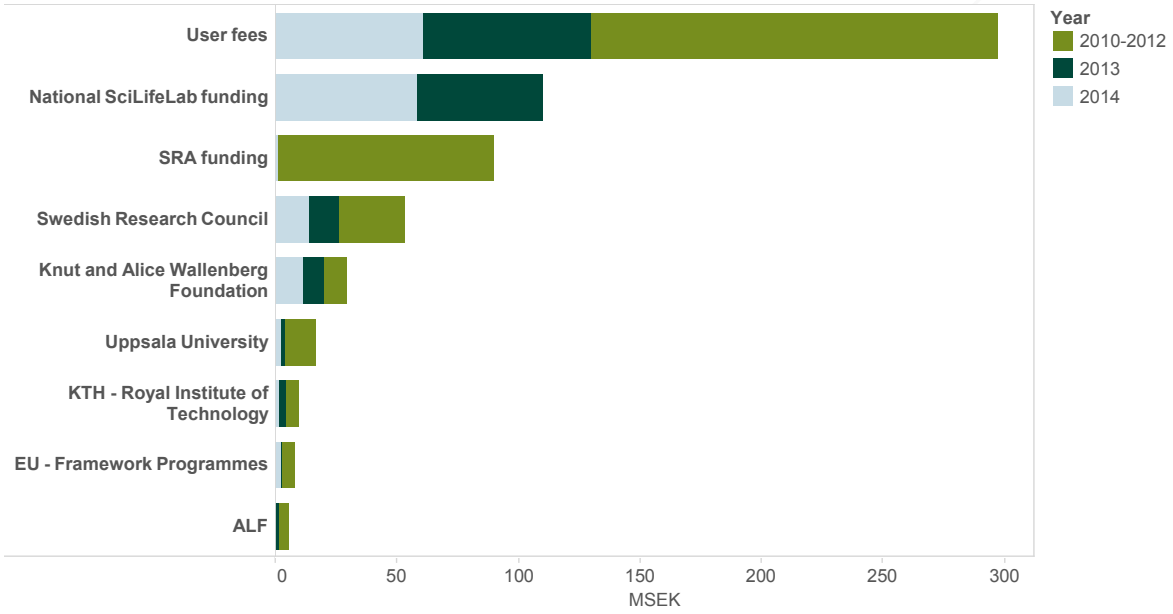


Source: DAMVAD (2015) based on data from SciLifeLab host universities and facilities

National Genomics infrastructure is a platform that operates quite differently compared to the other platforms. The vast majority of the funding to the platform comes in the form of user fees. The platform has received 300 MSEK in user fees during 2010-2014. In 2014, the second largest source of funding was National SciLifeLab funding (58 MEK). Other important sources of funding 2014 was the Swedish Research Council and Knut and Alice Wallenberg Foundation.

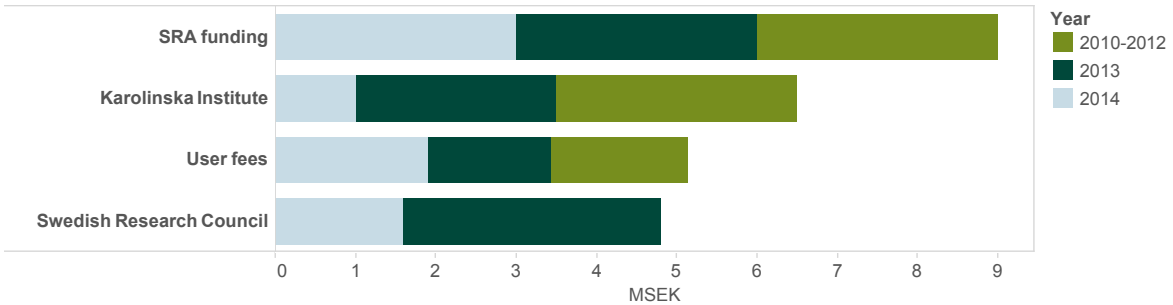
Structural Biology is a relatively small platform. It has received most of its funding in the form of SRA funding, 9 MSEK, during 2010-2014. Other sources

FIGURE 4.14
Total funding to the platform National Genomics Infrastructure, by year



Source: DAMVAD (2015) based on data from SciLifeLab host universities and facilities

FIGURE 4.15
Total funding to the platform Structural Biology, by year



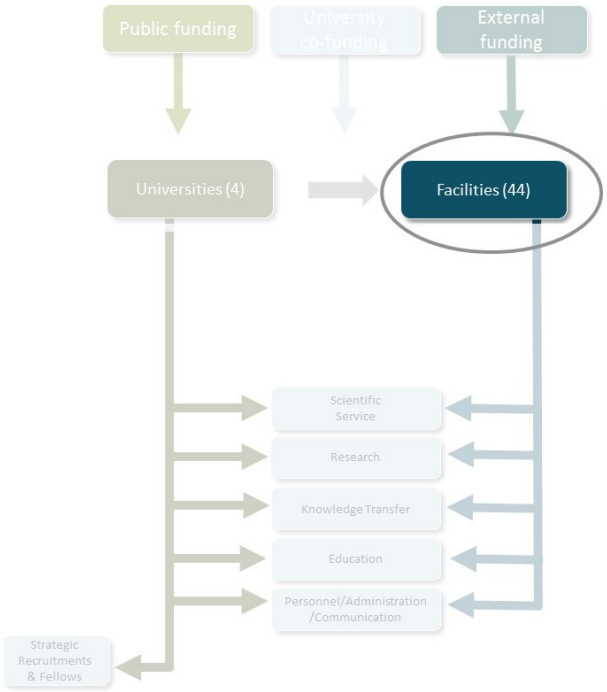
Source: DAMVAD (2015) based on data from SciLifeLab host universities and facilities

of funding have been the Swedish Research Council, university co-funding from Karolinska Institute and user fees.

4.4 Total funding to facilities

This section covers the funding distributed to the facilities within SciLifeLab. The step of the analysis is illustrated in Figure 4.16 below. The data includes all types of funding used at facility level, and is based on the self-reporting schemes sent to facility managers who has compiled the data with support from platform managers and financial accountants at the host universities.

FIGURE 4.16
Analytical model – facility level



In Figure 4.17 the total amount of funding to facilities is presented. During the period 2010-2012, the funding from public and external sources were about the same, 288 MSEK and 279 MSEK respectively. As SciLifeLab turned into a national infrastructure 2013, the amount of public funding increased both in absolute and relative terms on a yearly basis.

Public funding amounted to 200 MSEK and 237 MSEK during 2013 and 2014 respectively. External funding amounted to 133 and 160 MSEK respectively.

Compared to public and external funding, university co-funding makes up a relatively small funding source. In 2013, 34 MSEK were allocated to facilities in the form of university co- funding. In 2014, the funding was 40 MSEK.[15]

The funding to the facilities is summarized in Table 4.2 below.

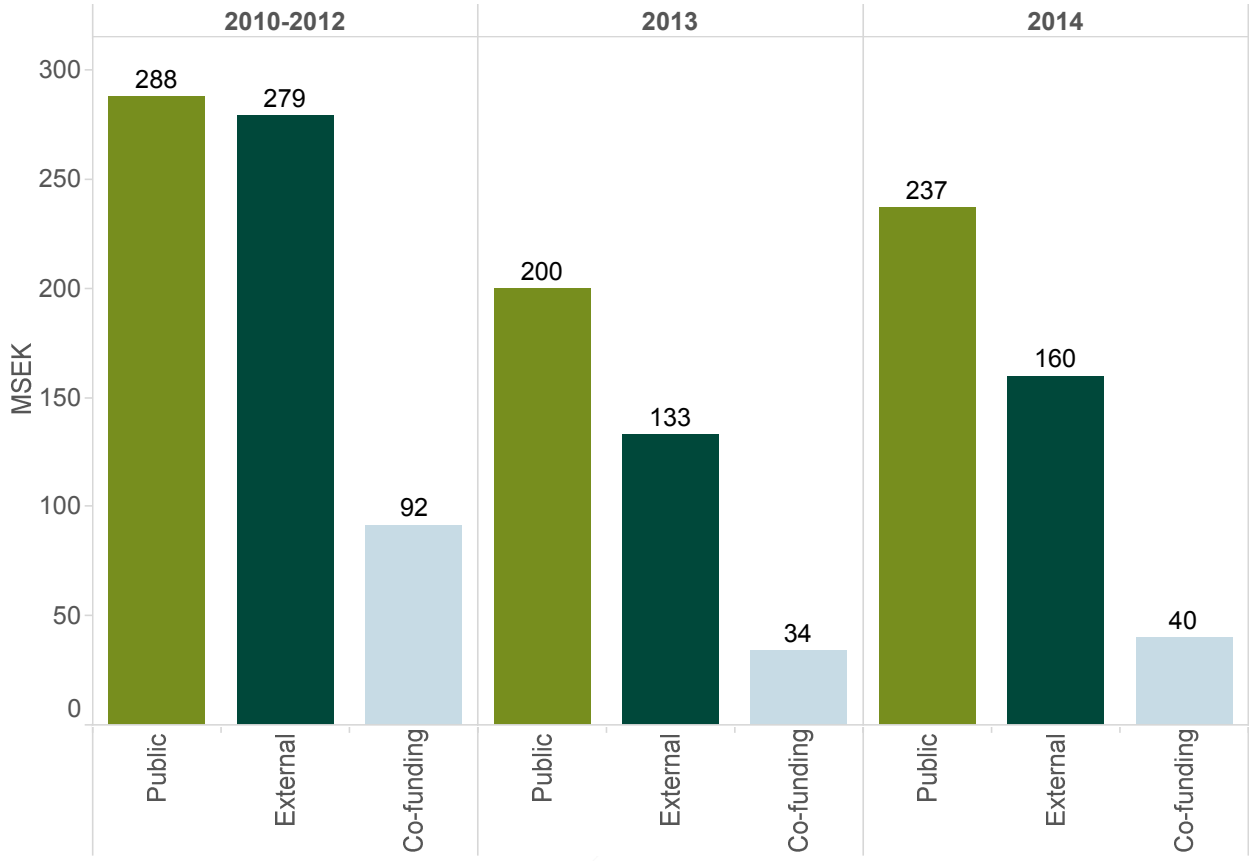
TABLE 4.2
Total funding to facilities by category of funding and year (MSEK)

Category of funding	2010-2012	2013	2014	Total
Public	288 (44%)	200 (55%)	237 (54%)	726 (50%)
External	279 (42%)	133 (36%)	160 (37%)	572 (39%)
University co-founding	92 (14%)	34 (9%)	40 (9%)	166 (11%)
Grand total	659	368	437	1.463

Source: DAMVAD (2015) based on data from SciLifeLab host universities and facilities

[15] In addition to the four host universities, this category also include co-funding from Umeå University and Linköping University.

FIGURE 4.17
Distribution of total funding to facilities, by category of funding and year (MSEK)



Source: DAMVAD (2015) based on data from SciLifeLab host universities and facilities

Note: Share of funding per year in parenthesis.

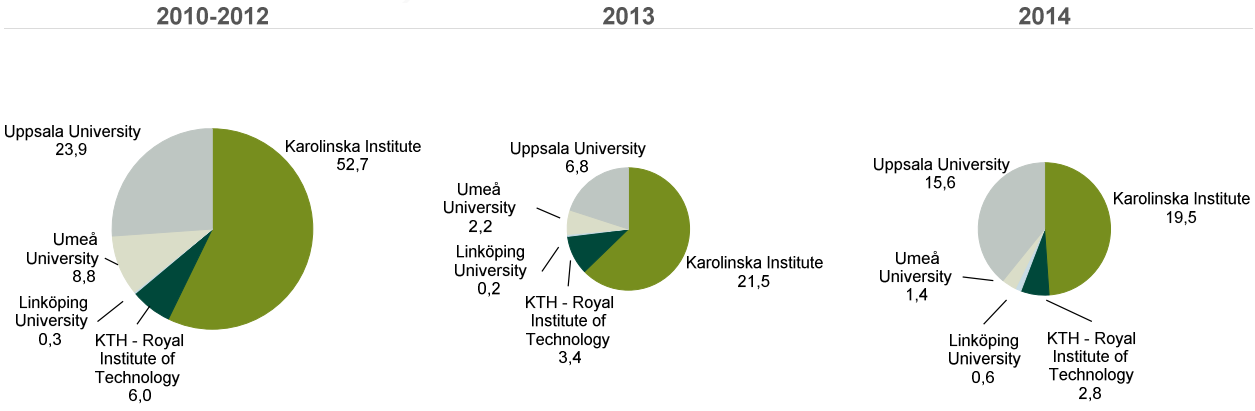
In Figure 4.18 we show the co-funding to facilities by year and university. The shares are basically equivalent to the allocations visualised in Figure 3.3. Karolinska Institute has been the largest co-funder to facilities, while Uppsala University has been the second largest contributor. No facilities has declared any co-funding from Stockholm University.

Figure 4.19 describes the funding sources to facilities. The bubbles in the figure describe individual sources of funding. The colour of the bubbles indicates the type of funding (public, external and university co-funding).

As depicted in the figure, user fees is a large funding source for the facilites. More than 400 MSEK has been distributed to SciLifeLab in the form of user fees during 2010-2014. During 2010-2012, the user fees amounted to 208 MSEK. During 2013 and 2014, the two years SciLifeLab has been a national infrastructure, the user fees amounted to 91 MSEK and 104 MSEK respectively. Worth noticing though is that the platform National Genomics Infrastructure covers a large part of user fees to SciLifeLab (300 MSEK during 2010-2014, c.f. Figure 4.14). If the facilities within this platform were to be excluded from the figure, user fees would not cover such a significant part of the funding.[16] The significant amount of user fees within National Genomics Infrastructure is explained by that the reagents for this type of analysis are very expensive, even though the costs have declined significantly in recent years.

Among the public funding sources, national SciLifeLab funding and SRA funding cover a large part of the funding distributed to facilities. 271 MSEK has

FIGURE 4.18
University co-funding to platforms, by university and year (MSEK)



Source: DAMVAD (2015) based on data from SciLifeLab host universities and facilities

[16] The facilities within the platform are NGI Stockholm (Genomics Applications), NGI Stockholm (Genomics Production), NGI Uppsala (SNP&SEQ Technology Platform) and NGI Uppsala (Uppsala Genome Center)

been distributed in the form of SRA funding 2014-2014, while national SciLifeLab funding cover 178 MSEK during the same period. SRA funding amounted to 52 MSEK and 50 MSEK in 2013 and 2014, and national SciLifeLab funding amounted to 79 MSEK and 100 MSEK during the same periods. The Swedish Research Council also represents a large part of the public funding with 50 MSEK and 54 MSEK during 2013 and 2014 respectively.

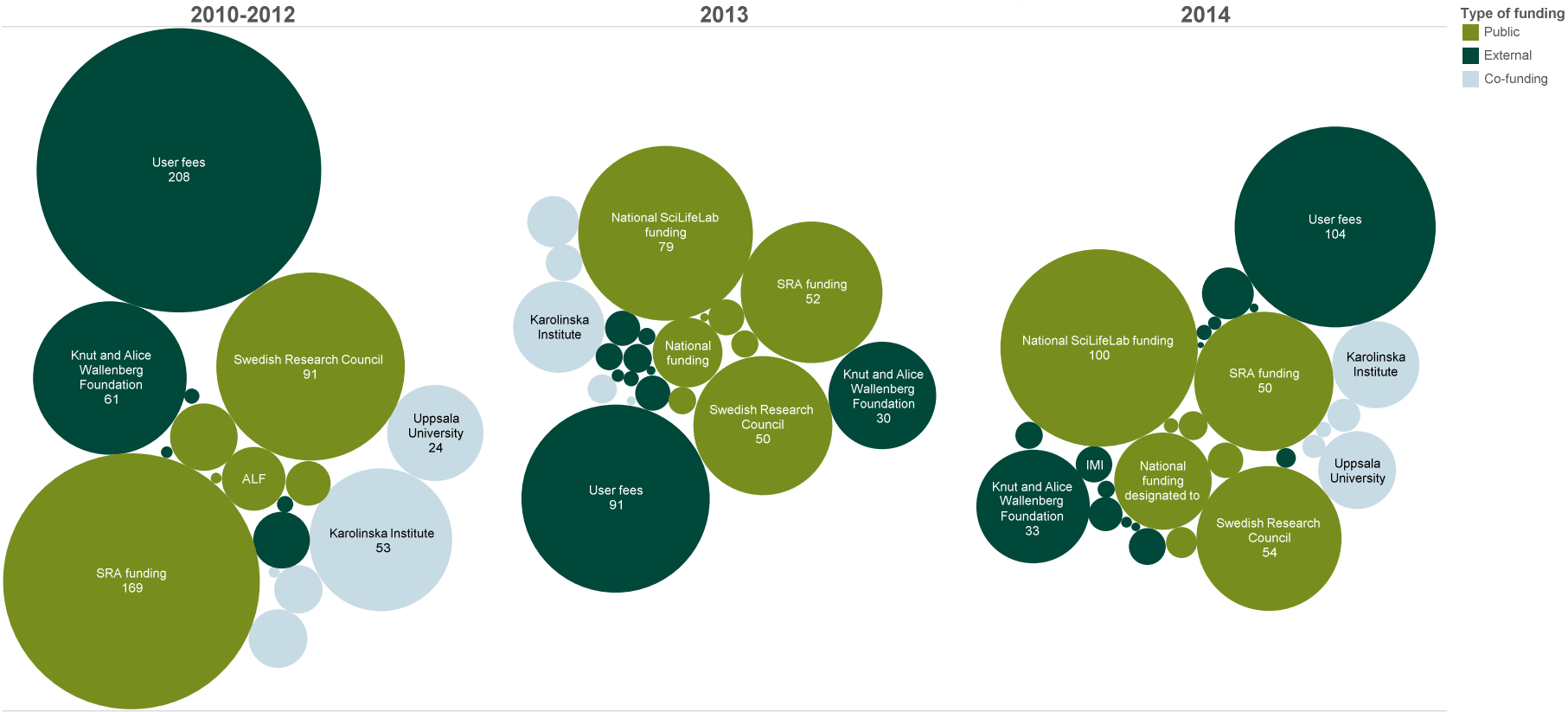
Among external sources of funding Knut and Alice Wallenberg Foundation (KAW) represents a large part of the funding. The foundation has contributed with 61 MSEK during 2010-2012, 30 MSEK during 2013 and 33 MSEK during 2014.

Figure 4.20 describes the total funding to the facilities, divided by the following categories:

- National government (National SciLifeLab funding, SRA funding and national funding designated to drug development)
- Governmental agencies
- Other public resources
- Foundations / funds
- Private companies
- EU / International funding
- University co-funding
- User fees

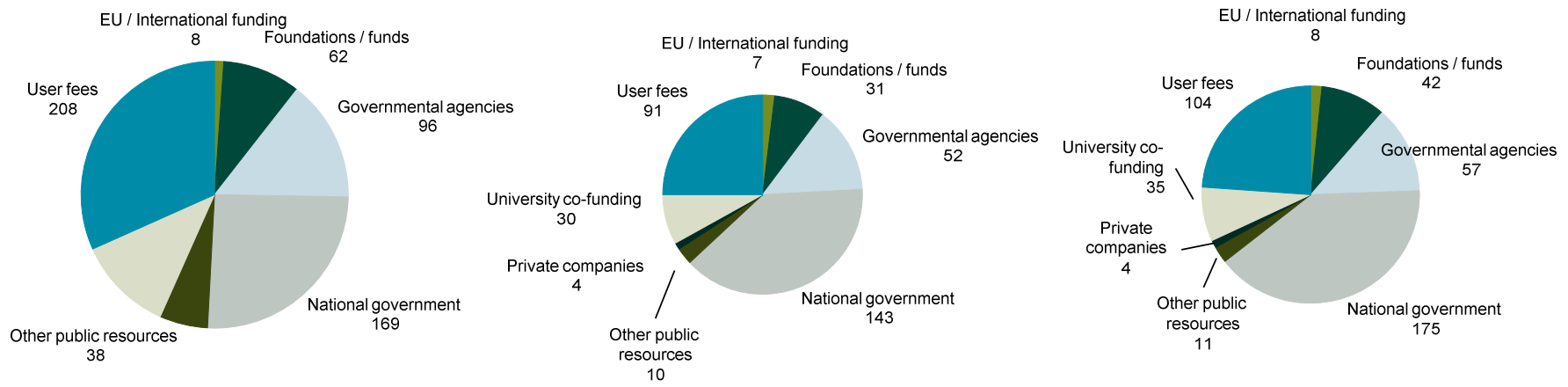
User fees represents a quarter of the total funding to facilities 2013 and 2014. Funding from the national government, governmental agencies and other public funding sources represents half of the funding to facilities. The last quarter of funding consists of funding from private companies, foundations and funds, university co-funding and EU / international funding.

FIGURE 4.19
Funding sources on facility level, by category of funding and year (MSEK)



Source: DAMVAD (2015) based on data from SciLifeLab host universities and facilities

FIGURE 4.20
Type of funding sources, facility level, by year(MSEK)

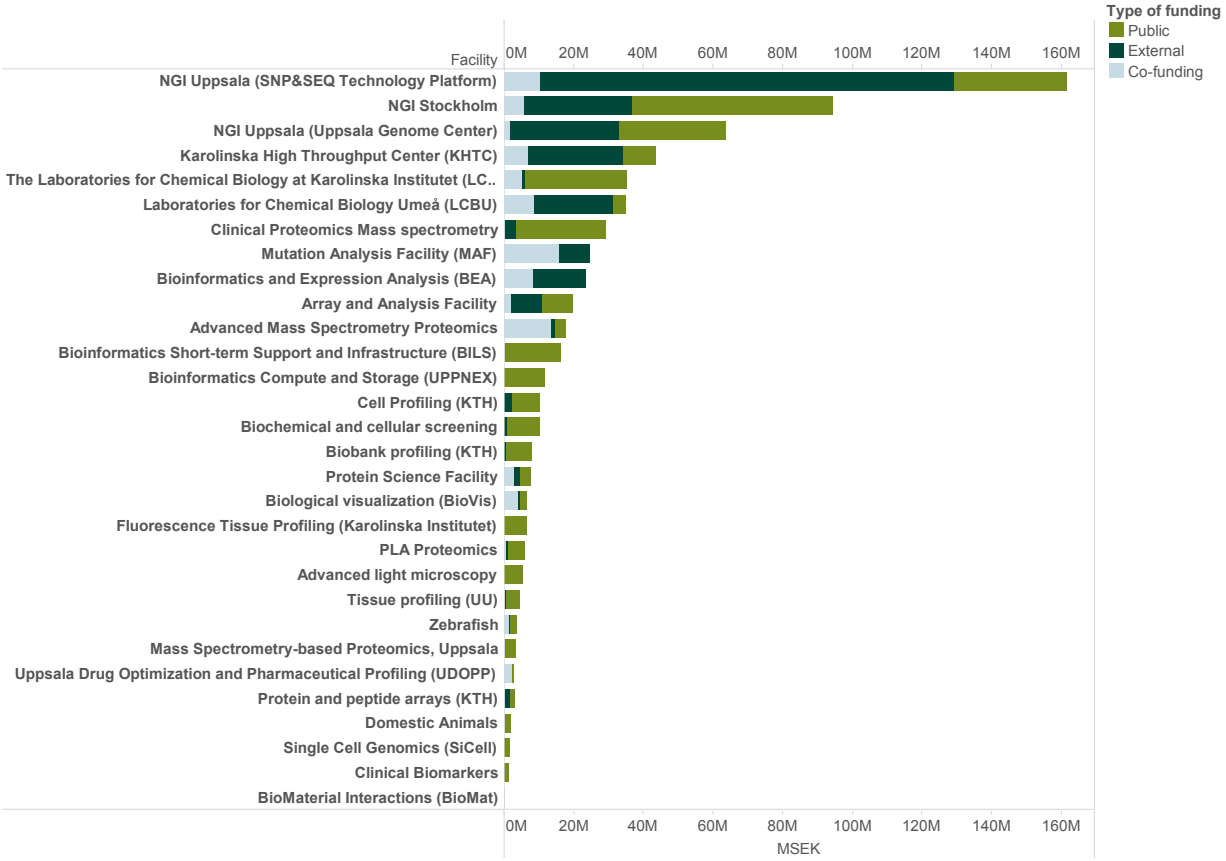


Source: DAMVAD (2015) based on data from SciLifeLab host universities and facilities

4.4.1 Funding distributed to individual facilities

Figure 4.21 - Figure 4.23 shows the total amount of funding to individual facilities in the three time periods we focus on in this analysis, 2010-2012, 2013 and 2014. Note that the number of facilities increase during the three periods. During 2010-2012, 30 facilities received funding – in 2014 the number of reporting facilities in the analysis increased to 42.[17] In 2010-2012, NGI Uppsala (SNP & SEQ Technology Platform) received most of the resources, although most of this is in the form of user fees. The second largest facility measured by amount of funding is NGI Stockholm.[18]

FIGURE 4.21
Distribution of total funding to facilities 2010-2012, by category of funding (MSEK)



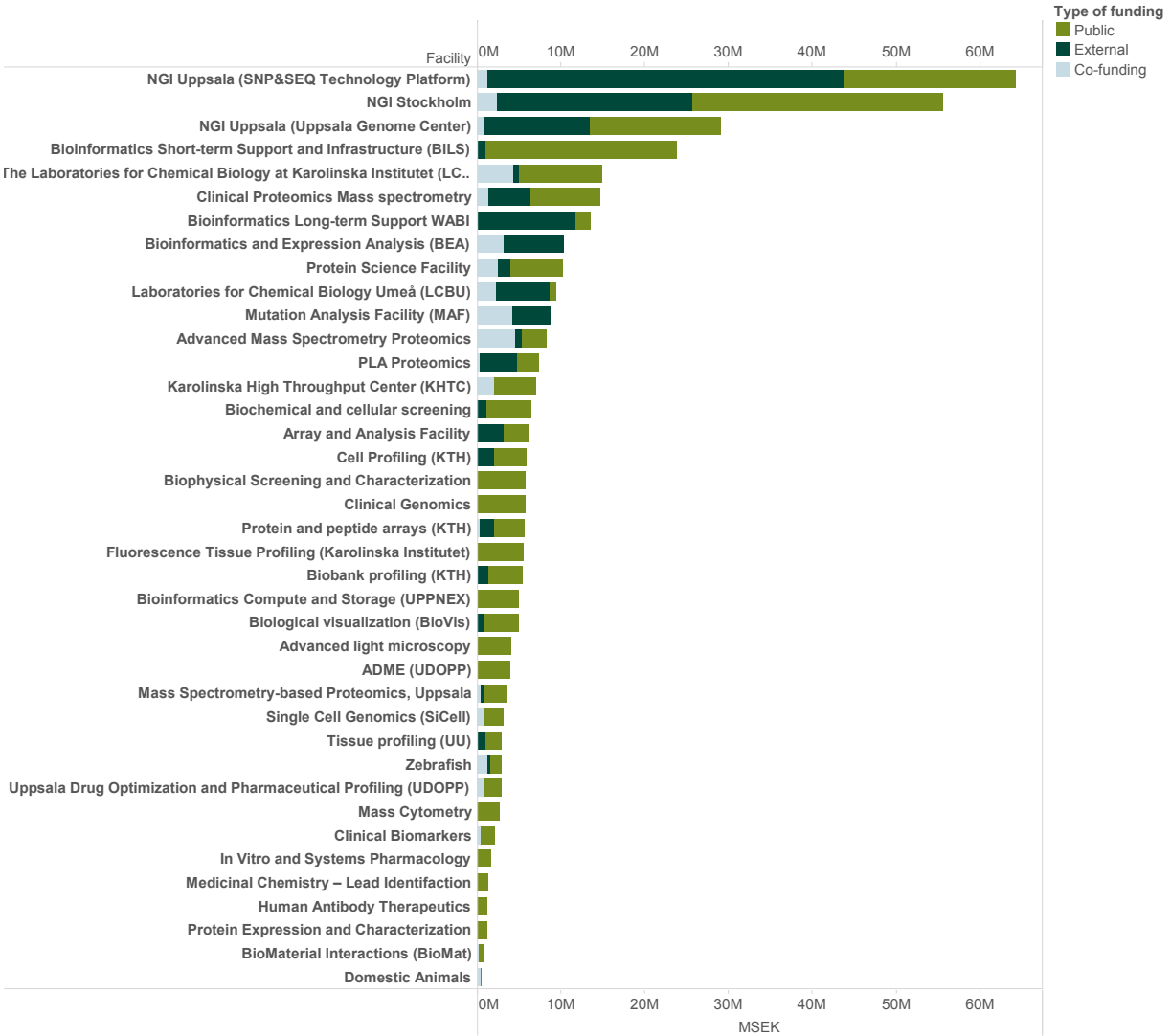
Source: DAMVAD (2015) based on data from SciLifeLab host universities and facilities

[17] Note that some facilities where combined and responded with a single report. The present total number of facilities are 44.
[18] NGI Stockholm consists of two individual facilities – Genomics Applications and Genomics Production. As they cooperate extensively and share much of the instruments, a single self report scheme representing both facilities was declared.

In Figure 4.22, the total funding to individual facilities during 2013 is shown. Note that the axis has different scales compared to Figure 4.21. Yet again, SNP & SEQ Technology Platform has received the largest amount of funding, while the two NGI facilities in Stockholm received the second largest amount.

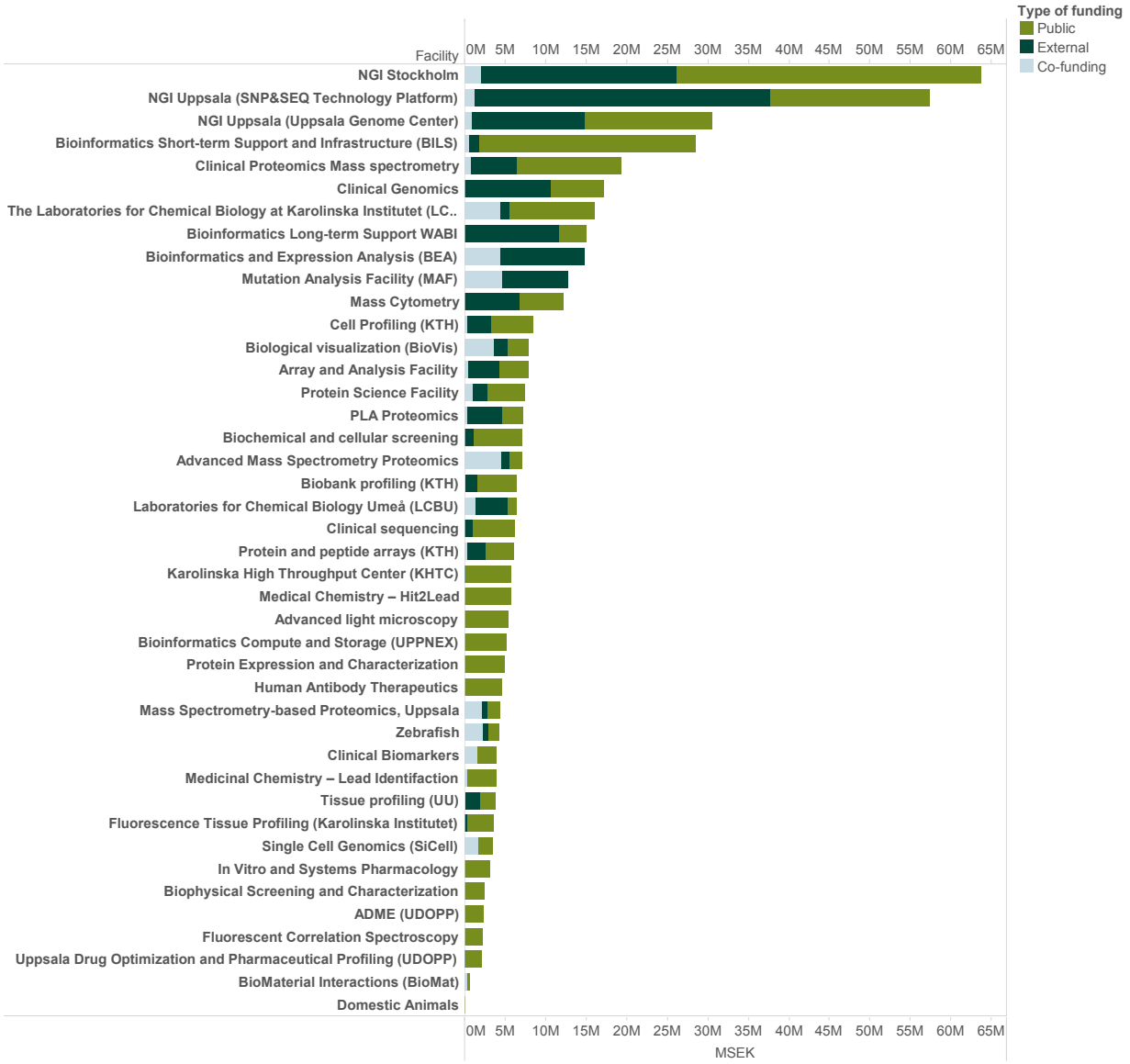
Figure 4.23 shows the total funding to facilities during 2014. This year, the NGI facilities in Stockholm received the largest amount of funding.

FIGURE 4.22
Distribution of total funding to facilities 2013, by category of funding (MSEK)



Source: DAMVAD (2015) based on data from SciLifeLab host universities and facilities

FIGURE 4.23
Distribution of total funding to facilities 2014, by category of funding (MSEK)

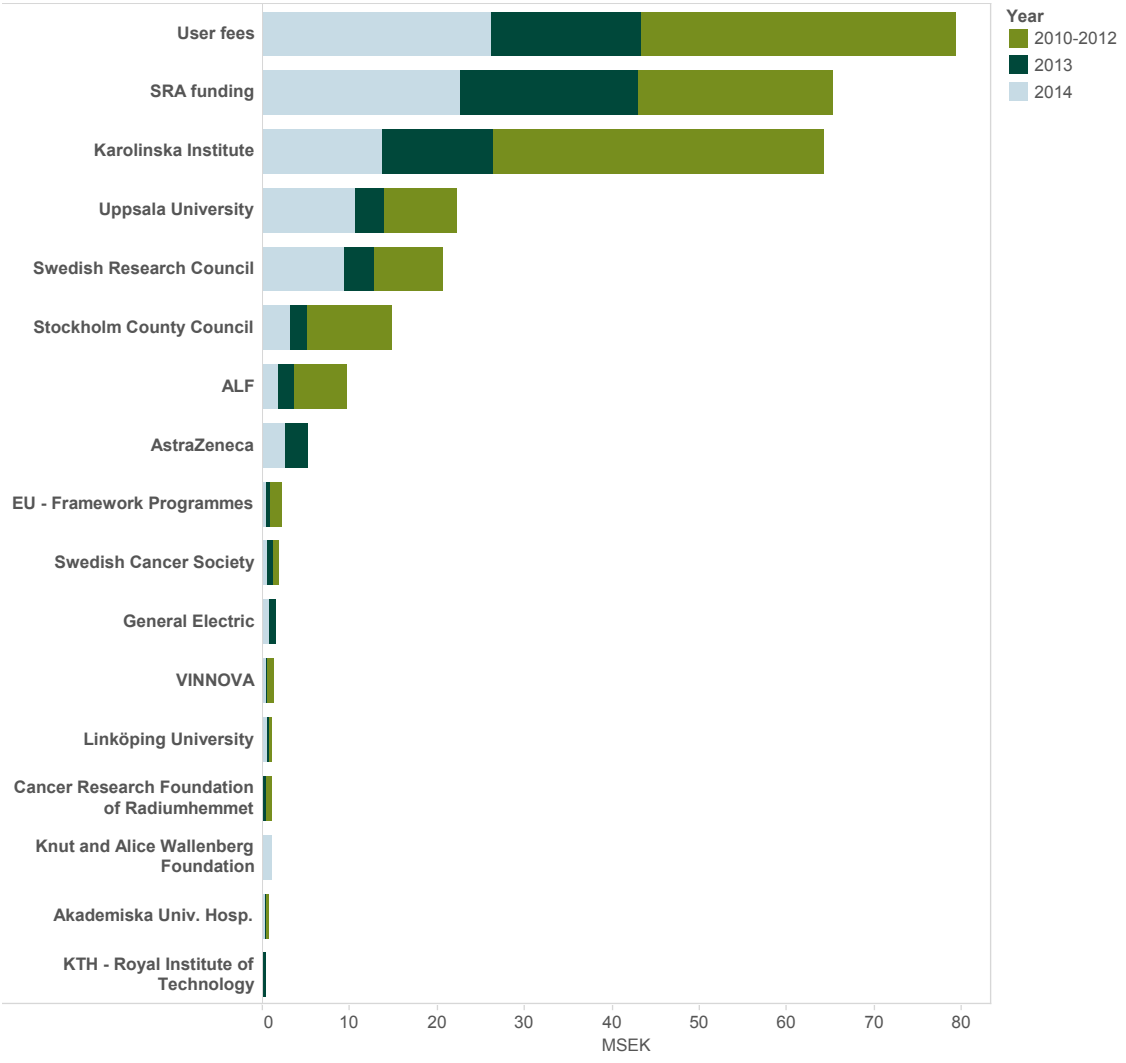


Source: DAMVAD (2015) based on data from SciLifeLab host universities and facilities

Regional facilities do not form a distinct platform. They are diverse and have a large numbers of financiers. Although most of its funding comes in the form of user fees, 79 MSEK during 2010-2014, a large amount of funding has also been provided by SRA funding (66 SMEK) and co-funding from Karolinska Institute (64 MSEK).

Other notable sources of funding is co-funding from Uppsala University, the Swedish research Council and Stockholm County Council.

FIGURE 4.24
Total funding to regional facilities, by year



Source: DAMVAD (2015) based on data from SciLifeLab host universities and facilities

In Table 4.3 below, we summarize the maximum, mean, median and minimum values of funding to individual facilities in each
period.

In the period 2010-2012, the maximum amount of funding to a single facility was 161 MSEK, while the least amount of funding to a facility was 0,4 MSEK. The mean value was 22 MSEK and the median was 9 MSEK.

Both in 2013 and 2014, the maximum amount of resources to an individual facility was 64 MSEK (NGI Uppsala SNP & SEQ Technology Platform and NGI Stockholm respectively. The mean value of funding to facilities were 9 and 10 MSEK in 2013 and 2014. The median values were slightly lower – 6 MSEK both years. The minimum amount of funding to a single facility was 0,5 MSEK 2013 and 0,1 MSEK 2014.

TABLE 4.3

Summary statistics of total funding to facilities (MSEK)

Variable	2010-2012	2013	2014
Maximum	161	64	64
Mean	22	9	10
Median	9	6	6
Minimum	0,4	0,5	0,1

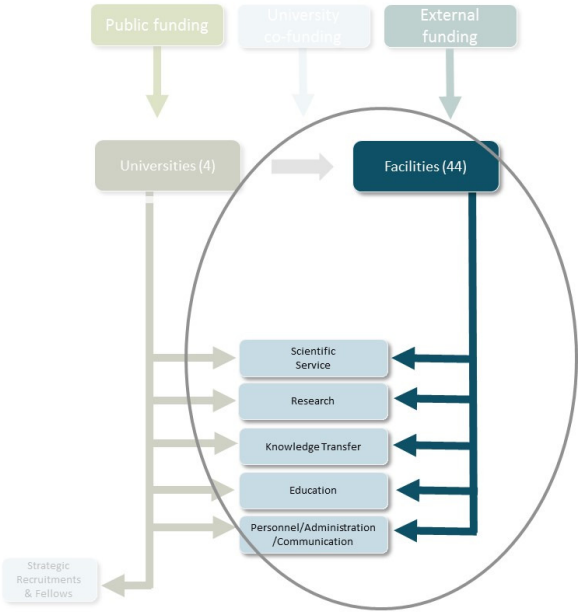
Source: DAMVAD (2015) based on data from SciLifeLab host universities and facilities

4.4.2 Purpose and usage of funding to facilities

In this section, we focus on how and for which purpose the funding to facilities has been used. This step is illustrated in Figure 4.25 below.

Analytical model – purpose and usage of funding

FIGURE 4.25



In addition to declare the amount of resources distributed among units within SciLifeLab, the respondents were also asked to estimate for what specific purpose the funding was used. The categories available were:[19]

[19] See section 1.3 for definitions of each category.

- Scientific Service
- Research
- Knowledge Transfer
- Education
- Personnel/Administration/Communication
- Other

The allocation of resources is primarily based on estimates, and should be regarded as an indication of how the resources are used, rather than exact figures.

As described in Figure 4.26 below, more than 1.000 MSEK (75%) of the funding has been used for scientific service during 2010-2014. 153 MSEK (11%) has been allocated to personnel / administration / communication while 88 MSEK (6%) has been allocated to research. Resources to knowledge transfer and education has been 44 MSEK (3%) and 25 MSEK (2%).

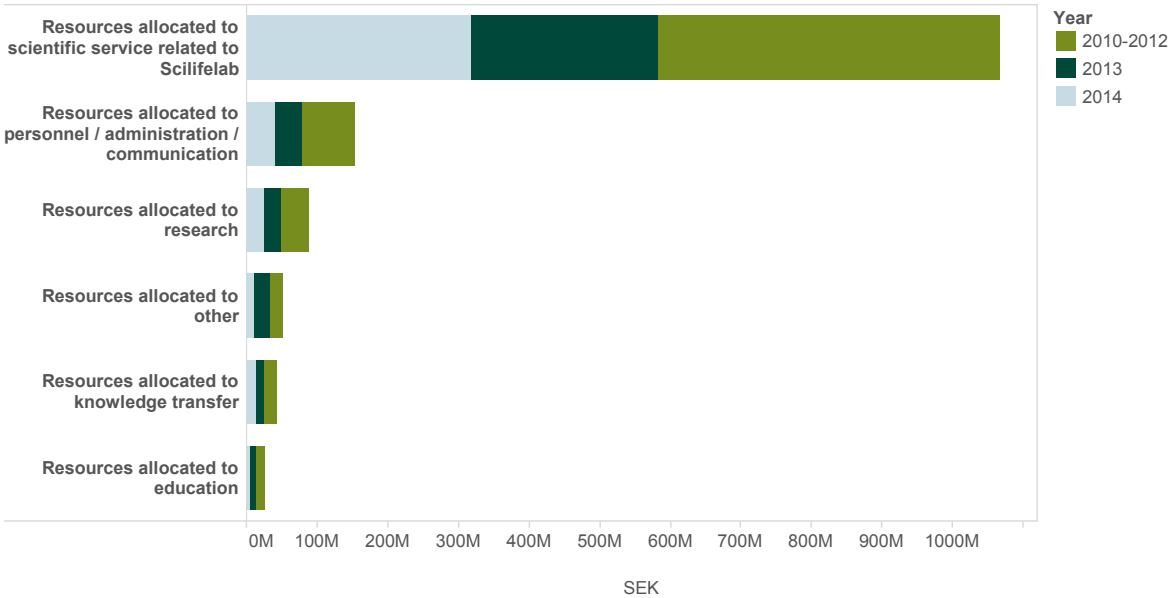
A few of the facility managers have not been able to recall how they have allocated each source of funding to specific categories, therefore the data in Figure 4.26 does not contain all funding to the facilities. In total, the data represents 97,3 % of all funding to facilities.

4.5 Management, criteria for accessibility and prioritization

SciLifeLabs organization and functions are governed by Regulation (2013:118) on National center for life science research. The organization is governed by the SciLifeLab Board, which is supported by the National Reference Committee.

The responsibility for the distribution of national funding varies however depending on the type of funding. The National Board is responsible for the

FIGURE 4.26
Purpose and usage of total funding to facilities, by year (MSEK)



Source: DAMVAD (2015) based on data from SciLifeLab host universities and facilities
Note: Estimated values – not to be regarded as exact figures.

distribution of national SciLifeLab funding and national funding designated for drug development while a steering committee at each university decides on the allocation of the SRA-funding to SciLifeLab.

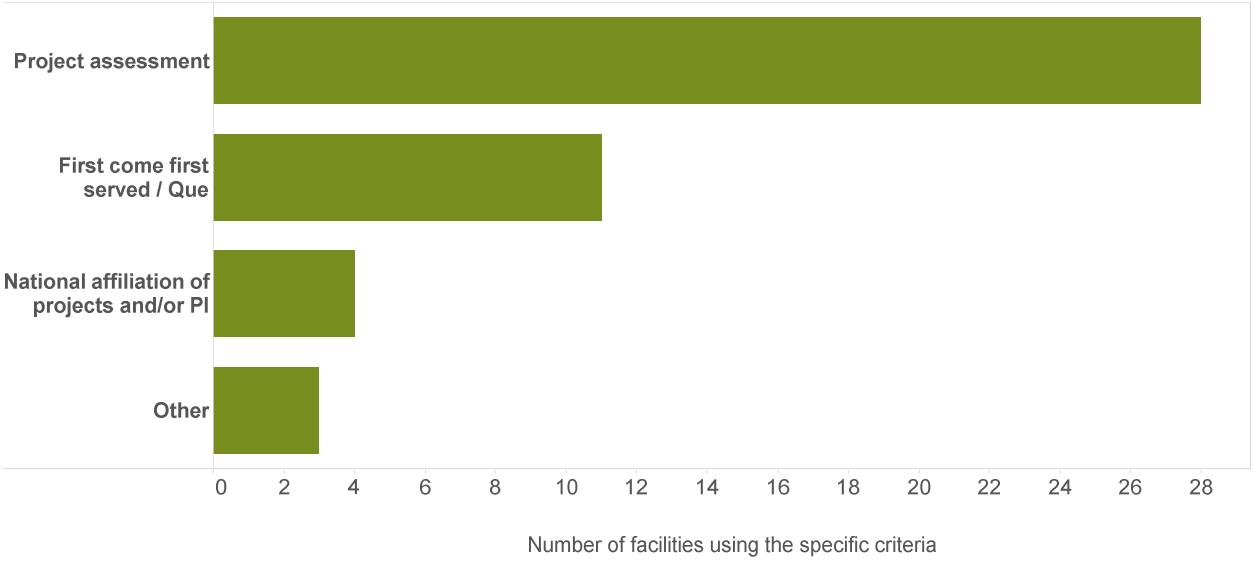
The National Reference Committee has representatives from other major universities in Sweden. This committee should help to ensure that SciLifeLab continues to provide relevant technology access and services to Swedish scientists. The Board also has a distinguished Scientific Advisory Board for strategic and scientific advice.

The research of SciLifeLab is broadly divided into the two fields, health and environment, whereas the services and the technologies provided by the SciLifeLab are organized into technology platforms that transcend the research fields.

The management and steering committees are composed of faculty members (a group leader affiliated with one of the host universities and with a strong commitment to SciLifeLab) alongside a number of external actors.

Project assessment is the first step and most common criteria applied for using the facilities, c.f. Figure 4.27. This category includes specific evaluation criterias such as scientific quality, feasibility, impact and potential, resource demand etc. A common criterion is also to apply a queue system based on a

FIGURE 4.27
Criterias applied for prioritization



Source: DAMVAD (2015) based on data from SciLifeLab host universities and facilities
Note: A single facility might use more than one criteria.

first come first served basis. This is usually applied after conducting an assessment of the project. The prioritization may also vary depending on the complexity of the project which requires more resources. As the facilities provide service to the Swedish research environment, prioritization is given to Swedish research.

As stated in the recent working paper, *Governance of national platforms SciLifeLab*[20], a Platform Steering Board will be formed for all approved national platforms to oversee the operations and decide on a process for project prioritization, as well as to advise on strategic issues within the platform. The platform steering board will approve the proposal for annual budget from the platform directors before submitting the proposal to the SciLifeLab national board.

[20]http://www.scilifelab.se/wp-content/uploads/2013/09/Styrning-av-nationell-infrastruktur-SciLifeLab.pdf

5 Appendix

5.1 Data approach

Due to expected complexity of the financial flows, this financial analysis has used a rather explorative approach with various methods to collect the data required.

The data approach is divided into three blocks i) Planning and Design; ii) Data Collection and iii) Quality Assurance. These blocks are explained in detail below and summarized in Figure 2.1.

Planning and Design

The first step of this project was about planning and designing the data collection in a way that allows for a thorough financial analysis of SciLifeLab. The planning and design phase was conducted between week 1-5 2015. The planning and design phase was very important for the success of the data collection as data is required on various levels and from many sources.

In the planning and design phase we conducted four explorative interviews with both Chairman, Director and Site Managers of both the Uppsala and Stockholm Node to receive a better understanding of the set-up of SciLifeLab and possible challenges for a financial analysis. We have asked questions such as:

- How do we best define the SciLifeLab environment?
- On what levels/ units can we expect to receive financial data?
- Are there types of information we might be missing?
- What cautions should we take in forming the self-reporting scheme?
- Who are best suitable to receive the self-reporting scheme?
- What is the expected quality of data?

This has been useful when designing the self-reporting scheme. Likewise, the interviews have supported us in identifying key persons receiving self-reporting schemes.

The process along with in-depth desk-research of annual reports, protocols from national board meetings as well as steering group meeting and research made it possible to implement a design that enabled a collection of all the necessary data. The interviews have provided further knowledge about the administration and financial flows within SciLifeLab.

It also provided information about the sizes of the flows and how, where and for what purposes the funding has been distributed within SciLifeLab. The information gained has been essential for designing the self-reporting scheme in a way that reflects the factual structure of SciLifeLab and allowed us to collect the data needed.

Data Collection

After identifying relevant indicators and finalising the analytical design, we started the data collection. Due to the expected complexity of the financial flows, we have used a combination of methods to collect data consisting of desk research, qualitative in-depth-interviews and self-reporting schemes. The self-reporting schemes constitute the major tool for data collection. The data collection was conducted during week 6-8, 2015.

In week 6 DAMVAD distributed the self-reporting schemes via e-mail to identified persons at both nodes, and university and facility level. The mailing

list with contact details of facility managers and platform directors were distributed to DAMVAD by the Node Manager at Uppsala. The facility managers were given 2 weeks to provide the data. Two self-reporting schemes have been used to collect data.

The first scheme was aimed at identifying funding at university level. This self-reporting scheme was sent to the node managers in Stockholm and Uppsala.

The second self-reporting scheme aimed at identifying funding distributed to each facility as well as provide principles for accessibility to each facility. The self-reporting schemes, including instructions, were sent by e-mail to 43 facility managers with a copy platform directors. In cases where the same person were responsible for two facilities, two separate self-reporting schemes had to be filled out.

By the end of week 6 and during week 7, DAMVAD contacted each facility manager that received the self-reporting scheme by telephone. The follow-up was conducted in a structured manner and each facility manager was called on several occasions. The aim of the follow up was to assure that the person had received the self-reporting scheme and to clarify and explain the structure. The persons not reached by telephone, received an e-mail and were asked to confirm that they received the self-reporting scheme.

During week 7 DAMVAD had further dialog and guidance with respondents of the self-reporting scheme.

In week 8 consultants from DAMVAD reviewed the self-reporting schemes provided by the facilities. In cases where data seemed incorrect, DAMVAD contacted the responsible facility manager to assure that data was reported correctly.

Besides the two self-reporting schemes, the host universities have been asked to provide data of external funding given to each of the 115 faculty members connected to the SciLifeLab and stated on the SciLifeLab website.

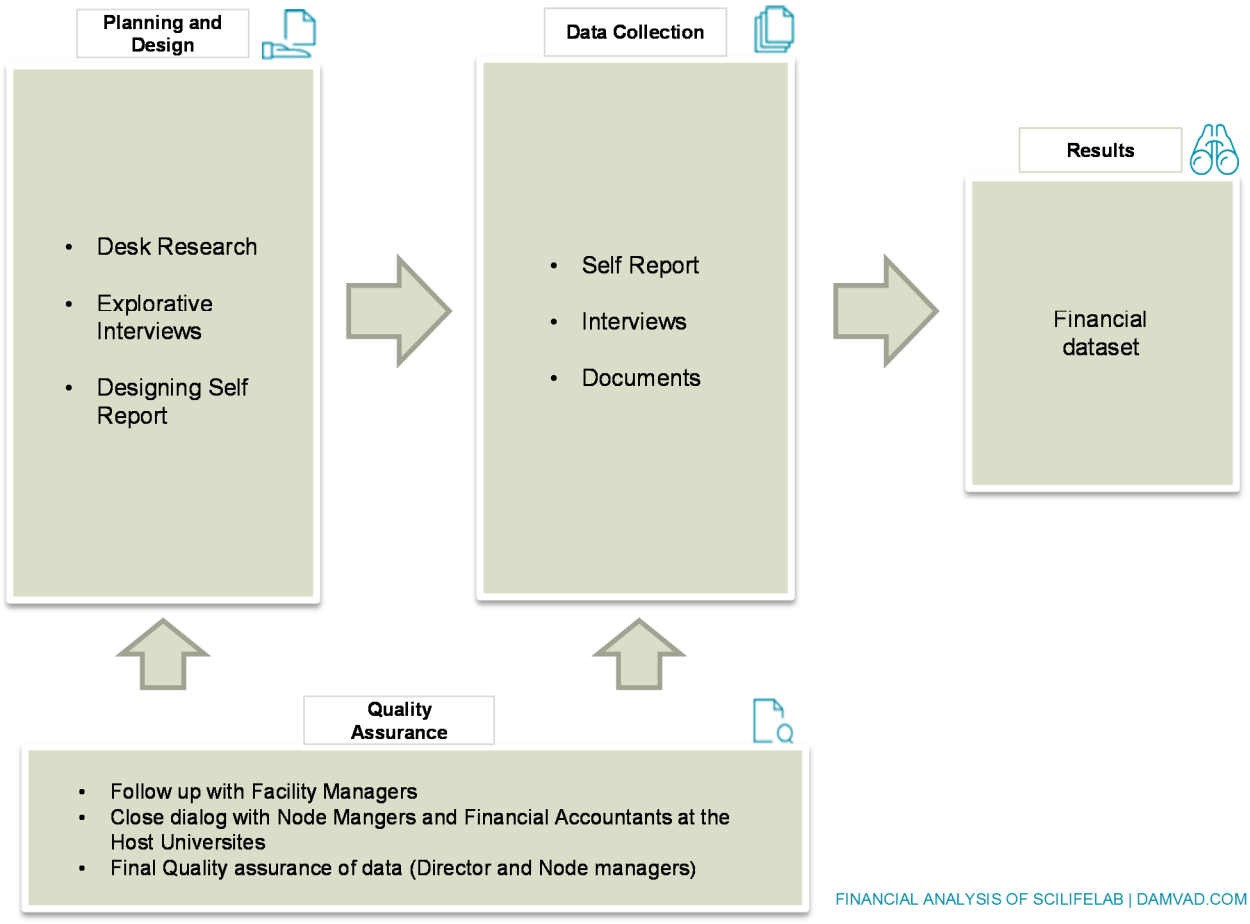
Quality Assurance is essential

The quality of data is essential for any financial analysis. During the design phase of the self-reporting scheme DAMVAD had a continued dialog with Node Managers and the Director of SciLifeLab, in order to ensure that the scheme was designed in a way that allowed for data to be presented fairly. After sending the self-reporting scheme DAMVAD had a close dialog with the facilities to ensure that it was correctly and properly filled out. In cases of incomplete self-reporting schemes or misunderstandings DAMVAD called the responsible facility manager to reassure that the data was corrected and if required complemented.

When the data was compiled, DAMVAD met with the Director of SciLifeLab and Node Manager in Stockholm to present the data and discuss the quality of the data. A skype meeting was held with the Node Manager at Uppsala.

The data compiled in this financial analysis provides a representative picture of total funding of SciLifeLab, distribution on university, platform and facility

FIGURE 5.1
Illustration of data approach



Source: DAMVAD (2015)

managers as well as funding to faculty members. The data provided in this financial analysis varies in precision as the respondents have been asked to provide both data in exact terms; and give estimations.

Note that the number of facilities has increased during the development of SciLifeLab and that data is not based on the same number of facilities throughout the period.

5.2 Total funding distributed to university level

In this first sub-section, we provide a review of the total funding[21] distributed at the university level. There are in total two categories of funding at university level, public funding and university co-funding. Public funding consist of three type of national funding; national SciLifeLab funding, SRA-funding and national funding designated to drug development.

1037 MSEK has been distributed at the host university level during 2010-2014. Public funding remained approximately constant during 2013-2014. Co-funding remained constant between the period 2010-2012 and 2013 but decreased with approximately 40 percent from 24 MSEK in 2013 to 14 MSEK in 2014. There is a large variation in the share of distributed funding to the four universities. However, UU has received the largest amount (37%) of public funding during the entire period. This followed by, KTH (27 %), KI (21 %) and SU (17 %). The steering board of SciLifeLab in Stockholm has decided to support a number of common activities within the Stockholm node. As the majority of these initiatives are within KI, in practice, SRA funding has been re-allocated from KTH and SU to KI.

KTH has received the largest amount of national SciLifeLab funding, both during 2013 and 2014, 58 and 48 MSEK respectively. The main reason for this is KTHs role as administrative center of the Stockholm node. Also, during 2013 investments in instruments were transferred from SRA funding to national SciLifeLab funding. As a result, a relatively large amount of national SciLifeLab funding was distributed to KTH since the instruments of SciLifeLabs largest platform, National Genomics Infrastructure, was registered at the university.

Stockholm University has received the smallest amount of national SciLifeLab funding in both 2013 and in 2014, 17 MSEK both years. The total amount of national SciLifeLab funding to SciLifeLab was 154 MSEK in 2013 and 161 MSEK in 2014.

Some national SciLifeLab funding were not distributed among the universities during the years depicted in the table. In 2013, 7,3 MSEK were not distributed among the universities. In 2014, 33,6 were not distributed.

[21] In this subsection, we focus on allocated, transferred funding, which implies that it is not directly comparable to data depicted in other parts of this report. Unlike other parts of this report, the data in this subsection do not review funding used for instruments in the form of depreciated values

TABLE 5.1
Total funding to university level divided by type of funding source, university and year (MSEK)

Type of funding source	University	2010-2012	2013	2014
National SciLifeLab funding	KTH	-	58	48
	KI	-	24	20
	SU	-	17	17
	UU	-	48	42
	Non-distributed resources	-	7	34
	Total	**-**	**154**	**161**
SRA funding	KTH	73	26	34
	KI	70	49	38
	SU	59	28	30
	UU	85	44	45
	Total	**286**	**147**	**147**
National funding designated to drug development	KTH	-	17	13
	KI	-	4	5
	SU	-	2	14
	UU	-	12	12
	Total	**-**	**35**	**44**
Co-funding	KTH	-	0.0	1.7
	KI	6.8	14.0	2.9
	SU	2.6	1.5	2.0
	UU	15.6	8.6	7.4
	Total	**25.0**	**24.1**	**14.0**
Grand total		**311**	**360.1**	**366**

Source: DAMVAD (2015) based on data from SciLifeLab host universities

There are several explanations behind the non-distributed funding. Some of the funding is earmarked for instruments, and will be distributed after the actual acquisition of the instrument. Some of the funding has been allocated to facilities, but has not yet been transferred. Funding to specific national projects are also included in these types of funding.

Some of the SRA funding have been re-allocated among the host universities since the initial distribution of funding. Due to increased costs, SRA funding has been re-allocated from KTH and SU to KI.[22]

During 2013, Stockholm University received a relatively small amount of national funding designated to drug development (2 MSEK). In 2014, the funding increased substantially to 14 MSEK, more than any of the other universities. KI has received a relatively

[22] The total amount of re-allocated SRA funding to KI was 23,6 MSEK during 2010-2014. KTH re-allocated 0,9 MSEK to KI 2010-2012, 9,1 MSEK in 2013 and 2,0 MSEK in 2014. SU re-allocated 2,5 MSEK in 2010-2012, 6,4 MSEK in 2013 and 2,6 MSEK in 2014.

small amount of national funding designated to drug development, 4 MSEK 2013 and 5 MSEK 2014. The total amount of distributed national funding designated to drug development 2012 and 2014 was 35 MSEK and 44 MSEK respectively.

Also, during 2013 investments in instruments were transferred from SRA funding to national SciLifeLab funding. As a result, a relatively large amount of national SciLifeLab funding was distributed to KTH since the instruments of SciLifeLabs largest platform, National Genomics Infrastructure, was registered at the university. Also, the Drug Development platform has its main activity at KTH.

5.3 Description of funding sources

AFA Insurance: Organisation owned by Sweden's labour market parties. AFA insure employees within the private sector, municipalities and county councils. Today their insurances cover more than four million people.

Agria and SKK Research Fund: The purpose of the fund is to promote research on pets in areas such as veterinary medicine, genetics and ethology, but also research on companion animals' psychological, social and economic importance.

ALF: ALF is an agreement on medical training and research between the state and some county councils. It provides project funding for education of doctors, medical research and development of health care.

Alzheimerfonden, the Swedish Alzheimer's Foundation: Collect and distribute money for research on Alzheimer's disease and other dementias.

Arbetsförmedlingen (AMS), The Public Employment Service: National public agency with an overall goal to facilitate matching between jobseekers and employers. AMS is funded by appropriations from the Swedish Parliament and the Government.

AstraZeneca: Global and innovation-driven pharmaceutical company focused on the discovery, development and commercialization of prescription medicines.

AXA Research Fund: The core mission is to finance basic research contributing to understand and prevent risks. The fund supports innovative and cutting-edge projects that prepare against environmental, life and socio-economic risks.

Axel Tielman's Memorial Fund: The fund supports research in childcare at Swedish universities and to medical facilities in the county of Stockholm. A particularly desirable purpose is the acquisition of equipment. The foundation shall promote such needs, which are not covered by state or municipal funds.

BalticSea2020: The foundation aims to create a strong organization that contribute to turn around the negative environmental trend in the Baltic Sea.

Barncancerfonden, the Swedish Childhood Cancer Foundation: A non-profit organization dedicated to collecting money to prevent and combat cancer diseases in children. Donations are used for research and education, advice and support, and information. This is for instance done by supporting basic and clinical research on childhood cancer, by supporting the development of new investigation and treatment methods, and by supporting further training for researchers.

Brottsoffermyndigheten, the Swedish Crime Victim Compensation and Support Authority: Its overall aim is to look after the rights of crime victims and to draw public attention to their needs. The authority provides support for research projects focused on victims and victimology including e.g. criminology, social work and medicine.

Cancerfonden, the Swedish Cancer Society: The main task of the organization is to raise and distribute money for cancer research. The Society aims to

achieve a higher survival rate and a reduction in the incidence of cancer.

Carl Tryggers Foundation: The foundation provide support for research in the disciplines of forestry and agricultural science, biology, chemistry and physics. In addition, the research should have an approach that is expected to contribute to industrial development in Sweden.

Dr Åke Olsson Foundation: The fund's beneficiary is Karolinska Institutet and it aims to stimulate the development of new skills in the field of hematology. Primarily, projects that are supported are in a crucial but early stage and thus have difficulty finding other financing.

Energimyndigheten, Swedish Energy Agency: Works for the use of renewable energy, improved technologies, a smarter end-use of energy, and mitigation of climate change. The agency supports research and development about the supply, conversion, distribution and use of energy. Assistance is also provided to development of new technologies.
European Research Council, ERC: Funding body set up to stimulate scientific excellence by supporting individual researchers in Europe through competitive funding. The ERC encourages in particular cross-disciplinary boundaries, new and emerging fields that introduce unconventional and innovative approaches.

EU, Framework Programmes for Research and Technological Development: Funding programmes created by the European Union/European Commission to support and foster research in the European Research Area (ERA). The specific objectives and actions vary between funding periods.

Erling-Persson Family Foundation: Supports scientific research and prioritizes projects with a focus on medicine and healthcare. Funds have been donated in several areas, such as diabetes, palliative care and cancer research.
Folkhälsomyndigheten, Public Health Agency of Sweden: The agency has a national responsibility for public health issues. It promotes good public health by building and disseminating knowledge to professionals involved in the area of public health, including infectious disease prevention.

Formas, The Swedish Research Council Formas: Promote and support basic research and need driven research in the areas Environment, Agricultural Sciences and Spatial Planning.

Försäkringskassan, the Swedish Social Insurance Agency: The agency has a dedicated research function and it has associated itself with qualified representatives of universities and colleges. Financial support is given to projects and programs at universities. In addition, support can be given to conferences, seminars and data costs.

Göran Gustafsson Foundation: Each year, the foundation distributes over SEK 12 million to basic scientific research in medicine at Uppsala University, as well as in engineering at the Royal Institute of Technology.

GE Healthcare Bio-Sciences AB: Offers solutions to support work from biological research to clinical therapy including tools for research, drug discovery, diagnostics, and bioprocessing.

Hjärnfonden, the Swedish Brain Foundation: Raises money for research and information about the brain and its diseases, injuries and disabilities.

The scholarships and grants that the fund provides support researchers to enable or intensify important research about the brain.

Hjärt- och lungfonden, the Swedish Heart-Lung Foundation: A charitable fundraising organizations established in 1904 that works to defeat heart and lung diseases. The fund collects and distributes money to specially selected heart and lung researchers.

IngaBritt and Arne Lundberg Foundation: The purpose of the Foundation is to promote scientific medical research, mainly dealing with cancer, renal disease and orthopaedics. The foundation's grants have been awarded to major projects that are considered to be essential to the future development of the areas for which the foundation was established. Normally, grants are not awarded for project funding. Priority is given to grants for the purchase of instruments, aids and equipment.

Innovative Medicines Initiative (IMI): Europe's largest public-private initiative aiming to speed up the development of better and safer medicines for patients. IMI supports collaborative research projects and builds networks of industrial and academic experts in order to boost pharmaceutical innovation in Europe.

Kammarkollegiet: The oldest public authority in Sweden with more than 35 different missions from the Government. A main objective is to provide services within the public sector, primarily relating to economics, law, asset management, risk management and administration.

Karo-Bio: A pharmaceutical company that develops innovative drugs for key medical needs. The purpose of the Karo Bio Research Foundation is to award grants to research projects within the scope of Karo Bio´s research field.

Karolinska Institute: Awards grants from a large number of foundations and funds. The foundations and funds award research and travel grants, as well as prizes and other distinctions.

Karolinska University Hospital

Knut and Alice Wallenberg Foundation, KAW: The purpose of the foundation is to promote scientific research, teaching and education beneficial to Sweden. The foundation grants funding in research projects of high scientific potential and individual support of excellent scientists. It also initiates strategic projects and scholarship programs. The foundation approves yearly grants totaling SEK 1.3 billion.

Kempe Foundations: Contribute to research activities that are believed to draw resources to Northern Sweden.

Kjell and Märta Beijer Foundation: Formed in 1974 and primarily, the foundation supports scientific research in Sweden. It has distributed more than SEK 350 million.

KTH Royal Institute of Technology

Kungliga vetenskapsakademien, the Royal Swedish academy of sciences: Every year, the academy awards many different kinds of Scholarships, grants, scientific exchange and research fellow positions in most scientific fields. A special responsibility is taken for natural sciences and mathematics.

Kungliga Slottsstaten, the Palace Administration: The administration consists of the Office of the Governor of the Royal Palaces (management of the Royal Palaces and their grounds) and the Royal Collections (management and care of furnishings and art collections). These two departments receive a total of some SEK 60.8 million (2013) from the State and in addition derive revenues from visitor and retailing activities at the various palaces. The budget allocation for the Palace Administration is disbursed monthly.

Linköping University

Linnaeus University

Livsmedelsverket, the National food agency: Work towards healthy dietary habits, safe foods and fair practices in food trade through regulations, recommendations and communication.

Lund University

Magnus Bergvall Foundation: The main purpose of the foundation is to promote scientific research through grants to Swedish scientists and to scientific and cultural institutions.

Märta and Gunnar Philipson Foundation: Märta Philipson donated money from the business empire that Gunnar built up during his lifetime. The foundation supports medical research.

National Institute of health (NIH): A part of the U.S. Department of Health and Human Services and it is the nation's medical research agency – making important discoveries that improve health and save lives. NIH's mission is to seek fundamental knowledge about the nature and behavior of living systems and the application of that knowledge to enhance health, lengthen life, and reduce illness and disability.

Naturhistoriska riksmuseet, the Swedish Museum of Natural History: Their research activities are focused into four themes: Diversity of Life, Ecosystems and Species History, Man and the Environment, The Changing Earth. The research Division consists of eleven departments and several co-operation projects sort under the Research Division Directorate.

National SciLifeLab funding The purpose of the funding is to establish and maintain the SciLifeLab centre for molecular research. The national funding is determined in the Government Bill on Research Policy.

National funding designated to Drug Development: The purpose is to enhance research on drug development. The national funding is determined in Government Bill on Research Policy.

NordForsk: An organization under the Nordic Council of Ministers that provides funding for Nordic research cooperation as well as advice and input on Nordic research policy. NordForsk provides funding for cooperation within all fields of research.

Nordiska ministerrådet, the Nordic Council of Ministers: The most important criterion for granting project funding is that the projects must benefit the Nordic countries and the adjacent areas. The projects must generate Nordic synergy. Some 500 projects and activities are launched and run per annum.

Novartis Sverige AB: Novartis is one of the largest pharmaceutical companies in the world. In 2012, the company invested approximately USD 9.3 billion in research and development of new drugs.

OncoTrack IMI: An international consortium of over 80 scientists, that has launched one of Europe's largest collaborative academic-industry research projects to develop and assess novel approaches for identification of new markers for colon cancer.

Oriflame Cosmetics AB: Their research & development function employs over a hundred scientists and technical experts, covering many scientific disciplines including microbiology, toxicology, and environmental science. In Stockholm, their experts work on projects at a cellular/biological level.

Oslo University Hospital

Radiumhemmets forskningsfonder, Cancer Research Foundation of Radiumhemmet: Consists of The Cancer Society in Stockholm (Cancerföreningen i Stockholm) and King Gustaf V's Jubilee Foundation (Konung Gustaf V:s Jubileumsfond). Both foundations have, in accordance to their statues, the same aim - to support clinical cancer research in Sweden. The Cancer Society and the Jubilee Foundation together have a capital of more than SEK 1 billion.

Ragnar Söderberg Foundation: A private research funding agency that supports research, particularly in medicine, economics and jurisprudence. The foundation provides grants to academic younger researchers that have demonstrated academic skills and have innovative ideas.

Reumatikerförbundet, the Swedish Rheumatism association: Non-profit organization working for people with rheumatic disorders. Today, the association is via the Swedish Rheumatic Foundation, the largest single donor to rheumatology research in Sweden.

Riksbankens jubileumsfond, the Swedish Foundation for Humanities and Social Sciences: Supports research in the humanities and social sciences. Support is provided for programs, projects, infrastructure for research, and research.

Rockefeller University

SIDA, The Swedish International Development Agency: A government agency working on behalf of the Swedish parliament and government, with the mission to reduce poverty in the world. Through their work and in cooperation with others, they contribute to implementing Sweden's Policy for Global Development (PGU).

SRA funding: The purpose of the funding is to enhance research in strategic research areas as the Swedish Government designated in the Government Bill on Research Policy.

SSF, Strategic Research Foundation: Finances strategic research centers and individual researchers through grants with a focus on biology and life sciences, systems and communication technology, materials development, process and product development technology.

Stiftelsen Olle Engkvist Byggmästare: One of the main objectives is to support scientific research. Other important goals are healthcare to children and elderly.

Stiftelsen Otto Allan Hagbergs Minnesfond

Stiftelsen Frimurare, Swedish Order of Freemasons: The purpose is to support the care and education of children and youth. Subsidies can support scientific research that can be important for the foundation's main purpose such as medical, psychological or educational research.

Stiftelsen Tornspiran, Tornspiran Foundation: The main purpose is to promote scientific research, teaching and education activities. Grants support research in natural sciences, humanities, and especially medical applied research. The foundation does not support basic research.

STINT, Swedish Foundation for International Cooperation in Research and Higher Education: STINT offers a wide variety of grant and scholarship programmes to support internationalization at Swedish educational establishments. Programmes aim to pick up on various current needs, from initiating international projects through four-year international partnerships at faculty level, to strategic internationalization at university level.

Stockholm County Council: The council is working closely with the medical university Karolinska Institutet, both involved in the initial and further training of personnel groups in health care, and research and development. A large part of this takes place within the County Council's various activities and in collaboration with other stakeholders, for example in the pharmaceutical industry.

Stockholm University

Svenska Sällskapet För Medicinsk Forskning, the Swedish Society for Medical Research, SSMF: Foundation, who with the help of donations is working to support medical research. Their aims are to create powerful Swedish medical forums to draw public attention to the medical significance of the research, and to raise money for medical research.

Svenska Läkaresällskapet, the Swedish Society of Medicine: The scientific organization of the Swedish medical profession. Their aim is to promote research, education and development in the healthcare sector. They contribute with more than SEK 25 million to medical research every year.

Svenska smärtafonden: The purpose of the fund is to receive and distribute financial resources to promote research, development, rehabilitation, education and information. The fund supports institutions or individual researchers in their quest to advance in their research in pain relief.

Swedish e-Science Research Center, SeRC: Funded by the Swedish Research Council, SeRC brings together a core of nationally leading IT research teams and scientists in strategic application areas. SeRC is a national center for e-Science, which is complementary to the traditional means of doing research by experiments and theoretical reasoning.

The Swedish Police

Swedish University of Agricultural Sciences

Sällskapet barnavård: Organization whose purpose is to broaden interest in and knowledge about children's care and upbringing. Subsequently, it has mainly worked with handing out money from the organization's funds.

The Danish Agency for Science Technology and Innovation: The Agency performs tasks relating to research and innovation policy and provides secretariat services to and supervises the scientific research councils. The councils allocate funds for independent research, for strategic research and for innovation and advice the political system.

Tillväxtverket, the Swedish Agency for Economic and Regional Growth: National agency under the Ministry of Enterprise, Energy and Communication. It has the role to strengthen regional development and facilitate enterprise and entrepreneurship throughout Sweden.

Tore Nilsson Foundation: The foundation's purpose is, through grants to individual researchers to promote clinical medical research. As a rule, however, it does not support the areas that are well catered for by other specifically targeted funds, for example, cancer research.

Torsten Söderberg Foundation: Promotes scientific research and scientific teaching focusing mainly on the financial, medical and legal fields.

Umeå University

University of Gothenburg

University of Technology, Pakistan

Uppsala Akademiförvaltning, Uppsala University Foundation Management of Estates and Funds: Manages capital that has been donated with the intent of supporting the activities of Uppsala University. All proceeds go to grants, several kinds of research-supporting measures, and other activities at the University.

Uppsala County Council

Uppsala University

Uppsala University Hospital

Vetenskapsrådet, the Swedish Research Council: Government agency that provides funding for basic research of the highest scientific quality in all disciplinary domains.

VINNOVA, the Swedish Governmental Agency for Innovation Systems: Sweden's innovation agency under the Ministry of Enterprise, Energy and Communication, and the national contact agency for the EU Framework Programme for R&D.

Västra Götaland County Council
Region Västra Götaland

Örebro University

5.4 List of facilities and faculty members

Facilities (44)
ADME (UDOPP)
Advanced Mass Spectrometry Proteomics
Array and Analysis Facility
Bioinformatics and Expression Analysis
Bioinformatics Compute and Storage
Bioinformatics Long-term Support WABI
Bioinformatics Short-term Support and Infrastructure
BioMaterial Interactions
Biophysical Screening and Characterization
Clinical Biomarkers
Clinical Genomics
Clinical Proteomics Mass spectrometry
Clinical sequencing

Domestic Animals
Fluorescence Tissue Profiling
Fluorescent Correlation Spectroscopy
In Vitro and Systems Pharmacology
Karolinska High Throughput Center
Laboratories for Chemical Biology Umeå
Mass Spectrometry-based Proteomics
"Medical Chemistry – Hit2Lead
Medicinal Chemistry – Lead Identifaction
Mutation Analysis Facility
NGI Uppsala (SNP&SEQ Technology Platform)
NGI Uppsala (Uppsala Genome Center)
NGI Stockholm (Genomics Applications)
NGI Stockholm (Genomics Production)
Protein Expression and Characterization
Protein Science Facility
Single Cell Genomics
The Laboratories for Chemical Biology at Karolinska Institutet
Tissue profiling
Uppsala Drug Optimization and Pharmaceutical Profiling
Advanced light microscopy
Biobank profiling
Biochemical and cellular screening
Biological visualization
Biophysical Screening and Characterization
Cell Profiling
Human Antibody Therapeutics
Mass Cytometry
Protein & Peptide arrays
PLA proteomics
Zebrafish

Faculty members who received external funding 2014 (115)
Adnane Achour
Afshin Ahmadian
Aman Russom
Anders Isaksson
Anders Andersson
Angelica Loskog
Anna Wedell
Ann-Christine Syvänen
Annika Jernmalm-Jensen
Antti Niemi
Aristidis Moustakas
Arne Elofsson
Aatto Laaksonen
Bengt Persson
Bengt Westermark
Berk Hess
Birgitta Bergman
Björn Andersson
Bo Lundgren
Carolina Wählby
Cecilia Williams
Claes Wadelius
Dan Larhammar
David van der Spoel
Emma Lundberg
Erik Ingelsson
Erik Lindahl
Erik Sonnhammer
Fredrik Ponten
Fredrik Swartling
Gerli Pielberg
Gunnar von Heijne
Göran Akusjärvi
Helena Danielson
Helena Berglund
Helena Jernberg Wiklund
Helene Andersson Svahn
Hjalmar Brismar
Ingela Parmryd
Jacob Odeberg
Jan Dumanski

Jan Komorowski
Jan Mulder
Janne Lehtiö
Jens Carlsson
Jens Lagergren
Jerker Widengren
Jin-ping Li
Joakim Lundeberg
Jochen Wolf
Jochen Schwenk
Johan Elf
Jonas Bergquist
Jöns Hilborn
Karin Dahlman-Wright
Karin Forsberg Nilsson
Kenneth Söderhäll
Kerstin Lindblad-Toh
Lars Feuk
Lars Engstrand
Leif Andersson
Lena Claesson-Welsh
Lena Kjellén
Lene Uhrbom
Lukas Käll
Lynn Kamerlin
Magnus Essand
Maija-Leena Eloranta
Manfred Grabherrs
Maria Strömme
Marie Allen
Marie-Louise Bondesson
Marjam Ott
Martin Lascoux
Masood Kamali-Moghaddam
Mathias Uhlén
Mats Larhed
Mats Nilsson
Mattias Jakobsson

Mia Phillipson
Mia Wadelius
Mikael Altun
Mowbray Sherry
Niklas Dahl
Nils Welsh
Ola Söderberg
Olle Kämpe
Olof Emanuelsson
Patric Jern
Paul Hudson
Per Ahlberg
Per Artursson
Pernilla Bjerling
Peter Lindblad
Peter Nilsson
Peter Savolainen
Petter Brodin
Richard Rosenquist
Roman Zubarev
Sara Light
Simone Immler
Siv Andersson
Sophie Sanchez
Staffan Svärd
Stefan Bertilsson
Sven Nelander
Tanja Slotte
Thijs Ettema
Thomas Svensson
Tobias Sjöblom
Tomas Helleday
Ulf Gyllensten
Ulf Landegren
Valeria Giandomenico

Vetenskapsrådet har haft regeringens uppdrag att utvärdera verksamheten vid Nationellt centrum för livsvetenskaplig forskning (SciLifeLab).

Rapporten belyser SciLifeLabs verksamhet ur ett organisatoriskt, finansiellt och vetenskapligt perspektiv. Likaså granskas SciLifeLabs samhälleliga relevans.

Utvärderingen har utförts av två vetenskapliga paneler. Deras övergripande bedömning av SciLifeLab är att det är en imponerande satsning inom ett område som har stor potential att bli en världsledande satsning inom livsvetenskaperna. För att säkerställa att SciLifeLab fortsätter på den framgångsrika väg som etableringen inneburit, behöver SciLifeLab en tydligare och mer samlad målbild, struktur, styrning och finansiering.

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