

# Performance Metrics for Technology Transfer Offices

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## 1. Introduction

In 2003 a new university law became operative in Norway, formalizing the universities responsibility to stimulate commercialization and industrial adoption of research. The law lead to the formation of technology transfer offices at all major universities, further development of the sector of start-up incubators and accelerators, as well as enhancements of regional and national funding instruments to support such technology transfer. Today, Abelia<sup>1</sup> lists 34 members in its “Association for Innovation Companies in Norway” (Abelia-FIN) and among these members we find the seven TTOs that are key collaboration partners of the Research Council of Norway’s innovation program FORNY2020<sup>2</sup>. There exists also innovation companies not present in these lists, among these are Simula Innovation.

The FORNY-partners, which together with Simula Innovation are central to the discussion in this report, had in 2014 a joint income of 305 MNOK. We do not have access to a specified breakdown of this income, however, FORNY2020 informs in its 2015 annual report<sup>3</sup> that it channelled about 130 MNOK of its 180 MNOK spending in 2015 through the partner TTOs. In addition just above 30 MNOK was given as support directly to micro-companies outside the management of these TTOs.

It is clear that the TTOs, and innovation companies more generally, are competitors for funding from FORNY2020 as well as other governmental funding instruments and possibly private sources. In contrast to other university units, such as for example research groups, it appears, however, not to have been developed indexes or metrics that can quantify performance and support comparison of TTOs. This is the case, even if key parts of the TTOs operations are readily quantifiable, such as portfolio companies and IP-licensing through accounts and valuations.

The purpose of this report is discuss and exemplify methods that could be used to create performance metrics for TTOs.

## 2. Past Evaluations and Analysis

NIFU gives in a report<sup>4</sup> from 2015 a compact review of past evaluations and analysis conducted on governmental instruments and other aspects relevant for commercialization of research. Example of focal areas of these studies are how the universities followed up the law-change from 2003, the engagement in commercialization activities among university employees, university culture for patenting, study of efficiency of the national instruments with advice for improvements and several evaluations of FORNY with a focus on the definition of their support programs.

A specific report, also reviewed by NIFU, is a report<sup>5</sup> from 2013 studying the value creation from FORNY2020 in the period 1995 – 2012. This report (hereinafter referred to as the SIB-report), authored by Senter for Innovasjon and bedriftsøkonomi together with several Norwegian universities, focus on societal value creation from FORNY’s portfolio companies

<sup>1</sup> <https://www.abelia.no/bransjeforeninger/fin-foreningen-for-innovasjonsselskaper-i-norge/>

<sup>2</sup> <http://www.forskningsradet.no/prognett-FORNY2020/Kommersialiseringsaktorer/1253964138084>

<sup>3</sup> [http://www.forskningsradet.no/prognett-FORNY2020/Sentrale\\_dokumenter/1253963921837](http://www.forskningsradet.no/prognett-FORNY2020/Sentrale_dokumenter/1253963921837)

<sup>4</sup> <http://hdl.handle.net/11250/297128>

<sup>5</sup> [http://www.forskningsradet.no/prognett-FORNY2020/Sentrale\\_dokumenter/1253963921837](http://www.forskningsradet.no/prognett-FORNY2020/Sentrale_dokumenter/1253963921837)

and licenses in total. The value created by the company is defined by what are received by employees (salaries), society (taxes), owners (profits) and capital wear (depreciation) and can simply be calculated by adding together personal costs, operating result and depreciation. This calculation agrees with the way one calculates gross national product.

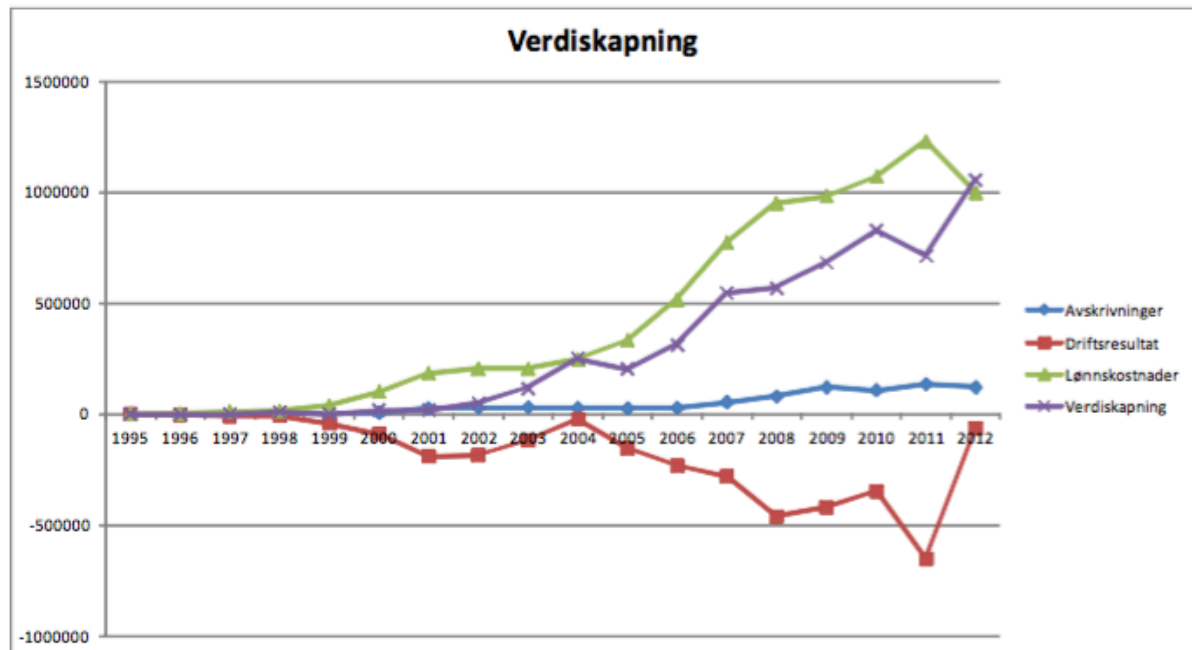


Figure 1. Value creation 1995 – 2012 for FORNY company portfolio in 1000 NOK. Figure taken from report in footnote 5.

The total value creation 1995 – 2012 from the FORNY portfolio is in the SIB-report calculated to 5,7 billion NOK and for 2012 alone it is just above 1,0 billion NOK. We mention that Opera Software alone covers 3,6 billion NOK of the value creation and a few other successful companies cover major parts of the reminder. A report from MENON Business Economics estimates the value creation from the portfolio to grow to 1,2 billion NOK in 2013.

The general impression from the above referenced evaluation and analysis work is that focus is on the systemic level. Analysis is made on the full FORNY company and license portfolio and TTOs performance or service offerings are discussed on the overall level. We found no attempt to break analysis down on named individual TTOs. We should not, however, conclude that such individualized studies do not exist, they may just not be publicly available or hard to find. It has been outside the scope of this report to find them.

### 3. Measurable and Less Measurable TTO Activities

One may reasonably divide the typical TTO's activities in three areas:

1. Management of portfolio companies
2. Management of portfolio license agreements
3. Entrepreneurship development

While the first two items are quite specific and concrete, the third item points to the role the TTO has in the mother organization's work to stimulate entrepreneurship and innovation. Such work can involve (see also Lundquist<sup>6</sup>) business plan competitions, entrepreneurship education, presentations and shows. A TTO's activities may vary over time, and if it initially focuses on entrepreneurship development, it may over time develop more momentum in management of company and license portfolios. Due to these variations, it is reasonable to dismiss an ambition to create universal performance metrics that effectively can rate TTOs in all stages and formats. Rather, it seems more reasonable to develop metrics measuring isolated well defined activities.

To this end, we will in this report only focus on metrics for the management of portfolio companies. This appears to be the simplest place to start, as the availability of open historical accounting information makes it a viable subject for analysis. Regarding license agreements, they are in principle easily quantifiable, however, such information is rarely publicly available, and we will therefore not go into this matter here. Entrepreneurship development is a type of activity that is hard to measure with quantitative methods at a distance, but are probably best measured by interviews, questionnaires and site visits.

#### 4. Metrics

In the evaluation reports discussed in section 2, the value creation of the portfolio companies was the central quantity used to measure success. We can use this measure as basis for defining metrics for TTOs.

Assume we have  $n$  TTOs,  $T_i$  for  $i = 1, \dots, n$ , each with a portfolio of  $m_i$  companies. Let  $v_{ij}$  denote the value creation of company  $j$  for  $T_i$ . Then  $v_i = \sum_j v_{ij}$  expresses the value creation of the portfolio of  $T_i$ , and  $v = \sum_i v_i$  represents the total value creation of all companies. If we speak about the FORNY2020 TTOs, then  $v$  would be about 1,2 billion NOK in 2013, cf. section 2.

The  $v_i$ 's are, however, not suitable to be used directly to compare different TTOs. They need to be scaled to take into account the different resources that are used to produce them. Let then  $r_i$  denote the resources used by  $T_i$  to develop and maintain the its portfolio companies, i.e. the resources it invests to create  $v_i$ . Then  $v_i/r_i$  expresses the value creation per unit resource consumption that the  $T_i$  uses, and is as such an expression for performance.

Now, in addition to the TTO, there are a number of other owners that invests resources to facilitate the company's value creation. It therefore seems reasonable to say that the part of the value creation that can be traced back to the TTO is proportional to its share in the company.

Let then  $s_{ij}$  denote the share  $T_i$  owns in company  $j$ , and set  $\bar{v}_{ij} = v_{ij}s_{ij}$ . Then  $\bar{v}_{ij}$  is can be viewed as the part of  $v_{ij}$  that can be traced back to  $T_i$ . The part of the total value creation of the portfolio that can be traced back to  $T_i$  is thus estimated as  $\bar{v}_i = \sum_j \bar{v}_{ij}$ .

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<sup>6</sup> Lundquist, Mats, The importance of surrogate entrepreneurship for incubated Swedish technology ventures, in *Technovation* 34 (2014), 93 – 100.

From this discussion, we follow a suggestion originally proposed by professor Aslak Tveito at Simula to define a value creation metric for  $T_i$  of the following form:

$$I^{MEAN}(T_i) = \frac{\sum_j \bar{v}_{ij}}{r_i} = \frac{\sum_j v_{ij} s_{ij}}{r_i}$$

In this expression, the  $v_{ij}$  and  $s_{ij}$  are easily obtainable from public records. The  $r_i$  should express the resources/costs  $T_i$  is using for the isolated task of maintaining and building the company portfolio. This cost may not be directly available from public records. As an alternative, one could use the full operating costs of  $T_i$ . If all TTO's have the same operating profile, such a simplification can work well. If not, we may experience unreasonable ratings.

The metric could conveniently be applied on an annual basis, i.e. looking at the value creation in a given year and the ownership in that year. Then, as the ownership changes over time and eventually reaches zero, the value creation of that company will not impact the metric. This is as to say that the company is no longer viewed as a portfolio company of the TTO. This is in contrast to the SIB-report, which reports the value creation of a company as long as it has or has had a TTO as owner.

Set  $\bar{v}_i^{MEAN} = \frac{1}{m_i} \sum_j \bar{v}_{ij}$  where  $m_i$  is the number of portfolio companies for  $T_i$ . Then

$$I^{MEAN}(T_i) = \frac{\sum_j \bar{v}_{ij}}{r_i} = \frac{m_i}{r_i} \bar{v}_i^{MEAN}$$

This way of writing the expression underlines the metric as an average, and in particular underlines its dependence on outliers. As discussed in section 2, outliers are indeed dominating the portfolio and greatly favour TTO's with the "good fortune" of hosting an isolated success story. A much used variant in such situations is to look at the median instead of the mean. A metric based on the median would look as follows:

$$I^{MEDIAN}(T_i) = \frac{m_i}{r_i} \bar{v}_i^{MEDIAN}$$

where  $\bar{v}_i^{MEDIAN}$  is defined to be the middle value of the sorted set  $\{\bar{v}_{ij}\} / \{0\}$ . This metric is insensitive towards outliers and can be favourable for measuring the performance related to the large majority of "unproved" commercialisation projects.

As said, the  $I^{MEAN}$  metric can be interpreted as a method to measure the part of the value creation that can be traced back to the TTO. This resembles the concept of "additionality", which is thoroughly discussed in the SIB-report (footnote 5) and which is there defined as to what extent "the value creation would have been realized also without the FORNY programme". In the SIB-report, the authors put forward two main methods to measure additionality: (1) ask the portfolio companies about the alternative (counterfactual scenario) or (2) compare with a control group. As no control group was available, the SIB-report resolved to asking the portfolio companies about their experiences. The survey response is that 55 % of the responding companies says that the company would not have been established or would have been postponed indefinitely without the FORNY support. The report does not discuss whether the response could be biased. It is not unreasonable to suspect that the response could be biased in an affirmative direction, simply because it might feel

better for the respondents to give an answer they know their sponsor would like than not. The survey is not used in the SIB-report in a way as to quantify how large part of the total value creation that could be traced back to the TTO/FORNY. Such an estimate would obviously be of interest, and it could be that such a quantitative measure for additionality could be based on the  $I^{MEAN}$  metric. A possible way forward for FORNY would be to calculate a weighted sum of the  $I^{MEAN}$  of all its partner TTO's, where the weight should express the engagement of FORNY in the TTO's activities. This weighted sum could then be interpreted as the part of the value creation in the portfolio companies that could be traced back to FORNY.

In the above discussion, the underlying measure is the societal value creation  $v_{ij}$ . The suggested metrics are, however, not depending of this specific variable. Alternative measures could be:

1. the company's market value
2. the company's annual operation income
3. the company's annual profit

The annual operation income and profit are directly available from public sources, while the share market value is more difficult to obtain. A start-up's market value is normally not available (or not defined) as there is no open trade in the share. Alternative methods to obtain market value estimates are to have them estimated from accounts, forecasts and market assessment. Such processes are, however, unreliable, infrequent and often not publicly available when looking at the range of TTOs. For Simula Innovation, however, this process is an annual undertaking, and one idea would be to use such valuation as a key to for extension to other TTO's. Such extension would, however, need to be based on more company information than pure accounting data, and would therefor likely be resource demanding to accomplish. Regarding profit, this may not be a good indicator for start-ups as they are expected to have negative results in the early phase while the outlooks may still look promising.

In the reminder of this report, we will discuss the MEAN and MEDIAN metrics with the underlying measure being the company's annual income. Although using value creation as underlying measure is in line with the reports discussed in section 2 and therefore of considerable interest, we do not at present have access to the necessary data to carry out this analysis.

## 5. Data

TTO	Research Partners	Portfolio Count
Inven2 AS	Universitetet i Oslo and Helse Sør-Øst.	46
Bergen Teknologioverføring AS	Universitetet i Bergen, Helse Bergen, IMR, UniResearch, Høgskolen i Bergen, CMR, Nofima, Nifes, Kunnskapsparken Sogn and Fjordane, Haraldsplass Diakonale Sykehus, Nyskapingsparken	20
Kjeller Innovasjon AS	Universitetet for miljø and biovitenskap (UMB), Høgskolen i Oslo and Akershus, OFFI, FLO, IFE, Norsar, NILU, NGI, NIVA, Simula, HiAk, UNIK, NVH, VI, Nofima Mat, Bioforsk, Skog and landskap	48
Norinnova Technology Transfer AS	Universitetet i Tromsø, Høgskolen i Finnmark, Høgskolen i Narvik, UNN, Norut Tromsø, Norut Narvik, Nofima Marin, GenØk and Bioforsk Nord	27

NTNU Technology Transfer AS	NTNU, Høgskolen i Sør-Trøndelag and Helse Midt-Norge	29
Simula Innovation AS	Simula Research Lab and Bærum commune	13
SINTEF TTO AS	SINTEF-gruppen	7
Sum		190

The table gives an overview on the data sources. The list of TTOs coincides with the FORNY2020 partners except that Prekubator TTO is missing and Simula Innovation is added. The total portfolio counts 190 companies distributed as shown in the right column in the table. The criterion to be counted as portfolio company is that a TTO owns shares in the company in one of the target years 2011 – 2014. The number of portfolio companies is 115, 111, 110 and 123 in each of the years 2011 – 2014 respectively. More details on the technical collection of data as well as the full data sets for all portfolio companies is given in Appendix C.

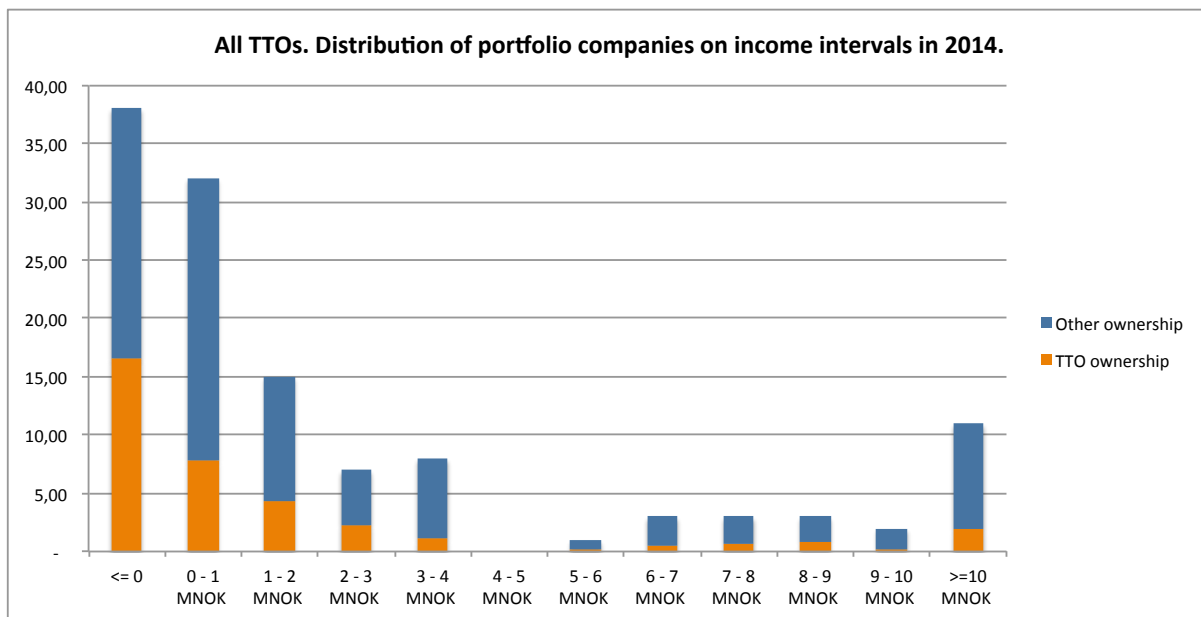


Figure 2. Distribution of portfolio companies on income intervals in 2014. Similar figures for the 2011 – 2013 are given in Appendix A and for the different TTO's in Appendix B.

The height of the columns in the figure shows how many portfolio companies that have a income falling into the given income interval in 2014. In 2014 there were 123 portfolio companies, and as illustrated in the figure, more 70 of those had income below 1 MNOK. The orange part of the columns show the fraction of these companies owned by the TTO and the blue shows what is owned by other owners.

In terms of the MEAN and MEDIAN metrics discussed in section 4, we are interested in mean and median values of the quantities  $\bar{w}_{ij} = w_{ij}s_{ij}$ , where  $w_{ij}$  is the income of a portfolio company and  $s_{ij}$  is the relevant TTO's share in that company. The distribution of the  $\bar{w}_{ij}$  in 2014 is shown in Figure 3. The figure involves the same 123 companies as in Figure 2, and we observe that 70 of those are in the <100 KNOK range and 21 in the >1 MNOK range. The mean value of the distribution is 766 KNOK and median is 62 KNOK. Thus, the distribution is heavily skewed.

The last group of 21 companies in the >1 MNOK range is listed in Figure 4. The sum of the TTO's share of income of this group is about 81 MNOK of a total of 94 MNOK for all the 123 portfolio companies.

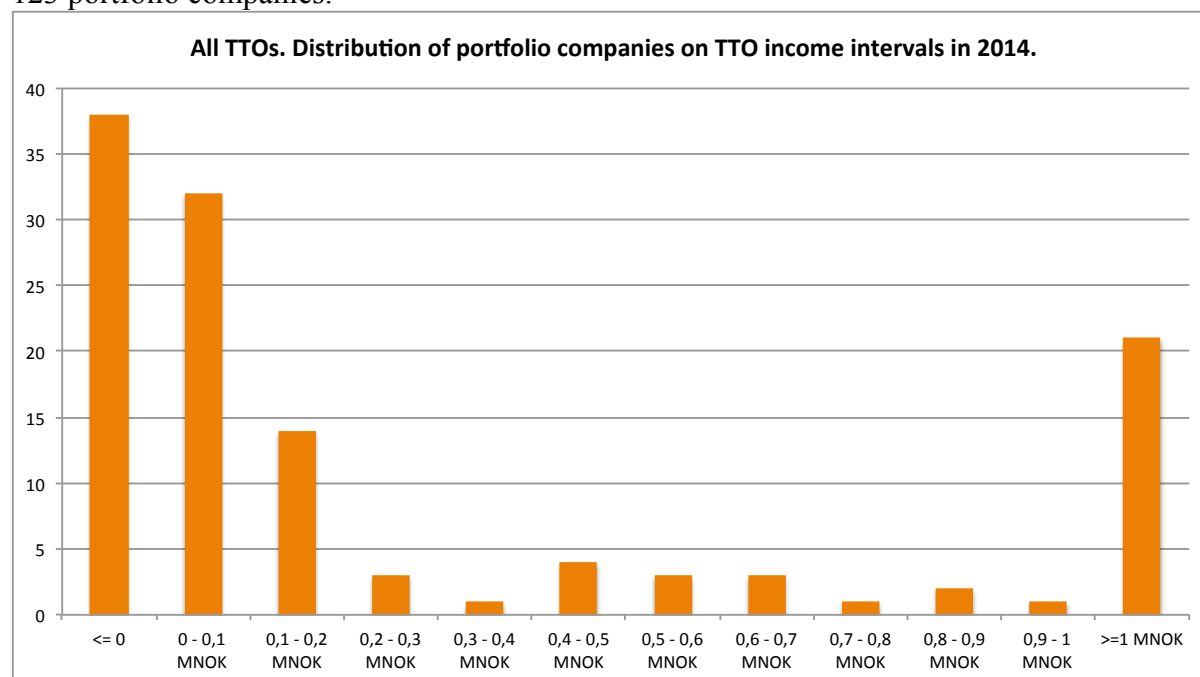


Figure 3 Distribution of portfolio companies in 2014. The key for distribution is the income of the portfolio company scaled with the ownership of the TTO in the company.

TTO share of income	Company income	TTO ownership	Company name	TTO name
23 058	62 319	37 %	Akershus Teknologifond AS	Kjeller Innovasjon AS
17 375	17 375	100 %	Kalkulo AS	Simula Innovation AS
7 464	67 852	11 %	Calanus AS	Norinova Technology Transfer AS
4 513	8 679	52 %	HYOP AS	Kjeller Innovasjon AS
4 165	36 860	11 %	Dualog AS	Norinova Technology Transfer AS
2 282	7 605	30 %	Testify AS	Simula Innovation AS
2 095	9 883	21 %	Prophylix Pharma AS	Norinova Technology Transfer AS
2 081	2 771	75 %	Crisis Training AS	Kjeller Innovasjon AS
2 077	20 769	10 %	Novelda AS	Inven2 AS
1 570	2 968	53 %	Globesar AS	Norinova Technology Transfer AS
1 564	7 818	20 %	Norinova Forvaltning AS	Norinova Technology Transfer AS
1 524	6 627	23 %	Ultimovacs AS	Inven2 AS
1 407	7 178	20 %	Forskningsparken Narvik AS	Norinova Technology Transfer AS
1 321	6 261	21 %	Origo Nord AS/kunnskapsparken Origo AS	Norinova Technology Transfer AS
1 318	3 983	33 %	Mazemap AS	NTNU Technology Transfer AS
1 301	1 301	100 %	Bergen Biomedisinske Inkubator	Bergen Teknologioverføring AS
1 290	27 443	5 %	Aptomar AS	NTNU Technology Transfer AS
1 248	2 501	50 %	Veritrack AS	SINTEF TTO AS
1 135	8 729	13 %	Vaccibody AS	Inven2 AS
1 067	3 049	35 %	Innsep AS	NTNU Technology Transfer AS
1 050	8 076	13 %	Promon AS	Inven2 AS

Figure 4. The 21 portfolio companies for which the TTO's share of income is above 1 MNOK in 2014. The sum of the companies income is 320 MNOK and the TTO's share of that is 81 MNOK.



## 6. Comparison of TTO's

We will here calculate the MEAN and MEDIAN metrics discussed in section 4 for the 8 TTO's listed in section 5, as well as for the all TTO's seen together. The totality will serve as reference, and the individual TTO's can then be compared to the reference.

To make it precise we summarize the metrics here, ref. section 4.

Set  $\bar{w}_i^{MEAN} = \frac{1}{m_i} \sum_j \bar{w}_{ij}$ : Here  $m_i$  is the number of portfolio companies for  $T_i$ ,  $\bar{w}_{ij} = w_{ij}s_{ij}$ ,  $w_{ij}$  is the income of portfolio company  $j$  for  $T_i$  and  $s_{ij}$  is the share  $T_i$  owns in that company. Let further  $r_i$  be the total operation cost for  $T_i$ . Then we define the *MEAN income index* for  $T_i$  as follows:

$$I^{MEAN}(T_i) = \frac{m_i}{r_i} \bar{w}_i^{MEAN}$$

Let next  $\bar{w}_i^{MEDIAN}$  is defined to be the middle value of the sorted set  $\{\bar{w}_{ij}\} / \{0\}$ . Then we define the *MEDIAN income index* as follows:

$$I^{MEDIAN}(T_i) = \frac{m_i}{r_i} \bar{w}_i^{MEDIAN}$$

Note, in these definitions we taken the scaling factor  $r_i$  to be the total operation cost of  $T_i$  and not only those costs underlying building and managing the company portfolio. The effect of this will be that TTO's with a lot of costs not related to such management will have a tendency to fall on the index, while TTO's with a strong focus of portfolio management will have a tendency to rise.

All TTOs	2011	2012	2013	2014
MEAN income index	0,2762	0,3516	0,2047	0,3215
MEDIAN income index	0,0592	0,0340	0,0381	0,0258
TTO	2011	2012	2013	2014
Operation income	197 614	174 274	287 263	291 704
Operation result	3 236 -	5 504	4 495 -	1 307
Operation cost	194 378	179 778	282 768	293 011
Portfolio companies	2011	2012	2013	2014
Total portfolio income	466 334	489 956	486 300	473 223
Mean portfolio income	4 055	4 414	4 421	3 847
Median portfolio income	862	619	593	428
No of portfolio companies	115	111	110	123
Mean TTO ownership	25,97 %	27,73 %	31,22 %	29,57 %
Median TTO ownership	16,10 %	18,40 %	19,95 %	20,00 %
Total TTO income = (Mean TTO income)*(No of portfolio companies)	53 695	63 213	57 890	94 191
Mean TTO income	467	569	526	766
Median TTO income	100	55	98	62
(Median TTO income)*(No of portfolio companies)	11 517	6 105	10 775	7 569

Figure 5. MEAN and MEDIAN income indexes for all TTOs as well as the underlying parameters.

We remark that these indexes are well defined also for all TTO's put together. For this special case, the operation cost is simply the sum of operation costs for all the TTO's. Note also the compound index defined in this way is not the same as adding or averaging

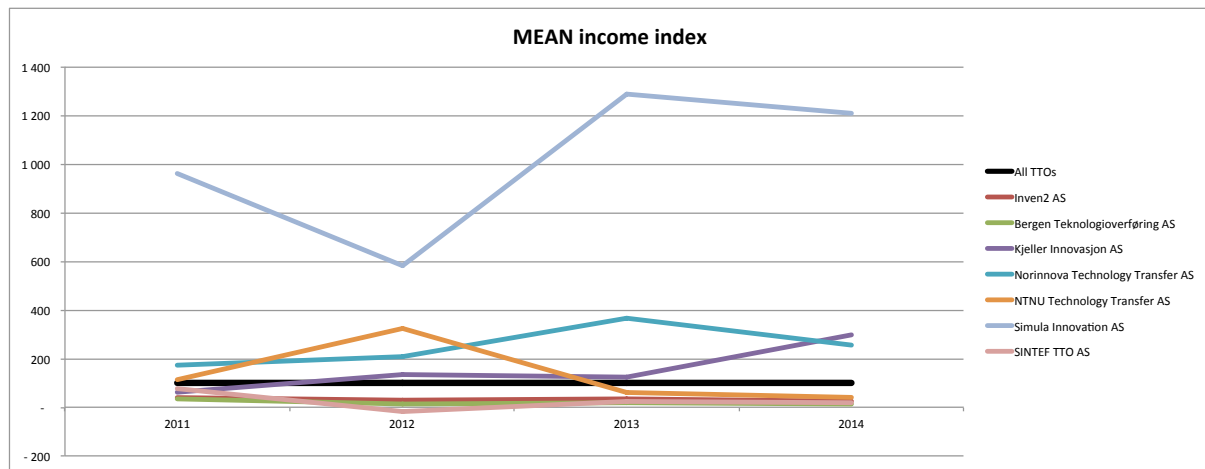
individual indexes. The calculated indexes for the “All TTOs” case is shown in Figure 5 together with the key quantities defining the index.

MEAN income index	2011	2012	2013	2014
All TTOs	0,28	0,35	0,20	0,32
Inven2 AS	0,10	0,10	0,07	0,08
Bergen Teknologioverføring AS	0,09	0,04	0,03	0,04
Kjeller Innovasjon AS	0,17	0,48	0,26	0,96
Norinnova Technology Transfer AS	0,48	0,74	0,75	0,82
NTNU Technology Transfer AS	0,31	1,13	0,12	0,13
Simula Innovation AS	2,65	2,04	2,63	3,88
SINTEF TTO AS	0,21	-	0,05	0,05

Figure 6. MEAN income index tabulated for the individual TTO's and all together.

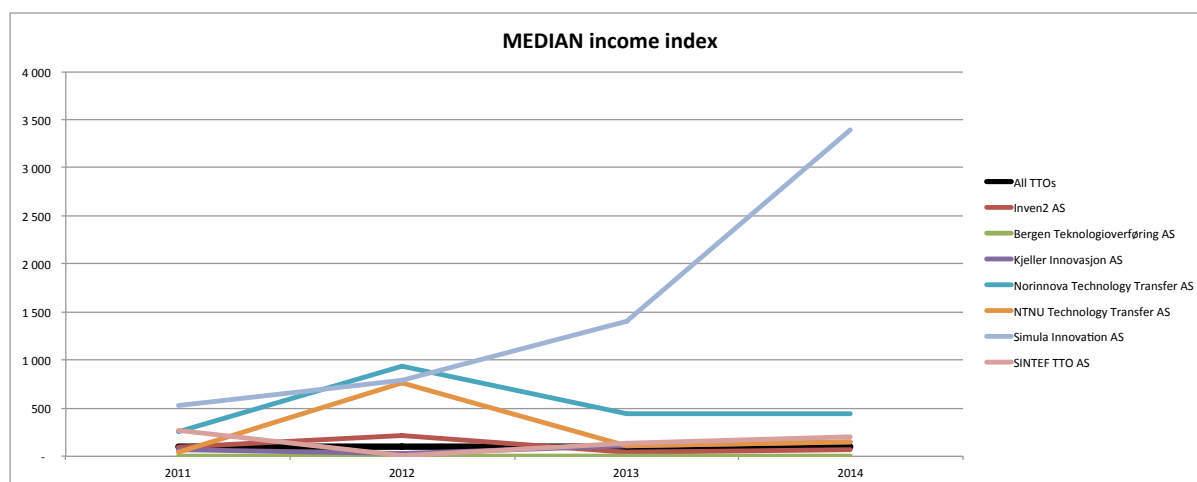
From Figure 6 we observe that most TTO's have MEAN income index well below 1. The exception is Simula Innovation, for which the index ranges in the area 2,0 – 3,9.

A reasonable procedure to be used for comparison purposes is to scale the indexes by setting the “All TTOs” to 100 each year. In the following tables and figures this is done for both indexes.



MEAN income index	2011	2012	2013	2014
All TTOs	100	100	100	100
Inven2 AS	38	30	33	25
Bergen Teknologioverføring AS	32	12	17	12
Kjeller Innovasjon AS	62	136	125	300
Norinnova Technology Transfer AS	173	210	367	255
NTNU Technology Transfer AS	112	321	59	40
Simula Innovation AS	960	581	1 285	1 208
SINTEF TTO AS	76	-	26	16

Figure 7. MEAN income index scaled to “All TTOs” set to 100.



MEDIAN income index	2011	2012	2013	2014
All TTOs	100	100	100	100
Inven2 AS	100	215	40	65
Bergen Teknologioverføring AS	-	-	1	-
Kjeller Innovasjon AS	66	26	113	148
Norinova Technology Transfer AS	249	932	444	442
NTNU Technology Transfer AS	43	761	102	152
Simula Innovation AS	528	789	1 406	3 388
SINTEF TTO AS	275	7	137	200

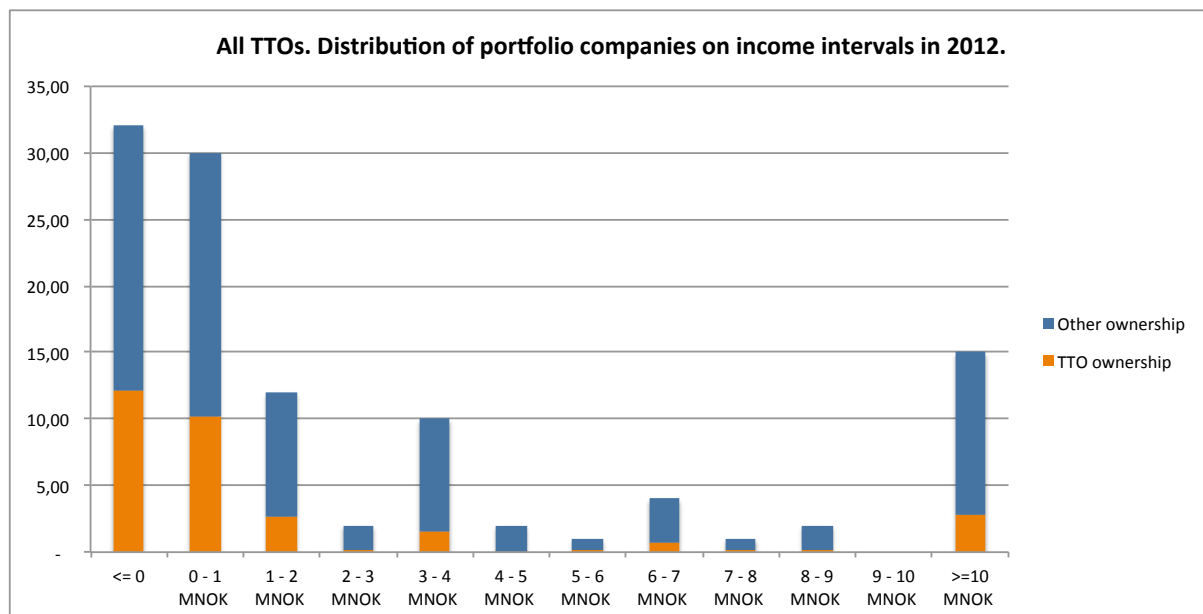
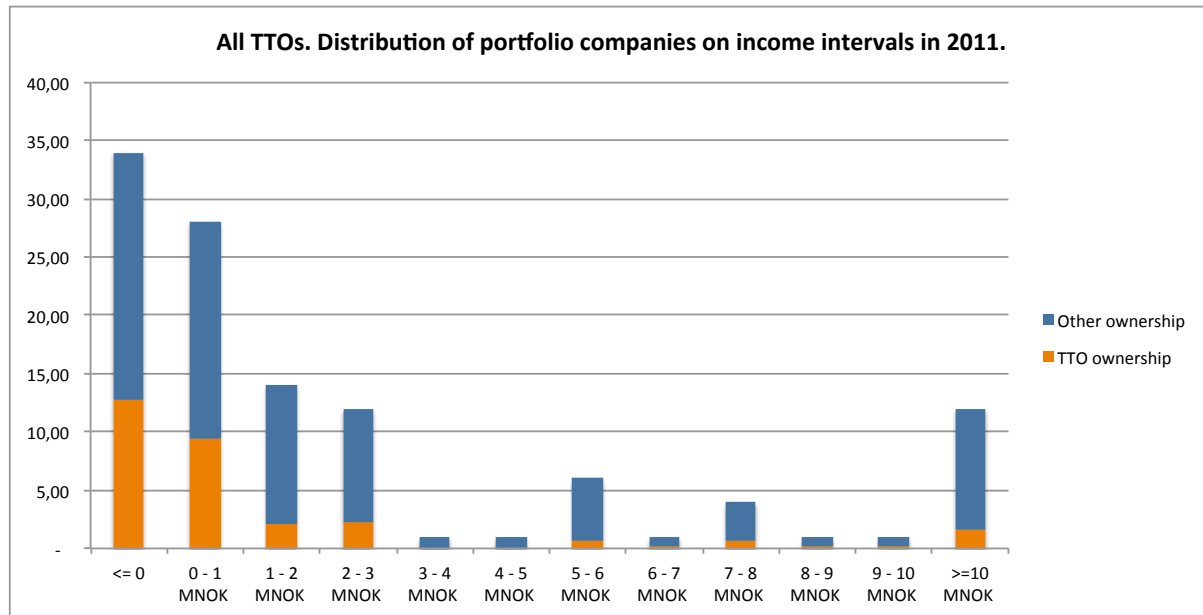
Figure 8. MEDIAN income index scaled to “All TTOs” set to 100.

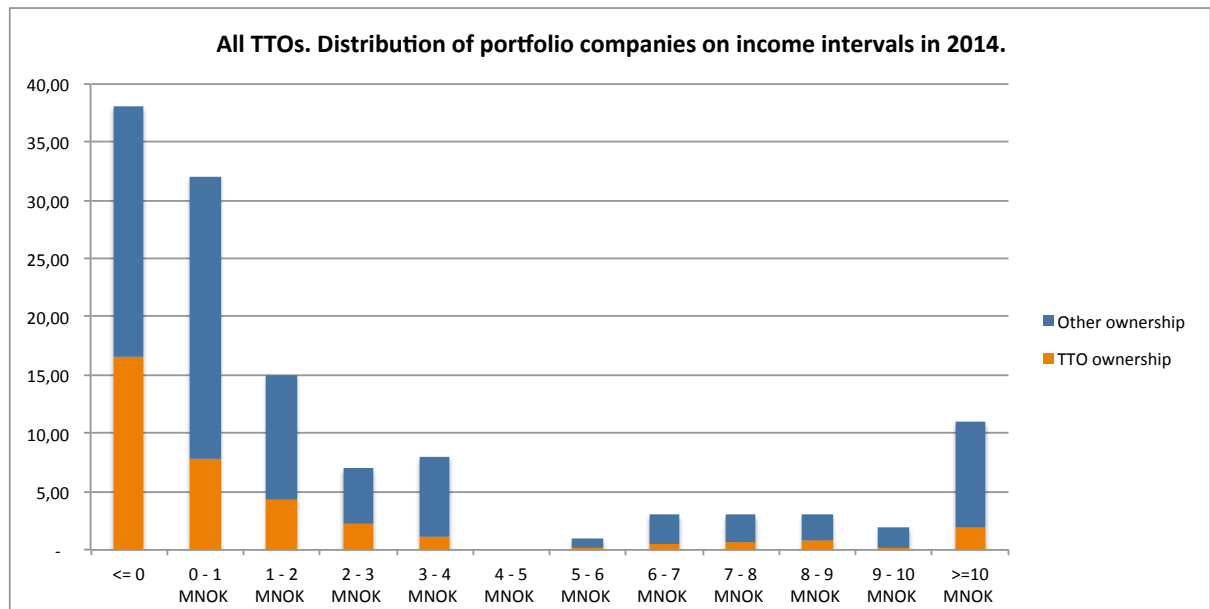
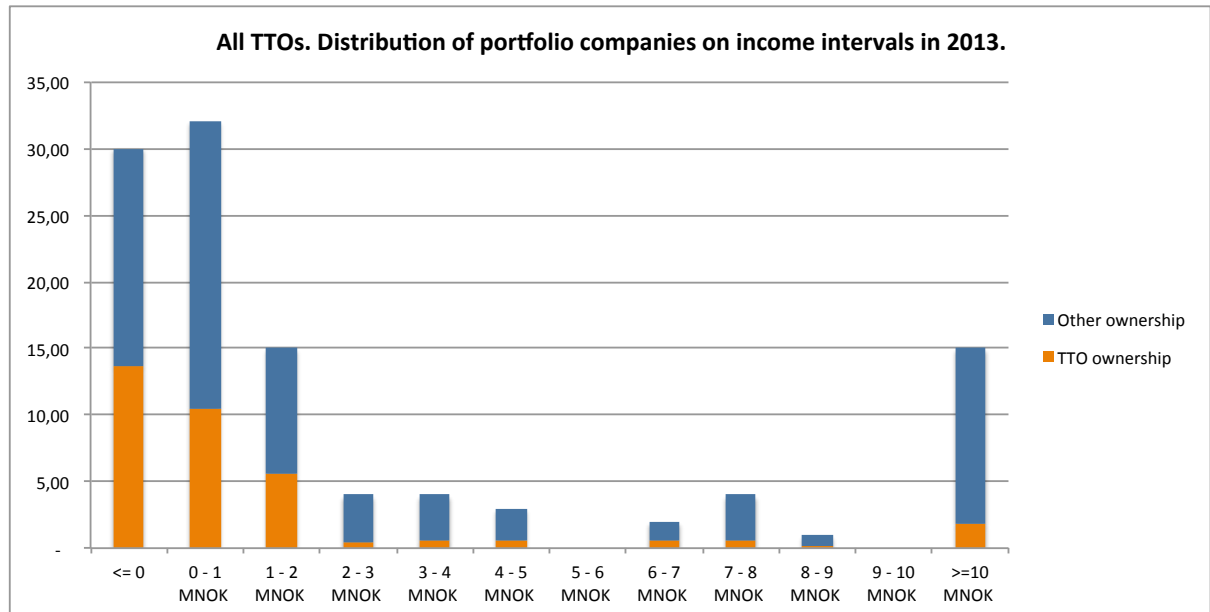
## 7. Disclaimer

This report should be regarded to be in unfinished form. Readers should be aware that errors and incompleteness of data could be present and are encouraged to review also the appendices on data. Such possible deficiencies will be addressed in possible subsequent versions of this report.

## Appendiks A. Distribution on income intervals 2011 – 2014

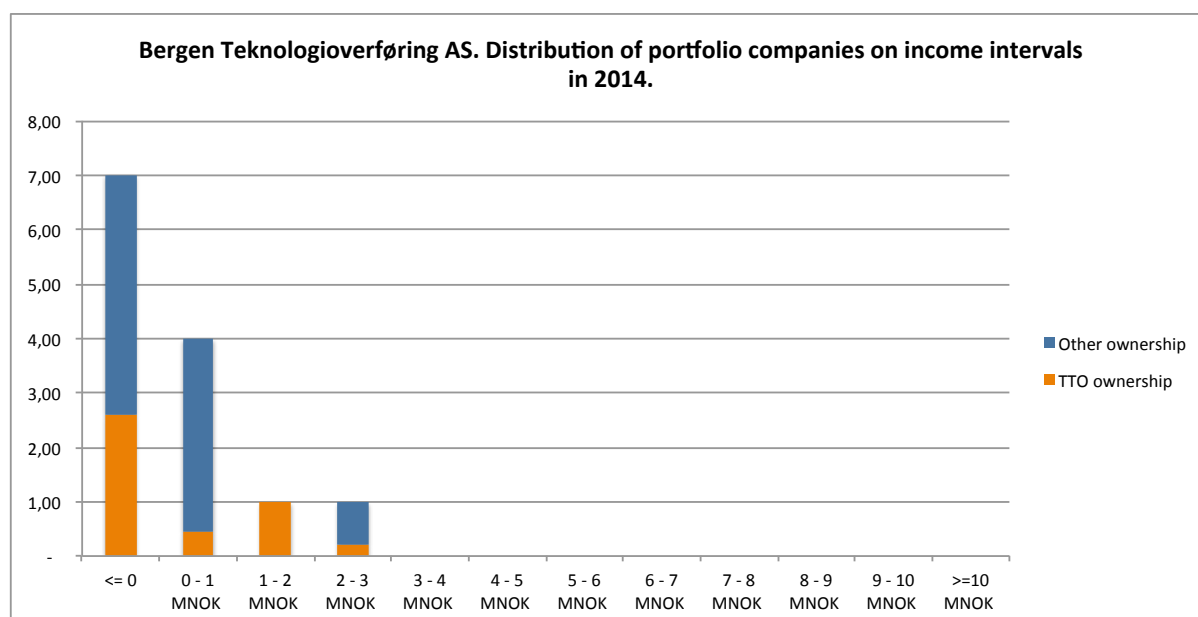
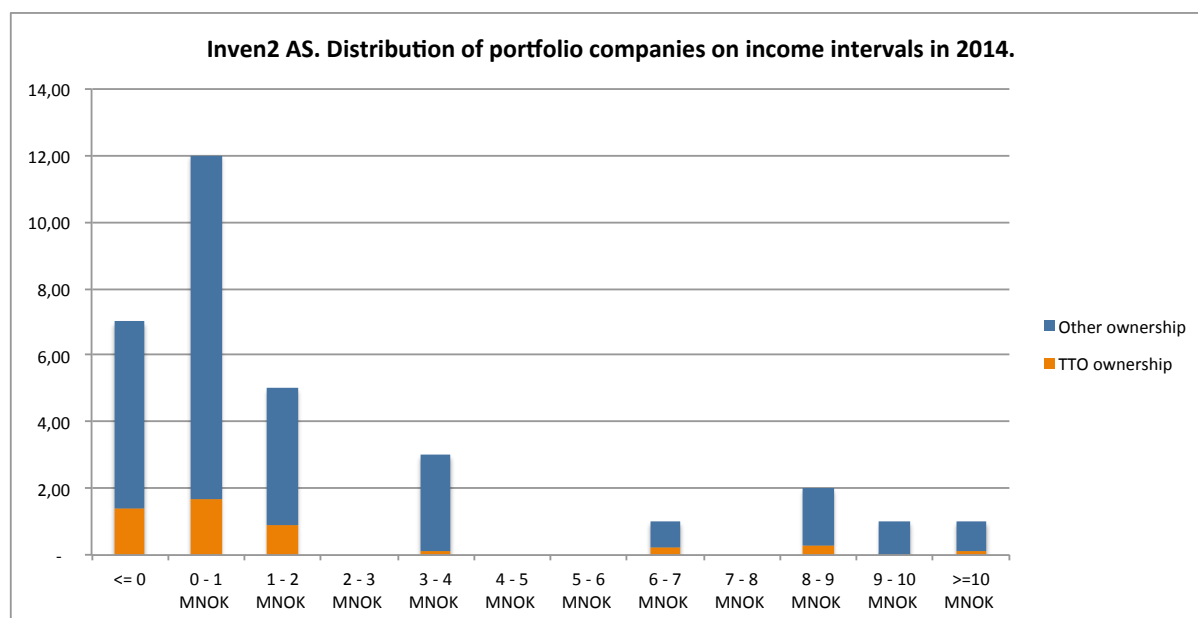
The figures below show the distribution year by year. The height of the columns in the figure shows how many portfolio companies that have a income falling into the given income interval in the given year. The orange part of the columns show the fraction of these companies owned by any TTO and the blue shows what is owned by other owners. The reason for a year by year view is that it gives little meaning to average over years.

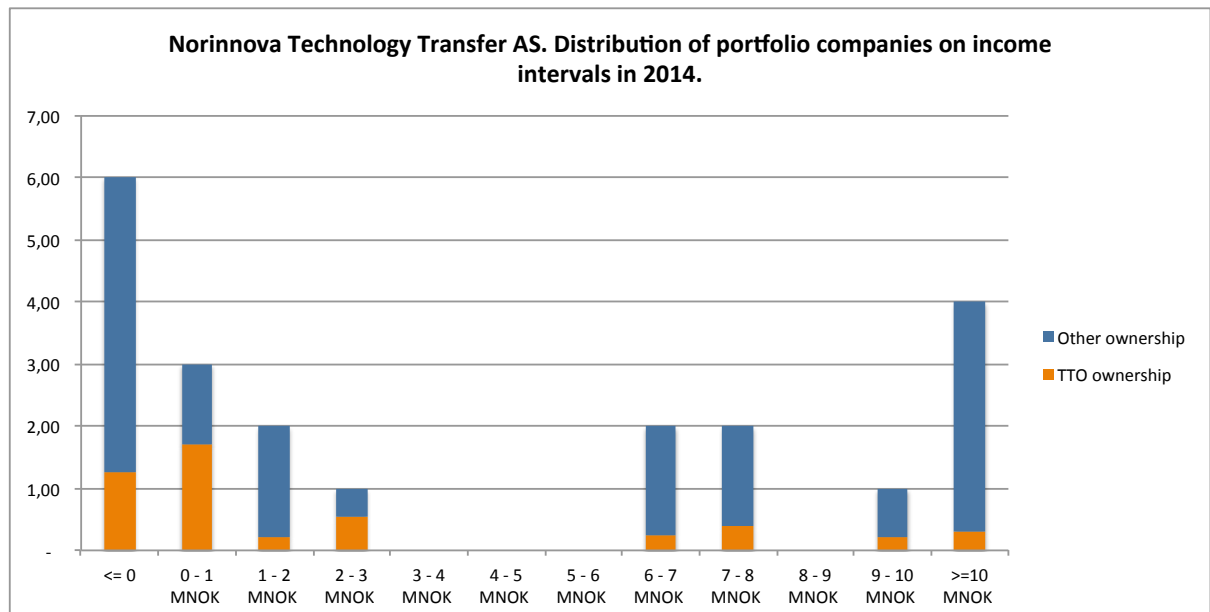
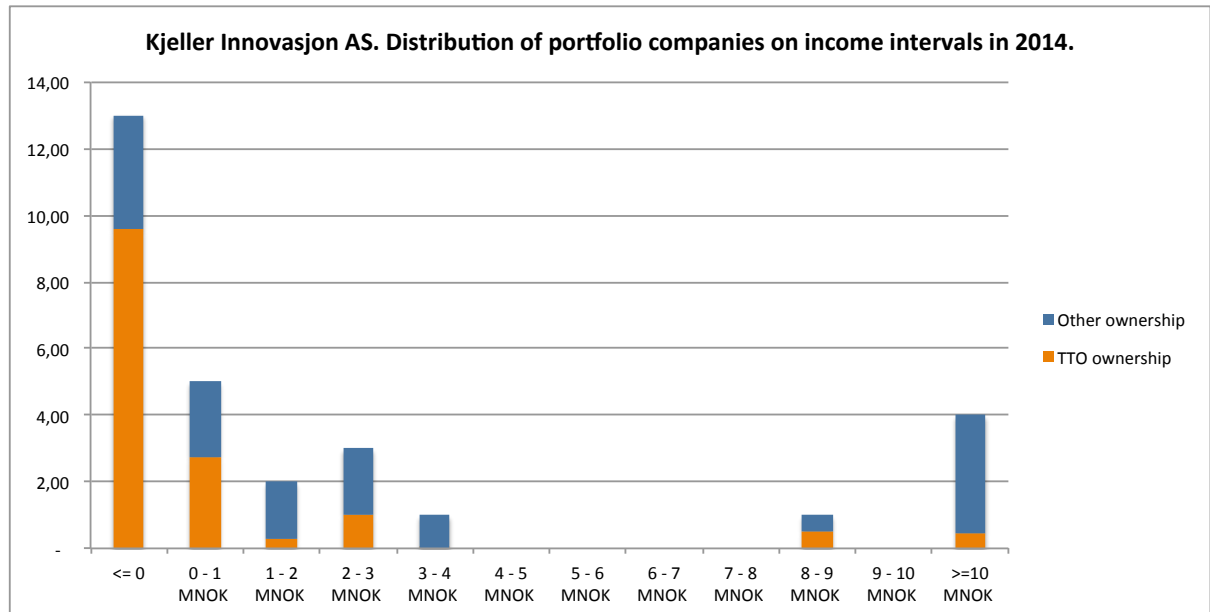


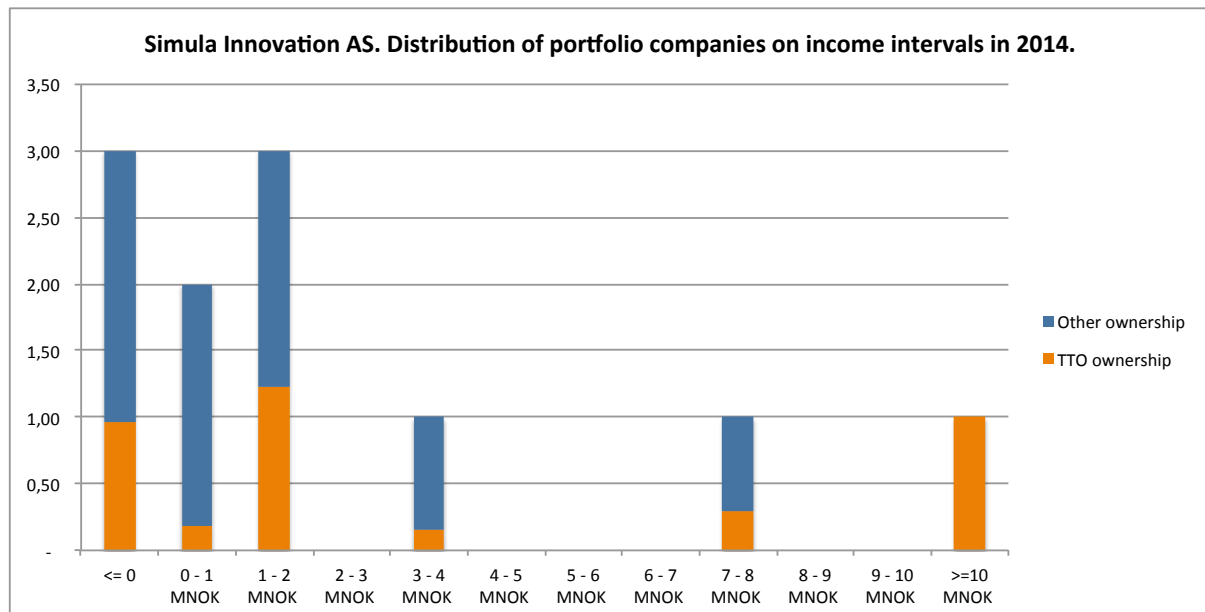
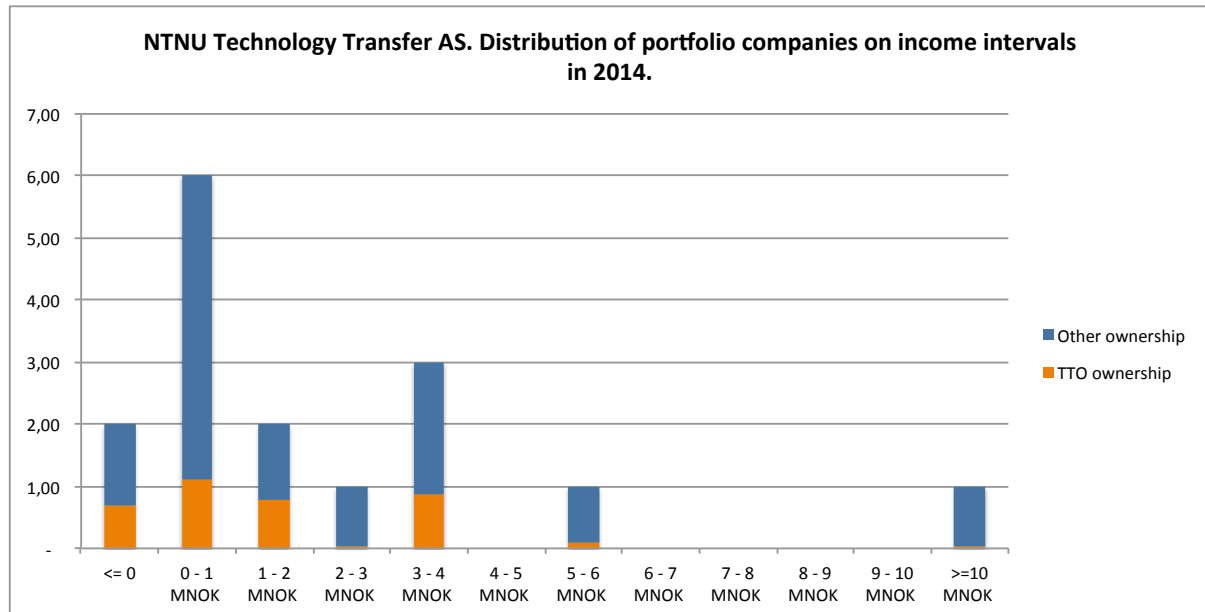


## Appendiks B. Distribution on income intervals per TTO in 2014

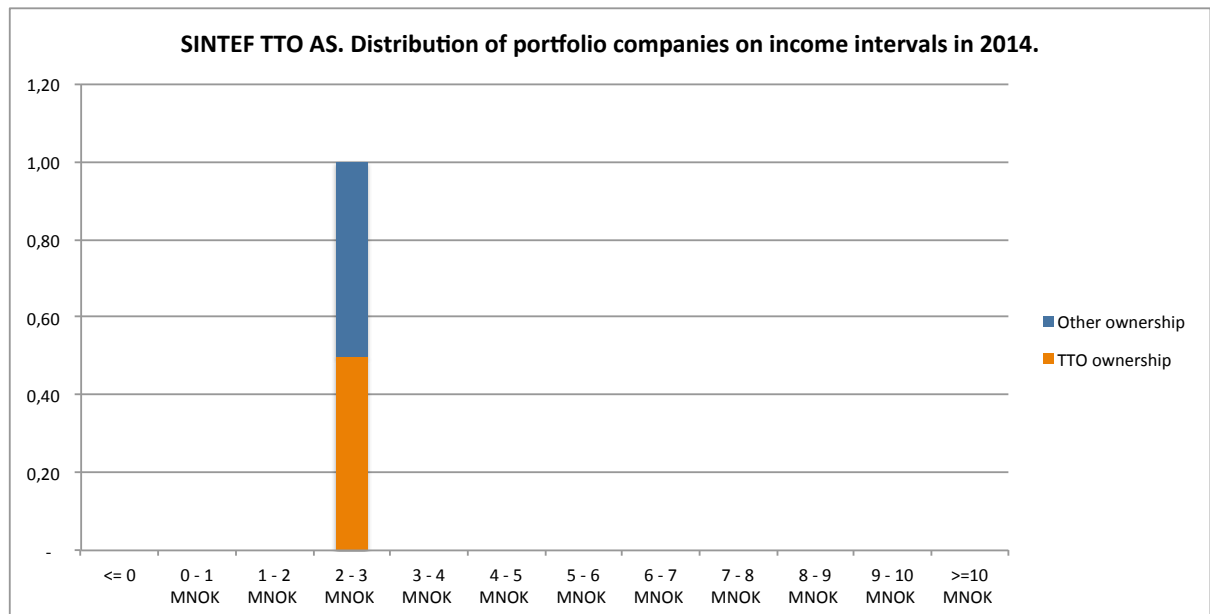
The height of the columns in the figures below show how many portfolio companies that have a income falling into the given income interval in the given year. The orange part of the columns show the fraction of these companies owned by the TTO and the blue shows what is owned by other owners.











## **Appendiks C.      Collected Data**

The data has been collected via the following steps:

1. The complete accounts for each TTO for target period was purchased from Proff.no
2. In agreement with Norwegian law, these accounts are required to list all portfolio companies for the TTO.
3. The operating income and operating result for the portfolio companies were next collected from Proff.no
4. For those portfolio companies that were no longer active, the data were available from Regnskapstall.no

The following tables lists the complete data sets underlying the analysis in this report.

## C.1. Invent2

Id	Inven2 AS	Ownership on portfolio company						Income of portfolio company				
		2011	2012	2013	2014	2015		2011	2012	2013	2014	2015
1	Medinova AS	1,00	1,00									160
2	Birkeland Innovasjon AS	1,00	1,00									
3	Aims Innovasjon AS a	0,34	0,30	0,24	0,26	0,26		400	971	248	428	1 308
4	Ultimovacs AS	0,50	0,50	0,26	0,23	0,20		-	-	3 878	6 627	8 429
5	Comet Biotech AS	0,33	0,33	0,33	0,33			1 096	416	87	108	694
6	Oncoinvent AS	0,08	0,04	0,03	0,02	0,03		490	616	760	1 755	2 588
7	Serodus AS	0,20	0,20	0,04	0,02	0,01		52	52	59	3	297
8	Omegatri AS	0,25	0,25	0,06	0,06	0,03		82	-	319	633	209
9	Cgene AS	0,31	0,31	0,31								
10	Baldur Coatings AS	0,50	0,50	0,50	0,50	0,50		871	504	495	1 059	991
11	Nordic Nanovector AS	0,18	0,18	0,13	0,04	0,02		63	148	306	439	437
12	Promon AS	0,14	0,14	0,13	0,13	0,13		2 961	3 498	11 095	8 076	14 635
13	Unigeo AS	0,15	0,15	0,12	0,12	0,12		1 887	3 935	1 759	713	954
14	Neorad AS	0,12	0,12	0,07	0,08	0,07		963	1 726	2 109	1 882	3 262
15	Protia AS / Coorstek Membrane Sciences AS	0,12	0,12					5 935	6 341	7 669	9 287	5 095
16	Bio-Medisinsk Innovasjon AS	0,11	0,11					7 450	2 336	119	117	203
17	Lividi AS	0,06	0,06					2 500	787	1 393	1 662	2 011
18	OstomyCure AS	0,08	0,08	0,08	0,08	0,08		181	1 567	3 608	1 876	2 101
19	Nextera AS	0,04	0,04	0,06	0,05	0,04		557	1 375	2 984	3 303	5 260
20	Setred AS	0,07	0,07	0,00	0,00	0,00		1 565	405	2 017	1 543	1 222
21	Elliptic Laboratories AS (EL.)	0,05	0,05	0,04	0,04	0,04		4 065	3 001	3 604	3 543	3 579
22	SimSurgery AS	0,04	0,04	0,04				3 969	6 893	6 071	2 597	4 634
23	Symphonical AS	0,03	0,03	0,00	0,02	0,02		2 038	467	585	235	1 473
24	Novelda AS	0,02	0,02	0,01				11 767	14 236	12 089	20 769	14 817
25	Csam International/invest AS	0,01	0,01	0,02				70 744	75 029	83 373	61 065	40 558
26	Nordic Labs AS	0,00	0,00		0,00	0,01		2 877	785	185	-	-
27	Vaccibody AS		0,15	0,13	0,13	0,08		1 320	1 781	4 953	8 729	5 623
28	Biomolex AS		0,03	0,03	0,03	0,03		5 638	4 560	978	3 759	2 334
29	Qotics AS			1,00				550	-	-		
30	Odin Therapeutics AS			0,88				400	1 550	1 207		
31	Skiflex AS			1,00	0,20	0,20					-	
32	Unlock Giving AS			1,00	0,20	0,20					50	
33	Muridae AS			1,00	0,20	0,20					-	50
34	Smart Charge AS/Meshcrafts AS			1,00	0,20	0,20					246	822
35	Idia AS			0,10	0,11	0,11					600	990
36	Safeedawba AS			0,02						-		
37	Prophylax Pharma AS			0,01	0,01	0,01		962	3 712	7 393	9 883	6 395
38	NordicNeurolab AS			0,00				22 247	27 844	31 361	40 353	47 182
39	Blue Couch AS				0,20	0,20						
40	CosyTech AS				0,20	0,20						
41	Dompap Design AS				0,20	0,20						
42	Somsagt AS				0,20	0,20					280	2 317
43	Safe Node AS				0,20	0,20						100
44	Pre Diagnostics AS				0,20	0,05				150	1 691	1 316
45	Knut Kvernbo AS				0,19	0,10						
46	Lundelab AS				0,10	0,10					300	300
47	Novelda AS				0,10	0,01		11 767	14 236	12 089	20 769	14 817
48	Normetrix AS					0,97						
49	Prosa Security AS					0,26						
50	EpiGuard AS					0,25						58
51	ViVil AS					0,20						75
52	cFire AS					0,20						
53	Sportech AS					0,20						
54	Cardinor AS					0,15						-
55	Tankeboksen AS					0,10						200
56	RespiNOR AS					0,07						2 417
57	OCC Incubator					0,04						
58	Prediktor AS					0,01			57 880	48 091	45 060	52 586

## C.2. Bergen Teknologioverføring AS

	Bergen Teknologioverføring AS											
1	Bergen Biomedisinske Inkubator	1,00	1,00	1,00	1,00	1,00		735	921	1 078	1 301	1 095
2	Norsk Innovasjonskapital II AS	0,65	0,42	0,34	0,29	0,30		-	-	-	-	-
3	LTL NOR AS	0,48						2 753	1 958	2 596	323	
4	CO2BIO AS	0,25	0,25	0,25	0,25	0,13		-	-	315	-	50
5	Holberg EEG AS	0,35	0,35	0,27	0,27			-	132	19	204	230
6	ARRG AS	0,25	0,25									
7	UniGeo AS	0,15	0,15	0,12	0,11	0,12		1 887	3 935	1 759	713	954
8	One2Touch AS	0,17			0,03	0,02		862	7 324	62	94	99
9	HammerTech AS	0,17	0,03						1 528	1 748	1 503	
10	Pattern Solution AS	0,10						-	-	-	-	-
11	Embigo AS	0,07						510	-	-	-	-
12	Q-Pharmaceuticals AS		0,52							60	3 310	
13	Multi Trophic Aquaculture AS		0,50									
14	Alden Cancer Therapy II AS			0,34	0,34	0,34						
15	Quantidoc AS			0,20	0,20	0,20				-	2 600	
16	Kitemill AS			0,05	0,05	0,05				-	50	
17	Tunichor AS				1,00	1,00						120
18	Rock Physics Technology AS				0,60	0,60						
19	Teknomar AS				0,05	0,05						
20	Offshore Sensing AS				0,07	0,07					-	2 347
21	Pluvia AS					0,51						
22	Nobesita AS					0,56						
23	Catch Control AS					1,00						
24	Adap AS					0,33						
25	Norsk Innovasjonskapital IV					0,18						-
26	Seasmart AS					0,10						

## C.3. Kjeller Innovasjon AS

	Kjeller Innovasjon AS											
1	IC platform AS	1,00						176	120	19		
2	Nordic THM AS	0,51	0,51	0,51				-	-	-	-	
3	Crisis Training AS	0,75	0,75	0,75	0,75	0,75		836	1 855	1 871	2 771	1 866
4	Flood Securities AS	0,49	0,49	0,49				-	-	-	-	-
5	Akershus Teknologifond AS	0,37	0,37	0,37	0,37	0,37		767	6 242	577	62 319	-
6	Kadabra AS	0,35						7 797	7 212	397	400	-
7	Nicarnica AS	0,26						2 570	-	-	410	-
8	Kunnskapsbyen Eiendom AS	0,23	0,23	0,23	0,23	0,23		-	52	76	-	481
9	Mflow AS	0,20						-				
10	Obeo AS	0,29							1 403	325	414	
11	Leogriff AS	0,12	0,12	0,12	0,07	0,07		5 580	8 729	11 628	12 554	12 435
12	Seismic Innovation AS	0,18	0,18	0,18				-	-	-	-	
13	EIF Air AS	0,11	0,11					1 333				
14	Hynor Lillestrøm AS	0,05	0,05	0,05	0,02	0,02		2 015	4 990	22 856	3 077	
15	Televenture Management AS	0,05	0,05	0,05	0,05			-	250	1 288	2 138	2 850
16	Inkubator Halden AS/Smart Innovation Østfold	0,02	0,02	0,02	0,02	0,02		19 701	16 841	15 008	15 821	
17	ar-lab Norway AS	0,08						1 071	319	996	127	-
18	Datek Wireless AS	0,00	0,00	0,00	0,00			16 772	17 654	15 656	15 214	13 106
19	Viva AS	0,08	0,08	0,08	0,08	0,08		1 680	2 259	1 600	1 039	- 202
20	NaviGuiding AS	0,04	0,04					1 237	-			
21	Waterment	0,04						369	1 101	830	676	822
22	LokalData Instruments	0,04						-	-	-	-	
23	Xymphonic System	0,01						-	-	-	140	-
24	Campus Kjeller AS		1,00	1,00				176	120	19		
25	HYOP AS		1,00	0,52	0,52	0,52			10 420	6 918	8 679	
26	Syntech AS		1,00	1,00	1,00				-	-	-	150
27	Nextelco Norway AS/Basic Internet AS		0,54	0,54	0,80	0,80			136	425	-	-
28	Tjubi AS		0,39	0,39	0,39					444	115	92
29	Eggs Design AS		0,35								-	55 568
30	Portseye AS		0,20	0,20	0,20	0,20			-	200	1 447	616
31	Nordic Airport Solutions		0,19						6	750	104	
32	EcoCube AS		0,13	0,13						106	73	1 471
33	Asio AS		0,12	0,12	0,20	0,20			-	456	895	1 432
34	Promatic AS		0,00	0,00				25 156	23 069			
35	Inhibio AS			1,00	1,00					150	500	1 607
36	Postsmolt AS			1,00	1,00					-	-	-
37	Piscora AS			1,00	1,00	1,00					-	-
38	Previwo AS			0,23	0,23	0,42					2 027	
39	Sea-Lix AS			0,16	0,16	0,16		50	-	600	500	
40	Plants4Ever AS				1,00	1,00					115	75
41	Healthboost AS				1,00	0,70						113
42	Belle vacc AS				1,00	1,00					-	-
43	Pharmaplants AS				1,00	1,00					-	-
44	Forest Vision AS				1,00	1,00					-	-
45	IFE Flow AS				0,55	0,55					-	150
46	Inkubator Ås AS				0,50	0,50					-	1 574
47	BioZeg AS				0,33	0,33					-	150
48	Visavi Technology Holding AS				0,18	0,22						
49	AdoScent AS					1,00			-	-	-	150
50	GIMA Teknologitutvikling AS					0,15						-
51	Prosa Security AS					0,13						

## C.4. Norinova Technology Transfer AS

	Norinova Technology Transfer AS											
1	Uformia AS	0,10	0,14	0,15	0,15			468	207	1 429	1 993	
2	Globesar AS	0,86	0,86	0,72	0,53			322	297	1 692	2 968	
3	Integrogen AS	0,02	0,02					138	150			
4	Precap AS	0,41	0,41	0,41	0,41			-	-	171	-	-
5	D'liver AS	0,35	0,35					475	1 480	1 139	1 480	1 459
6	Procelo AS	0,67	0,60	0,60	0,60			216	619	610	132	
7	Lytix Biopharma AS	0,03	0,03	0,03	0,02			54	51	50	6 441	15 224
8	Norinova Forvaltning AS	0,20	0,20	0,20	0,20			6 439	6 999	7 558	7 818	8 102
9	Stiftelsen Tromsø Internasjonale Skole	0,10	0,10	0,10	0,10			5 913	8 452	11 051		
10	Northern Biolabs AS	0,20	0,20	0,20								
11	Aranica AS	0,30	0,80	1,00	1,00			185	391	114	144	
12	Advanced Biopolymers AS	0,22	0,22	0,22	0,22			-	-	-	-	-
13	Taco Scientific AS	0,21	0,21	0,21				1 099	1 227	410	8	
14	Calanus AS	0,12	0,11	0,11	0,11			7 736	10 799	25 448	67 852	61 495
15	Probio ASA	0,08						12 390	11 271	15 410	13 687	10 238
16	Dualog AS	0,11	0,11	0,11	0,11			22 458	29 398	31 436	36 860	45 353
17	Såkorninvest Nord AS	0,15	0,15	0,15								
18	Prophylax Pharma AS	0,36	0,28	0,21	0,21			962	3 712	7 393	9 883	6 395
19	Orthogenics AS	0,14	0,15	0,15	0,07			65	3 802	1 854	1 630	809
20	ObexCode AS	0,11	0,11	0,11	0,11			1 321	146	124	114	
21	Origo Nord AS/kunnskapsparken Origo AS	0,21	0,21	0,21	0,21			8 942	7 817	7 203	6 261	5 124
22	Forskningsparken Narvik AS	0,20	0,20	0,20	0,20			9 186	12 574	8 570	7 178	
23	Nordinnova Invest AS	0,20	0,20	0,20	0,20			-	-	-	-	-
24	Nordnorsk Vitensenter - stiftelse	0,00	0,00	0,00	0,00			16 634	13 768	12 708	11 775	13 304
25	Grunnkapital MIT-Fablab	0,00	0,00	0,00	0,00							
26	Ayanda Group AS		0,07	0,07	0,07			12 390	11 271	15 410	13 687	10 238
27	Motion Corporation AS			0,33	0,33					300	-	-

### C.5. NTNU Technology Transfer AS

	NTNU Technology Transfer AS											
1	Aptomar AS	0,05	0,05	0,05	0,05	0,05		69 274	83 676	68 449	27 443	31 169
2	Initial Force AS	0,08						201	1 404	2 966	4 036	6 866
3	Chapdrive AS	0,01	0,01					7 103	3 709			
4	Hypond AS	0,33	0,10	0,10	0,07	0,06		-	-	-	180	- 120
5	Ceramic Powder Technology AS	0,37						2 422	513	1 040	1 701	2 480
6	Protia ASCoorstek/Membrane Sciences AS	0,12						5 935	6 341	7 669	9 287	5 095
7	MemfoACT AS	0,10	0,10	0,09	0,09			5 932	3 927	1 249	252	
8	Preseria AS	0,27	0,25	0,30				1 030	642	609	599	436
9	Dynamick Rock Support AS	0,16	0,16					22 651	24 642	32 090		
10	APIM Therapeutics AS	0,26						-	60	1 553	4 215	5 907
11	Mucova Therapeutics AS	1,00	1,00	1,00				-	-	-		
12	Ecotone AS	0,25	0,20	0,14	0,11	0,12		1 192	1 323	3 030	5 930	12 161
13	SURF Technology AS	0,04	0,04	0,04	0,04	0,04		1 212	1 093	2 688	2 201	
14	Kaliber Industriedesign/Mose Innovation AS	0,16						1 643	2 474	3 553		
15	Mobitroll AS/Kahoot! AS	0,33	0,35	0,26					1 602	2 397	3 250	
16	MedXense AS/Glucoset AS	0,50	0,45	0,45					200	838	1 743	1 602
17	CompBuoy AS	0,46							572	1 167	388	-
18	Norsk Innovasjonsskapital III AS		0,18	0,17	0,11	0,10		-	-	-	143	1 152
19	Innsep AS		0,35	0,35	0,35	0,35			3 608	1 130	3 049	
20	Vorn Equipment AS		0,25						809	1 241	3 830	4 644
21	Solution Seeker AS			0,20	0,20	0,20				725	3 795	9 885
22	NTNU Accel AS			0,71	0,41	0,41					1 445	1 208
23	Glucoset AS				0,36				200	838	1 743	1 602
24	Beatstack AS				0,32	0,32					324	1 318
25	Mazemap AS				0,33					1 808	3 983	5 303
26	Optimeering Aqua AS				0,20	0,20						1 548
27	Rockseis AS				0,49	0,49						636
28	Seram Coatings AS				0,38	0,38				500	400	4 858
29	Atla Lasers AS				0,12	0,12			-	500	400	373
30	EiR Solutions AS					0,35						-
31	Norsk Innovasjonsskapital IV AS					0,26						-
32	Moonwalk Tomorrow AS					0,25						-
33	Bluey Robotics AS					0,29						500
34	Eelume AS					0,28						-
35	Heavenlock AS					0,40						-
36	Optistore AS/Memoscale AS					0,30						

### C.6. Simula Innovation AS

	Simula Innovation AS											
1	Symphonical AS	0,15	0,09	0,06	0,06	0,05		2 038	467	585	235	1 473
2	Kalkulo AS	1,00	1,00	1,00	1,00	1,00		13 289	14 031	13 183	17 375	26 241
3	Lividi AS	0,12						2 500	787	1 393	1 662	2 011
4	Resiliens AS	1,00	1,00					-	176			
5	Testify AS	0,05	0,22	0,30	0,30	0,30		2 450	3 697	4 747	7 605	11 885
6	Expertware AS	0,30	0,30	0,00	0,30			884	1 684	2 141	1 514	394
7	Celerway Communications AS		0,50	0,60	0,60	0,60			62	1 033	1 491	8 131
8	Radytek Sp. z o.o.			0,33	0,33	0,33				1 400	2 000	
9	Edgefolio AS			0,13	0,12	0,10						
10	Expert Analytics AS			0,15	0,15	0,15				1 069	3 118	222
11	IMERSO AS				0,13	0,13					200	550
12	Fabriscale Technologies AS				0,45	0,45					-	3 519
13	Forzasys AS				0,39	0,38					-	2 023

### C.7. SINTEF TTO AS

	SINTEF TTO AS											
1	Såkorn invest Midt-Norge AS	0,12	0,12	0,12				15 883	- 17 588	4 771	3 782	-
2	Metrocad AS	0,04										
3	Sonowand AS	0,00	0,00	0,00				15 982	12 685	14 061	11 646	2 426
4	Catenda AS	0,12	0,12					5 804	5 783	4 285	4 845	4 656
5	Veritrack AS	1,00	1,00	0,77	0,50			-	-	381	2 501	1 086
6	MarbiLeads AS	1,00						469	769	1 467	2 725	1 990
7	SIMLink AS	0,50						2 273	5 335	3 020	1 527	1 161
8	Forskningsparken AS					0,01						
9	NTNU Accel AS					0,03					1 445	1 208