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KNOWLEDGE TRANSFER EUROPE

ASTP 2018 SURVEY REPORT

on Knowledge Transfer Activities in Europe

Financial Year 2016

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I. Presentation of the Survey

We are pleased to provide our members, contributors and stakeholders with the results of our annual survey on the European Knowledge Transfer landscape for the financial year 2016 (FY2016).

ASTP is a pan-European non-profit organisation committed to knowledge transfer among universities and industry. We gather professionals in knowledge transfer to share best practices, develop strong competences, and create a better understanding of knowledge transfer at both individual and collective levels.

The results provided in this report are based on the largest European dataset so far, offering a valuable insight into knowledge transfer offices, their activities and outputs. Strong support from various parties allowed us to again increase the number of respondents from 369 in FY2014 and 419 in FY2015, to 474 for this FY2016.

This is the result of fruitful collaborations with ASTP National Associations Advisory Committee (NAAC) and with several national associations of knowledge transfer. They helped to promote the survey's direct participation of individual Knowledge Transfer Offices (KTOs) or contributed by sharing data that they had collected nationally, as did the French Réseau C.U.R.I.E, Irish KTI, Italian NETVAL, Spanish RedOTRI and UK Research England. We are truly thankful for all that support and look forward to continuing these collaborations. Strong cooperation with national associations enables us to provide the best regional coverage as well as data completeness and quality. Indeed, there is a crucial need for harmonisation of questions and data definitions if we want to increase the potential use of data collected and the quality and completeness of a European dataset.

The significant increase in participation demonstrates the interest of European knowledge transfer community in sharing information and receiving overviews on data and analysis insights. We aim to provide high-quality and useful report at the European level as well as for individual KTOs. The report is therefore constantly evolving. In this year's edition, we present an "Analysis" chapter with time series and ratios insights. It resulted from the work of a "New Metrics" sub-committee that was created this year within the existing ASTP Survey Committee. As further detailed in this chapter, the goal of this work is to explore the potential for further analysis of the ASTP annual datasets.

We hope the information about the status of the European knowledge transfer activities is of great value to the reader of the report. We frequently review the relevance of our metrics for our members and peers and appreciate any feedback in that regard.

Sincerely,

Henric Rhedin
President ASTP

Cécile Cavalade
VP Survey & Impact

II. Executive Summary

A European-wide survey on knowledge transfer activities and outputs

The relevance of knowledge transfer is increasingly recognised both on a national and European level. Knowledge transfer has become a visible link between excellent science and industry in Europe to facilitate the efficient development and commercialisation of innovative products and services for the economic and societal benefit of Europe.

The main purpose of this report is to provide an overview of relevant metrics and performance indicators for the knowledge transfer landscape at a pan-European level.

The report is based on the analysis of data collected from two different sources. The first data set is provided by individual Knowledge Transfer Offices (KTO) submitting their answers directly through our online questionnaire. The second and main source of data comes from national associations that conducted their own national survey and kindly shared their compatible data with ASTP. Altogether, the survey collected data from a growing sample of 474 KTOs, the largest European knowledge transfer dataset.

The survey questionnaire covers a wide range of topics. However, KTOs do not have available data for all of them, and national surveys do not collect exactly the same data, thus the number of respondents varies very much from one question to the other. In the following lines we indicated systematically the responding rate (n) for each metric.

To be able to propose a common view on European technology transfer landscape, it is essential to find common metrics with available and compatible data. By analysing the number of respondents, we see that the most common metrics available/collected at KTO level are: invention disclosures (n=450), licence agreements (n=422), gross revenue from IP (n=413) and the number of spin-off (n=397). We believe that the priority patent applications should be among these metrics. Indeed, the rather low rate of 224 respondents is partially explained by some incompatibility on this metric with some of the datasets provided by national associations. We are working with them on improving data compatibility in the coming years.

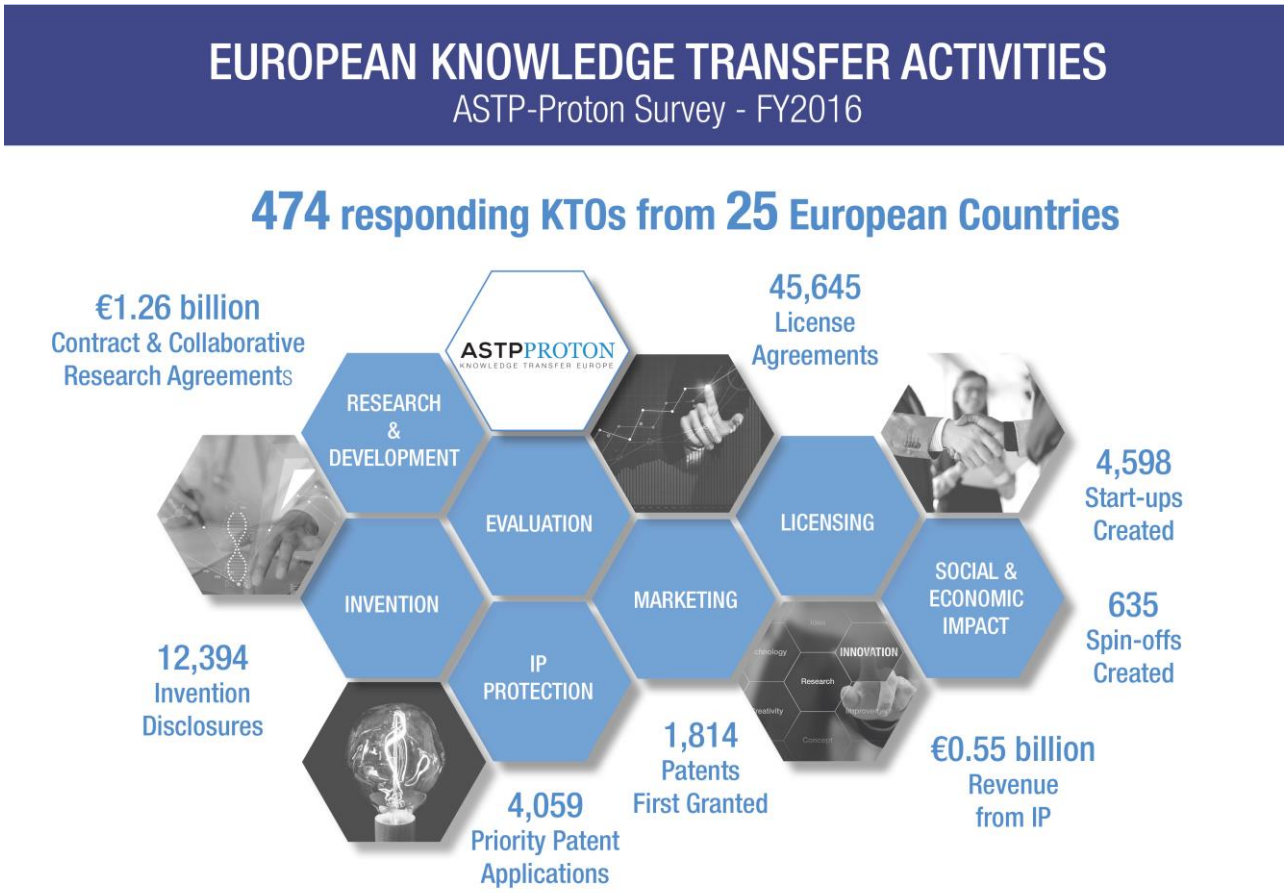
New metrics and longitudinal analysis

Annual monitoring activities of KTOs usually use standard metrics, and standardised performance measurement by combining metric by research expenditure. However, this metric-based comparison may miss possible confounding factors further developed in the new metrics analysis chapter of this report. To develop a complementary set of metrics that might add useful information for the management of KTOs, a dedicated sub-committee looked at the comparison of the ratios of these standard metrics. The work focused on few particular ratios and shows that, while the distribution of KTOs and their activity is very heterogeneous in Europe, some patterns do emerge from the ratios and there is value in analysing these further on the individual KTO level as well as on the transnational/European level with a view to demonstrating differences across EU regions or between individual KTOs.

FY2016 Survey ended with a question related to impact measurement. The highly valuable elements collected through this open question have been gathered and will feed the work that the Survey Committee is starting on how to gather, eventually assess and mainly give visibility on technology transfer impact at European level.

As announced in our previous report, ASTP wishes to follow the activities and outputs of KTOs over a period of several years. Therefore, a sample of KTOs was assembled, each of which had provided data for all three FY2014, FY2015 and FY2016 surveys and also had provided data for a significant number of (core) survey questions. The detailed outputs of this analysis are further described in a dedicated chapter of this report. While the numbers may go up or down a little from year to year, the striking conclusion that we can draw from this analysis is that the aggregate numbers are actually quite stable over time.

Main outputs of the survey



Knowledge Transfer Offices characteristics

A total of 2,251 FTE (full time equivalent) were reported by 228 KTOs, making an average of 9.9 FTE per responding KTO. Most of them serve only one Public Research Organisation. Reporting KTOs and their PROs spent €43.7 million for intellectual property protection. However, some costs may not be considered in these figures as they may be borne by research departments themselves or external commercialisation companies.

Intellectual Property rights protection and commercialisation

Responding KTOs registered 12,394 invention disclosures (n=450), 4,059 priority patent applications (n=245) and 1,814 patents first granted (n=138). On average, we see that 30% of the patent portfolio is licensed or optioned.

Commercialising IP estate takes different forms such as transfer of ownership to the commercial partner (assignment) or more commonly, a licence agreement that gives the licensee the right to work under the IP rights. Assignment is not very frequently used (65%

of the 227 responding KTOs did not sign any assignment in FY2016). Licensing stays by far the main route for commercialisation. During FY2016, 451 KTOs reported an overall number of 45,645 new licence agreements concluded. We shall note that the great majority of them (80%) are software licences, this topic is detailed in a dedicated section.

In FY2016, 413 reporting KTOS earned altogether more than €0.5 billion out of IP commercialisation. Several institutions collectively account for almost half of this amount, showing a great heterogeneity in the associated PRO profiles. We also believe that this amount is not fully representative given that it may not capture all revenue streams from IP commercialised through separate affiliated entities covering additional commercialisation efforts for PROs.

IP protection and commercialisation is a core activity of KTOs. Its further analysis gives inputs on individual KTO characteristics as well as global profiling. In the related chapter, we present two new metrics to deeper analyse IP related activities/outputs:

- The recording and protecting of intellectual property, based on a “patents to invention disclosures” ratio.
- The commercialisation of new ideas, based on a “commercialisation deals (licenses, options and assignments) to invention disclosures” ratio.

Research and consultancy agreements with industry

In FY2016, respondents signed 172,056 research agreements. Contract research agreements generated a total revenue of €0.57 billion (n=118), collaborative research agreements €0.68 billion (n=156) and consultancy agreements €0.75 billion (n=275).

An “Industry funded research” new metric measures the ratio of income from “for-profit parties” to total research expenditure, and thus representing a measure of the focus of the PRO on these types of collaboration. This ratio should thus separate organisations which rely heavily on collaboration / contract income for applied research funding versus those which focus primarily on basic research. It may also allow benchmarking with comparable organisations with similar goals and background.

Spin-offs and start-ups

Spin-offs are created to develop or exploit IP with a formal contractual relationship for the use of this IP. Responding KTOs reported the creation of 635 spin-offs in FY2016. However this type of output is not widely spread as out of 397 responding KTOs, half of them reported no spin-off creation.

Many more start-ups were created meanwhile: 4,598 (n=314), a “start-up” being a company created out of the Public Research Organisation but with no direct involvement in exploiting IP generated by this PRO.

We believe that this report is providing valuable insights for individual KTOs and PROs and gives a unique European overview on knowledge transfer activities and outputs. The report will be publicly available in January 2019 on ASTP’s website.

III. Survey Methodology

The FY2016 Survey

The FY2016 survey consisted of 30 questions and mostly used the same questions and definitions as in the FY2015 survey. In fact, 25 questions were the same, two were newly introduced thereby replacing two other questions and three questions were modified in their wording. The two new questions were on the number of staff members in spin-offs and parameters for impact measurement. They replaced two questions in the FY2015 survey which had been on research expenditure and research effort in STEM (Science, Technology, Engineering and Mathematics) and life science specific.

Data Collection

The FY2016 Survey was sent to:

- ASTP KTOs members
- Individual Knowledge Transfer Offices present in the ASTP CRM system
- National Associations (NA) for knowledge transfer in Europe

Data collection was launched on 29 January 2018 and closed on 7 April 2018, but was extended, at the request of a number of contributing NAs, until May 2018. It was not until June 2018 that the last NA dataset was made available to ASTP and the data cleaning process required to ensure data quality (see section 'data quality') could start.

In total, 27 NAs in Europe were contacted through their representatives, who are members of ASTP National Associations Advisory Committee (NAAC), and were asked to either distribute the ASTP Survey and help collect data on a national scale or – where such national associations organise their own survey – to contribute with data from such surveys to the ASTP dataset for FY2016. In the case of the latter, care was taken to only include data that was compatible with ASTP's survey questions and definitions.

Respondents

ASTP collected FY2016 data from a total of 474 KTOs through various channels. This continues a trend of increasing participation by individual offices and associations in Europe.

Data received from individual Knowledge Transfer Offices

Individual Knowledge Transfer Offices submitted their data directly via the online ASTP survey. The reason for changing the online survey platform was the functionality to ask follow-up questions if respondents decided to skip questions. Just as in previous years, there was no obligation to answer questions. However, this had resulted in a lack of clarity in the database as to why data was not provided for certain questions. In this year's survey a second question appeared, in case a respondent left the answer field empty. This follow-up question was mandatory and asked for the reason to skip the question, showing four possible answers: (1) the data is not tracked, (2) the data is tracked but under the given definition not compatible, (3) it is confidential, (4) the question will be revisited later.

The analysis of follow-up questions showed that across all questions and 104 survey respondents, 77-times questions were not answered because of confidentiality concerns and 41-times because of concerns that have to do with compatibility. Also, it became clear which data was not tracked and therefore could not be provided for certain questions. The highest number was 36 respondents who indicated not to track the number of staff members

of spin-offs. The frequency with which follow-up questions occurred was quite low, given the total of 3,120 responses across all survey respondents on the 30 survey questions. However, it became clear that the resulting increase in transparency and clarity for the absence of responses allowing for the improvement of upcoming surveys outweighs the burden of attending to follow-up questions.

Data received from National Associations

Just as in previous years, the majority of data was obtained from NAs who shared their national datasets with ASTP. Since most of these NAs use their own national survey with a set of questions that differ from the ASTP Survey, each question was checked for compatibility. Only data from the questions considered to correspond with questions in the ASTP Survey were included in the database. Unfortunately, it was not rare that substantial parts of the datasets received from NAs had to be disregarded due to incompatibility of questions and/or definitions. This shows that the need for standardisation of survey questions and definitions relating to knowledge transfer across Europe is as great as ever. We encourage our partners to compare and ideally harmonise their own questionnaires to allow for an integration of their data in a broader European context. ASTP also opened the discussion in the NAAC context.

Response rates

The absolute number of responses (total n=474) per country is shown in *Figure 1* below. It shows clearly that the number of responses varied greatly from country to country. The following NAs shared their data namely KTI (Ireland), Netval (Italy), RedOTRI (Spain), Research England (United Kingdom), Réseau C.U.R.I.E. (France), and Universities Denmark (Denmark).

ASTP received data for most of all KTOs or PROs (Public Research Organisations) in those countries. As shown in *Figure 2*, for some of the other countries where KTOs responded to the FY2016 Survey directly, the number of responses received are also estimated to represent a fair proportion of the KT activities.

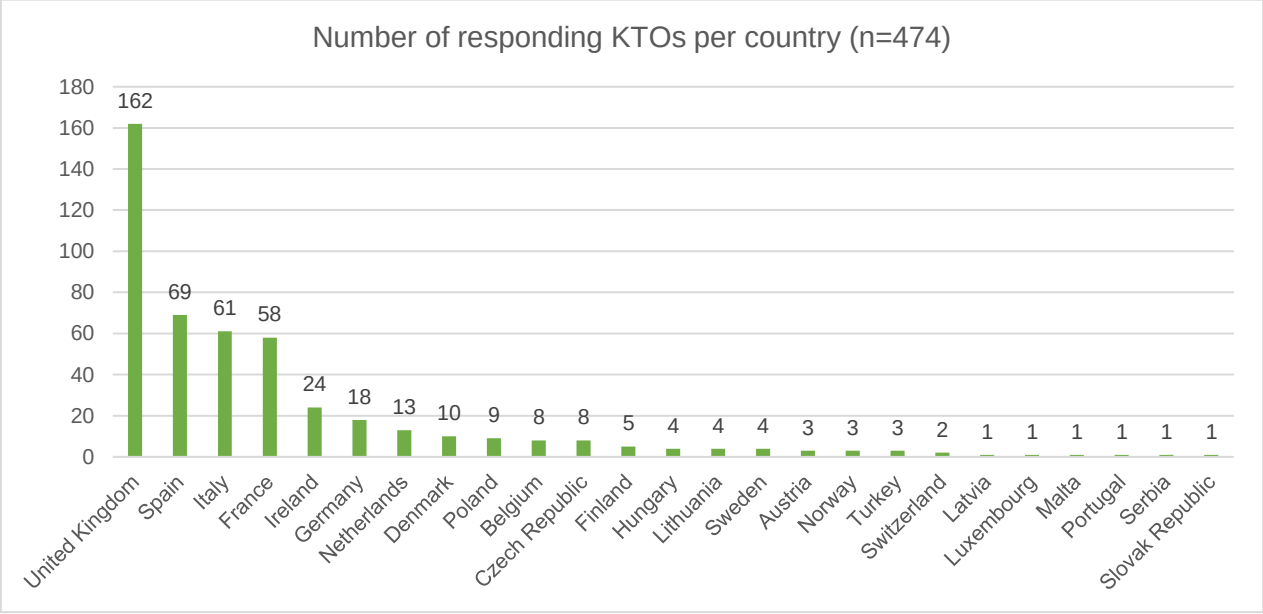


Figure 1: Graphic distribution of the number of responding KTOs per country

The year-on-year comparison of KTO participation per country shows a fairly stable number of KTO respondents per country. There are two notable exceptions from FY2015 to this year's Survey: France and Switzerland. While in previous survey's dataset, 17 Swiss KTOs were present through the NA, SwiTT, there were only two direct responses in our database for FY2016. In contrast, France, which previously had not contributed data to the ASTP survey, shared data of 58 KTOs through its NA, Réseau C.U.R.I.E.

Figure 2: Relative survey response rates across Europe

The above map provides a geographic overview of the relative participation by country. The relative response rates per country have been calculated based on the number of KTOs in each country that is known to ASTP. The response rate for countries with no KTO participation is 0% and shown in white.

Data Quality

Data cleaning was performed during the creation of the database which involved the incremental inclusion of information from various sources, starting with the primary data from the ASTP FY2016 Survey and the addition of secondary data from the NAs, as described above. Two members of the ASTP Survey Committee were in charge of this task and decisions were made unanimously.

In a first step, extreme outliers that were considered to be potentially erratic were flagged up in the FY2016 database. To aid this process, several cross-checks were implemented, e.g. via the calculation of ratios such as the research budget (Euro/FTE research staff). The premise for using such ratios as a tool for data checking is that – within any given country (but not between countries) – the average cost of research on an FTE basis can be expected to fall within a limited range, assuming that salary costs are by far the largest factor

determining research budgets. If the research budget divided by the number of research FTE would be lower than what could be considered a reasonable gross salary in the respective country, then the research budget and the FTE research data would be flagged up as doubtful and removed.

Next, if possible, outlier data were followed up for confirmation/correction via phone or email with the person who submitted the data. If no (satisfactory) response was obtained, the outlier data were rejected and deleted from the database and thus excluded from the data analysis. A total of 36 data outlier cases were formally followed up with the respective points of contacts.

Where mistakes in data entry were obvious (e.g. research expenditure entered as '55' and the likely actual number of 55 million was reasonable in view of the number of research FTE reported), such data were corrected without consultation with the respective KTO. Double entries (where the KTO in question had responded directly to the ASTP Survey but also indirectly contributed data to the Survey Database, via e.g. a National Association) were removed. In such cases, the most complete dataset of the two (invariably the one that was submitted by the KTO directly) was retained.

Missing data

It is not uncommon in empirical databases that values for variables are missing. The reason for this to occur in this year's database is two-fold: for the primary data from the FY2016 Survey, respondents were asked to provide a reason when skipping questions so that it is clear why data is missing. One of the most common reasons was that data was not tracked (or confidential), as reported above. Concerning the indirect data from NA datasets, the reason for missing values is that the question was either not asked in the national survey, or the compatibility check resulted in the conclusion that the definition used did not match with the one used in the FY2016 ASTP Survey.

When it comes to data analysis, missing data is a problem and some statistical methods cannot be applied when values are missing. Thus, it is common practice to either remove incomplete datasets with missing data for variables or to use statistical methods to impute datasets. The latter is used in advanced statistical analysis which were not applied for the analysis presented in the following chapter. Still, it is important to note the total number of respondents for each question (indicated with "n") varies and is indicated for each statistic.

Longitudinal analysis

In order to follow the activities/output of KTOs over a period of several years, the survey data for FY2014, FY2015 and FY2016 were analysed. A list of 40 KTOs was assembled who each had provided data for all three subsequent surveys and also had provided data for a significant number of (core) survey questions. In addition, the 40 KTOs were located in 11 different countries, ensuring a level of representativeness across Europe.

IV. Data presentation

The following chapters will provide a summary of the raw data analysis of a series of questions regarding KTOs and PROs, their intellectual property management, commercialisation activities and spin-off creation efforts together with some interesting findings.

ASTP received data from 474s KTOs. The responses per question vary which is why the total number of responses (n) is indicated per question. Also, the set of KTOs for which data is available overlaps year-on-year but is not identical. This is why we refrain from making direct comparisons to previous years on a total basis.

1. Knowledge Transfer Offices

In the FY2016 Survey, the first section covers some basic parameters concerning the surveyed KTOs themselves: their staffing levels, budget and the number of PROs served by them. Most KTOs serve one university or one research centre. However, some of them serve several PROs (being universities or research centres).

In the FY2016 survey, 228 KTOs reported a total of 2.251 FTE (full time equivalent) for an average of 9.9 FTE per responding KTO. While this year 27 KTOs reported 0-2 and 64 reported 2-5, last year's distribution was 49 reported 0-2 FTE and 65 reported 2-5 FTE.

Out of the nearly same number of responding KTOs (n=224) to FY2015 survey, the average FTE was 8.6 FTE/KTO. This could show a slight evolution toward an increase in KTO staffing.

The following graph illustrates the distribution of FTEs per KTOs at the end of FY2016.

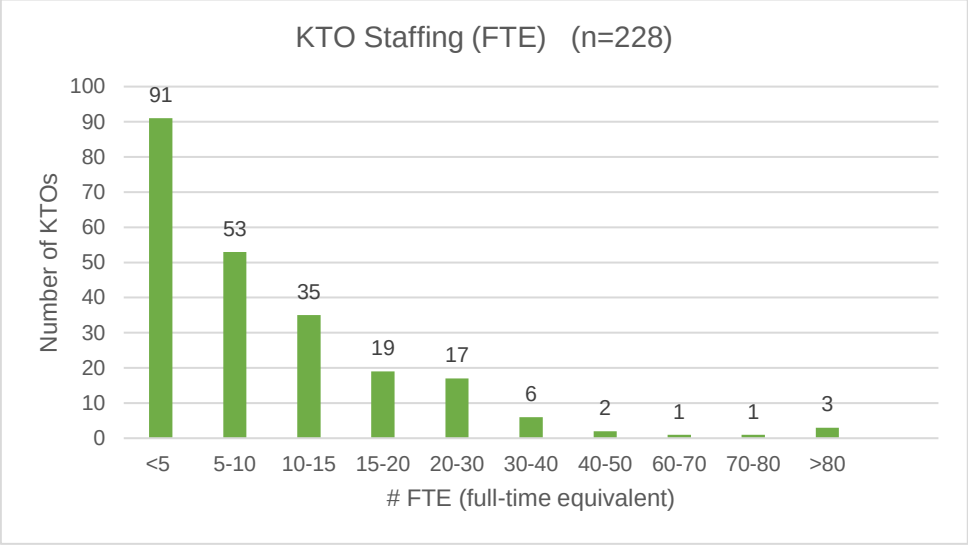


Figure 3: Distribution of KTO staffing levels across respondents (FTE)

We must be careful concerning the representativeness of the samples regarding number of PROs served and KTO budget, with 90 and 75 respondents respectively. No compatible data on this metric was available from the British, Irish, French, Italian and Spanish KTO datasets.

Out of the 90 KTOs that responded to the number of PROs that the KTO serves; 75 KTOs indicated that they are dedicated to one PRO, 5 KTOs are working with 2 PROs and 8 KTOs with 3-9 PROs.

One may think that this feature of KTOs may be influenced by national or regional policy to structure knowledge transfer within a territory. However, our figures do reflect any particular national pattern as the 13 KTOs answering that they serve more than one PRO are coming from 8 different countries.

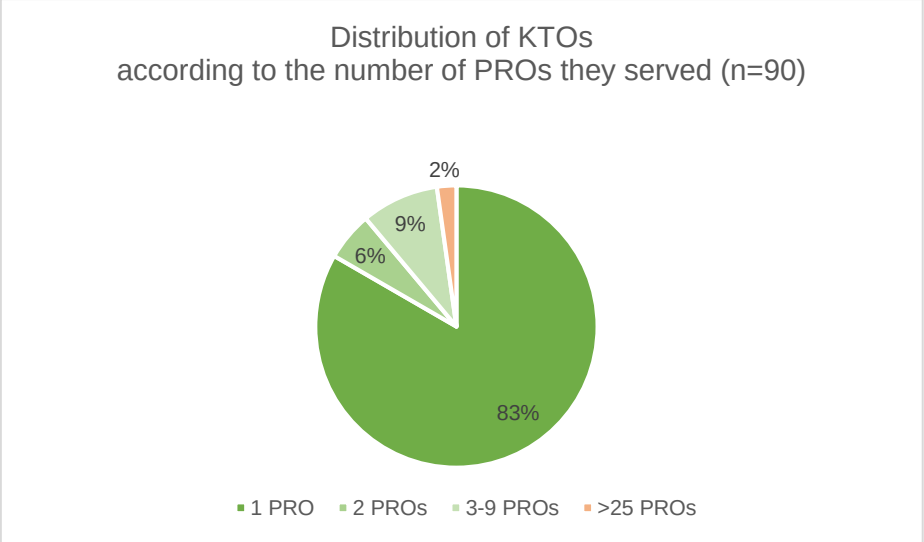


Figure 4: Distribution of responding KTOs according to the number of PROs that they serve

In terms of budget, 75 KTOs have spent an aggregate of €100.5 million for their operational costs. This gross expenditure does not include costs dedicated to IP borne by the KTO and PROs.

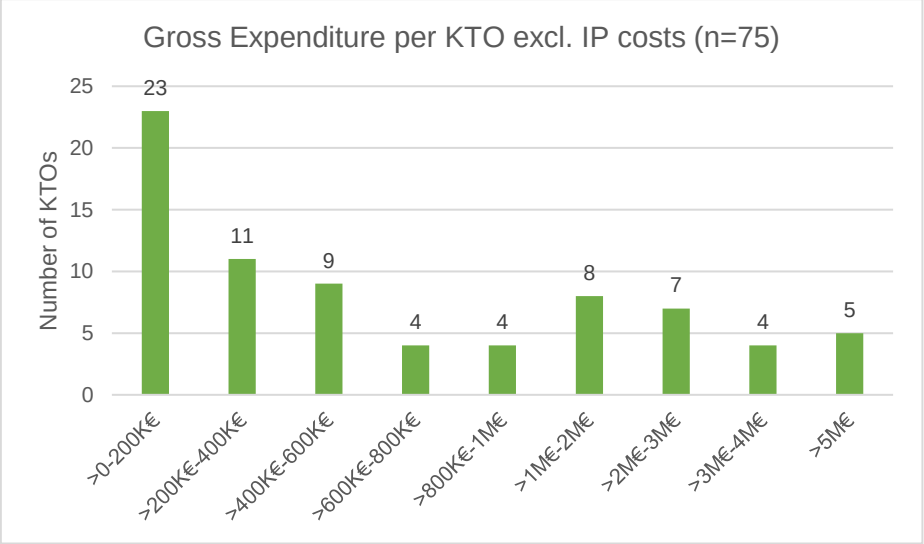


Figure 5: Distribution of gross expenditure per KTO excluding IP costs

A total of 153 responding KTOs and their PROs spent €43.7 million on intellectual property protection. The graph below shows that the costs for IP protection are unequally distributed, either in the low range up to €50k or mid-range between €100k – €500k. Around 12% of the respondents (19/153) reported IP protection costs of more than €500k.

However, it is difficult to measure these costs as some may be borne by research departments themselves or by external valorisation companies that hold the IP rights generated by the PROs.

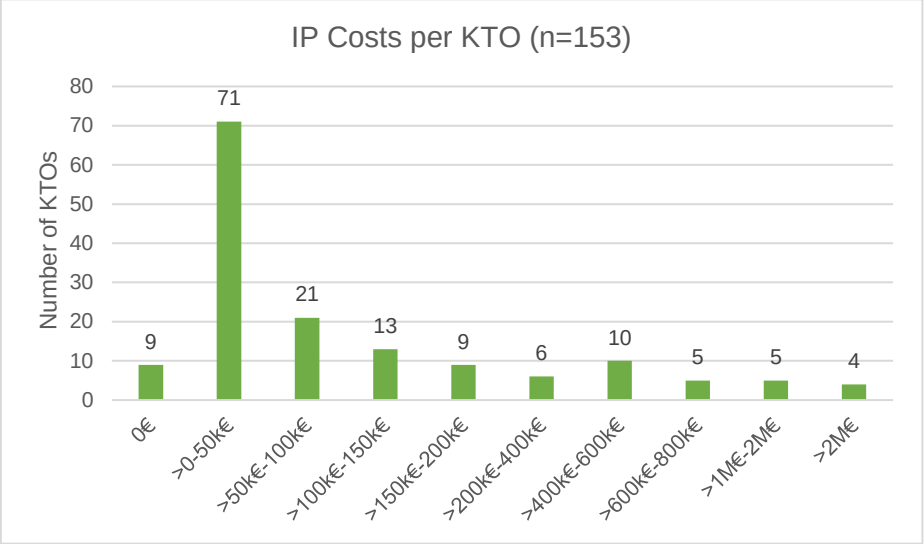


Figure 6: Distribution of intellectual property costs per KTO

2. Intellectual Property

The following table shows the total and the average number of invention disclosures, priority patent applications and patents first granted to KTOs in FY2016[1]. It is important to note that the number of valid responses varies greatly across the three categories: while most KTOs report on invention disclosures, significantly fewer do so on priority patent filings (mainly due to the fact that the definition of priority patent applications as used in some of the datasets from national associations is not compatible with the definition used in the ASTP Survey), and the fewest KTOs report on patents first granted.

KTO's IP Activities	No. of responding KTOs (n)	Total	Average per KTO
Number of invention disclosures	450	12,394	27.5
Number of priority patent applications	245	4,059	16.5
Number of patents first granted	138	1,814	13.1

Table 1: KTO's intellectual property activities

[1] See the definitions in the survey for questions 15, 16 and 17 respectively.

Regarding the number of invention disclosures, 22% of KTOs reported not receiving invention disclosures at all during FY2016. Most of these are active in the field of Arts, Humanities, Business and Social Sciences (non-technological fields). Half of the respondents received up to 10 invention disclosures and 15% of them received more than 50 disclosures and 9 received more than 200.

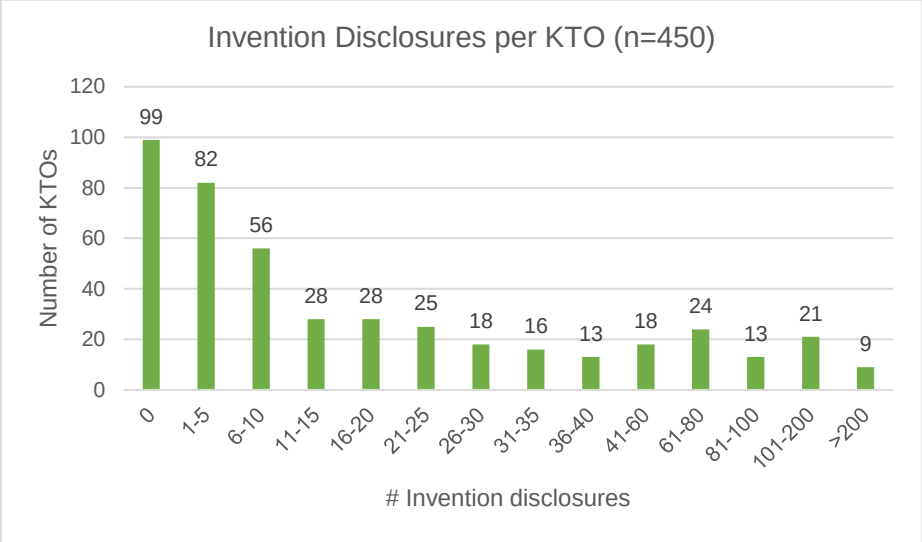


Figure 7: Distribution of the number of invention disclosures per KTO

Compared to FY2015, the pattern of the graph is largely similar, the distribution has not changed significantly.

In terms of the number of priority patent application per KTO, the number of responses is lower than for invention disclosures. This is partially explained by the fact that no compatible data on this metric was available from some of the datasets provided by national associations. Out of the 245 respondents, 16% have reported not to have filed a priority patent application in FY2016, 38% reported to have filed between 1-10 patent applications and a relatively small number (7%) filed more than 50 priority patent applications.

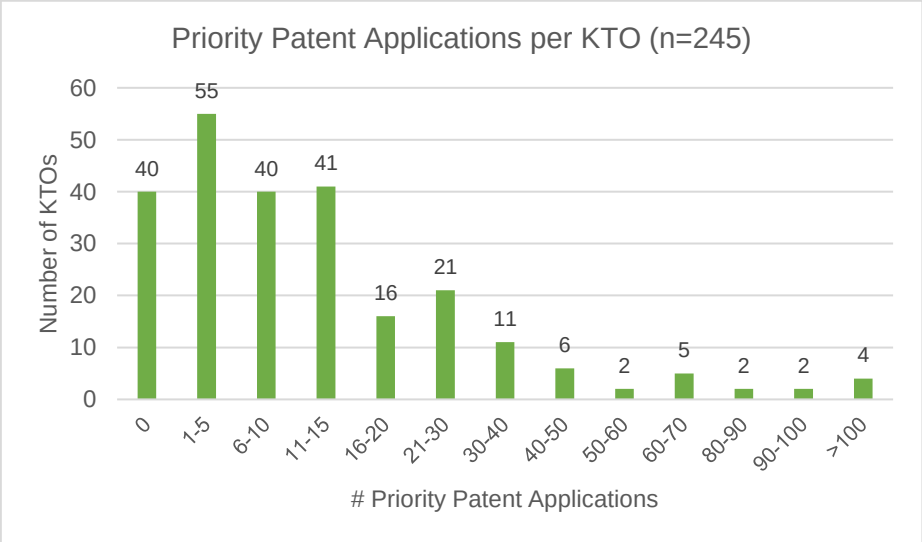


Figure 8: Distribution of the number of priority patent applications per KTO

Compared to the FY2015 report, just as for invention disclosures, the graph shows a similar distribution.

The following figure shows the number of patents first granted per KTO in FY2016. It becomes immediately obvious that most respondents (38%) reported between 1-5 patents granted in that year. Just as in the previous period, 5 KTOs reported to have been granted over 50 patents in FY2016.

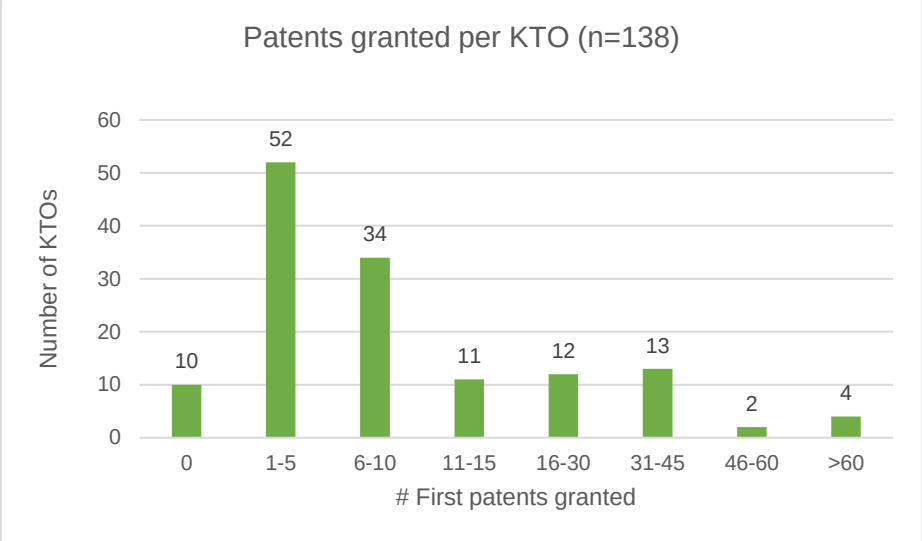


Figure 9: Number of first patents granted per KTO

The following figure shows the number of active patent families in the KTO's portfolio at the end of FY2016. A total of 224 KTOs reported altogether 26,125 active patent families, which means that a KTO has an average of 116 patent families. More than half (58%) of the reporting KTOs have a patent portfolio with 11-200 active patent families, while 22% have 1-10 active patent families. A relatively small percentage (24/224 or 10%) of the respondents reported 0 active patent families and 2 responding KTOs have more than 1,000 active patent families.

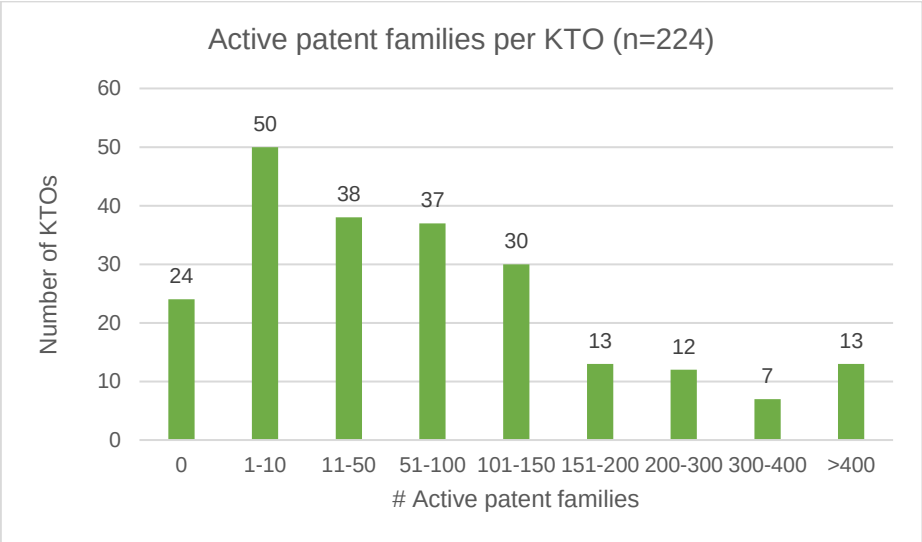


Figure 10: Distribution of the number of active patent families in KTOs portfolio

The distribution of the graph exactly corresponds with the one in FY2015. It is worth noting that 12 KTOs reported fewer active patent families than priority patent applications filed. This could be due to the fact that these KTOs do not count in their active patent families with those filed by industry or other partners.

The following graph shows the percentage of patent families per KTO licensed or optioned by the end of FY2016. No compatible data on this metric was available from some of the national KTO datasets.

A significant fraction of the responding KTOs has licensed or optioned a small percentage of the patent families in their portfolio. A closer look at the dataset reveals that there is no correlation between the size of the patent portfolio and the fraction of licensed or optioned patents.

On average, 30% of the patent portfolio is licensed or optioned by the reporting KTOs and 80% of the KTOs reported having less than 50% of their portfolio licensed or optioned.

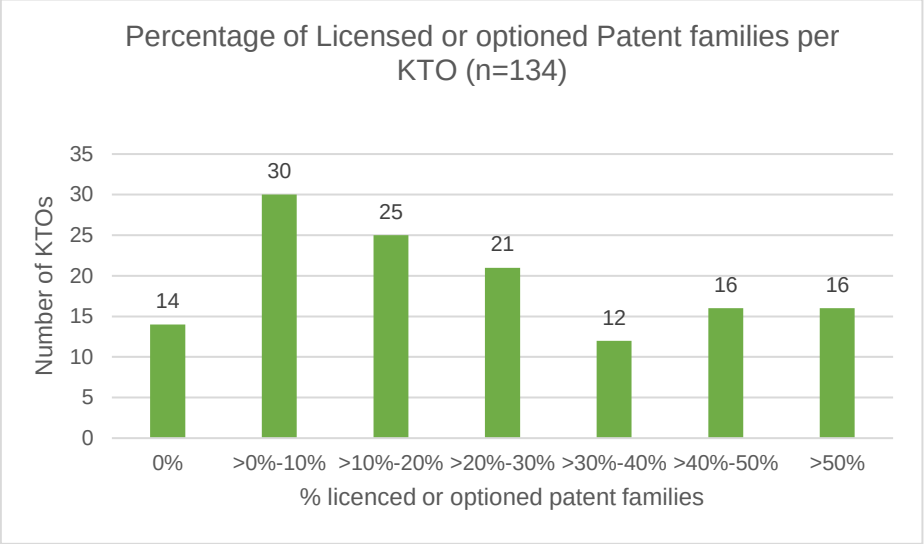


Figure 11: Percentage of patent families in portfolio that are licensed or optioned

3. Agreements with industry

In FY2016, reporting KTOs signed 172,065 research agreements with for-profit parties. The following table shows the three types of research agreements, namely contract research, collaborative research and consultancy agreements. Consultancy agreements appeared to be the most popular agreement type. It was not only reported by most KTOs (293) but also had the highest average number of agreements per KTO: 505, compared to on average 140 contract research and 44 collaborative research agreements.

# Industry Agreements	No. of responding KTOs (n)	Total	Average per KTO
Contract Research Agreements	126	17,634	140
Collaborative Research Agreements	148	6,491	44
Consultancy Agreements	293	147,940	505

Table 2: Overview of the number of research, collaborative and consultancy agreements

The following table shows the income that has been generated through the KTOs on the three agreement types. When comparing both tables in this section, it becomes evident that collaborative research agreements tended to be the most lucrative for European KTOs in FY2016: far fewer in terms of number of agreements concluded, but the income generated from them appears to be in the same ballpark as the other two agreement types, respective of the number of responding KTOs.

Income from industry Agreements	No. of responding KTOs (n)	Total
Contract Research Agreements	118	€571,938,884
Collaborative Research Agreements	156	€685,386,089
Consultancy Agreements	275	€746,571,005

Table 3: Income generated from research, collaborative and consultancy agreements concluded in FY2016

A very rough approximation on the average value of the industry agreements is €35,000 for contract research, €100,000 collaborative research and €5,000 for consultancy agreements.

The following section will present more detailed information on each agreement type.

Contract and Collaborative Research Agreements

Concerning the number of contract research agreements per KTO, the following graphic shows that only 8% of responding KTOs did not conclude any agreements of this type, while one third indicated between 11 and 50 and half of the reporting KTOs realised between 20 and 250 agreements.

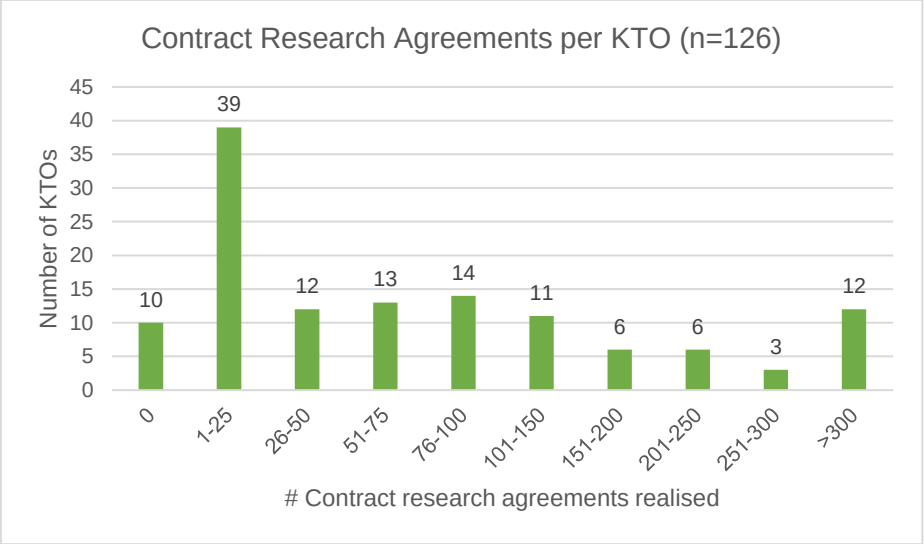


Figure 12: Number of new contract research agreements realised per KTO

In FY2015, 286 KTOs reported on contract research agreements which is a much higher number than this year. Still, between 11 and 50 was the most prominent number of this type of research agreement with industry per KTO. In both years 26% of responding KTOs reported to have concluded between 11-50 contract research agreements.

Just as for contract research agreements, between 11 and 50 collaborative research agreements per KTO were reported from the majority of responding KTOs (35%). The following graph also shows that 15% of KTOs reported not having signed any and 22% realised more than 50 collaborative research agreement in FY2016.

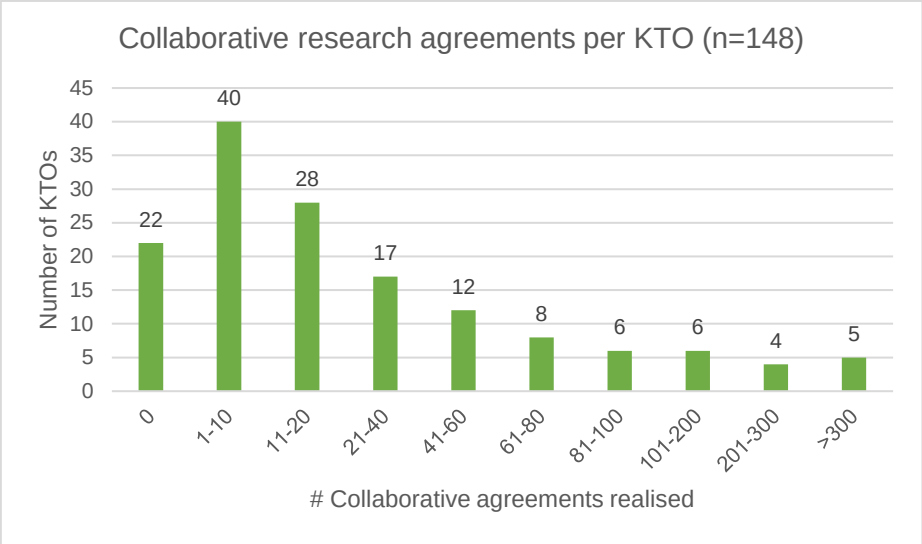


Figure 13: Number of new collaborative research agreements realised per KTO

Consultancy Agreements

The number of consultancy agreements per KTO was fairly evenly distributed, as the following graph shows. In fact, it also becomes clear that 15% of KTOs did not sign this type of agreement. 15% of KTOs, reported to have signed up to 250 consultancy agreements per KTO. And taking together the remainders, 24% of KTOs reported having signed more than 250 agreements.

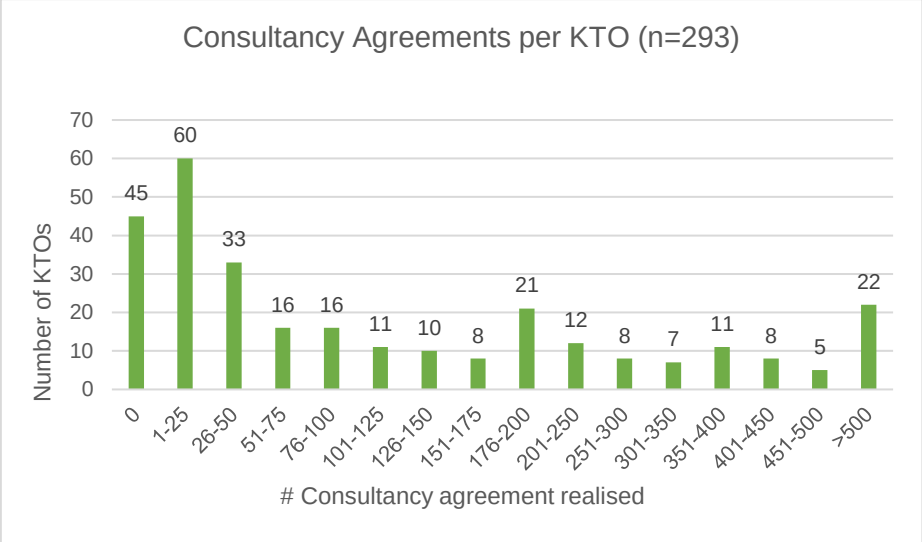


Figure 14: Number of new consultancy research agreements realised per KTO

The average is skewed to over five hundred by a few British and Spanish KTOs. In the case of the Spanish consultancy agreements, testing services are included.

4. Commercial Contracts

The following section provides insight on how the reporting organisations in the survey have commercialised their intellectual property estate.

Commercialisation can be formalised in different manners: by transfer of ownership (assignment) from the PRO to the commercial partner or, more commonly, through a licence agreement that gives the licensee the right to work under the IP rights held by a PRO. Separate attention is given to software agreements as such licences (especially when granted to end-users in a semi-automated fashion) can reach a high number and thus significantly impact the total reported number of licence agreements.

In addition, a well-known form of agreement that may precede an actual commercial contract is the option agreement that is often granted for an evaluation period to allow the prospective partner to test a particular technology or the use of certain know-how. This testing phase can provide a better understanding of the commercial potential and the investment needed to bring a product to market and thus give more comfort to the commercial partner before entering into a licence or assignment agreement.

Commercial Contracts	No. of responding KTOs (n)	Total	Average per KTO
Licenses	422	45,645	108
Options	179	188	1
Assignments	227	370	2
Research materials licenses	154	348	2
Software licences	308	37,489	122

Table 4: Overview of licenses, options and assignments

It is obvious from the above table that licenses are by far the most popular means for the commercialisation of IP. On average, KTOs create 108.2 licenses, compared to 1.6 assignments and 1.1 option per KTO.

Licence Agreements

The most important route of commercialisation by far is through licensing, with an overall number of 45,645 new licence agreements concluded in the FY2016 as reported by the 451 respondents to this question. About one-third of responding KTOs (148 out of 451or 33%) do not report any license agreement few of them (30/451 or 7%) conduct a substantial number of licences (over 100), among which 7 KTOs signed 800-5,000 licences, and one had about 24,000. This observation is similar to what was reported in FY2015.

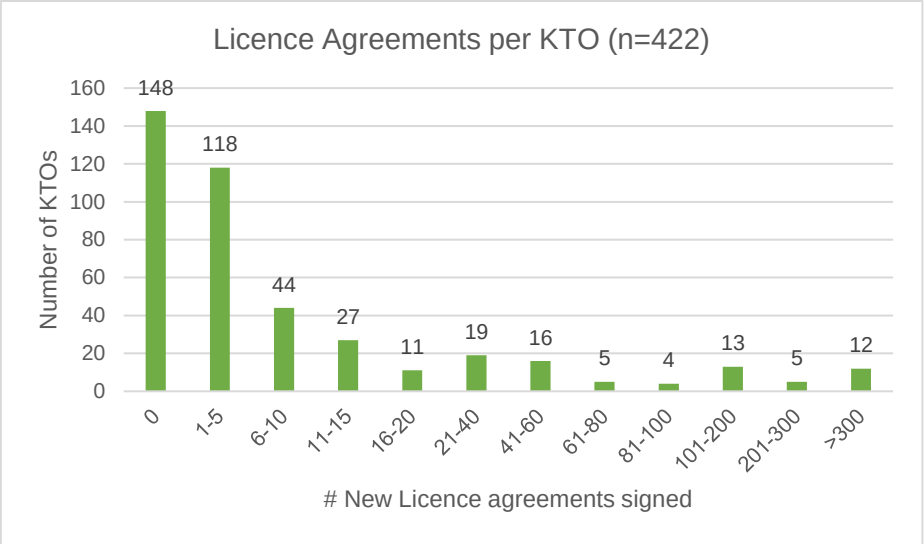


Figure 15: Distribution of the number of new licence agreements signed per KTO

As detailed in *Table 4: Overview of licenses, options and assignments*, there are several types of licenses. The great majority (over 80%) are software licenses which is why they will be detailed in the next section.

Software Licence Agreements

The survey committee has decided to separate out software licenses which is typically licensed in a non-exclusive manner using semi-automated, standardised agreements (to end-users). This low-threshold licensing method can lead to very large numbers of non-exclusive licenses for a particular piece of software, thus skewing the overall number of licenses. For this reason, a €1,000 threshold was included in the survey question for reporting a software license.

National surveys account differently for software licenses. Most do not separately ask for software licenses, whereas others that do, did not apply any monetary threshold. Where we cannot exclude that software licenses meet our threshold, we decided to include this data in our analysis.

The 308 responding organisations reported a total of 37,489 new software licences concluded in FY2016. More than half (58%) of responding KTOs did not report any licence for software.

Of the 132 KTO which concluded at least one software licence, 35% reported more than 10, and 11% more than 100. This 11% represent 98% of the software licences concluded.

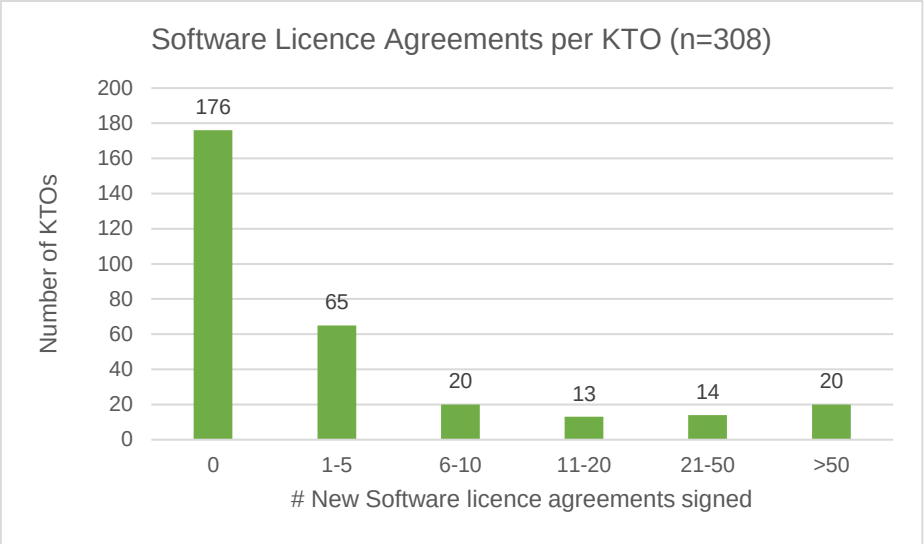


Figure 16: Distribution of the number of new software licence agreements signed per KTO

Option Agreements

As we already noted in last year's survey report, for the majority of responding KTOs (68%), option agreements are not frequently used as an instrument for the commercialisation of knowledge and technology. As shown in the following graph, out of 179 respondents to the question, 121 reported not to have concluded a single option agreement during the year.

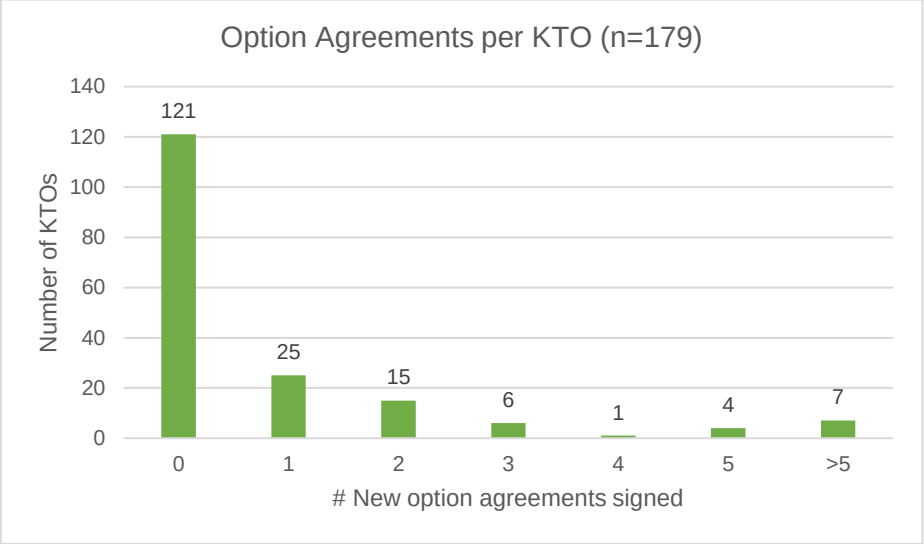


Figure 17: Distribution of the number of new option agreements signed per KTO

Assignment Agreements

Despite the number of assignment agreements signed being much lower than the number of license agreements signed, we can state that one third of the KTOs are using it for commercialisation of intellectual property.

As we can see on the following graph, 50% of assignments are signed by about 4% of the total number of respondents. The majority of respondents (65%) reported not having signed any assignment agreement at all, reproducing the observation made in the report FY2015.

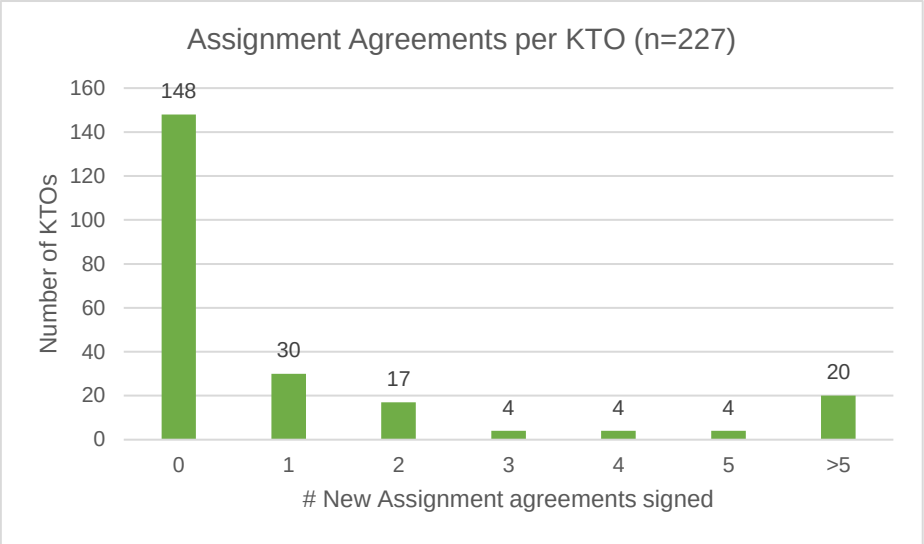


Figure 18: Distribution of the number of new assignment agreements signed per KTO

5. Commercial Revenue from IP

IP revenues	No. of responding KTOs (n)	Total	Average per KTO
Commercial revenue from IP	413	€554,070k	€1,342k
Patent licenses	140	€55,146k	€394k
Running royalties	69	€40.334k	€585k

Table 5: Total amounts of gross revenue from commercialisation of IP earned in FY2016

The large majority of KTOs (413/474 or 87% of respondents) reports on the revenue received in return for the commercialisation of their IP estate.

In total, the reporting organisations together earned more than €0.5 billion in FY2016. Three institutions collectively account for almost half of this amount, whereas 120 KTOs report an income of '0'. We believe that the total amount reported is an underrepresentation because of the fact that several institutions, that provided data for this particular metric, revenue streams from commercialisation of IP go through a separate affiliated entity, which do not report such revenues to the KTO.

Among the 293 KTOs generating at least some revenues from the commercialisation of IP (>0), the average gross revenue for FY2016 was €1,891,023 per KTO. The revenue generation is very unevenly distributed among the KTOs; only a small portion of the KTOs is responsible for almost three quarters (72%) of the total gross revenue from IP.

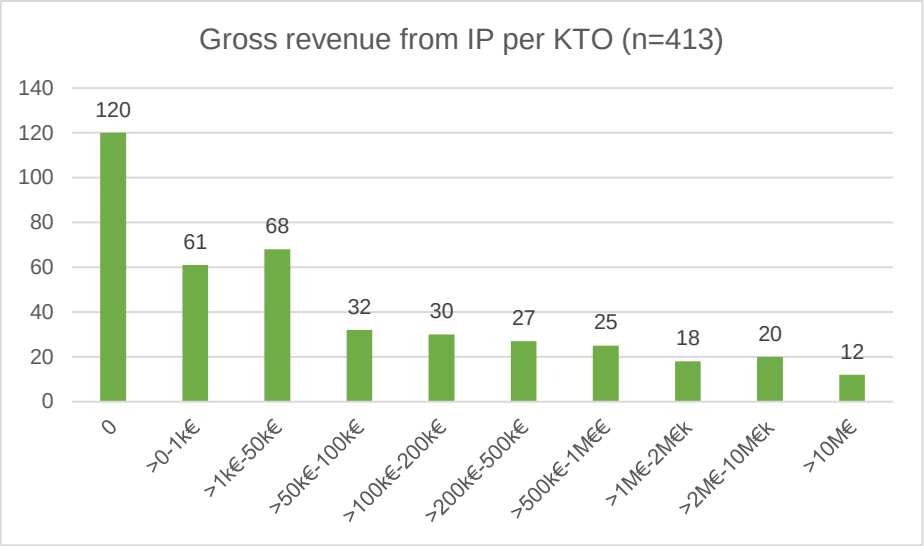


Figure 19: Distribution of gross revenue generated by intellectual property per KTO

Patent licenses

A total of 106 KTOs report both on the total commercial revenue and the revenue that specifically comes from patent licenses that they have concluded. Looking at this subset of respondents, the fraction of commercial income that is generated from patent licenses is around 56%.

One third of the responding KTOs do not report any revenue from patent licenses. For those KTOs reporting income, the average revenue from patent license per KTO is €393,898 for FY2016. Of those, 9% of KTOs generates a revenue greater than €10M, meaning that they account for over 90% of all reported revenue from patent licenses, and showing a very skewed revenue distribution.

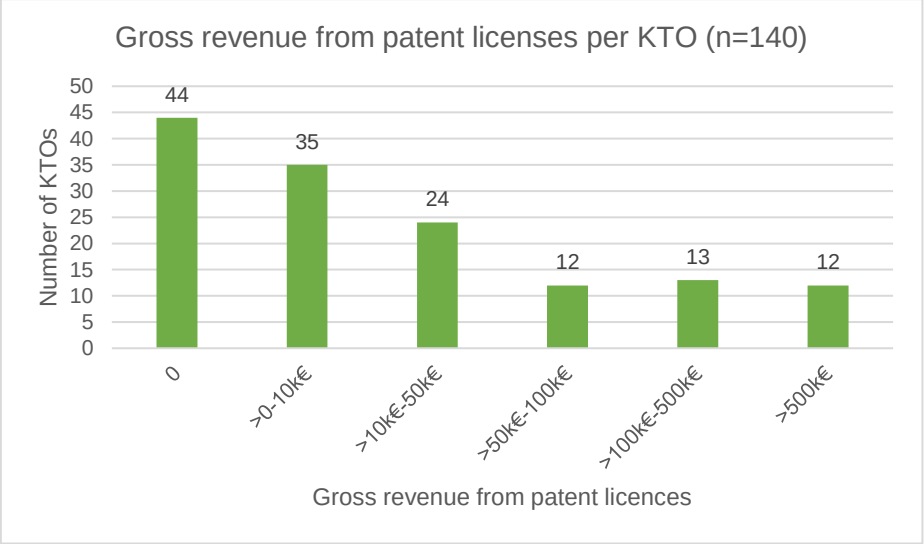


Figure 20: Distribution of gross revenue generated by patent licences per KTO

Running royalties

Considering gross revenue from running royalties, as shown in Figure 21, again one third (38%) of the responding KTOs do not report any revenue from running royalties. For those KTO reporting income, the average revenue is €574,436 per KTO for FY2016, with one KTO generating a revenue greater than €10 million.

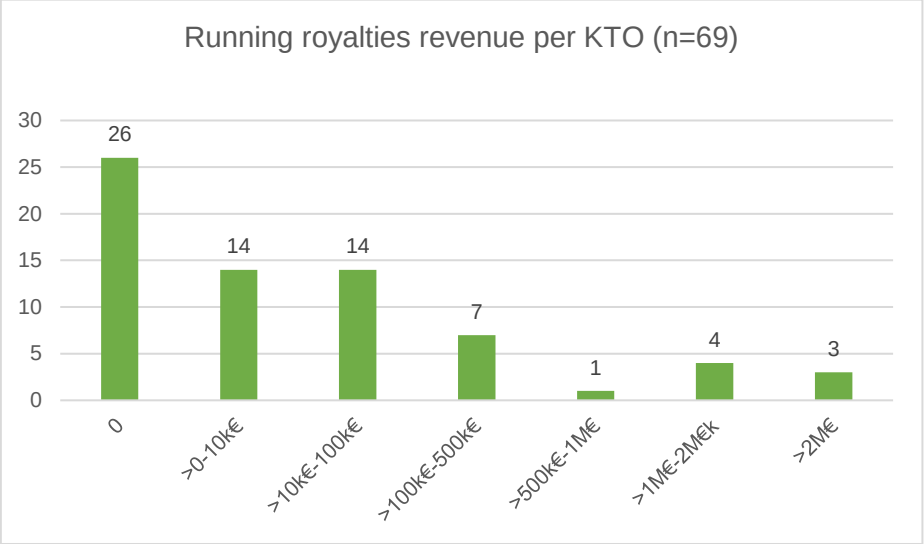


Figure 21: Distribution of gross revenue generated by running royalties per KTO

Cashed-in equity

It is worth noting that most respondents (251 corresponding to 88%) reported no cashed-in equity and one reported over €15 million.

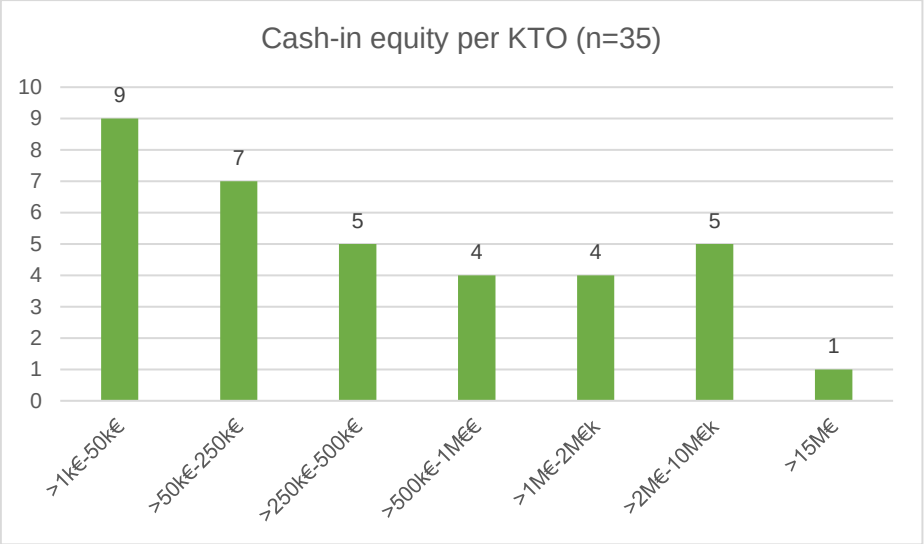


Figure 22: Cashed-in equity per KTO

6. Spin-offs and start-ups

The creation of new companies falls in the area of entrepreneurship in KTOs. It is important to distinguish between those companies, not directly involved with the exploitation of IP generated within the respective PRO (i.e. a start-up), and spin-offs, which were established

to develop or exploit IP created by a PRO and with a formal contractual relationship for the use of this IP.

The FY2016 data shows that the creation of start-up companies was by far more popular among European KTOs than the creation of spin-off companies.

Many more start-ups were created than spin-offs in FY2016. Not only more start-ups in absolute numbers (4,598 compared with 635 spin-offs) but also relative, in terms of on average per KTO (14.6 compared with 1.6) were reported from European KTOs in FY2016.

Spin-offs and Start-ups	No. of responding KTOs (n)	No. of companies	Average per KTO
Spin-off created	397	635	1.6
Start-up created	314	4,598	14.6

Table 6: Overview on the creation of spin-offs and start-ups

Despite the high participation rate of KTOs who reported on spin-offs, 52% of respondents reported not having created this type of company in FY2016. Among those who reported having created spin-offs, between 2-5 were the most common number of spin-offs per KTO.

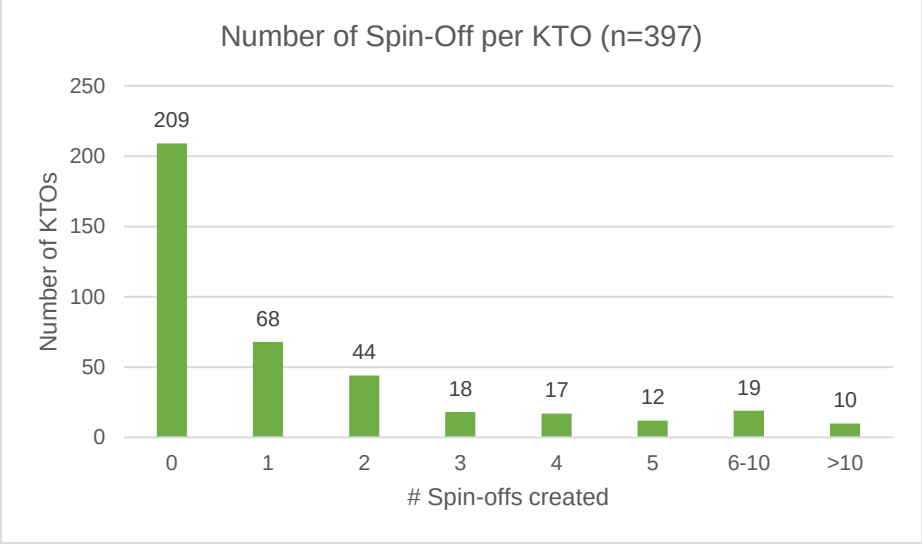


Figure 23: Distribution of the number of spin-offs created per KTO

Staff in existing Spin-Offs

In terms of employment at spin-offs, it appears from this year's data that a significant number of spin-offs must be rather small, as 22% of responding KTOs reported 1-20 employees (aggregates FTE of all active spin-offs). It is worth noting that 92 KTOs reported not to have any spin-offs which is expressed as an FTE value of 0.

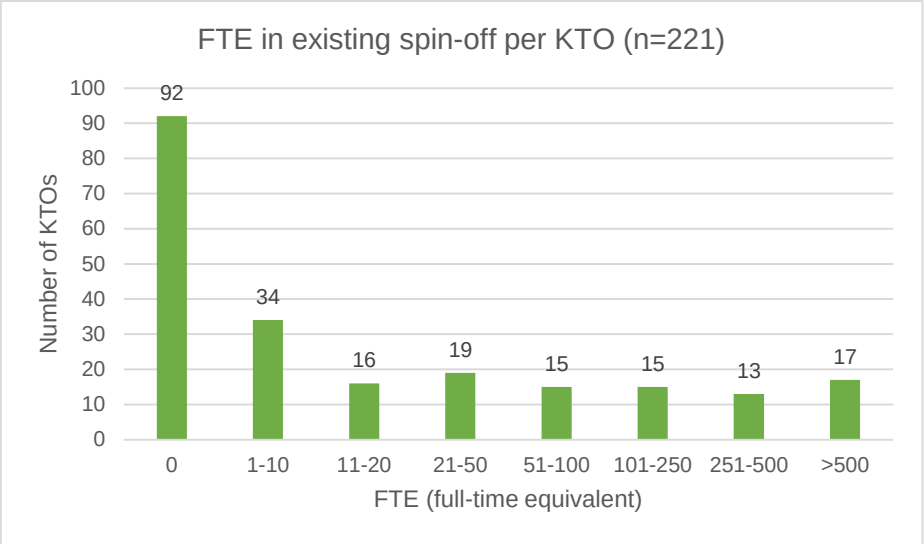


Figure 24: Distribution of the number of FTE in existing spin-off per KTO

V. Data analysis

1. Introduction

This chapter presents the recent work of the New Metrics Subcommittee of the ASTP Survey Committee. The aim of this group has been to explore deeper analysis of the ASTP annual datasets in an effort to derive further information and insights, in addition to the aggregate descriptive reporting (see previous chapters). The intent is that this information may offer a potential additional value for participating European KTOs and wider promote survey participation.

In addition to presentation of the outputs of KTOs across Europe, we feel that analysis of the data may yield further insight and that this report might thereby become more meaningful for the reader.

Analysis is hampered to this day by the lack of suitable information for the majority of KTOs on the size of the research organisations that they serve. By normalising metrics to e.g. research budget (€) or the number of people working in research (FTE), we can start to compare larger with smaller organisations and perhaps give more meaningful averages for a particular metric if such metric is expressed as e.g. the number of invention disclosures / €100M research expenditure.

There are, however, other ways of looking at the dataset in more depth. In this report, we have looked both at novel ratio's (other than those making use of the size of the research effort for normalisation purposes) and at an analysis of a time series spanning 3 years to look at year-on-year trends.

In this chapter, we will sometimes visually display the distribution of a set of data points by making use of a boxplot. Essentially, a boxplot sorts all of the data points in a set from the lowest to the highest and displays the middle 50% of those data points (the second and third quartile) as a box, with the lower and upper 25% of data points (quartiles 1 and 4) being visualised as lines extending from such box. Also shown are the median as well as the mean (average) for that dataset (*Figure 25*).

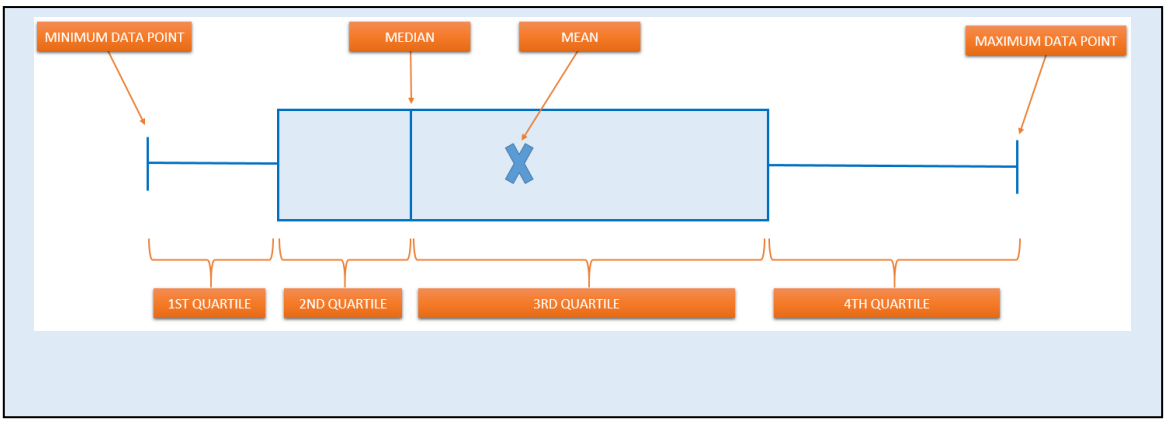


Figure 25: How to read a boxplot

For additional explanation on boxplots and how to interpret them, please visit this link.

2. New metrics: ratio analysis

The methodology used for analysis is based on a ratio-metric set developed by John Scanlan[2] using KT data from Ireland. The intent here has been to test its usability in the context of the European dataset of ASTP. The principal goal is not to benchmark performance of one institute versus others, but rather to demonstrate what general trends and distributions exist, how they can be interpreted, and if deviation from those trends exist, how they might be explained.

Motivation for ratio development

KTOs are largely familiar with the annual monitoring and reporting of standard metrics, usually adjusted to research spend. These metrics predominantly include the number of spin-out companies, the number of technology licences/assignments/options, the number of research collaborations with industry, the number of inventions reported and the number of patents filed. In theory, the metrics allow for the comparison of the very different PROs that exist across Europe. Such benchmarking is useful, allowing transfer of best practice, and funders of KT activity often request these metrics.

However, this standard metric-based comparison may miss possible confounding factors, which include: (a) the core mission of the PRO, (b) the source of the research funding, (c) the PRO and KTO size, (d) the economic ecosystem of the region or country, and (e) the maturity of both the PRO and KTO. For example, does it make sense to compare a university with a very broad arts and humanities research activity with a small technology-focused research institute? Does it make sense to compare a university research hospital funded by substantial private funds, with a small university in a developing region? It would seem more intuitive to compare one KTO with another KTO in which these differences are minimised. However, this is not always possible and it often depends on the availability of the data and a knowledge of KTOs in other jurisdictions. While the idea of normalising outputs to research spend goes someway to smoothing out differences between PROs, it is not enough to eliminate these other confounding biases.

To remove some of these differences and develop a complementary set of metrics that might add useful information for the management of KTOs, we have looked at the comparison of the ratios of these standard metrics. Using ratios is not uncommon in other fields, such as financial management. In the context of technology transfer, it may be possible to not only remove the research volume bias but also the biases associated with institute core mission and maturity. For example, if one compares the number of license deals (LOA, Licences, Options, Assignments) per invention disclosure (ID), one gets a possible measure of the efficiency of the KTO in turning an opportunity into a deal, almost regardless of all other issues. There are many other ratios that offer similarly interesting insights, such as spin-offs per ID, or patents filed per ID. These ratios offer the possibility for making valuable comparisons from which any KTO can benchmark itself over a period of time or against KTOs that it aspires to emulate.

[2] More information can be found in Scanlan, J. (2018). “A capability maturity framework for knowledge transfer”. Industry and Higher Education. 32(4).pp 235-244.

The sections below present the results of the following ratio analyses that were conducted using the FY2016 data:

Ratio	Section name
A. PAT/ID (first granted patents/invention disclosures)	Recording and protecting intellectual property
B. LOA/ID (Commercialisation deals/invention disclosures)	Commercialising new ideas
C. SO/LOA (Spin-offs/commercialisation deals)	Commercialisation routes
D. RA-EUR/Research spent (income from industry agreements to PRO research expenditure)	Industry funded research

The difference in the sample size used for each ratio is based on the fact that the data required for the ratio was not always reported by KTOs. Each section will conclude with pointers as to why the above ratios for any particular KTO may be significantly higher or lower than the average observed for the diverse set of PROs sampled.

A. Recording and protecting intellectual property - Patents to invention disclosures (PAT/ID)

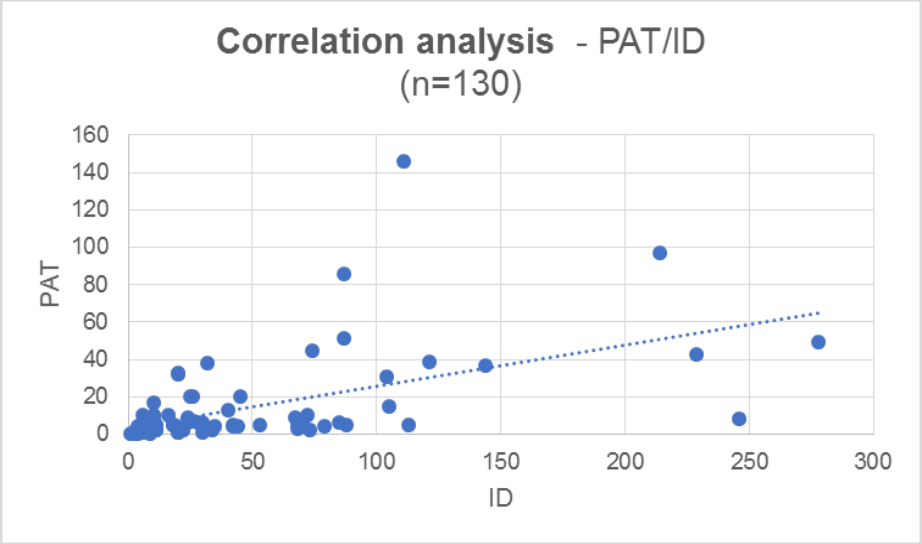


Figure 26: Patents to invention disclosures ratio – Correlation analysis

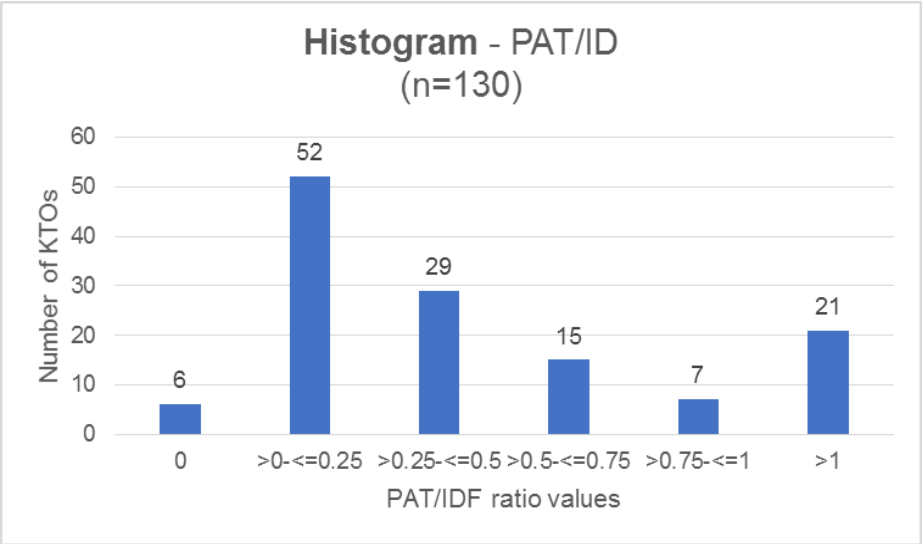


Figure 27: Patents to invention disclosures ratio – Histogram

Using FY2016 data from 130 KTOs on patents granted and invention disclosures, the ratio was computed and a correlation analysis was performed which is shown in the *Figure 26* above. *Figure 27* shows the distribution of the ratio in histogram form. The analysis indicates a linear correlation coefficient of 0.52, meaning that patent filing is not strongly correlated to IDs. We find that 71 of the 130 samples report a ratio between 0 and 0.5 (see histogram), and the full sample set represents an average of 0.45 patent filings per ID, or stated another way, on average 45% of IDs lead to a patent filing.

Thus, the majority of our sample set of KTOs generally process invention recording and patent filing in similar ways, but there are several marked outliers. Before exploring potential reasons for those outliers, it is important to note that patent applications are not always filed in the same year that the ID is received, so that discrepancies may occur if the KTO is not in a “steady-state” situation. Also, this comparison measures the KTO's decision process for filing a patent, and this process is dependent on the age of the KTO and its maturity, or of the available budget for patents.

However, it is worth considering other potential reasons for such outliers in an effort to highlight potential areas of interest.

A ratio of Pat/ID much higher than the mean may indicate:

- IDs are only collected or recorded when the patentability has already been evaluated;
- Patents are filed initially as a matter of course and triage occurs mainly at the end of the priority year;
- A ratio greater than 1 may indicate that an ID is not collected for each patent filing or several filings are done from a single ID;
- There is some institutional pressure which encourages a lot of patent filing.

A ratio of Pat/ID much lower than the mean may indicate:

- No triage by meeting or phone is done prior to recording of the ID;
- Patent budget is limited;
- If patent filing is limited by novelty it may be that some training on publication timing is required;

- A significant proportion of reported inventions are not in a technical field and not appropriate for patent protection.

B. Commercialising new ideas - Commercialisation deals to invention disclosures (LOA/ID)

The LOA/ID ratio was computed with data from 346 KTOs received in FY2016 on commercialisation deals and invention disclosures. As *Figure 28* below makes clear, the ratio shows a quite heterogeneous distribution and with various values higher than 1. *Figure 29* shows the scatter plot and with a correlation of 0.294, no linear correlation is observed.

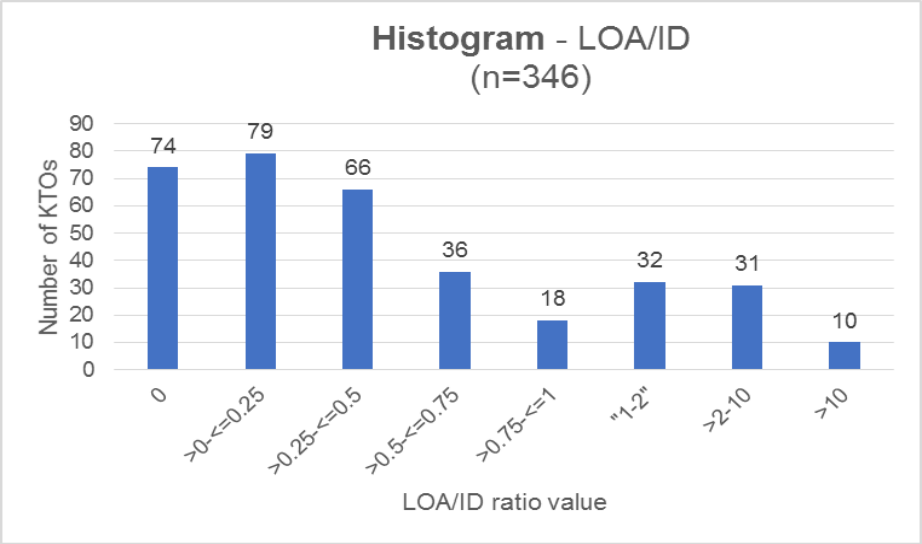


Figure 28: Commercialisation deals to invention disclosures ratio – Histogram

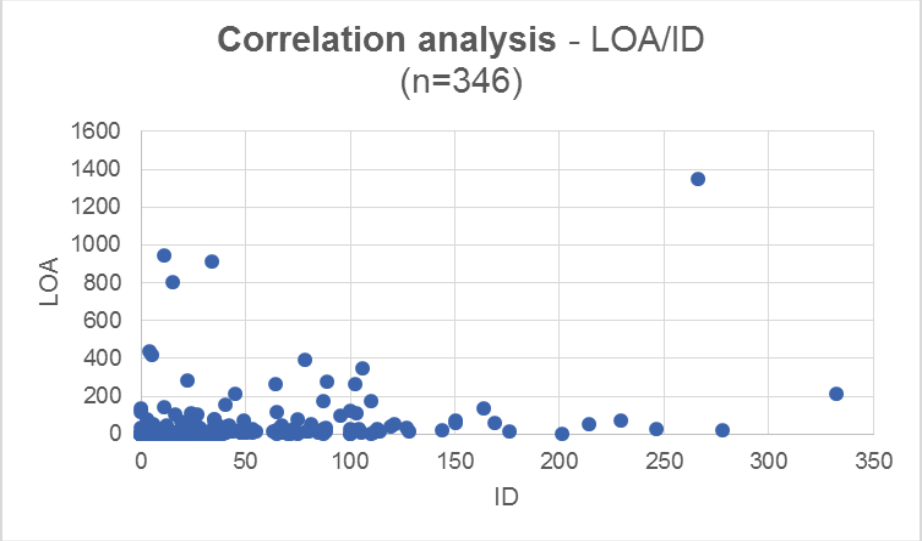


Figure 29: Commercialisation deals to invention disclosures ratio - Correlation analysis

While the number of LOAs is expected to have some relationship to the number of inventions recorded, several factors influence the ratio. Firstly, it is important to note that LOAs can arrive years after the ID and thus the ratio is really only useful for mature organisations that operate at 'steady state' level, rather than in KTOs that are still in the process of building up their patent and license portfolios. In addition, one ID can give rise to one or several LOAs,

so a one-on-one correlation between LOAs and IDs is unlikely. It is also possible that software disclosures are not recorded as IDs but that software licenses are counted under LOAs and/or licensed multiple times.

Thus, we see a large distribution in the values, but with approximately 50% of the sample falling between 0 and 1. KTOs reporting no LOAs are likely to be embryonic and will work to ensure that the LOA/ID ratio becomes positive. However, for individual KTOs this ratio may be useful in assessing their own efficiency with reference to their internal and external systems and structure, and in particular how this ratio changes with time.

C. Commercialisation routes - spin-offs per commercialisation deal (SO/LOA)

KTOs generally commercialise IP via a commercialisation deal (LOA) to an existing company or to a spin-off company. It is interesting to see how the ratio of these two commercialisation routes vary across the data set. To analyse this ratio, we used data received in FY2016 from 255 KTOs.

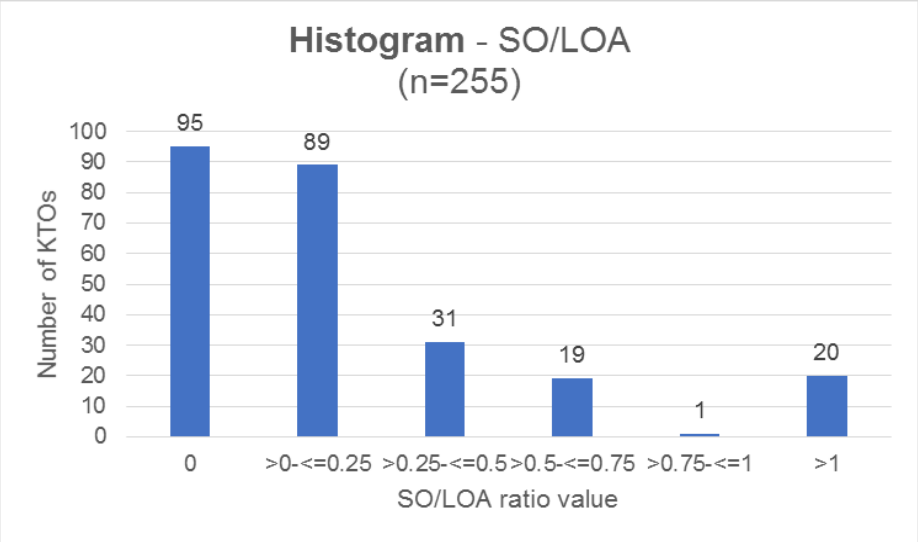


Figure 30: Spin-offs per commercialisation deals ratio - Histogram

The analysis shows that a relatively large number of KTOs do not create any spin-offs, which may indicate lack of investment funding, no particular focus for new spin-off creation, or simply that the KTO has a very mature set of collaborations with for-profit parties and all commercialisation is done via this route. We also see a number of KTOs reporting more spin-offs than LOAs, which may indicate a time lag between the spin-off creation and the LOA completion.

D. Industry funded research – ratio of income from industry agreements to research expenditure (RA-EUR/Res. spent)

This ratio measures the proportion of income from "for-profit parties" to total research expenditure, and thus represents a measure of the focus of the PRO on these types of collaboration. This ratio should thus separate organisations which rely heavily on collaboration / contract income for applied research funding versus those which focus primarily on basic research. This ratio can thus aid in identifying the KTO's current position and if change occurs, how the ratio evolves. The data is from 100 KTOs received in FY2016. *Figure 31* shows the distribution of the data, with an average 0.12, a median 0.07, outliers

>0.28. Thus, the sample set of PROs receive on average 12% of their total research income from for-profit collaborations, but with a median at 7% (that is the main distribution is centred around 7%). There are also a notable set of outliers (with ratio values larger than 0.28), indicating PROs with a very high ratio of funding from for-profit organisations.

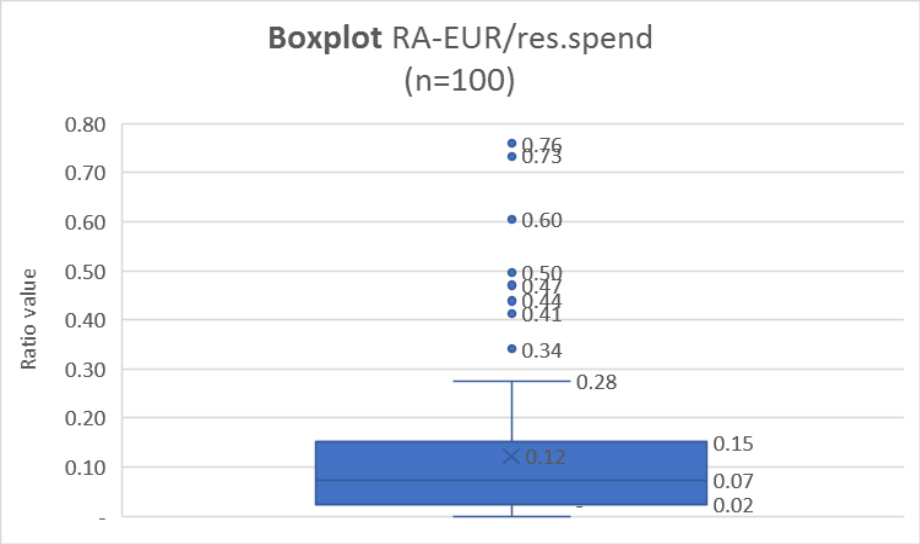


Figure 31: Income from industry to total research expenditure ratio - Boxplot

Concluding remarks

The ratio analysis of the standard KT metrics has the potential to offer additional useful insight into KTO activities. This chapter demonstrated these insights for the first time. We have looked at a few particular ratios and note that, while the distribution of KTOs and their activity is very heterogeneous in Europe, some patterns do emerge from the ratios and there is value in analysing these further on the individual KTO as well as on the transnational/European level with a view to demonstrating (a) differences across EU regions, (b) differences between individual KTOs. With the data from ratio analysis, KTO management will eventually be in the position to initiate changes based on insights derived from ratio analyses in conjunction with standard KT metrics.

3. Longitudinal analysis

We wish to follow the activities/output of KTOs over a period of several years to see if we can observe interesting trends. To this end, the survey data that ASTP had received for FY2014, FY2015 and FY2016 were analysed. A list of 40 KTOs was assembled, each of which had provided data for all three subsequent surveys and also had provided data for a significant number of (core) survey questions. In addition, the 40 KTOs were located in 11 different countries, ensuring a level of representativeness across Europe.

The longitudinal analysis of a number of their reported activity metrics in subsequent years is presented in this chapter.

Metrics	(n)	FY2014	FY2015	FY2016
Invention disclosures	38	2,183	2,334	2,177

Priority patent applications	38	787	754	836
IP Agreements	31	793	666	752
Commercial revenue from IP	28	€141,022k	€182,292k	€183,330k
Spin-offs	36	82	105	91

Table 7: Aggregate totals from the data set used for the time line analysis

The aggregate totals in the above table provides a lot of information for the various metrics listed in the first column. Please note that not all 40 institutions provided data for all metrics in all of the relevant years. For this reason, the actual number of institutions for which useable data was available across all three years (and thus used in this section of the report) is given in the second column.

While the numbers may go up or down a little from year to year, the striking conclusion that we can draw from this analysis is that the aggregate numbers are actually quite stable over time. Looking at the boxplots below for the individual metrics largely confirms this finding. The biggest year-on-year difference (both in absolute and in relative terms) was observed for Gross revenues from IP, where the aggregate total for the 28 reporting organisations went up from €141M in FY2014 to €182/183M in FY2015 and FY2016, respectively. This difference is readily explained when looking at the boxplot for this metric below. The outlier performance of one institution that reported commercial income in each of these years appears to be singlehandedly responsible for the variation that is observed.

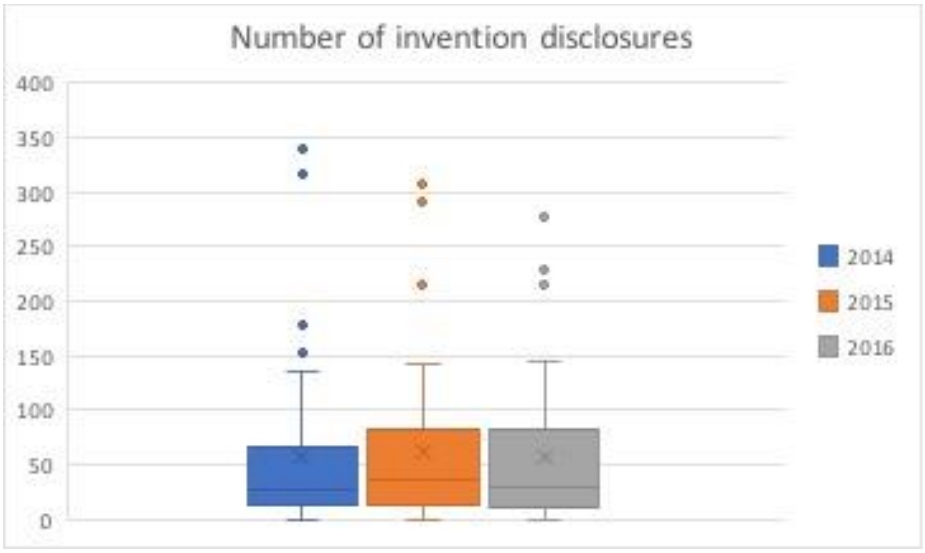


Figure 32: Time line analysis - Invention disclosures

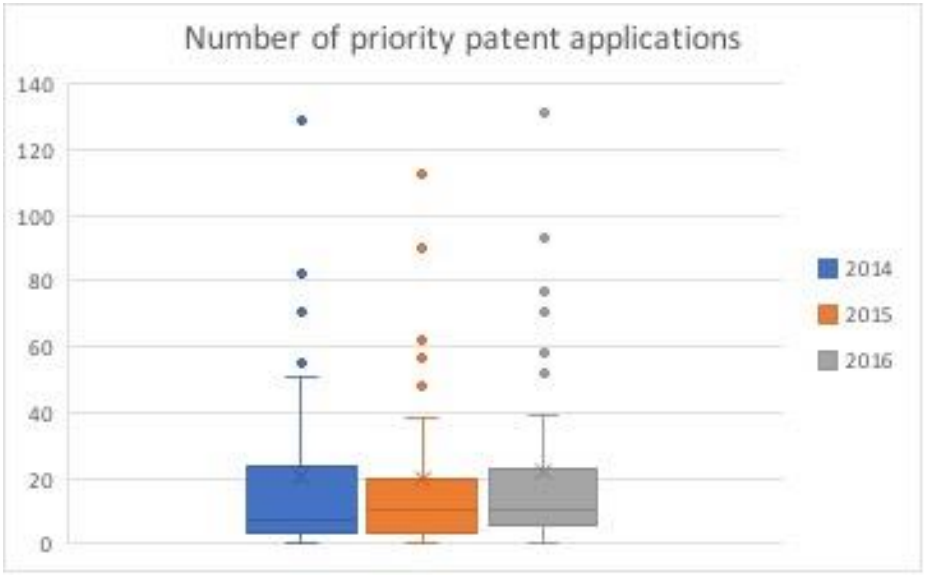


Figure 33: Time line analysis – Patent applications

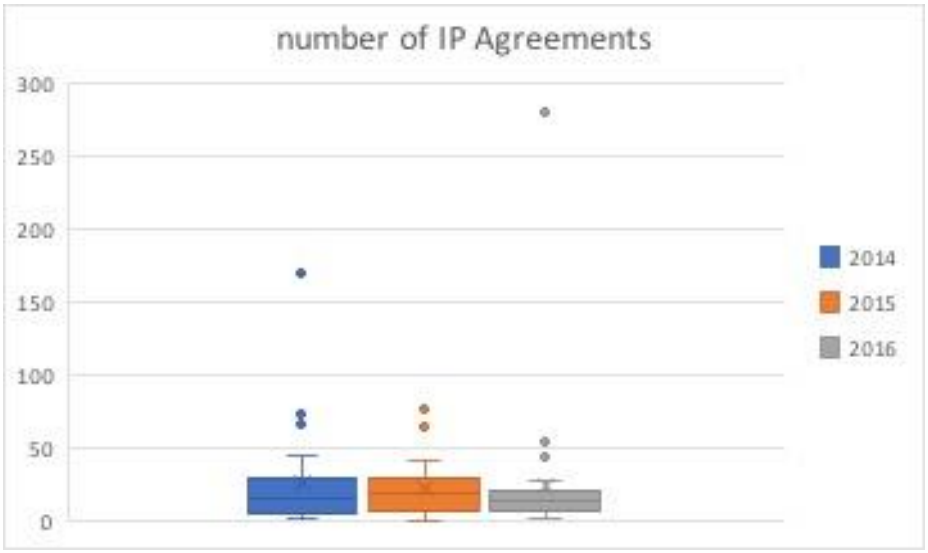


Figure 34: Time line analysis – Intellectual property agreements

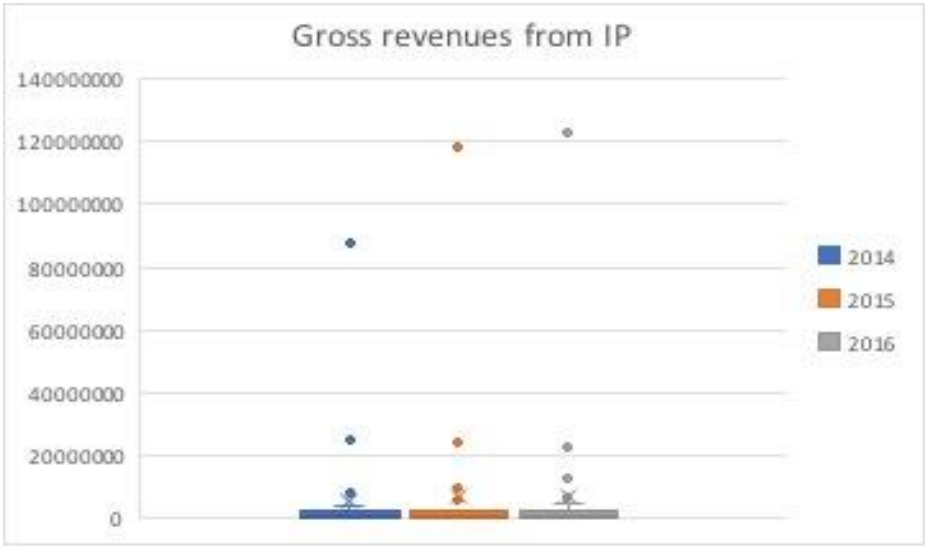


Figure 35: Time line analysis – Gross revenue from IP (€)

The stability of these metrics over time may suggest two things:

First, this group of KTOs appears to be operating at a relatively steady state. If many of these KTOs would still be in a phase in which they are developing their internal outreach, patent-, license- and spin-off portfolios, one would expect this be reflected in a gradual increase of most reported metrics. Such a trend is, however, not visible.

Second, the other conclusion that might be drawn is that at least these organisations appear not only to be diligent but also consistent in their reporting. That suggests that the data concerning their reported outputs may be reliable year on year, which is a comforting thought for the ASTP survey committee.

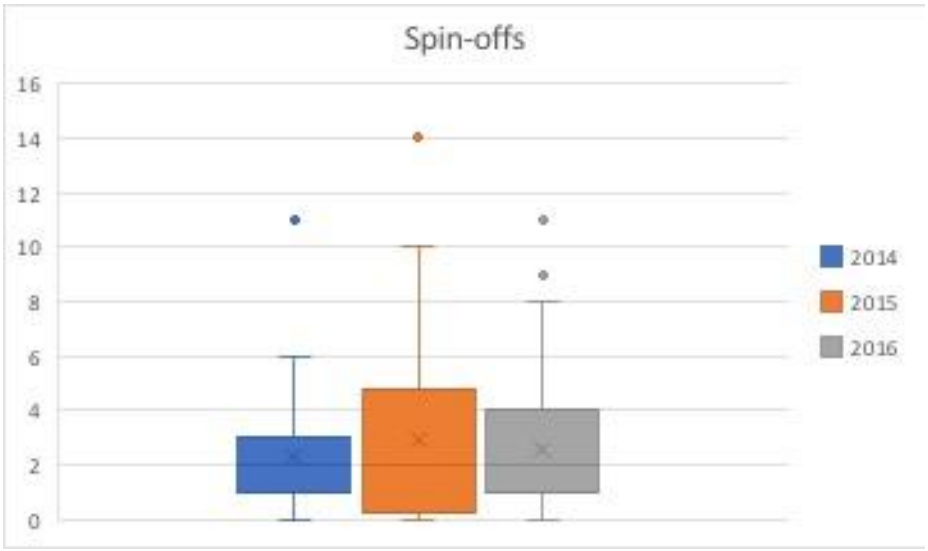


Figure 36: Time line analysis – Spin-offs

VII. Acknowledgements

The ASTP Board and the Survey Committee are very happy that participation in the ASTP Annual Survey continues to increase. We thank all of the survey respondents for contributing data from their respective university or research organisation and for taking the time to diligently fill in our questionnaire. These data are crucial for the preparation and quality of this report which aims at providing relevant overview to the profession of knowledge transfer.

We also thank the National Associations and the ASTP National Associations Advisory Committee (NAAC) for their tremendous effort in supporting our collection of a substantial European KTO data set. The diffusion of information about the survey and the motivation at the national level is a key success factor for the survey increasing participation.

In this regard, we would like to thank our committed partners of National Associations; TechnologieAllianz (Germany), SNITTS (Sweden), Réseau LIEU (Belgium), Universities Denmark (Denmark), PACTT (Poland), Transfera (Czech Republic), FIN (Norway) and ÜSIMP (Turkey), who have been very active in supporting us in collecting data from individual KTOs in their respective networks.

We would like to extend our special thanks to Research England (previously known as HEFCE, UK), Knowledge Transfer Ireland (Ireland), NETVAL (Italy), RedOTRI and Crue (Spain), Réseau C.U.R.I.E (France) and Universities Denmark (Denmark) for their invaluable willingness to cooperate and share national data collected through their own national surveys. This has added great value and breadth of the data and made our results more robust and representative. We intend to strengthen and continue our fruitful cooperation and welcome all suggestions for improvement.

We are very thankful for the commitment and very hard work of the Survey Committee which was necessary to collect, integrate, clean and analyse the data and to the generation of a compelling report for our stakeholders. The process of developing the report takes tremendous effort by highly committed volunteers, with the assistance of ASTP headquarters. We are grateful for their engagement, which allows us to provide our members and contributors with, what we hope is, a real added value for their business.

Finally, we would like to acknowledge for the highly effective and fruitful work done by Ulrich Mahr as Survey Committee chair until May 2018, and the valuable work done by the New Metrics Sub-Committee members on the ratio and longitudinal analysis.

VIII. Survey Committee Members

Cécile Cavalade
Chairman, VP Survey/Impact

Koen Verhoef
Vice-Chairman

Tamas Bene

Laura Kreiling

Ugo Rizzo (until 30-09-2018)

Olivier Vande Vyver

New Metrics Sub-Committee Members

Laura Kreiling
Chair

John Scanlan

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Koen Verhoef

Survey Committee Mentors

Ahmed Bounfour

Massimiliano Granieri

Ulrich Mahr

Laura Ramaciotti

Appendix A: Lists of Figures, Tables and abbreviations

List of figures

List of tables

List of abbreviations

CRM	Customer Relationship Management
CRUE	Conference of Rectors of Spanish Universities
EU	European Union
FTE	Full Time Equivalent
FY	Financial Year
HEFCE	Higher Education Funding Council for England (it ceased to exist as of 1 April 2018)
ID	Invention Disclosures
IP	Intellectual Property
KT	Knowledge Transfer
KTI	Knowledge Transfer Ireland
KTO	Knowledge Transfer Office
LOA	Commercialisation deals
NA	National Association
NAAC	National Associations Advisory Committee
Netval	National Association of Knowledge Transfer in Italy
PAT	First granted patents

PRO	Public Research Organisation
RA-EUR	Income from industry agreements
RedOTRI	Red de Oficinas de Transferencia de Resultados de Investigación (National Association of Knowledge Transfer in Spain)
Réseau C.U.R.I.E.	National Association of Knowledge Transfer in France
SO	Spin-offs
STEM	Science, Technology, Engineering and Mathematics

Appendix B: FY2016 Survey Questionnaire

The questionnaire below has been fulfilled by direct respondents to ASTP annual survey.

Survey Financial Year 2016

Introduction - please read carefully

This survey collects data for Financial Year 2016 (FY2016)
Please provide us with data relevant for the 12 month period that is used within your Knowledge Transfer Office (KTO) or Public Research Organization (PRO) for financial reporting ("Financial Year" or "FY"). If this period does not coincide with a calendar year, then please provide us with data for the 12 month period that ENDS in the year for which data are requested.
For example, if your Financial Year starts on May 1st, Financial Year 2016 (FY2016) would then be the period from May 1, 2015 – April 30, 2016.

If your KTO is the major service provider of knowledge transfer services for more than one PRO
Please provide aggregate data for all PROs combined (and indicate the name of all PROs in Question 4).

Before starting to fill out this survey
Please make sure that you have collected the relevant data for all of the PROs that you report on, in particular the total amount of Research Expenditure in FY2016 and the total number of FTE engaged in research in FY2016. These numbers are used by us to normalise data such that the output of organisations of different sizes can be compared more readily (we can then calculate the number of Invention Disclosures received per 10M€ Research Expenditure for example). You can determine what data you need to collect by looking up the questions in the pdf file that you received attached to the email with the link to this survey. This way, you will be well prepared when starting the survey online.

Guiding notes

Save and continue later
If you don't have the data to answer certain questions and you don't have the time to look them up immediately, you can save the survey and revisit it later to fill it in. Please use the 'save and continue' button at the top of each survey page for this and click on the link in the email that you will receive to continue. If the email with the edit link does not arrive, please contact survey@astp-proton.eu

Entering values
If you don't know the answer to a question, please leave the question blank. Only fill in zero '0' if the answer is in fact '0'.
For most questions, when left unanswered, you will subsequently be asked why you didn't answer the question. We ask this to gain a better understanding of why some questions are more frequently answered than others.

Entering numbers (use of comma , and period .)
Most questions only accept whole numbers as an answer. Questions that do accept entering of fractional numbers are marked accordingly.

- If you wish to use a decimal separator, please use a period (.)
- Do not use a comma (,) as a decimal separator nor as thousands separator. All commas will be removed by the software.
- Do not use a period (.) as a thousands separator. The software treats the use of a period (.) in a number as a decimal point. *For example: entering '110.000' will result in conversion to '110'.*

This survey consists of 30 questions
If you have any questions regarding this survey, please contact ASTP-Proton at survey@astp-proton.eu

Some information about yourself

1. Please provide us with some information about yourself, should we need to contact you. *

Your name

Email address

Phone number

Demographics and KTO age

2. Please provide some basic information on your KTO or PRO. *

Name of KTO or the Public Research Organisation of which the KTO is a part

Address 1

Address 2

City

Postal code

Country

3. In what year was your KTO first established?

4. Please enter the names of all the Public Research Organisations for which you submit aggregate data in this survey.

List all names of PROs separated with a comma e.g. Name of PRO 1, Name of PRO 2.

Confidentiality and Permissions

5. Please enter 'YES' in the box below if you are happy for us to publish the data submitted by you under this survey without anonymization. Leave blank if not. Enter 'NO NAME' if you also wish ASTP-Proton to keep the fact that your organisation participated in this survey a secret.

By default, ASTP-Proton does not publish any data submitted by you under this survey, but may use the name of your organisation solely in connection with your participation in the survey (the name of your organization will never be linked with any data that would allow tracing back to you).

If you leave this question blank, we will assume you do not give permission to publish the data in a non-anonymized way. Your data will then only be presented in aggregate fashion and will not be traceable to your organisation.

If you insert 'NO NAME' in the textbox above then, in addition to not publishing the data you submit under this survey, ASTP-Proton will also not mention the fact that your organisation participated in this survey.

Naturally, we hope that you will enter 'YES' and in doing so help us give access to the survey data to others.

6. Please allow us to share your data with your national knowledge and technology transfer organisation and name the organisation or person in charge of collecting data in your country below.

Name of organisation or person with whom we can share your data

Email address of organisation or person

ASTP-Proton requires specific permission from you regarding sharing data submitted by you under this survey with others.
If you leave this question blank, then ASTP-Proton will not share the data with anyone who is not directly involved in the data analysis for ASTP Proton (unless you already answered 'YES' under question 5 course).

KTO staff and expenditure

7. What was the total number of KTO staff in full-time equivalents (FTEs) at the end of FY2016?

This question allows the use of a decimal point, but if you wish to do so please use a period (.) instead of a comma (,) as use of commas in numbers is not allowed and the comma will be removed (e.g. 12,4 will become 124)

8. Please give the total gross expenditures of the KTO in FY2016 less out-of-pocket costs for IP protection (€).

9. What total amount was spent on out-of-pocket costs for IP protection by your KTO and PRO(s) combined (€)?

Please include both the charges from external IP specialists as well as fees paid to IPR-granting authorities (e.g. the EPO)

Quantification of Research Effort, Agreements with Industry

The data that we ask you to provide under the following 2 questions will be used for normalisation purposes. Therefore, please make sure numbers are as accurate as possible.

Where possible, please use the same numbers that Public Research Organisations submit through their national statistics office for the Research and Development Official Survey (harmonized by Eurostat and OECD)

10. Please give the aggregate Research Expenditures in FY2016 for all PRO(s) for which your KTO is the major provider of Knowledge Transfer Services (€).

Include share of academic costs dedicated to research (e.g. salary costs of permanent academic staff, costs of administrative support, capital expenditures on new equipment. Exclude cost of new buildings or land.

11. What was the (combined) research effort of your PRO(s) in FY2016, expressed in Full Time Equivalents (FTEs)?

Include time spent by academic staff on research (also include FTEs for post-docs, PhD students, research fellows, technicians and the like). Exclude time spent by staff on teaching.

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12. Please use this comment box to provide context where necessary to any of the numbers provided under the preceding questions 10 and 11. Insert comment if there are reasons to assume that the numbers provided under the previous 2 questions may not be comparable with those provided by other European institutions.

e.g. for some PROs, a lot of research work is being performed by PhD students on stipends, who do count towards the number of FTE in research but are not on the payroll of the PRO and so do not contribute to the Research Expenditures etc.

13. Please provide the number of agreements with industry that were concluded in FY2016:

Number of new Contract Research Agreements

Number of new Collaborative Research Agreements

include all collaboration agreements involving industry, including those under which the industry party does not make any cash payment to the PRO directly (e.g. in case the project is fully subsidised)

Number of new Consultancy Agreements

exclude consultancy agreements concluded by individual staff members directly with third parties (i.e. not through the PRO) or those that relate to technical services, testing of equipment and the like

14. Please provide the aggregate amount (€) received directly by your PRO from for-profit parties under the following agreement types in FY2016:

Contract Research Agreements

Collaborative Research Agreements
exclude any cash contribution of a for-profit party to a collaborative project budget (e.g. in a H2020 project) IF such payment is not made directly to your PRO (e.g. where such cash contribution is used to fund that for-profit partner's work in the collaborative project)

Consultancy Agreements

Invention disclosures, patent applications and patent grants

15. What is the number of invention disclosures received by your KTO in FY2016?

Formal or informal descriptions of inventions or discoveries that are discussed with and/or evaluated by the KTO staff or other technology experts to assess their commercial potential.

16. Please give the total number of priority patent applications filed in FY2016.

A priority patent application constitutes the first patent application for a technically unique invention. If priority patent applications relating to the same technically unique invention are submitted simultaneously in multiple patent offices, or are submitted after the first priority patent application within the priority year, only a single priority application should be counted.

17. How many patents were first granted in FY2016?

The first grant in any territory of a patent for a technically unique invention. Count a patent grant for the same invention in two or more countries as one technically unique patent. If a first patent grant for a technically unique invention has been counted in a previous year, no further patent grants for such invention should be reported. Please only count the first granted patent in each patent family.

18. What is the total number of patent families in the patent portfolio of your KTO that are active at the end of FY2016?

A patent family is a collection of patent applications and granted patents that relates to a single invention.

19. Please give the number of active patent families in the patent portfolio provided under Question 18 that is licensed or optioned at the end of FY2016.

Include both patent applications and granted patents for which, as of the end of the reference year, an option agreement or a license agreement is active for at least one patent family member.

Licenses, options and assignments involving IP

20. What is the number of IP agreements executed in FY2016 by type:

Licenses (not including licenses for research materials)	
Options	
Assignments	
Licenses for the commercial use of research materials	

21. Of all the Licenses reported under Question 20 for FY2016, what number involved licenses for software?

If the total value of a single license agreement to a piece of software is less than €1000 then please group all such licenses and count the group as a single license only.

Commercial Revenues

22. What are the gross revenues from commercialisation of IP earned in FY2016 (€)?

Gross revenues from the commercialisation of all types of know-how and IP (e.g. patents, copyright, designs, trademarks, software, trade secrets etc.) before distribution within the PRO or to inventors. Include license issue fees, annual fees, option fees, milestone payments, running royalties, change-of-control payments, dividends and proceeds from cashed-in equity. Exclude license income forwarded to third parties other than individual inventors.

23. Of the gross revenues reported under Question 22, what amount was generated by patent licenses (€)

24. Of the gross revenues reported under Question 22, what amount was generated from running royalties (€)?

i.e. revenues based on turnover of product

25. Of the gross revenues reported under Question 22, what amount relates to cashed-in equity (€)?

26. How many IP agreements yielded more than 1M€ in gross revenues in FY2016?

Spin-offs and start-ups

27. How many spin-offs were established in FY2016?

A spin-off is a company expressly established to develop or exploit IP created by a Public Research Organization and with a formal contractual relationship for the use of this IP. Include, but do not limit to, spin-offs established by PRO staff. Exclude companies that have no formal agreement for commercially developing IP or know-how created by the institution.

28. How many start-ups were established in FY2016?

*A start-up is a newly registered company that is **founded by PRO students** or employees but that is **not directly involved with the exploitation of intellectual property** generated **within that PRO.***

29. How many staff members (FTE) were employed by your spin-off companies (in aggregate) at the end of FY2016?

Please disregard any change in the number of FTE after take-over or merger of the spin-off company by/with another company. Use the last FTE count before such event instead.

Impact Metrics

30. Please indicate what parameters for impact measurement you have been using and/or that you deem interesting/relevant for assessing the impact (socio-economic, environmental, territorial/regional) of your knowledge transfer activities.

We wish to gain an understanding of the different ways of measuring impact that are currently used or considered for use in European KTOs.

Feedback

Please use this space to give us your opinion on any aspect of the survey, e.g. the relevance of particular questions, its length, whether you think something is missing or what you'd like to have changed, if anything.

On behalf of the ASTP-Proton Survey Committee:

Thank you very much for participating in this survey.

Ulrich Mahr
Chair of the Survey Committee
Vice President ASTP-Proton

If you still wish to access to the survey data (e.g. to make amendments or provide additional data) you may request an edit link at survey@astp-proton.eu<mailto:survey@astp-proton.eu> if desired.

Edit links can only be provided so long as the survey hasn't been closed yet.