ASTP
A World of
Knowledge
Transfer

ASTP 2019 Survey Report on Knowledge Transfer Activities in Europe

Financial Year 2017 data

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Foreword

The ASTP Annual Survey provides a unique view of the European knowledge transfer landscape. We are pleased to share the results of the survey conducted on financial year 2017 data.

ASTP is the pan-European association of Knowledge Transfer (KT) professionals. Our main missions are to share best practices and develop competences among professionals, as well as creating a better understanding of knowledge transfer resources, and activities.

The results provided in this report are based on **the largest European dataset so far, with 475 responding Knowledge Transfer Offices (KTOs) from 27 countries**. This is the result of fruitful collaborations with ASTP National Associations Advisory Committee (NAAC). National KT associations helped either to promote the survey or shared data that they had collected through national surveys, as did the Danish Universities Denmark, French Réseau C.U.R.I.E, Irish KTI, Italian Netval, Spanish RedOTRI, and UK Research England. We are truly thankful for this strong cooperation with national associations, which enables us to provide the best regional coverage and data quality.

Within this context, there is a crucial need for metrics harmonisation in order to maximise the use of collected data. For that reason, ASTP and the Technology Transfer Competence Centre of the European Commission Joint Research Center (EC JRC), launched an expert group on *KT Metrics Harmonisation*, in close collaboration with NAAC members. This study report will be published in early 2020.

Knowledge transfer aims to maximise the economic and societal benefits of ideas, knowledge or inventions coming from research activities. Our survey focuses on the development of business engagement and commercialisation, to cover the following fields: KTO characteristics and resources, intellectual property rights protection and commercialisation, research and consultancy agreements with industry, spin-off and start-up creation.

However, we are fully aware that the European KT landscape cannot be reduced to a set of quantitative metrics. Firstly, the European situation of KT is heterogeneous among countries, depending on the legal framework, public funding or institutional organisation of PROs/KTOs. In some cases, certain activities may not be supported or relevant. Secondly, social and business impacts require narrative storytelling. So, alongside this report, a set of case studies may be found on https://www.astp4kt.eu/resource-center/best-practice-library/. Moreover, this year we included an analysis of impact measurement indicators used by our responding KTOs (based on answers to specific questions added in the survey).

We are eager to maximise the utility of the data collected not only at European level, but also at national or local level. Therefore, KTOs are invited to allow ASTP to share their individual data with their national association, enabling via one single collect, the production of a national data set. Also, from this year onwards, we offer KTOs that responded to the ASTP Survey to have an individual feedback report on their own data, using some of the ratios that we presented in last year's edition.

Conducting the Annual Survey and producing this report would not have been possible without the strong involvement of the volunteers in the ASTP Survey Committee. The Committee members dedicate this 2019 report in memory of John Scanlan†, who contributed to the work of the New Metrics Sub-Committee and sparked new developments.

We hope the information about the status of the European KT 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.

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1. Introduction

1.1. Challenges of a European-wide Survey on Knowledge Transfer

Knowledge Transfer has become a visible link between excellent science, industry, public and social actors 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 KT landscape at a pan-European level. It focuses on the development of business engagement and commercialisation: KTO characteristics and resources, intellectual property rights protection and commercialisation, research agreements with industry, spin-offs and start-ups creation.

Furthermore, the impact of the research results is strengthened and expanded as a result of knowledge and technology transfer, not only for commerce, services and economy but also on health, policy, law as well as arts and culture. In chapter 4, we present a common analysis of the answers collected about Knowledge Transfer Impact Measurements in our last two surveys (FY2017 and FY2016). From FY2018 onwards, we will collect impact case studies to complete the figures with qualitative narratives enabling us to provide a more valuable view of the European KT landscape.

This report is based on the analysis of data collected annually from two different sources. The first data set is provided by 94 individual Knowledge Transfer Offices (KTOs) 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 sample of 475 KTOs, the largest European KT dataset.

However, we believe that we could gather more data by involving even more KTOs in our survey and providing a more accurate view on KT activities throughout Europe. As explained in the Foreword, from this year we will provide a feedback report to each directly responding KTO, which aims at providing more value to the respondents for their effort of filling in the survey.

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 from one question to another. In the following sections, we indicated systematically the responding rate (n) for each metric.

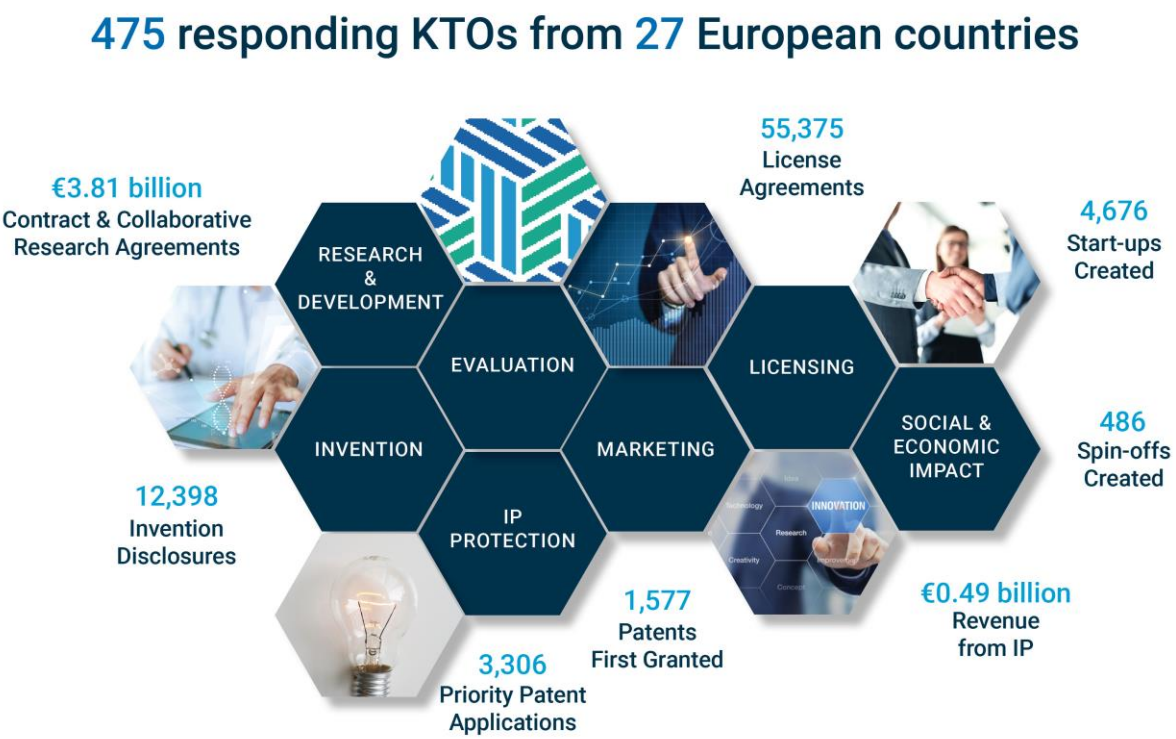
By analysing the number of respondents, we see that the most common metrics available and collected at KTO level are: invention disclosures (n=452), licence agreements (n=413), gross revenue from IP (n=404), the number of spin-offs (n=359) and start-ups (n=333).

We believe that the number of priority patent applications should be among this list of common metrics. The rather low rate of 263 respondents is partially explained by some incompatibility of this metric among the datasets provided by national associations.

To be able to provide an even more holistic view on European KT landscape, it is essential to find common metrics with both available and compatible data. To address this, ASTP and the European Commission Joint Research Centre (EC JRC) launched a common study in September 2019. A dedicated EC expert group has been assigned to work on a harmonised core set of KT metrics, in collaboration with ASTP NAAC members.

Besides improving the response rate and data harmonisation, the ASTP Annual Survey is facing another challenge; standardisation. Our survey gathers responses from KTOs in 27 countries. Some countries have more than 25 years of recognised technology transfer activities and a complete ecosystem to support it (proof of concept funds, incubators, public/private investors, capacity building resources), whereas other countries have less experience and few available skills or funds in technology transfer. To enable a meaningful comparison, metrics would need to be set in relation to research expenses or research FTE (full time equivalent). However, it is not easy to get these figures given the various schemes under which KTOs are serving one or several public research organisation (see Figure 7 and Figure 8). Following last year's work on new metrics and ratios, section 4.2 of this report presents a Cluster Study for the Creation of KTO Peer Groups, which resulted from the work done by some members of ASTP Survey Committee on Advanced Metric Analysis - Cluster Study for the Creation of KTO Peer Groups.

1.2. Overview of Survey Main Outputs and Findings



Source: ASTP Survey Report on Knowledge Transfer Activities in Europe for Financial Year 2017

2. Survey Methodology

2.1. The FY2017 Survey

The FY2017 Survey consisted of 29 questions, of which 22 were exactly the same as in last year's FY2016 Survey. In fact, 75% of the questions were the same, 2 were deleted, 1 was newly introduced, and 6 questions were modified in their wording. The 2 questions that were deleted from the FY2016 Survey asked for the number of IP agreements that yielded more than 1M€ in gross revenue, and the number of software licenses over a threshold of 1k€. This change was motivated by the fact that in current national surveys, either no threshold was applied or different ones e.g. 600€, 1000€, etc. To facilitate harmonisation and being compliant with the maximum number of data collected, we decided not to apply any threshold. The latter was included as a category in the general question on the number of IP agreements without the threshold. Also, question on the total gross expenditures of the KTO in FY2016 less out-of-pocket costs for IP protection was substituted for a new question asking about the types of activities of KTO staff which linked better with the previous question on the number of KTO staff in full-time equivalents at the end of FY2017. The questions that were modified in their wording concerned the PROs served – rather than asking their names, the FY2017 Survey asked for the number of PROs served – this now links with the question on the aggregate research expenditure of these PROs. In addition, the question on the permission to publish data was reworded to state the same message but to provide clearer understanding. The question on impact metrics was also adapted, asking in 2 questions in the FY2017 Survey about the metrics currently used and those that should be used, to achieve a more precise understanding of this important emerging topic. Main inputs collected on impact measurement are presented below in a "Way Forward" chapter.

2.2. Data Collection

Data collection was launched on 12 December 2018 and concluded on 15 February 2019, but at the request of a number of contributing NAs, was extended until 15 March 2019.

The FY2017 Survey was sent to:

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

In total, 34 NAs in Europe were contacted through their representatives, most of whom are members of ASTP National Associations Advisory Committee (NAAC). They 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 FY2017. With regard to the latter, care was taken to only include data that was compatible with ASTP's survey questions and definitions.

2.2.1. Respondents

ASTP collected FY2017 data from a total of 475 KTOs. This marks a slight increase in participation by individual offices and associations in Europe compared to FY2016.

2.2.2. Data Received from Individual Knowledge Transfer Offices

Data from 94 individual KTOs were directly submitted to the online ASTP Survey. Just as in previous years, there was no obligation to answer questions. In order to avoid a lack of clarity in the database as to why data was not provided for certain questions, the practice from the previous year was continued so that a follow-up question appeared if a respondent left an answer field empty. This follow-up question asked for the reason to skip the question/s in the previous section, 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. Thanks to feedback, the modality of the follow-up questions was slightly modified compared to last year's survey: the follow-up question appeared after a section in the survey if a question was unanswered, rather than after every unanswered question. While alleviating the burden to answer follow-up questions, the caveat of this approach is that the provided information is less precise.

2.2.3. Data Received from National Associations

The majority of data (80%) were obtained from NAs. The following NAs either have shared data or data were publicly available, namely KTI (Ireland), Netval (Italy), RedOTRI (Spain), Research England (United Kingdom), Réseau C.U.R.I.E. (France), Universities Denmark (Denmark), and swiTT (Switzerland).

Most of these NAs use their own national survey. To ensure compatibility, each question was checked and only data from the questions considered to correspond with questions and definitions used in the ASTP FY2017 Survey were included in the database.

Unfortunately, it was not unusual that substantial parts of the datasets received from NAs had to be disregarded due to incompatibility. This shows that the need for standardisation of survey questions and definitions relating to knowledge transfer across Europe is essential. 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. To work towards this ambitious goal, ASTP has teamed up with the TT competence centre of the European Commission and will oversee the work of an expert group which will jointly work on a unified set of metrics together with the NAAC.

2.2.4. Response Rates

The absolute number of responses per country for the past 3 years is presented in the table below. It clearly shows that even though the number of responses varies considerably from country to country, the participation per country remains quite stable for most.

Country	FY2017	FY2016	FY2015
	2019 (n = 475)	2018 (n=474)	2017 (n=419)
United Kingdom	166	162	160
Spain	71	69	70
Italy	55	61	62
France	52	58	0
Ireland	27	24	25
Denmark	14	10	10
Switzerland	13	2	17
Germany	12	18	18
Poland	10	9	8
Belgium	9	8	7
Netherlands	8	13	9
Finland	6	5	3
Hungary	5	4	3
Czech Republic	5	8	1
Sweden	4	4	7
Norway	4	3	8
Lithuania	3	4	0
Austria	2	3	3
Turkey	2	3	0
Russian Federation	2	0	0
Portugal	2	1	2
Slovak Republic	1	1	3
Luxembourg	1	1	1
Croatia	1	0	1
Latvia	0	1	0
Malta	0	1	0
Serbia	0	1	1

Table 1: Overview of ASTP Survey response rates FY2017, 2016 and 2015

As shown in Table 1, the number of responses received is also estimated to represent a fair proportion of the KT activities for some of the other countries where KTOs responded to the FY2017 Survey directly.

Figure 1: Relative survey response rates across Europe

The map above 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 and which were attempted to be contacted. The response rate for countries with no KTO participation is 0% and shown in white.

2.3. 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 FY2017 Survey and the addition of secondary data from the NAs, as described above.

Initially, extreme outliers that were considered to be potentially erratic were flagged up in the FY2017 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 is divided by the number of research FTE, it 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, deleted from the database, and thus excluded from the data analysis. A total of 26 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 FY2017 ASTP 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 by the FY2017 ASTP Survey. It is important to note the total number of respondents for each question (indicated with 'n') varies and is indicated for each statistic.

3. Data presentation

The data that we have received for FY2017 is presented in the following sections under a number of different subject headings. It is important to stay as consistent as possible year on year, which is why the data is presented in a similar way to last year's report.

In the 475 KTO's datasets received, not all respondents have provided data for all of the questions in our questionnaire. This is why there is a different number of responses for each question. The actual number of respondents is shown in the sample size for a particular question, indicated with 'n=' in each graph. For this reason, a direct comparison between the data presented in this report and that of last year's (or any previous year for that matter) is not very meaningful since the set of responding KTOs is different from year on year.

3.1. Knowledge Transfer Offices

This section presents data on the KTOs themselves, such as on staffing levels (including staffing levels for basic KTO functions such as commercialisation and handling research contracts) and budget.

When looking at the number of FTE employed at a KTO (without considering the size of the organisation(s) that the KTO is supporting), relatively few KTOs (28/272, approximately 10%) employ fewer than 2 FTEs (see Figure 3 below). A similar number of KTOs employ 2 to <5, 5 to <10 and 10 to <25 (around 25% of total responding KTOs for each bracket), with a sizeable number of KTOs employing more than 25 FTE (32 or 12%).

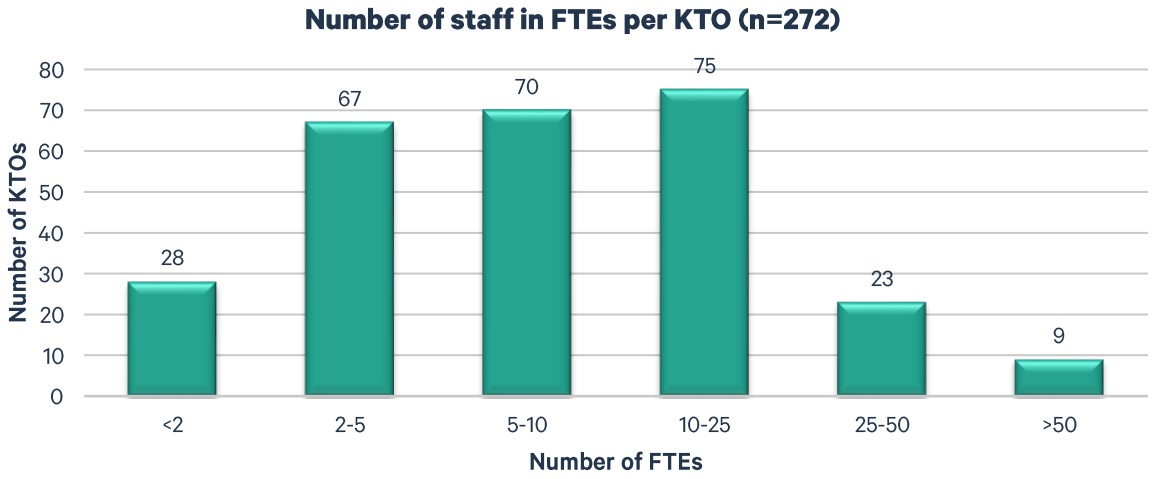


Figure 2: Distribution of KTO staffing levels in FTEs across responding KTOs

To gain more insight into the activities of KTOs, we have asked respondents to provide the number of FTE within the KTO that are engaged in one of the following activities:

- Handling of research agreements
- Commercialisation of knowhow and/or research output (including IP rights)

The distribution of the number of FTEs across respondents is given in Figures 3 and 4.

For the more limited set of respondents (around 150 for each sub-question of Question 8) compared to the 272 respondents providing overall staffing levels, the distribution of the staffing levels for each of these functions appears to be very similar. Exceptionally, the set of respondents for each of the 2 Question 8 sub-questions is nearly identical, allowing some comparison between staffing levels for these two functions on an aggregate scale.

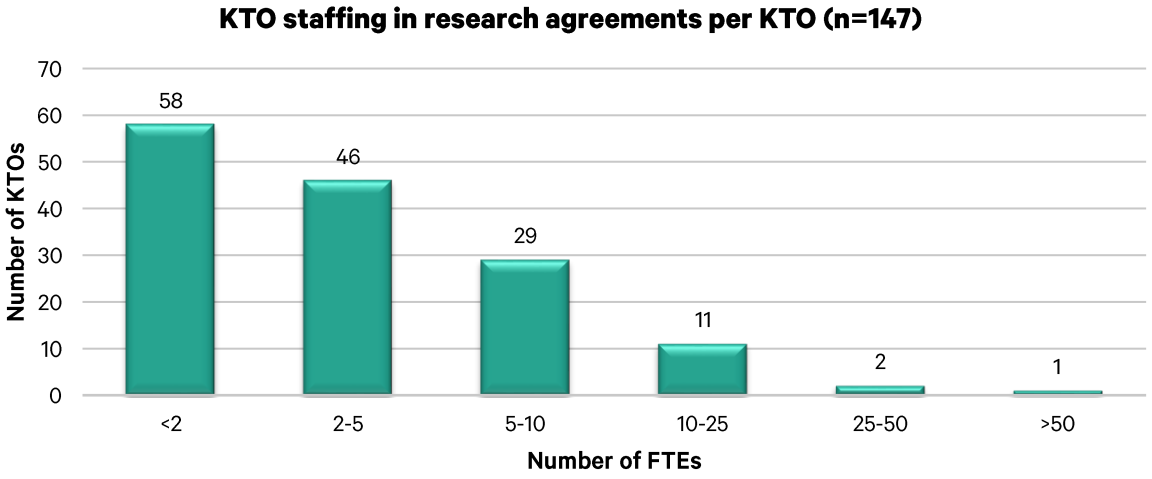


Figure 3: Distribution of KTO research agreement staffing levels in FTEs across responding KTOs

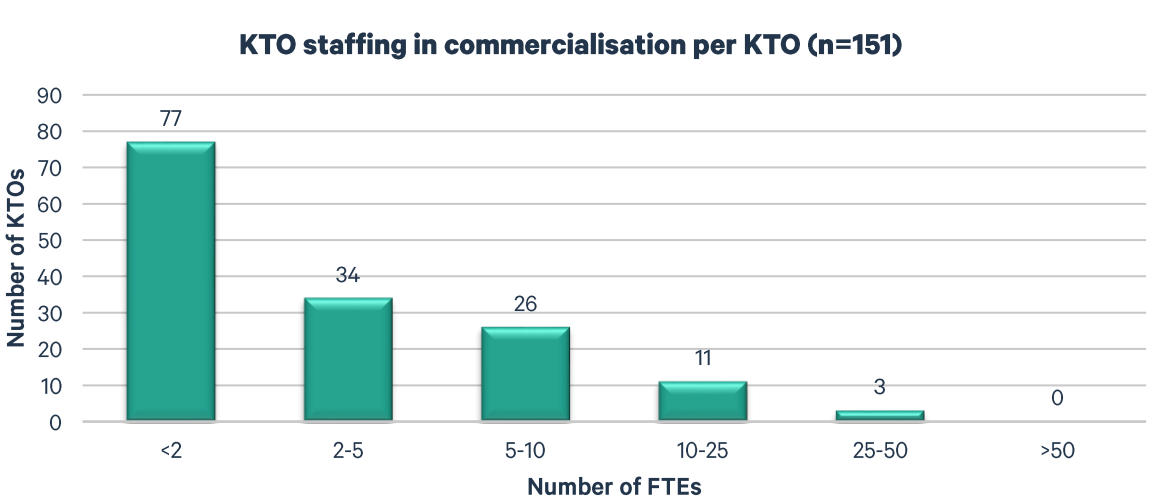


Figure 4: Distribution of KTO commercialisation staffing levels in FTEs across responding KTOs

Overall, the total number of FTE tasked with handling Research Agreements is slightly higher than the number of FTE with Commercialisation responsibilities (see Figure 5). This analysis was only from the KT offices that submitted both the total number of FTE, and the number of FTE for each of the subcategories 'Research Agreements' and 'Commercialisation' (that is answered to both question 7 and question 8).

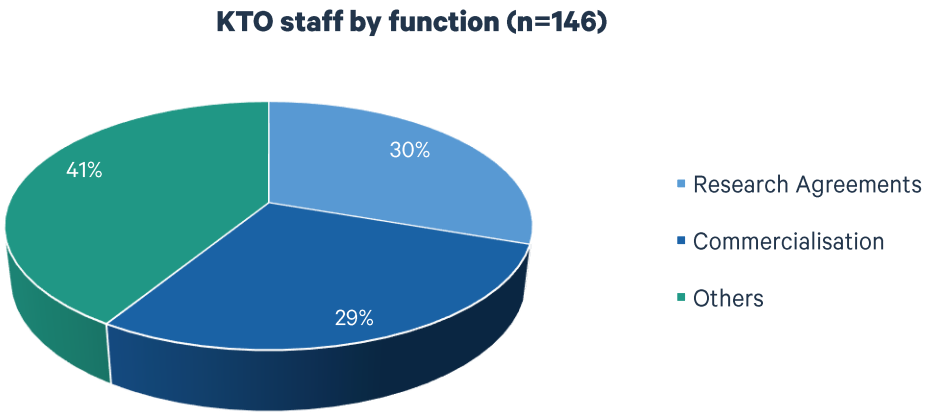


Figure 5: Distribution of KTO staff across two major KTO functions

Though most KTOs serve a single PRO (80%), some KTOs report data for multiple PROs, with a few operating on behalf of several 10's of research institutions (Figure 6).

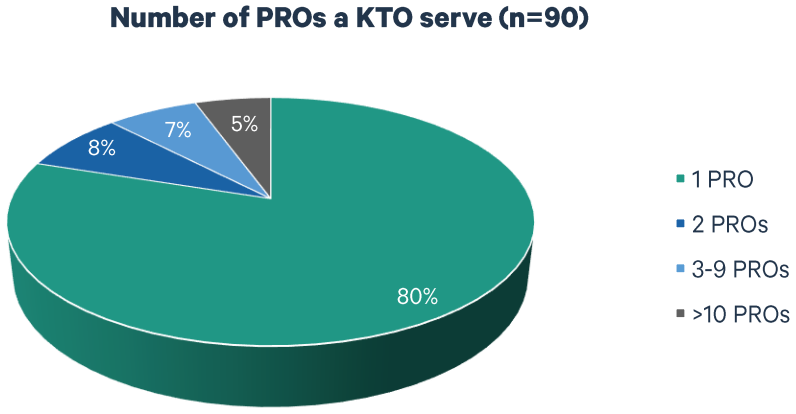


Figure 6: Distribution of the number of PROs that a KTO serve across responding KTOs

In order to normalise for organisation size and perform some analysis on the metrics, we asked KTOs to provide us with two metrics for the PROs that they serve: the PRO Research Expenditure and the PRO Research Effort expressed in FTE. The distribution of PROs Research Expenditure and PROs Research Effort (FTE) is given in the following two graphs (Figures 7 and 8), including the cumulated data provided by KTOs which serve several PROs.

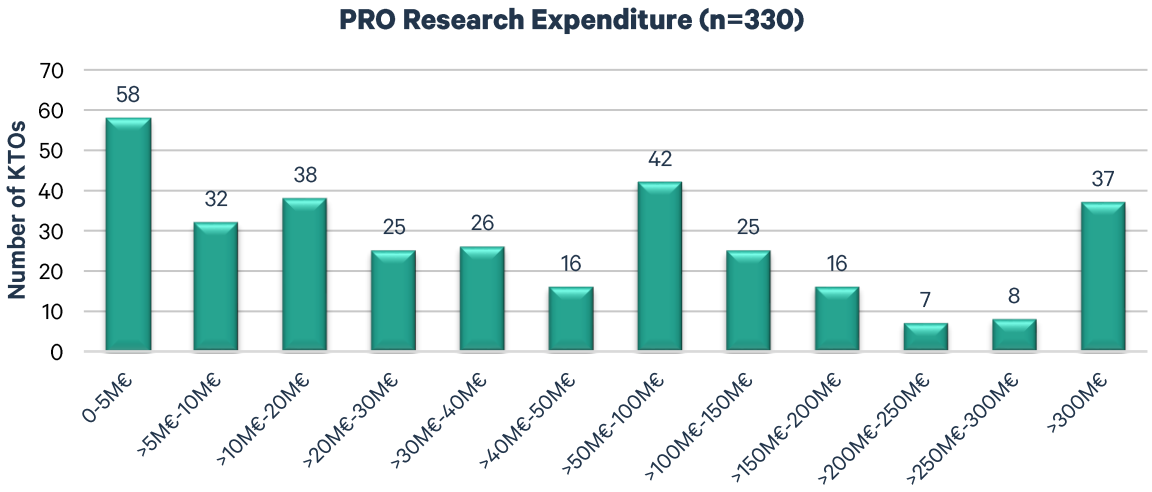


Figure 7: Distribution of PRO research expenditure across responding KTOs

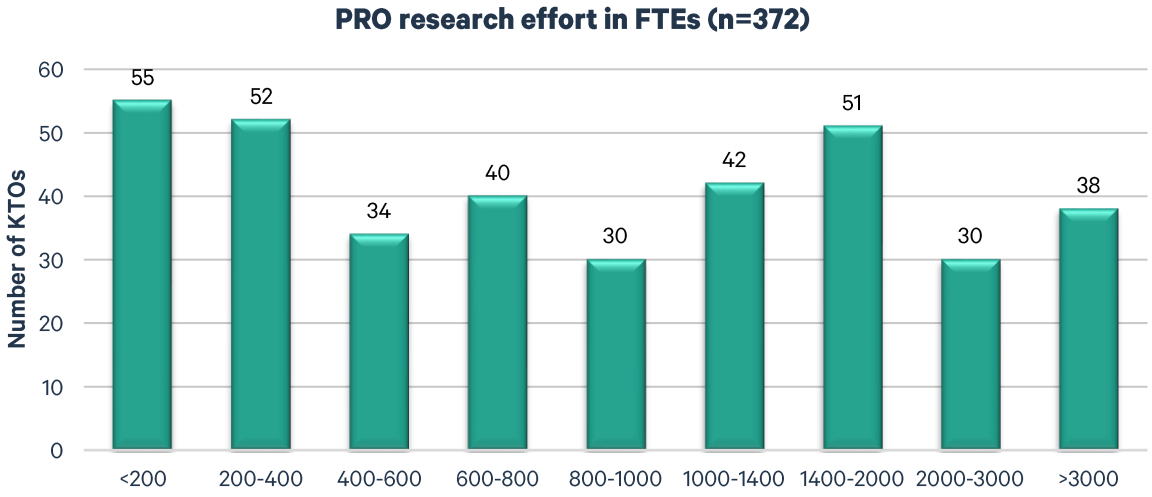


Figure 8: Distribution of PRO research effort in FTEs across responding KTOs

The last topic of interest regarding the KTOs themselves is the amount spent by the KTO (and/or the PRO) on IP protection (Figure 9). Though a small minority (less than 5%) of the KTOs have not spent any money on IP protection, most offices report spending at least some money on this, with around 30% of offices having spent a minimal amount of up to 50k€ on IP protection in FY2017.

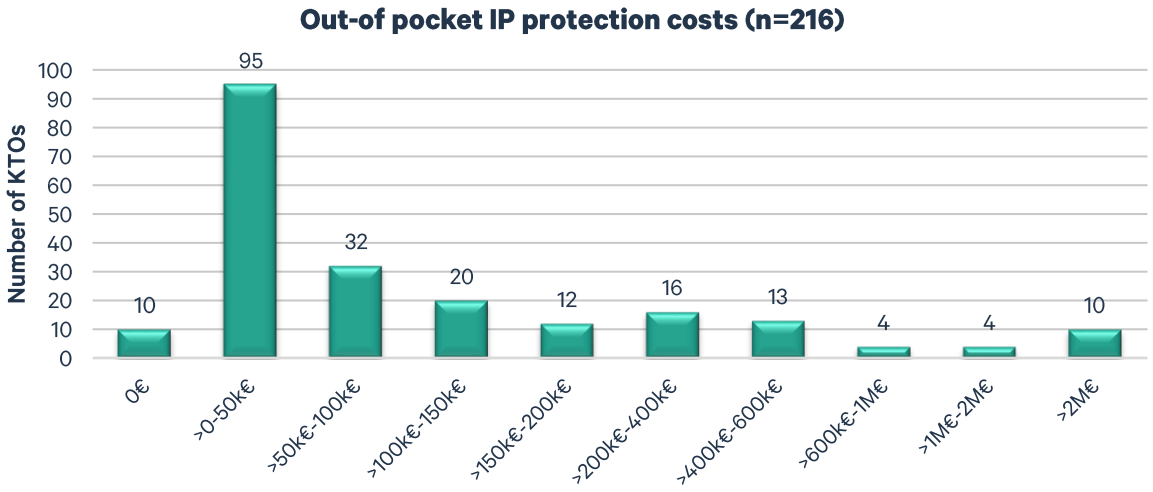


Figure 9: Distribution of out-of-pocket intellectual property protection costs across responding KTOs

3.2. Intellectual Property (IP)

IP management has always been a core activity of technology transfer offices, as it provides grounds for the commercialisation of research results. The output of the IP management activity are not only quantitative indicators, but they may also refer to the strategic focus of the PRO in terms of knowledge transfer. The present section provides an overview of intellectual property activities of the respondent KTOs.

The table below shows the total reported number of invention disclosures, priority patent applications and patents first granted to KTOs in FY2017[1]. It is worth noting 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 used in some of the datasets from national associations is not compatible with the definition used in the ASTP Survey). Only one quarter of the contributing KTOs reported on patents first granted.

Comparing with last year's same findings, we can see, that the total number of invention disclosures is similar to the data presented in FY2016, however the total number of priority patent applications is significantly lower (-18%) this year. Part of this decrease may be explained by the case of Spain, given the implementation of new patent law and the requirement for prior examination, having universities to pay for registration fees which they did not have to previously.

KTO's IP Activities	No. of responding KTOs (n)	Total
No. of invention disclosures	452	12,398
No. of priority patent applications	263	3,306
No. of patents first granted	125	1,577

Table 2: Total number of KTO's Intellectual Property Activities

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

We can see from the following graph, that 21% of KTOs reported not receiving invention disclosures at all during FY2017. The background analysis shows that most of these are active in the fields of Arts, Humanities, Business and Social Sciences (non-technological fields). Compared to FY2016, the pattern of the graph is largely similar, and the distribution has not changed significantly: one-third of the respondents received up to 10 invention disclosures, 10% of them received more than 60 disclosures and 34 KTOs received more than 90.

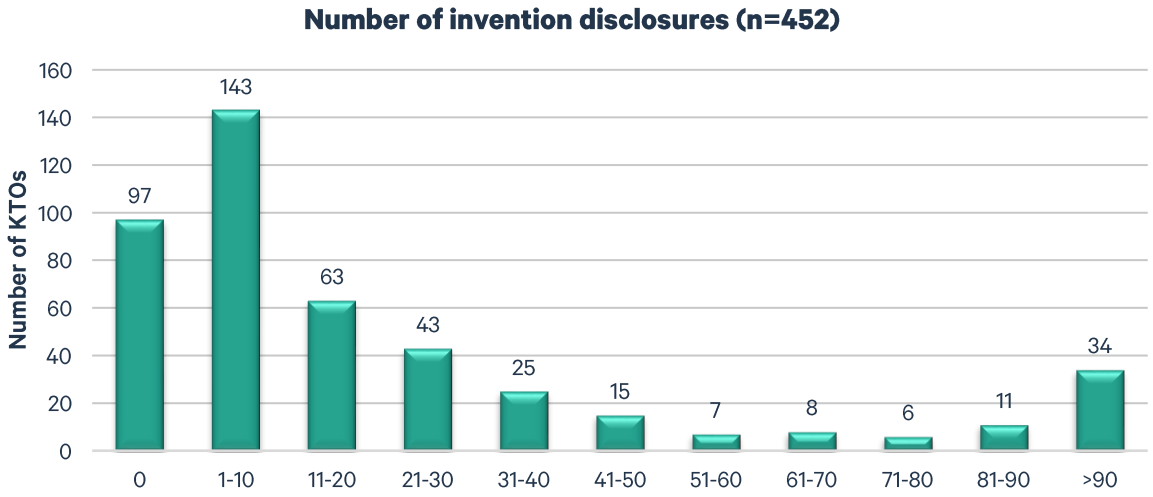


Figure 10: Distribution of the number of invention disclosures across responding KTOs

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 263 respondents, 12% have reported not filling a priority patent application in FY2017. Slightly more than half (54%) of the KTOs reported to have filed between 1-10 patent applications, which is considerably higher, than last year's same finding (+16%). One quarter of the respondents filed between 11-30 priority patent applications and only a relatively small number (5%) filed more than 50.

Compared to the FY2016 report, the graph shows a significant shift towards lower numbers: the number of respondents filing between 1-5 has nearly doubled. This may be explained by a lack of continuity among responding KTOs that took part in our survey.

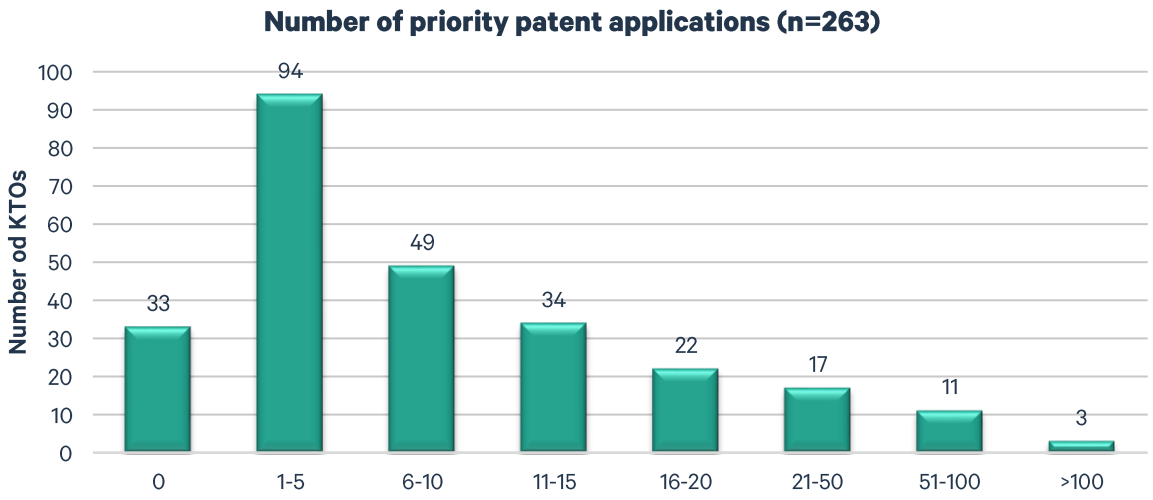


Figure 11: Distribution of the number of priority patent applications across responding KTOs

The following figure shows the number of patents first granted per KTO in FY2017. It is immediately clear that most respondents (36%) reported between 1-5 patents granted in that year. The distribution pattern has not changed significantly in the last couple of years: just as in the previous periods, only a few KTOs reported to have been granted over 50 patents in FY2017.

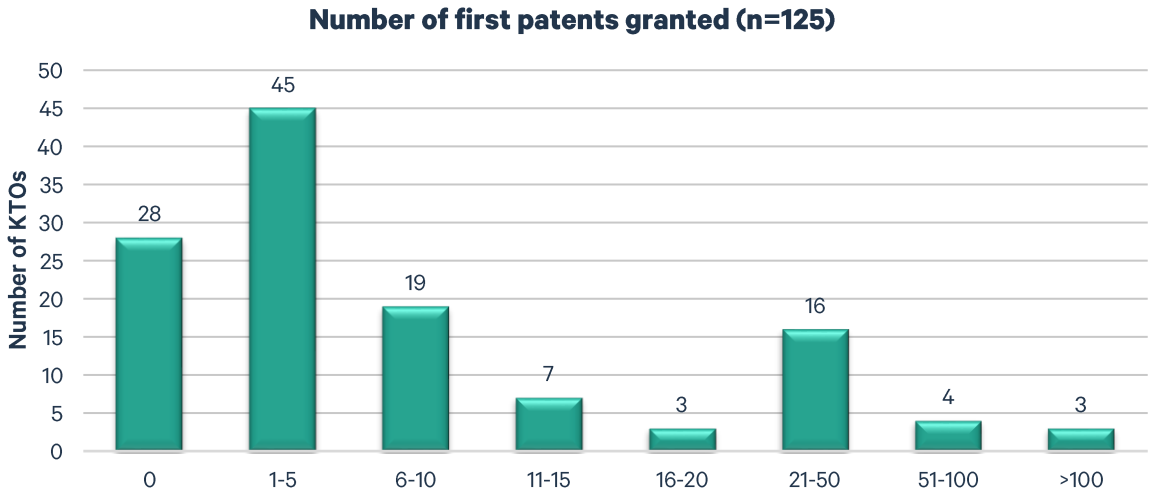


Figure 12: Distribution of the number of first patents granted across responding KTOs

The figure below shows the number of active patent families in the KTO's portfolio at the end of FY2017. A total of 209 KTOs reported 20,468 active patent families. Our findings suggest, that 41% of the reporting KTOs have a patent portfolio with 11-100 active patent families, while 18% have 1-10 active patent families. A relatively small fraction (12%) of the respondents reported zero active patent families, and 10 responding KTOs have more than 400 active patent families.

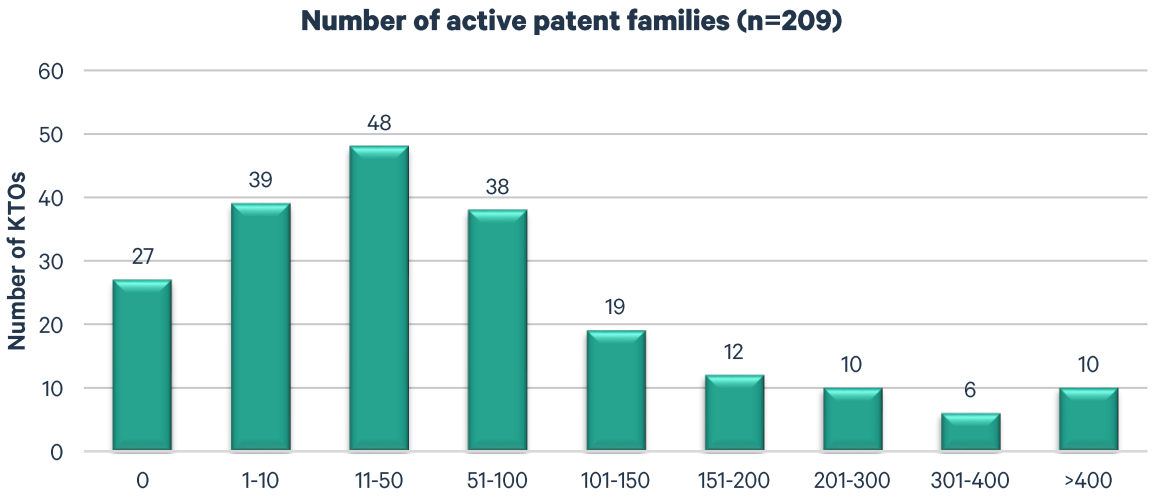


Figure 13: Distribution of the number of active patent families across KTOs' portfolio

The following graph shows the percentage of patent families per KTO licensed or optioned by the end of FY2017, showing the cumulative licensing activity until the end of 2017 (and not only the activity that took place in 2017). The number of responding KTOs is significantly lower than for the active patent families, since no compatible data on this metric was available from some of the national datasets.

Nearly one fourth of the responding KTOs has a patent portfolio with no license nor option. A significant fraction (41%) of the responding KTOs has licensed or optioned up to 20% 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. However, the percentage of licensed and optioned patents is likely to be higher for established IP portfolio as compared to rather "young" portfolios of entities just starting to build up an IP portfolio. Only 8% of the KTOs (n=11) reported having more than 50% of their portfolio licensed or optioned.

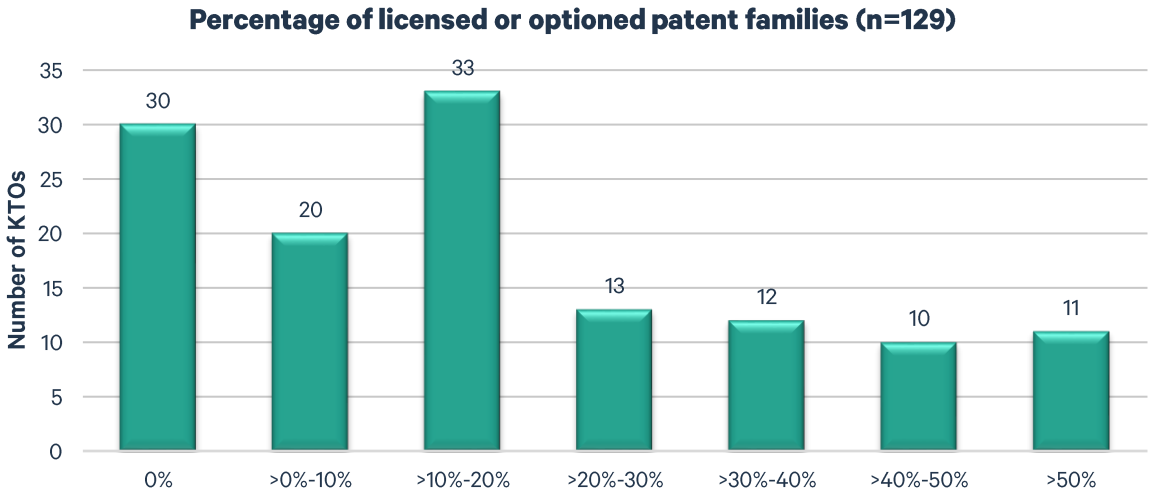


Figure 14: Distribution of the percentage of patent families in portfolio that are licensed or optioned across responding KTOs

The last graph in this section demonstrates the overall ratio of commercialised patent families: one quarter (25%) of the total number of active patent families reported by 129 KTOs were licensed or optioned by the end of FY2017 (3,318 out of 13,242).

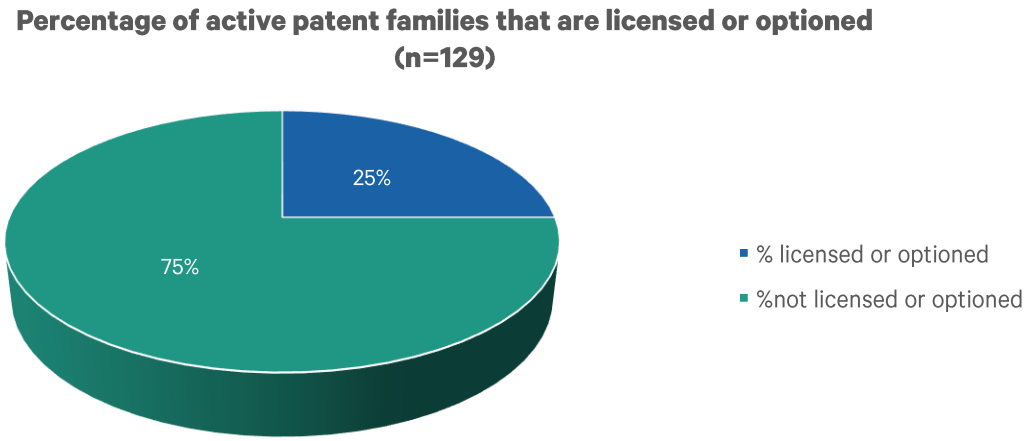


Figure 15: Percentage of patent families that are active at the end of FY2017 and are licensed or optioned

3.3. Agreements with Industry

In FY2017, European KTOs reported that a combined total of 171,136 agreements with industry have been concluded. A breakdown of these number across different industry agreement types are given in Table 3.

New industry agreements	No. of responding KTOs (n)	Total
Contract Research Agreements	335	60,779
Collaborative Research Agreements	179	8,965
Consultancy Agreements	264	101,392

Table 3: Overview of the number of contract research, collaborative research and consultancy agreements

In plain terms, consultancy agreements appear to be the most common form of engagement between academia and industry, with almost 60% of industry agreements being of this type. Least numerous (around 5%) are collaborative research agreements and contract research agreements representing the remaining 35%.

In terms of contract value, a different picture emerges: an impressive aggregate total of more than **2.8 billion Euros** is reported for the amount of money received for performing contract research in FY2017. Despite the relatively low number of collaborative research agreements reported, these agreements have in 2017 led to a combined 986M€ in turnover. For consultancy services, aggregate total payments of almost 640M€ were reported. However, the number might be higher as in quite some cases consultancy agreements are not an engagement with the academic institution and industry but with a private person.

Assuming that a) there is a significant overlap between the group of KTOs submitting data for the number of industry contracts and the group of KTOs submitting data for the amount received under such industry contracts and b) these two numbers are relatively constant year on year, one might be able to conclude that the average contract research agreement brings in almost €46,500 per year. Following the same logic, collaborative research agreements average a much greater total of almost €110,000 per contract per year. Though the most numerous in terms of the number of agreements concluded, consultancy agreements appear to generate more modest amounts of payment, around €6,300 per contract.

Income from Industry agreements	No. of responding KTOs (n)	Total (€)
Contract Research Agreements	327	2,825,855,770
Collaborative Research Agreements	161	985,584,437
Consultancy Agreements	235	639,822,118

Table 4: Income generated from research, collaborative and consultancy agreements

3.3.1. Contract Research Agreements

When looking at the distribution of the number of contract research agreements concluded by KTOs, it emerges that around 10% of KTOs (35/333) did not conclude any such contracts, whereas a slightly larger number (38/333 or more than 11%) concluded more than 400 contract research agreements in FY2017. We refer to Figure 16 for a further breakdown of the number of contract research agreements signed per KTO.

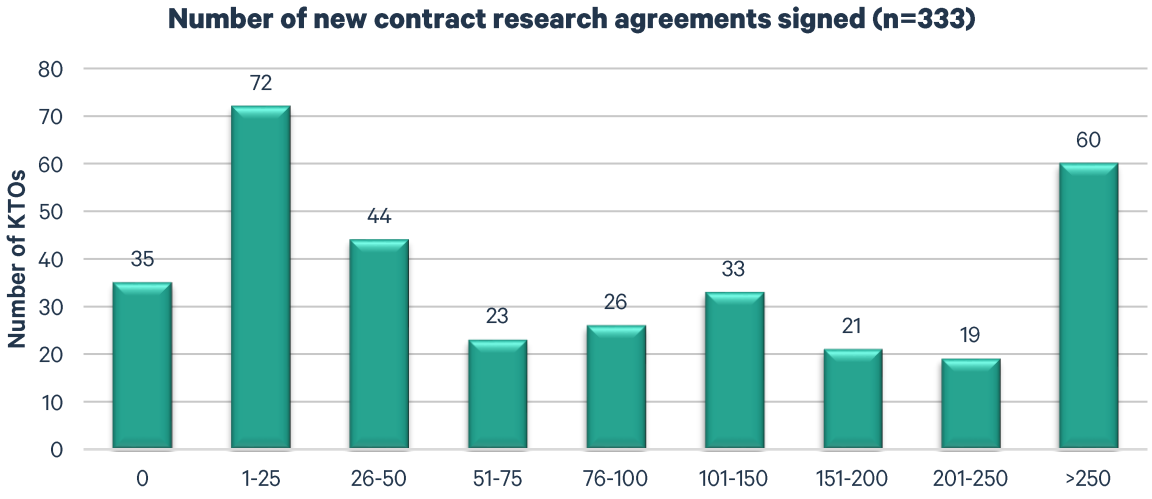


Figure 16: Distribution of the number of new contract research agreements signed across responding KTOs

3.3.2. Collaborative Research Agreements

The distribution of the number of collaborative research agreements signed in FY2017 across KTOs is shown in Figure 18. More than 91% of KTOs have concluded at least one such industry agreement in the course of FY2017, and around 10% of those even 100 or more agreements.

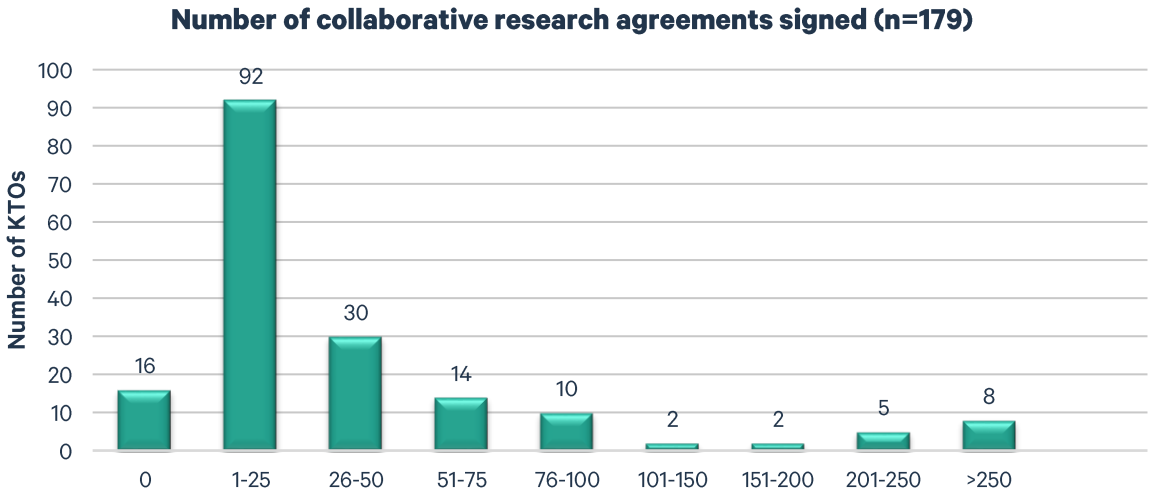


Figure 17: Distribution of the number of new collaborative research agreements signed across responding KTOs

3.3.3. Consultancy Agreements

The distribution of KTOs according to the number of consultancy agreements that they concluded in FY2017 is given in Figure 20. A small minority of KTOs (around 13%) report that they had not concluded any consultancy agreements within the given time frame. On the other side of the spectrum, there are 30 KTOs that report they have executed in excess of 500 consultancy contracts per year. The majority of KTOs concluded between 1-50 consultancy agreements in 2017.

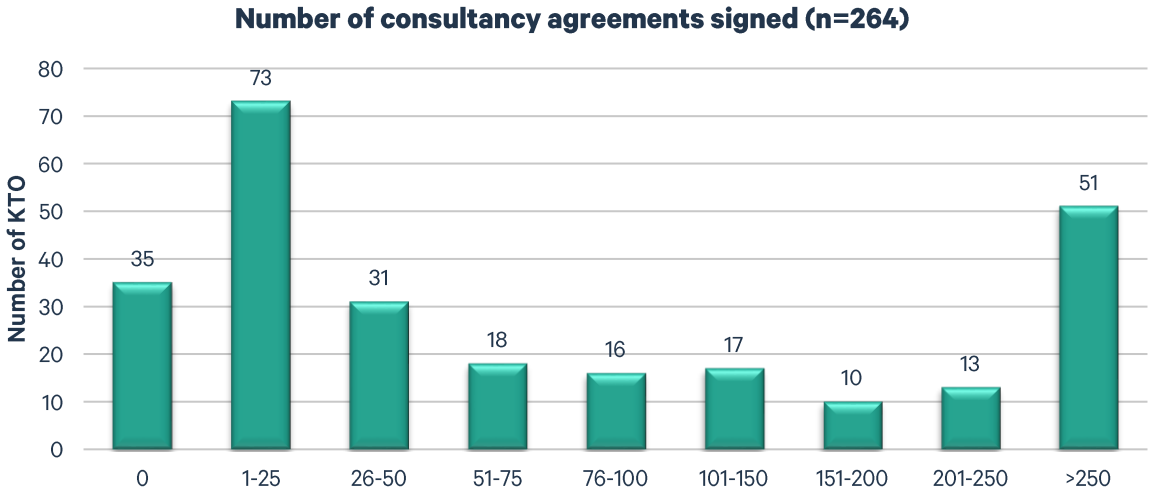


Figure 18: Distribution of the number of new consultancy agreements signed across responding KTOs

3.4. Commercial Contracts

The following section aims to provide information on the commercialisation of intellectual property by European KTOs.

Commercialisation can take a number of forms, the most common being a license agreement, which gives the license holder the right to practice under another party's intellectual property rights.

In addition to this, agreements on the transfer of ownership (assignment) and option agreements are commonly used tools as well – however much less frequently.

For licenses, we have separately asked for the number of licenses for software and for research material licenses as the former can push up the number of licenses to such an extent that it becomes hard to compare license output between different KTOs and the second because such licenses are quite common and relatively easy to conclude but do not directly lead to new products under development or on the market.

Commercial contract	Number of responding KTOs (n)	Total number of agreements signed
Licenses	413	55,375
Options	164	117
Assignments	164	192

License agreements	Number of responding KTOs (n)	Total number of agreements signed
Software licenses	240	37,650
Material licenses	151	675
Other licenses	413	17,050

Table 5: Overview of licenses, options and assignments signed

From the aggregate numbers in Table 5 above, it is abundantly clear that, among Licenses, Options and Assignments, License agreements are by far (>99%) the most common modus for commercialisation of technology/IP rights developed within academic centres across Europe. This conclusion does not change, even if the much lower number of respondents for data regarding Assignments and Options is considered (164 each vs 413 for Licenses).

3.4.1. License Agreements

The aggregate number of reported license agreements (excluding licenses for research materials and for software) of 17,050 is distributed over the 413 reporting organisations (Figure 19)

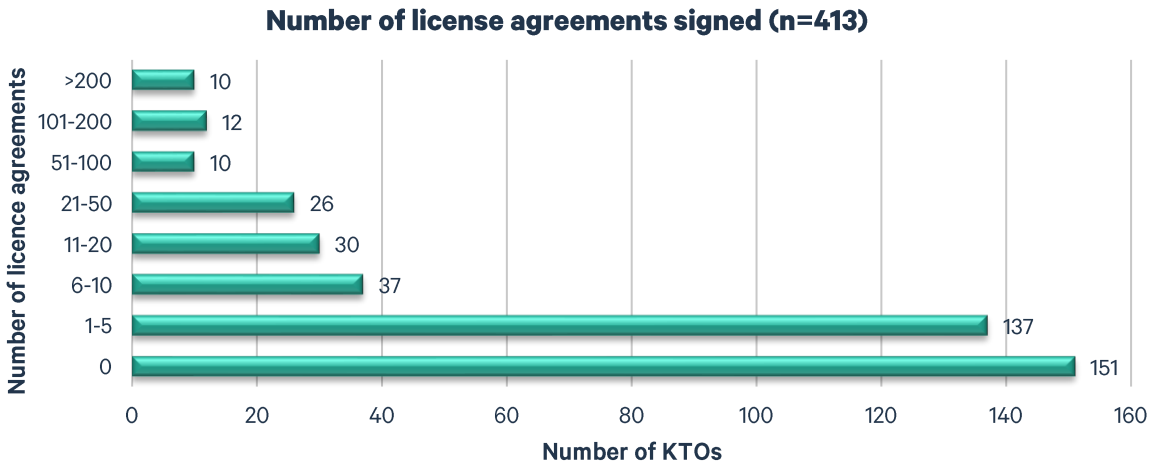


Figure 19: Distribution of the number of new license agreements signed (excluding research material and software) across responding KTOs

One thing that is not immediately obvious from this graph is that the distribution of license agreements over KTOs is vastly skewed. The majority of the >17,000 licenses are concluded by only 10 KTOs. In fact, it can be stated that the top 10 KTOs have concluded a much greater number of license agreements than all the others (400+) combined. We shall suppose that despite the figures collected do not include MTAs and software licenses, some KTO may take into account some very particular business-model related licences.

On the other hand, a large (36%) number of KTOs report that they have not concluded a single license agreement in FY2017. It remains possible, of course, that these KTOs did conclude licenses for software or research materials as well as options or assignment agreements since these subcategories were not taken into consideration for this analysis.

Despite being used relatively infrequently, hundreds of licenses for research materials were reportedly concluded in FY2017. Figure 20 provides a graphical presentation of the distribution of the number of licenses per KTO across all 151 reporting organisations.

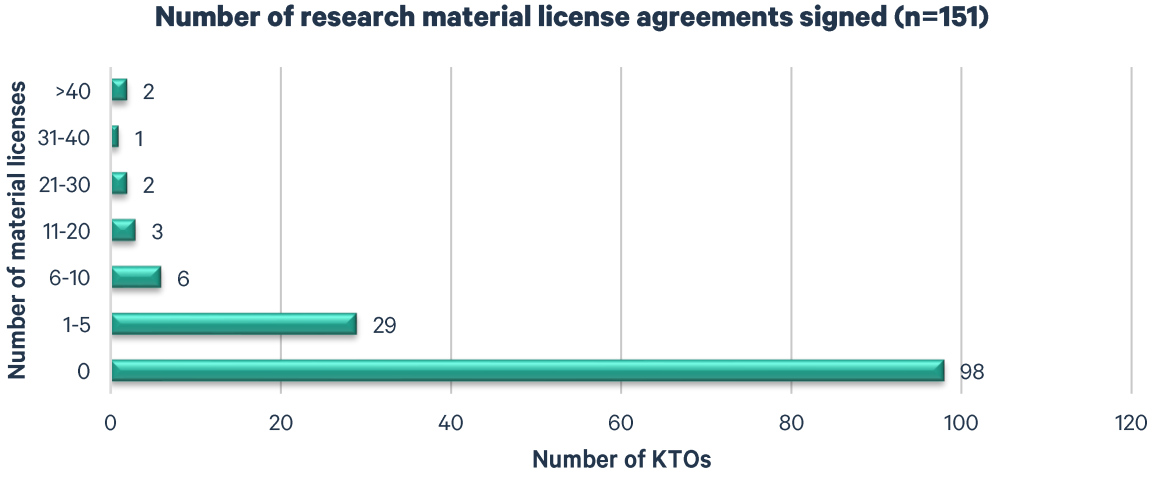


Figure 20: Distribution of the number of new material license agreements signed across responding KTOs

It can be concluded that the majority of KTOs (98/151 or 65%) have not concluded any such licenses, and only a handful have concluded more than 10 in the reporting year.

3.4.2. Software Licence Agreements

Since software is often licensed on a non-exclusive basis to end-users, they can be very easy to conclude (e.g. by clicking on an "I accept" button before download and installation) and usually do not involve negotiations on standardized license terms. Popular software can in this way easily be licensed to hundreds, thousands or even more users, without requiring much additional effort from the KTO for that, which is necessary to conclude the first license. Such high numbers can greatly skew the total number of licenses concluded by a KTO, making it difficult to compare output of KTOs that have concluded software licenses with those that have not, which is why ASTP ask separately for the number of software licenses that have been concluded.

The following graph presents the distribution of software licenses concluded per KTO across all KTOs in 2017.

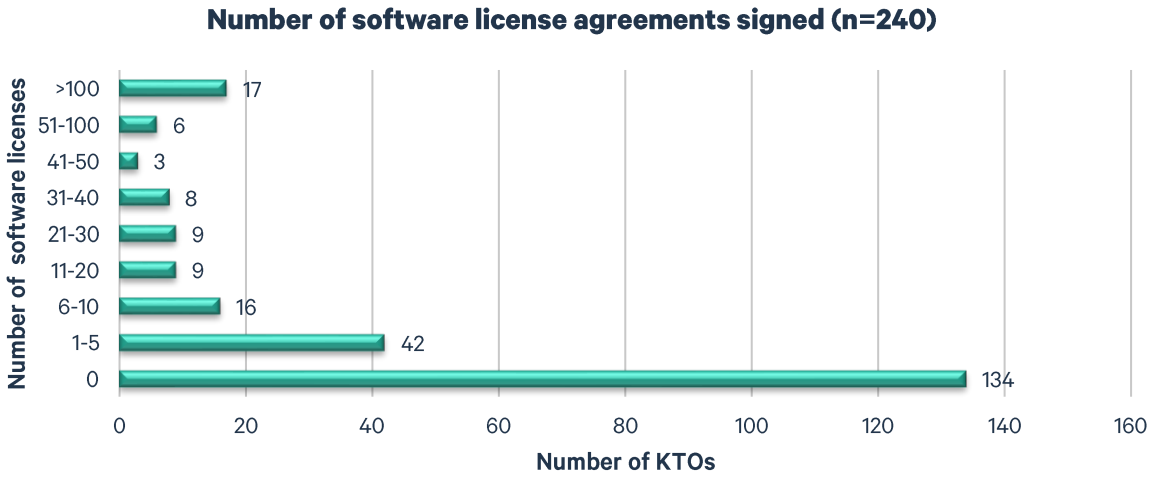


Figure 21: Distribution of the number of new software license agreements signed across responding KTOs

The conclusion drawn from this is that the majority of KTOs (134/240 or 56%) have not concluded any software licenses in FY2017. On the other hand, a significant number of KTOs (52/240 or 22%) declare concluding more than 10 in the reporting year. Since the aggregate number of software licenses reported is 37,650 (see Table 4), it figures that the 17 KTOs that report having concluded more than 100 software licenses each will have jointly concluded around 36,000, an average of more than 2,000 for each of these 17 organisations. Even for software licenses, where we might expect (much) higher numbers than for licenses to other technology/IP, the numbers are vastly skewed towards a few extreme outliers.

3.4.3. Option Agreements

As in previous years, relatively few KTOs record concluding an option agreement, that is often used to provide an evaluation period to prospective licensees during which they can test-drive the technology and determine whether it is fit for the purpose they have in minds. From the data presented in Figure 22 below, it is apparent that the large majority (123/162 or 76%) of reporting organisations have not concluded any option agreement in FY2017.

In all, an aggregate of only 117 option agreements were reported to have been concluded, and the number of reporting organisations (162) is relatively low, reflective of a lack of tracking the number of contracts for this type of agreement.

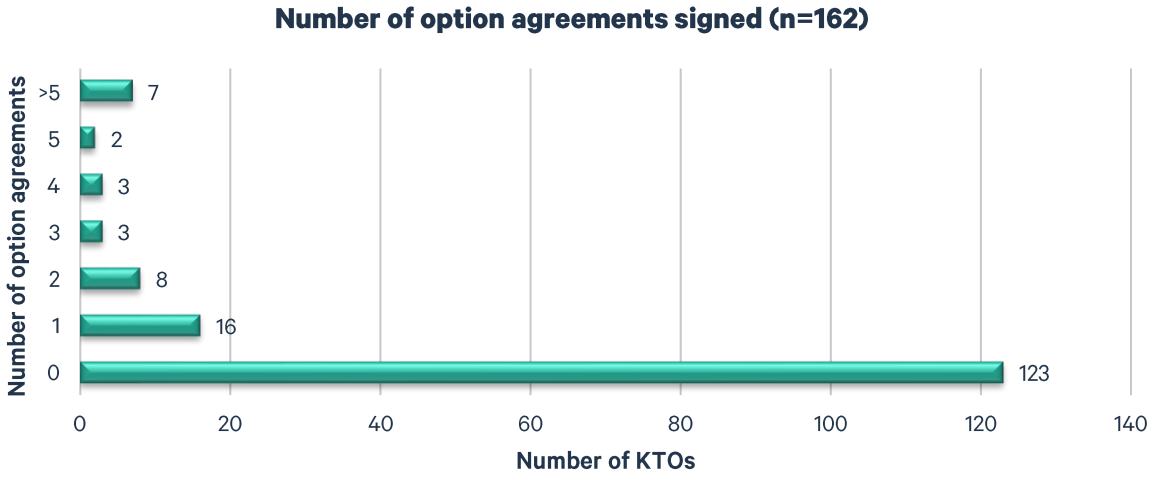


Figure 22: Distribution of the number of new option agreements signed across responding KTOs

3.4.4. Assignment Agreements

Assignment agreements arrange for the transfer of ownership of certain property from one party to another. In the context of knowledge transfer, this usually relates to the transfer of intellectual property rights (mainly patent rights and copyright). As a result, a lot, if not all control over such rights is lost by the assigning party. Due to this, assignment is not often used as a tool in the commercialisation arsenal of a KTO. Nevertheless, we received reports that total 192 assignment contracts, the distribution of which per KTO (across all reporting KTOs) is given in Figure 23. In line with the data that was received for FY2016, again it is shown that a large majority of 69% of KTOs have not concluded any assignments in FY2017.

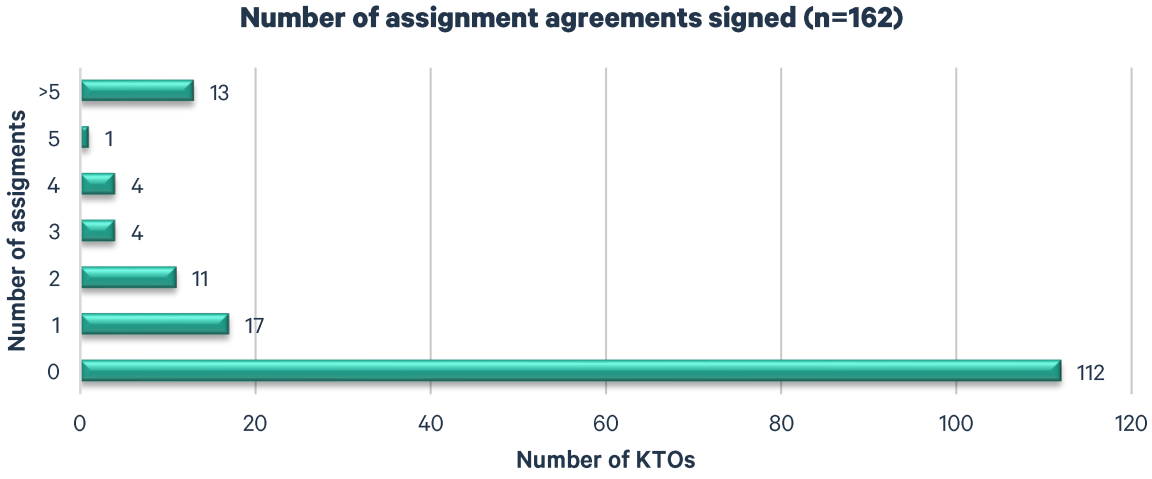


Figure 23: Distribution of the number of new assignment agreements signed across responding KTOs

3.5. Commercial Revenues from IP

The table below presents some aggregate numbers that ASTP has collected on the overall revenue from licensing IP and for a number of revenue types.

An impressive aggregate total of 458 million Euro in commercial revenues from IP has been reported for FY2017 by a total of 404 respondents. This metric is one of the most frequently reported, with more than 85% of KTOs (404/475) submitting an answer. A significant fraction of this number (28%) consists of revenues from patent licenses, although the much lower number of respondents to this question (153 as opposed to 404) suggests that

the actual fraction of total commercial revenue that is made up of revenues from patent licenses could (and would be expected to) be much higher.

Another major revenue type included in the 458M€ aggregate total comes from the sale of equity in spin-off and/or start-up companies. Here, almost 53M€ is reported to have been received in FY2017 (11.5% of total).

IP Revenues	Number of responding KTOs (n)	Total (€)
Gross revenues from IP	404	458,001,826
Gross revenues from patent licenses	153	128,352,525
Running royalties revenues	58	42,177,042
Cashed-in equity	284	52,864,094

Table 6: Total amount of gross revenues from commercialisation of IP

If we zoom in on the distribution of gross revenues from IP across KTOs, almost one-third (33%) of KTOs do not have any revenues from the commercialisation of IP and another 27% report revenues of 50k€ or less. 60 KTOs (or around 15% of respondents) report income in FY2017 in excess of 1M€. It is unfortunate that insufficient information was collected on the size of the research effort of the PROs connected to these KTOs that would allow for the normalisation of these numbers and let them be expressed as e.g. 'gross revenues from IP/100M€ research expenditure'.

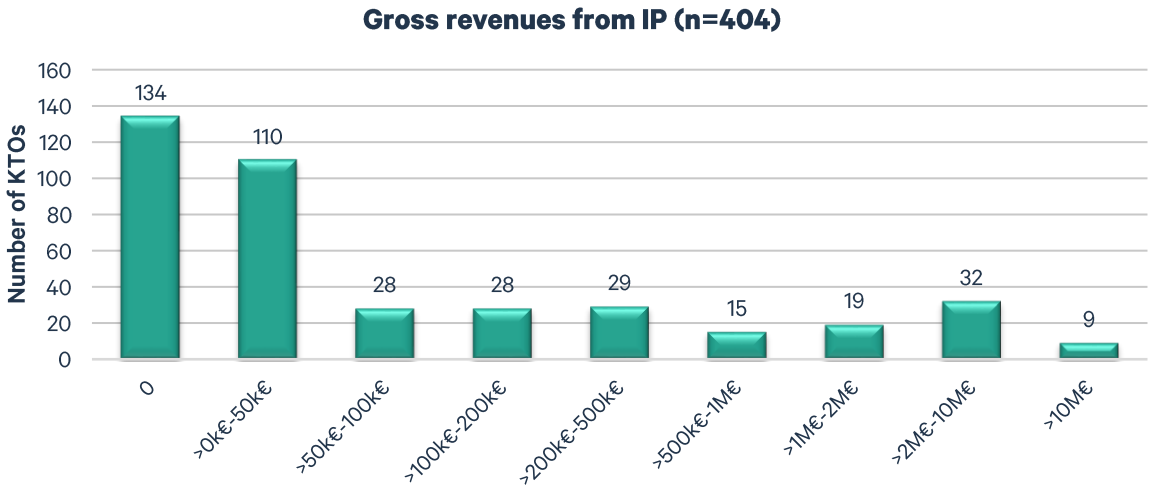


Figure 24: Distribution of gross revenues generated from IP across responding KTOs

3.5.1. Patent licenses

Since patents are a very prominent method that KTOs use to protect IP, which provide broad protection as well as enhancing value. It could be assumed that a very sizeable fraction of the total reported gross revenues from IP would consist of revenues obtained under patent licenses. Unfortunately, due to the much lower number of responses to this specific question, it remains unclear exactly what fraction of the total reported revenues consists of income from patent licenses.

Again, almost a third of respondents report no income from patent licenses but here only 13 KTOs report having received more than 500k€ in income from patent licenses (as opposed to 75 KTOs that report having received more than 500k€ total gross revenues from IP in the year). We suspect that the actual numbers would be much higher if all KTOs that report on the total gross revenues from IP would also report their income under patent licenses in the year.

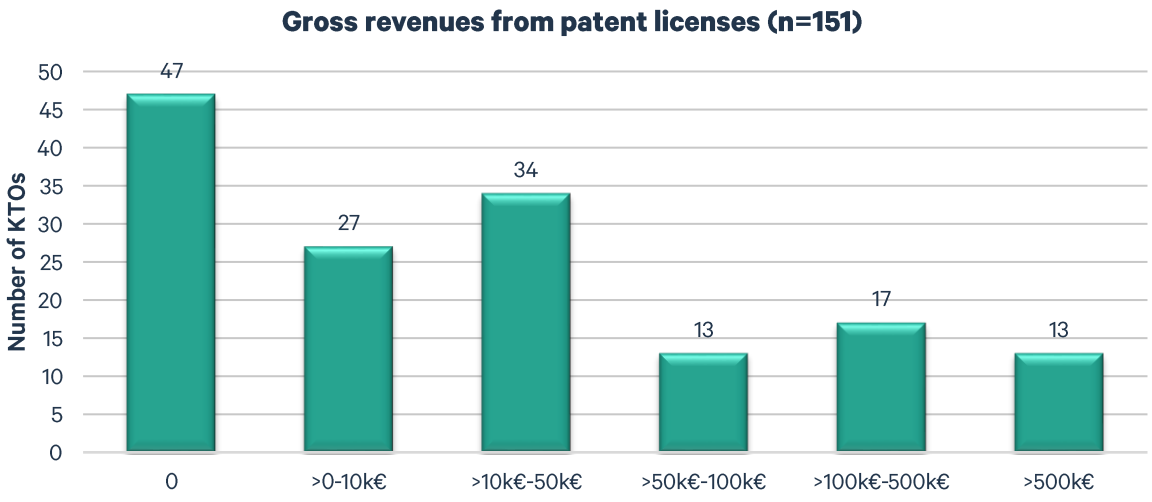


Figure 25: Distribution of gross revenues generated from patent licenses across responding KTOs

3.5.2. Running royalties

Running royalties represent income that is tied to the turnover of product sold (directly or indirectly) by a licensee. The product in this case does not need to be something physical; it could also refer to services being provided. The distribution of income over the KTOs reporting on this metric is presented in the graph below. As running royalties correlate with product success, they are as indicator of impact, related to goods or services for the benefit of society and employees engaged in generating such revenue.

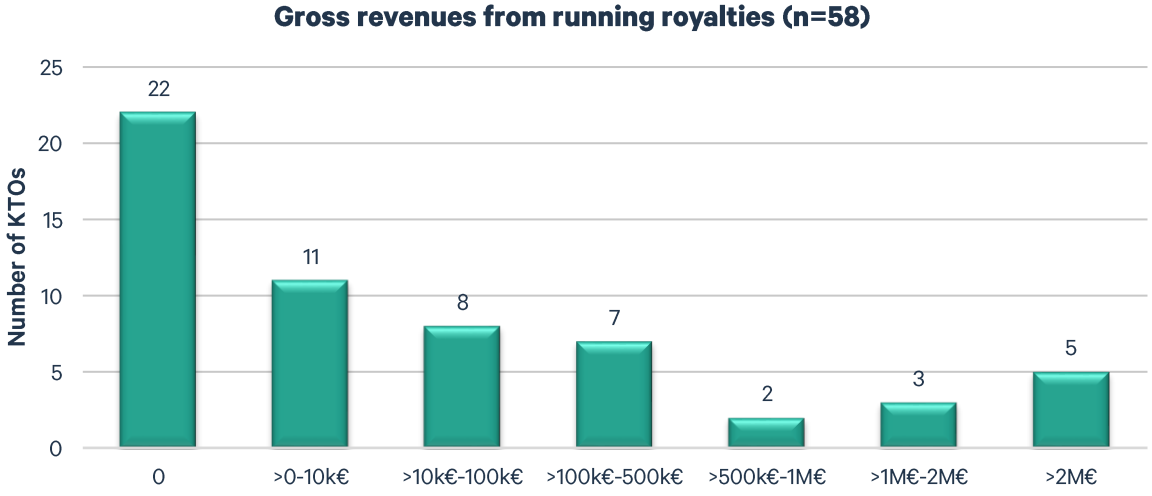


Figure 26: Distribution of gross revenues generated from running royalties across responding KTOs

3.5.3. Cashed-in equity

When IP is licensed or transferred (assigned) to a third party, a common form of compensation – especially in the context of spin-off companies – is in the form of equity (shares in the company that gains access to the IP). However, many PROs do not take direct equity participations (for structural, legal or strategic reasons) and as a result do not have a chance to net income from participations.

The compensation can be monetized upon sale of these shares, either as part of a trade sale of the company (which is most common), or after a company has been floated on a stock exchange or by dividends distribution.

Out of 281 respondents, 248 KTOs reported zero cashing in equity and 33 reported cashed in equity. In the graph below, the distribution of revenues from cashed-in equity across these 33 KTOs is presented. Of those that did

report income, around half of respondents received less than 500k€, whereas the other half received more than 500k€.

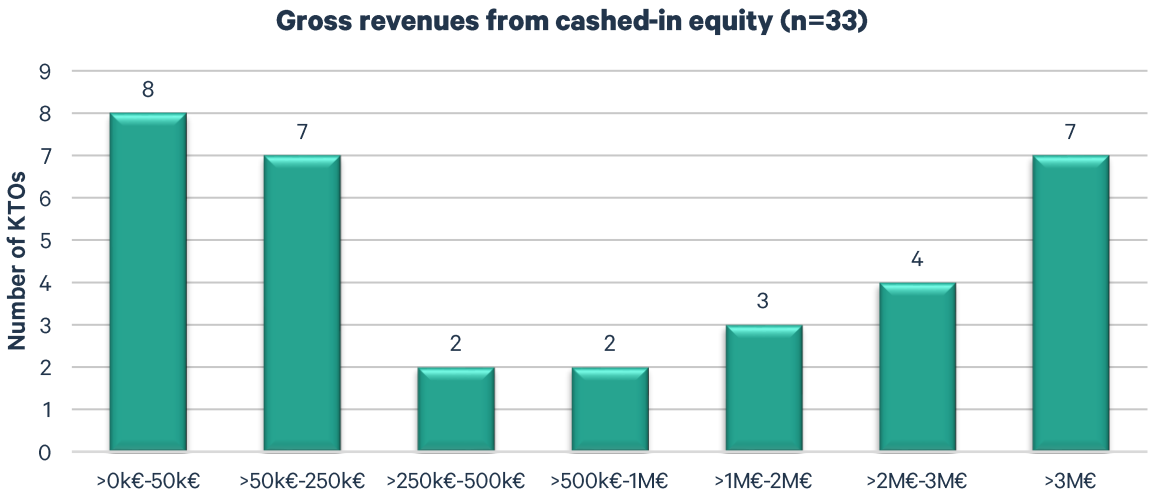


Figure 27: Distribution of gross revenues from cashed-in equity across KTOs reporting a value above 0

3.6. Spin-offs and Start-ups

New company creation is a focus of many KTOs, often supported or even driven by governmental policies that aim to stimulate such activity. For the purpose of output measurement, we distinguish between (1) companies that have a formal agreement with the KTO or PRO to use intellectual property developed at the PRO for the development of new products or services (spin-offs) and (2) companies that do not rely on such intellectual property or formal use agreement (start-ups). This distinction is important because spin-offs relate to the output of research performed by the PRO, whereas start-ups do not. The latter are often started by students rather than by PRO personnel, although some start-ups build on existing activities within a PRO and expand these activities to third parties on a commercial basis.

When looking at the table below, it is hard to escape the fact that start-ups are much (almost 10x) more numerous than spin-offs. Since start-ups, by definition, do not use IP developed at the originating PRO, their numbers are not expected to have a direct relationship with the size of the research effort that is performed within such PRO. Unfortunately, due to the lack of data regarding the size of the research effort, this hypothesis cannot be tested (nor can the hypothesis that spin-offs do have such a relationship).

It might be interesting for future surveys to look into the effort dedicated to support new business creation within PROs (such as training or incubator programs, dedicated staff, etc.) and the output in terms of the number of spin-offs and start-ups. The sustainability of these businesses remains a question though. Will they attract sufficient investment, will they be profitable long-term, will they provide high value employment opportunities?

	Number of responding KTOs (n)	Total number created
Spin-offs	359	486
Start-ups	336	4,676

Table 7: Overview of the number of spin-offs and start-ups created

When looking at the distribution of spin-off creation across KTOs, it becomes apparent that 60% of KTOs reported that they did not create any spin-offs in FY2017. The remaining KTOs mostly generated one or a handful of

companies in that year, with only a small number (20/359 or a little more than 5%) of KTOs reporting 6 or more spin-offs per year.

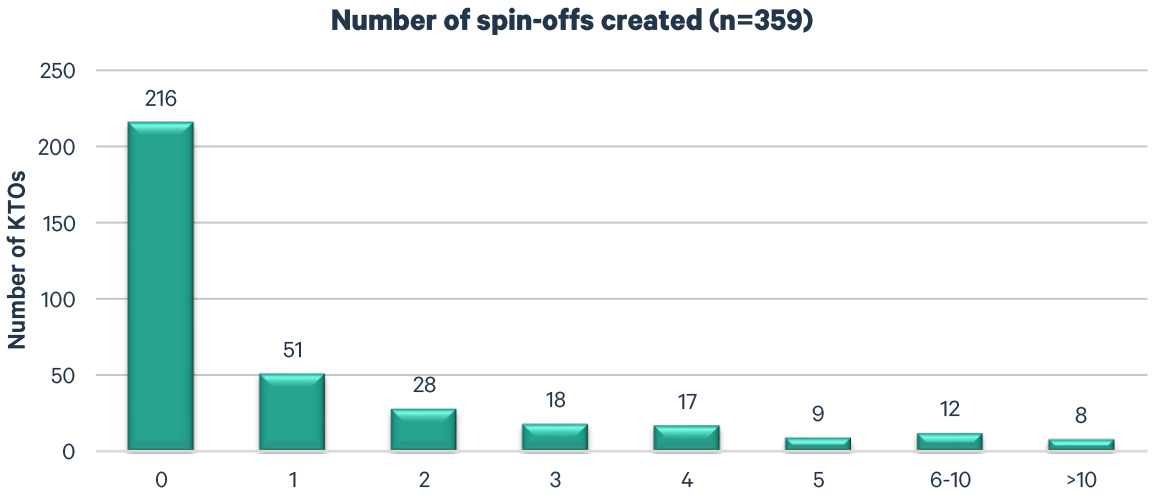


Figure 28: Distribution of the number of spin-offs created across responding KTOs

In addition, the distribution of start-ups reported by different KTOs looks to be similar overall, with just under half of the KTOs reporting zero start-ups in the year. Here, however, a full 110 (or 33% of) KTOs report having supported the creation of 6 or more start-ups, with quite a few KTOs supporting more than 50.

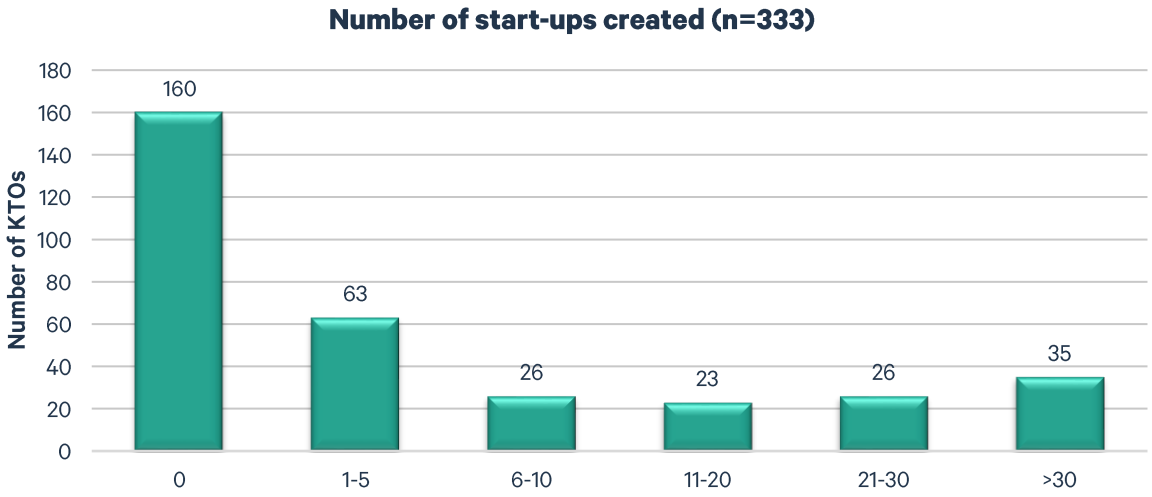


Figure 29: Distribution of the number of start-ups created across responding KTOs

3.6.1. Staff in Existing Spin-offs

This metric provides a snapshot of the impact (in terms of employees) that spin-offs have on the local economy. The numbers quoted here are expected to have been built over the course of many years and will primarily reflect the past activity of the KTO in creating spin-offs. It seems significant that almost half of the KTOs report not knowing of any staff that is employed by spin-offs that have been supported by the KTO. The easiest explanation would be that this concerns those KTOs that created zero spin-offs in FY2017. Since this is a snapshot of past activity going back many years, it would also suggest that these KTOs have not created any spin-offs in previous years either. For those KTOs that do report the employment of staff with their spin-off companies, quite a few have

created in excess of 100 jobs across all of their spin-offs, which should be lauded as quite an achievement even if this should be seen as a company success more than that of the KTO (or PRO) itself.

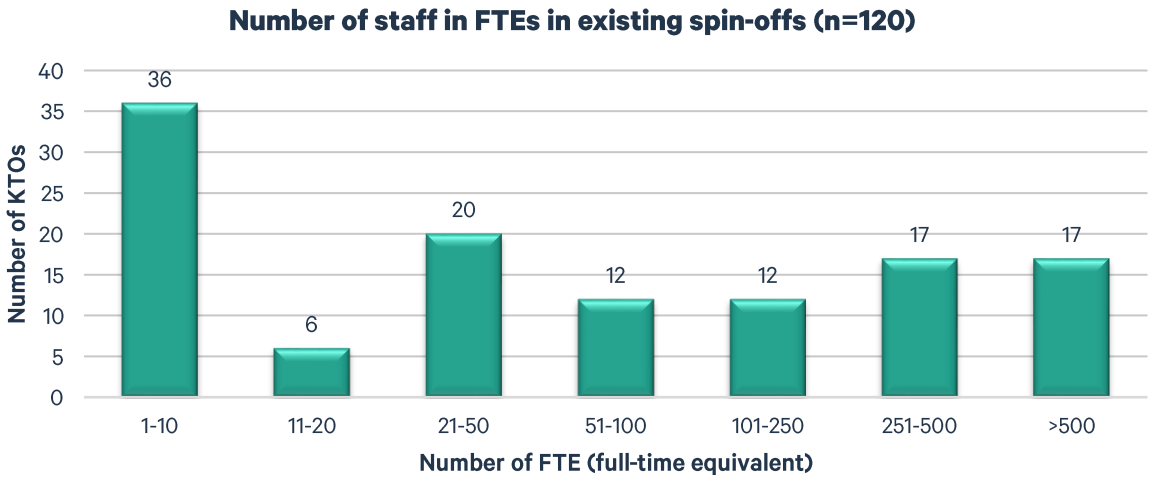


Figure 30: Distribution of the number of staff in FTEs in existing spin-offs across responding KTOs

4. Way Forward

It is an important concern and indeed ambition of the ASTP Survey committee to not only present the collected data, but also explore ways to gain further insights and create additional value for survey respondents and the wider KT community in Europe. Consequently, last year's report (in 2018 with data on FY2016) contained not only a chapter presenting the data, but also one which focused on data analysis. It was the result of the work of subcommittees of the ASTP Survey Committee.

The data analysis chapter in last year's report focused on two streams of work; namely longitudinal and ratio analysis. The latter was continued over the course of 2019 and culminated in a cluster study (see section 2). It has been complemented this year with two additional activities: the first concerns the development of a tool which enables the creation of an individualised report for each KTO that participated in the ASTP Survey (section 1). The second addresses the questions on KTO impact measurement, based on the data received in the FY2016 and FY2017 Surveys (section 3).

If you would have any feedback or suggestions regarding any of the initiatives presented below, please contact us via survey@astp4kt.eu

4.1. Individual Feedback Report

The ASTP Survey Committee has developed a software tool that enables the creation of an individual report in a standardised format for each KTO that has submitted data to the annual ASTP KT Survey. The report contains a number of metrics (or ratio's) using data submitted in the respective the survey. The data reported of individual offices is presented next to the data of all other KT offices for which data has been collected on the respective metric. This is presented as a box plot, meaning that it will only give information on a dataset at an aggregate level. Individualized reports are specific to an individual KT office and will not be shared with or be made available to any other organisation.

The primary aim of the ASTP Survey Committee with this personalised report is to acknowledge KTOs' contribution to the ASTP Survey by providing them with a service in return for their efforts to complete the survey which enables them to analyse their metrics in relation to the European KTO community. A secondary aspect might be that it acts as incentive, motivating participation in the annual ASTP Survey and improving completion levels.

In the example below, the individual KTO appears in blue and can analyse its situation compared to the rest of the ASTP data set, in orange.

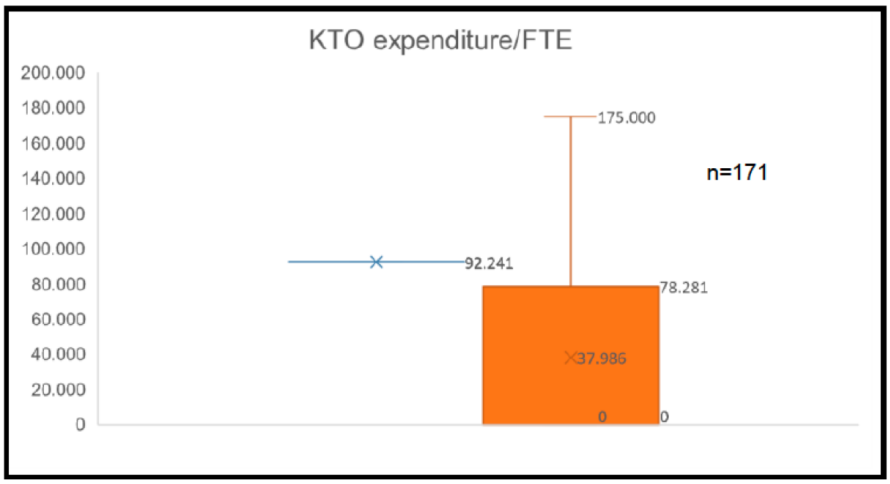


Figure 31: Example of individual report graph

The individual feedback reports are using boxplots. 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.

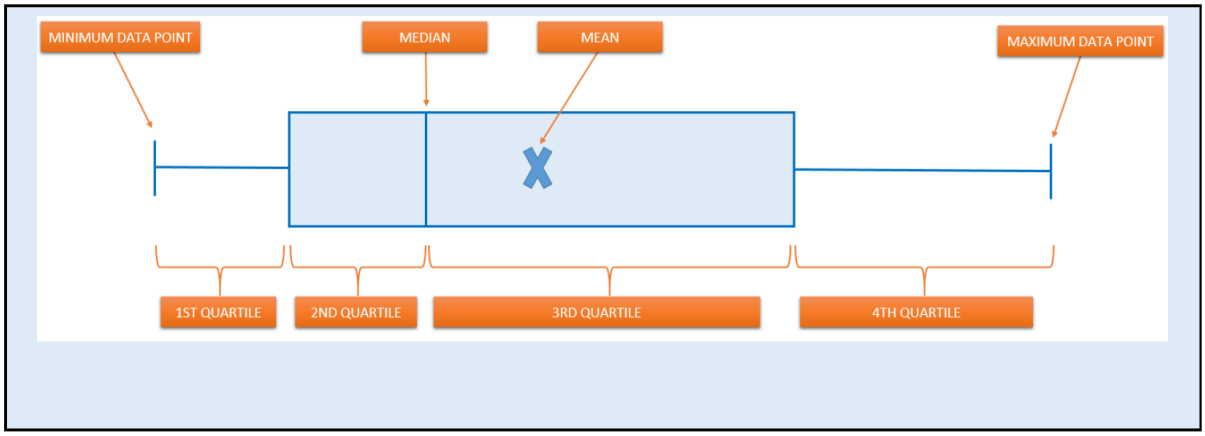


Figure 32: How to read a box plot

4.2. Advanced Metric Analysis - Cluster Study for the Creation of KTO Peer Groups

The ASTP report shows the diversity of the European KTO landscape and this work strives to enable the creation of KTO peer groups - transnational groups of organisations with similar activity metrics – which is a prerequisite for effective performance studies, such as benchmarking, bench-learning and the sharing of best practices for informed decision making on strategic, tactical and operation aspects. The creation of these peer groups has not been possible thus far, due to the lack of adequate approaches. As a result, the standard practice for KTO comparisons in Europe has been the use of national datasets and the normalisation of KT metrics to research spending, then to use these as national and international comparators. Depending on the intent, there is value in following this approach. However, comparing KT activity by simply normalising the KT metrics to research expenditure is somewhat crude and fails to account for fundamental differences in PRO type, national innovation programmes, and available budgets and other confounding factors. Plus, the issue has remained that European KTOs face difficulties in finding their peers - who might be in countries other than their own.

A solution has been developed to address this, tapping into the potential of the unique transnational ASTP dataset: an approach for the creation of groups of similar European KTOs was developed and tested in a cluster study. It built upon the ratio-based approach presented in the "New metrics: ratio analysis" section in the ASTP 2018 report (on pages 29-34)[2] as well as a specific clustering method that was tested for its suitability in this context.[3] At the core, the study proposes a set of ten indicators with which to conduct a cluster analysis. These indicators are summarised in a conceptual framework - 'KTO DNA' – with four conceptual dimensions. Each dimension represents a key KTO characteristic which captures the key factors that determine the level of KT activity. The framework is depicted in the following figure 33[4].

[2] See also: Scanlan, J. (2018), "A capability maturity framework for knowledge transfer", Industry and Higher Education. 32(4), pp 235-244.

[3] Kreiling, L. (2018). *Comparing European knowledge transfer organisations – development of a clustering method.* Presented at the World Open Innovation Conference, Berkeley, USA.

[4] Kreiling, L., Scanlan, J. (2020), "A European clustering study with Knowledge Transfer Office DNA", International Journal of Intellectual Property Management (forthcoming)

Dimensions	Indicator	(Ratio-)variables	Description
KT Budget	1. Available budget for salary and all operational costs per KTO employee 2. Budget available for IP protection	1. KTO_GEX/ KTO_FTE 2. KTO_IP / KTO_GEX	1. KTO annual expenditure per KTO employee 2. IP expenditure to total KTO expenditure
Internal KT culture	3. Importance of IP developement 4. KT commitment 5. KT embedded in university 6. Level of applied research at RPO	3. PAT/PRO_REX 4. KTO_FTE / PRO_REX 5. IDF / PRO_REX 6.No.IAGR / PRO_REX	3. Patents granted to total research expenditure 4. Staff dedicated to KT to total research expenditure 5. Invention disclosures to research expenditure 6. Industry expenditure to total research expenditure
External KT Ecosystem	7. Entrepreneurship culture to invest in ideas 8. Engagement of local industry in KT	7. SO / LOA 8. No.IAGR / LOA	7. Spin-offs created to total license deals with industry 8. Industry agreements to total license deals with industry
KT Office	9. A proxy for KTO experience 10. Institutional form	9. Age 10. KTO type	9. Years since creation 10. KTO in RPO or external KT company

Figure 33: Presentation of the Framework 'KTO DNA'

As the above figure shows, the four conceptual dimensions in the framework are: available budget to support KT, internal KT culture, external KT ecosystem, KTO structural characteristics. 10 indicators are describing the dimensions. Each dimension consists of two, except for 'internal KT culture' which is associated with 4 'ratio-variables'. In total, 8 'ratio-variables' were deployed and raw metrics were only used for the dimension on structural characteristics of the 'KTO'.

The 'KTO DNA' framework was validated with KTO professionals and tested in a study which used a dataset of 37 European KTOs. In fact, the lack of consistent data was an obstacle that had to be overcome at several points in the study. The use of complete datasets only was a prerequisite for the clustering algorithm, and it was refrained from imputing missing data. The issue of missing data also influenced the development of the conceptual framework in that certain metrics from the initial database, namely 'income from industry agreements', 'number of software licenses' and 'full-time equivalents in the research institution' could not be included in the final framework, because the available data lacked sufficient information on these metrics at the time.

Consequently, there is ample room for development and future work. There is no doubt that the continued use of the proposed 'KTO DNA' framework will be beneficial for KTO practitioners. It will not only enable the creation of an individual profile for the KTO, but in the establishment of an understanding on KTO characteristics and their relationship with organisational performance and ecosystem parameters. The vision that European KTOs will be able to meet with their peers and exchange best practices has strongly motivated this work which will be continued in the future, unfolding its full potential with more complete datasets and an openness of the European KT community for benchmarking and bench-learning.

4.3. Knowledge Transfer Impact Measurement at KTO Level

As the Third Mission of PROs has gained importance in the past years some KTOs are moving toward "Third Mission Services". Meanwhile, the European Commission and several countries have begun to set systematic impact assessment at project, lab or institution level. In this context, the ASTP Survey Committee was interested in understanding how impact of KT activities is or could be measured in KTOs.

Two open questions have been added in the online surveys, which were conducted in 2018 and 2019 to capture current practices and further ideas:

- Which parameters have you been, or are you currently using for assessing the impact (socio-economic, environmental, territorial) of your KT activities?
- Which parameters do you think should be used and are more relevant for assessing the impact (socio-economic, environmental, and territorial) of your KT activities?

Responding KTOs

These questions are specific to ASTP survey. Therefore, only KTOs that answered directly the ASTP online survey were able to provide inputs, and National Association data set did not provide any input.

Out of the 91 responding KTOs to the FY2017 ASTP survey, 53 answered the impact questions (59%). Five KTOs did not propose any indicators but rather commented on the question or stated that this matter is not a topic for

their KTOs. This means that 48 KTOs from 22 countries provided propositions for existing or new indicators on KT impact.

In the previous survey on FY2016 data, the response rate was very similar (54% of the participants to the online survey). The proposed indicators were also similar, drawing the same patterns.

A wide set of proposed parameters

The indicator propositions cover a wide range of KTO activities. It appears surprisingly that most of them are close to 'established' indicators already used by the profession. This can be explained by the fact that KT is already an impact related activity for PROs and most of the KTOs directly responding to the ASTP survey come from an area with no long history of regular annual surveys.

We identified 205 propositions of indicators. The most popular ones are the following: Commercialised IP/LOAs were mentioned 27 times, company creation 24 times just as patent management (patent application, filed or granted). Regarding collaboration, 13 indicators were proposed counting the number of agreements and 10 the revenue generated.

It is valuable to notice that even though impact usually requests narrative in the research assessment field, case study, success stories or other publications only represented 3% of the propositions. 24% of the proposed indicators are monetary ones and 73% numeric ones. Among those, only 3 propositions are ratios (conversion of IDF to patent, or patent to licences and success rate in EU collaborative projects).

Some of the proposed indicators could be considered as infrastructure or input indicators rather than as impact ones (existing policies, KTO operational budget). They are integrated in the "others" category in the diagram below.

The 207 propositions of indicators are categorized as follow.

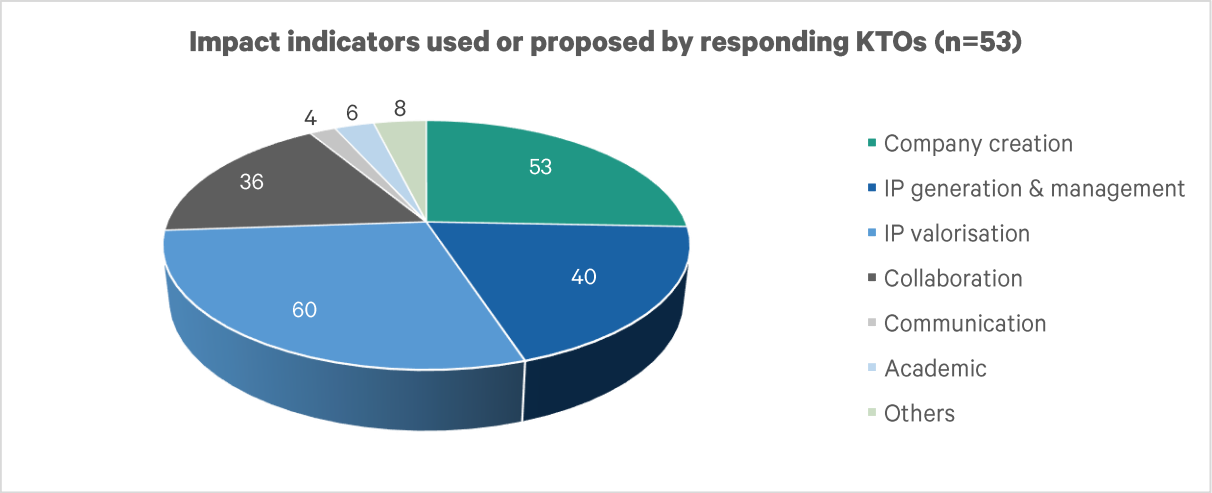


Figure 34: Impact indicators used or proposed by KTOs

Company creation includes 53 propositions of indicators such as:

- Company creation
- Spin-off and start-up impacts (aggregated investment, employees)
- Collaboration with spin-off

IP generation includes 40 propositions of indicators such as:

- IP protection
- IP management

IP valorisation includes 60 propositions of indicators such as:

- IP commercialisation, LOAs agreements

- Embedded IP in project, collaboration
- Revenue from IP commercialisation
- Marketed products

Collaboration includes 36 propositions of indicators such as:

- Revenue from contract & grants
- Research agreements
- Co-creation, common patent
- Feedback from project partners users, quality of the relation

Follow-up work and impact case studies collection

The data provided by the responding KTOs show that no ready-to-use indicators exist to assess KT activities impact, and that the culture and the practices of impact assessment still need to be developed among KT actors. KT is one of the activities that increases societal and economic impact of research. However, the challenge remains to track the causality between KT actions and the actual changes in the society. Indeed, there are many of the factors leading to impact that lie outside the sphere of influence of KTOs. Impact is eventually a very contextualised matter. To be assessed, it should be predefined and formally linked to the specificities of the environment.

How to measure KT contribution to the impact of research, and how to better show its value? How to report this at the national and possibly at the European level? The Survey Committee is looking to work in the coming years on these questions. A dedicated open working group is to be established on this subject (please contact survey@astp4kt.eu, to learn more or become involved).

As the European association of KT professionals, ASTP provides visibility on KT activities and results. To better show how these activities benefit the society, the annual survey will collect success stories from responding KTOs from 2020 survey onwards. This case studies collection will complement and illustrate the usual data of the annual ASTP Survey report.

5. Acknowledgements

The ASTP Board and Survey Committee are very happy that participation in the annual ASTP Survey continues to remain high. We would like to thank all survey respondents for contributing data from their respective university or research organisation and for taking the time to diligently fill in our questionnaire. This data is crucial for the preparation and quality of this report which aims to provide a relevant overview to the profession of knowledge transfer.

We also would like to 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; ETTF (Hungary), FinnChamps (Finland), NATT (Russia), PACTT (Poland), Réseau LIEU (Belgium), SNITTS (Sweden), TechnologieAllianz (Germany), Transfera (Czech Republic), ÜSIMP (Turkey), and VSNU (Netherlands), who have been very active in supporting us by collecting data from individual KTOs in their respective networks.

We would like to extend special thanks to Knowledge Transfer Ireland (Ireland), Netval (Italy), RedOTRI and Crue (Spain), Research England (previously known as HEFCE, UK), 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. We intend to strengthen and continue our fruitful cooperation and welcome all suggestions for improvement.

We are very thankful for the commitment and hard work of the Survey Committee which was necessary to collect, integrate, clean and analyse the data and to the creation of a compelling report for our stakeholders. We are also very grateful to Ulrich Mahr, former ASTP VP Survey and Impact, and to Jürgen Walkenhorst, new Survey Committee member for their suggestions and comments that have improved the report.

The process of developing the report takes tremendous effort by highly committed volunteers, with the assistance of ASTP Headquarters. Their engagement allows us to provide our members and contributors with, what we hope is, real added value for their business. We also would like to acknowledge the highly effective and fruitful work done by the New Metrics Sub-Committee on the individual feedback report and the cluster analysis.

This report is dedicated to the memory of John Scanlan†, Director of Commercialisation at Maynooth University (Ireland). John's passion for knowledge transfer sparked new developments in the Survey Committee: with his scientific curiosity he proposed ratio-based analysis which we jointly developed into an approach for advanced metric analysis and his keen interest to enable survey respondents to compare their responses with others prompted the development of individual feedback reports. Both are discussed in the chapter Way Forward (section 4.1 and 4.2). John made these contributions to the work of our Committee as a volunteer in the New Metrics Sub-Committee in 2018 and 2019. We are deeply saddened about the loss of a dear colleague and friend who was an ardent advocate of our European KT community.

5.1. Survey Committee Members (2019 Report)

Cécile Cavalade, Chair, VP Survey and Impact | Université libre de Bruxelles, Belgium
Koen Verhoef, Vice-chair | Netherlands Cancer Institute, Netherlands
Tamas Bene, University of Debrecen, Hungary
Lidia Cerezo, Universidad Politécnica de Madrid (UPM), Spain
Laura Kreiling, Paris-Sud University, France
Olivier Vande Vyver, University of Mons, Belgium

The Survey Committee at their Annual Face to Face Meeting at ASTP Headquarters in Leiden; Olivier Vande Vyver, Koen Verhoef, Laura Kreiling, Tamas Bene, Cécile Cavalade, and Lidia Cerezo Garcia (from left to right)

5.2. New Metrics Sub-Committee Members

Laura Kreiling, Chair | Paris-Sud University, France
John Scanlan†, Maynooth University, Ireland
Koen Verhoef, Netherlands Cancer Institute, Netherlands
Olivier Vande Vyver, University of Mons, Belgium

Appendix 1 – List of Figures, Tables and Abbreviations

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List of Abbreviations

CRM	Customer Relationship Management
EC	European Commission
EU	European Union
FTE	Full Time Equivalent
FY	Financial Year
IDF	Invention Disclosure Form
IP	Intellectual Property
JRC	Joint Research Centre
K€	Thousand Euros
KT	Knowledge Transfer
KTO(s)	Knowledge Transfer Office(s)
LOA	Licensed with an Option to Assign
M€	Million Euros
NAAC	National Associations Advisory Committee
NA(s)	National Association(s):
CRUE	*Conference of Rectors of Spanish Universities*
ETTF	*Technology and Knowledge Transfer Forum of Hungarian Universities*
FinnChamps	*Informal Knowledge Transfer Association in Finland*
HEFCE	*Higher Education Funding Council for England (it ceased to exist as of 1 April 2018), now known as Research England*
KTI	*Knowledge Transfer Ireland*
NATT	*Russian National Association of Technology Transfer*
Netval	*Italian Knowledge Transfer Association*
PACTT	*Porozumie Akademickich Centrów Transferów Technologii (Polish Association of Centers for Technology Transfer)*

RedOTRI	*Red de Oficinas de Transferencia de Resultados de Investigación (Spanish Knowledge Transfer Association)*
Réseau C.U.R.I.E.	*French Knowledge Transfer Association*
Réseau LIEU	*Belgian Knowledge Transfer Association*
SNITTS	*Swedish Network for Innovation and Technology Transfer Support*
swiTT	*Swiss Technology Transfer Association*
TechnologieAllianz	*German association for knowledge and technology transfer*
Transfera	*Knowledge Transfer Association in Czech Republic*
Universities Denmark	*Danish association for knowledge and technology transfer*
ÜSIMP	*University-Industry Collaboration Centres Platform of Turkey*
VSNU	*Vereniging van Samenwerkende Nederlandse Universiteiten (Association of Dutch Universities)*
PRO	Public Research Organisation
VP	Vice President

Appendix 2 - FY2017 Survey Questionnaire

The questionnaire below has been fulfilled by direct respondents to ASTP Annual Survey.

ASTP Survey on Knowledge Transfer Activities FY2017

Introduction - please read carefully

This survey collects data for Financial Year 2017 (FY2017)
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 2017 (FY2017) would then be the period from May 1, 2017 – April 30, 2018.

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 total number of 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 FY2017 and the total number of FTE engaged in research in FY2017. These numbers will be used to normalise data such that the output of organisations of different sizes can be compared more readily. 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.

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 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 not answered.

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 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'.*
- Do not use a comma (,) as a decimal separator nor as thousands separator. All commas will be removed by the software.

This survey consists of 29 questions

If you have any questions regarding this survey, please contact ASTP at survey@astp-proton.eu

Comments and Feedback on the survey

Your comments and feedback are valuable to us in order to improve future surveys. If you have any comments and feedback, please submit them in the feedback box on the last page of the survey.

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. What is the total number of Public Research Organisations (PROs) your KTO serves?

Please include the total number of PROs for which you are submitting aggregate data in this survey.

Confidentiality and Permissions

5. Do you give explicit permission to ASTP for publishing your data?

*By submitting data to ASTP survey, you agree that ASTP can use the data for analysis and academic research purposes (no commercial purposes). Unless you give us your explicit permission, ASTP will **never** publish any data submitted by you under this survey nor will any data be traced back to your organisation.*

- ○ YES
- ○ NO

6. Do you allow us to share your data with your national knowledge and technology transfer association?

- ○ YES
- ○ NO

If yes, please choose your national association:

Austria - Austrian TT Network
Belgium - Réseau LIEU
Belgium - TTO Flanders
Croatia - Croatian TT Network
Czech Republic - Transfera
Denmark - Universities Denmark
Finland - FinnChamps
France - Réseau C.U.R.I.E.
Germany - Technologie Allianz e.V.
Greece - PRAXI Network
Hungary - Technology and Knowledge Transfer Forum of Hungarian Universities
Ireland - IKTIG (Irish Knowledge Transfer & Innovation Group)
Italy - NETVAL
Netherlands - VSNU (Vereniging van Samenwerkende Nederlandse Universiteiten)
Norway - FIN
Poland - PACTT (Porozumie Akademickich Centrów Transferów Technologii)
Portugal - UTEN/GAPI
Russia - NATT (Russian National Association of Technology Transfer)
Slovenia - SI-TT (Association of Technology Transfer Professionals of Slovenia)
Spain - RedOTRI
Spain - Redtransfer
Sweden - SNITTS (Swedish Network for Innovation and Technology Transfer Support)
Switzerland - swiTT (Swiss Technology Transfer Association)
Turkey - ÜSIMP (University-Industry Collaboration Centers Platform of Turkey)
Ukraine, Azerbaijan, Georgia & Maldova - TTIRA (Technology Transfer Inter-Regional As
United Kingdom - PraxisAuril
Other

If your national association is not listed above, please fill in below:

Name of National Association

Name of contact person

Email address of contact person

KTO staff and expenditure

7. What was the total number of KTO staff in full-time equivalents (FTEs) at the end of FY2017?

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)

Total FTEs

8. Of the total FTEs reported under Question 7, how many of them were dedicated for the following activities:

Research Agreements
including Material Transfer Agreements and Collaborative Research Agreements

Commercialisation
including IP protection and commercialisation, licensing and company formation

9. What total amount was spent 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) excluding internal staff-related costs.

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 FY2017 for all PRO(s) for which your KTO is reporting data under this survey (€).

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 FY2017, 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.

12. Please use this comment box to provide context where necessary to any of the numbers provided under Questions 10 and 11. Insert comment if there are reasons to assume that the numbers provided 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 signed in FY2017:

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 FY2017:

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

Consultancy Agreements

Invention disclosures, patent applications and patent grants

15. What is the number of invention disclosures received by your KTO in FY2017?

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 utility outside academia.

16. Please give the total number of priority patent applications filed in FY2017.

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 FY2017?

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 FY2017?

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 FY2017.

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. Note that assigned patent are not considered as part of active patent families.

Licenses, options and assignments involving IP

20. What is the number of IP agreements executed in FY2017 by type:

Licenses *Excluding licenses for research materials and software*	
Material Licenses	
Software Licenses	
Options	
Assignments	

Commercial Revenues

21. What are the gross revenues from commercialisation of IP earned in FY2017 (€)?

Gross revenues from the commercialisation of all types of know-how and IP (e.g. patents, copyright, designs, trademarks, software, trade secrets, plant breeder rights, 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.

22. Of the gross revenues reported under Question 21, what amount was generated by patent licenses (€)

23. Of the gross revenues reported under Question 21, what amount was generated from running royalties (€)?

i.e. revenues based on turnover of product

24. Of the gross revenues reported under Question 21, what amount relates to cashed-in equity (€)?

Spin-offs and start-ups

25. How many spin-offs were established in FY2017?

*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.*

26. How many start-ups were established in FY2017?

*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.***

27. How many staff members (FTE) were employed by your operating spin-off companies (in aggregate) at the end of FY2017?

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

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

28. Which parameters have you been or are you currently using for assessing the impact (socio-economic, environmental, territorial/regional) of your knowledge transfer activities?

29. Which parameters do you think should be used and most relevant for assessing the impact (socio-economic, environmental, territorial/regional) of your knowledge transfer activities?

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 Survey Committee:

Thank you very much for participating in this survey.

Cécile Cavalade
Chair of the Survey Committee
Vice President ASTP