ASTP-Proton SURVEY REPORT
Fiscal Year 2015

ASTPPROTON
KNOWLEDGE TRANSFER EUROPE

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I. Presentation of the Survey

We are pleased to provide our members, contributors and stakeholders with the results of our fiscal year 2015 (FY2015) Survey which provides insights of the FY2015 European Knowledge Transfer landscape. This report presents the results which derive from our FY2015 Survey that was conducted and analysed with significant efforts and the strong commitment of our Survey Committee who collected and analysed information from an ever-increasing number of universities and research institutions all over Europe.

The basis of our efforts, however, is an ever-rising participation by our members and a strong support and engagement of committed promoters from several national knowledge transfer associations ("NAs") and the National Associations Advisory Committee ("NAAC") in which they are represented. These parties all helped to promote the survey participation and in several cases even contributed valuable data that had been collected nationally. We are truly thankful for all that support and look forward to continuing these very fruitful collaborations.

The strong support from various parties allowed us to again increase the number of respondents from 369 in FY2014 to 419 in FY2015 – resulting in the largest European dataset so far and on which this report is based.

This result gives us comfort that our members continue to be interested in sharing information and receiving an overview of actual knowledge transfer data and analysis insights which we have compiled.

As the quality of our report strongly depends on the level of participation in the ASTP-Proton Annual Survey, we encourage the readers of this report and representatives of national organisations to also participate in and support the next ASTP-Proton Survey. We aim at further increasing the participation and continue our cooperation with national organisations to achieve the best possible regional coverage, data completeness and quality as well as harmonised definitions. These elements are prerequisites to draw meaningful conclusions and to ensure the quality and impact of our future reports.

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	Ulrich Mahr
President ASTP-Proton	VP Survey & Impact

II. Executive Summary

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 industry on a pan-European level. The FY2015 ASTP-Proton Survey was sent out to European public research organisations ("PROs") and to their Knowledge Transfer Offices ("KTOs").

419 of these PROs and KTOs provided data for all or a subset of questions (the "reporting organisations"), which were analysed and reported upon in this report. The database, which is the foundation for any analysis presented, consists of direct responses to the ASTP-Proton Survey FY2015 and substantial additional national data which were kindly provided by several national organisations.

As response rates and data availability vary greatly from country to country, some of the findings in this report may not be representative for a specific region. In addition, the response rate varied significantly from subject to subject so that the analysis is based on data derived from a larger or smaller subset of the reporting organisations. Despite considerable efforts to obtain reliable data (e.g. by improving definitions and emphasizing the importance of the data for the ASTP-Proton Survey), there is still a lack of support data for normalisation (e.g. data regarding full-time equivalents ("FTEs") and research budget from all participants). Therefore, this report provides average non-normalised results but we plan to provide such normalised data for comparison purposes in future reports. We also intend to provide time series analyses in the future that up till now could not be easily performed due to year-on-year changes to the questionnaire over the last couple of years.

The Survey Report is based on a significant and growing European sample - the largest pan-European data collection and analysis – with the goal to even further increase the reach and response rate for data collection – to become the source of choice for data on European knowledge transfer activities and output.

This report was sent out to all participating organisations and National Associations. It will be accessible to a greater public on request for other interested parties via a download link on ASTP-Proton's webpage from January 1st, 2018. This executive summary is immediately available on the ASTP-Proton website.

The information provided in this report spans KTO specific data, invention disclosures and patenting activities, commercial agreements and spin-off creation.

The following summary of aggregate figures for different subjects will be presented and analysed in more detail in the following chapters. As not all responding organisations have entered data for each subject, the aggregate numbers shown below are based on varying numbers of respondents to the specific subject (the number (n) of respondents for each subject is indicated in brackets):

KTO and PRO metrics:
A cumulative total of 1,924 FTE working in KTOs (from 224 respondents)
€129,585,938 in aggregate KTO budget, excluding budget for IP protection (157 respondents)
€14.23 billion in aggregate research budget (140 respondents

Intellectual Property (IP) metrics:
11,301 invention disclosures (386 respondents)
2,802 new patent applications filed (228 respondents)
1,079 patents granted (123 respondents)
18,762 active patent families at the end of FY2014 (197 respondents)

Contracts and licence income metrics:
23,936 contract research agreements concluded (286 respondents)
7,968 collaboration agreements concluded (151 respondents)
80,842 consultancy agreements signed (285 respondents)
135 option agreements executed (115 respondents)
240 assignment agreements concluded (119 respondents)
18,400 licence agreements executed (290 respondents)
9,248 software licence agreements executed (277 respondents)

Spin-off metrics:
640 new spin-offs formed (380 respondents)

The following sections will report more in detail about the applied methodology and the results of the data analysis which hopefully will be very insightful and provide an interesting overview of the activities and results of the European knowledge transfer.

III. Survey Methodology

Set-up of the FY2015 Survey

For the launch of the FY2015 Survey, the questionnaire from the FY2014 Survey was changed quite considerably. The FY2014 Survey was the first since the merger between ASTP and ProTon Europe and was newly developed based on the 2009 'Metrics for Knowledge Transfer from Public Research Organisations in Europe' report from the European Commission's Expert Group on Knowledge Transfer Metrics.

The changes for the FY2015 Survey were made based on feedback received both from individual offices and from National Associations (NAs) on the FY2014 Survey. To further boost the number of respondents, it was suggested to reduce the number of questions to a minimal set, which would better align with the metrics that are collected by or are readily available to KTOs throughout Europe.

This resulted in the FY2015 Survey which consisted of 30 questions, 4 questions fewer than that of FY2014. In fact, 14 were directly taken from the FY2014 Survey, 12 questions from the FY2014 were left out and 9 new questions were introduced. As for the remaining 7 questions from the FY2014 Survey, either the question itself or one or more definitions (or both) were significantly changed.

Data Collection

Data collection was launched on 5 December 2016 and closed on 28 February 2017, but was extended, at the request of a number of contributing NAs, until 15 March 2017. It was not until June 2017 though that the final dataset was made available and the data cleaning process required to ensure data quality (see section 'data quality') could be completed.

The FY2015 Survey was sent to:

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

In addition, 27 National Associations in Europe were contacted through their representatives, who are members of ASTP-Proton National Associations Advisory Committee (NAAC), and were asked to either distribute the ASTP-Proton 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-Proton dataset for FY2015. In the case of the latter, care was taken to only include compatible data in this analysis.

Respondents

ASTP-Proton collected FY2015 data from a total of 419 KTOs[1] through various channels.

Data received from National Associations

The majority of data were obtained from NAs or other national organisations, who submitted the results of their national survey to ASTP-Proton. Since some NAs use their own national survey with a different set of questions than the ASTP-Proton Survey, each question was checked for compatibility. Only data from the questions that were considered to correspond with questions in the ASTP-Proton Survey were used in this report. The only problem encountered was 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.

Data received from individual Knowledge Transfer Offices

Individual Knowledge Transfer Offices submitted their data directly either via the online ASTP-Proton survey on SurveyMonkey or by sending an interactive PDF form. Despite encouraging the target audience to answer as many questions as possible, the majority of the respondents skipped or decided not to answer one or more questions in the survey. Answering any single question of the survey was no longer made compulsory as it would hinder the respondents to continue to the next question and thus tends to negatively impact the number of responses that ASTP-Proton receives. As a result, and as indicated throughout the report for reference, the response rates and the number of responses vary considerably between questions, which may suggest that many offices only track a handful of metrics and that data are not readily available for all questions in the survey or have intentionally decided not to share those particular data.

Response rates

The number of responses varied greatly from country to country. For a few countries, thanks to the help of national organisations/associations (namely: HEFCE (United Kingdom); RedOTRI (Spain); Netval (Italy); KTI (Ireland) and SwiTT (Switzerland)), ASTP-Proton received data for most if not all KTOs or PROs in those countries (although, again, most NA questionnaires only overlapped to a limited degree with the set of questions in the ASTP-Proton Survey). For most other countries where KTOs responded to the FY2015 Survey directly, a decent number of responses was received that are estimated to represent a fair proportion of the KT activities within those countries.

The absolute number of responses (total n=419) per country is shown in Figure 2 below:

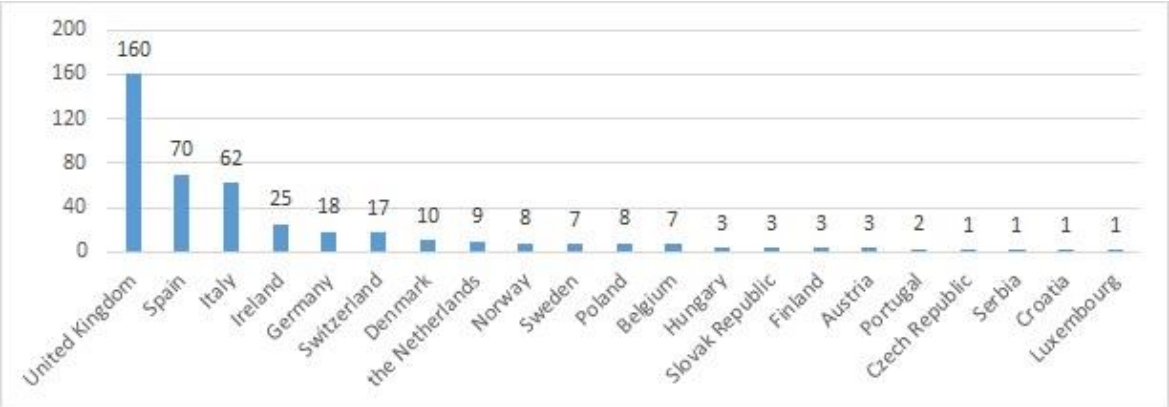

Figure 2. Graphic distribution of respondents per country

[1] Some KTOs provide services for several PROs and thus the report combined figures for such PROs

The figure below shows the relative response rate on a country-by-country basis.

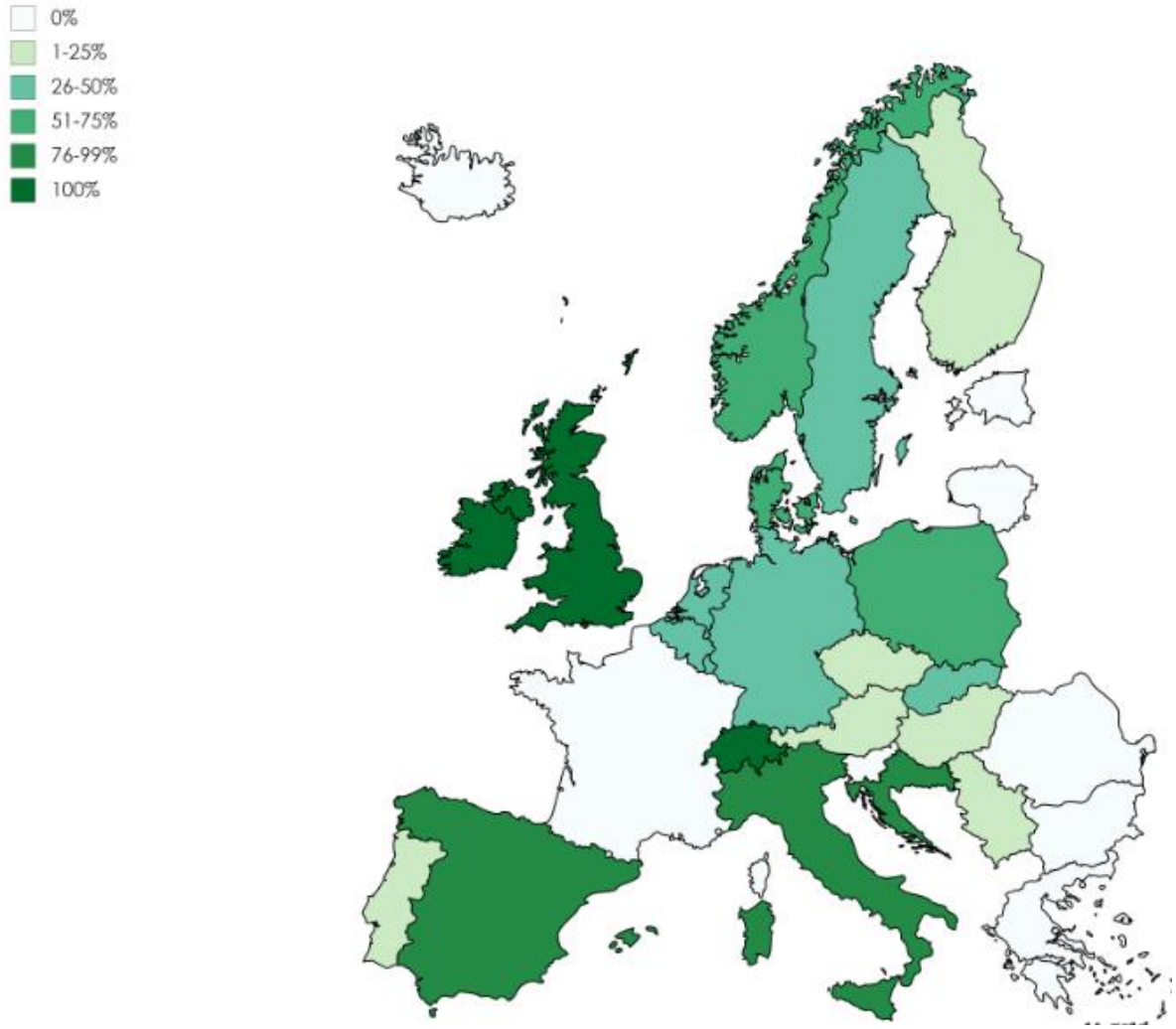

Figure 1. Relative survey response rates across Europe

The relative response rates per country have been calculated on the basis of the number of KTOs in each country that is known to ASTP-Proton. Unfortunately, collecting data for even a single KTO in some countries have been very unsuccessful. The relative response rate for these countries is therefore 0% and shown in white. For a number of countries, no data on the number of existing KTOs is known and it was therefore not possible to calculate a relative response rate. Such countries are hidden in the above map.

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 ASTP-Proton FY2015 Survey results and the addition of data from the NAs, as described above. Two members of the ASTP-Proton 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 FY2015 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 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 24 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-Proton 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.

IV. Data and Analysis

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.

1) Knowledge Transfer Offices

In the FY2015 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. Not all of the 419 overall survey respondents completed all of the questions in this section. Therefore, the number of responses on which the following analysis is based varies from question to question. Nonetheless, the following analysis is based on a significant sample.

The total number of FTEs involved in knowledge transfer reported in FY2015 was 1,924 (N=224), with the smallest office reporting staffing levels of 0.5 FTE and the largest office employing 76 FTE. The average staffing level was calculated at 8.59 FTE per reporting KTO. The larger number of respondents in the FY2015, compared to FY2014, allows us to observe an even larger set of professionals involved in knowledge transfer activities in Europe. The following graph (Figure 3) illustrates the distribution of FTEs per KTO at the end of FY2015.

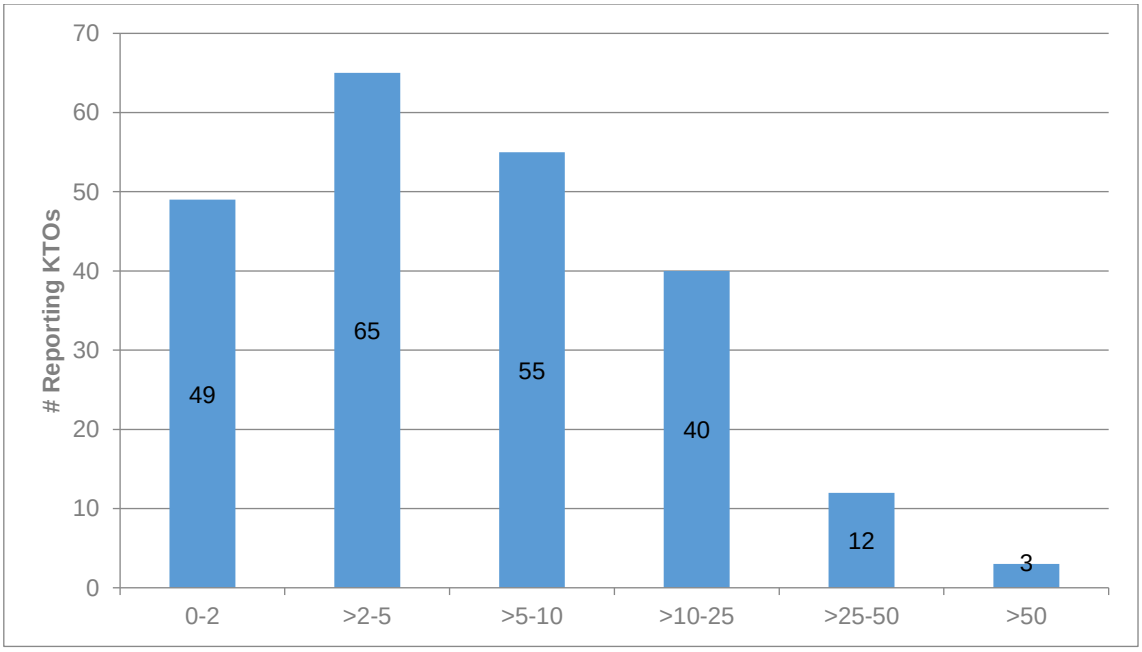

Figure 3. Distribution of KTO staffing levels across respondents (FTE)

It was observed that 232 responding European KTOs serve a total of 410 institutions, with the number of institutions served per KTO ranging from 1 to as high as 42, with 1.77 institutions served on average per KTO. It is worthwhile mentioning that by far the largest number of KTOs only serve 1 institution.

In terms of budget, 157 KTOs had spent, in FY2015, an aggregate €129.6 million for the operation (gross expenditures), without considering the out-of-pocket expenses for IP protection borne by the KTO and the PRO. The survey reveals that 297 responding organisations spent slightly more than €71.6 million for IP protection.

The distribution of the total gross expenditure of the KTO in FY2015, less out-of-pocket costs for IP protection is shown in the following graph (Figure 4).

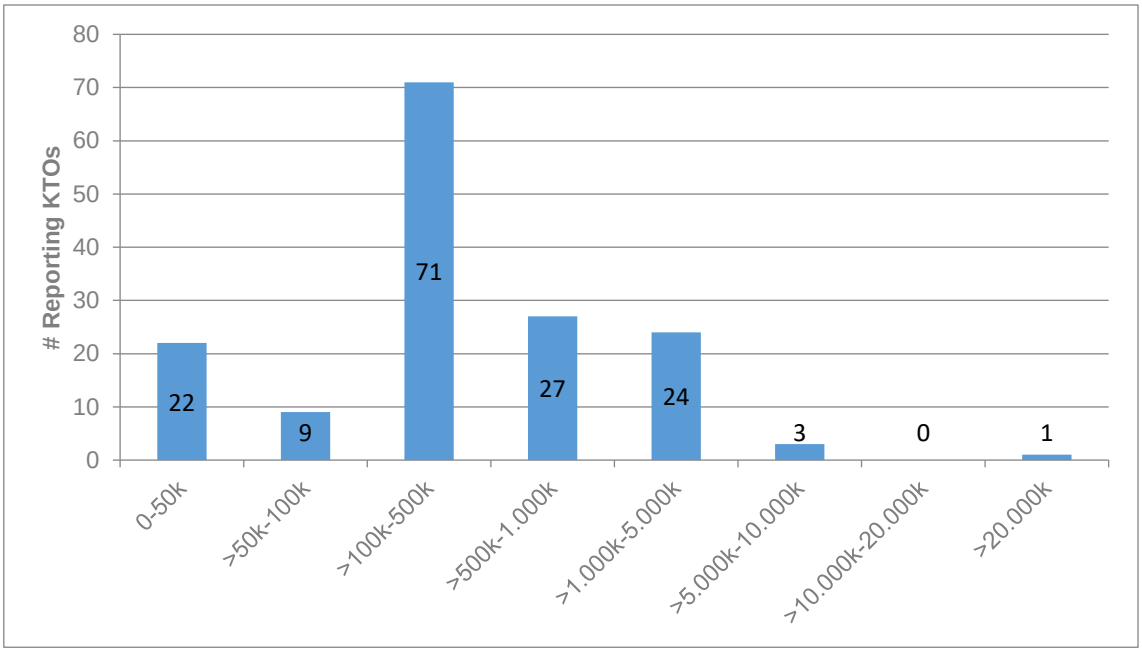

Figure 4. Distribution of gross expenditure per KTO (excl. IP costs) across respondents (€)

As far as costs for intellectual property protection are concerned, 296 respondents reported an average expenditure of €242,037, according to the distribution resulting from the following graph (Figure 5). It shows that the costs for IP protection are unequally distributed, either in the low range up to €50,000 or mid-range between €100,000 – €500,000. In fact, of the 165 responses that fall within the €0-50,000 bin, more than half (85) reported zero (0) budget for IP costs. It is of course possible that in these cases the IP costs are borne by departments other than the KTO or by affiliated companies that manage and hold the IP rights generated by the PRO.

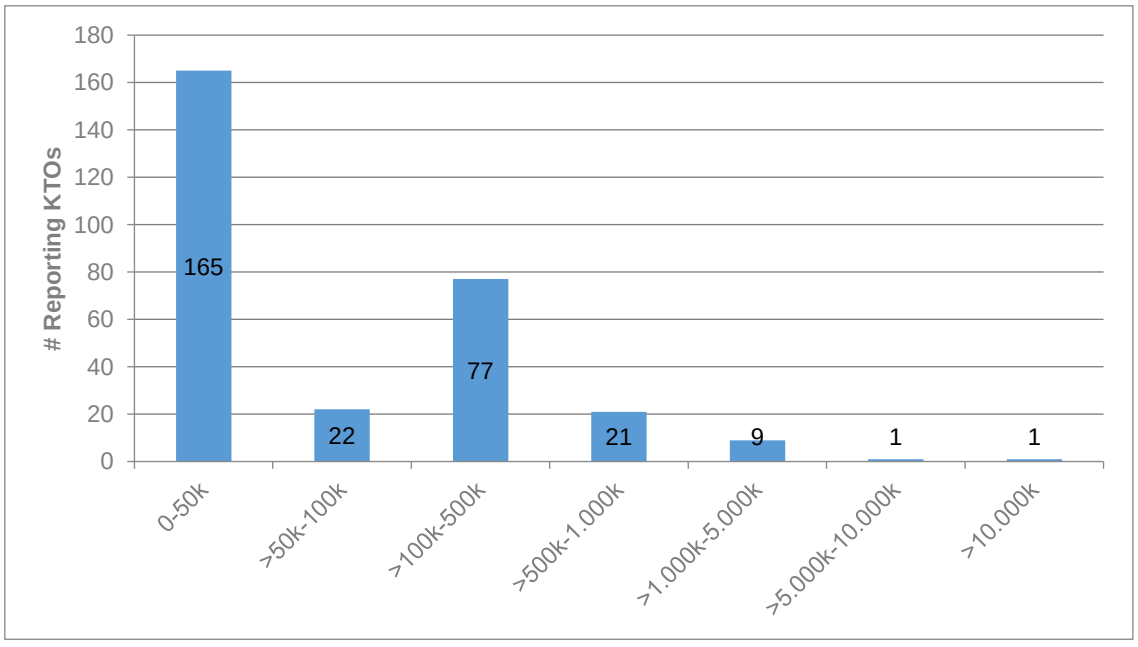

Figure 5. Distribution of IP costs per KTO across respondents (€)

2) Intellectual Property

Intellectual property management is a core activity of KTOs as it is an important and often essential part in the commercialisation of academic research results.

Table 1 shows both the aggregate total and the average number per KTO of invention disclosures, of priority patent applications and of granted patents in FY2015. The number of valid responses is highest for invention disclosures, significantly lower for priority patent filings (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-Proton Survey), and is lowest for granted patents.

A look at the connection between invention disclosures and priority patent filings suggests that, on average, almost 42% of invention disclosures result in the filing of a priority patent application.

KTO activity / (N=response rate)	Total	Average per KTO/PRO
Number of invention disclosures (N=386)	11,301	29.3
Number of priority patent applications (N=228)	2,802	12.3
Number of patents first granted (N=123)	1,079	8.8

Table 1. Overview of invention disclosures, patent applications and patents granted

In order to explore the variation in the patterns of disclosure and patenting activities across KTOs, the number of disclosures and patent filings is illustrated in the next couple of figures (Figures 6 & 7).

A significant number of KTOs report having received no invention disclosures at all during FY2015 (87/386 or 23%; Figure 6). It is worth noting that some organisations in this fraction appear to be active in non-technical fields (e.g. Social Sciences, Arts and Humanities) only, and so filing patent claims is not a typical way of protecting intellectual property for them.

A similar number of respondents reported between 1 and 5 invention disclosures in FY2015 which, together with those that reported zero (0) disclosures, represents almost half (171/386 or 44%) of the respondents. This is a striking number as it suggests that many organisations receive very few, if any invention disclosures per year. Compared to the FY2014 report, the graph shows a more even distribution, since the number of KTOs registering more than 25 disclosures has more than doubled. Also, the number of KTOs that receive more than 100 invention disclosures/year is significantly higher.

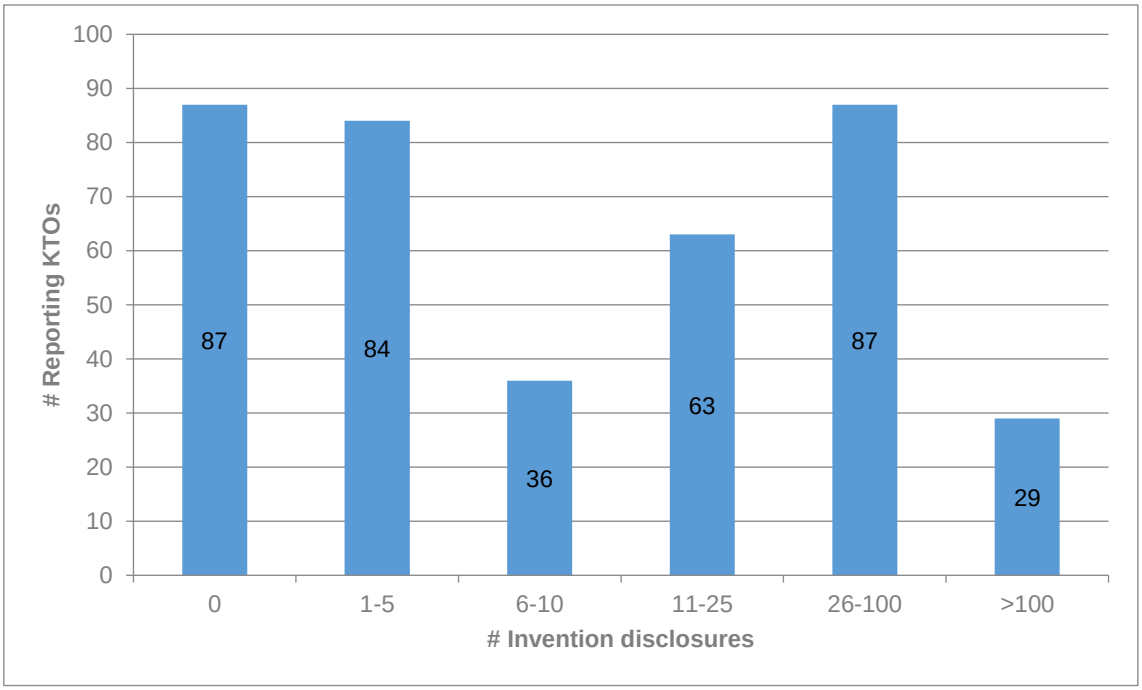

Figure 6. Number of invention disclosures per KTOs

As shown in Figure 7 below, 17% (39/225) of responding KTOs did not file a priority patent application in FY2015.

Although the number of respondents reporting zero priority patent applications is somewhat higher, the distribution of priority filings across the remaining bins looks very similar to the distribution reported in the FY2014 Survey Report. Still, the largest fraction of respondents (69/228 or 30%) report in between 1-5 patent applications and a relatively small percentage (12/228 or 5%) of PROs file more than 50 priority patent applications.

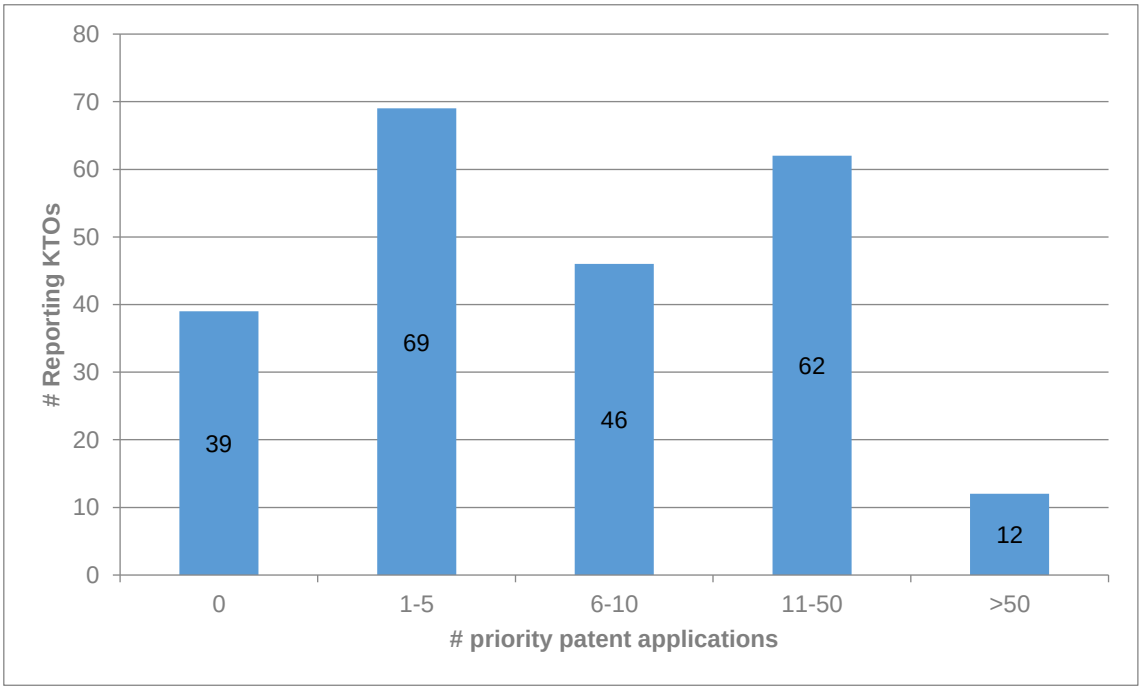

Figure 7. Number of priority patent applications per KTO

A closer look at the data reveals that there are several KTOs that, while they reported receiving a high number of invention disclosures, only reported very few or even zero new patent filings. However counterintuitive, there are a number of situations that can be envisaged that would explain this apparent discrepancy: (i) the PRO has most of its research focused outside of the technical fields (the Humanities, Social Sciences or the Arts) and patent rights are therefore rarely applied for; (ii) due to the professor's privilege IP system, the invention is not owned by the PRO and consequently the PRO does not record the filing of patent applications; (iii) the PRO has a strong focus on contract research with outside organisations (where the outside partner acquires ownership and responsibility for patent filing); (iv) there is a lack of IP awareness within the PRO that often causes academic publications to destroy patent novelty; or (v) alternative forms of IP protection (such as design, utility model) are available that can also underpin the commercial application of a particular invention. Finally, patent protection is a costly business and as costs rise with the increase in a KTO's patent portfolio, KTOs may need to be very selective when it comes to filing patent applications.

Concerning patents first granted in FY2015, it was observed that there is a rather high number of KTOs that report no new patents being granted (29/123 or 24%), as shown in Figure 8. The largest percentage of respondents (49/123 or 40%) reports between 1-5 patents granted. Again, only a small percentage of KTOs (5/123 or 4%) report over 50 patents being granted.

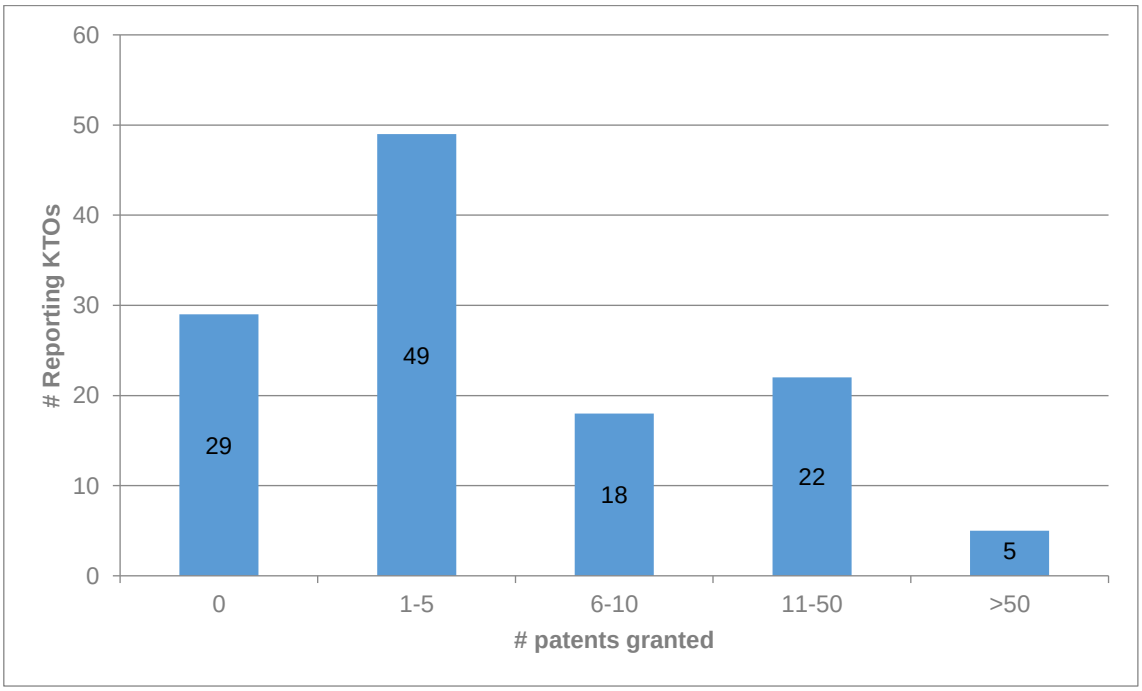

Figure 8. Number of first patents granted per reporting organisation

Figure 9 below shows the number of active patent families in the KTO's portfolio at the end of FY2015. In a sample of 197 responding KTOs, it is concluded that most KTOs (119/197 or 60%) are shown to hold a patent portfolio consisting of anywhere between 11-200 patent families. Approximately 12% (24/197) of the KTOs declare more than 200 patent families and a relatively small percentage (16/197 or 8%) of the respondents report 0 active patent families.

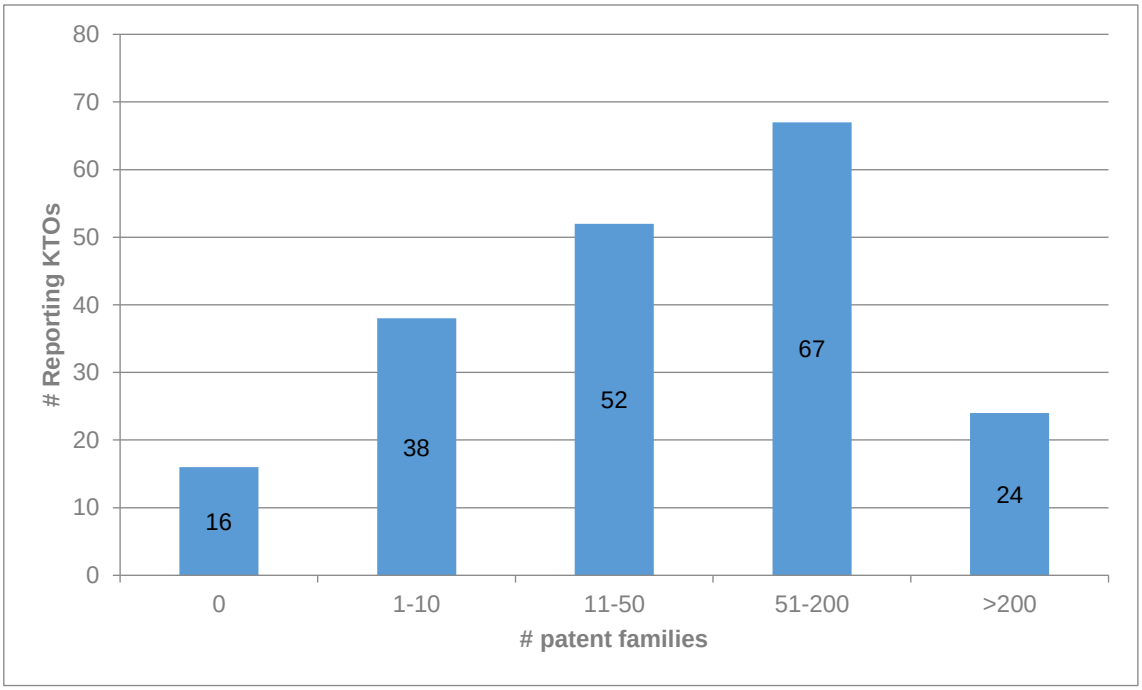

Figure 9. Number of active patent families in portfolio

Figure 10 on the other hand, is based on a significantly smaller sample of only 127 respondents and shows the percentage of patent families per KTO licensed or optioned by the end of FY2015.

A significant fraction of the responding KTOs has licensed or optioned only 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.

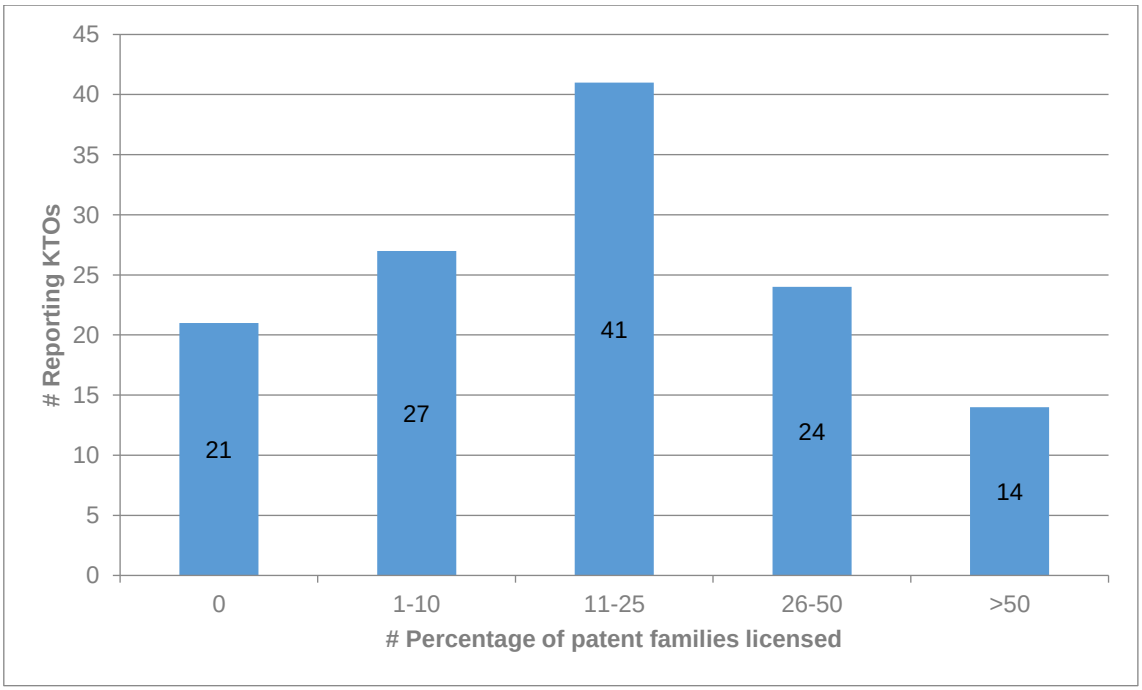

Figure 10. Percentage of patent families in portfolio licensed or optioned

3) Research Agreements and Commercial Contracts

This section deals with different types of agreements concluded by European KTOs/PROs with respect to contract research, collaboration and consultancy.

Type of Agreement (N=number of respondents)	Total	Average per KTO/PRO
Contract Research Agreements (N=286)	23,936	83.7
Consultancy Agreements (N=285)	80,842	283.7
Collaboration Agreements (N=151)	7,968	52.8
Option Agreements (N=115)	135	1.2
Assignment Agreements (N=119)	240	2.0
Licence Agreements (N=290)	18,400	63.4
Software Licence Agreements (N=277)	9,248	33.4
Material Transfer Agreements (N=104)	263	2.5

Table 2. Overview of research, consultancy and commercialisation agreements

The total reported income in this survey from contract research activities was more than €1.1 billion, with another €600 million reported as income under collaboration agreements with industry. The aggregate income from consultancy was more than €350 million.

Contract Research Agreements

While almost one third of the reporting organisations (90/286 or 31%) reported only up to 5 new contract research agreements, 22% (64/286) concluded more than 100 new contracts and 3% (9/286) reported more than 500 new contracts in the given year, which led to a rather high average of 84 agreements per reporting organisation in FY2015 (Figure 11).

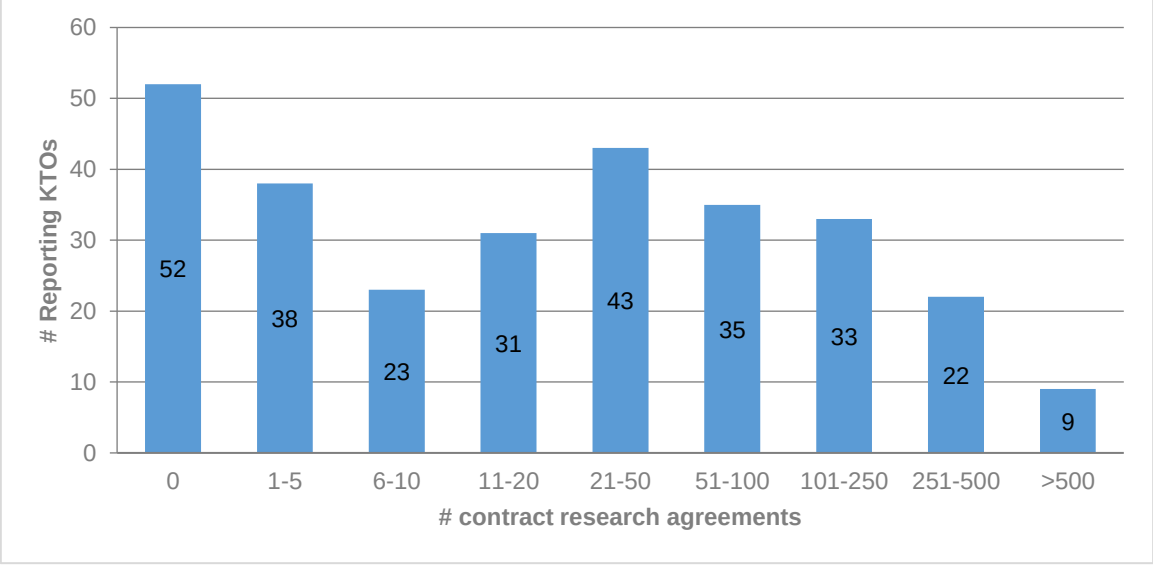

Figure 11. Number of new contract research agreements

Consultancy Agreements

Concerning consultancy agreements, a similar distribution pattern as observed for contract research agreements can be seen in Figure 12.

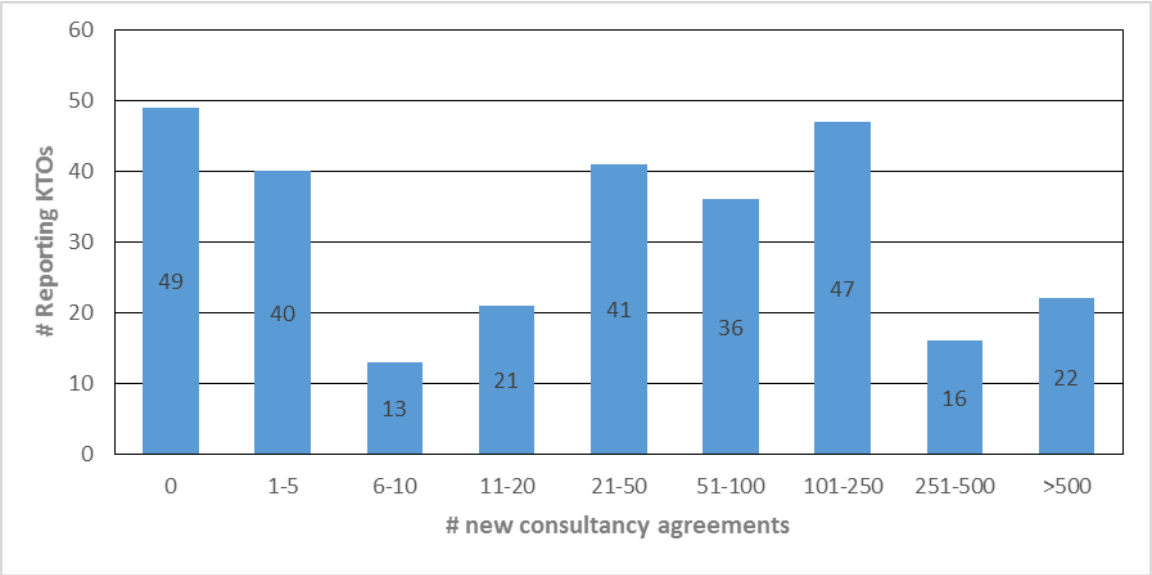

Figure 12. Number of new consultancy agreements

A significant fraction of the respondents (89/285 or 31%) reported having concluded fewer than 5 consultancy agreements in FY2015, with 49 of them (17%) having concluded no consultancy agreement at all. This could be due to some institutions allowing their employees to offer consultancy services in their private capacity.

Approximately 30% of the responding organisations (85/285) concluded more than 100 new consultancy agreements in the FY2015. A small fraction (22/285 or 8%) is very active institutions in this field, with more than 500 consultancy agreements concluded during FY2015.

Collaboration Agreements

Compared to contract research agreements, a significantly lower aggregate number of collaborative research agreements was reported for FY2015 (Figure 13). The distribution is relatively homogeneous with the majority of the respondents (94/151 or 62%) reporting between 0 and 20 new agreements, with only 21% (32/151) reporting having concluded more than 50 agreements for FY2015.

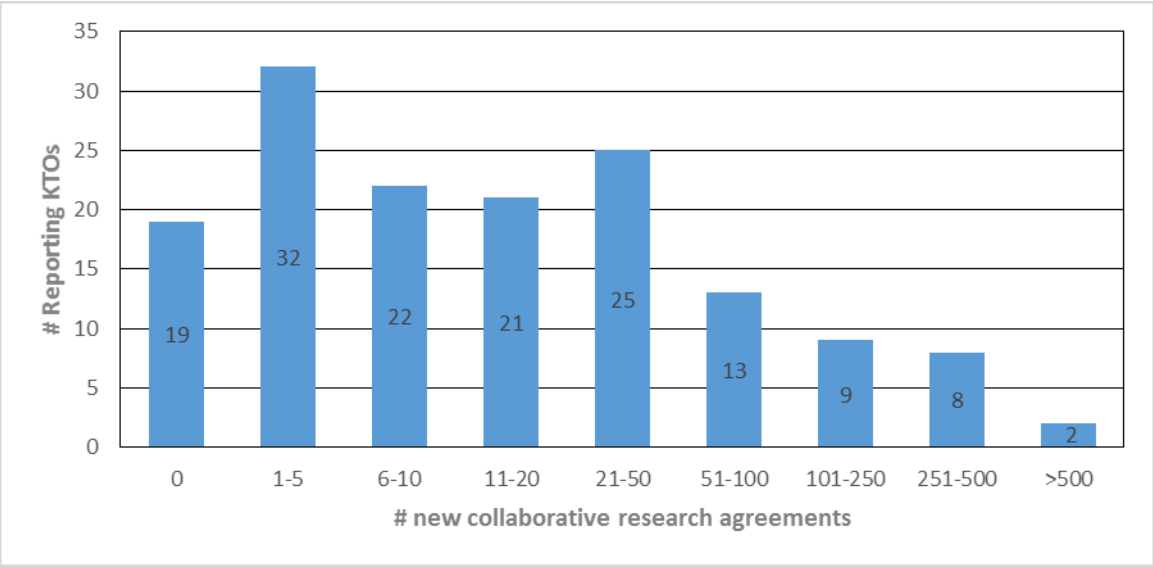

Figure 13. Distribution of the number of new collaborative research agreements per reporting organisation

Commercialisation Agreements

The following section provides some insight on how the reporting organisations in the survey have commercialised their intellectual property estate as described in more detail in the intellectual property section of this report. 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.

Option Agreements

It may be deduced from the following graph (Figure 14) that option agreements are a less used instrument for the commercialisation of knowledge and technology: Almost two thirds of the respondents to this question (73/115 or 63%) reported concluding not a single option agreement during FY2015.

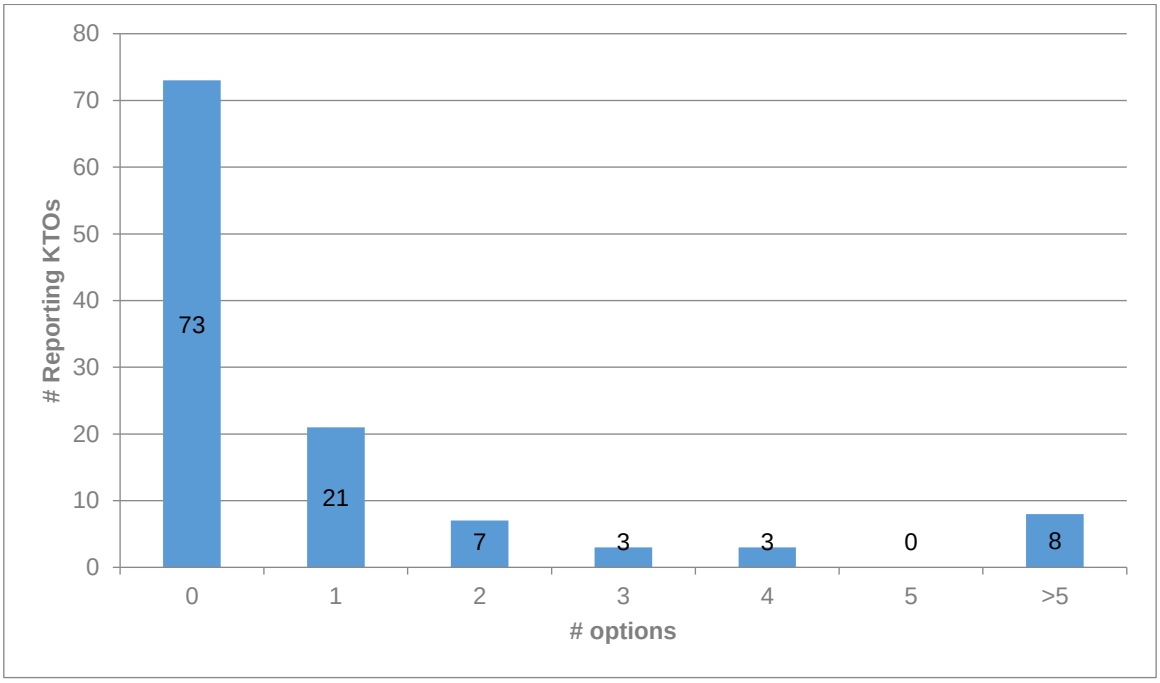

Figure 14. Distribution of new option agreements per reporting organisation

Assignment Agreements

As observed for option agreements, assignment agreements appear not to be a frequently used means for commercialisation. As shown in Table 2 (page 15), the total number of 240 new assignments reported for FY2015 is somewhat higher than the total number option agreements but far smaller than the number of licence agreements. The majority of those organisations that reported the number of assignment agreements that they had entered into in FY2015 (73/119 or 61%) reported zero assignment agreements and only a small fraction of respondents to this question (10/119 or 8%) seems to use assignments relatively frequently as they report entering into more than 5 assignment agreements in the reporting period (Figure 15).

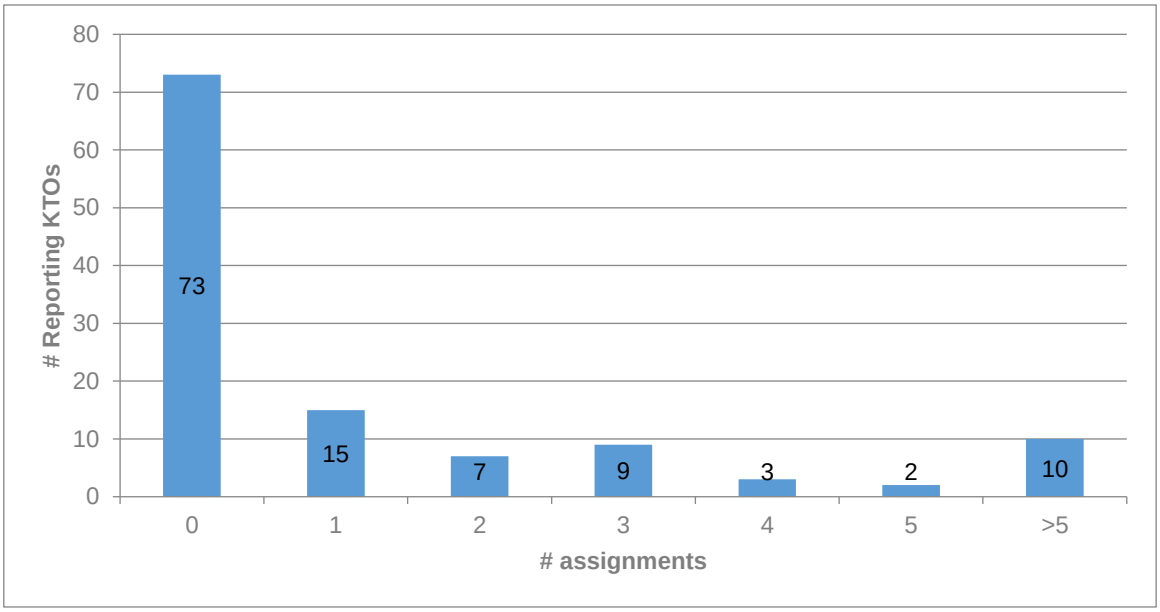

Figure 15. Distribution of new assignment agreements per responding organisation

Licence Agreements

As expected, the most prominent route of commercialisation by far is through licensing, with an overall number of 18,400 new licence agreements concluded in the FY2015 as reported by the 290 respondents to this question.

Figure 16 shows that half of the responding organisations (145/290 or 50%) concluded between 1 and 50 licence agreements. However, more than a third of the respondents (102/290 or 35%) reported that they did not conclude any licence agreement in FY2015. On the other side of the spectrum, some organisations (22/290 or 8%) report to have concluded quite a substantial number (>100) of licence agreements (including software licence agreements) in the reporting period.

The higher numbers may be due to the fact that there was no limitation imposed for UK respondents regarding counting several licence agreements based on one and the same piece of software. Due to such lack of limitation, numbers for UK participants tend to be structurally higher than for participants from other EU states.

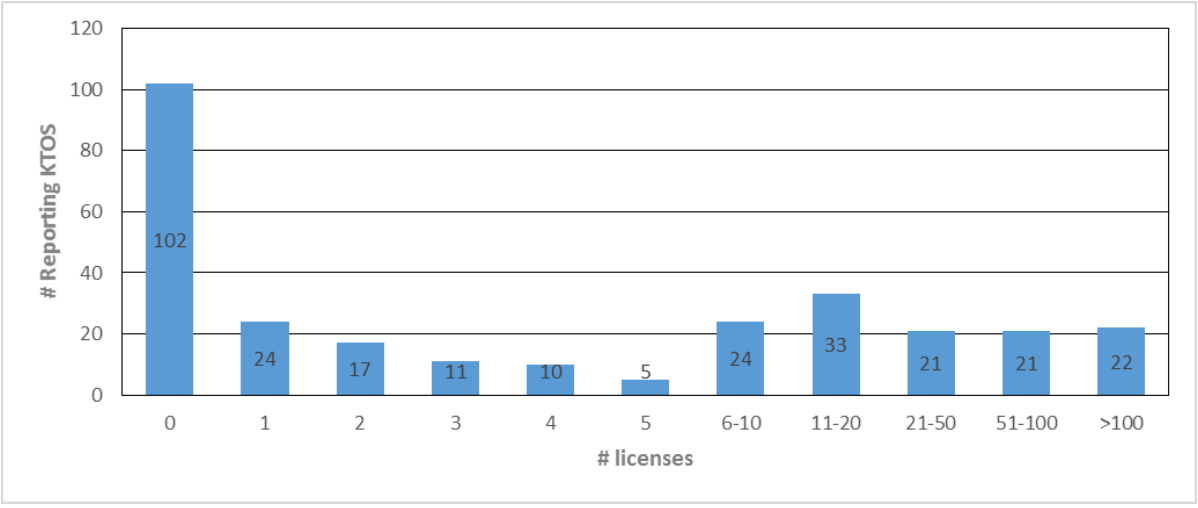

Figure 16. Distribution of the number of new licence agreements per reporting organisation

Software Licence Agreements

Given the special role of software in intellectual property asset commercialisation nowadays (with licence agreements to end-users often being highly standardised/automated), this survey also addressed transactions concluded in this specific field.

The 277 responding organisations reported a total of 9,248 new software licence agreements that were concluded in FY2015.

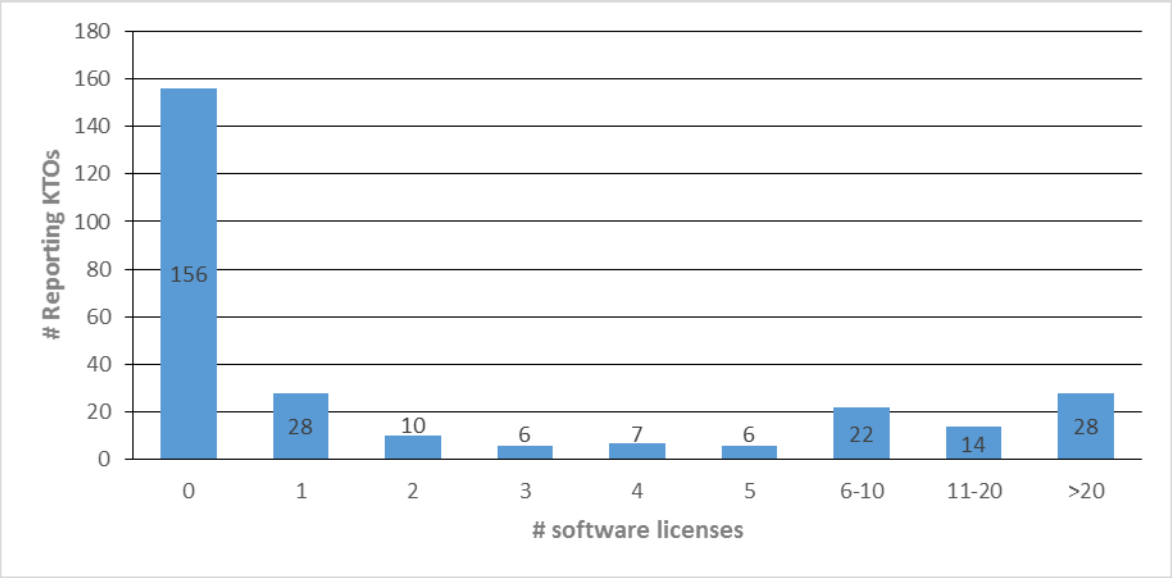

Figure 17. Distribution of the number of new software licence agreements per reporting organisation

Again, as seen earlier in this chapter for option-, assignment and licence agreements, a relatively large number of responding organisations (156/277 or 56%) reported that they have not concluded any software licence agreements in the FY2015. Almost one third of the respondents, 79 respondents, reported up to 10 new software licences in FY2015 and 28 respondents (10%) concluded more than 20 new software licences. It is worth pointing out that, in this latter group, some respondents report many hundreds or even thousands of new software licences per year.

4) Spin-offs and Gross Equity Revenues

This section deals with the establishment of spin-offs and the amount of gross revenues related to cashed-in equity, each as defined in the Survey Questionnaire (see Appendix).

Entrepreneurship activity	Total	Average per KTO/PRO
Spin-offs (N=380)	640	1.7

Table 3. Total of spin-offs and average per organisation

Figure 18 shows that about two-thirds of the 380 respondents declared having founded either 0 or 1 academic spin-off in FY2015. In more detail 48% of the responding organisations (184/380) registered no academic spin-off formed in this fiscal year, while 65 responding organisations (17%) reported only 1 spin-off created. Furthermore, 103 responding organisations (27%) reported having spun-off 2 to 5 companies and 28 responding organisations (7%) reported having created more than 6 spin-offs in FY2015.

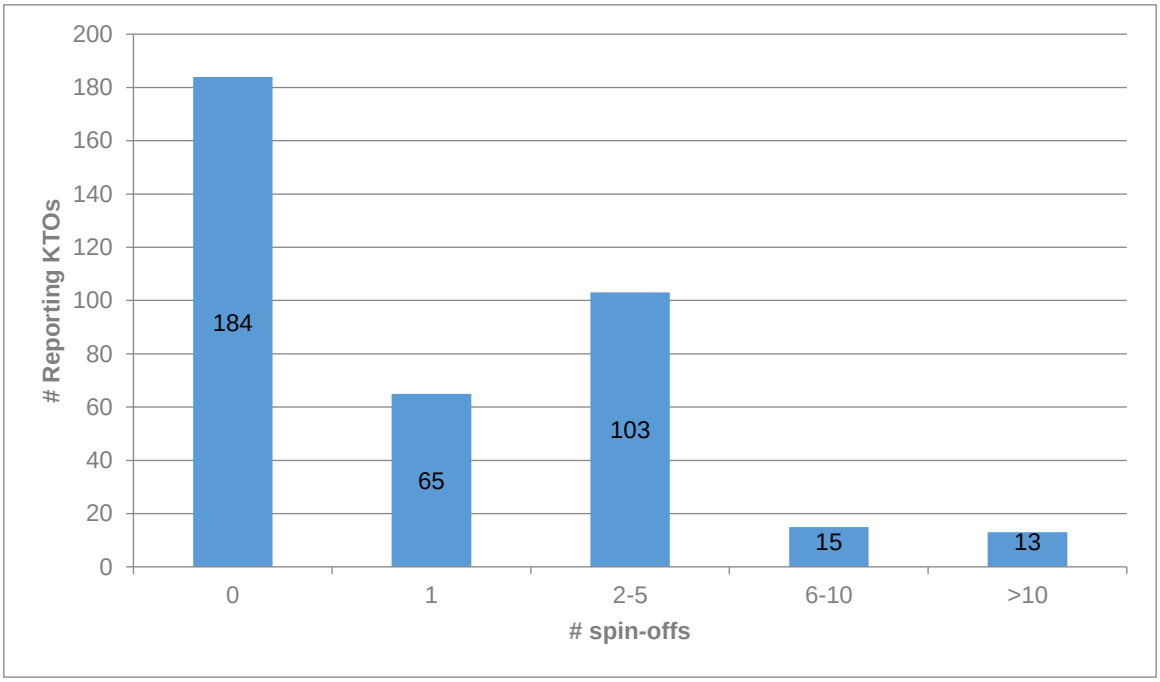

Figure 18. Distribution of the number of new spin-offs reported in FY2015 per reporting organisation

Finally, Figure 19 shows that the vast majority of respondents report either no or less than €50,000 in gross revenue from cashed-in equity. Of the remaining 21 entities (from a total of 281 responses), only 8 declared an amount of over €1 million in FY2015. Three organisations report having grossed €10 million or more from the sale of equity, with the two highest values each greater than €20 million.

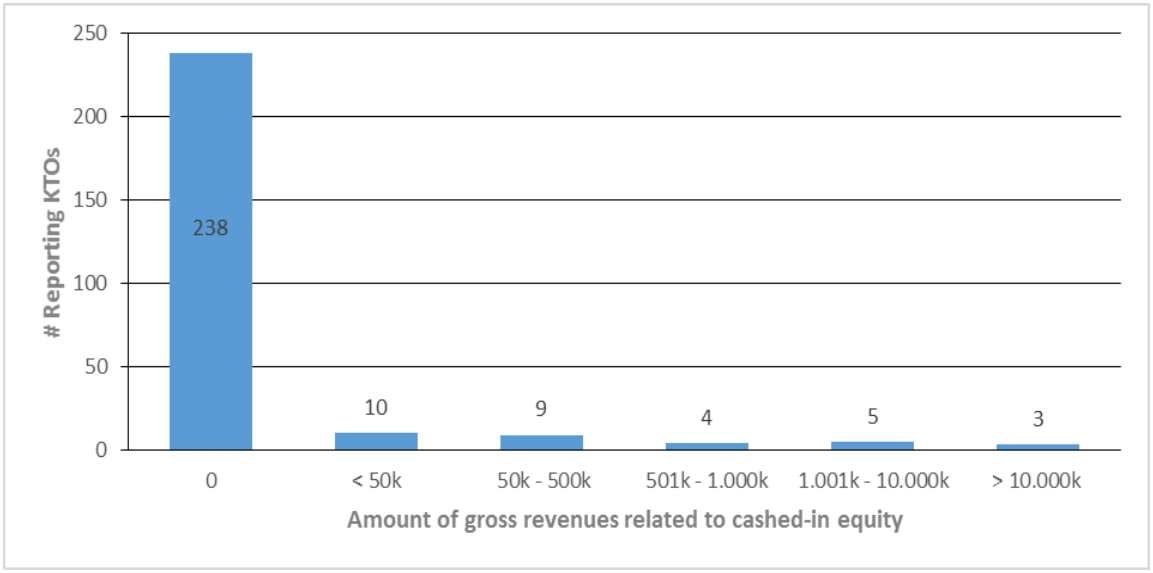

Figure 19. Distribution of the amount of cashed-in equity per reporting organisation

V. Conclusions

The Annual Knowledge Transfer Survey is a core activity of ASTP-Proton. This report is one of the most relevant products of the association as it aims to report on the activities of the knowledge transfer community in Europe. Having gathered and analysed data on FY2015 from over 400 European reporting organisations, the continued effort in surveying knowledge transfer activity in Europe has reached new heights in terms of the number of respondents.

This report is based on an extensive dataset and can be used as a reference profile of the European knowledge transfer industry, for stakeholders such as PRO management and policy makers in Europe and elsewhere.

The FY2015 data underlying this report shows a great diversity in the volume of knowledge transfer activities in Europe. This is not surprising, given that KTOs have been active for a long time in some countries, whereas organised knowledge transfer is a relatively new activity in others. Moreover, PRO-industry relationships also differ from country to country.

It is important to bear in mind that the analysis presented in this report is performed on aggregated data. The result of this is that the specific context in which an individual reporting organisation operates and from which individual data points are derived is not visible. Careful review and cleaning of the raw data by the Survey Committee before aggregation and analysis is therefore very important. Furthermore, the reported data may not be representative of specific countries/regions but are intended to portray a picture of the overall European KTO landscape.

Another aspect to consider is that the underlying data set consists of data from several sources. ASTP-Proton received data from both individual KTOs or PROs as well as sizeable datasets derived from national surveys, representing many KTOs or PROs . These surveys are not aligned across European countries with regard to definitions used and questions asked, which as a consequence result in the compilation of a heterogeneous European dataset.

For the FY2015 Survey, ASTP-Proton has attempted not to overwhelm respondents by asking too many questions. Compared to the FY2014 Survey, the number of questions was brought down to a set that the Survey Committee (in consultation with representatives of several national associations) felt were both relevant and for which data were likely to be easily tracked or readily available.

Some questions were intended to provide data that could be used as normalisation factors. Normalising data in this way (e.g. making numbers relative to the amount of research funding or the number of FTE engaged in research) is important when comparing entities of different sizes to one another. However, the report does not feature any normalised data because these questions were inconsistently answered. In cases where normalisation data were provided, differences within Europe regarding e.g. living standards, currency and employment status of PhD students created too much variation for these normalisation data to be useful.

The first part of this report, dealing with KTOs themselves, has been more focused compared to last year's report. An aggregate number of 1,924 FTE KTO professionals was reported, serving a total of 410 institutions. Based on the input of 175 KTOs, their aggregate budget (not including IP costs), was €129.6 million. Given that the actual number of KTOs in Europe is much higher, these numbers point to a sizeable investment by European academic organisations (and local and national governments) in Knowledge Transfer.

Intellectual property management remains a key activity for KTOs. On average, a European KTO received 29 invention disclosures, filed 12 priority patent application and was granted 9 patents in FY2015. A closer look at the data reveals that there are several KTOs that, while they reported receiving a high number of invention disclosures, only reported very few or even zero new patent

filings. However counterintuitive, there are a number of situations that can be envisaged that would explain this apparent discrepancy: (i) the PRO has most of its research focused outside of the technical fields (the Humanities, Social Sciences or the Arts) and patent rights are therefore rarely applied for; (ii) due to the professor's privilege IP system, the invention is not owned by the PRO and consequently the PRO does not record the filing of patent applications; (iii) the PRO has a strong focus on contract research with outside organisations (where the outside partner acquires ownership and responsibility for patent filing); (iv) there is a lack of IP awareness within the PRO that often causes academic publications to destroy patent novelty; or (v) alternative forms of IP protection (such as design, utility model) are available that can also underpin the commercial application of a particular invention. Finally, patent protection is a costly business and as costs rise with the increase in a KTO's patent portfolio, KTOs may need to be very selective when it comes to filing patent applications.

Still in the intellectual property management section: almost 24% of responding KTOs report that there were no patents granted in FY2015. As patents may take more than five years to be granted, this should come as no surprise. Newer KTOs just may not have patent applications in their portfolio yet that have reached this stage. For others, it may be a result of a year that was not so abundant in patent applications or the KTO was not even filing patent applications in the first place. Another strategy that seems to be quite common among KTOs is to file patents quite frequently, but abandon them by the end of the priority year or after completion of the PCT procedure if no commercial partner has been identified. This may allow the TTO to invest their patent budget on protecting more inventions, while being very stringent in selecting those that will be continued in the national phase. Such strategy is expected to lead to a sizable portfolio of patent applications but with few applications going all the way to grant.

The difference between the number of reported new patent applications and the total number of patent families managed by the KTOs indicates an active management of such patent portfolio that spans multiple years. The large majority (92%) of KTOs have at least a few patents or patent applications in their portfolio and on average 21% of the patents are licensed or optioned. These numbers demonstrate that European KTOs actively manage their IP and suggest that they are reasonably successful in attracting commercial interest in the application of their IP.

This brings us to contracts and licensing income. Here, the data suggest a vibrant environment in Europe. The majority of responding organisations reported entering into contract research agreements, consulting agreements, and licence agreements in the reporting year. While less relevant for some PROs, consultancy appears to be the most common type of interaction with industry (especially in the UK). As reported in Figure 12, 8% of the reporting organisations seem very active in this field (>500 consultancy contracts in the reporting year), a slightly lower percentage than reported in the FY2014 Survey (11%). The number of consultancy contracts may even be underreported as consultancy services – in contrast to collaborative research or contract research services – are not always contracted from the PRO itself but are also known to be agreed with the consulting academic directly, which contract may not be recorded by the PRO employing the consulting academic.

In terms of aggregate income, contract research stands out at over €1.1 billion, but while the number of collaborative agreements is only about one-third of the number of contract research agreements, the average income per PRO from collaborative research contracts is slightly higher than that from contract research (€4.96 million vs €4.30 million). Responding organisations reported 18,400 licences executed, including 9,248 software licences.

Finally, the formation of spin-offs is a constant activity for European KTOs, with more than half of the organisations reporting on this metric having founded at least 1 spin-off in the reporting year.

However, the reported amounts of cashed-in equity were negligible for the vast majority (88%) of responses.

This ASTP-Proton FY2015 report sheds light on quantifiable knowledge transfer activities in Europe, in a rich, diverse and complex landscape. Despite some limitations mentioned in the report, the FY2015 data (and those of FY2014) lay the foundation for a data collection that can potentially be used for conducting longitudinal studies in the years ahead. To do so, it is essential that the knowledge transfer community continues its support and contribution to future surveys so as to increase its coverage of European technology transfer activities with rising numbers of respondents. ASTP Proton aims at improving the quality and completeness of data and providing useful feedback to the associations' stakeholders, both on the process of data collection and on complementary indicators that could be developed over time.

The Survey Committee is aware that the quantitative data on knowledge transfer activity across Europe presented in this report represents only a part of the activities of all European KTOs. Still, these conclusions remain based on a significant sample of European KTOs. It is important to stress that the data in this report are not suited to be used as a sole means for measuring the performance of an individual KTO, let alone measuring the impact that is created with the valorisation of research results, even if impact were only viewed in a very narrow, economic sense. Yet, quantitative data play an important role in setting the metrics for capacity building in technology transfer, where measuring is not just about showing how effective or full of potential KTOs may be, but also to understand the dimensions of KTOs' performance where further human, technical and organisational investments are needed to enable more to be done and done better.

VI. Acknowledgements

The ASTP-Proton Board and the Survey Committee are very happy that participation in the ASTP-Proton Annual Survey continues to increase and 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 data to the profession of knowledge transfer.

We also thank the National Associations and the ASTP-Proton National Associations Advisory Committee (NAAC) for their tremendous effort in supporting our collection of a substantial European TTO data set. The distribution of information about the survey and the motivation at the national level have been of tremendous value and resulted in a significantly higher participation than in the previous year.

In this regard, we would like to thank our committed partners at TechnologieAllianz (DE), SNITTS (SE), Réseau LIEU (BE), DNNT/Danske Universiteter (DK), NCTT (SI) and PACTT (PL), who have been very active in supporting us in collecting data from several members in their respective networks.

We like to extend our special thanks to HEFCE (GB), Knowledge Transfer Ireland (IE), NETVAL (IT), RedOTRI and Crue (ES), and SwiTT (CH) 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 underlying our assessment and made our results more robust and representative.

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

The cooperation with national organisations is of tremendous value as they contribute significantly to the completeness of our territorial coverage and thereby increase the representativeness of our findings. We intend to strengthen and continue our fruitful cooperation with such associations and try to engage further organisations to be able to provide additional valuable information such as regional differences and trends in the future and invite national organisations to support our efforts and provide feedback for improvements in our future surveys. This especially also includes our efforts in harmonising data collection throughout Europe and inclusion of such harmonised data from collaborating national associations.

Ulrich Mahr
VP Survey and Impact

VII. Survey Committee

Ulrich Mahr, MBA, RTTP
(Chairman, VP Survey/Impact)

Koen Verhoef, PhD, RTTP
(Vice-Chairman)

Tamas Bene

Prof. Ahmed Bonfour

Massimiliano Granieri, PhD

Laura Kreiling

Marusela Oliveras, PhD, RTTP

Prof. Laura Ramaciotti

Ugo Rizzo, PhD

Appendix A: FY2015 Survey Questionnaire

The ASTP-Proton Knowledge Transfer survey for FY2015

Welcome to the ASTP-Proton Knowledge Transfer Survey

REFERENCE YEAR

Please provide us with data relevant for the 12 month period that is used within your Knowledge Transfer Office or Public Research Organization for financial reporting ("Financial Year" or "FY").

If this period does not coincide with a calendar year (e.g.: your Financial Year starts on May 1st), then please provide us with data for the 12 month period that ENDS in the year for which data are requested. In the example above: Financial Year 2015 (FY2015) would be the period from May 1, 2014 – April 30, 2015.

This survey collects data for **FY2015**

If your KTO is the major service provider for more than one Public Research Organization, please provide aggregate data for all PROs combined where possible.

Please make sure that - before starting to fill out this survey - you have collected some basic numbers for all of the Public Research Organisations that you report on, in particular the total amount of Research Expenditure in FY2015 and the total number of FTEs engaged in research in FY2015.

These numbers are used during survey analysis to normalize data such that the output of organizations of different sizes can be compared more readily.

The ASTP-Proton Knowledge Transfer survey for FY2015

Demographics and KTO age

*** 1. Please provide demographic information on your Knowledge Transfer Organization (KTO) or - if the KTO is not a separate legal entity - your Public Research Organization (PRO).**

Name of contact person for the survey

Name of KTO or - if not independent - the Public Research Organization of which the KTO is a part:

Address 1:

Address 2:

City/Town:

State/Province:

ZIP/Postal Code:

Country:

Email Address contact person:

Phone Number contact person:

2. In what year was your KTO first established?

3. Please give the number of Public Research Organisations for which your KTO is the major service provider of Knowledge Transfer services.

The ASTP-Proton Knowledge Transfer survey for FY2015

Confidentiality and permissions

4. 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 organization 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.

5. Please allow us to share your data with your national knowledge and technology transfer organization and name the organization or person in charge of collecting data in your county below.

ASTP-Proton requires specific permission from you regarding sharing data submitted by you under this survey. 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 4 of course).

The ASTP-Proton Knowledge Transfer survey for FY2015

KTO Personnel and Expenditure

6. What was the total number of KTO staff in full-time equivalents (FTEs) at the end of FY2015:

7. Please give the total gross expenditures of the KTO in FY2015, less out-of-pocket costs for IP protection (€)

8. 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)]

We intend to use the numbers that we ask you to provide under the following questions 9 through 12 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)

9. Please give the aggregate Research Expenditures in FY2015 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 permanent academic staff, costs of administrative support, capital expenditures on new equipment. Exclude cost of new buildings or land]

10. Of the aggregate Research Expenditures reported under Question 9, what amount was spent in the Science, Technology, Engineering and Mathematics (STEM) and Life Sciences/Medicine fields (€)?

11. What was the (combined) research effort of your PRO(s) in FY2015, 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. Of the (combined) research effort reported under Question 11, what number of FTEs was engaged in the Science, Technology, Engineering and Mathematics (STEM) and Life Sciences/Medicine fields?

13. Please use this comment box to provide context where necessary to any of the numbers provided under the preceding questions 7 through 10.

please comment if there are reasons to assume that the numbers provided under questions 7 through 10 may not be comparable with those provided by other institutions (e.g.: because 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 payrol of the PRO and so do not contribute to the Research Expenditures etc.).

14. Please provide the number of agreements with industry that were concluded in FY2015:

Number of new Contract Research Agreements

Number of new Collaborative Research Agreements*

Number of new Consultancy Agreements**

* for this question please 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 sponsored).

** please 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.

15. Please provide the aggregate amount (€) received directly by your PRO from for-profit parties under the following agreement types in FY2015:

Contract Research Agreements

Collaborative Research Agreements**

Consultancy Agreements

** *please 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).*

Invention disclosures, patent applications and patent grants

16. What is the number of invention disclosures received by your KTO in FY2015?

[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]

17. Please give the total number of priority patent applications filed in FY2015.

[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]

18. How many patents were first granted in FY2015 (please only count the first granted patent in each patent family)?

[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]

19. What is the total number of patent families in the patent portfolio of your KTO that are active at the end of FY2015?

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

20. Please give the percentage of active patent families in the patent portfolio provided under question 19 that is licensed or optioned at the end of FY2015.

[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

21. What is the number of IP agreements executed in FY2015 by type:

Licenses (not including licenses for research materials)

Options

Assignments

Licenses for the commercial use of research materials

22. Of all the Licenses reported above for FY2015, 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

23. What are the gross revenues from commercialisation of IP earned in FY2015 (€)?

[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]

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

25. Of the gross revenues reported under Question 23, what amount was generated from running royalties (i.e.: revenues based on turnover of product) (€)?

26. Of the gross revenues reported under Question 23, what amount relates to cashed-in equity (€)?

27. How many IP agreements yielded more than 1M€ in gross revenues in FY2015?

Spin-offs and start-ups

28. How many spin-offs were established in FY2015?

[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]

29. How many start-ups did your KTO deal with in FY2015?

[A start-up is a newly registered company that is not directly involved with the exploitation of intellectual property generated within a Public Research Organization served by the KTO]

Please leave this question blank if your KTO does not support start-ups. If you enter 0, we will assume you normally do support start-ups but did not assist any in FY2015

30. 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 any.

Survey completed

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