



Summary Report for Respondents: The ASTP Survey for Fiscal Year 2007

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1. INTRODUCTION

Technology transfer offices (TTOs) play a key role in the commercialisation of publicly funded research. Many of the activities of TTO staff are tacit and difficult to measure, but other activities, such as assisting with patent applications or helping to establish start-up firms, can be identified and measured.

In the spring of 2008, MERIT conducted a third survey on behalf of the Association of Science and Technology Professionals (ASTP) on the technology (or knowledge) transfer activities of ASTP members representing universities and other public institutes. The latter includes academic hospitals, government or non-profit research institutes, and research parks or incubators affiliated with these public institutions. This year, the survey also included a sample of European TTOs that are not members of ASTP.

The survey response rate was 61.4% for ASTP members, with 72 eligible responses from universities and 21 eligible responses from other public research institutions. For other TTOs (not ASTP members), the response rate was 18.8%, with 39 eligible responses from universities and 8 eligible responses from other public research institutions.² Responses from ASTP members were received from 18 EU countries and 4 non-EU countries. Other TTOs responded from 12 EU countries and 3 non-EU countries.

The survey collected information on the types of knowledge transfer services provided by TTOs and data on seven performance measures in 2007: invention disclosures, patent applications, patent grants, new start-ups, license agreements, license income, and research agreements.

Some of the ASTP results for 2006 from the earlier 2007 survey are compared with the results of the 2006 survey of American TTOs conducted by the Association of University Technology Managers (AUTM).³ In order to be able to combine results across European countries and to compare them with the AUTM data for the United States, all ASTP financial data are given in US dollar purchasing power parities (PPP\$), using OECD data on PPPs for each European country.⁴

This report summarizes the main results of the ASTP 2008 survey. The complete report is available from ASTP. This survey was made possible with the financial support from Paul Capital Partners, whose support ASTP gratefully acknowledges.

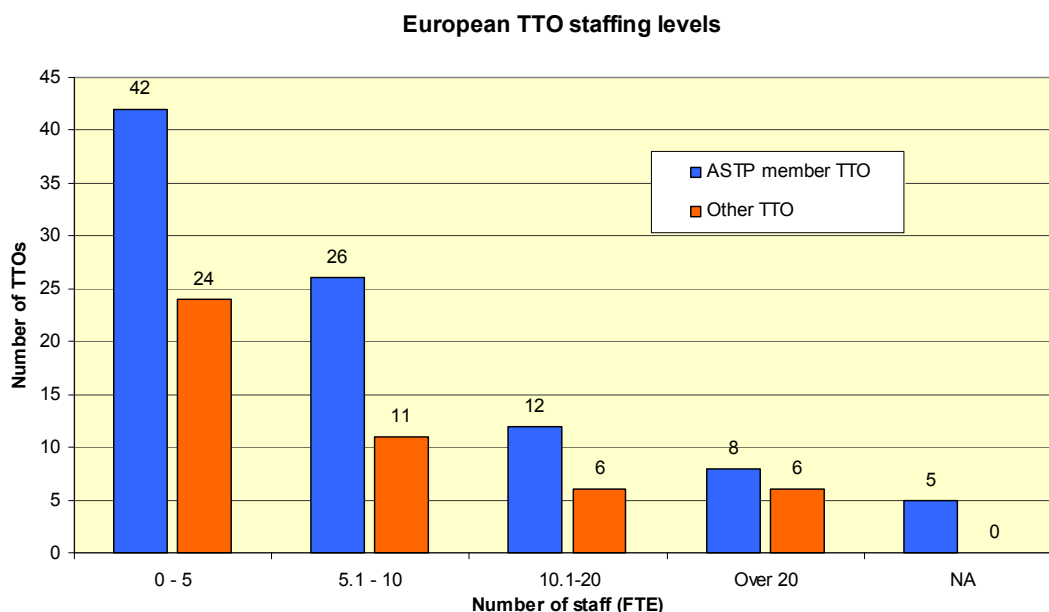
² The lower response rate for non-member TTOs is due to less intensive follow-up in order to reduce costs.

³ No AUTM results are available yet for fiscal year 2007.

⁴ PPP stands for purchasing power parity. It is a currency exchange rate whereby a basket of goods in country A costs the same as in country B, if the currencies are exchanged at that rate. Actual exchange rates vary from the PPP levels.

2. CHARACTERISTICS OF THE TTOS

Figure 1



NA = Respondent did not report results

The average ASTP member TTO has 8.8 staff members. ASTP TTOs that represented universities had an average of 8.8 personnel, compared to an average of 9.1 personnel for TTOs that represented other public research institutions. The non-member TTOs that represented universities were slightly larger than the ASTP member TTOs, with an average of 11 staff, but the average for non-member TTOs representing other public research institutions was almost identical to the ASTP average, at 9.0 personnel. Figure 1 gives the distribution of staffing levels.

On average, the ASTP members are 9.3 years old and the other TTOs are 9.6 years old. Over half of both the ASTP (55%) and non member TTOs (64%) were established after 2000.

For 75% of the 93 ASTP members, intellectual property (IP) rights belonged to the affiliated institutions, for 12% the IP rights were held either by the institution or by others (usually the inventor or the government), and for 13% the affiliated institution did not own any of the IP, with the rights held by the inventor. The results were very similar for the 47 non-member TTOs: 72% stated that only their affiliated institutions held the IP rights, 15% reported that the IP rights were held either by the institution or by others, and 13% replied that the affiliated institution did not own any of the IP.

3. INVESTMENT IN RESEARCH

Table 1. Research investment by affiliated institutions in 2007

| | | Research personnel | | Research expenditures (million PPP\$) | |
|-----------------|--|--------------------|----------------|--|--------------|
| | | Mean | Total | Mean | Total |
| ASTP members | Universities | 2,483 | 153,921 | 123.8 | 5,942 |
| | Other public research institutions | 1,687 | 27,232 | 161.9 | 2,610 |
| | <i>Total</i> | <i>2,319</i> | <i>181,153</i> | <i>133.3</i> | <i>8,552</i> |
| Non-ASTP | Universities | 1,662 | 46,532 | 61.9 | 1,423 |
| | Other public research institutions | 2,137 | 12,820 | 326.8 | 1,307 |
| | <i>Total</i> | <i>1,746</i> | <i>59,352</i> | <i>101.1</i> | <i>2,730</i> |

Investment in research by the TTO's affiliated institution is measured through the number of research personnel and total expenditures on research (in million US dollar purchasing power parities). One hundred and thirteen respondents provided data on research personnel and 92 provided data on research expenditures. Table 1 gives the means and total amounts of research personnel and research expenditures reported by the TTOs for their affiliated institutions.

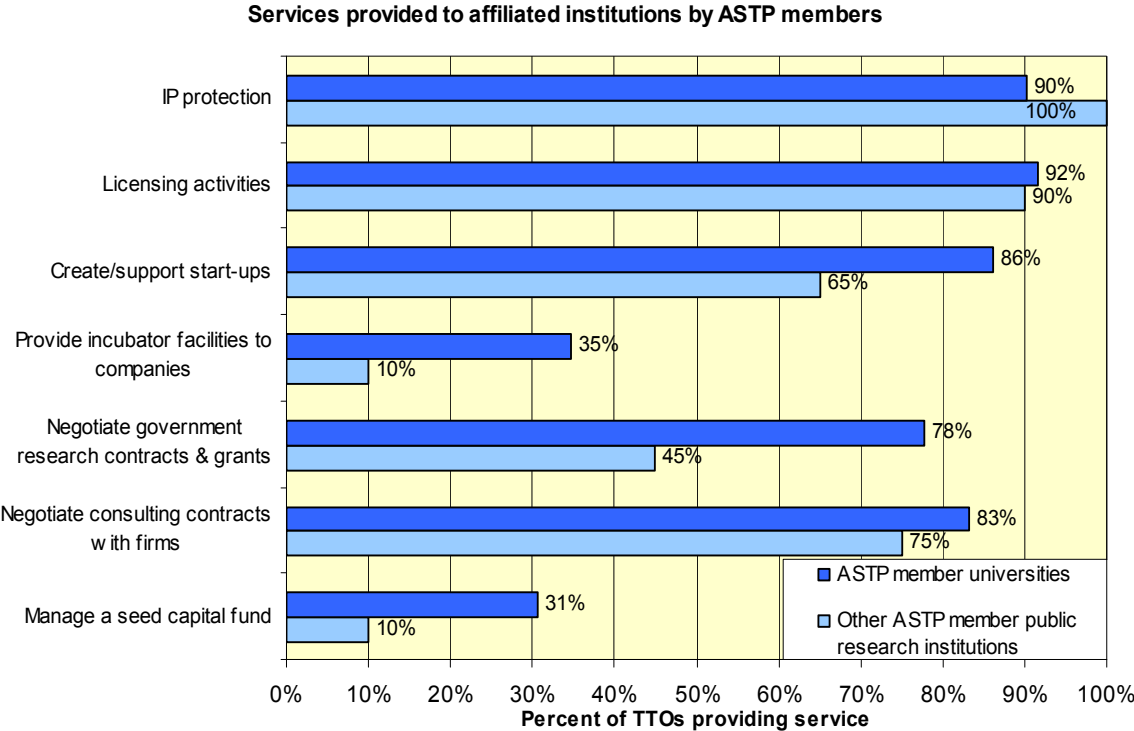
ASTP member affiliated universities have on average 47% more research personnel than other public institutes. Conversely, for non-member TTOs the situation is reversed: other public research institutions have on average 29% more research personnel than universities.

On average in 2007, 16.1% of research in the ASTP member TTOs and 11% of research in the non-member TTOs was funded by private companies. Within both groups, a significantly higher percentage of 2007 university research was funded by private companies (20.3% for ASTP members and 16.2% for non-members) than non-university research (7.6% for ASTP members and 6.2% for non-members).

4. TTO SERVICES

Figure 2 for ASTP members and Figure 3 for non members give the results for the services given by TTOs to their affiliated institutions.

Figure 2

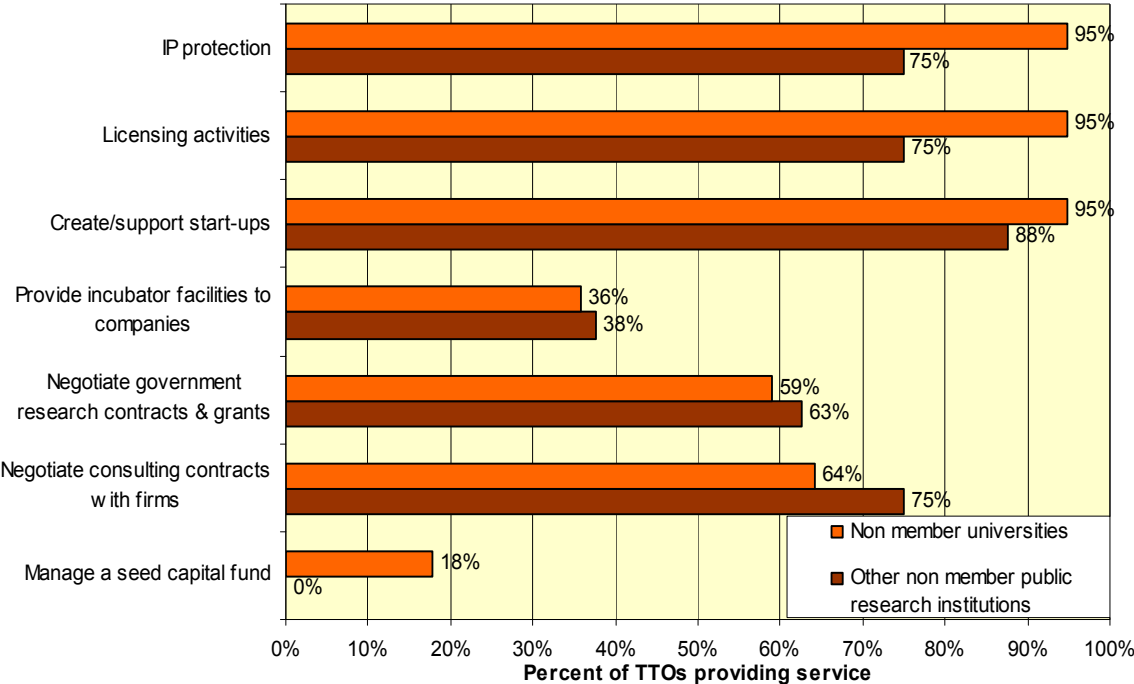


Almost all TTOs provide intellectual property protection (92% in total for all 93 ASTP and 47 non-member respondents), negotiate or arrange licences (91% in total) and create or support start-ups (86% in total). Less than half of the TTOs provide incubator services to companies (32% in total) or manage a seed fund (22% in total).

Among ASTP members, a much lower percentage of non-university TTOs negotiate government research contracts (45% versus 78% for universities) than among non-members, where the proportions are very close (63% versus 59%). The only group reaching 100% consists of ASTP members providing IP protection to non-university research institutions.

Figure 3

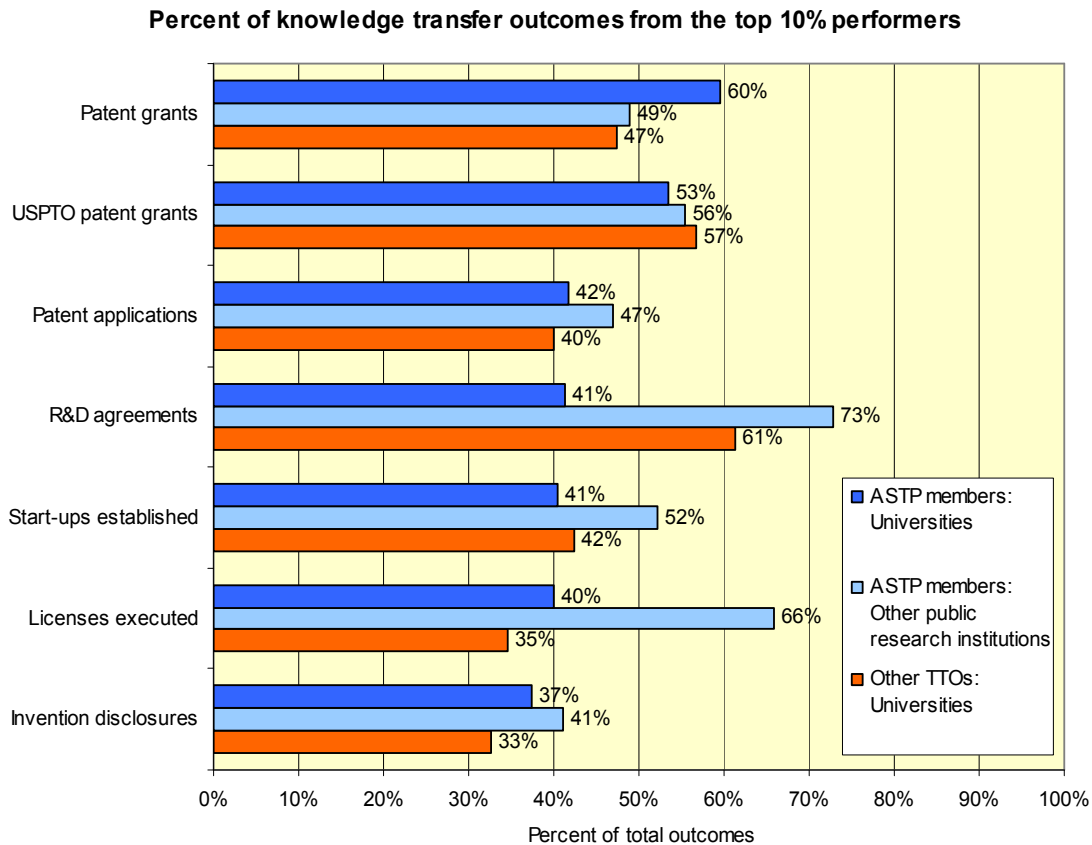
Services provided to affiliated institutions by other TTOs (non members)



5. PERFORMANCE OUTCOMES

5.1 Performance share from the top 10%

Figure 4



Notes: Results limited to TTOs that reported data for each indicator.

This figure does not include other TTOs that represent 'other public research institutions' due to the small number of respondents.

Figure 4 gives the percentage of the total number of outcomes that are reported by the top 10% of the universities affiliated with TTOs and for other public research institutions that are members of ASTP. For example, 55 ASTP members that represent universities report a total of 394 patent grants. The top performing 5 university ASTP members for patent grants (approximately 10%) account for 235 of these patents, or 60% of the total. With the exception of R&D agreements and licences, there is not much difference between the ASTP members and other TTOs in the share of each outcome held by the top 10% of affiliated institutions. However, the top 10% of ASTP members that represent other public research institutions account for a higher percentage of R&D agreements (73% versus 41%) and licenses granted (66% versus 40%) than ASTP members that represent universities. The top 10% of non-member universities also account for a high percentage of R&D agreements (61%) than do ASTP member universities.

5.2 License income

Table 2. License income in 2007 (million PPP\$)

| | Mean¹ | Median¹ | Total |
|---|-------------------------|---------------------------|--------------|
| Universities | | | |
| ASTP members | 1.44 | 0.15 | 63.54 |
| Other TTOs | 0.40 | 0.11 | 11.94 |
| <i>Total</i> | <i>1.02</i> | <i>0.11</i> | <i>75.48</i> |
| Other public research institutions | | | |
| ASTP members | 2.01 | 0.91 | 34.24 |
| Other TTOs | 0.28 | 0.07 | 1.38 |
| <i>Total</i> | <i>1.62</i> | <i>0.15</i> | <i>35.62</i> |

1: Mean is the arithmetic average of all values in a sample, whereas in a population or a sample, the median is the value that has just as many values above it as below it. If there is an even number of values, the median is the average of the two middle values.

Table 2 gives results for license income. On average, ASTP members report substantially more license income than non member TTOs. For example, the mean license of universities served by ASTP members is 1.44 million PPP\$, compared to 0.40 million PPP\$ for universities served by non member TTOs. The median is much lower, partly due to the number of TTOs that report zero license income and due to a high percentage of total license income earned by a small percentage of respondents. For example, the top 10% of performers accounted for 73.4% of all license income earned by universities and for 57.7% of all license income earned by other public research institutions.

5.3 Performance per 1,000 research staff

Table 3 gives standardized performance measures for 2007 per 1,000 research personnel. For example, universities affiliated with ASTP member TTOs produced, on average, 5.7 patent applications and 3.3 patent grants per 1,000 research staff.

Table 3. Performance per 1,000 research staff in 2007

| | Universities | | | Other public research institutions | | |
|-----------------------|--------------|------------|-------------|------------------------------------|-------------|-------------|
| | ASTP members | Other TTOs | Total | ASTP members | Other TTOs | Total |
| Invention disclosures | 18.0 | 15.1 | 17.3 | 23.1 | 15.6 | 20.6 |
| Patent applications | 5.7 | 7.9 | 6.2 | 7.9 | 11.9 | 9.2 |
| Patent grants | 3.3 | 1.6 | 2.8 | 6.5 | 6.8 | 6.6 |
| USPTO patent grants | 1.0 | 0.3 | 0.8 | 1.8 | 0.2 | 1.2 |
| License agreements | 4.8 | 3.0 | 4.4 | 10.9 | 5.1 | 9.0 |
| License income | 0.5m PPP\$ | 0.1m PPP\$ | 0.5 m PPP\$ | 1.1 m PPP\$ | 0.1 m PPP\$ | 0.8 m PPP\$ |
| Start-ups established | 1.3 | 1.6 | 1.4 | 0.7 | 1.2 | 0.9 |
| Research agreements | 88.6 | 203.8 | 115.9 | 75.5 | 114.4 | 89.4 |

With the exception of the number of start-ups established and research agreements, other public research institutions outperform universities. Per thousand researchers (for both ASTP and Other TTOs combined), other public research institutions have 1.5 times more patent applications, 2.0 times more license agreements, and 2.4 times more patent grants than universities. This is not surprising, since the government and non-profit research institutions that account for most of the ‘other public research institutions’ are likely to perform more applied research than universities and have substantially larger research budgets per researcher. Furthermore, many university researchers will have other responsibilities such as teaching in addition to research.

5.4 Performance by research expenditures

Table 4 gives the “cost” in terms of research expenditures for each unit of performance outcome. These are not real costs because many outcomes such as invention disclosures or patent applications would have been developed out of research funded before 2007 and the primary goal of the research was not necessarily to produce such outcomes. Nevertheless, the results provide an indication of the level of investment in public research that is required to produce outcomes such as a start-up or a patent with commercial potential.

Table 4. Unit outcome costs in million PPP\$ of research expenditure, 2007

| | Universities | | | Other public research institutions | | |
|-----------------------------|--------------|---------------|--------------|------------------------------------|---------------|---------------|
| | ASTP members | Other TTOs | Total | ASTP members | Other TTOs | Total |
| Invention disclosures | 3.3 | 2.1 | 3.0 | 4.2 | 6.6 | 4.8 |
| Patent applications | 9.1 | 4.6 | 7.6 | 12.2 | 8.7 | 10.7 |
| Patent grants | 23.4 | 15.3 | 21.0 | 12.3 | 15.2 | 13.5 |
| USPTO patent grants | 54.0 | 107.1 | 61.0 | 44.8 | 653.6 | 76.9 |
| License agreements | 10.8 | 9.0 | 10.4 | 8.8 | 26.7 | 11.4 |
| License income ¹ | 76.0 m PPP\$ | 122.2 m PPP\$ | 82.9 m PPP\$ | 83.5 m PPP\$ | 947.2 m PPP\$ | 120.6 m PPP\$ |
| Start-ups established | 34.9 | 32.2 | 34.4 | 112.9 | 186.7 | 134.5 |
| Research agreements | 0.5 | 0.2 | 0.8 | 0.8 | 0.9 | 0.9 |

1: This indicator equals the amount of research expenditures to earn 1 PPP\$ of license income.

On average, universities spent 3.0 million PPP\$ on research in 2007 to produce one invention disclosure. One granted patent was produced per 21.0 million PPP\$ in research expenditures, and one PPP dollar of license income was produced per 82.9 PPP\$ of research expenditures.

For both ASTP members and other TTOs combined, universities are more efficient than other public research institutions in terms of invention disclosures, patent applications, license agreements, license income, start-ups and research agreements, with a lower cost in terms of research expenditures per unit outcome. For example, 34.4 million PPP\$ of research expenditures by universities led to one start-up, but other public research institutions spent, on average, 134.5 million PPP\$ on research for each start-up. However, other public research institutions perform better for patent grants.

Success in terms of outcomes appears to partly depend on experience. The age of the TTO office is positively correlated with the number of invention disclosures, patent applications, patent grants, USPTO patent grants, start-ups, license agreements, license income and R&D agreements.⁵ However, the effect of age vanishes when using the *efficiency* with which research expenditures are turned into outcomes.

⁵ There is no significant correlation between the age of the TTO and patent grants and R&D agreements when limited to ASTP members.

5.5 Percentage change in performance outcomes 2004-2007

Using the results of the last three editions of the ASTP survey, a matched sample of 47 ASTP members (40 universities and 7 other public research institutes) has been constructed containing data from the years 2004, 2005, 2006 and 2007. Since the institutions which are not ASTP members are answering the survey for the first time this year, their results are not included in this section.

Figure 5

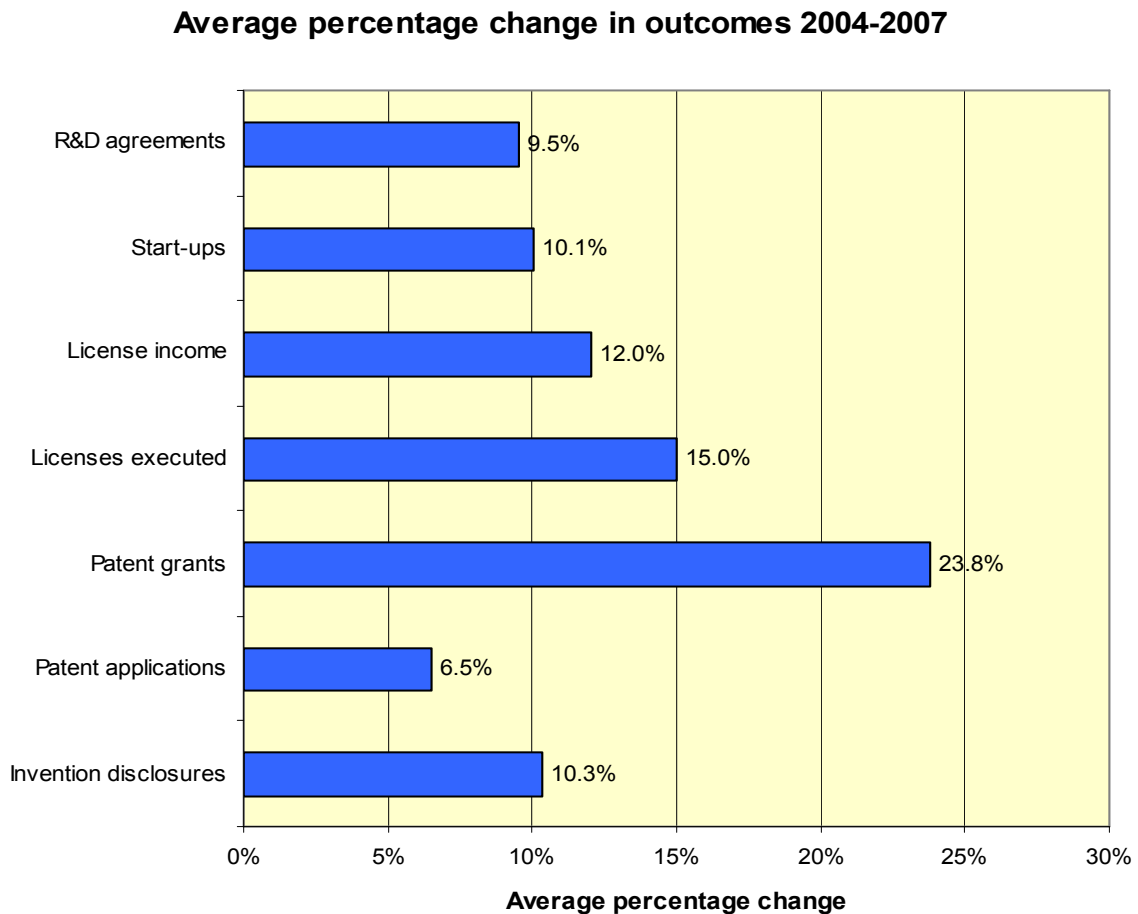


Figure 5 shows the average annual change in outcomes for respondents that reported results for 2004, 2005, 2006 and 2007. As can be seen, all outcomes improved between 2004 and 2007. The number of patent grants, license agreements and license income all increased by clearly more than 10% between 2004 and 2007. Conversely, the number of patent applications only increased by 6.5%.

6. ASTP AND AUTM PERFORMANCE

This section compares ASTP and AUTM results for 2006. Given that AUTM data for fiscal year 2007 is not available, a similar comparison for this fiscal year is not yet possible.

Figure 6

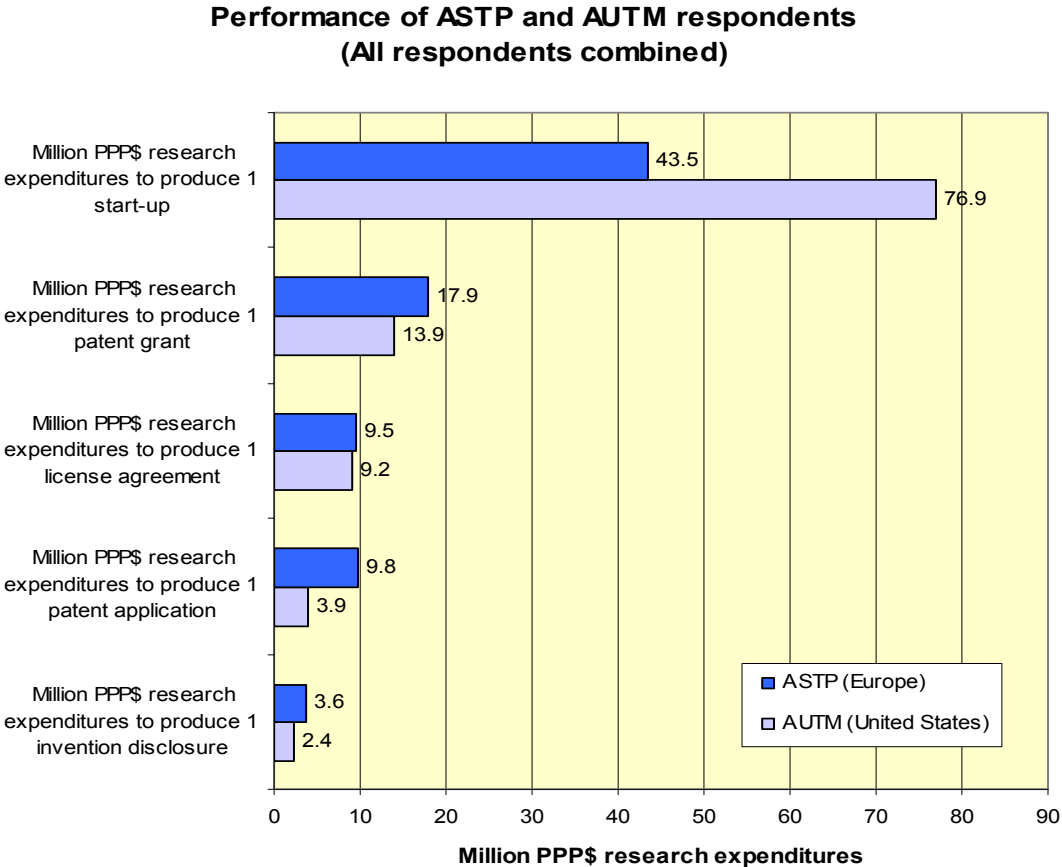


Figure 6 gives the estimated ‘cost’ in million PPP\$ to produce each outcome. These are approximate estimates, since outcomes can depend on research conducted before 2006.

The AUTM institutions are more efficient in producing invention disclosures, filing patent applications and in receiving patent grants than the European ASTP institutions. For example, the AUTM respondents require 13.9 million PPP\$ to produce one patent grant, whereas the ASTP respondents require 17.9 million PPP\$ per patent grant. Conversely, European ASTP members require a much smaller amount of research expenditures to produce one start up than the AUTM institutions. These results suggest that the AUTM institutions are more effective in patenting, particularly for patent applications, but that the ASTP members are more effective in establishing start-ups.