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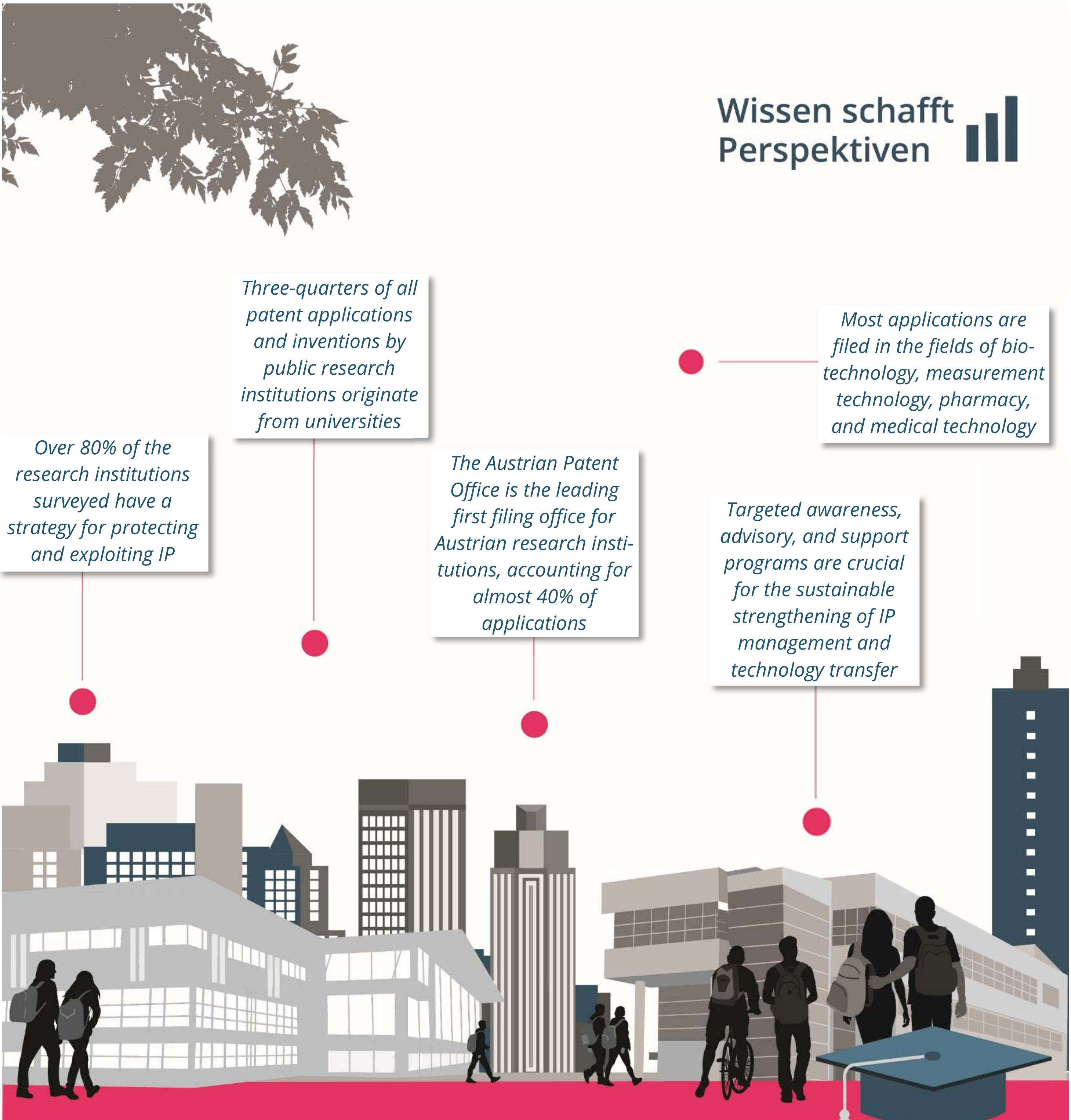

Intellectual property in Austrian research institutions – a quantitative and qualitative analysis

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„Failure is simply the opportunity to begin again, this time more intelligently“

(Henry Ford, American inventor and entrepreneur, 1863-1947)

„Hope and curiosity about the future seemed better than guarantees.“

(Hedy Lamarr, American actress and inventor, born in Austria, 1914-2000)

Wissen schafft Perspektiven is a series of publications by the Austrian Patent Office that attempts to present topics relating to intellectual property in such a way that they can be of use to an interested public without claiming to be exhaustive. Various data and studies from renowned IP organisations are analyzed and processed and underpinned with our own data analyses. Wherever possible, the focus is on the Austrian IP landscape and its stakeholders.

The statements and considerations contained therein do not necessarily reflect the opinions and views of the Austrian Patent Office. The data presented has been carefully and conscientiously compiled to the best of our knowledge, but errors cannot be completely ruled out.

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Intellectual property in Austrian research institutions – a quantitative and qualitative analysis
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List of Abbreviations:

AIT	Austrian Institute of Technology
APO	Austrian Patent Office
aws	Austria Wirtschaftsservice Gesellschaft mbH – Austrian promotional bank
BMFWF	Federal Ministry of Education, Science and Research (Austria)
CDG	Christian Doppler Forschungsgesellschaft – a non-university research institution
COMET	Competence Centers for Excellent Technologies
EIC	European Innovation Council
EIT	European Institute of Innovation and Technology
EP	European Patent
EPC	European Patent Convention (in the context of Article 93 EPC)
EPO	European Patent Office
EMR	Erfindungsmeldungsrecherche – Pre Check Invention Disclosure Search
FFG	Austrian Research Promotion Agency
FTO	Freedom-To-Operate
IP	Intellectual Property
IPR	Intellectual Property Right(s)
IPF	International patent families
LSH	Locality Sensitive Hashing
MTA	Material Transfer Agreement
NDA	Non Disclosure Agreement
NURI	non-university research institution
PATSTAT	Patent Statistics Database of EPO
PCT	Patent Cooperation Treaty
PRO	Public Research Organisations
R&D	Research and Development
RTOs	Research and Technology Organisations
TOS	technologies without property rights (Technologien ohne Schutzrechte)
TTO	Technology Transfer Office
U	Universities
UAS	University of applied science
UG 2002	Austrian Universities Act 2002
WIPO	World Intellectual Property Organization
WKO	Austrian Federal Economic Chamber
WO	World (WIPO application publication code)

1 Introduction

The patent activity of European universities and public research institutions has been steadily gaining in importance for years and is a key indicator of the performance of the European innovation system. Recent studies by the European Patent Office show that universities, universities of applied sciences, and public research institutions not only contribute significantly to the creation of technological foundations but are also increasingly involved in their commercial exploitation.

Based on this indication, in 2025 the Austrian Patent Office placed a special focus on Austrian universities, universities of applied sciences, and public research institutions as key stakeholders in the innovation system. The present study takes a closer look at this important group in order to gain a comprehensive understanding of how it deals with intellectual property, to identify obstacles, and to highlight potential areas of support for the interface between research and commercial exploitation.

The quantitative empirical analysis, for which a separate model was developed to identify the relevant research institutions from the patent data, enables the systematic recording of the patent and utility model activities of Austrian research institutions over a longer period of time and allows trends, focal points, and institutional profiles to be quantitatively documented.

The qualitative data analysis was conducted via a survey and has the advantage of establishing direct contact with the institutions, obtaining immediate and detailed responses, and gaining important contacts for future activities and collaborations. It also offers the opportunity to gather different perspectives and practical experiences, identify obstacles and support needs, and thereby promote the development of tailored recommendations for IP management.

2 Empirical indications – the starting point

The studies presented below provide an in-depth look at patent activity, exploitation practices, and the institutional structures of European scientific institutions, and served as both motivation and indication to examine the topic in greater depth.

Valorisation of scientific results, 2020

The study on "Valorization of scientific results" published by the European Patent Office (EPO) in 2020 shows that European universities and public research institutions primarily use European patents as a tool for economic exploitation. According to the study, around 36% of the inventions recorded are already being commercialised, and there are concrete plans for exploitation for a further 42%. Licensing is the dominant form of exploitation, accounting for around 70%, followed by R&D collaborations (14%) and patent sales (9%).

According to the survey-based study results, although a significant proportion of scientific inventions are already being successfully transferred to the market, substantial barriers to comprehensive commercialisation remain. The main reasons are insufficient maturity of the technologies, a lack of identified market opportunities, difficulties in finding partners, and limited resources. These challenges limit the full exploitation of the innovation potential of public research, particularly in parts of Europe.

The role of European universities in patenting and innovation, 2024

A study published by the EPO in October 2024 entitled "The role of European universities in patenting and innovation" shows that the influence of European universities (both public and private) on the European patent system has grown steadily over the past two decades. This study uses European patent applications for academic inventions as a benchmark for assessing the patenting activity of European universities. In addition to direct applications filed by the universities themselves ("direct applications"), the database also includes patent applications that were not filed by universities but where university-affiliated researchers are listed among the inventors. These "indirect applications" are typically filed by companies as a result of knowledge transfer through research collaborations, entrepreneurship, or informal contacts. Direct and indirect applications defined in this way are considered "academic" inventions here.[1]

- More than 10% of all patents filed with the EPO by European applicants in 2020 are based on research results from university institutions. The corresponding share rose from 6.2% to 10.2% between 2000 and 2020, which roughly corresponds to Switzerland's patent volume in 2023.

[1] EPO, 2024.

- In total, over 1,200 European universities have filed patent applications. While large member states such as Germany, France, the United Kingdom, and Italy lead in absolute terms, smaller countries such as Sweden, Switzerland, Denmark, Belgium, Finland, and Austria have the highest number of patents per university.
- Austria ranks tenth among EU countries in terms of the absolute number of academic patent applications (2000-2020). The total number of academic patents is 3,125 (around two-thirds of which are indirect applications), which corresponds to 3% of European academic patents. On average, Austrian universities have 97.4 patents. Furthermore, Austrian academic patents account for 10.2% of all European patents filed by domestic applicants (European average 2000-2020: 8.7%).
- A comparison of these 3,125 patent applications from Austria relative to the population illustrates the particular performance of smaller countries, including Austria: with 363.4 academic patents per million inhabitants, the country ranks sixth among the 34 countries surveyed.

The role of European public research in patenting and innovation, 2025

The EPO study "The role of European public research in patenting and innovation" (October 2025) is the first systematic analysis of the patenting activities of public research organisations (PRO) and university-affiliated research hospitals in all 39 EPC member states (member states of the European Patent Convention). Building on the 2024 study on universities, it shows the extent to which PRO contribute to Europe's innovation and knowledge base. This contribution manifests both in their own patent applications, which are classified as direct academic patents, and in the participation of researchers in industrial patent applications, which are considered indirect academic patents.

Between 2001 and 2020, PRO were involved in around 63,000 European patent applications. This corresponds to 4.9% of all European applications and highlights the significant role of the public research sector in Europe's technological competitiveness. In 2020, a peak was reached with 3,815 European applications, compared to 1,950 in 2001.

At the same time, the analysis reveals clear differences between countries, pointing to heterogeneous roles and conditions for PRO within national innovation ecosystems:

- France has the largest absolute volume with 25,352 PRO patent applications, followed by Germany with 18,276. However, the strategic importance varies considerably: In France, Spain, Poland and Belgium PRO patent applications account for between 9% and 14% of national patent production, while in Germany and the Netherlands, they account for around 4%, despite high absolute volumes.
- With 640 EP applications (i.e., patent applications to the European Patent Office) – around a third of which are indirect applications – Austria ranks ninth within the EU (eleventh within the EPO member states) in terms of PRO. The share of all Austrian

applications is around 2% (exactly 1.9%), which is similar to countries such as Italy (2.1%) and the United Kingdom (1.1%). The differences between countries reflect their respective national innovation strategies, intellectual property systems, and forms of cooperation.

These empirical findings illustrate that public research institutions are among the most important drivers of knowledge-based value creation and that it is worthwhile taking a closer look at the available data in order to fully understand the role of public research in the innovation process.

3 Qualitative Analysis

The following empirical analysis of Austrian research institutions is based on a specially conducted data project that aims to record and comparatively classify the patent and utility model activities of public research institutions in Austria. After a brief description of the methodology used, the key findings are presented, which paint a multi-faceted picture of the Austrian research landscape and provide insights into performance, thematic priorities and institutional profiles.

3.1 Data basis and methodology

The patent and utility model data of Austrian research institutions from 2000 to 2024 were analysed. The data basis is PATSTAT, a global patent statistics database of the European Patent Office (EPO), which contains information on published patents from more than 80 patent authorities.

- The data used in the project includes not only European applications from Austrian research institutions (applications to the European Patent Office), but also applications to other national patent offices or via other application channels such as WO/PCT, i.e. international patent applications under the Patent Cooperation Treaty (PCT) submitted via the World Intellectual Property Organisation (WIPO). In this respect, the data spectrum and the observation period are larger than in the European Patent Office studies mentioned above.
- On the other hand, in contrast to the EPO studies, only direct applications are analysed here, as the identification of indirect applications would have increased the complexity of the project disproportionately. Thus, inventions from research institutions that are registered by spin-offs or affiliated companies are not included here. Furthermore, the data set is based only on public research institutions (private universities, for example, are not included).
- Where, due to the delay in publication, the significance of the data at the beginning or end of the observation period is not justified or meaningful due to the small number of data points, the period has been restricted accordingly.

Regarding the number of data points at the edges of the observation period:
Beginning of the observation period: With the 2002 University Act, Austria's universities became legal entities under public law with full legal capacity as of 1 January 2004. The Act expressly granted them the right to exploit inventions made by their scientific staff. Paragraph 106 of the 2002 University Act stipulates that inventions made by university employees in the course of their duties are attributed to the university as the employer within the meaning of the Patent Act. This new legal situation created strong incentives for technology transfer and led to a significant increase in patent applications by universities.

End of the observation period: The observed decline in patent applications at the end of the observation period may be partly due to a data methodological artefact. As in most patent systems, the European patent system (according to Art. 93 EPC) generally publishes patent applications only 18 months after the earliest filing or priority date. This delay leads to an undercounting of applications in the most recent years of observation, known as truncation bias due to publication lag, which distorts the last observation period in particular.[2]

Identification of relevant research institutions

While the identification of Austrian universities and universities of applied sciences is comparatively easy – their number and legal status are defined by law and published[3] – the delimitation of public non-university research institutions (NURI) is not that straightforward. The Statistics Austria research facility catalogue alone lists 3,226 institutions.[4]

It was therefore necessary to narrow down the selection. The basis for this was the list of public non-university research institutions eligible for the Houska Prize[5] – an Austrian research prize awarded annually for outstanding business-related research. This basis seemed appropriate in terms of content, as it includes public institutions that stand out for their application-oriented research, innovative achievements and strong market proximity. The sample is therefore selective and does not cover all public non-university research institutions in Austria that register intellectual property rights, but it does offer a practical approximation. As mentioned above, inventions by research institutions that have been made, for example, by a company or spin-off are not included.

Based on these lists, all those Austrian public research institutions for which patent and/or utility model applications were filed during the period in question were examined. These included 26 public non-university research institutions (hereinafter referred to as NURI), 20 universities (U) and 10 universities of applied sciences (UAS). Since the names of individual institutions appear in very different spellings in the application data, the following procedure was chosen to identify the organisations: the name information was automatically compared using similarity methods from the patent application data and then manually checked.[6]

3.2 Application behaviour of Austrian research institutions

To analyse the application behaviour of certain groups, one approach is to consider the application figures independently of possible multiple applications for the same invention. Multiple applications arise because inventions are often submitted in parallel in several countries or via different protection routes in order to ensure the most comprehensive patent protection possible. The number of inventions behind these application figures is discussed below.

[2] See also: OECD. 2013.
[3] BMBWF. 2025.
[4] Source: Statistics Austria.
[5] Houska Prize 2025. Submission requirements for the category "Non-university research". Link.
[6] A detailed description of the methodology can be found in the appendix.

Over the entire observation period (2000-2024), 5,644 applications for patents and utility models were identified that can be traced back to Austrian universities (U), universities of applied sciences (UAS) and non-university research institutions (NURI).

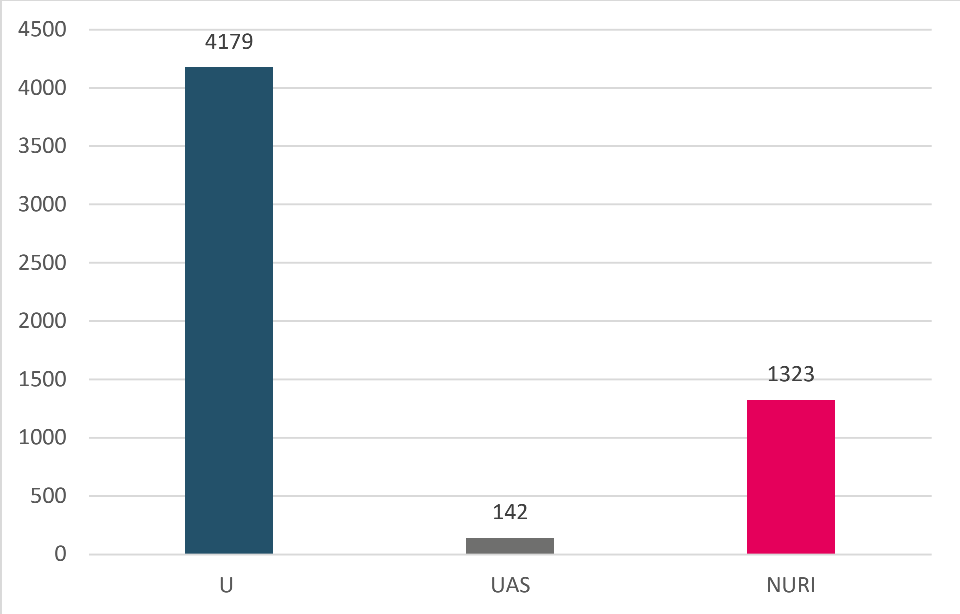

Figure 1: Patent and utility model applications, 2000-2024, total (absolute numbers)

Universities (U) are by far the most important players in patent and utility model applications among the research institutions presented. They account for almost three quarters (74.0% or 4,179 applications) of the total applications filed by the research institutions examined in the period 2000–2024. Non-university research institutions (NURI) follow with 23.4% (1,323) of applications, and universities of applied sciences (UAS) with 2.5% (142).

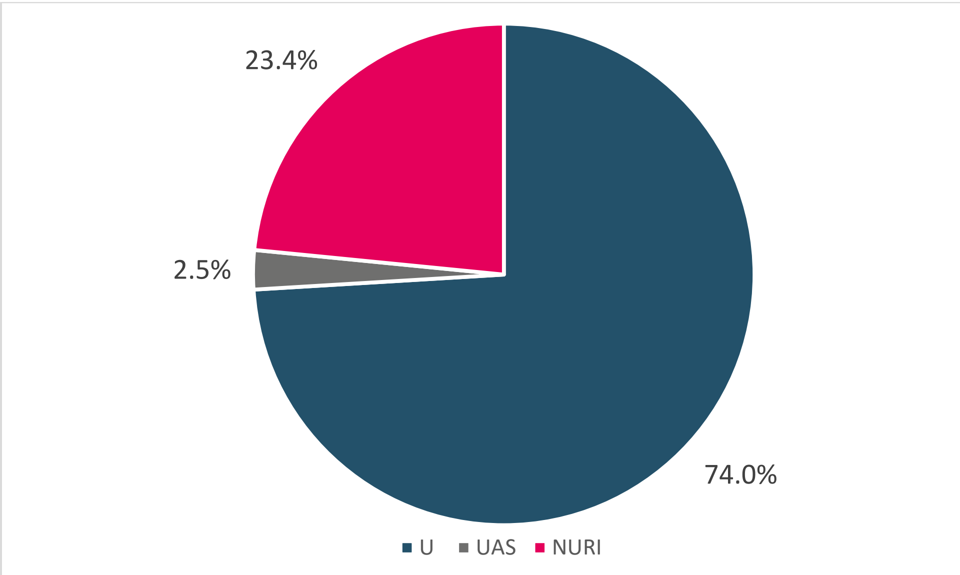

Figure 2: Patent and utility model applications, 2000-2024, total (shares)

The annual percentage distribution of applications among the three applicant categories has developed as follows over the years: Despite slight fluctuations, universities have maintained their dominant position in the relative distribution over the entire period.

The ratios between the applicant categories have remained relatively stable over time, with universities (U) consistently generating the largest share of the total innovation output of this group of institutions. Universities achieved the highest shares of over 80% at the beginning of the observation period (in 2005 and 2006) and in 2020. Non-university research institutions (NURI) reported above-average figures in 2013, 2015 and 2017, accounting for over 30% of the total output of all research institutions surveyed. Austrian universities of applied sciences (UAS) achieved their highest registration activity in 2010 and 2012 with just under 5% (in 2004 it was even almost 6%, but with only 35 total registrations).

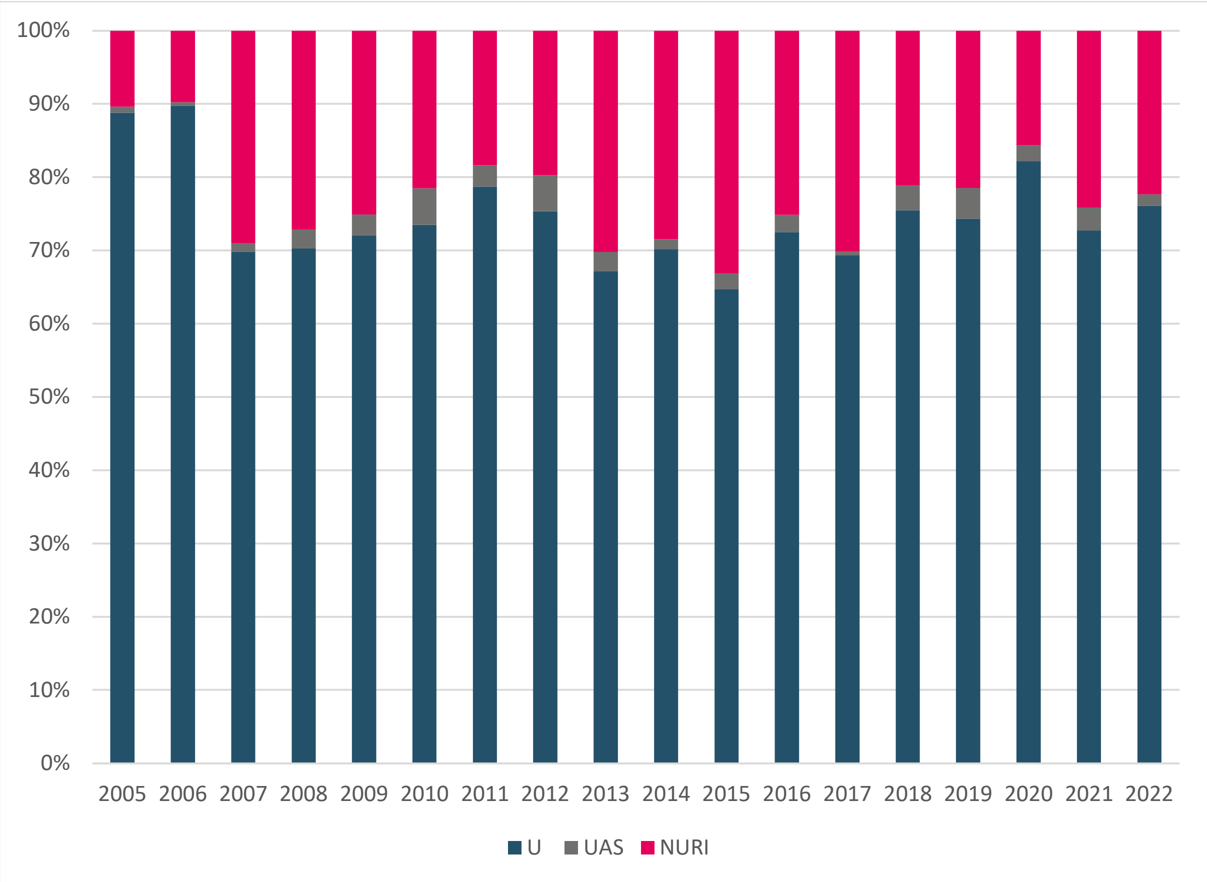

Figure 3: Patent and utility model applications, 2000-2024 – development of shares

The development over time (2005–2022) in the figure below shows that all three types of institutions reached their peak in 2018 with 440 applications, with universities recording a clear absolute high of 332 applications in 2018. The years 2017 and 2019 were also strong in terms of registrations, with 378 and 382 respectively.

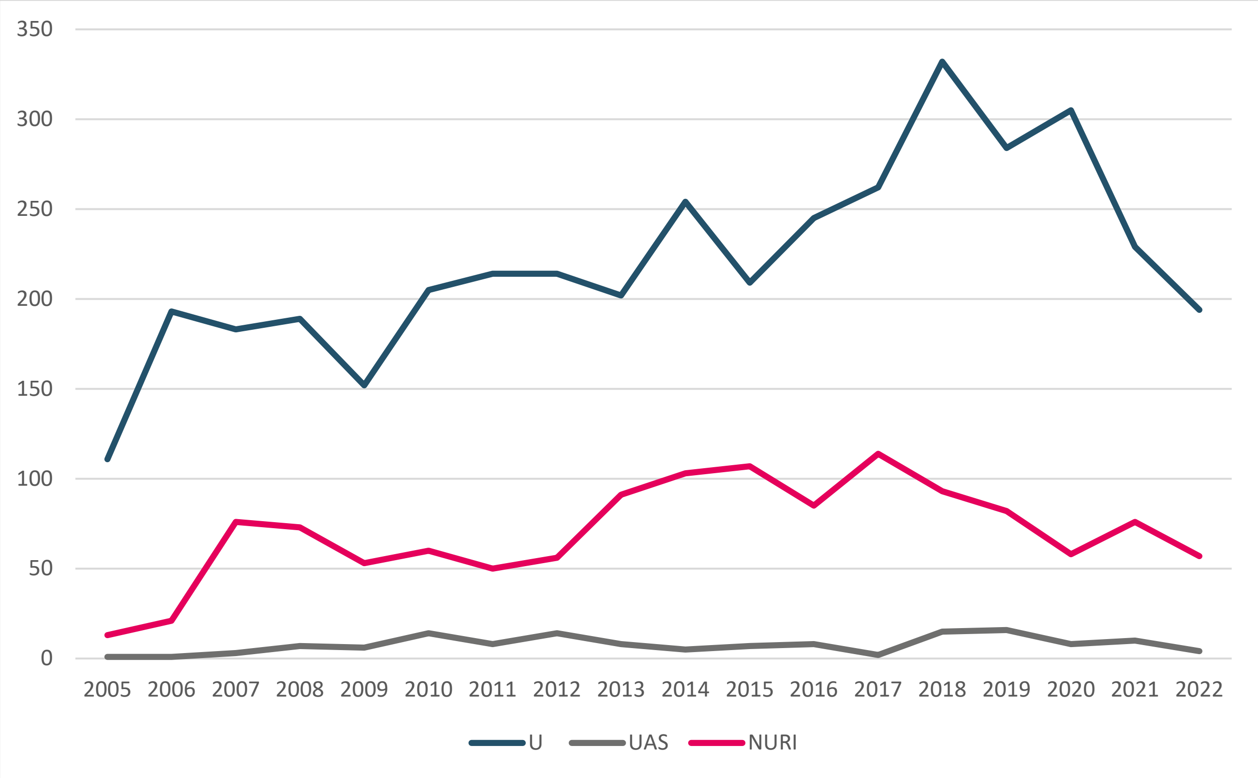

Figure 4: Patent and utility model applications, 2005-2024 – development of absolute numbers

In the following, the research institutions under consideration are grouped together and analysed in terms of their application activity. It should be noted that this activity naturally depends on the size and available resources of the respective institution. A ranking weighted, for example, according to the scientific staff available at the respective institution – based on a separate analysis not included here – showed that the University of Mining and Metallurgy, Leoben/Styria (Montanuniversität Leoben), for example, would lead the ranking in this case.

Universities:

The distribution of application figures confirms the expected correlation between scientific focus and patenting activity. Institutions with a strong technical, scientific or medical focus dominate the top of the ranking. This is also due to the nature of these disciplines, in which research results often take the form of directly exploitable technical inventions or medical procedures that are suitable for patenting or utility model applications. TU Austria – an alliance founded in 2010 between the Vienna University of Technology, Graz University of Technology and the University of Mining and Metallurgy, Leoben – alone accounts for 45.4% of all patent and utility model applications.

- **Technical leaders**: The Vienna University of Technology (1,132 applications) leads the list by a clear margin, followed by the Graz University of Technology (544 applications). The high number underscores the role of technical universities as key drivers of technological innovation.

- **Strong medical presence**: The Medical University of Vienna (433 applications) ranks third, closely followed by the University of Vienna (429 applications), the latter also accounting for a significant share of scientific and medical research. The Medical University of Graz (189 registrations) and the Medical University of Innsbruck (155 registrations) confirm the high registration intensity in the life sciences sector.

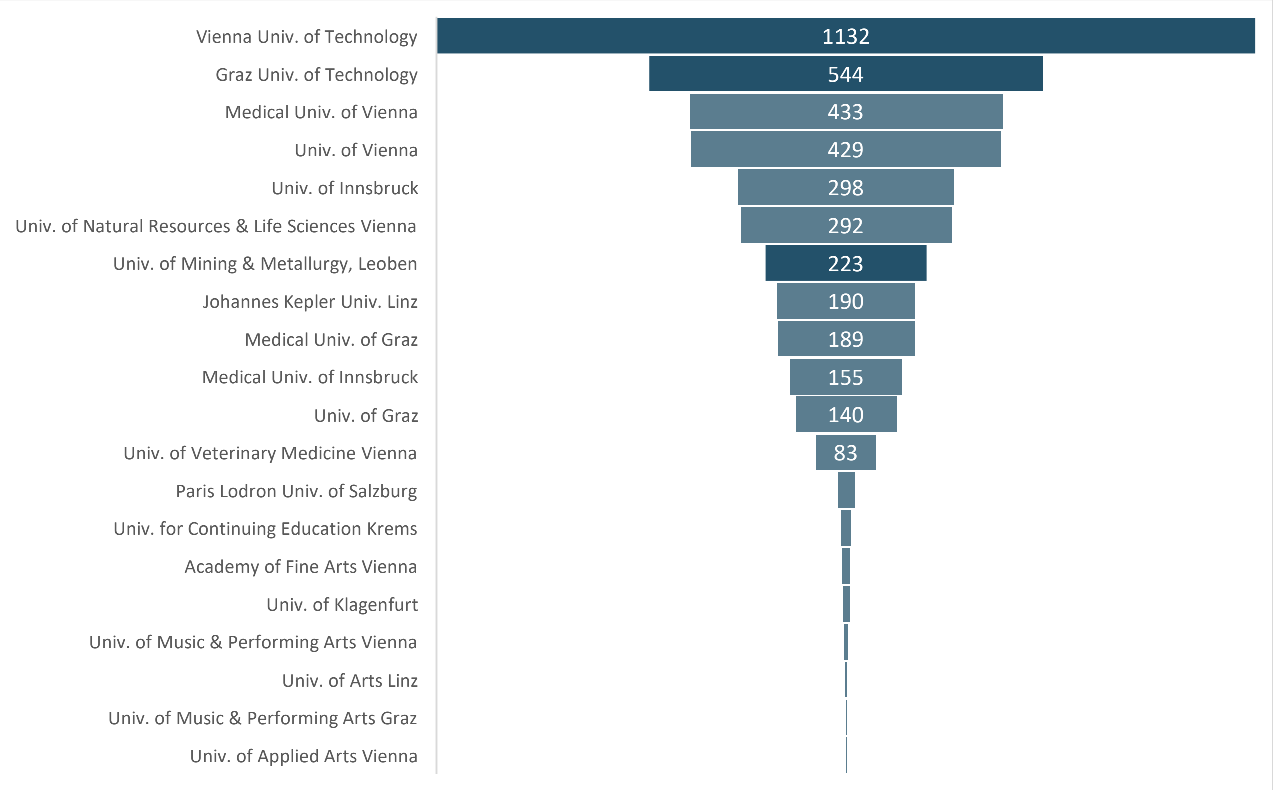

Figure 5: Universities: Patent and utility model applications, 2000-2024

- **Further technical/scientific orientation**: The University of Innsbruck (298 applications), the University of Natural Resources and Life Sciences, Vienna (292 applications) and the University of Mining and Metallurgy, Leoben (223 applications) are also positioned in the top third, reflecting their focus on engineering and natural sciences.
- **Art universities** naturally have comparatively fewer patent and utility model applications. Nevertheless, the data show that individual innovations relevant to property rights are also being developed and registered there.

Non-university research institutions:

The public non-university research institutions (NURI) examined here show extreme asymmetry in their patent and utility model activity. The total number of applications is overwhelmingly dominated by a single player in the list on which this study is based. The AIT (Austrian Institute of Technology) stands out with 763 applications. This figure accounts for almost 60% of the total 1,323 applications identified, far exceeding the sum of all other institutions listed in the graph. The AIT thus occupies a unique key position as an innovation driver among non-university research institutions in Austria.

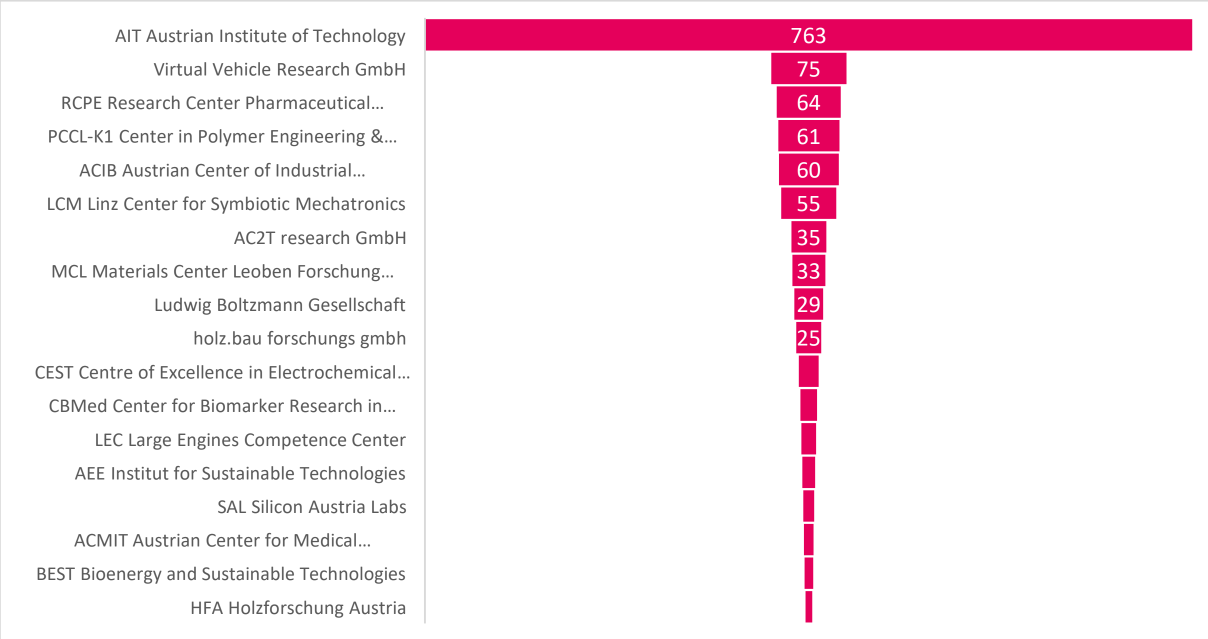

Figure 6: NURI: Patent and utility model applications, 2000-2024

The AIT is followed by a group of competence centres and specialised research institutions, which also demonstrate considerable innovative strength with 25 to 75 applications. This group comes primarily from the fields of mobility/vehicles, pharmacy/medicine/biotechnology, materials and polymer research, mechatronics and technology, wood and sustainability research, and basic research. Eight other non-university institutions, each with fewer than ten applications, are not shown for reasons of clarity.

Universities of applied sciences:

The University of Applied Sciences Technikum Wien dominates the ranking for intellectual property applications and acts as a driver of innovation in the sector of Austrian universities of applied sciences. With 57 identified applications, it has a significant lead, underscoring its intensive research activity and focus on technical innovations. The MCI Management Centre Innsbruck (30 applications) is also very active and ranks second, followed by the University of Applied Sciences Campus Vienna (13 applications). These top three institutions account for the majority of the applications shown, with a combined total of 100 applications.

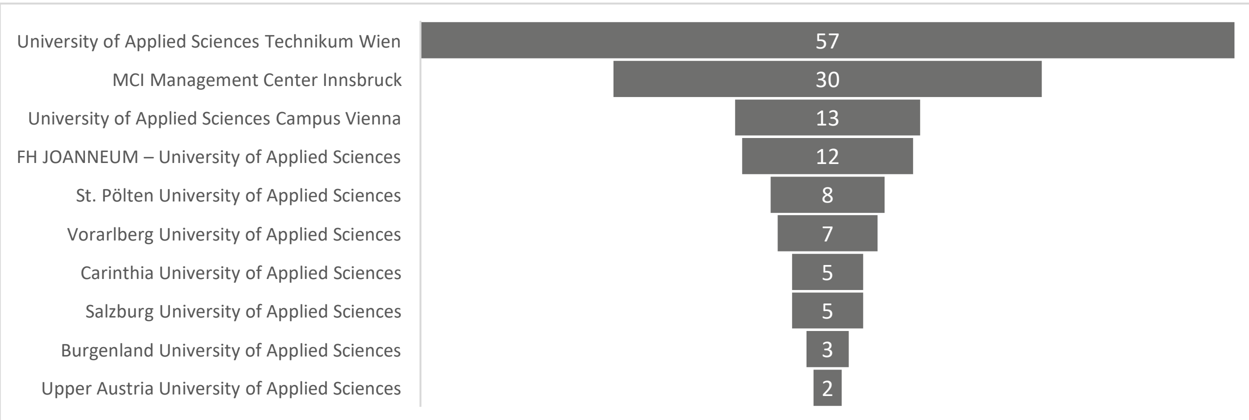

Figure 7: UAS: Patent and utility model applications, 2000-2024

3.3 Inventions by research institutions

One and the same invention can result in several patent applications. For example, it can first be registered nationally and then submitted as an international patent application under the Patent Cooperation Treaty (PCT)[7] or as a European patent application. Thus, although the figures in the previous chapter show how active the research institutions examined are in terms of applications, they do not clearly indicate how many inventions are behind them.

For this reason, the identified intellectual property data was screened specifically for the number of international patent families (IPFs). An IPF comprises all patent applications relating to the same invention that have been filed and published with at least two patent authorities – international, regional or national. It thus represents a single invention seeking protection in several patent offices. It serves as a reliable indicator of inventive activity, as it reflects a certain level of quality: only those inventions are recorded for which inventors consider the value to be high enough to seek international patent protection.

The analysis shows that the 5,644 property rights applications (patents and utility models) in the period 2000-2024 correspond to 1,884 IPFs, i.e. inventions.

Of these 1,884 IPFs, around 145 were jointly filed by several (at least two) research institutions, with the joint application being made, for example, by a university and a non-university research institution; applications by several institutions are considered particularly valuable as they indicate close cooperation between the institutions and show that existing synergies are being actively exploited.

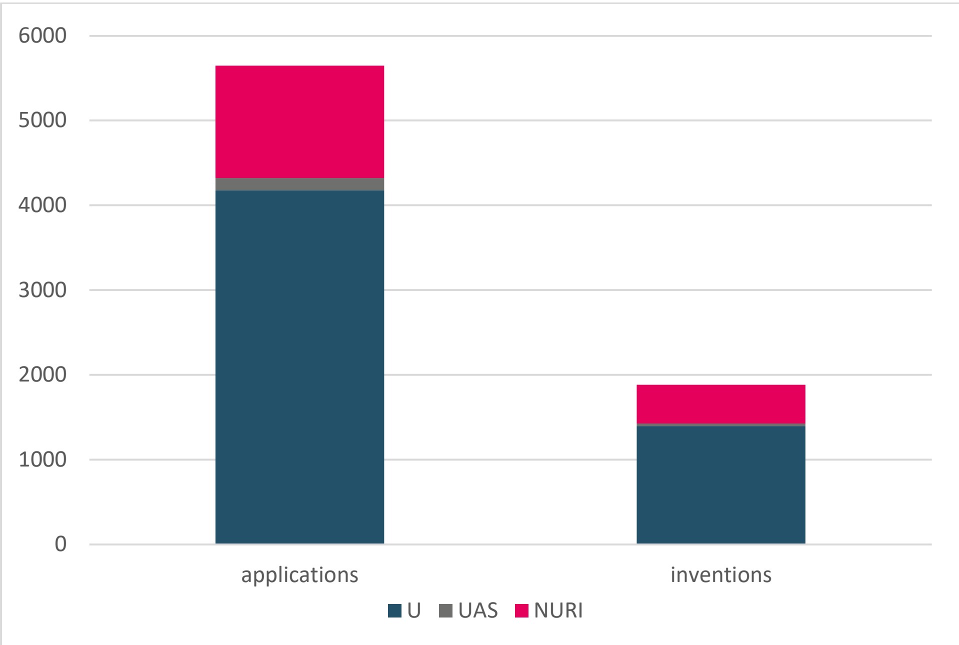

Figure 8: Applications and related inventions, 2000-2024

[7] PCT (Patent Cooperation Treaty): international patent procedure that makes it possible to apply for protection for an invention in over 150 contracting states with a single application. A PCT application does not directly lead to a granted patent, but simplifies the procedure for obtaining patent protection in individual countries/regions at a later date.

In order to reflect the innovative performance of each research institution, each IPF is assigned to these institutions individually. Universities account for 73% of all inventions, which is similar to their share of applications (74%), while non-university research institutions account for 25%, which is slightly higher (23.4%), and universities of applied sciences account for 2%, which is slightly lower (2.5% for applications).

A second insight follows from this: the size of the international patent family allows conclusions to be drawn about the number of countries in which the invention is registered, thus providing an indication of how valuable or marketable an innovation is considered to be. Overall, it can be seen that the research institutions identified here protect their inventions in around three countries on average. Universities register in 3.2 countries on average, non-university research institutions in 2.9 countries and universities of applied sciences in 2.8 countries.[8]

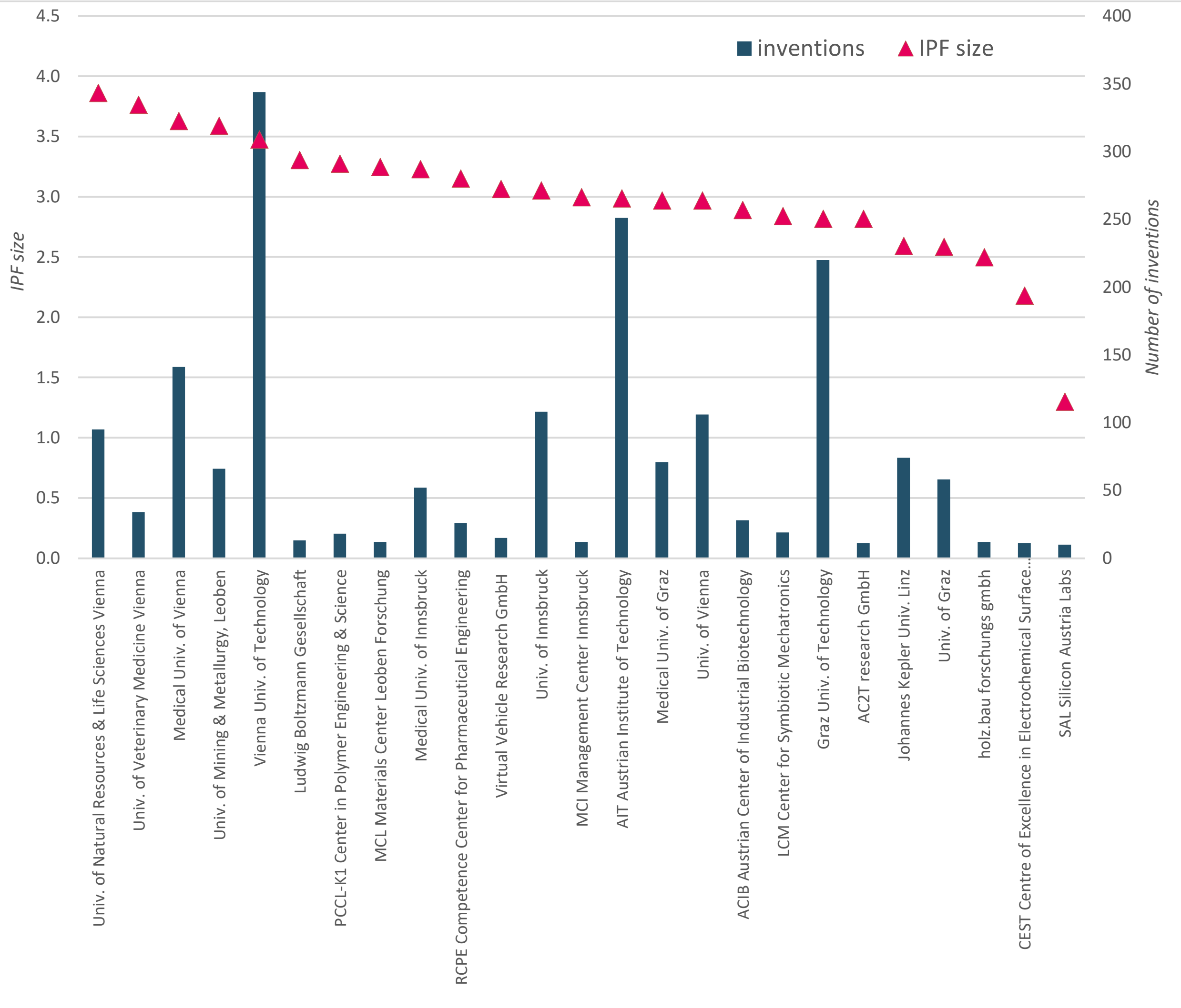

Figure 9: Average IPF size and number of inventions, 2000-2024

Note: Research institutions by average IPF size (left axis) and number of inventions (right axis). Only research institutions with more than 10 inventions during the observation period are shown.

[8] Example: An invention from Austria is first filed with the European Patent Office and then protection is sought for seven other countries – the IPF size of this invention would be 8.

The graph above shows the institutions that recorded more than ten inventions in the period 2000-2024. A high number of inventions (represented by the bars) does not necessarily correspond to a high IPF size (triangles) – for example, the University of Natural Resources and Life Sciences has an average IPF size of almost four (countries), while the Vienna University of Technology, Graz University of Technology and the Austrian Institute of Technology account for the most inventions.

3.4 Which technologies are being registered?

The available data can be used to derive the technological focus of patent and utility model applications from universities, universities of applied sciences and non-university research institutions in the period from 2000 to 2024.

Technology sectors (WIPO definition): The technical fields are divided into five technology sectors, each of which comprises several specialised technology fields (35 in total):

- **Electrical engineering**: This includes electrical machines, apparatus, energy (non-electronic parts), audiovisual technology, telecommunications, digital communication, basic communication processes, computer technology, IT methods for administration and semiconductors.
- **Instruments**: This group includes optics, measurement technology, the analysis of biological materials (the largest sub-area of measurement technology), control (control and regulation technology) and medical technology.
- **Chemistry**: The technology fields included are organic fine chemicals (excluding pharmaceuticals, but including cosmetics), biotechnology (excluding pharmaceuticals), pharmaceuticals (excluding cosmetics), macromolecular chemistry, polymers, food chemistry, basic chemistry, materials, metallurgy, surface technology, coating, microstructure and nanotechnology, chemical process engineering and environmental technology.
- **Mechanical engineering**: This sector includes handling (e.g. robots, packaging equipment), machine tools, motors, pumps, turbines, textile and paper machines, other special-purpose machines, thermal processes and apparatus, mechanical elements (such as joints and couplings) and transport, with automotive engineering dominating.
- **Other areas**: These include furniture, games (the largest share of consumer goods), other consumer goods (less research-intensive) and construction.

One methodological challenge here is that a patent often covers various aspects of an invention that cannot be clearly assigned to a single technology sector or field. Instead, the uniform classification system is used to assign patents to several fields and sectors.

In order to derive meaningful information nonetheless, a weighted allocation is carried out. Each patent is assigned a proportional value for each assigned technology field. For example, a patent that is assigned to two technical sectors is therefore included in the analysis with a weighting of 0.5 each. If, for example, an invention is assigned to three technology fields in one sector and two technology fields in another sector, it is weighted proportionally at 3/5 and 2/5 respectively. The weights always add up to 1. This prevents multiple counts and artificial overrepresentation.

The results of the analysis show that the innovation activity of the Austrian institutions examined is strongly concentrated in three main areas, with innovations in the field of chemistry playing the dominant role.

- The chemical technology sector dominates the innovation landscape of the Austrian institutions surveyed. With a share of 42%, this area accounts for by far the most patents and utility models registered. This underlines the outstanding importance of chemical research and materials science for innovation activity in Austria.

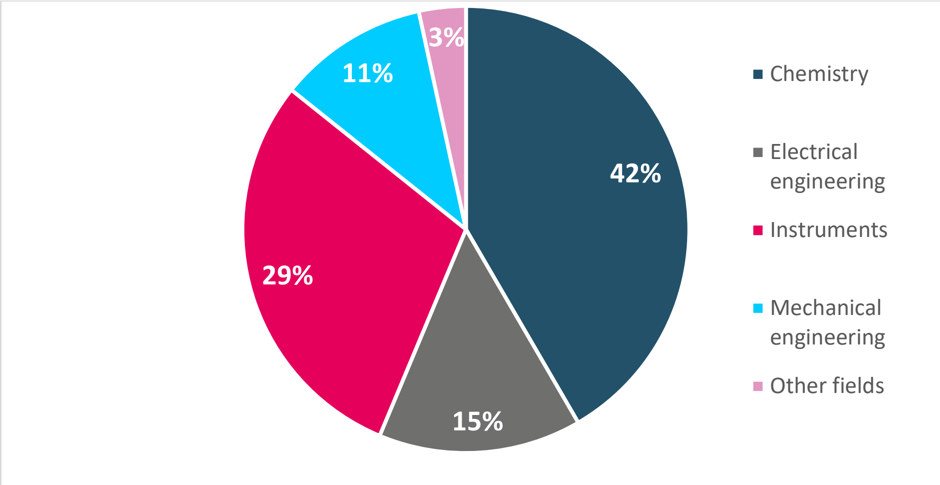

Figure 10: Patent and utility model applications, 2000-2024, total, by technology sector

- This is followed by the instruments and electrical engineering sectors, which together account for 44% (29% and 15% respectively) of applications. This strong position emphasises the relevance of precision and high technology (such as medical technology, measurement technology and optics) as well as electronic and digital applications.

Looking at this by applicant category, the following picture emerges: The pie charts show the distribution of patent and utility model applications by technology sector for the three different categories of institutional types examined.

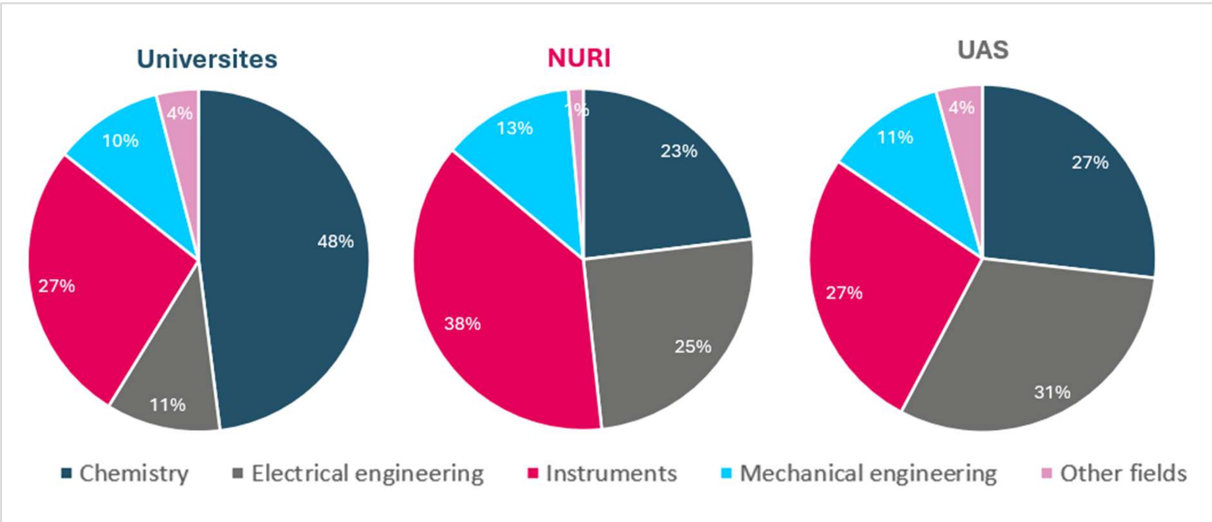

Figure 11: Patent and GM applications 2000-2024 – technology sector & applicant category

- Chemistry: With 48%, universities show a massive focus on chemistry and materials science. In contrast, applications from the chemistry sector play a smaller, albeit still important role at non-university R&D institutions (23%) and universities of applied sciences (27%).

- Instruments: The instruments sector is the most important sector for non-university research institutions, accounting for 38% of their applications. Both universities and universities of applied sciences show an identical relative strength of 27% in this area.
- Electrical engineering: The electrical engineering sector is the clear relative focus of universities of applied sciences, accounting for 31% of their applications – more than any other institution (the low proportion of patent and utility model applications from universities of applied sciences should not be overlooked). Non-university research institutions (25%) also show a high level of activity in this area, while this sector is of comparatively lesser importance for universities (11%).
- Mechanical engineering: This sector is the most balanced across all types of institutions, with shares ranging from 10% (universities) to 13% (non-university research institutions).

Technical field	**U**	**NURI**	**UAS**	**Main focus**
Chemistry	**48**	23	27	University
Electrical engineering	11	25	**31**	UAS
Instruments	27	**38**	27	NURI
Mechanical engineering	10	13	11	Balanced
Other fields	4	1	4	Low proportion

Table 1: Research institutions by technical technology sector – proportions

A closer analysis of the technology fields (i.e. the subgroups of the five technology sectors) across all applicant categories (U, UAS, NURI) shows that most patent and utility model applications between 2000 and 2024 relate to the technology fields of "biotechnology", followed by "measurement" (measurement technology), "pharmaceuticals" and "medical technology".

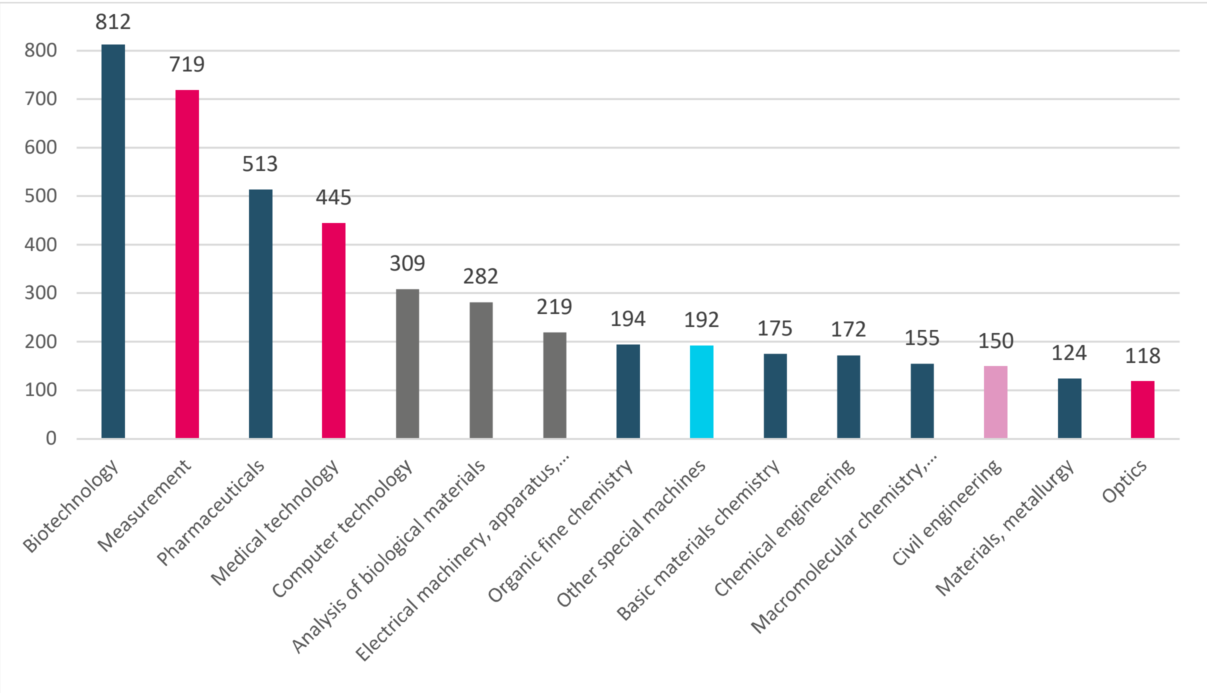

Figure 12: TOP 15 technology fields – patent and utility model applications 2000-2024, total

Note: Includes multiple assignments of the same invention to different subgroups. Dark blue: Chemistry; Magenta: Instruments; Grey: Electrical engineering; Turquoise: Mechanical engineering; Pink: Other.

The table below compares the top 15 technology fields (based on patent applications according to WIPO classification) for all applications and separately for universities (U), non-university research institutions (NURI) and universities of applied sciences (UAS).

The top 15 fields for universities are consistent with the overall ranking. Apart from slight shifts in the order, the 15 technology fields identified are the same in both columns. This may indicate that the patent activity of universities makes a significant contribution to the overall picture and possibly plays a weighting role in the ranking due to their higher application numbers.

	Overall	U	NURI	UAS
1	**Biotechnology**	**Biotechnology**	**Measurement**	Electrical machinery, apparatus, energy
2	**Measurement**	**Pharmaceutical**	**Computers technology**	Control
3	**Pharmaceuticals**	**Measurement**	**Biotechnology**	**Medical technology**
4	**Medical technology**	**Medical technology**	**Medical technology**	Chemical engineering
5	**Computer technology**	Analysis of biological materials	Analysis of biological materials	**Biotechnology**
6	Analysis of biological materials	Organic fine chemistry	Telecommunications	**Computer technology**
7	Electrical machinery, apparatus, energy	Electrical machinery, apparatus, energy	Electrical machinery, apparatus, energy	**Measurement**
8	Organic fine chemistry	Other special machines	Other special machines	**Pharmaceuticals**
9	Other special machines	Chemical engineering	Control	Thermal processes and apparatus
10	Basic materials Chemistry	**Computers technology**	Basic materials Chemistry	Environmental technology
11	Chemical engineering	Basic materials Chemistry	Mechanical elements	Other consumer goods
12	Macromolecular Chemistry, polymers	Civil engineering	Materials, metallurgy	Basic materials chemistry
13	Civil engineering	Macromolecular Chemistry, polymers	Digital Communication	Telecommunications
14	Materials, metallurgy	Materials, metal-lurgy	Thermal processes and apparatus	Engines, pumps, turbines
15	Optics	Optics	Optics	Organic fine chemistry

Table 2: TOP 15 technology fields by institution

Note: Dark grey and bold: TOP 5 in the overall ranking; light grey: remaining fields from the TOP 15 in the overall ranking; white: new technology fields compared to the overall ranking.

In contrast to universities, the top technology fields of non-university research institutions (NURI) and universities of applied sciences (UAS) are more heterogeneous:

- Non-university research institutions (NURI): The top 4 fields in the overall ranking (biotechnology, measurement technology, pharmaceuticals and medical technology) are included in the top fields of the NURI. It is striking that the field of pharmaceuticals, which ranks third in the overall ranking, is no longer among the top 15 in the NURI rankings. This indicates a difference in focus compared to universities and the overall market. Instead, five new areas can be identified in the top 15 of the NURI (highlighted in white), which are therefore of greater importance in patent activity at research institutions.
- Universities of applied sciences (UAS): The top 5 fields in the overall ranking are also represented among universities of applied sciences, which indicates a certain basic consistency with general research priorities. However, with six new fields (highlighted in white), the strongest deviations from the overall ranking can be seen here. These fields represent specific priorities of the UAS.

These data underscore that non-university research, and universities of applied sciences in particular, occupy specific technological niches in the patent landscape that deviate from the general trend, while universities largely reflect the breadth of technological development.

3.5 Where is the first application filed?

The first filing office is a key indicator in the analysis of patent statistics. It essentially answers the question: In which country was a particular invention first filed for a patent or utility model? This provides a good indication of where the invention originated – or at least where the applicant has their legal or economic origin – and thus says something about a country's technological capabilities.

Since an invention can be registered in many countries at a later date, considering the first filing office also prevents multiple counts. Furthermore, in this context, international patent families (IPFs) again serve as a consistent data starting point to ensure clear counting at the invention level.

Finally, conclusions can be drawn about strategic application behaviour: If the application is first filed in the home country, this may indicate that the applicants see Austria as their sales market, but also that the Austrian Patent Office is chosen as the starting point in order to secure the priority of the invention from there as a basis for further global patent strategy. An initial application to the European Patent Office or another national patent office, for example, could indicate a strong export orientation or an important sales market in a particular country.

Analysis of the data reveals the clear dominance of the Austrian Patent Office (AT in the graph) as the office of first filing. With just under 40% of all first filings (IPF) by Austrian research institutions examined, the Austrian Patent Office is the primary choice. This national application serves strategically as the basis for establishing priority for the subsequent securing of property rights abroad.

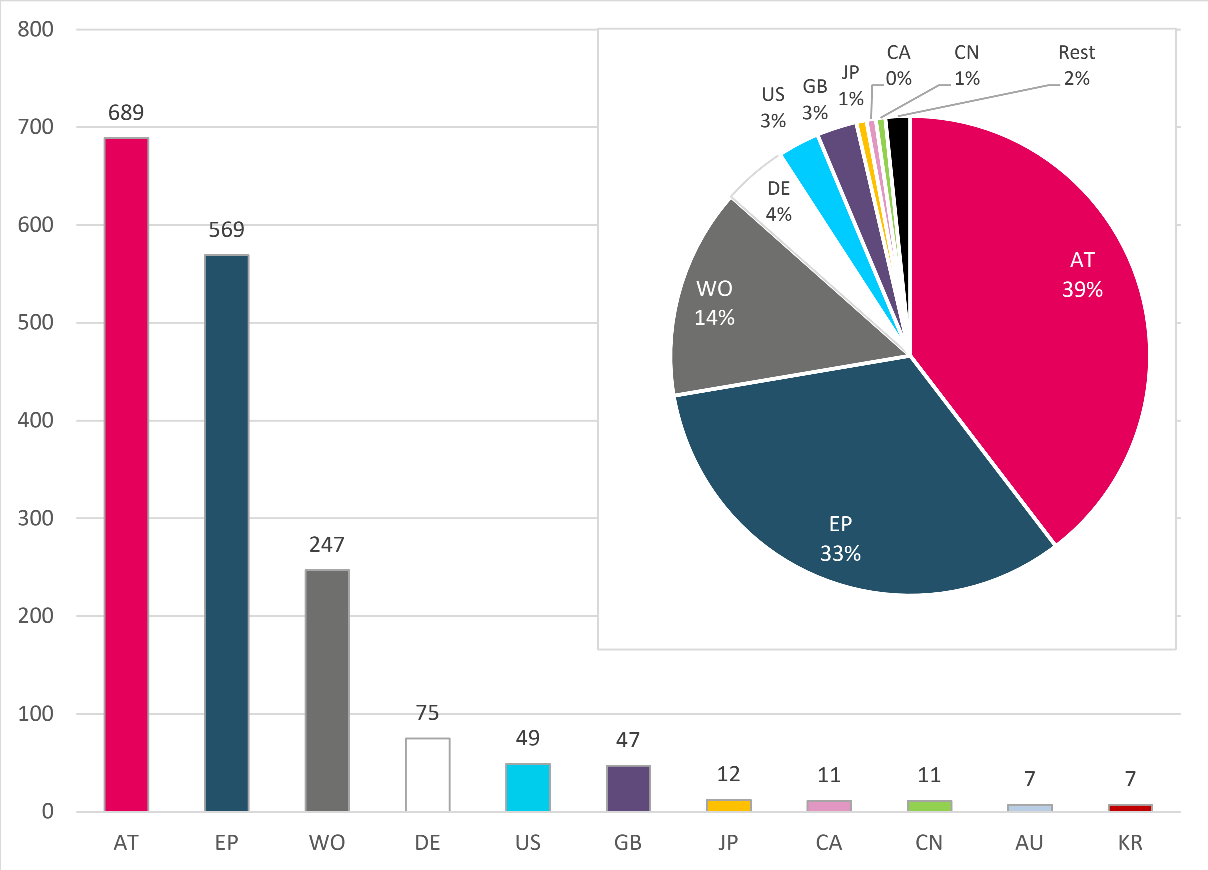

Figure 13: First filing offices of Austrian research institutions – 2000-2024

Bar chart: Top 10 offices. Pie chart: Shares of first filing offices. IPF were counted here. Inventions jointly filed by several research institutions were counted as one application

- The European Patent Office (EP) is the second most frequent first filing office with 33%. This indicates a strong export orientation and the strategic necessity of obtaining broad protection for the European internal market.
- The World Intellectual Property Organisation (in the figure: WO) follows with 14%. This use of the international application procedure underlines the global strategic orientation of Austrian research, which seeks potential protection in many countries worldwide.

In summary, the data show that almost three-quarters (72%) of first applications by the Austrian research institutions examined here are filed either in Austria (AT) or via the European route (EP).

First filing strategies by applicant group

A differentiated analysis of first filing offices by applicant group reveals specific patterns of behaviour in the Austrian research landscape. The following section analyses the first filing behaviour of universities and non-university research institutions; universities of applied sciences are not included due to statistically non-representative case numbers.

The data from the universities show a clear prioritisation of the European Patent Office (EP), which is the most important first filing office with 36%. The Austrian Patent Office (AT) follows closely in second place with 32%. The third most important office is the World Intellectual Property Organisation (in the figure: WO), which is used in 17% of cases.

This concentration is highly significant: almost 85% of all initial university applications are filed with these three offices. The remaining national offices play a comparatively minor role in terms of quantity. Among them, however, Germany (DE) with 4% and the United States (US) with 3% stand out as the most important national target markets outside the top three. This underlines the strategic importance of these major industrial nations for the international commercialisation of Austrian university innovations.

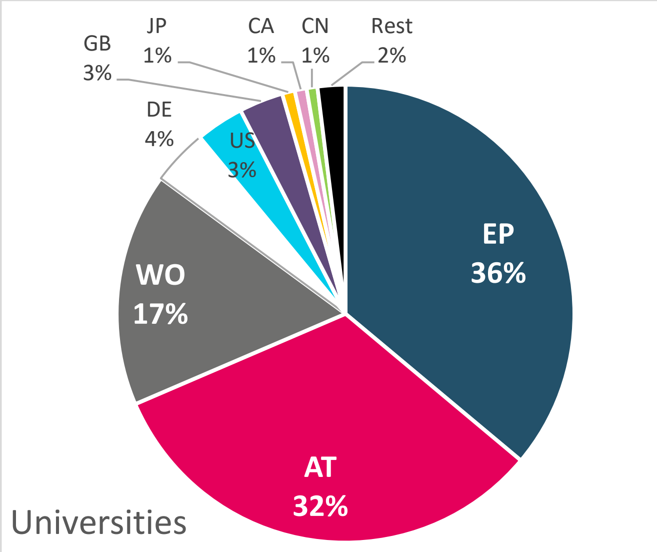

Figure 14: First filing office of Austrian universities - 2000-2024

The analysis of non-university research institutions (NURI) shows a completely different filing behaviour: In contrast to universities, where the EP is the leading first filing office, the Austrian Patent Office (AT) is by far the most important office, accounting for an overwhelming 58% of first filings. The European Patent Office (in the figure: EP) follows in second place with 23%, which is significant but considerably lower than for universities. The World Intellectual Property Organisation (in the figure: WO) plays a comparatively minor role with only 9%.

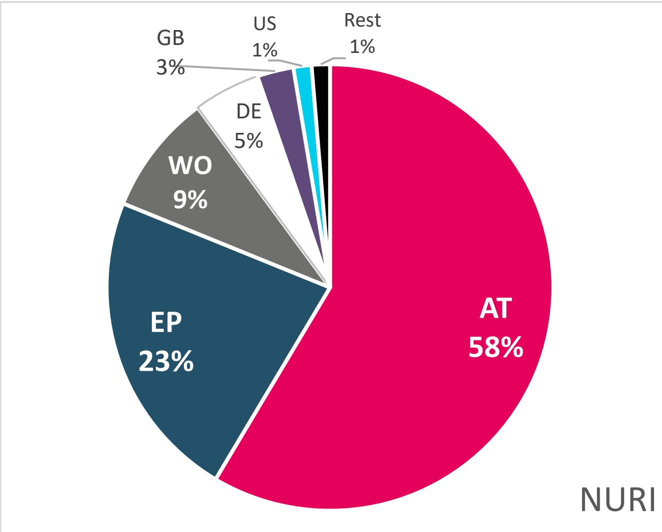

Figure 15: First filing office of Austrian non-university research institutions (NURI) - 2000-2024

In Figure 15, the inventions for which Austria is chosen as the first filing office are all cases with subsequent follow-up applications (within the framework of an international patent family [IPF]). The Austrian Patent Office is strategically used as a priority basis. The quality of the search report prepared by the Austrian Patent Office is generally trusted to such an extent that it serves as the starting point for further international application routes – a positive signal, especially against the background of the direct first filing option at the

European Patent Office (EPO). Of the remaining national offices, Germany (DE) is the only notable target market with 5%.

3.6 Which technology is preferred by which filing office?

If we examine the application data from universities (universities and universities of applied sciences) and non-university research institutions, differentiated according to the responsible application office and the respective technological field of the application – here, again, the applications are considered in their entirety – we can see which inventions (i.e. which technologies) these players prefer to register with certain offices. When broken down by technological sector (as mentioned above, a patent can be assigned to several technological areas), the same procedure is followed as at the beginning, with weighting.

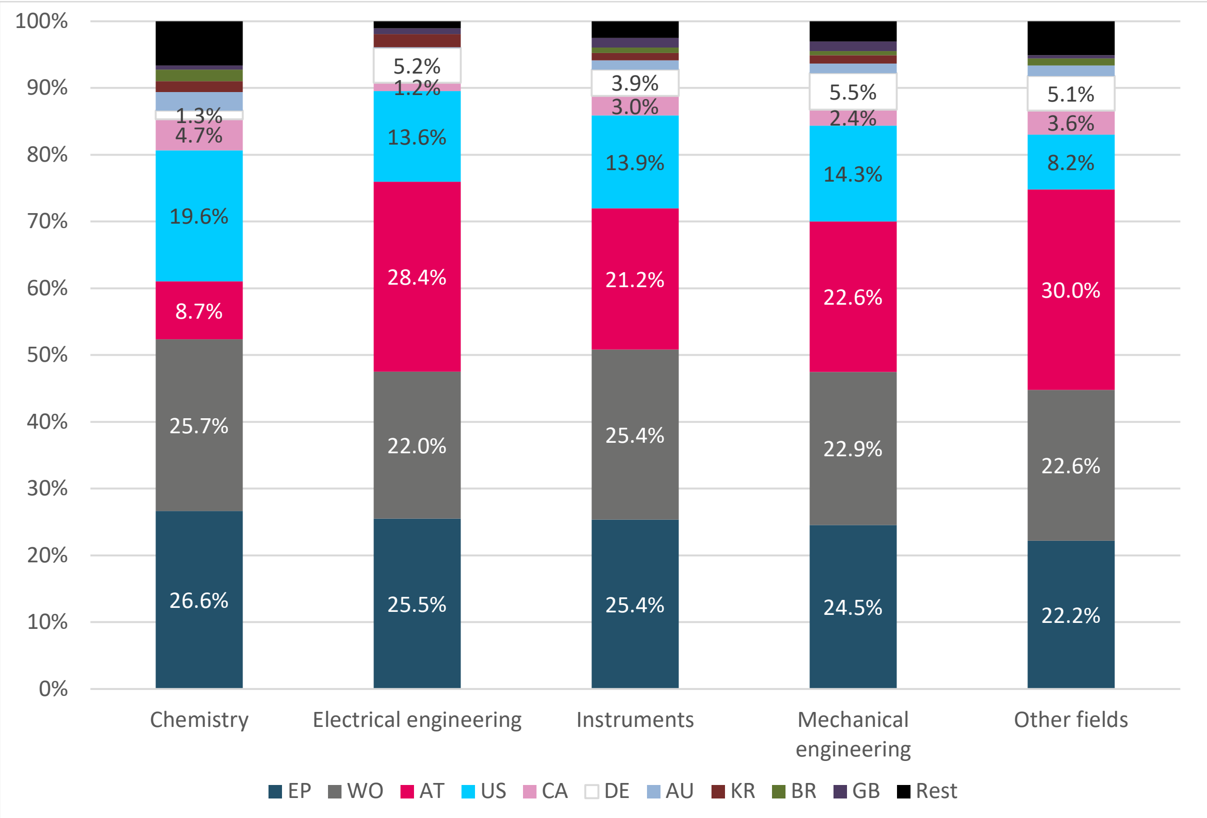

Figure 16: Applications – technology sector & filing office, 2000–2024

- Applications from universities, universities of applied sciences and non-university research institutions to the EPO and WO (international applications via WIPO/PCT) are almost independent of the associated technological sector of the invention (marginal fluctuations between 22 and 26%).
- For applications to the Austrian Patent Office (AT), the range of fluctuation is greater: inventions classified in the technology sector "Other" (i.e. innovations in the fields of construction, furniture, etc.) are relatively frequently registered with the Austrian Patent Office (30%), with an equally high proportion in electrical engineering. However, the chemical sector stands out with a share of just under 9%. Here, applications to the US (USPTO) and Canadian (CIPO) offices are relatively stronger.

- Germany: Where the Austrian research institutions examined tend to focus their inventions on mechanical engineering, electrical engineering or construction (sector: "Other"), they file more applications with the German Patent and Trade Mark Office (DPMA), compared to those with a tech focus on chemistry or instruments.

The following section examines the five technology sectors to determine whether inventions from specific fields of technology influence the choice of registration office.

Chemistry technology sector

The chemistry sector consists of eleven technology fields into which inventions can be categorised. Inventions from the technology field "surface technology/coatings" are particularly striking here: these are only submitted to five filing offices, and the proportion of applications submitted nationally is also highest here.

Inventions from the technology field "Microstructural and Nanotechnology" are filed at only three offices, accounting for over 80% of the total: the EPO is the most popular choice, accounting for just under 40%, followed by WIPO (WO) with 33%. Around 10% of such applications are filed at the Austrian office. The lowest share is in the field of "pharmaceuticals" as far as applications to the Austrian Patent Office are concerned.

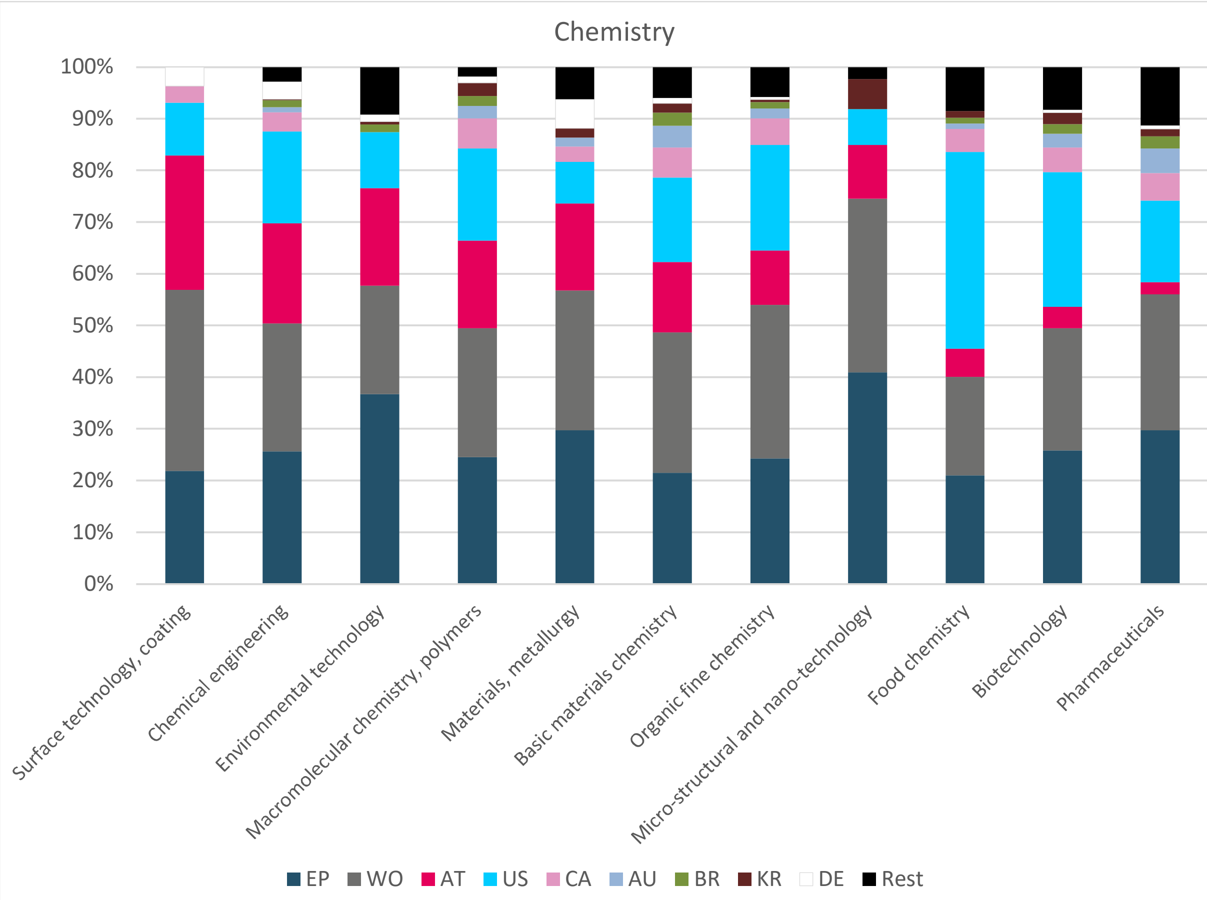

Figure 17: Applications – technology sector: chemistry – filing office and technology field

Technology sector Other

In the technology sector "Other", it is striking that only five registration offices are identified for technical inventions classified under "Furniture and games" and "Other consumer goods". The technology field "construction", on the other hand, is more broadly based, but here too, more than 70% of applications go to only three offices, with the USA, Germany and Canada sharing another 20%.

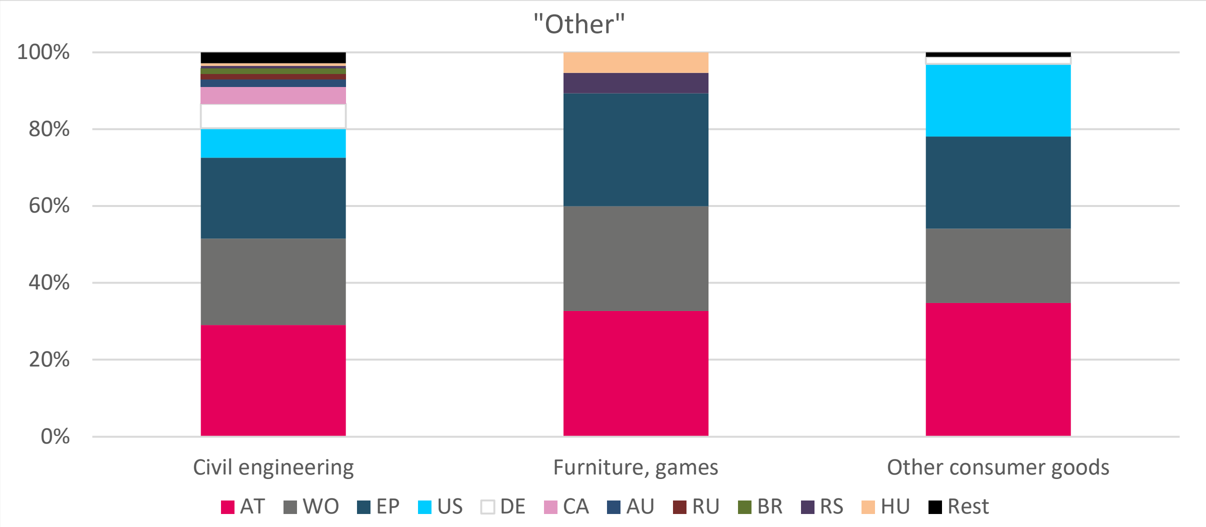

Figure 18: Applications – technology sector: „other“ – filing office and technology field

Electrical engineering technology sector

Technologies from the electrical engineering sector are divided into eight technology fields. According to the data, only a few offices are relevant for inventions in the field of audiovisual technology, basic communication processes and "IT methods for management".

In the case of the latter, which includes storage technologies and computer technologies, there are only four. This is also the technology field in which 60% of all applications are made nationally, with 23% going to Germany. It is also the only sub-field in which no invention can be assigned to the USA as the country of application.

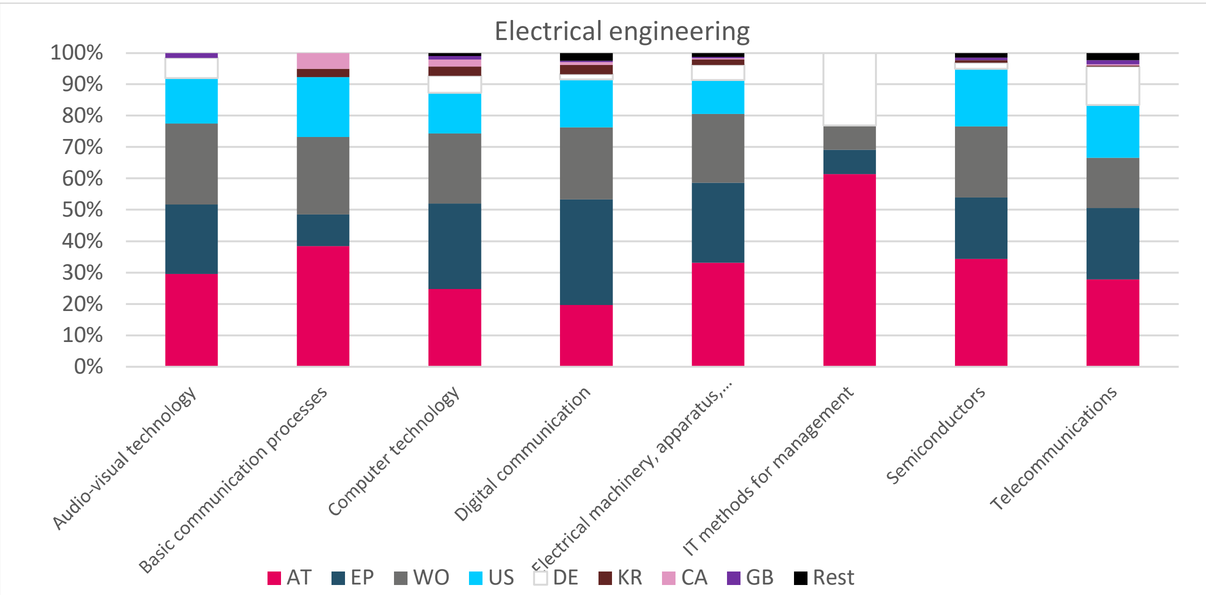

Figure 19: Applications – technology sector: electrical engineering – filing office and technology field

Mechanical engineering technology sector

In the mechanical engineering technology sector, inventions are divided into eight subcategories. Five filing offices dominate across all technology fields. With the exception of "textile and paper machines" and other "special machines", 90% of applications are filed with these five offices. In general, inventions in the field of mechanical engineering are filed with a much wider range of filing offices than in other technology fields.

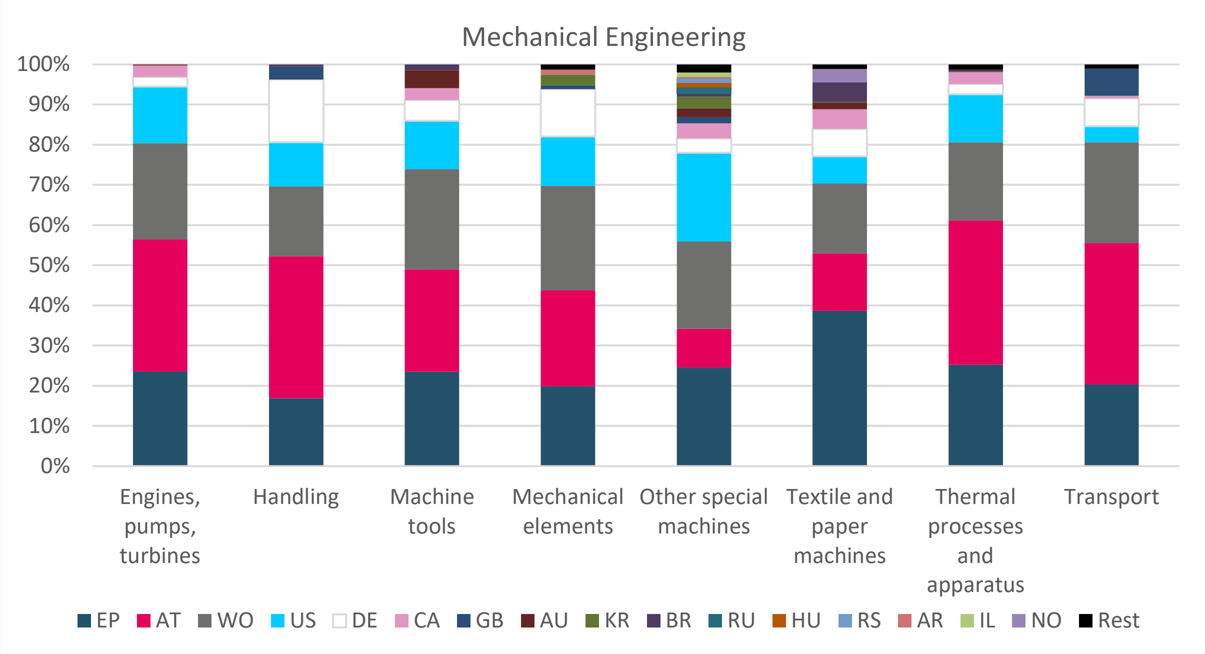

Figure 20: Applications – technology sector: mechanical engineering – filing office and technology field

Technology sector: instruments

Austrian research institutions file a particularly high number of national applications for inventions in the field of control and regulation technology (over 44% of applications). In contrast, applicants tend to file European or PCT applications for innovations in the field of "analysis of biological materials".

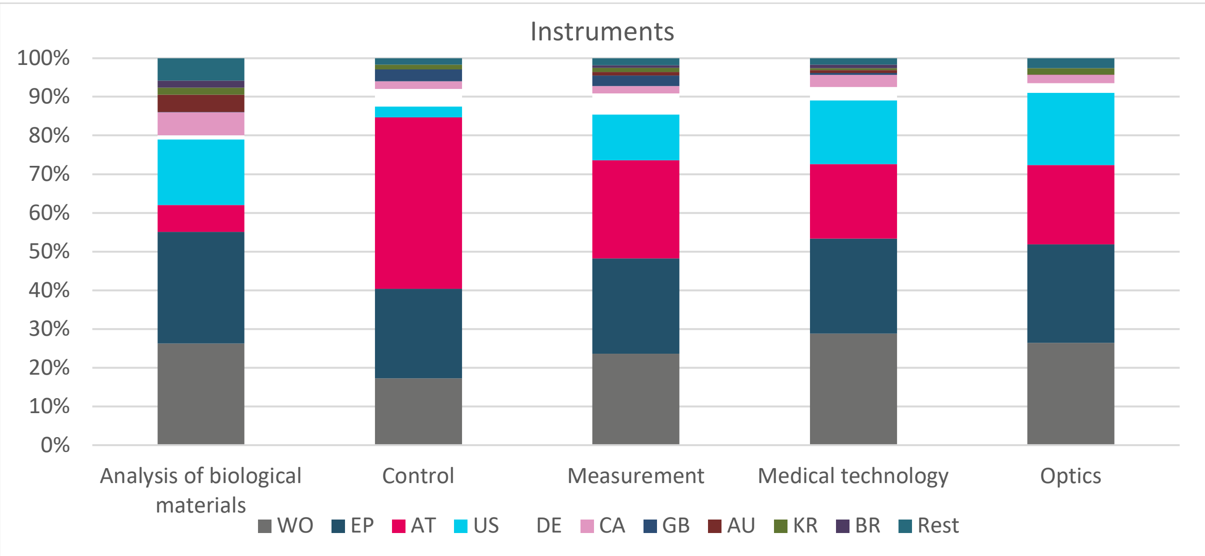

Figure 21: Applications – technology sector: instruments – filing office and technology field

4 Results of the qualitative survey

Against the backdrop of the strategic priorities for 2025, the Austrian Patent Office – based on studies already published at European level (see introductory chapter) and on its own initial data analyses using data from these studies – decided to survey universities, universities of applied sciences and non-university research institutions on their handling of intellectual property (IP).

The aim of the survey was to find out how these institutions deal with intellectual property in practice, where potential challenges and obstacles lie, and in which areas the Austrian Patent Office can provide targeted support. The following section first outlines the setting of the survey before discussing the qualitative results.

4.1 Development and structure of the questionnaire

The questionnaire was developed by the Strategy Department of the Austrian Patent Office (APO), with a particular focus on issues of central importance to the Patent Office. The starting point was a range of topics that had proven to be particularly significant in previous cooperation with stakeholders.

In addition to basic information about the respondent or institution, the questionnaire covered seven thematic areas with a total of 40 main questions:

1. Importance of intellectual property and IP strategies
2. Exploitation of intellectual property
3. Patenting and publishing
4. Funding and support services
5. Licensing strategies and technology transfer
6. Cooperation with the Patent Office – Services provided by the APO and the EPO
7. Cooperation and events

Survey period: The survey was launched on 11 April 2025 and ran until the end of May 2025.

Target group: A total of 89 stakeholders were contacted, including (vice) rectors and managing directors of all 23 public universities, all 21 public universities of applied sciences (UAS) and 45 selected public non-university research institutions[9] .

Response rate: A total of 31 institutions completed the questionnaire. These included 15 universities, six universities of applied sciences (UAS), seven public research institutions (hereinafter referred to as PROs – Public Research Organisations – in order to distinguish

[9] See also section 3.1.

them from those in the quantitative analysis and in accordance with EPO terminology) and three institutions that fell into the "Other" category (private research institutions).

Geographical distribution: All nine federal states are represented with at least one complete survey response that was included in the evaluation. Most responses came from Vienna and Styria (seven each), Lower Austria and Upper Austria (four each), Burgenland and Tyrol with three each, and Carinthia, Salzburg and Vorarlberg with one each.

4.2 Importance of intellectual property (IP) and IP-strategies

4.2.1 Importance of intellectual property

The importance of intellectual property (IP) is consistently rated as significant: 24 of the respondents rated it as very high (5) or high (4). A higher degree of technical orientation of the research institution tends to be associated with a higher rating. Universities in particular (dark blue) show the highest absolute appreciation for IP, with 13 mentions (8 times "very high" and 5 times "high").

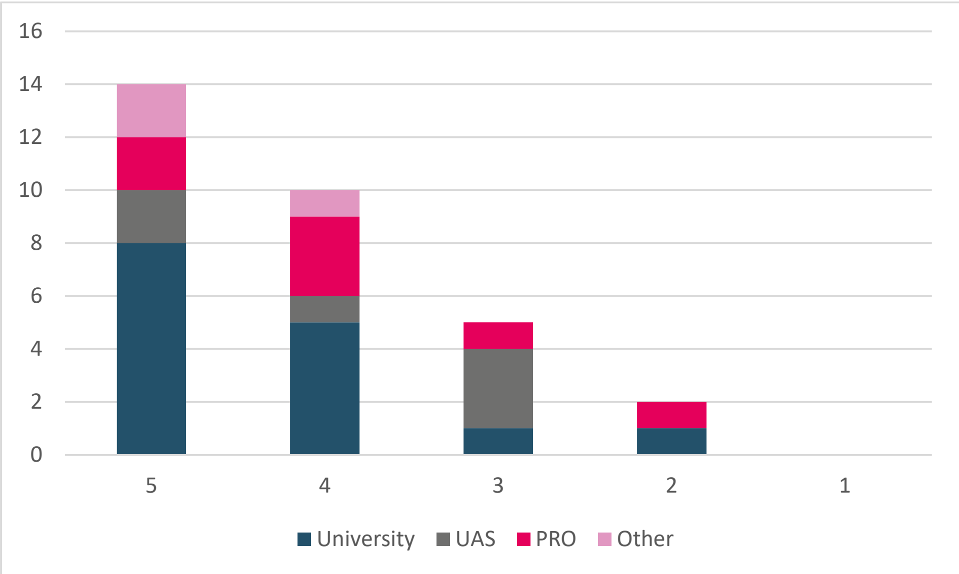

Figure 22: Importance of IP at research institutions
Note: 5 = very high, 1 = very low

The highest rating, "very high", was given a total of 14 times, while the lowest rating, "very low", was not selected by any of the respondents. The complete absence of mentions in this lowest category suggests that no one considers intellectual property to be insignificant – people with such an attitude would probably have chosen "very low".

This suggests that there is no doubt about the fundamental necessity of the patent and IP system and that, moreover, the prevailing attitude is overwhelmingly positive. This result confirms the very high regard in which intellectual property is held across all types of institutions examined here.

4.2.2 IP strategy – existence and main components

Universities, universities of applied sciences and non-university research institutions in Austria pursue a variety of strategies to secure, exploit and further develop their intellectual property. Of the 31 institutions that responded, 26 (or 84%) stated that they had a strategy for protecting and exploiting intellectual property.

Depending on the institution's focus and relevance, these strategies vary in depth and breadth. The strategy's primary objectives are to secure innovation for society and to exploit scientific results, as the following two quotes from the responses show:

The aim is "to secure the results and inventions of research in the best possible way for the benefit of society and scientific progress".

Quote (university – medical focus)

"The objective is the beneficial exploitation of scientific knowledge for the increased value creation of the company."

Quote (university – technical focus)

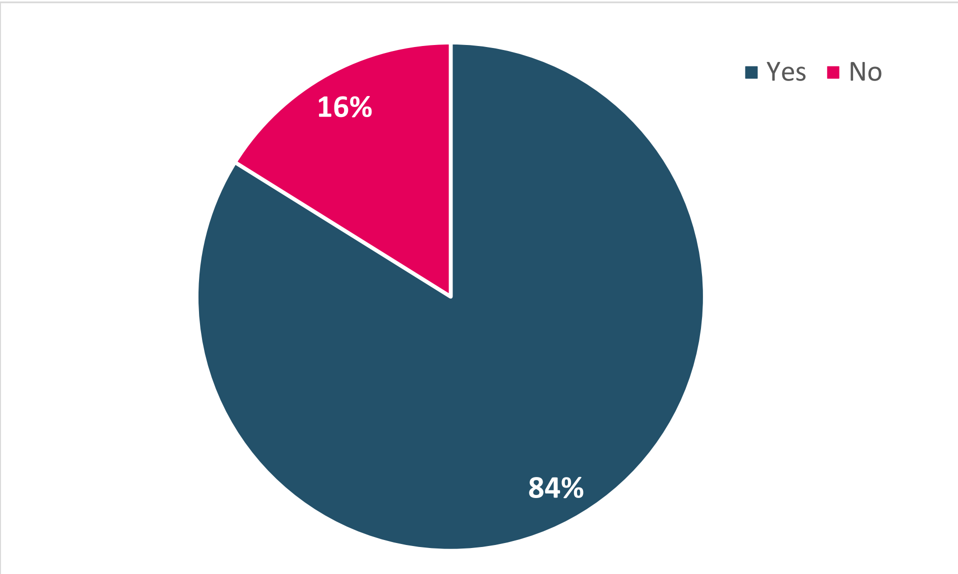

Figure 23: Is there an IP strategy?

Many existing strategies describe the entire process from invention to exploitation and set out the conditions for all parties involved at the research institutes. The following core elements of a strategy can be identified from the respondents' answers (not all components were mentioned by everyone).

4.2.3 Patent strategy – transparent and early-stage

Respondents were asked to indicate the key elements of their institution's patent strategy. The most frequently mentioned components are summarised below:

- **Goal, tools and content:** Securing intellectual property is often the primary goal. Many of the institutions surveyed have a clear focus on transparent handling of inventions. Some report having existing guidelines or manuals to ensure clear processes for handling invention disclosures, particularly for identifying inventions worthy of protection, deciding whether to pursue or not pursue them, including evaluation, and examining the technology in terms of the state of the art, patentability and market potential. These decisions and assessments are often linked to specific deadlines. The weighing up/evaluation of costs and benefits and the decision on whether to involve other stakeholders – from both the technical and commercial sides – or to consult a patent attorney is also often determined at this stage.

- **Operational:** In many cases, this is carried out by the institution's own technology transfer offices (TTOs), where available. Some also mention established invention disclosure forms, idea forms or TOS forms for "technologies without property rights" ("Technologien ohne Schutzrechte") that may nevertheless be relevant to the economy.
- **Contractual matters:** Contract management – such as the use of non-disclosure agreements (NDAs) or clear IP provisions in research contracts – is often cited as an integral part of the strategy.
- **Timing**: Many respondents emphasise the importance of regulating rights at an early stage.

4.2.4 Exploitation strategy

Some research institutions offer "active portfolio management"[10] and the development of exploitation plans. Respondents also consider it essential to define the terms of exploitation transparently, for example, which rights remain with the universities and how revenue sharing is regulated.

General types of exploitation:

- Investments and cooperation with industry partners/business: this primarily involves the structuring of licences, such as securing appropriate licence fees for the research institution. Another model element can be the early transfer of property rights to the respective corporate partner while securing licence fees and/or actively supporting start-ups and spin-offs through funding.
- Sale of IP: Designing the framework conditions for the sale of intellectual property, such as the sale of a patent to a business partner "before entering the national phase".
- Publication of research results as open access publications, i.e. publishing research results online freely and without access restrictions so that they are accessible to everyone without additional hurdles.

According to the respondents, it is important to initiate both the exploitation and patent strategy in consultation with and through the active participation of the inventors, often accompanied by recommendations from the respective institution and coordination by the latter on how to proceed. Some institutions also offer quality assurance in the form

[10] Quotations from the responses received are indicated below in italics and quotation marks.

of regular reviews of plans and monitoring of procedural steps, as well as legal support, particularly in contractual matters.

4.2.5 Further measures and elements of IP and exploitation strategies

To strengthen their innovative power and the sustainable exploitation of intellectual property, universities pursue a variety of complementary measures in the area of their IP and exploitation strategies. The following were mentioned by several respondents:

- One of the elements cited in many cases is the area of "incentives": targeted incentive systems are designed to promote the exploitation of intellectual property (IP). These include, among other things, the announcement of awards that highlight and recognise excellence in IP use. Similarly, the visibility of research results is being increased in a variety of ways in a targeted manner in order to better exploit their economic and social potential.
- Awareness measures focus on sensitisation and qualification. Training courses, workshops and further education programmes for students and researchers impart basic and in-depth knowledge in the field of IP. In addition, the topic of intellectual property (IP) is systematically integrated into the curricula of many institutions in order to raise awareness of the protection and exploitation of intellectual property during studies.

  In many places, this is supplemented by individual coaching and counselling services. Targeted communication and motivation of all university members help to leverage existing IP potential and further develop IP management in a professional manner.
- In the area of cooperation and networks, the focus is on expanding strategic partnerships. This includes both cooperation projects with companies and increased participation in national and international research networks.

  Particular attention is also paid to cooperation with other universities, for example within the framework of the European University Alliance E³UDRES². In order to jointly develop and exploit innovations, clear regulations are being established for shared intellectual property rights to inventions that arise in such alliances. Cooperation with partners such as other TTOs or companies is also being intensified to optimise the exchange of information and develop joint exploitation strategies.

These measures make an important contribution to systematically protecting the university's intellectual property, exploiting it strategically and strengthening its innovative capacity in the long term.

4.2.6 Current topics – topics in progress:

To further strengthen the IP and exploitation strategy, research institutions are pursuing several forward-looking fields of action. The following were mentioned by one or more institutions:

- According to some of the respondents, these include the continuous expansion of an efficient exploitation network that optimally links internal competencies with external partners. In parallel, the expansion of development capacities in the field of digitalisation is being driven forward to specifically promote digital innovation.
- The further development of an existing location concept and the targeted optimisation of the intellectual property rights and exploitation strategy contribute to the long-term strengthening of the regional innovation landscape. Close cooperation with industry, politics and society is intended to ensure that scientifically generated knowledge is applied as effectively as possible.
- In addition, cooperation with transfer institutions at other universities will be further intensified in order to exploit synergies and improve the flow of information.
- Finally, the open access strategy will also be continuously developed to support the principles of open science and promote sustainable access to research results.

The institutions surveyed that do not currently have their own IP strategy cite various reasons for this. In general, it can be said that a formal strategy can be particularly helpful for larger institutions, as it facilitates the coordination and management of complex IP activities. For smaller institutions, however, such a strategy can be very costly, so that individual processing is more practical and at the same time allows for greater flexibility. The lack of a formal IP strategy is not necessarily a disadvantage and may even offer advantages in some cases.

- One institution (a university of applied sciences) decides how to deal with intellectual property on a case-by-case basis, as situations vary greatly. In principle, however, it feels obliged to comply with existing intellectual property protection requirements. The institution stated that the issue should be given greater consideration in future revisions of the research strategy.
- According to another institution (a university of applied sciences), the central aspects of intellectual property (IP) are regulated by law, in particular by the law on employee inventions. IP usually arises in the context of funded projects, the cycles of which vary depending on the field of research. Regulations are project-specific and are set out in funding and consortium agreements, which offer sufficient flexibility for different constellations.
- One public research institution reported that it was not currently pursuing an independent IP strategy due to the low prospects of financial added value.
- Another institution stated that it planned to develop an IP strategy for 2025.

4.2.7 Challenges in protection and commercial exploitation

The protection and commercial exploitation of intellectual property pose challenges for research institutions, which are particularly characterised by the perceived conflict of objectives between the openness of scientific results (open science) and protection through patents or utility models. While open science aims at free, timely access to research results, patent protection requires confidentiality and novelty. This tension is a central theme in almost all the feedback.

The key statements and feedback are summarised below. Three groups can be distinguished: firstly, those who perceive a clear conflict of objectives between open science and intellectual property rights; secondly, those who consider both concepts to be compatible; and thirdly, those who focus on open science.

1. Conflict of objectives between openness and protection

Many institutions see the balance between scientific freedom and commercial exploitation as the greatest challenge. Science thrives on open exchange, while patent protection requires a certain degree of secrecy until the application is filed. Premature publication could destroy the novelty of the invention and thus thwart potential exploitation rights.

At the same time, it is emphasised that publicly funded research results – for example, through national or EU funds –should or must be made available to the general public. The balancing act between transparency and protection therefore requires careful strategic consideration: projects with clear economic potential should pursue a targeted IP strategy, while research results oriented towards the common good could be shared openly.

Young researchers in particular face a dilemma here: visibility and publications are crucial for their scientific careers, while institutions focus more on long-term economic benefits. In addition, there are interdisciplinary differences in the handling of intellectual property – there is often a lack of knowledge, experience and awareness of the legal and economic dimensions of IP management.

2. Compatibility through clear processes and strategies

Other institutions emphasise that scientific openness and economic exploitation are entirely compatible – provided that clear strategies, processes and contractual arrangements are in place. Through early coordination, phased publication strategies and targeted patent applications, both scientific freedom and economic benefits can be preserved.

According to these respondents, open science and IP protection do not have to be mutually exclusive if the sequence is clearly defined: first patent application, then publication.

> Note: In many cases, an initial application is deliberately used primarily as a priority application. The actual continuation of the invention – for example, as a European or international application – then takes place within twelve months, claiming this priority. If the priority application is withdrawn at an early stage, it can remain unpublished, while the subsequently continued application appears as a visible publication.

> From a patent law perspective, it is crucial that scientific publications only take place after the application or priority date: from this point on, the inventor or applicant may publish the results (including open access publications, without jeopardising patent protection for the content already applied for).

In practice, the respondents also emphasise that patent protection creates significant added value, particularly in cooperation with industrial partners, and sets research institutions apart from their competitors. The problem is not so much the patent itself, but rather the classification of results as trade secrets, as this severely restricts scientific visibility.

3. Focus on open science and limited economic prospects

Some research institutions deliberately focus on open science and only consider patents to be economically viable in individual cases. The cost of applying for intellectual property rights is often disproportionate to the potential return. Patents rarely lead to substantial income, which is why scientific publications are often preferred – they promote scientific reputation and career advancement.

In addition, limited market understanding and a certain reluctance on the part of European companies to pay for university intellectual property make commercial exploitation difficult. Licensing outside existing collaborations remains a challenge. The economic benefits are often considered too small to justify the high costs and personnel expenditure involved in a patent strategy.

4. Structural, organisational and procedural challenges

Costs, time pressure and limited resources are recurring and frequently mentioned issues. Patents are sometimes perceived as expensive to apply for, maintain and defend. The procedures often take too long, so that some technologies may already be technologically obsolete or overtaken by new developments by the time they are granted. In many cases, the amount of work required for well-founded applications, market analyses and technology transfer processes exceeds the capacities of smaller institutions.

In addition, some respondents find the processes complex: particularly in the case of collaborations, for example with spin-offs or dual employment of inventors, the question of property rights and exploitation claims arises. Unclear regulations, for example on data or know-how ownership, would further complicate economic transfer.

5. Awareness and competence building

A recurring theme is the lack of awareness and knowledge about IP issues – both among researchers and industry partners. It is often unclear when and how inventions should be reported, how priority rights are secured, or what legal obligations arise from funding projects. Many survey participants consider regular training and awareness-raising to be necessary.

On the corporate side, too, there is a need to strengthen the understanding that universities and research institutions pursue not only scientific but also economic interests and must comply with legal requirements (e.g. state aid conditions).

6. Lessons from the past

According to some respondents, experience from previous funding programmes, such as uni:invent[11], shows that focusing solely on patent activity is not effective. Today, many institutions instead pursue a differentiated approach, whereby property rights are only registered if there are realistic market opportunities. The focus is increasingly shifting towards alternative forms of exploitation such as know-how transfer, licensing or spin-offs – with greater emphasis on practical feasibility and cooperation with users.

Conclusion:

The tension between open science and commercial exploitation remains one of the key challenges in the research and innovation system. While openness promotes scientific progress and societal benefits, commercial exploitation requires strategic restraint, resources and market knowledge. A balanced IP strategy must integrate both objectives – through clear processes, awareness raising, early planning and realistic assessment of economic potential.

4.2.8 Exploitation of intellectual property

Survey participants were also asked about their practices and experiences with patent applications, particularly with regard to first filing offices, use of the unitary patent system and applicant roles. In addition, examples of recent spin-offs and start-ups are presented to illustrate the practical implementation of patent strategies.

First filing office

When asked where the initial patent application was filed, nine respondents said they tended to file with the European Patent Office, while seven tended to file nationally with the Austrian Patent Office. The vast majority of respondents (15) stated that the initial patent application was filed in different ways (including all responses from universities of applied sciences).

Use of the patent with unitary effect

Nineteen respondents stated that they use the unitary patent system, which is a surprisingly high figure given that it has only been in existence for two years, representing around 60% of all respondents. The reasons for not using it are mainly a lack of knowledge, relevance or need, or that the decision on the type of application lies with the company or spin-off.

[11] uni:invent, an Austrian funding programme (2004-2009) initiated by ministries and Austria Wirtschaftsservice to promote the exploitation of scientific inventions at universities.

Question about the applicant

Asked whether the cooperating or spun-off company or the research institution or researcher files the application, the responses were exactly evenly split. However, universities tend to file applications themselves or through their researchers, while universities of applied sciences or non-university research institutions and also the music and art universities included in the sample tend to file applications through companies.

Examples of recent spin-offs and start-ups:

Respondents were asked to name some of their spin-offs and start-ups, if available. The figure below shows some of them, without claiming to be exhaustive.

Figure 24: Spin-offs and start-ups of Austrian research institutions – examples

4.2.9 The path from university research to patent application

Although the responses regarding the path from university research to patent application vary in detail across the different institutions, they follow a basic logic. The process that triggers this valorisation (value creation from research results) is complex:

1. **Starting point – invention disclosure:** The most common formal starting point is the internal disclosure of the invention by the researchers themselves. Sometimes this is preceded by informal consultation within the project teams or with partners, as some respondents report, in order to identify relevant ideas at an early stage. In other cases, especially in cooperative research or RTOs (Research and Technology Organisations), the desire of the cooperating companies or the stipulations in contracts can initiate valorisation in advance. In RTOs, the majority of valorisation is designed to make research results usable for industry, often through licence agreements.
2. **Evaluation**: The invention disclosure is followed by a comprehensive evaluation. This usually includes:
   - Technical and economic assessment of patentability: This involves examining whether the invention is new, inventive and commercially applicable, and what its market potential is. This can be done internally (e.g. by the R&D department, TTO or IP management) or by external experts such as patent attorneys. In addition, the Austrian Patent Office offers a pre-check for invention disclosures, which provides an initial assessment of the patentability and economic potential of the invention (see also below).
   - Legal assessment: This clarifies the allocation of rights, especially in the case of collaborations with other universities, research centres or corporate partners.
   - Cost-benefit analysis: Value preservation is taken into account when estimating the cost-benefit ratio.
3. **Decision:** According to the survey results, the institution (e.g. rectorate, management, etc.) decides on whether to pursue and patent the invention based on this assessment.
4. **Patenting and exploitation strategy**: If the decision is positive, the patent application process is initiated, often in close cooperation with patent attorneys. Parallel to this or immediately afterwards, an exploitation strategy is developed. This can take various forms:
   - Licensing: The patent rights are licensed to a company.
   - Transfer or sale: The patent is transferred or sold directly to an industrial partner.
   - Establishment of a spin-off: The invention serves as the basis for a new company.
   - Contribution to cooperation projects: The patent serves as "background" IP for further research projects with partners.

Some institutions have a defined employee invention process, which is often part of their quality management system or described in manuals (e.g. tech transfer manual). Others describe the process as more project-driven or as support from an in-house expert, as requirements can vary greatly.

The overarching goal of the entire process is to valorise and secure the value of research results in order to make them accessible to society and the economy and to promote the transfer of knowledge into application. Some research institutions achieve this through proactive licensing efforts, the promotion of spin-off ideas or direct partnerships with industry.

Survey participants were asked to select (multiple) options from the following list of mechanisms used by their research institution to exploit their research results: publication, spin-off, licensing, participation in companies, and other.

- Publication (29) was the most frequently cited option, followed by participation in companies (24) and spin-offs (22). Participation in companies is an option for 10 institutions, while eight have indicated another (additional) option, such as sales, cooperation, open access applications or contract research to transfer research results into innovations in industry and public organisations.
- All four options are possible for nine institutions, and all options except participation in companies are possible for a further 13.
- For all institutions, scientific publication is one of the options – apart from one university, for which none of the options mentioned are currently relevant. For five of these institutions (all of which are universities of applied sciences and public research institutions), publication is in fact the only option.

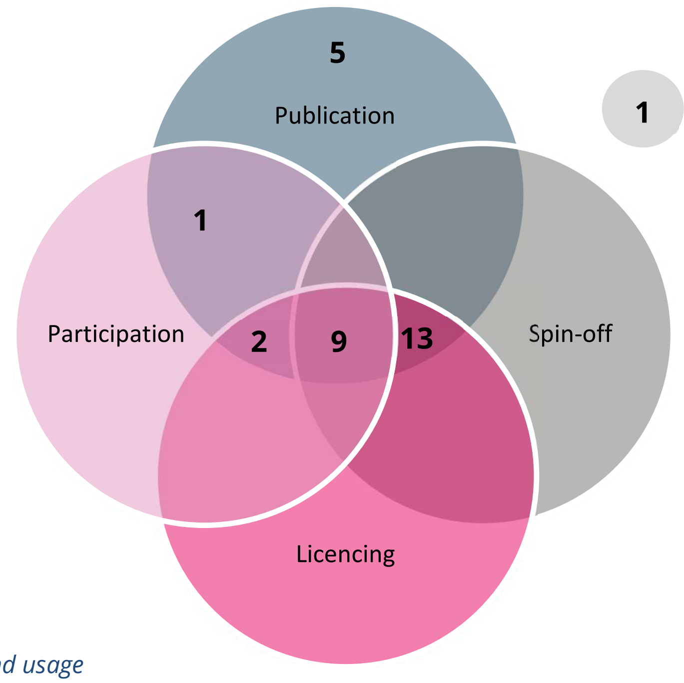

Figure 25: Types of exploitation and usage

4.3 Patenting and publishing

4.3.1 Decision: Patenting or scientific publication

The decision between patenting and scientific publication represents a fundamental turning point in the research and innovation process. Only on this basis can exploitation strategies be developed – for example, in the form of spin-offs, licensing, investments or sales – whereby various factors were mentioned that significantly influence this decision.

The responses show that nine institutions have guidelines or recommendations that are used to decide whether a research result should first be patented or immediately published in a scientific journal. In contrast, seven responses indicate that there are no established internal guidelines and that decisions are made on a case-by-case basis (e.g. by a project manager).

The arguments given in favour of patenting (rather than immediate publication) can be summarised as follows: a research result should first be patented if it has clear economic exploitation potential and is eligible for protection. Patent protection ensures exclusive access to the knowledge and enables economic exploitation before publication potentially jeopardises intellectual property rights. The following are the main decision-making factors mentioned, supported by quotes from the respondents:

- Novelty: "*If there are no patents on the subject yet and novelty and inventive step are present -> patent, otherwise paper*."
- Determination of patentability: "*The patent team […] evaluates technology, patentability, dependency, infringement relevance, implementation time, competition, market accessibility, finances, strategy and exploitability*."
- Determination of exploitation potential: "*Evaluation of market potential (USP; competition; market size). If the evaluation is positive, there is a clear recommendation to patent first and then publish scientifically.*" And: "*If there is a prospect of successful exploitation, the patent is prioritised.*"
- Third-party funding or industrial cooperation: "*Patenting is only carried out if the business partner so desires.*" And: "*This is usually already specified in the consortium agreement during negotiations for third-party-funded projects*."

In most cases, this is discussed with the TTO, the rectorate or other bodies.

Arguments in favour of immediate scientific publication (instead of patenting): According to some of the respondents, rapid scientific publication is generally advisable if the focus is on the interest in knowledge, if there is insufficient patentability, or if the results need to be made publicly available in a timely manner. The most important criteria cited are:

- Low inventive step/incremental innovation: "*Incremental innovations are usually published*."

- Necessity of publication (e.g. as part of a dissertation): "*More problematic are incremental results that are routinely published (or must be published; -> publication requirements in dissertations) ...*" and: "*We generally encourage scientific publication, as most research projects have also been funded by public money*."
- Wishes of the cooperation partner: "*Patenting is only carried out if the corporate cooperation partner so desires.*"

The decision-making process regarding whether to publish or patent is therefore project-based in many institutions, taking into account market potential, novelty and the interests of all parties involved.

4.3.2 Use of the Pre Check Invention Disclosure Search

The Pre Check Invention Disclosure Search is a service provided by the Austrian Patent Office for public universities and universities of applied sciences, in which experts from the Office research the submitted invention disclosure and, within approximately two months, provide a basis for deciding whether a patent application would appear to be worthwhile. It includes a qualified search on the state of the art and, on request, a technical assessment of the invention to assist in the decision to pursue the invention further.

Eleven universities, two universities of applied sciences and one non-university research institution stated that they had already used the Austrian Patent Office's Pre Check Invention Disclosure Search to help them decide whether to apply for a patent. It should be noted here that, due to its focus on universities and universities of applied sciences, this service is currently less directly relevant for PROs and other independent research institutions. (See also the section on the evaluation of the services provided by the Austrian Patent Office and the European Patent Office).

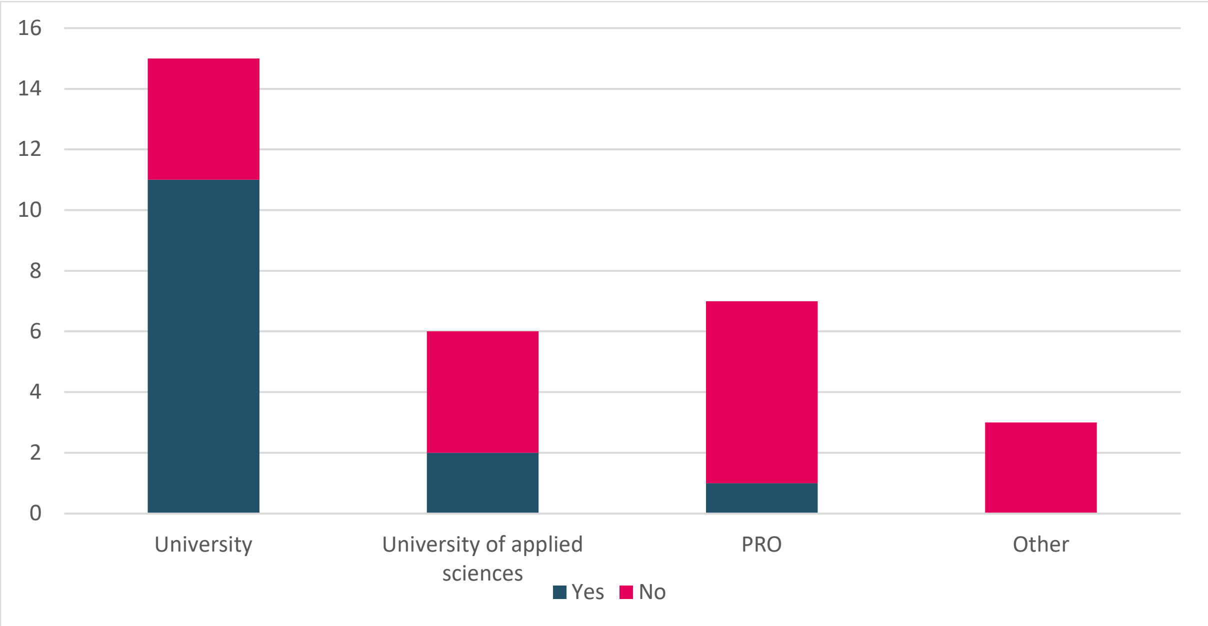

Figure 26: Use of the Pre Check Invention Disclosure for decision-making

When asked why they had not yet used this service, universities stated that they had "*other partners to evaluate invention disclosures*" or that this was done by "*internal experts*". Universities of applied sciences often cited low demand or a lack of relevant cases. Three responses indicate that there are "*other cooperation partners*" or that there is an "*internal decision to keep the invention internal*". One response clearly suggests that there is a need for improvement in terms of knowledge about this service ("*don't know how long it takes and whether the results are binding*").

4.3.3 Patent publications

When asked whether research teams use patent publications in addition to scientific publications to obtain information on the current state of research and technology, the picture was mixed: patent publications are used frequently (9 times) to rarely (20 times); only one independent research institute stated that it always uses them, while one art university stated that it never uses them.

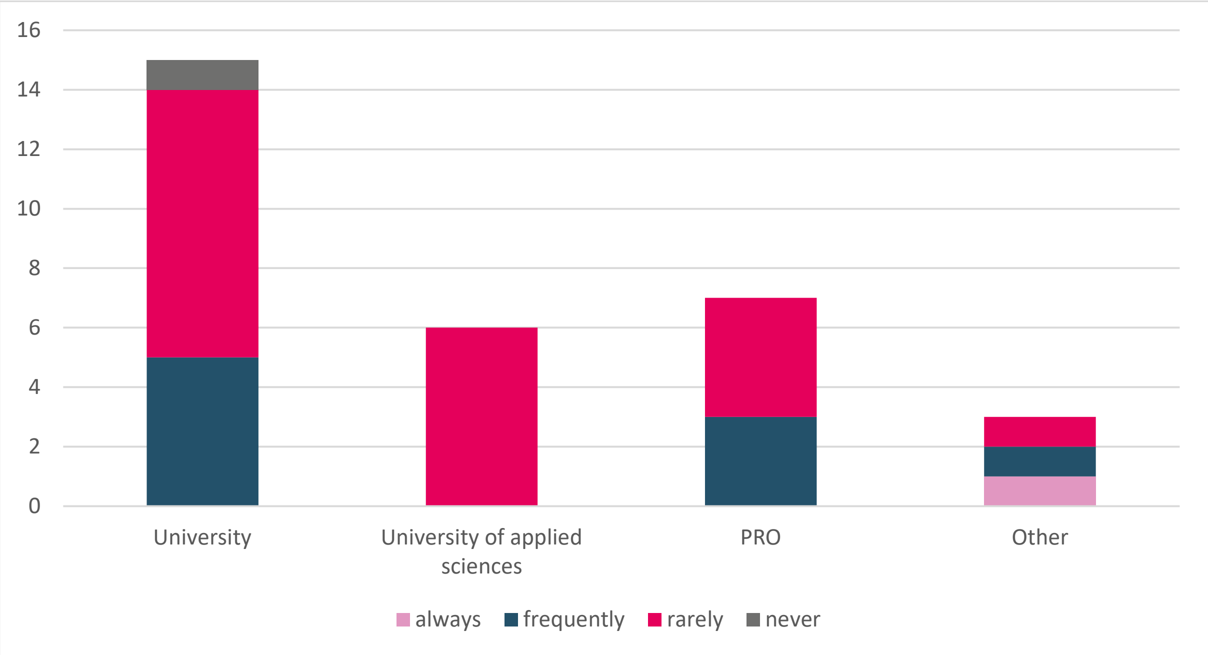

Figure 27: Use of patent publications

4.3.4 Influence on scientific careers

Most respondents currently see little or no direct influence of patent strategy on scientific careers – especially when compared to the dominant role of publications ("*publication pressure*", "*Within the scientific community, a patent has a rudimentary significance as a research achievement […]*") and third-party funding. Scientific publications are "*of central importance*" to researchers and are "*a priority for researchers*" because they "*contribute significantly to scientific careers*" and the publication strategy "*certainly has greater value for scientific careers*." This is naturally more pronounced at institutions with few or no patents.

However, there are also voices that emphasise indirect effects or context-dependent relevance. For example, in some departments, there is an observable "*awareness of intellectual property protection in connection with potential spin-offs*".

Patents are also maintained in some institutions as part of internal performance databases and are considered essential, particularly when founding spin-offs *("Patents are a mandatory basis for spin-offs," "Patents enhance reputation, especially among companies")*. Particularly institutions with a strong economic or practical focus emphasise that career paths would benefit more from an active patent strategy, for example through inventor remuneration as an incentive for employees or reputation gains vis-à-vis industrial partners.

The responses also indicate that patent applications do not generally stand in the way of scientific publications and "*are not perceived by researchers as restrictive*", but are treated as equivalent to publications or as "*a possible supplement to publications*".

4.4 Funding and support

4.4.1 Funding programmes to support commercialisation activities

When asked which (national or international) public funding programmes research institutions use to support their exploitation activities, the answers revealed the diverse picture of the national funding landscape and its instruments, which are used depending on the institutional orientation and exploitation goals:

- Most frequently mentioned by the institutions is the FFG (Austrian Research Promotion Agency) with its wide range of programmes (Spin-off Fellowship, Innovation Check, Patent Check Digital Innovation Hubs, Bridge, …), closely followed by funding from aws (Austrian promotional bank, Austria Wirtschaftsservice GmbH), primarily the "Proof of Concept" funding line, but also "aws Innovation Protection" and prototype funding, as well as "aws Preseed".
- EU funding opportunities (e.g. within the framework of Horizon Europe, but also the EIT (European Institute of Innovation and Technology) and EIC (European Innovation Council) are mentioned by eight institutions.
- Three institutions mention "CD laboratories" of the CDG (Christian Doppler Research Association) in the survey, and eight institutions mention funding at the federal state level.

It is striking that universities of applied sciences seem to focus almost exclusively on FFG and aws, while public non-university research institutions focus on FFG and European programmes. Among universities, the mentions of aws and FFG are balanced. In principle, universities draw from all possible sources (much more heterogeneously than other research institutions).

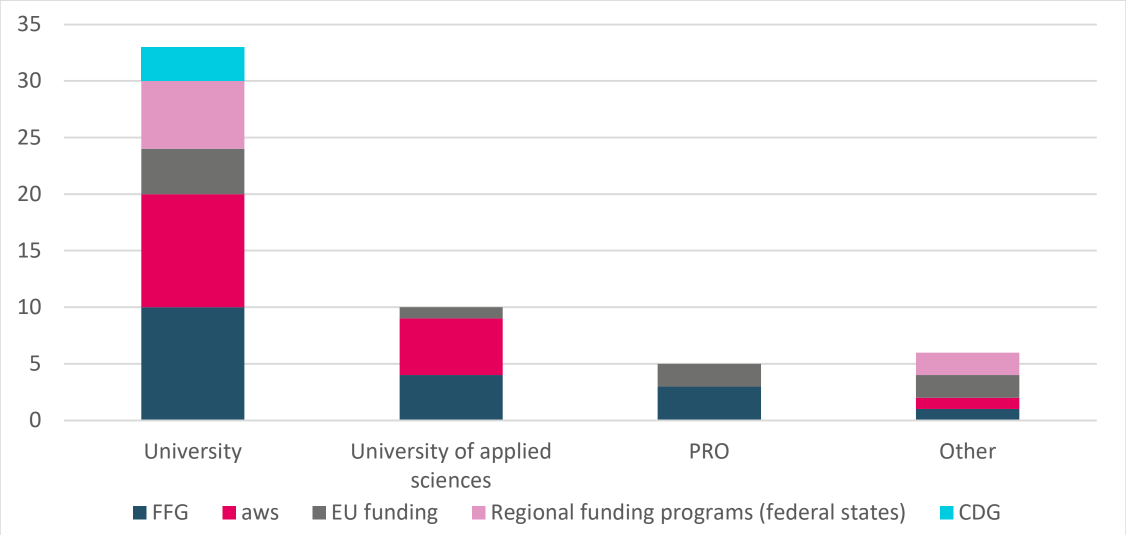

Figure 28: Use of public funding programmes (multiple responses)

4.4.2 Evaluation of funding programmes

Three-quarters of respondents rate the funding system in Austria as good (9) or adequate (15). Three respondents give it a rating of "very good". Only four institutions believe that there is too little funding available.

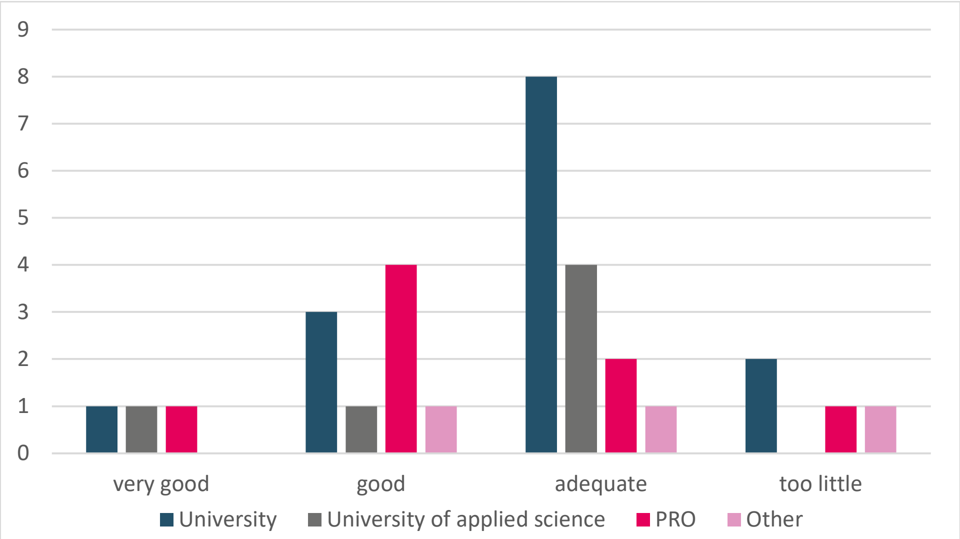

Figure 29: Evaluation of Austrian funding programmes

In terms of desired improvements, universities repeatedly expressed a desire for (more) funding in the area of prototypes and proof of concept, especially in the early stages of development ("*because if business partners are involved too early, the exploitation strategy is already very limited*").

Funding should generally be low-threshold, uncomplicated, transparent and practice-oriented. According to the feedback received, it should also take into account the profile characteristics of research institutions with a non-technological focus (e.g. inclusion of "*art university specifics*") and be supplemented by "*targeted knowledge transfer and clearly defined interfaces between science and industry*".

There was also a desire for "*short-term cost coverage for market research/IP evaluation*" and, in general, "*financing options for patents*" – especially in the exploitation phase. One university (in the medical field) has a concrete proposal here: the assumption of costs (co-financing) for patents in the nationalisation phase (or post-PCT), especially for spin-off projects in the pre-start-up phase.[12]

According to one research institution, the wishes of founders regarding the number and selection of countries cannot always be fully met due to the financial situation and the large number of projects, which would reduce the market for the start-up company. In the context of broader international patenting, the proposal is that 50% of the patent costs incurred by the university should be refunded.

Funding should also take non-university research institutions into account, at least "*up to a certain size*" of the research institution, in order to also consider non-profit Research and Technology Organisations (RTOs).

Twenty-four of the institutions surveyed stated that they had collaborations with companies or other institutions that provide financial support or resources for application-oriented research. CD laboratories, Josef Ressel Centres and COMET (Competence Centres for Excellent Technologies) were mentioned most frequently.

4.4.3 Information about IP protection, patent research and technology transfer

When asked how researchers/students are informed about IP protection, patent research and technology transfer, the clear majority of respondents stated that there is a corresponding range of training courses, consultations, workshops and internal processes. Some of these offerings are mandatory (as part of onboarding or training), some are mentioned to take place regularly – using both internal experts and external providers (including the Austrian Patent Office, the Austrian Federal Economic Chamber and partner universities) – and some range from individual coaching to general events. New forms of media like social media platforms or intranets are also used for this purpose. Only two responses indicate that personal initiative is required or that there are gaps in this area.

Two-thirds of the institutions surveyed consider the support provided by the Austrian Patent Office to be sufficient and see no need for further action in this area. The 11 institutions that would like further support mentioned the following areas, among others: individual advice on patent strategy (universities and PRO), additional services in the area of research (universities), accelerated procedures (universities), FTO analyses (PRO and universities) and coverage of research costs (universities). Support with exploitation and technology transfer (universities) and patent evaluation (universities) was also mentioned. The universities of applied sciences expressed a desire for training on patents in a broader sense.

[12] Note: aws Innovation Protection advanced comes into play here and subsidises, among other things, the costs of obtaining property rights and the costs associated with the transfer of property rights. (Source: aws).

4.4.4 Role of patents and patent searches in research

Survey participants were also asked about the role of patents and patent searches in the course of a research project. A patent search is a systematic search of national and international patent databases for previously published patents and technical publications that are relevant to a specific invention or issue. It serves to determine the state of the art, to examine the novelty and patentability of an invention, or to identify the property rights of third parties.

The fact that patents play a role for the research institutions surveyed tends to be more evident in the later phases (towards exploitation), but also in terms of technical orientation: the more technical the research institution, the higher the rating in the individual phases. (1 = no role, 5 = central role)

	Idea generation & concept development	Planning & funding acquisition	Conducting research (data collection, experiments, prototypes)	Publication & dissemination	Commercialisation & technology transfer	**Total**
University	5	5	5	5	5	**25**
University	5	5	5	5	5	**25**
PRO	5	5	5	5	2	**22**
Other	5	4	3	5	5	**22**
University	4	4	5	4	5	**22**
University	3	3	3	5	5	**19**
PRO	3	4	2	4	5	**18**
PRO	4	4	4	2	3	**17**
Other	1	3	4	4	5	**17**
University	3	3	3	3	5	**17**
University	1	3	5	3	5	**17**
University	3	4	3	2	4	**16**
UAS	2	2	4	3	4	**15**
PRO	3	3	3	3	3	**15**
Other	3	3	2	3	4	**15**
University	2	2	3	3	5	**15**
University	2	3	2	3	5	**15**
University	1	2	3	4	5	**15**
University	2	2	3	3	5	**15**
UAS	4	2	3	1	4	**14**
UAS	4	3	1	3	3	**14**
UAS	1	1	4	3	4	**13**
PRO	1	4	2	3	3	**13**
PRO	1	1	3	4	4	**13**
University	1	1	2	3	5	**12**
University	1	1	3	1	5	**11**
University	2	2	2	2	2	**10**
PRO	1	1	2	1	3	**8**
University	1	1	1	2	3	**8**
UAS	2	1	1	1	2	**7**
UAS	2	1	1	1	1	**6**
Total	**78**	**83**	**92**	**94**	**124**	**471**

Table 3: Role of patents in the course of a research project

4.5 Licensing strategies and technology transfer

4.5.1 Licensing models

Licensing models differ mainly in terms of who owns which intellectual property rights (whether the licence is granted to one party – exclusively – or to several parties – non-exclusively – or even made public – referred to as open source or open access).

Just under half of the institutions (mainly universities) use both exclusive and non-exclusive and open source licensing models (three of them even use other models in addition, and another three use none of the models mentioned or other models). Here, too, the responses appear to positively correlate with the technical proximity of the institution: the more "technical" (including medical) the focus of the institution, the more likely it was to respond that it uses licensing models.

4.5.2 Standardised procedures: licensing of technologies or patents

Ten of the institutions (seven universities, three non-university research institutions) stated that they have standardised procedures for licensing technologies or patents. In some cases, predefined licensing agreements are in place, or the specific procedure is regulated by the TTO or in guidelines.

Specific questions were asked about the standardised procedures used in the research stations. The following responses were specified and are listed here as examples:

1) Example of the technology transfer and licensing negotiation process

Together with the inventors, a structured document is first created that clearly describes the technical innovation and is prepared for external presentation.

At the same time, a targeted search for suitable industrial partners begins. The patent and licence management team supports the establishment of contact with potential partners by participating in networking events, conferences and partnering events.

In parallel, the technology is strategically marketed to create visibility. Throughout this process, building and maintaining a strong network is crucial to establishing partnerships that contribute not only financial resources but also market knowledge and technological resources.

If a company expresses interest, a non-disclosure agreement (NDA) is first signed to enable confidential exchange. If the industry partner wishes to conduct tests before making a decision, a material transfer agreement (MTA) is concluded.

If the technology is evaluated positively, it is either licensed, sold or further developed as part of a research collaboration – in this case, contract negotiations and drafting are handled by Research and Transfer Support.

2) Example of internal coordination and contract approval

After successful negotiations, internal coordination takes place with the departments responsible for research and technology. The licence agreement is prepared during this phase. Final approval of the agreement is given by both the Rectorate and the licensee. The agreement is then signed and becomes legally valid.

3) Example of contract initiation and negotiation
Before the contract is concluded, preliminary discussions take place between the university – represented by the Technology Transfer Office (TTO) and the researchers involved – and the corporate partner.

The TTO then draws up a key issues paper, which serves as a basis for negotiation. The terms and conditions are negotiated in consultation with the partner company, involving the legal department if necessary. The final contract is drawn up by the university's legal department before the document is finally signed by the Vice-Rector.

4.6 Cooperation with the Patent Office – APO & EPO services

Among the ten support services offered by the Austrian and European Patent Offices that were surveyed, the Pre Check Invention Disclosure Search was the most frequently mentioned measure, with 28 out of 31 positive responses regarding awareness, closely followed by the IP Academy of the Austrian Patent Office and, tied for second place, EP-Search (26 respondents stated that they were aware of these measures).

The IP Buddies of the Austrian Patent Office and the associated free patent search for students (IP Scan) were known to 18 of the respondents – including 12 of the 15 universities, but only two of the six universities of applied sciences that responded. [13]

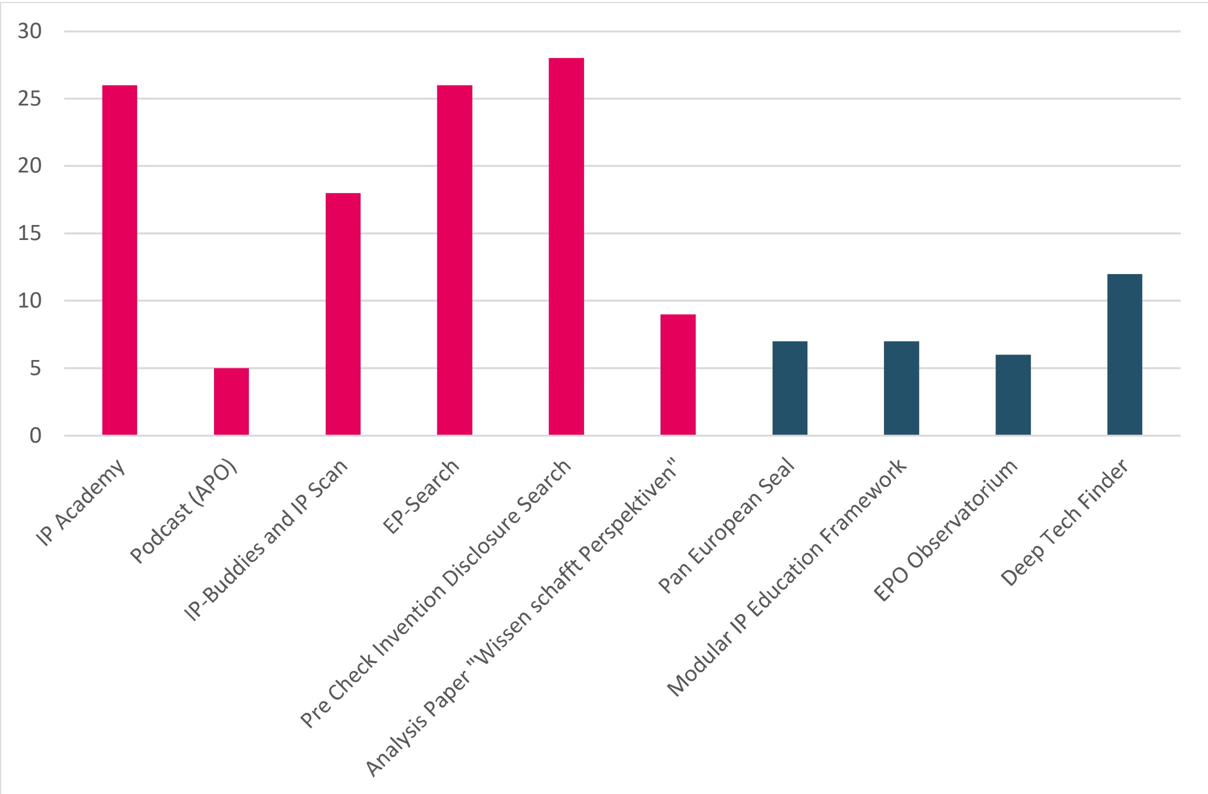

Figure 30: Services offered by the APO (pink) and the EPO (blue) – awareness

[13] For details on the services: see the following chapter.

Of the EPO's services, Deep Tech Finder is the best known. No particular characteristics can be identified with regard to the group of interested parties – awareness seems to be very unevenly distributed.

For the other EPO services surveyed, awareness seems to be limited to universities (with the exception of one non-university research institution) – and it is clear that if a university is aware of one EPO service, it often also knows about further services.

Usage behaviour and satisfaction:
The IP Academy of the Austrian Patent Office, EP-Search and the Pre Check Invention Disclosure Search are the most frequently used services (16 of the 31 respondents stated that they had used these). Satisfaction with these three services was as follows:

- The IP Academy of the Austrian Patent Office received 10 "very good" ratings, 6 "good" ratings and only one "satisfactory" rating for satisfaction.[14] Only one of the responding universities of applied sciences stated that it had already used the IP Academy's services.

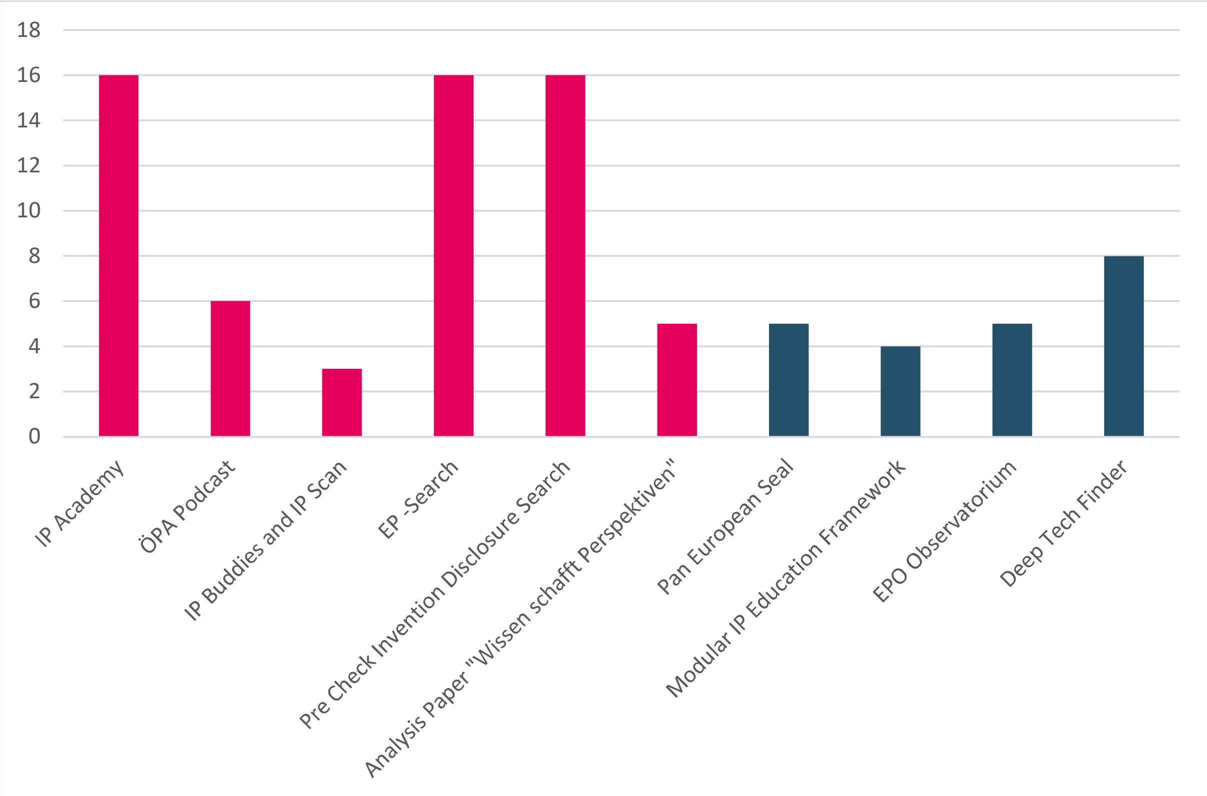

Figure 31: Services provided by the APO (pink) and the EPO (blue) – usage

- Seven of the respondents are very satisfied with the EP search, and just as many rated this support service as good. The response "satisfactory" was given three times. Universities of applied sciences and public research institutions stand out here as (yet) infrequent users.

[14] Note: one institution gave a satisfaction rating without having used the service).

- The Pre Check Invention Disclosure Search received more mixed reviews, with four respondents rating it as "very good", nine as "good", three as "satisfactory" and one as "could be improved". This service is currently used primarily by universities and universities of applied sciences.

The use of EPO support services varies between eight (Deep Tech Finder) and four (Modular IP Education Initiative).

4.7 Future cooperations

19 of the respondents are interested in having the Austrian Patent Office give a guest lecture on IP protection in individual existing courses. Some respondents stated that they already collaborate with the Austrian Patent Office on guest lectures and that, in some cases, particularly in technical departments, this is already part of the curriculum or in the planning stage, and that this is also an option for the TTO team itself. Those for whom this is not an option stated, among other things, that it was too specific for the course, that there was no need for it due to the content focus of the institution, that such cooperation already existed, or that there were sufficient internal offerings.

Twenty-three of the responses indicated that a webinar on research funding and spin-off initiatives in connection with IP protection would be of interest to the respective institution.

The reasons given by those who expressed no interest are also interesting: on the one hand, the potential for spin-offs was cited as too low (institution with a focus on business), and on the other hand, that the topic required too many resources, but also that appropriate events would be organised if necessary, or that the knowledge about it was already available (technical institution).

Further suggestions from respondents:

- Practical model contracts for cooperation agreements/proven wording (university of applied sciences)[15]
- Recordings of IP Academy seminars available for viewing at any time (university)
- Involvement of experts from the patent office in an in-depth intellectual property rights course for pharmacists and chemists as part of continuing education (university).

[15] The Intellectual Property Agreement Guide (IPAG) is a project of the Austrian Universities Conference (UNIKO) and is supported by the National Contact Point for Intellectual Property in Open Knowledge Transfer (NCP-IP), ministries and the aws. IPAG provides free sample contracts for dealing with R&D collaborations, intellectual property rights, licence agreements, patents, contract research and confidentiality. All sample contracts are the result of joint development between Austrian universities and companies under the guidance of specialised lawyers. (Source: NCP-IP).

5 Initiatives of the Austrian Patent Office

The qualitative survey of Austrian research and innovation institutions clearly demonstrated the need for increased IP awareness, practical advice and the integration of IP knowledge into teaching. There was a desire for closer cooperation, particularly through guest lectures and expanded services. The Austrian Patent Office is already responding to these requirements with a wide range of measures and initiatives aimed at strengthening expertise in research institutions and promoting knowledge transfer, and will continue its efforts to disseminate IP knowledge in a targeted manner.

As part of its focus, the Austrian Patent Office evaluated the patent-related service offered to universities, the Pre Check Invention Disclosure (EMR), and conducted interviews with 12 users of the service for its further development (a summary of the results can be found in Appendix 3).

Furthermore, a pilot project was initiated and implemented with the Vienna University of Technology to develop a technology field search in an academic research project. The final report was considered particularly useful as a basis for further research work, and follow-up projects were planned.

Since 2018, the IP Academy has been offering training content on industrial property rights for various target groups. Students, teachers and researchers at Austrian universities have always been a particularly important group for whom a wide range of training measures is provided.

While initially only a few professors and lecturers enriched their courses with contributions from the Patent Office, in recent years the topic of IPR (Industrial Property Rights) has increasingly been recognised as an important part of lectures and seminars.

The Patent Office is therefore particularly committed to the topic of "IPR awareness at universities and universities of applied sciences" and has signed a memorandum of understanding with the Association of Technical Universities in Austria, TU Austria, among others, in 2025. The aim of this agreement is to strengthen cooperation between the Patent Office and the three technical universities, TU Vienna, TU Graz and the University of Mining and Metallurgy, Leoben, to engage in regular exchanges to promote and utilise intellectual property, and to offer a range of services and information, as well as teaching content and lectures.

In this context, 33 different contributions in the form of lectures and workshops were held at the three technical universities between 2022 and 2025, and 45 such events were held at other Austrian universities and universities of applied sciences.

The courses were offered online, but also in person and as part of excursions to the Patent Office. In addition to the basics of patents, trademarks and designs, the main topics were computer-implemented inventions (the protection options for software), Artificial

Intelligence and the protection of intellectual property, as well as workshops on searching patent databases.

As part of this year's university focus, numerous new contacts and collaborations with universities and universities of applied sciences throughout Austria have already been established. The Austrian Patent Office has put together a comprehensive information package for this purpose. At the heart of this awareness campaign, which includes both print materials and increased joint social media activities, is the IP Buddy service: here, students receive free, low-threshold, comprehensive advice on intellectual property. The IP Buddies were deliberately put in the spotlight, making them even more visible to the target group.

By establishing contact with start-up centres, innovation institutes and technology transfer offices, further opportunities for cooperation have also been initiated. These range from greater inclusion of intellectual property rights in courses to excursions to the Austrian Patent Office and long-term partnerships.

The Austrian Patent Office plans to assign so-called DOI numbers to patent publications at the request of the applicant from 1 April 2026. A DOI number (Digital Object Identifier) is a unique and permanent identifier for digital objects, mainly used for scientific articles. It enables reliable linking that does not change when the location of the document on the internet changes – unlike a URL, which can expire or become invalid.

The assignment of DOI numbers is aimed in particular at universities, research institutions and other scientific institutions, as it makes their patent applications in the scientific field easier to find. The DOI number makes it possible to cite patents uniformly and permanently, which increases the visibility of research results and facilitates their integration into research, teaching and scientific publications. The assignment of DOIs is optional and only takes place at the request of the patent holders. This allows patents that are particularly relevant for scientific use to be permanently identified digitally, reliably linked and archived for the long term.

In 2025, the Austrian Patent Office also made the topic of intellectual property in Austrian research institutions a fixed part of its international agenda.

- At an international IP conference (November 2024, Vienna), the Austrian Patent Office brought together the President of the European Patent Office and the rectors of the three technical universities.
- In around a dozen bilateral meetings with foreign patent offices, the role of universities, universities of applied sciences and non-university research institutions in the IP system was a regular topic of discussion. The high international relevance was evident even at the provincial level in China (e.g. Hubei), underscoring the ongoing need for knowledge transfer and best practice exchange.

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Statistics Austria, FSK – Austrian Research Facility Catalogue. Link.

Appendix 1: Methods for the name harmonisation data analysis

The data source is PATSTAT Global (Spring 2025, EPO)[16]*. From the central person table tls206_person, the name fields person_name, doc_std_name, psn_name and han_name were used. The names were split into character trigrams (with padding), and their similarity was estimated via MinHash with k = 120 independent hash functions in a 16-bit hash range. The share of matching signature positions approximates the Jaccard similarity. For efficient candidate generation, Locality-Sensitive Hashing (LSH) was applied, followed by a downstream human review to confirm the proposed matches.*

␣␣T	␣␣T
␣TE	␣TE
TEC	TEC
ECH	ECH
CHN	CHN
HNI	HNI
NIS	NIS
ISC	ISC
SCH	SCH
CHE	CHE
HE␣	HE␣
E␣U	E␣U
␣UN	␣UN
UNI	UNI
NIV	NIV
IVE	
VER	
ERS	
RSI	
SIT	
ITÄ	
TÄT	
ÄT␣	
T␣W	
␣WI	␣WI
WIE	WIE
IEN	IEN
EN␣	EN␣
	IV␣
	V␣W
	N␣E
	␣E3
	E30
	302
	02␣

Table A: Example of trigrams of the example pair "TECHNISCHE UNIVERSITÄT WIEN" and "TECHNISCHE UNIV WIEN E302". Green shading indicates matching trigrams. Red shading marks trigrams without a corresponding counterpart in the comparison name.

Procedure for identifying spelling variants – name matching with MinHash and LSH

To be able to analyze patent information on Austrian research institutions in PATSTAT in a focused manner, these institutions first have to be reliably identified in the data. In patent registers and IP databases, however, one and the same entity often appears under numerous different name variants – for example abbreviated forms ("Universität" vs. "Univ"), suffixes such as "E302", different encodings of umlauts (Ü ↔ UE), inconsistent use of spaces and hyphens, or simple typing errors. Transliteration can introduce additional variants as well. As a result, the identification of semantically identical names is anything but straightforward. For the present study, all name variants in the PATSTAT data were therefore determined based on a list of official Austrian research institutions.

Heuristic strategies such as truncating names on the left or on the right fall short in such settings. Either genuine matches are rejected or large numbers of irrelevant candidates are produced. A robust approach should therefore meet three requirements: it should capture the internal text structure of a name, tolerate local deviations, and remain efficient even for large data sets.

Algorithms do not operate on meaning, but on characters. Names must therefore be transformed into analyzable building blocks before they can be compared. Only these building blocks, often called features, make a reliable similarity assessment possible. There are different ways to form such features, for example word tokens, syllables or character n-grams. In this work, character n-grams are used, specifically trigrams. All overlapping three-character segments of a name are created by moving a window of length three over the character sequence. For example, the German word "UNIVERSITÄT" yields the trigrams "UNI", "NIV", "IVE", "VER", "ERS", "RSI", "SIT", and so on[17]. The resulting trigrams are collected into a set[18]. One way to measure how similar two names are is the Jaccard similarity. It is defined as the relative share of trigrams that both names have in common, compared to all trigrams that appear in at least one of the two names: $s = |A \cap B| / |A \cup B|$. Values close to 1 indicate high Jaccard similarity, values close to 0 low similarity.

[16] Data basis: PATSTAT Global, Spring 2025, European Patent Office, worldwide bibliographic patent database. For the name analysis, several parallel versions of harmonised applicant names in PATSTAT were used: *person_name, doc_std_name, psn_name* and *han_name* from table *tls206_person*.

[17] Choosing three characters turns out to be a practical compromise. Two-grams are too unspecific and produce many random matches. Four-grams, by contrast, react sensitively to abbreviations and insertion or deletion errors. Trigrams preserve enough context to limit random collisions, yet remain short enough to handle abbreviations, small shifts and insertions robustly. To reduce edge artefacts, the character sequence is conceptually padded with spaces at the boundaries. In this work, trigram padding is asymmetric: two spaces at the beginning and one space at the end.

[18] The order of trigrams is irrelevant and multiple occurrences are counted only once.

As an example, the comparison pair "TECHNISCHE UNIVERSITÄT WIEN" versus "TECHNISCHE UNIV WIEN E302" in Table has 19 common trigrams and a total of 35 distinct trigrams. The resulting Jaccard similarity is $s \approx 0{,}543$. Despite the shortened form "UNIV" and the additional suffix "E302", the common core „TECHNISCHE UNIV WIEN“ remains visible and leads to a medium similarity value.

For large corpora, an explicit comparison of all name pairs is not feasible, because the number of comparison operations grows extremely quickly.[19] For this reason, the study relies on the Min-Hash/LSH algorithm to solve this problem.

MinHash does not work directly with the trigrams themselves, but with the hash values produced by hash functions, which represent each trigram uniquely as a number.[20] When the hash function is applied to all trigrams of a name, the result is a set of hash values, one per trigram. The MinHash method then reduces this set of hash values to exactly one value by always selecting only the smallest hash value, the minimum hash. To reliably capture the full variety of trigrams, the Min-Hash procedure does not rely on a single hash function; instead, it deliberately repeats this process using k different, mutually independent hash functions. Each of the k independent hash functions assigns *different* numerical values to the *same* trigrams of the given word or name[21]. Because the sets of values produced by each function differ, the *smallest value* over this fixed trigram set is in general different for *each* hash function. This smallest value then forms one component of what is called a MinHash signature. The collection of these k minima is the MinHash signature of the name: a vector of fixed length k, that represents the original trigram set in compressed, yet similarity-preserving form. [22]

Each hash function effectively imposes an almost random ordering on the trigrams of the name, based on their hash values. Selecting the smallest hash value therefore corresponds to randomly selecting one trigram from the set, in a way that is reproducible for the given hash function. When comparing two names with their trigram sets A and B, the probability that the minimal trigram chosen by a given hash function is the same for both sets is equal to the number of trigrams they share divided by the total number of trigrams that appear in at least one of the names. This quantity is the Jaccard similarity $s = |A \cap B| / |A \cup B|$. The share of the k rows of the signature in which two names have the same minimum value thus provides a direct estimate of the Jaccard similarity.

The more independent hash functions are used, the more stable and reliable this estimate becomes. A key advantage is that the length of the signature remains constant, independent of the size of the original trigram set. This means that comparisons between very many names can be reduced to comparing only k numbers per name.

To reduce the number of pairwise comparisons dramatically, locality-sensitive hashing (LSH) is introduced. The MinHash signature of a name, which consists of k MinHash values, is divided into b bands with r MinHash values each, such that $k = b \cdot r$. If the r rows within *at least one band* are identical for two names, the names are regarded as candidates for a more detailed follow-up review. A single matching band is sufficient for this decision. As a result, not all pairs of signatures

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[19] The number of possible pairs is given by $N(N-1)/2$ and thus grows quadratically with the number of entries.

[20] Good hash functions always assign the same value to identical inputs and distribute different inputs as evenly as possible over the target range. Here, a 16-bit numerical range from 0 to 65535 is used, so that each trigram input is mapped to a number within this interval. Because the range is finite, so-called collisions can occur, where two different trigrams receive the same hash value. Such collisions are very rare but can slightly distort the computed similarity, for example by creating apparent common elements that do not actually exist. In practice, this can be mitigated by suitable control mechanisms.

[21] Each of these hash functions assigns *different* numerical values to the same trigrams; however, within any given hash function this assignment is *deterministic*. That is, for a fixed hash function, a specific trigram always maps to exactly the same value.

[22] Although a single name may contain only few trigrams, a signature length of $k = 120$ is still justified. Repeating the procedure with many independent hash functions provides enough samples for a reliable similarity estimate. The same approach also applies to longer texts, where the trigram set is larger and the signature indeed acts as a strongly compressed representation of the original trigram set.

need to be compared with each other. The comparison effort is focused on those names that share at least one band with exactly the same block of values. LSH achieves this reduction by assigning each band of a name to a particular storage slot, a bucket, based on the r MinHash values in that band. All names with exactly the same band content end up in the same bucket. When similar names are searched for, the same bucket address is computed for each band of a new name, and only the entries stored in that bucket have to be examined. Names outside these buckets, often thousands or tens of thousands, are not considered at all. In this way, the effort drops from an almost quadratic comparison of all pairs to an almost linear dependency on the number of names in practice, because for each name only a small number of entries in the same buckets usually needs to be inspected. This is what makes search in large data sets practically manageable.

A small example illustrates the procedure. Suppose that a band of a given name contains the six MinHash values (1203, 9981, 553, 553, 774, 101). LSH derives a unique bucket address[23] from these six values and stores a reference to this name in that bucket. When a further name is processed later, it is likewise split into trigrams, its k MinHash values are computed and grouped into the same band structure. If this second name is similar enough to the first one to produce identical MinHash values within the same band introduced above, the six MinHash values in that band are identical as well, and the same bucket address is calculated. Since that bucket already contains a reference to the first name, the pair is treated as a candidate for further review. No further bands need to be inspected in this case, since a single complete band match is sufficient to classify the pair as probably similar. This procedure also explains why LSH makes the comparison so efficient. Instead of comparing every name with all others, only the few names that appear in the same buckets are considered. The computational effort thus grows practically linearly with the number of names and remains scalable.

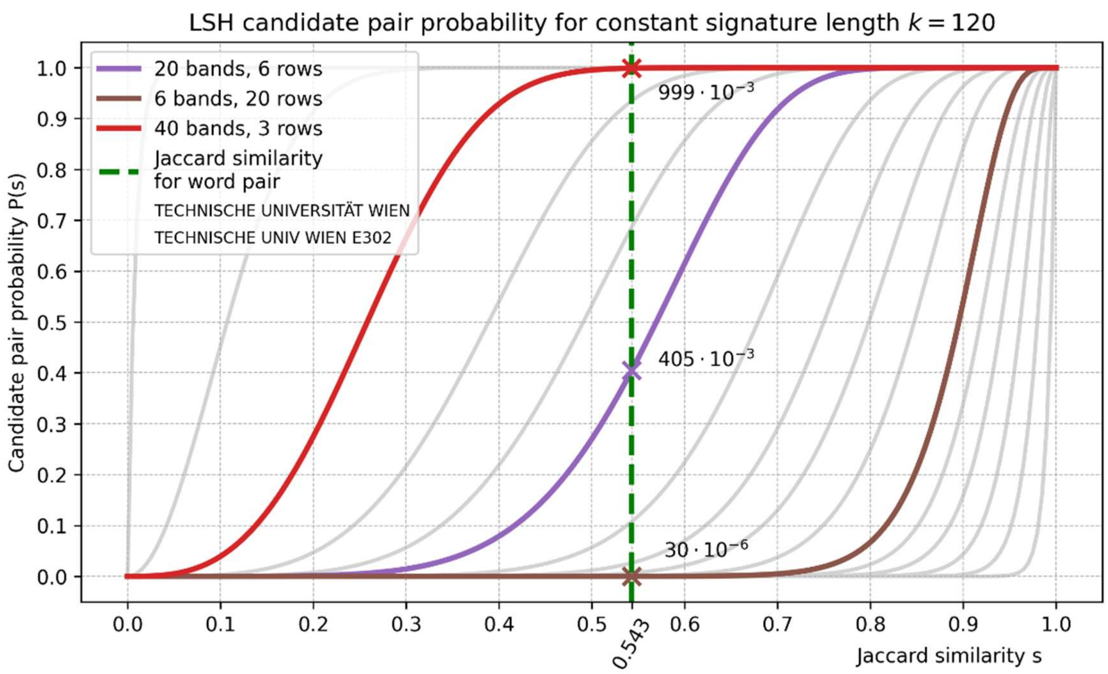

Figure A: Theoretical candidate probabilities of locality-sensitive hashing, LSH, as a function of the true Jaccard similarity. The intersection points with the green dashed line show how likely it is that the comparison pair passes the LSH filter. The grey auxiliary curves illustrate alternative factorisations of the signature length 120.

[23] The bucket address is computed by applying an additional hash function to the r MinHash values of a band. A thirty-two-bit hash value is used here, providing roughly 4.3 billion possible bucket addresses. This band hash serves only to assign bands efficiently to buckets and has no role in the similarity computation itself.

The probability that a pair with a true similarity value s is selected as a candidate, that is, that the pair receives the same bucket in at least one band, follows an S-shaped curve: $P(s) = 1 - (1 - s^r)^b$. This function gives the probability that two names whose trigram sets have Jaccard similarity s show complete agreement in at least one of the b bands and are therefore placed together into the same bucket. For small values of s, $P(s)$ stays close to zero, while for large values of s the function approaches one. In the transition region the curve rises steeply. The parameter r sets how many MinHash values in a band must match exactly at the same time, so it controls how demanding a band hit is. The parameter b is the number of bands, meaning how many independent opportunities there are for at least one band hit to happen. By adjusting r, this decision boundary can be tuned. Larger r shifts the transition towards higher s values and makes the curve steeper, leading to a sharper separation. Smaller r shifts the transition towards lower s values and flattens the curve, resulting in a more generous separation. In Figure this effect can be read off directly, and Figure shows how complete band matches occur more or less frequently for different values of r.

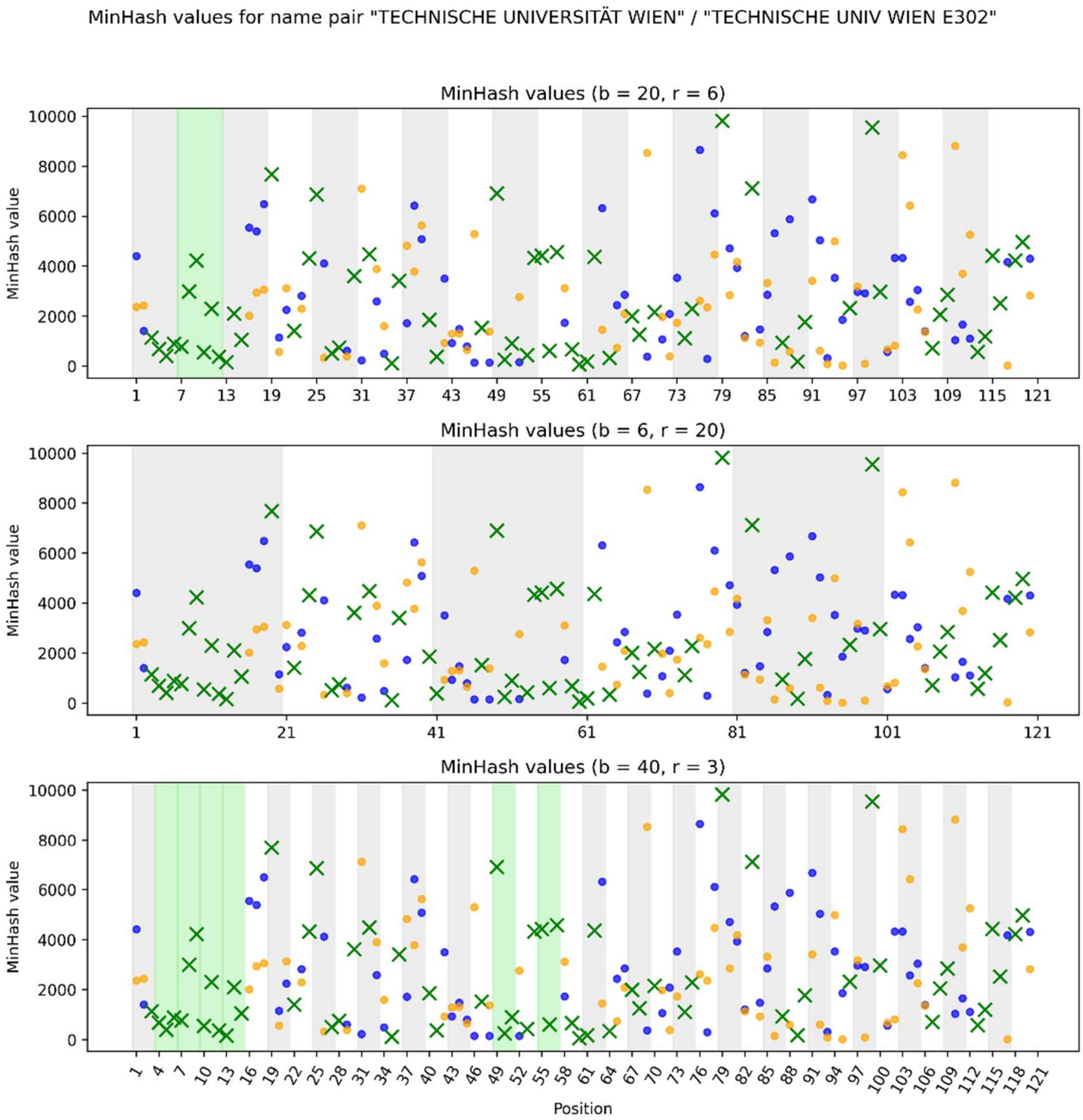

Figure B: For each setting, 120 MinHash values are shown, which together make up the MinHash signatures of the two names. Each of the 120 positions corresponds to the result of one of the 120 independent hash functions. Yellow dots show the MinHash value for the name "TECHNISCHE UNIVERSITÄT WIEN", blue dots the MinHash value for "TECHNISCHE UNIV WIEN E302". If the two values at a position are identical, this is marked by a green cross. This makes it possible to see both individual MinHash signatures and their pointwise matches. Bands are indicated by grey backgrounds. A light green segment shows a complete band hit, that is, r consecutive position (rows), whose MinHash values are identical in both signatures.

Using the comparison pair in table A as an example, the trigram table for "TECHNISCHE UNIVERSITÄT WIEN" and "TECHNISCHE UNIV WIEN E302" shows a broad common core indicated by green trigrams, as well as red trigrams that only appear on one side, caused by the shortened form "UNIV" and the suffix "E302". In the MinHash plots in Figure with $k = 120$, the signature components of the two names are shown row by row for three different band sizes r. Matches at individual positions appear as green crosses, and the background is partitioned into bands with r rows each. Complete band hits are shaded light green. The colored S-curves in Figure for the three parameter combinations $(b, r) = (20,6)$, $(6,20)$ and $(40,3)$ are reflected in Figure by different numbers of completely filled bands. For $(b, r) = (20,6)$ and $(40,3)$ there are complete band hits, so the comparison pair with $s \approx 0{,}543$ is admitted to the candidate filter as similar. For $(b, r) = (6,20)$, on the other hand, Figure shows no band with 20 matching MinHash values, so the pair would be rejected as dissimilar under this strict setting.[24] The process described so far thus first decomposes names into trigrams, compresses these into MinHash signatures, uses LSH to select a small but plausible set of candidates, and leaves the final decision to a user-driven review.

Building on this technical foundation, that is, the combination of MinHash signatures and band-based candidate selection by LSH, the general workflow for searching name variants is constructed. One additional preparatory step in the study, not yet discussed above, concerns the cleaning of applicant names by removing legal forms, academic titles and similar formal suffixes. These word segments often account for a considerable part of the name length and usually do not contribute to the substantive identification of the entity, but they would strongly influence the trigram sets and thus the MinHash signatures. The technical implementation of this cleaning relies on a systematic evaluation of the word segments that occur in the data, including a MinHash/LSH-based procedure to identify and filter out undesired recurring segments.[25]

Only after this cleaning step is a comprehensive search index built that contains all relevant applicant names. In the present study, this covers all applicant names with Austrian origin recorded in the PATSTAT database. This index then serves as the starting point for the actual search. When a user enters a name, the index is filtered to extract those entries that qualify as similar candidates according to the LSH mechanism. The resulting names are presented for inspection and can be marked as correct or incorrect.

Once this selection step is finished, the user can choose to use the confirmed names themselves as new starting points for further search runs. In this way, the search gradually expands beyond the original term. Variants of names that have already been confirmed are included, so that the entire name space of an entity can be reconstructed step by step. This iterative process can be repeated as often as desired until no new matches appear or the user stops the procedure. Rejected candidates are recorded permanently and are not presented again in later iterations, which

[24] Although the hash functions underlying the figures are fixed and always produce the same value for the same input, one can conceptually think of the k MinHash values as coming from random shufflings of the trigram sets. For fixed values of b, r and a given Jaccard similarity s, the decision whether a band is completely filled or not is therefore a random outcome with hit probability $P(s)$. Especially in the transition region of the S-curve, when a band is just filled or just not filled, a different but equally valid choice of hash functions or a different random arrangement of the k MinHash values can, with some probability, lead to a different outcome under an alternative, equally valid choice of hash functions (or seeds); with the fixed choice used here, the candidate decision is reproducible and does not vary between runs.

[25] In the study, the approach does not rely solely on pre-defined lists of legal forms and titles. It is complemented by a data-driven step based on the word segments that actually occur in the data. All applicant names are split into word segments, for example at spaces, hyphens or dots, and the frequency of each segment is measured over the full corpus. Very frequent segments in a given jurisdiction are usually legal forms or formal suffixes, while the segments of the substantive entity name are typically much rarer. In this way, candidates for legal forms and titles can be identified even when no complete country specific lists are available in advance.

For this study, an additional MinHash and LSH index was built on these normalised word segments. This made it possible to group not only identical legal forms but also different spellings and variants of the same legal form, such as abbreviations, versions with dots or with inserted spaces. Segments that were recognised in this way as legal forms or titles were removed from the applicant names before trigrams were generated. The subsequent MinHash and LSH analysis thus focuses on the substantive name core of the entity instead of being dominated by systematically recurring formal segments.

avoids duplicate work and improves the quality of the suggestions. From the confirmed assignments, a query component for a relational database is automatically generated. In the present study, this component is used in searches on the PATSTAT database and serves as a filter for patent applicants, thereby providing the basis for the subsequent data analysis.

Table B gives an overview of the name variants of the applicant "Technische Universität Wien" identified in PATSTAT. The workflow thus combines efficient algorithmic pre-filtering with a transparent, user-guided decision process and helps ensure that the final results are as complete and consistent as possible.

Variants of "Technische Universität Wien" in PATSTAT
HLAWATSCH, FRANZ, TECHNISCHE UNIVERSITÄT WIEN
STANETTY, PETER TECHNISCHE UNIVERSITÄT WIEN
TECH UNIVERSITÄT WIEN
TECHNICSHE UNIVERSITAT WIEN
TECHNICSHE UNIVERSITÄT WIEN
TECHNISCH UNIV WIEN
TECHNISCH UNIVERSITAT WIEN
TECHNISCH UNIVERSITÄT WIEN
TECHNISCHE UNIV WIEN E302
TECHNISCHE UNIVERSIATAT WIEN
TECHNISCHE UNIVERSIT?T WIEN
TECHNISCHE UNIVERSITA WIEN
TECHNISCHE UNIVERSITACY WIEN
TECHNISCHE UNIVERSITAET WIEN
TECHNISCHE UNIVERSITAT WIEN
TECHNISCHE UNIVERSITÂT WIEN
TECHNISCHE UNIVERSITÄ WIEN
TECHNISCHE UNIVERSITÄET WIEN
TECHNISCHE UNIVERSITÄT WEIN
TECHNISCHE UNIVERSITÄT WIEN
TECHNISCHE UNIVERSITÄT WIEN E302
TECHNISCHE UNIVERSITÄTWEIN
TECHNISCHE UNIVERSITĀT WIEN
VIENNA UNIVERSITY OF TECH
VIENNA UNIVERSITY OF TECHNOLOG
VIENNA UNIVERSITY OF TECHNOLOGY

Table B: Name variants of the applicant "Technische Universität Wien" identified in PATSTAT Global (Spring 2025).

Appendix 2: Special evaluation of Pre Check Invention Disclosure Search

18 of the responding institutions indicated in the survey that they were available for a further discussion/interview on the (non-)use and purpose of the Pre Check Invention Disclosure Search (in German: Erfindungsmeldungsrecherche - EMR), 15 of which also named a specific person to contact. A total of 12 in-depth discussions (online/by telephone; over the summer of 2025) were held on the Pre Check Invention Disclosure service. Questions were asked about the decision-making process and the criteria for commissioning an EMR, as well as the use and comprehensibility of the EMR report, including desired additional information. Satisfaction with processing time and costs was also surveyed, and further feedback requests were collected.

In general, there is a mixed picture regarding awareness and use of the Pre Check Invention Disclosure Search: while several research institutions are completely unaware of the service, it is routinely used at individual universities. The cost of EUR 450 is generally considered reasonable, although some respondents suggest that it should be free of charge for early-career researchers. Although the processing time of eight weeks is widely considered acceptable, there is a repeated desire for it to be shortened.

The quality of the reports is generally rated positively, but there is a need for clearer assessments, more concise highlighting of relevant features and supplementary comments. In addition, exchange formats such as personal consultations are desired in order to efficiently clarify specific information needs relating to the technology field. Numerous institutions express interest in expanded services, including technology field research, market analyses, exploitation support and co-funding models. Furthermore, the need for funding programmes that cover the costs of preliminary patent searches in public research institutions is emphasised.

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Wissen schafft
Perspektiven