

Various reasons

Many structural reasons for the lack of gender parity, but there are also specific approaches for the Austrian Patent Office.

Gender gap in inventions

Only 8% of Austria's inventions derive from females.

Type of activity ...

... is decisive: women are more likely to work in scientific and administrative fields, but less in technical and application-oriented areas.

Raising awareness

and disseminating knowledge as an integral part of daily work.



Low rate of female inventors –
Results of a qualitative survey

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**Low rate of female inventors -
Results of a qualitative survey**
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Table of Content

1. Background and Motivation	5
1.1. Women and inventions	5
1.2. Women and designs	6
1.3. Female inventors and female researchers	7
2. Results of the Qualitative Survey	8
2.1. Survey settings	8
2.2. What are the reasons?	9
2.2.1. Reasons rooted in socialization or in norms and values	10
2.2.2. Reasons rooted in the labor market	11
2.2.3. Application procedure, know-how, costs, incentives	12
2.2.4. Time-related factors	12
2.2.5. Reasons rooted in the education system	13
2.3. Gender-specific differences in practice	13
2.4. Fewer applications despite STEM profession	13
2.5. Survey results of the stakeholder groups	14
2.5.1. Group 1 (where inventions originate)	14
2.5.2. Group 2 (those who provide external support for IPR)	15
2.5.3. Group 3 (those who promote inventions)	16
2.6. What can be done?	16
2.6.1. Raising awareness - better visibility of positive role models	16
2.6.2. Targeted training and advice	17
2.6.3. Stronger networks	17
2.6.4. Financial incentives	17
2.6.5. Thematic focus	18
2.6.6. English-language services	18
2.6.7. Legislation	18
3. External Views – Experts from International Organizations	18
3.1. OECD experts	18
3.2. EC experts	20
3.3. IMF staff	23
3.4. Take-Aways	23
4. Next Steps – Utilizing the Results	24
4.1. Conclusions and development of measures	24
4.1.1. Ensuring data truth	24
4.1.2. Raising awareness and promoting mentors and role models	24
4.1.3. Raising awareness for IP rights	25
4.1.4. Setting incentives	25
4.2. Conclusion	25

List of Figures

Figure 1: Female inventors in total and by technological field	6
Figure 2: Female inventor and female researcher rate.	8
Figure 3: Survey stakeholder groups	8
Figure 4: Surprised about the bottom position for female inventors?	9
Figure 5: Main categories - Reasons for the low rate of female inventors.....	10
Figure 6: Reasons rooted in socialization or in norms and values	10
Figure 7: Reasons rooted in the labour market.....	12
Figure 8: Share of women in own company.....	14

List of Abbreviations:

APO:	Austrian Patent Office
EFTA:	European Free Trade Association
EIC:	European Innovation Council
EIT:	European Institute of Innovation and Technology
EPO:	European Patent Office
EPC:	European Patent Convention
EUIPO:	European Union Intellectual Property Office
R&D/R&I:	Research and Development/Research and Innovation
ICT:	Information and Communication Technologies
IMF	International Monetary Fund
IP/IPR:	Intellectual Property / Rights
SME:	Small and medium-sized enterprises
STEM:	Science, technology, engineering and math
OECD:	Organization for Economic Cooperation and Development
VC:	Venture Capital
WIPO:	World Intellectual Property Organization

1. Background and Motivation

1.1. Women and inventions

When the European Patent Office's (EPO) study "Women's participation in inventive activity" was published in November last year with the headline "New study: Fewer than 1 in 7 inventors in Europe are women",¹ it was hardly surprising that Austria was not among the top performers in terms of female inventors, as Europe lags behind other continents in terms of the female participation rate in inventions.² What was surprising, however, was that Austria is ranking in last place, with just one woman among 12 inventors.

The study by the European Patent Office shows that in 2019, across all 38 contracting states of the European Patent Convention (EPC)³, on average only 13.2% of inventors in Europe are women.⁴ The data shows that although the proportion of female inventors in Europe has increased in recent decades (in the late 1970s it was only 2%), there is still a large gender gap. With a rate of 8.2% (2019), **Austria is in last place** among the countries surveyed.

A look at the **national patent application data** also confirmed this performance: at around 6%, the proportion of applications by women at the Austrian Patent Office is even slightly lower than the figure for European applications from Austria.⁵

The Austrian Patent Office was given access to more detailed study data regarding the domestic situation, which revealed some further interesting facts⁶ (see also Figure 1):

- While the average European female inventor rate has steadily improved since the 1980s, the Austrian female inventor rate has not only been below the European rate over the entire period, but the gap to the European average has actually widened.
- The biggest improvement came in 2007, when the female inventor rate rose from less than 6% to 8%.
- Austria's rate of female inventors is lower than the European average in all technology areas, even in chemistry, the area with the highest rate of female inventors - both in Austria and the European average.
- Regional distribution: at 14.8%, Vienna has the highest rate of female inventors, while Upper Austria, the federal state with the traditionally highest number of invention applications, is in fifth place with 6.3% (behind Tyrol with 8.8%, Styria with 8.2% and Burgenland with 8.1%).

According to the EPA, part of the gap to the European average can be explained as follows:

- **Austria registers more in fields where women are underrepresented:** less than one in four Austrian inventions is linked to a European patent application in chemistry, the field with the highest proportion of female inventors. And: two out of three Austrian inventors are associated with inventions in mechanical engineering, electrical engineering or other fields (areas with low rates of female inventors).
- **In Austria, more applications come from the private sector,** where women

¹ EPO (November 2022).

² See also: WIPO (2023).

³ 38 EPC contracting states (excluding Montenegro): 27 EU and 4 EFTA states plus Albania, Monaco, North Macedonia, San Marino, Serbia, Turkey, United Kingdom.

⁴ The study is based on the percentage of female inventors named in all patent applications to the EPO from

1978 to 2019, using disambiguated (adjusted) inventor data and assigning gender to inventors based on their names.

⁵ APO-Data (2023).

⁶ EOP (November 2022a).

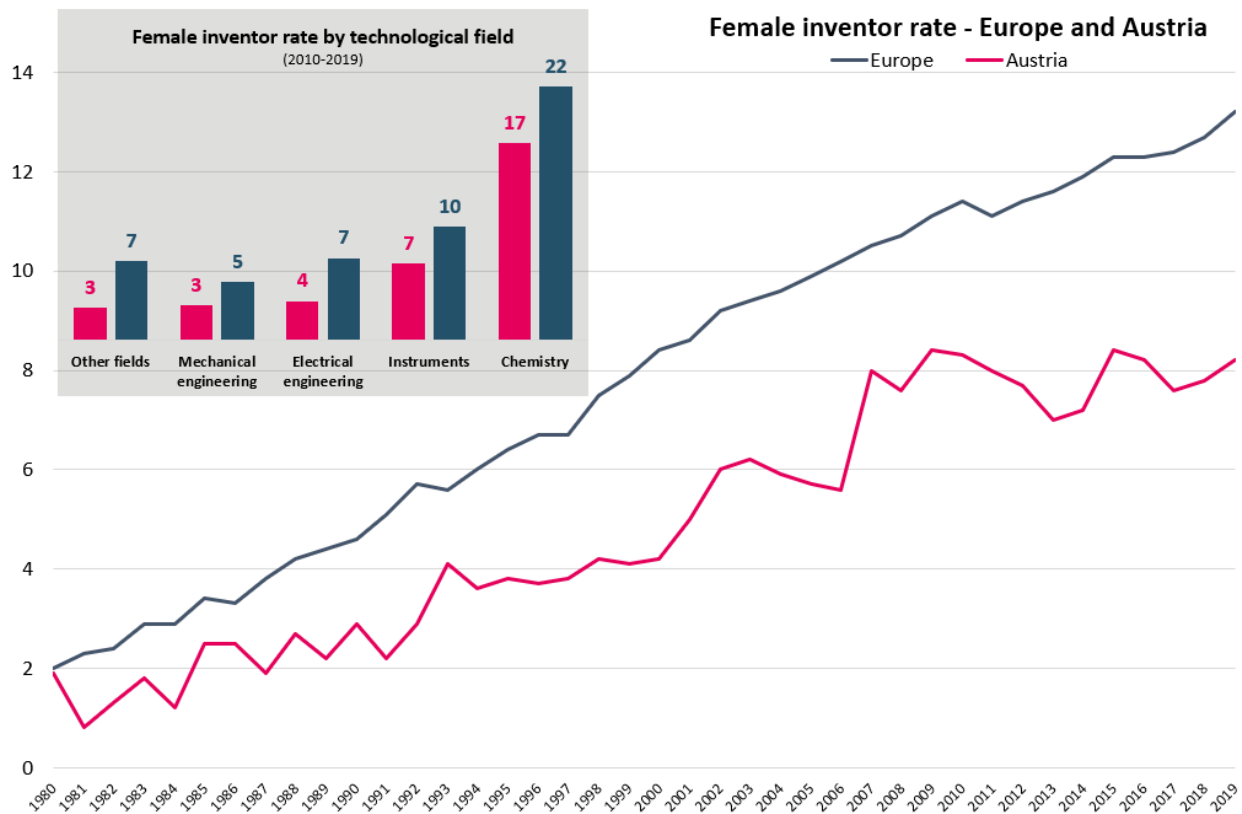


Figure 1: Female inventors in total and by technological field

Note: All figures in percent; Europe = average of the 38 EPC states excluding Montenegro. Technical fields according to WIPO (June 2008) Definition - Other fields: furniture and games, other consumer goods (less research-intensive) and construction.

are underrepresented: almost 90% of Austrian inventors are associated to applications from private companies and only 6% to universities and public research institutions (the rest: individual applications). However, universities and public research institutions have the highest rate of female inventors (17.2%). The rates for individual inventors and private companies are significantly lower at 5.6% and 6.5% respectively.

But even if these factors are taken into account, there is still a significant difference compared to the European average.

In addition, women are more likely to register inventions in **teams**, but the importance and size of teams of inventors is very dependent on the technology sector. For example, teams are more likely to be found in the pharma-

ceutical and biotechnology sectors and also in the higher education sector rather than in the corporate sector - all areas with high or higher proportions of women, but generally fewer inventions.⁷

The fact that in Austria the **naming of inventors in patent applications is voluntary** and not mandatory as in all other EPC contracting states may be a further explanatory factor for the even lower data for national applications - although it is difficult to estimate the extent of this effect due to a lack of available data.⁸

1.2. Women and designs

In April 2023, the EUIPO, the European Union Intellectual Property Office, published a study on the **gender gap in the design industry**.⁹ In 2021, just under 24% of designers in the EU

⁷ EPO (November 2022).

⁸ For applications at the European Patent Office, the name of the inventor is mandatory.

⁹ EUIPO (April 2023). Labor Force Survey Data for 23 EU countries.

were women¹⁰ and only 21% of owners of registered Community designs based in the EU had at least one female designer.

The following figures were calculated for **Austria**: the proportion of female designers in the total number of designers in 2021 was 20.4% and 17.9% of all registered designs included at least one woman.

With an annual growth rate of 2.5% calculated from the last 10 years, it would take 51 years to achieve gender parity in design registrations according to EUIPO calculations.

If this simple growth projection was also applied to the EPO data for female inventors, gender parity (i.e. a female inventor rate of around 50%) would be achieved on average in Europe in 2082 (the growth rate averaged 2.14% in the years 2009-2019).

For Austria, this average growth rate is only 1.05%, which means that Austria would only reach a female inventor rate of 15.8% in 2082 - assuming that growth remains the same as in the last 10 years.

1.3. Female inventors and female researchers

If we look at the **rates of female inventors in relation to the number of female researchers** (see Figure 2), it is not surprising

that there appears to be a positive correlation: the more female researchers a country has, the more female inventors there are. However, the following can be observed:

- It is interesting to note that one of the common features of the countries that, like Austria, are at the lower end of the scale is the official German language.
- Furthermore, all TOP 16 countries in the EU GDP per capita ranking - an indicator often used to depict the prosperity of an economy - are in the left-hand half of the graph¹¹ (i.e. those with low proportions of women). All five Innovation Leader countries (Denmark, Sweden, Finland, the Netherlands, Belgium) and the Strong Innovator countries, including Austria, can also be found here.¹²
- And finally: the number of female inventors and researchers increases the further south or east one goes from an Austrian perspective.

These results motivated the Austrian Patent Office to investigate the causes and drivers of Austria's poor performance. Following the many available quantitative evaluations, the idea was to ask a wide range of stakeholders in the innovation system directly. The results of this survey therefore reflect the users' perspective in particular.

¹⁰ From the point of view of intellectual property and property rights, the term "designer" is to be understood more broadly and includes professional classes from which designs are registered. See: EUIPO (April 2023).

¹¹ According to Eurostat data for 2022, these are: LU, IE, NO, CH, DK, SE, NL, AT, IS, FI, BE, DE, FR, IT, CY and UK (here: 2019 value). Eurostat (October 2023).

¹² European Commission (July 2023). Strong Innovator countries: AT, DE, LU, IE, CY, FR.

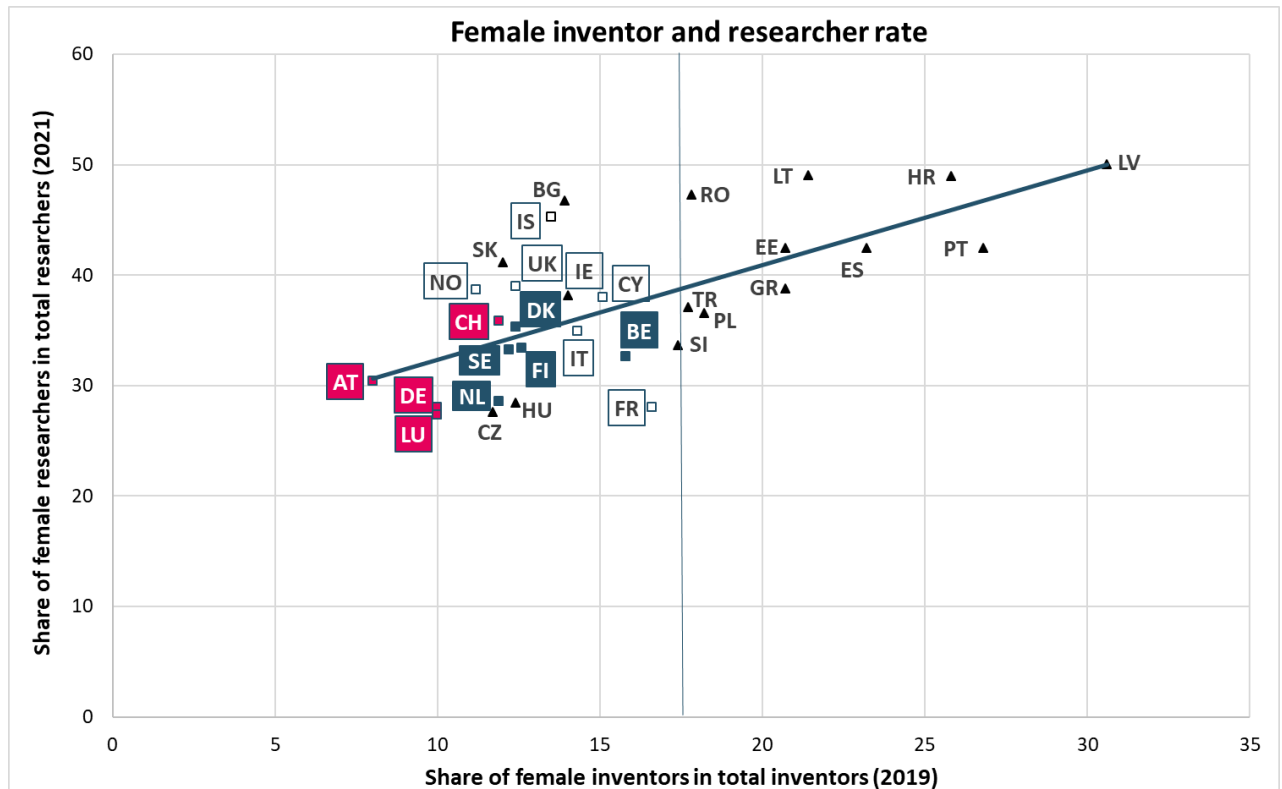


Figure 2: Female inventor and female researcher rate.

Notes: Horizontal axis: rate of female inventors (data from 2019; source: EPO (November 2022)); vertical axis: share of female researchers in the total number of researchers (data from 2021; source: OECD (2023)). Square bordered: Country among TOP 16 in GDP/capita; square border and pink background: country with German as mother tongue/official language (note: not all are shown); square border and blue background: Innovation Leader country.

2. Results of the Qualitative Survey

2.1. Survey settings

A qualitative online questionnaire comprising a total of 96 questions was developed (Lime Survey) and sent to over 1,700 stakeholders in the patent process, namely entrepreneurs, inventors, patent attorneys, representatives of social partners and research funding institutions, representatives of universities, licensing and IPR managers, business and other scientists.

The survey period was April 2023

Profile of the respondents:

- 78 people completed and returned the questionnaire in full. The **gender ratio** was balanced at exactly 50:50.

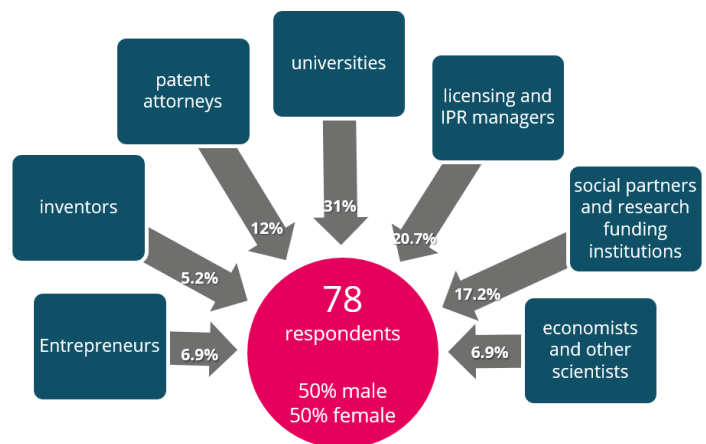


Figure 3: Survey stakeholder groups

- **IP affinity:** 31% of respondents have already registered at least one IP right themselves. 52% stated that their company had filed at least one IP application.
- **Company size:** most respondents (just under 60%) worked in a large company (with over 250 employees) at the time of the survey, while only 9% came from companies with fewer than 10 employees.
- **Sectors:** almost 60% of all respondents came from the ÖNACE sectors of education (24.4%), public administration (18%) or freelance activities (16.7%).
- **Field of activity:** 18 of the 78 respondents came from the higher education sector, 12 from the IPR/license management sector and 10 from research funding or a social partner organization. Seven patent attorneys, four entrepreneurs and economists and three inventors took part in the survey. Twenty of the respondents could not assign themselves to any of these professional fields of activity.

2.2. What are the reasons?

For almost three quarters of all respondents, it was **no surprise** that Austria was at the bottom of the league in terms of the proportion of female inventors (Figure 4).

The answers to the underlying reasons were much more heterogeneous: in total, the 78 respondents gave 268 reasons (an average of 3.4 per respondent).¹³ These numerous and complex reasons were grouped into 25 thematic groups, which in turn were grouped into seven main categories. The main categories and the sub-groups should not be considered separately - they are interdependent and have a causal relationship with each other.

Around three quarters of all the reasons cited lie in the area of **(1) gender-specific socialization or existing social norms and values** or the **(2) labor market**. About 11% saw reasons in the **(3) registration process, know-how and costs**. **(4) Time-related reasons** were cited by 6% of respondents and 5.6% saw the cause of the low rate of female inventors generally in the **(5) education system** (Figure 5).¹⁴

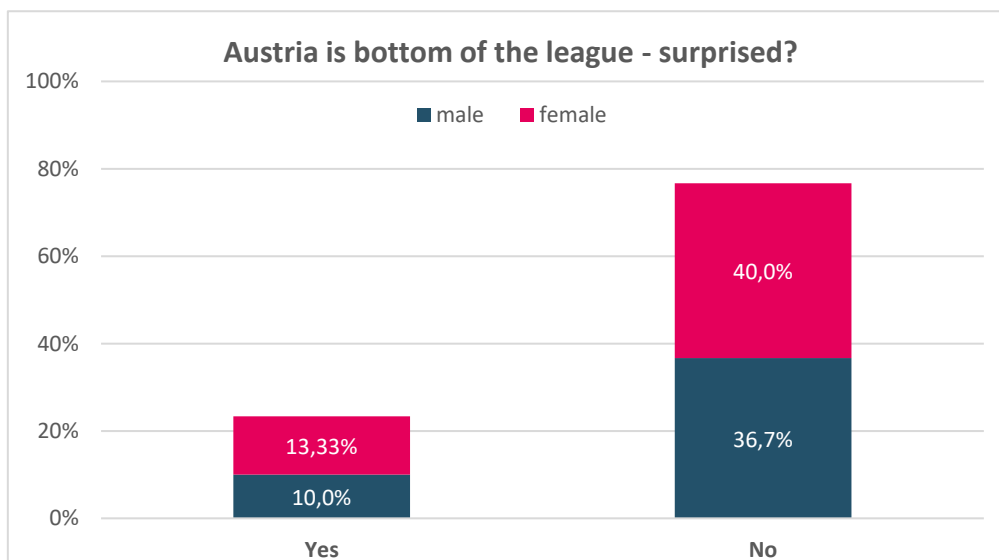


Figure 4: Surprised about the bottom position for female inventors?

¹³ Respondents were able to provide their own reasons in up to three text fields. Some formulations in a text field contained more than one reason. In these cases, the reasons given were split and assigned accordingly.

¹⁴ Three of the respondents stated that "there was no problem". Eight responses were subsumed under

"other", which could not be clearly assigned to any category: little social recognition of science and technology (1), an anti-science environment (1), doubts about the low statistics and the way they are calculated (3), there was no specific reason (1) and it did not apply to the respondent's institution (2).



Figure 5: Main categories - Reasons for the low rate of female inventors

Note: Size of boxes correspond to the percentage shares of the individual categories.

2.2.1. Reasons rooted in socialization or in norms and values

Most of the reasons subsumed in this category are not only often interdependent, but are also partly the cause of reasons in other categories. For example, "traditional gender roles"¹⁵ or the "conservative image of

women" in Austria are in many cases the causal basis for the prevailing gender differences in the labor market, such as the low proportion of women in R&D, in management positions in general or in "more patent-friendly" industries.

If you look at the reasons given (see Figure 6), you can see that there is a lack of various

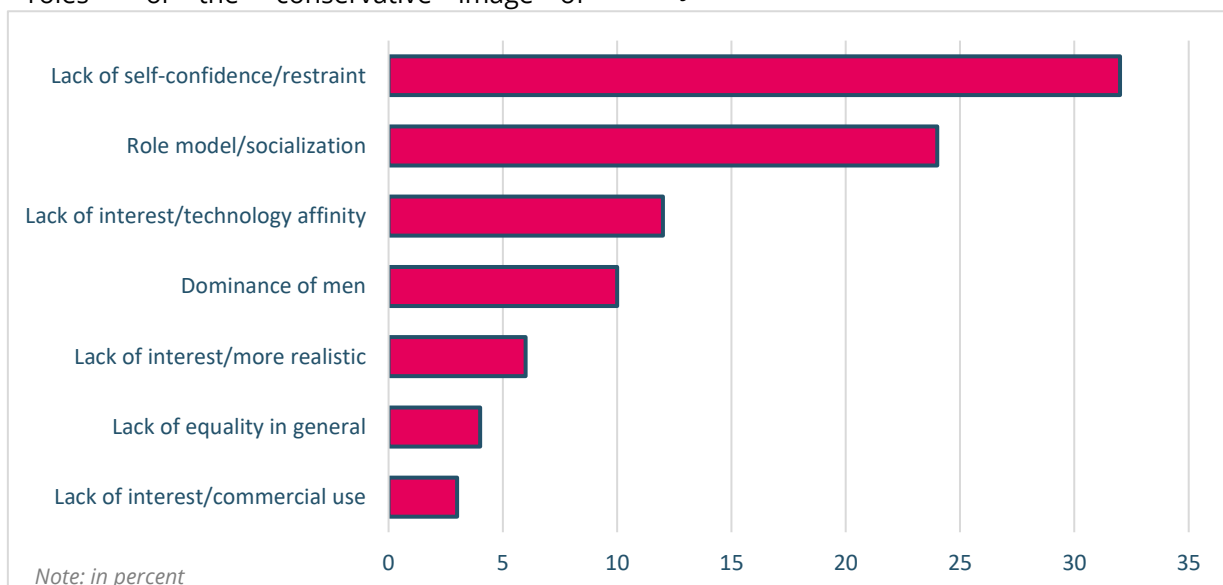


Figure 6: Reasons rooted in socialization or in norms and values

¹⁵ Parts of the text in quotation marks are quotes from the survey.

things: the **most frequently** cited reasons were a **lack of self-confidence or reticence on the part of women**

(especially in comparison to their male colleagues). Among other things, the following observations were made: too little self-confidence, "women do not push themselves forward", would be "too reticent, not progressive enough", underestimation of their own abilities, high self-criticism, shyness about applying, women were more easily intimidated and dissuaded from goals and possibly even left the nomination as inventor to their male colleagues.

The second most common cause was seen in **general role models and socialization**. Here, the spectrum of information ranges from traditional gender roles in Austria to the role models conveyed in upbringing and in the social and family environment, which subsequently influence career choices, to the low esteem and acceptance as well as underestimation of women and their work in general and their career intentions in particular.

The **general lack of equality** in Austria - in the sense of general gender equality, equal opportunities and sexism - was also cited as a reason.

Both categories are often causally linked to the third most frequently mentioned subgroup, a **lack of interest in technology and a lack of affinity for technology**. This lack of interest, which is sometimes also seen as a result of prevailing role models, is also cited as a reason for the low proportion of women in STEM professions. In addition, women are less interested in **commercial exploitation** and are **more realistic** about the value or prospects of success. The latter category also includes the fact that women are also "much more detailed" and "more perfectionist", concentrate on "the essentials" and first

"question a lot" before even considering an application.

"There are many individual inventors who also register inventions that are hardly economically feasible more as a status symbol. Many years of consultation have shown that women are more concerned with the factual approach and actual feasibility and are less likely to file an IP application simply because of their own ego."

(Quote from the survey)

The **general dominance** of men was cited ten times as a reason. Observations such as: the existence of "old boys' networks" as well as a consistently "male-anchored inventive spirit" but also that "men claim inventions for themselves".

2.2.2. Reasons rooted in the labor market

Around 39% of the reasons given were thematically assigned to the main category of the labor market. Of these, a good 80% of responses were concerned with the **lack of women in various areas**, be it in the STEM sector, in research and development in general, in management positions, in teaching, in setting up companies or in sectors from which patents tend to originate.

In 11% of cases, the **type of activity** that women and men carry out in research or invention, or the role they play in it, was cited as a reason. Women would rather take on accompanying, administrative, organizational, coordinative and desktop tasks, while men would take on the more experimental, prestigious and commercial parts and thus also the inventive part of the work.

In addition, women would rather work in teams, which means that the "individual contribution to the solution tends to lose importance in favor of the overall solution".

On the other hand, 7% of the responses referred to the general **lack of teams** or women in teams, which would make an inventive achievement possible first and foremost. The low proportion of female teachers, who would make it easier to set up a team, was also cited as a reason here. On the other hand, men would be better networked and

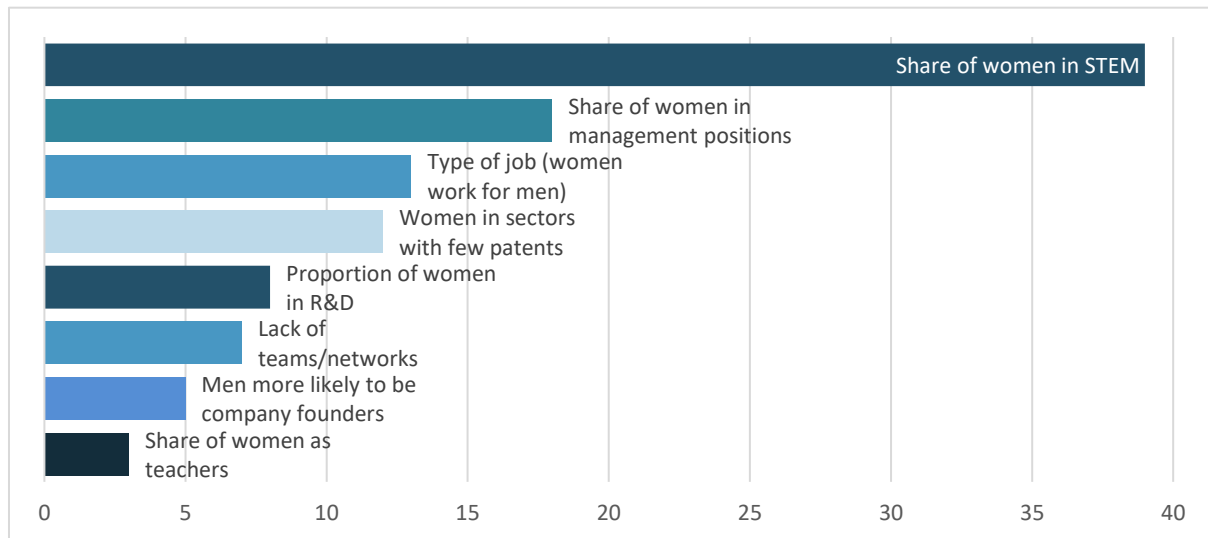


Figure 7: Reasons rooted in the labor market

Note: in percent

could therefore make better use of these networks to acquire potential investors.

2.2.3. Application procedure, know-how, costs, incentives

Around 11% of respondents saw reasons for the low rate of female inventors in the **application process** itself, in know-how, the costs or the lack of incentives. The following was mentioned in relation to the application process:

- Help must be provided before the application is filed.
- Patent procedures at universities and universities of applied sciences are generally considered to be "too time-consuming and complicated".
- There would be a lack of appropriate contact persons in the federal states.
- An employee contact point for employee inventions should be set up.

Financing and the costs incurred by the application as well as the search for the necessary investors were also mentioned several times. A lack of information about the costs and possible funding often seems to be the reason why an application is not even considered.

The following was mentioned in the area of **role models/mentoring/support**: there was a lack of "incentives", "campaigns" such as Girls Days and "promoting young talent", "mentoring", role models as well as "active support and promotion" in general, or there was too little of it. There are many indications here that there is a lack of information in terms of condensed and useful information on the topic.

However, the picture also appears to be heterogeneous within the companies (**operational factors**): there were isolated reports that "inventions and patenting" had not been promoted within the company in recent years and that there was no room for creative activity. In addition, there is a lack of financial resources and know-how, so that external knowledge has to be used, which would mean additional costs.

2.2.4. Time-related factors

Just under 6% of the responses dealt with time-related factors that would particularly affect women. The reasons mentioned here are also closely linked to gender-specific socialization and the conditions on the labor market. Be it that women take more care of children and thus suffer from double burdens (compatibility of family and career) and (therefore) tend to work part-time (which is less conducive to an invention report) or that

women go on maternity leave and then (have to) pass on projects to colleagues and thus experience a "career setback".

However, institutional framework conditions, such as the general lack of childcare facilities, were also mentioned. This would give women fewer opportunities to "embark on a career as a researcher".

"From my own experience, I know that innovative research succeeds when you have several days of undisturbed time to think, research, experiment and write things down. Days [with] only occasional free slots [...] are not useful for this."

(Quote from the survey)

2.2.5. Reasons rooted in the education system

The general education and training system in Austria, which can be seen at least indirectly as a product of socialization and the prevailing norms and values, is also held responsible for the low rate of female inventors. The education system in Austria is not always able to keep pace with changes and represents a challenge for women who want to gain a foothold in the fields of research and technology. The following examples were cited: the general dominance of languages in the academic secondary schools with a simultaneous lack of "math, crafts, informatics/computers" or the lack of treatment of the topics of inventions and patents in education (training). A "lack of support for motivated girls from primary school age" and a lack of career guidance were also noted. The "early segregation of boys and girls" in the education system was also identified as the reason for the low proportion of women in technical professions.¹⁶

¹⁶ For example, a joint subject "Textile and Technical Crafts" was not introduced at grammar schools until 2021. Moritz/Gruber (2019).

2.3. Gender-specific differences in practice

When asked whether gender-specific differences were noticeable in the daily work of patent applicants and inventors, 21 of the 78 respondents, i.e. just under a quarter, answered that this was the case, while 35 answered in the negative (including 14 women).¹⁷

Those who perceived differences cited similar observations to the reasons identified above: women were more reserved, more self-critical, more risk-averse, more social, more precise and perfectionist, less active, less confident, more easily influenced, more skeptical and more insecure. They would underestimate the importance of intellectual property and often find themselves in the conflicting area of balancing family and career.

2.4. Fewer applications despite STEM profession

Why do women register less even if they are already working in a STEM profession? Many answers to this question focused on the **actual activities** of women in STEM professions. On the one hand, women are more likely to be found in scientific professions than in technical ones and on the other hand, they are more likely to be employed in administrative, non-research-related activities ("Even STEM graduates only work in technical development to a lesser extent later on"). Both of these factors mean that they are less likely to be involved in tasks relevant to inventions and patents.

However, the **knowledge and expertise** relating to patenting was also mentioned here: "The nature of filing inventions and patenting needs to be communicated better in general", "it would also be helpful if someone could accompany the first patent application or take you along to see how it is done."

¹⁷ Rest: no answer to this question.

The "**classic glass ceiling**" was also mentioned several times, triggered by the above-mentioned reasons of socialization and the prevailing traditional role model, which would stand in the way of professional success and thus the patenting of women.

Finally, the **time factor** resulting from work-life balance issues and its consequences (double workload, more part-time jobs, career setbacks, etc.) plays a role, which often does not allow for the "extra mile" of an application: "A patent application also means more work: in drafting the patent (even if the patent attorneys do it), arguing in search reports, in exploitation - discussions with the companies - additional hours are always required." Among other things, the "age window" of inventors was also cited, which is typically between 27 and 35 years old - "the age range in which many take their first parental leave."

2.5. Survey results of the stakeholder groups

The survey participants were also asked thematically tailored questions depending on their professional affiliation.

2.5.1. Group 1 (where inventions originate)

37 of the 78 respondents felt they belonged to the group "entrepreneurs, universities, licensing/IPR managers and inventors" and were asked about the **general proportion of women** in their company/institution and the explanatory factors for this.

- If the **share of women in the company was below 50%**, this was often justified by the highly technical nature of the industry and that (also for this reason) no female applicants could be found despite some initiatives. The size of the company also seems to be a decisive factor here (the smaller the company, the less gender parity).
- If the **share of women was over 50%**, the company's own employment policy in

favor of women, the corporate culture, the presence of good female role models, but also attractive (flexible) working time models were cited as decisive reasons. However, it was also pointed out in many cases that the high or comparatively higher proportion of women may also be due to the specific research area of the company/institution (e.g. chemistry, medicine, life sciences, generally with a higher proportion of women) or the actual field of activity of women (distinction between general/administrative and scientific staff). However, differences were also identified along the hierarchical level.

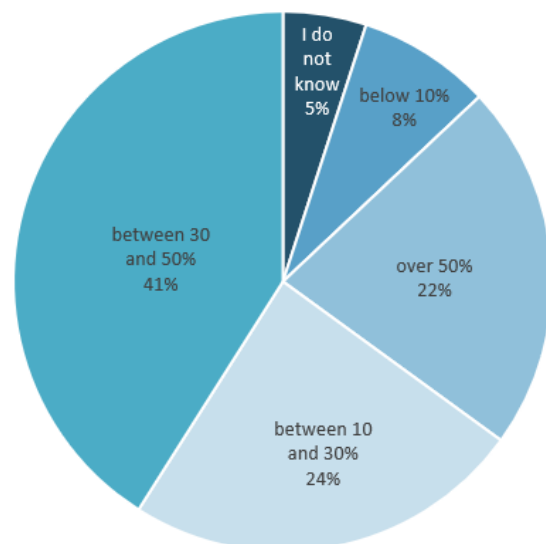


Figure 8: Share of women in own company

Factors that favor a higher proportion of women:

The following three areas were surveyed:

- **Company kindergartens:** Company kindergartens are most frequently found among respondents from universities and license/IPR managers (especially if the latter are based at universities). The high demand for company nurseries was mentioned several times here. None of the four responding companies have such a childcare facility (although they emphasized the "maximum consideration of family life" in their own company). In contrast, company kindergartens were available at all three inventors.

- **Paternity leave:** 35 (out of 37) people stated that paternity leave was (in principle) available. Although 25 of them stated that this was also taken up, it is "still a rare exception", fails "mostly due to the different income situations" and is "not chosen to the full extent".
- **Gender objectives or equality plans:** 28 (out of 37) respondents stated that their company had gender objectives or an equality plan. The majority (17) also confirmed regular evaluations in this regard. The most frequently mentioned objectives were regulations on recruitment policy (both quotas and preference for women with equal qualifications), but also measures to improve the work-life balance, more flexible working hours and work location regulations (keyword: home office) as well as gender-independent career and salary development measures. However, the degree of specification of these measures seems to vary greatly: from generally formulated goals such as a ban on discrimination or a gender equality requirement to quite specific ones such as the establishment of an independent office for gender equality officers or extra travel allowances for female academics. A third of the respondents (13) stated that measures for men were also taken into account.

The experiences with these equality plans are also very heterogeneous: from "effective and awareness-raising measures" to "sluggish implementation" and "few concrete or serious measures" are mentioned here within the companies. The latter was often supplemented by the comment that there was "at least something in writing" and that the company management was "at least thinking about it".

Factors relating to IPR:

The stakeholder groups were asked questions about the patent/IPR process that were

tailored to their respective stakeholder groups. Due to the small number of respondents in the individual groups, the general tendencies are presented here:

- **Patenting or publishing** - both seemed fundamentally important for the students. However, the closer to a university, the more important publication tended to be, especially in terms of recruiting and career.
- **Know-how on IPR** - seemed to be present in this survey group according to their own statements, but there was also a need for improvement in the transfer of knowledge in the company or in the institution itself.
- **Technology transfer** played a major role for the majority of respondents (18). The majority of respondents (25) saw industrial property rights as helpful in this respect.
- **Spin-offs:** As mentioned at the beginning, there are generally more female applicants from the university sector. Spin-offs from the university sector are generally particularly innovative.¹⁸ Suggestions as to how the Austrian Patent Office could better support spin-offs in applying for IP rights range from more favorable conditions and funding (cost factor) to awareness-raising, know-how transfer and support through networking. Reducing the administrative burden and speeding up the process were also suggested here (albeit less frequently).

2.5.2. Group 2 (those who provide external support for IPR)

Two of the seven patent attorneys who took part in the survey stated that, in their experience, men were more likely to file (the others did not notice any notable difference here). Two areas were particularly emphasized here: firstly, biotechnology was mentioned here, where the gender ratio is perceived as

¹⁸ Proportionately twice as many academic spin-offs have already filed at least one patent application in

comparison to all other start-ups. Austrian Startup Monitor 2021 (March 2022).

relatively balanced. Secondly, the medical technology/process engineering sector was cited as an example where "almost only men were observed as inventors".

In this group, too, there was a need for improvement in the transfer of knowledge about IPR - especially among individual applicants. More emphasis should also be placed on universities and technical colleges.

The financial outlay (especially for individual applicants) and an increased risk factor for the commercial exploitability of the invention, such as in the field of biotech, were occasionally cited as factors that would deter people from filing a patent application. Women are often risk-averse and would refrain from filing an application.

The proportion of women among patent attorneys in Austria is also low - the reasons are seen by the responding patent attorneys primarily in the technically oriented professional field. In addition, training to become a patent attorney is generally described as very time-consuming - both in terms of time, because it usually falls within the "life schedule of most women with families", and in terms of the content and the examination itself.¹⁹ There is also a need for improvement here (also with regard to training opportunities).

2.5.3. Group 3 (those who promote inventions)

People who responded here come from institutions such as the Chamber of Commerce or Labor, the Federation of Austrian Industries, the Business Agency and similar.

The main reasons given for women filing fewer IPRs were a lower awareness for IP rights, a different hierarchy of priorities and a lower focus on profit and wealth among women. The more frequent part-time employment of women was cited as a reinforcing factor for the fact that women are (still)

less anchored in technical development projects.

The answers to the question of whether these institutions themselves had anchored gender equality were quite heterogeneous. The "Gender and diversity management in the Vienna Business Agency" can be cited as a kind of best practice with concrete regulations, targets and monitoring.²⁰

2.6. What can be done?

This part of the questionnaire, which was the same for all survey participants, was primarily concerned with what can be done to increase the rate of female inventors. The measures that could be of particular relevance to the Austrian Patent Office are listed below. These suggestions are reproduced as they were stated in the survey.

According to the respondents' feedback, it is important to "dose" all the measures well so that the top priority is "equal opportunities" (and not to give the impression that one side is being unduly favored or that the innovative power of women is being questioned at all) and that acceptance among colleagues is maintained. However, it was also noted here that there would be no need for special support for women if there were equal opportunities or equal participation.

2.6.1. Raising awareness - better visibility of positive role models

Almost three quarters of all respondents were of the opinion that **targeted awareness programs** have a positive effect on the number of applications from women. 60% of respondents thought that a **lack of visibility of women's achievements** was an obstacle to patenting and just as many thought that media campaigns such as **promoting positive role models** could be an incentive for girls and women to become inventors.

¹⁹ Quote from the survey on the patent attorney exams: "[...] the patent example usually involves mechanical/mechanical engineering-related topics, where chemists,

biotechnologists, molecular biologists, pharmacists, ... have a disadvantage."

²⁰ Vienna Business Agency (2021).

- **Targeted awareness-raising:** Creating awareness for the topic, e.g. by discussing study results on the topic with a broad audience, bringing role models/inventors to the fore (due to their lack of visibility) as well as openly approaching and addressing women and highlighting best practices.²¹

Furthermore: Creating awareness within the company that not only a broad mix of training courses, but also a balanced proportion of women leads to innovative and higher quality ideas and that there is a lot of untapped innovation potential here.

- **Awareness-raising among men** (considered important by 62% of respondents): advice, coaching or "gender training" for male managers, fact-based highlighting of positive examples and benefits (keyword: untapped potential, higher creativity, performance and quality etc.) backed up by studies, educating and highlighting the male bias.
- **Prizes and awards** such as prizes for companies with a high proportion of female inventors, the female inventor of the year award, prizes for successful invention applications (not just patent awards) but also company-sponsored ideas competitions for women.

2.6.2. Targeted training and advice

- Build up **targeted knowledge and expertise** by expanding services "by women for women", targeted marketing such as information campaigns (e.g. "File your patent yourself"), coaching and training.
- **Develop low-threshold offers** for women in and around the application process in order to reduce the fear of the supposed complexity. Examples were given: a registration office and/or mentors specifically for women, a contact

point for women (upstream of the patent application) or times reserved for women at the Austrian Patent Office (managed by a woman) as well as an IP hotline (for everyone).

- **Education and training** - offers for schools (communicating the importance of technology, innovation and IP through e.g. the use of role models, participation of the Austrian Patent Office in the children's university), universities (e.g. tours through universities) and in the professional world (further training offers) were mentioned here.

2.6.3. Stronger networks

- Develop **networks and platforms** for women with the aim of exchanging information, increasing and utilizing group dynamics and networking. To this end, cooperation with educational institutions (the Technical Museum, for example, was mentioned) could be entered into in order to arouse interest in technology and research.
- Establishment of an **exploitation network** for women.

2.6.4. Financial incentives

- Pre-check offers or patent check for inventors.
- Financial support for patent applications (patent attorney fees, application costs, fees, ...).
- Promote the first patent application with an all-female share of 100% or funding according to the share of women - or according to the exploitation (turnover) up to a maximum amount.

²¹ 57 of the 78 respondents stated that targeted awareness programs would help; however, the appreciation of inventions should also be increased in general.

2.6.5. Thematic focus

- Address and take up subject areas in which women are already more strongly represented - such as medicine/medical technology - horizontally in all proposed measures, both in terms of educational opportunities, networks and (financial) incentives.

2.6.6. English-language services

Since the study by the European Patent Office suggests that women with a migration background patent more often in Austria than women resident in Austria - the rate of female inventors is twice as high here - the question was asked in this survey whether an **English-language service** would be considered useful: this was confirmed by two thirds of the 78 respondents, with just under 9% disagreeing. The following were mentioned specifically:

- Further training and advice in English - also horizontal.
- Easier access to information on IPR.
- Clear, non-complicated instructions and forms (in English) and support in dealing with authorities.

2.6.7. Legislation

- **Mandatory disclosure of the names of all inventors** (currently not mandatory in Austria) or the proportion of women in patent applications.
- Establishment of an **employee contact point for employee inventions**.

3. External Views – Experts from International Organizations

In order to substantiate the topic scientifically and from an "external" perspective on Austria, experts from the country desks of the OECD²², the EC²³ and the IMF²⁴ were asked for their assessment and input on the topic. All three institutions are distinguished by their well-founded scientific expertise. In addition, the country desks have know-how that is specifically focused on Austria and are therefore a particularly valuable source of input.

The experts were asked for their assessment of the reasons for the low rate of female inventors in Austria and what measures and best practices could be proposed. The answers are given below.

3.1. OECD experts

Gender and Innovation in the OECD and the G20

A recent report by the Directorate for Science, Technology and Innovation (STI), with contributions from the Directorate for Education and Skills (EDU) and the Directorate for Employment, Labor and Social Affairs (ELS) of the OECD covers the **gender divide in innovation**, and sheds some light on whether the digital era could contribute in reducing inequalities.²⁵

The key take-aways:

- **Teams** including women represent an increasing but relatively small share of invented patents. Patents invented by gender-diverse teams tend to be more valuable, as the top 50% of patents featuring at least one female

²² The answers to the questionnaire were provided by Dennis Dlugosch and Sébastien Turban of the OECD Economics Department. They are based on OECD analyses presented in the OECD Country Report 2021 on Austria (OECD, 2021) and the OECD report "Bridging the Digital Gender Divide: Include, Upskill, Innovate" (OECD, 2018), commissioned by the Australian government in 2018 to

support the further development of the 2017 G20 Roadmap for Digitisation: Policies for a Digital Future.

²³ EC: Vera Fehnle, Policy Officer, Country Desk for Austria & Germany, European Commission – Directorate General for Research and Innovation, Unit A1 – European Semester & Country Intelligence.

²⁴ IMF staff experts of the country desk for Austria.

²⁵ OECD (2018).

inventor are of greater value (although more dispersed) than those arising out of men-only inventors' teams

- Although the contribution of female inventors to the development of **ICT inventions** has increased, women nevertheless continue to play a relatively less important role in the development of technologies that are key in the digital era than the one they play in other technological domains.
- The **gender gap in entrepreneurship** is persistent (men being nearly twice as likely as women to be self-employed, and *three* times more likely than women to own a business with employees across OECD countries)
- Only 11% of start-ups looking for **VC investments** have female founders.
- **Raising capital** is more difficult for female-owned firms: in a sample of 25,000 start-ups operating across a wide set of countries and sectors, female-led business ventures, i.e. start-ups with at least one female founder, are significantly less likely to be funded. Even if they are funded, those ventures receive on average 23% less funding than male-led start-ups.
- **Several factors** may contribute to explain the gender gap in entrepreneurship and determine the gap in start-up founding activity and VC investment: among them, the existing gender gap in STEM studies, differences in attitudes towards risk, or gender differences in network formation and in social network ties to secure VC funding.

The low share of women in patent applications in Austria is according to the OECD experts consistent with the constraints in economic participation faced by women in the country, as discussed below:

- Just before the pandemic, **women's full-time labor force participation rate** was one of the lowest among comparable countries and their part-time employment rate one of the highest.
- **Gender gaps in Austria** are wide compared to other OECD countries, notably as a result of the deeply rooted traditional family and work arrangements. The so-called "separate gender roles" model

persists despite many policy initiatives to balance the roles. While young women have on average higher education than young men, the majority of women with children withdraw fully or partly from the labor force until their children reach school age and, for some, until they complete high school.

- The **parental leave** system which permits an asymmetric use of leaves between genders helps to perpetuate this pattern. Women also carry the main responsibility for caring for dependent elderly. The shortcomings of the childcare infrastructure became more visible during the pandemic.
- The **pandemic** has potentially amplified the gender gap. The double burden of work and care obligations affected women, in particular women teleworking from home, more than men. The proportion of women working in severely hit sectors was higher, resulting in sharper declines of their work hours and incomes. Income replacement schemes have compensated women's and men's losses in a fairly balanced way. Nonetheless, during the pandemic the highly skilled women were particularly squeezed between workplace and family responsibilities.

Earlier OECD analyses recommended an **integrated policy framework** to reduce gender imbalances in the labor market through four streams: i) making the tax and benefit system more employment friendly; ii) making the parental leave system better balanced between mothers and fathers; iii) significantly upgrading the child and elderly care infrastructure (while maintaining the enrolment age of very young children flexible according to parental preferences, and developments in pedagogical research); and iv) encouraging more flexible workplace practices

Better and flexible childcare options, including via innovative services such as certified nannies and childminders, would benefit growth, well-being, social cohesion, and the long-term sustainability of public finances.

The parental leave system was enhanced in recent years with more incentives to the balanced use of leave entitlements between mothers and fathers. These provisions are however not yet broadly used.

However, **public policy** directly targeting women participation may not suffice. A comprehensive empirical analysis of Austria's parental leave and childcare support policies published in 2021 concluded that public policy measures have a stronger impact on gender gaps in labor markets when they are backed by supportive changes in social norms and preferences regarding the family-career choices of men and women

The joint OECD report mentioned above considering the gender divide in innovation discusses specific options to narrow this gender gap. Narrowing the gender gap can be achieved not only by empowering women, but also by **facilitating men and women working together**, to erase differences and biases. Another important tool to be leveraged in the quest to achieve gender equality is having **women participate in international teams of inventors**, so that they can strengthen their networks, benefit from collaboration and from knowledge spillovers and, more generally, be able to find the best partner(s) for their inventive activities.

3.2. EC experts

For the European Commission, the result of a low rate of female inventors was **not surprising** as, overall, women are very underrepresented among inventors. At European (i.e., EU-27) level, for every 100 inventorships held by men, there were just 12 held by women between 2015 and 2018 - in Austria, the number is six female inventors.²⁶ Notably, economies in the G-20 region had the highest ratios of women to men inventorship, indicating that the EU is lagging behind some of its main competitors. For example, in China (except Hong Kong) and South Korea, for every five

inventorships held by men, there were over two inventorships held by women.

Some data from the European Innovation Council (EIC): out of all Austrian companies supported by the European Innovation Council (EIC) program in 2021-2022, only 12% had a female CEO, CTO or CSO. Of these, almost half operated in the health sector and 1/3 in IT. By comparison, across all EU Member States in 2014-2021 the EIC has funded a portfolio of companies of which 20% had a female CEO. This shows that **the underrepresentation of women in tech is not an exclusively Austrian problem**: across the entire EIC portfolio, there are more women innovators involved in sectors like healthcare, biotech, food, edutech/culture, than engineering. Health in particular, is where we find the highest number of women-led companies.

Within the European Union only one out of three graduates in science, technology, engineering and mathematics (**STEM**) are women. Austria also shows significant gender differences concerning STEM graduates. The share of women graduates in STEM has increased very slowly over the past 20 years and still amounts to less than a quarter of all students.^{27,28,29}

Women are underrepresented in the solutions design across the industries. It might be challenging to work in the male-dominated environment and to gain the respect and recognition. Women in STEM might be too busy working on their research projects and do not have mind space for more "strategic" tasks, such as ensuring a sound IP management.

The **RTI Strategy 2030** includes the objective to increase the proportion of women amongst graduates in technical subjects by 5%.

²⁶ European Commission (2021). Reference is made to the indicator "women to men ratio of inventorships, 2015-2018" (European patent applications (kind codes A1 and A2) in PATSTAT).

²⁷ European Commission (2021).

²⁸ European Commission (2021a).

²⁹ European Commission (2021).

Concerning patent applications, this is influenced by the **slower career progression** of women compared to men, which contributes to gender differences in access to research funding. Gender differences in funding success rates partly contribute to the gender gap in authorships and innovation outputs such as patents.

Men accounted for a greater share of **research team members** than women between 2015-2019 at both European and country level. In addition, between 2015-2019, women were more likely to be underrepresented among active authors who led research. Such gender differences in R&I outputs may contribute to a vicious cycle whereby women who have fewer patents or publications to their names will have reduced chances of being funded (or receive lower funding amounts), which could in turn decrease the scientific output and patent applications.

An interesting conclusion relating to jurisdiction was drawn from the research; a key element to reducing the gender gap in patenting in EPO countries is **international mobility**. Women inventors that reach out to inventors in other countries consequently increase their internationalization which is key for increasing women inventors globally.

Companies founded solely by women garnered just 2.4% of total **VC invested** in European **start-ups**, although women make up close to 40% of all European entrepreneurs. According to the case study on gender equality in **venture funding** in the EU, firms with a woman CEO receive only 11 % of VC funding³⁰. There is a need to have more women in the VC (decision making) but also in patent offices. The European VC ecosystem is facing unprecedented challenges and needs all talents to tackle them. By excluding women from the tech scene, valuable skills and perspectives are disregarded.

³⁰ European Commission (2020).

³¹ As an example, two educational projects are funded under the Horizon 2020 programme 'Science with and

Moreover, the latest evidence shows that women are between 10 and 25% less likely to apply for a **loan** and have a 10% lower probability of obtaining credit than their male peers in the same industry.

Gender differences in access to research funding can be one reason for the low proportion of women inventors. Furthermore, women inventors might **not be aware of the importance of IP management or strategies** at the early stage of their projects. Educational campaigns for women studying STEM or other careers could be designed with support of lawyers specialized in IP.³¹

Another reason might be the **cost and complexity** (with country specific rules) of such applications. Maybe an additional financing and programs providing assistance would change the current state of play.

Initiatives- some examples:

- With the **INNOVATORINNEN** (FEMALE INNOVATORS) program the BMAW (Federal Ministry of Labor and Economy) aims to provide targeted support to women in research and innovation and to make them more visible. Highly qualified women are encouraged to develop their ideas, to establish new highly interdisciplinary network contacts and to have more creative freedom and professional development. INNOVATORINNEN offers female researchers, innovators and entrepreneurs career training, networking events, the INNOVATORINNEN LEADERSHIP program and the INNOVATORINNEN alumnae network.
- In order to support the implementation of the **Guiding Principles for Knowledge Valorization**, in March 2023 the Commission issued its Recommendation on a Code of Practice for the management of intellectual assets for knowledge valorization.³² The Code of Practice helps R&I stakeholders, from individual researchers

for Society' (Swafs), including EQUALS-EU (with an Austrian partner).

³² European Commission (March 2023).

and innovators to private and public research organization and innovative SMEs, to successfully approach the various steps of intellectual assets management with the objective to transform their knowledge into market solutions. The Code of Practice addresses intellectual assets in a broad sense, including IP but also know-how, data and, more in general, any results of R&I activities. In particular, the Code provides guidance in the following areas: establishing a strategy for the efficient management of intellectual assets; managing intellectual assets in joint research and innovation activities; and: managing intellectual assets from creation to market.

- With regard to best practices for the **valorization** of IP, the European Commission hosts a **platform** that connects players in Europe with the ambition to turn research results into sustainable products and solutions for the public good - be it economic or environmental benefits, social progress or improved policy making. The Knowledge Valorization Platform includes a repository with best practices, 'learning from experience' examples and relevant policies.³³

Introducing **specific measures** for output-related activities and providing dedicated support for women researchers and innovators could contribute to increasing their inventive activity. Specific measures could also be introduced in the field of industry-academia collaboration. For instance:

- the creation of **programs and trainings** to promote and support the development of the skills and capacities of female inventors (such as trainings in intellectual assets management for PhD researchers) as well as to encourage their mobility
- developing a **relevant and fair system of incentives** particularly targeting female inventors and encouraging their participation as active partners in co-creating

value-adding innovation could also contribute to increase their inventive activity

- **Peer learning** - for instance through the promotion of national best practices, case studies and role models concerning women-led innovation - would draw further attention to women's contribution to innovation and provide a benchmark for similar initiatives in other countries
- **Gender-based and key performance indicators** could also further support women involvement in innovation activities.

Other good practices on EU-level:

- Priority to interview women-led companies for EIC Accelerator: definition includes companies with female CEO, CTO or CSO
- A target of 50% women in all EIC advisory structures (including the EIC Board, remote and panel evaluators).
- The [EIC Women Leadership Program](#), for funded EIC, EIT and Women TechEU projects, includes all business acceleration services (coaching, trainings, networking) and also mentoring
- The [EU Prize for Women Innovators](#) is awarded every year to women entrepreneurs that have founded a successful company (three €100,000 "Women Innovators" prizes and three €50,000 "Rising Innovator" prizes) - to be run jointly with EIT in 2023
- A European pilot [innovation gender and diversity index](#) for EU tech startups/SMEs and to monitor and foster diversity within their company.
- [Women TechEU](#) 2023-2024 program (180 companies funded in 2021-2022)
- [She Figures 2021](#) initiative, soon 2024 launched, including PATSTAT patent data from over 150 offices worldwide, including the USPTO (United States), EPO (Europe) and JPO (Japan).
- [Gendered Innovations Living Labs](#) (ecosystems of open innovation on campus in a real-world environment with collaborations across Europe).

³³ European Commission (2023a).

3.3. IMF staff

The IMF staff first notes that the gap found in the EPO study between the female inventor rates in the leading countries and that in Austria appears to be large. According to the IMF staff, the difference in STEM graduate rates among women could be a factor that contributes to the relatively low proportion of female inventors. Austria has a lower proportion of female STEM graduates than comparable countries in advanced economies (26% compared to 32% for the latter). In contrast, Portugal has a high proportion of female inventors (27% according to the EPO study) and also a higher proportion of female STEM graduates (37%) compared to the average of advanced economies.

The literature shows that R&D expenditure, ICT, and human capital are important inputs to innovation. An important structural policy priority for Austria is expanding access to ICT technologies through increased digital connectivity and integration of digital technologies. Recommendations for increasing Austria's innovation output, including by promoting gender equality in research, can be found in the publication of the OECD 2018³⁴.

3.4. Take-Aways

OECD and EC both point to the low shares of women in business start-ups and management as well as in (research) funding.

- Only 11% of **VC investments** go to companies with a female founder.
- Women are between 10 and 25% less likely to apply for a **loan** and 10% less likely to receive a loan than their male counterparts in the same industry.

An interesting aspect highlighted by the **OECD** in particular, which was less focused on by the respondents, is the **facilitation of collaboration between men and women** to eliminate differences and prejudices, and the **participation of women in international inventor teams** to strengthen networks,

benefit from collaboration and knowledge exchange, and find the best partners for their innovation activities. The EPO study also states that promoting international mobility will help women to have more opportunities to pursue a career as inventors.³⁵

The **European Commission** confirms the importance of **awareness-raising** (including peer learning) and programs and training on the subject. However, the **costs and complexity** of the application process are also cited as a possible reason why there isn't a higher rate of female inventors. Suggestions include **increased cooperation between industry and academia** similar to the best practice example of the INOVATORINNEN program, but also gender-specific performance indicators and key indicators.

The experts on the **IMF staff**, on the other hand, focus primarily on **structural policy** and **digitization** (access to ICT technologies, increased digital connectivity, integration of digital technologies).

³⁴ OECD (2018a).

³⁵ EPO (November 2022).

4. Next Steps – Utilizing the Results

The results of this qualitative survey on the low rate of female inventors are not intended for the drawer, but will lead to specific measures by the Austrian Patent Office and will be used for further work and efforts to make an active contribution to improving gender parity in inventions.

The survey results will be presented and incorporated at various events, as already done at the WIPO Chief Economist Meeting in Krakow (September 2023) or the Masters of IP - Female Edition (September 2023).

It became clear that the work on developing measures already includes some measures themselves: presenting and discussing the results simultaneously contributes to **raising awareness and sensitization** for the topic.

4.1. Conclusions and development of measures

The greater participation of women in intellectual property and inventions in particular is essential, as their involvement in the innovation sector is simply indispensable. On the one hand, greater participation leads to better quality results. On the other hand, studies show that women invent "differently": a patent is granted for a new and inventive technical solution to a problem. However, what is seen as a problem depends heavily on one's own perspective and reality of life. For example, women invent much more often for women - famous examples can be found in endometriosis research.³⁶

The aim of the survey was to allow users of the Austrian Patent Office to have their say and to gain new insights into the reasons for the low rate of female inventors. Although many of the reasons for the low participation rate of women have structural and societal

roots, starting points were also identified within the scope of the Austrian Patent Office to help improve the representation of women in the system.

4.1.1. Ensuring data truth

Defining the problem:

Respondents noted several times that the Austrian Patent Office should follow up on the correct indication of the (actual) inventor. Due to the current legal situation, the indication of the inventor's name is not mandatory in Austria (as the only country of the EPO contracting states).

Measures:

- By **introducing a new strategic objective** "applications for protection rights by women" the Austrian Patent Office will prepare and communicate an annual data evaluation on the current situation and the effects of its measures. This will ensure regular monitoring and further treatment of the topic.
- The **mandatory naming of inventors** should also be examined. In Austria, inventors are not named in around half of all invention applications.³⁷ This makes it difficult to detect changes.

4.1.2. Raising awareness and promoting mentors and role models

Defining the problem:

60% of respondents believe that a **lack of visibility of women's achievements** is an obstacle on the path to patenting and just as many believe that media activities such as **providing positive role models** can be an incentive for girls and women to become inventive. It was also suggested that a trusted person should accompany them through the process of applying for intellectual property

³⁶ Koning, Rem (2021).

³⁷ In 2022, it was 46.12% of total invention applications (invention = patent and utility model; total = company and individual applications). Data source: APO, Elvis.

rights in order to lower the inhibition threshold for filing applications.

Measures:

- Establishment of a **mentoring program** for women, in which a female patent examiner is directly available for inquiries from female customers.
- Improving the visibility of female inventors through **targeted communication campaigns** online and offline (events, social media, media work, podcasts, ...).
- With this **survey** and the **presentation of the results**, a further step was taken towards a common understanding of the IP gender gap.
- It is planned that the results of this survey will be published by the World Intellectual Property Organization. The aim is to promote the **exchange of best practices** with other countries.

4.1.3. Raising awareness for IP rights

Defining the problem:

Almost three quarters of all respondents believe that **targeted awareness and educational programs** have a positive effect on the number of women registering. Better networking opportunities were requested several times.

Measures:

- **Creation of special formats for women** to raise awareness for the relevance of intellectual property, exploitation and valorization, such as the "IP by Women for Women" format. Here, an open exchange on the topic is offered together with personalized seminar content by female experts at the Austrian Patent Office.
- The **event series "Masters of IP - Female Edition"** of the Austrian Patent Office offers women who are experts in the field of intellectual property a platform and networking opportunities.

- Through **comprehensive stakeholder mapping**, the Austrian Patent Office has contacted over 20 Austrian women's organizations in order to discuss possible **cooperation** through an in-depth exchange and to raise awareness for the problem. The resulting collaborations should inspire further measures.

4.1.4. Setting incentives

Defining the problem:

Targeted incentivization through prizes or awards was mentioned several times by the respondents with concrete examples. Prizes and awards also help to raise awareness by bringing them to the forefront. The **cost** of registration was also mentioned as one of the obstacles and financial assistance was suggested.

Measures:

- A **new category of the Austrian State Award for Patents** for companies with numerous female inventors is planned. In addition, a lecture program on the topic could be developed with the award-winning companies together with the APO IP Academy in order to give other interested companies an insight into award-winning best practices and to learn from them.
- Making **patent applications by female inventors more favorable** is being considered. The Austrian Patent Office is in discussions with funding organizations in this regard.

4.2. Conclusion

The promotion of women in the IP sector is not only a question of gender equality, but also an investment in Austria's economy and innovative strength. These planned policy measures aim to contribute to providing women in the IP sector with more support and equal opportunities to realize their full potential.

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