WOMEN AND INNOVATION

2024 REPORT

/ Executive Summary

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INTRODUCTION

The Women and Innovation 2024 Report is the third edition of the biennial series that began in 2020 promoted by the Women, Science, and Innovation Observatory (OMCI) of the Ministry of Science, Innovation and Universities, with the aim of analysing the situation of women in the field of innovation.

Despite major advances, the R&D&I system in our country still does not enjoy full and effective equality in the participation of women in all areas, including professional promotion and access to funding. To help reverse this situation, it is essential to have detailed diagnostic data, which are key to monitoring and improving existing equality policies. At present, data on the role of women in the field of innovation are still scarce, particularly if we want to analyse the causes that perpetuate inequalities and thus eradicate them.

The main novelty of this Women and Innovation 2024 Report is the introduction of qualitative information, through an anonymous survey and the direct opinion of a series of leading women in the world of innovation in their professional fields, whom we have gathered and interviewed to find out first-hand what lies behind the data, and to make a detailed x-ray of the situations faced every day by women innovators and entrepreneurs in Spain with the aim of taking another step forward in our strategy of monitoring, measuring and understanding gender equality in this field.

Furthermore, in this edition, the content offered in previous editions was reformulated, reducing the number of chapters to focus the report on presenting only the data of greatest interest for understanding the situation of women in the different innovation sectors.

CHAPTER 1

LABOUR MARKET PARTICIPATION

Despite major advances, women still do not participate in innovation in our country on an equal footing with men. It is therefore necessary to analyse where the differences occur and why.

Firstly, if we focus on the contribution that women and men make to R&D&I in terms of participation in the labour market, the fact that in 2023 there are more women employed in science and technology than men stand out, as shown by the Human Resources in Science and Technology (HRST) data. Women represent more than a third of the employed population (34.4%) while men represent 29.2% of the total population in the sum of Technical, professional, scientific, and intellectual staff (group 2) and Technical and professional support staff (group 3). This shows the interest of women in forming part of such an important sector in the economy and for society as R&D&I.

Despite these positive data, the under-representation of women in certain strategic sectors and emerging technologies persists. 61.3% of ICT sector companies have no female ICT specialists on their payroll, which highlights the urgent need to incorporate female ICT specialists into Spanish companies. Moreover, the percentage of companies without women in ICT decreased in 2020, which could be related to care needs during the pandemic, and pre-pandemic values have not yet been recovered.

Within the business sector, in the high and medium-high tech (SMAT) fields, the gender gap has not narrowed in recent years. Women represent only one out of every three occupied positions, 31% of the employed population both as R&D personnel and as research personnel.

Nor are the figures good in companies involved in innovative activities. Only 28.2% of staff in innovative companies were women, six tenths less than in 2020 (28.8%).

By sector, women do not reach 30% in any of the three main sectors of activity in Spain: Agriculture, livestock, forestry, and fishing (20.5%), Industry (26.8%) and Services (29.7%). Only in Textile, clothing, leather and footwear, Health and social work activities, Financial and insurance activities and other manufacturing activities is there a gender balance.

Although today the role of women in science, technology and innovation has advanced in Spain, it has not done so with sufficient strength and intensity to change the imbalances observed in the last decade. Much remains to be done, despite the progress made. The gender gap is palpable, and innovation requires the participation of a growing number of specialised and qualified human resources, capable of participating in and promoting innovation processes, in which the knowledge and experience of women cannot be lacking.

It is in this current deficit of specialised talent, which occurs not only in Spain but also worldwide, where it is necessary to focus our attention. Girls are more interested in having a useful social impact, in creating, inventing, and innovating by supporting measures. It now remains to eliminate the external stimuli, gender stereotypes and biases that keep them away from STEM (Science, Technology, Engineering and Mathematics) degrees. Only in this way will it be possible to re-establish gender balance in the most innovative productive sectors, breaking with the current scenario where a significantly higher proportion of men than women are still employed. In this way it will be possible to guarantee that the contents of R&D&I in Spain are developed with a gender perspective, also by and for women.

CHAPTER 2

WOMEN IN INNOVATION AND KNOWLEDGE TRANSFER

Innovation and technology offer great opportunities to transform modern economies, based on the knowledge and talent of people and citizens more broadly. It also offers unprecedented opportunities to break trends and reach those most at risk of being left behind, and to address the UN's ambitious Sustainable Development Goals, particularly those affecting gender equality and women's empowerment.

Innovation and technology thus emerge as one of the drivers of change, to achieve a world of equality across the board, developing economies based on innovations that promote gender equality, integrating women's needs and vision into innovation. It is not only about facilitating the entry of more women into innovation and entrepreneurship, but also about investing in innovative solutions, especially technology-based and disruptive technologies, which respond to the needs of all women.

Change in industry must be accelerated to remove the obstacles to women's progress in the field of innovation, technology, and entrepreneurship, as the analysis of current trends prevents this equality from being achieved in the medium to long term, with a view to 2030.

In the field of knowledge transfer activities, if we analyse the number of patent applications, women participate in 75.8% of the priority patents applied for by the CSIC (the Spanish patent applicant organisation), but the percentage of female inventors is still lower (35.5%) than that of male inventors (64.5%). By areas, there is only parity in Natural Resources and Agricultural Sciences and in Food Sciences and Technologies. The rest of the scientific fields are male dominated: Physical Sciences and Technologies, with 27.2% female inventors, Chemical Sciences and Technologies with 31.2%, Materials Sciences and Technologies with 35.6% and Biology and Biomedicine with 37.5%.

The percentage of women conducting knowledge transfer activities within the university environment is 37%, while they represent 43.7% of the Teaching and Research Staff (PDI). In contrast, most women are dedicated to innovation support tasks. Women represent 68.3% of the people dedicated to R&TD management. The need to streamline research management and modernise university management instruments could have a much greater impact on women, which would give them more time to participate in competitive projects.

Women Principal Researchers (PRs) continue to be under-represented in universities. Women make up only 33% of PIs, a fact that reveals the structural nature of the problem of gender imbalances in universities in terms of women's leadership capacity. The recent new Organic Law of the University System (LOSU) represents a new opportunity to bring gender balance to the three functions of the university: scientific development, professional training, and cultural extension.

In the spin-off companies created by university teaching and research staff, there has been an improvement over the last three years. The gap in this case has been reduced by 4 percentage points, and women now participate in 38.9% of the teams promoting these business initiatives.

In the CSIC's Technology-Based Companies (TBCs) there is a high participation of women in their creation. Of the 12 EBTs created in 2022, there were women in 10 of them. However, the participation of women in teams promoting technology-based companies remains low, with figures that reflect inequality in this area (35.7%), one point above the average for the 2014-2022 period.

Innovation has the capacity to make society advance, but for innovation to be social and effective, it must reach the entire population. This is why it is urgent to continue with active measures to guarantee effective equality between men and women and the development of innovation with a gender perspective, which promotes equal participation in these sectors, increases female leadership and the active participation of women in innovation and knowledge transfer. This is the only way to ensure that progress does not create new gaps and inequalities in our society, but effectively contributes to their elimination and thus to achieve inclusive and sustainable development.

CHAPTER 3
INNOVATION AGENDA

The new Science Act aims to ensure stable and growing public funding for R&D and innovation, to improve scientific and technical careers, with the introduction of new employment rights and greater stability, and to promote knowledge transfer. But, above all, this reform presents gender equality in the R&D&I system as one of its main pillars, giving, for the first time, legal certainty to gender equality in the R&D&I system, including, among other actions, programmes to promote innovative entrepreneurship among women.

The gender perspective has thus become a transversal axis of the planning instruments of public agents in science, technology, and innovation, which must have gender equality plans and protocols against sexual harassment and harassment based on gender or sexual orientation, and which must be evaluated annually to ensure compliance. In addition, the law reinforces the gender perspective in the content of research and knowledge transfer, promoting gender studies from an inclusive and transversal viewpoint.

Despite all this, the Agencia Estatal de Innovación (State Innovation Agency) (AEI) aid programmes for innovation funding still show a low representation of women. In the call for grants for R&D&I projects for "Proof of Concept" projects, which aims to foster the entrepreneurial and innovative spirit of research teams, women only represent 33.3% of the projects applied for and 33.6% of those awarded. Although their participation has increased in its two years of existence in both applications (28% in 2021) and awards (27.7% in 2021). By scientific area, only in Life Sciences is gender balance achieved, and in Social and Physical Sciences and Engineering there is clear under-representation, with results below 40%. In terms of funding for these projects, the amount women apply for (33.9%) and receive (33.3%) has also increased. This is why the EIG continues to analyse the reasons for this low participation and presence of women and to reverse this situation.

In CDTI´s calls, the main financing agent of Spanish companies for their technological development through innovation grants, women only occupy 26.4% of existing employment in the companies that receive financing, although there is a clear improvement in the employment created (54.7% women), with an increase of 20 points in 2022 compared to the previous year.

Although the gender gap manifests itself with equal intensity in existing employment and in employment created in both SMEs and large companies, the latter have a higher proportion of women among their existing employment (26% are women) and among their employment created (35.8% are women).

Along the same lines as the CDTI are the calls managed by the Ministry of Industry and Tourism. Only 22.6% of employment in companies funded through its calls for proposals for industry in 2022 were women. This under-representation of women in the publicly funded innovation industry persists over time, although it has been reduced by 5 points since 2021. In this case, the presence of women is higher in SMEs than in large companies (26.8% compared to 21.8%).

The situation is different in the call for projects of the Instituto de Salud Carlos III for Technological Development in Health in 2022. Applications submitted by female principal investigators (PIs) account for 35.1% of the total, but for the first time they reach gender balance in the projects awarded, with 43.8%, 15 percentage points more than in 2021. The success rate for women in terms of amount awarded for the period in whole is 16.1%, 2 percentage points lower than that of men (18.1%). In terms of funding requested and received by PIs, women have requested 37.1% of the total amount in 2022, and have obtained 38.3% of the amount granted, the highest percentage in recent years, which is close to gender balance.

The gender gap in participation in publicly funded R&D projects, despite a slight improvement, persists over time, evidencing a structural problem of female under-representation in innovation, especially in key sectors of the economy, such as industry and telecommunications.

There is a clear need to use public policies as a tool to close the gender gap in business, to promote women's empowerment in decision-making and to foster their presence in managerial roles and in STEM areas where they have traditionally been under-represented.

CHAPTER 4

LEADERSHIP AND PARTICIPATION IN DECISION-MAKING

Despite the increase in women's contributions to science in recent decades, this increase has not been equally reflected in the world of innovation, in the generation of new products or processes led by women.

Even today, women entrepreneurs encounter numerous barriers that prevent their full performance in a sector, that of innovation, traditionally led by men. These include, among others, the lack of role models who can function as a driving force for the new generations.

The lack of the mirror effect and the male domination of the investment sector are two obstacles that add to the historical delay that women have had in their full incorporation into the male-dominated business world, where parity with men has not yet been achieved.

The fact is that the data on entrepreneurship in Spain do not show major differences between women and men in recent years. The rate of female entrepreneurship, i.e. the percentage of women who start a business in relation to the female population, has been growing over the last decade to equal the 6% held by men. This makes us the only country in our environment where there is no gender gap in the entrepreneurship rate. France and Germany show a differential of close to 4 percentage points, as do the Nordic countries (Sweden and Norway) and in the case of the United Kingdom this differential in favour of men stands at 4.4 percentage points.

The lack of female role models in the field of entrepreneurship in the innovation sector is an obstacle to the success of women entrepreneurs and the incorporation of young women into STEM careers. In general, the technological level of entrepreneurial initiatives has been increasing, and one in ten is classified as medium or high technology, although the technological vocation of these entrepreneurial initiatives is still exceptionally low. When it comes to innovation, there are no major differences between men and women (73% of men do not innovate compared to 74% of women), so there is no technological gap between businesses started by women and men in 2022. Differences do appear in consolidated companies (more than 3.5 years old): 89% of low-tech companies are led by women and 85% by men, while 15% of high- or medium-tech companies are led by men and 11% by women.

In Spain, the number of executive and management positions has gone from 4.7% to 4.1% in the last decade, and the difference between men and women has been decreasing until it is 1.9 points in 2023 (5% men and 3.1% women). The percentage of women on the boards of IBEX-35 companies is increasing every year: in 2022 there were 35.7% female directors compared to 32.6% in 2021 and 8.8% female chairpersons compared to 5.9% in 2021. This percentage is like the percentage of female presidents of the official Chambers of Commerce, which was 8.6%. However, the gender gap continues in the advisory bodies of the Ministry of Science, Innovation and Universities. In the Science, Technology, and Innovation Advisory Council (CACTI) there has been an increase of 3 points in the percentage of women, which still only reaches 33% in the period 2021-2022, and there is still no female president. In the Council for Science, Technology, and Innovation Policy (CPCTI), the percentage of women has decreased in 2022 to 45%, when in the previous two years there was maximum equality (50%). Moreover, for the first time since 2014, and except for 2017, men are in the majority in the representation of the National Government, and women continue to be less represented than men in the Autonomous Regions.

There is also a clear under-representation of women in the composition of the selection committees in public calls for proposals for grants for innovation projects managed by the CDTI, by the Directorate General for Industry and Small and Medium-sized Enterprises of the Ministry of Industry and Tourism and by the Carlos III Health Institute. Women only account for 20% of the chairs, 12.5% of the vice-chairs and 32.3% of the members.

Even so, the General State Administration is an example where gender equality has been installed in the management and direction of public innovation policies and public intervention programmes aimed at promoting the creation of new products and processes. This is the case of the Ministry of Science, Innovation and Universities, whose portfolio is held by a woman, and whose main lines are headed by women, such as the general secretariat for research, the general secretariat for innovation and the general directorate for planning, coordination, and knowledge transfer, as well as the commissioner of the Cutting-Edge Health PERTE

This should help to promote proactive measures to achieve gender equality and the balanced presence of women and men in all areas and levels of the different institutions that carry out innovation, such as public research bodies or universities, and the transversal integration of the gender perspective in all of them, putting an end to existing biases in all these institutions responsible for the generation of knowledge and its transfer to society, to the daily lives of people and citizens in general terms, favouring women's access to the highest levels in the organisational structure of organisations.

Despite the increase in the presence of women on boards of directors and in the founding of new companies, and the fundamental role of women in economic and social growth through the creation of innovative companies and the commercialisation of high-value products and services, there is still a long way to go to achieve gender equality.

It is essential to foster an inclusive and equitable business environment, where women have equal access to finance and resources for their entrepreneurial initiatives. Spain must face a process of reindustrialisation, the implementation of Industry 4.0, where technology and women must play a decisive role, based fundamentally on open innovation capable of taking advantage of new digital solutions to build a more sustainable economic model.

For this reason, this series of reports includes for the first time the direct opinion of women in the business environment, with the aim of analysing the challenges they face in the world of innovation and entrepreneurship, and their differentiated vision of the future of this sector.

CHAPTER 5

PERCEPTIONS OF WOMEN INNOVATORS AND ENTREPRENEURS

Although we have increased data disaggregated by gender on women's participation in innovation, it is still too little, especially in the business sphere, to really know the situation of women and the role they are achieving in the field of innovation, entrepreneurship, and knowledge transfer. This is especially important if we want to analyse the causes that perpetuate inequalities to eradicate them.

For this reason, this Women and Innovation 2024 Report introduces, for the first time, quantitative and qualitative information through the direct opinion of women in the world of innovation in Spain, in their professional fields, with the aim of finding out first-hand what lies behind the data, and thus making a detailed x-ray of the situations they face every day.

To obtain this information and take a further step forward in our strategy of monitoring, measuring, and understanding gender equality in this field, the following social research techniques have been used: surveys, focus groups and in-depth interviews.

In terms of the demographics of the 248 women surveyed, 46% are aged between 45 and 54 and 27% between 35 and 44, and most of them work as entrepreneurs or are professionals with salaried employees in small companies (49 people or less). They have an important level of education, almost half (49.4%) have a university master's degree, and 31.5% have a university degree or bachelor's degree, mostly in the areas of business administration and law, with 38.3%, followed by engineering, industry, and construction, with 19.8%. More than 80% of them are currently working in activities related to their studies, and most of them belong to the sector of professional, scientific, and technical activities (38.3%), followed by information and communications (16.9%). It should also be noted that 93.2% of them lead a team/project or hold a management or supervisory position.

In addition to these general data, the women surveyed were asked questions on five major thematic blocks: Innovative process, Entrepreneurial process, Working conditions, Equality policies and Perception of equality conditions.

Regarding the innovation process, most of the women surveyed (63.3%) consider themselves capable of both planning innovative ideas and turning them into reality. Among the main difficulties they encounter when innovating is access to financing (49.6%) and finding qualified professional staff (41.1%). The skills they consider most important for innovation are leadership, teamwork, and creativity, with resilience, critical thinking, organisation and, finally, adaptability at the bottom of the list.

From the responses in the block on the entrepreneurial process, more than half (58.2%) have started and created their own business. As for the reasons they give for starting their own business (regardless of whether they have done so or not), 64.5% do so to have a positive impact on their environment, 51.6% for personal self-fulfilment and 48.4% for greater autonomy and creative independence. As barriers, uncertainty (55.2%) and difficulties in obtaining funding (49.6%) stand out. Perhaps because almost half (46%) have had to resort to private investment and family support to obtain funding and only 18.1% obtained it from public funding and 13.3% from bank loans.

As regards their perception of the conditions for equality, 60% consider that the measures taken in their institution to ensure equality are sufficient, although almost 67% of women consider that motherhood does not affect women's careers in the same way as men and 65% agree that motherhood can slow down their careers. Furthermore, only 34.2% consider that women occupy leadership positions commensurate with their abilities and 33.7% that the most prestigious tasks are shared equally. This difference between the situation they live in, and the perception of the measures denotes a certain learned helplessness and that they have internalised that they must go through this situation.

The results of the discussion groups show that we have extraordinary women in all fields of work and that, despite the differences between the sectors in which they work, they share similar problems and visions of innovation.

Their definition of innovation is quite different from the traditional definition, and in all the groups, the need for innovation to bring value to society was highlighted. Something that is also highlighted when asked about the interests that have moved them and still move them to innovate, and that is that they want to contribute to and improve society. In many cases as a response to the impossibility of doing so from research and from the university.

Another common element detected is that women tend to look to close references, even if they are not from the areas of R&D&I, such as professors, colleagues, or family members,

because female role models in the scientific or business world are very scarce, they are not visible.

In terms of challenges, the fact common to all groups that they quickly associate challenges with barriers stands out. In addition, initially the generalised response is that they have not suffered different obstacles because they are women. However, they end up detailing the persistence of problems of work-life balance, mains planning, gender discrimination and sexual and gender-based harassment. They share the view that innovation is still built on male parameters and that there needs to be a change in the model.

Regarding future trends in innovation, there is a widespread view of the importance of sustainability in innovation and of having people at the centre of the process and as the goal. In addition, education is seen as an opportunity to sow an inclusive mentality in general and to promote the use of modern technologies.

Regarding the interviews, it is worth highlighting the diversity of profiles of women who are currently working in the field of innovation. The passion that all the participants convey for their respective jobs is enormous. Passion that it is essential to transmit to young people, who have an innate interest in creating and inventing (especially them), to help eliminate persistent stereotypes in our society and move towards a fairer and more egalitarian society for all. This path is that of knowledge transfer for social innovation to put an end to inequalities.

CONCLUSIONS

Policies to promote effective gender equality in R&D&I in Spain are a benchmark in the European Union. Supporting the necessary structural change in institutions, companies, and entities in the field of Science, Technology and Innovation towards effective gender equality is a commitment of the Observatory of Women, Science and Innovation and the Ministry of Science, Innovation and Universities itself.

Progress on this path towards equality is only possible if it is done by defining policies based on scientific evidence, with reports such as this one, which monitor the situation and the level of compliance with equality policies and measures in the science, technology, and innovation system. And, although there is still some way to go, the changes that these policies are generating in the advance towards science and innovation with a gender perspective that has an impact on social improvement in our country are unquestionable. This is evidenced by the data and conclusions gathered in this report and which will continue to be worked on through successive editions of the Women and Innovation series of the Women, Science, and Innovation Observatory.