Women in software firms in Argentina: what do we know and what should we know?

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ABSTRACT

This article focuses on the labor environment of firms in the Software and Information Technology industry sector (SIS) in Argentina, specifically the participation of women in this sector. Based on the verification of the low participation of women in this type of activities at a global and local level, this text offers a literature review on the possible barriers faced by women who work in IT (briefly, activities related to software production) in these firms. Specifically, we systematize the existence of barriers in four dimensions: i. Recruitment; ii. Evaluation; iii. Promotion, and iv. Work dynamics. The main findings are related to barriers at the level of practices in these firms, in terms of the circulation of stereotypes but also in working, spatial and organizational conditions. In turn, we identified a relevant lack of literary coverage on the rules that govern these firms in each analytical dimension.

KEYWORDS

women; work; information technology; barriers; Argentina; software development

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INTRODUCTION

The low presence of women in information technology-related (IT) work activities is both a global (OECD, 2018; Ashcraft, McLain & Eger, 2016) and a local phenomenon (Basco & Lavena, 2019; CEPAL, 2014). These activities, with their intensive use of digital technologies, are prototypical of the current capitalist economy. We define IT work activities as a particular subset of "informational work" (Zukerfeld, 2013): that is, their main means of production are digital technologies (e.g. a computer) and its main output is digital information. Here we focus most specifically on those activities related to software production (development, production, supply, and maintenance of software). Although these activities are carried out in all sectors of the economy, they are concentrated in the software and IT industry sector (SIS).

Globally, it is estimated that women account for only 27% of employment and less than 20% of leadership roles in SIS (OECD, 2018).[1] In the United States, for example, women constituted barely 25% of all "occupations in computing" in 2015 (Ashcraft, McLain & Eger, 2016); in Great Britain, only one in six IT workers was female in 2017 (Kenny & Donnelly, 2020).

In Argentina, although in the origins of IT work activities (in the 1970s) women were included, the subsequent technological take-off and development of this industry has been marked by masculinization. At present, the proportion of women reaches 30% of the total employment in SIS and even lower proportions in software development activities specifically - the most relevant within the sector in terms of the total number of employees (CESSI[2], 2018; OPSSI[3], 2020). In this sense, the Argentinian case is of special relevance as it holds one of the lowest female activity rates in Latin America and The Caribbean (MTEySS, 2018, p. 5). The SIS in particular has experienced the greatest relative growth in employment during the last twenty years (Rabosto & Zukerfeld, 2019), and the workforce supply has been deemed insufficient (OPSSI, 2019; CEPAL, 2014).

In this context, the literature has made important contributions to understand those factors that drive women away from digital technologies and interest in IT work activities in particular. However, the factors that hold women back from joining and remaining in this sector have been less explored.

Considering this, the aim of this article is to systematize the contributions and limitations of the literature that characterizes the work conditions for women in software firms in Argentina. The question leading this review is the following: which barriers do women face in IT work activities in these firms?

By barriers we mean those elements that relegate women from participation in certain areas and activities in the division of labor (horizontal segregation), or from access to positions of power or prestige (vertical segregation) often referred to using a range of metaphors such as "glass ceiling", "sticky floors", "broken ladders" or "leaky pipelines" (Basco & Lavena, 2019; Vitores & Gil-Juárez, 2015). According

to other studies (Ashcraft, McLain & Eger, 2016; CEPAL, 2014), it is worth taking into account two kinds of barriers: those which are *normative in nature* (also called "systemic" or "institutional" – e.g., observed in policies, rules, or laws that, by act or omission, represent hurdles for women), as well as those "subtle barriers", "micro inequalities", or "gender biases" that circulate in daily labor interactions, and which we understand to be *practical in nature*. While the former are encoded in documents and other written sources, the latter can only be identified through observation and interviews with the actors involved. From our perspective, this distinction is relevant, since it implies different possibilities of accessing, studying, modifying, regulating, and intervening into these barriers.

Specifically, we examine these barriers in four analytical dimensions: i. Recruitment; ii. Evaluation; iii. Promotion, and iv. Work dynamics. These dimensions were defined and selected with the aim of fully covering workers' trajectories in firms and to enable future comparison with trajectories of women in other sectors of activity.[4] Recruitment refers to the processes whereby firms guide their search, admit and incorporate prospective employees. Evaluation refers to the processes whereby firms determine their employees' performance. Based on evaluation, promotion refers to the processes that determine progression into higher levels or positions (called "seniority" in SIS). Finally, work dynamics refers to the set of values, behaviors, and formal and informal relations that take place in the workspace in daily work activities.

In order to achieve the above-mentioned aim, we reviewed literature that empirically addresses labor conditions in Argentinian software firms that accounts for: i. the mechanisms that operate in the four proposed analytical dimensions, and ii. Specifically, the gender issue in these dimensions.

The literature was organized around the four above-mentioned dimensions of analysis, identifying possible normative and practical barriers in each of them. This review was complemented with secondary sources regarding the current situation of the participation of women in the SIS sector in Argentina in quantitative terms.

The ultimate goal is to contribute to an understanding of the factors that keep women away from IT work activities focusing on the barriers related to their inclusion, permanence and progress in SIS, and to detect potential literature gaps, identifying, thus, what we do not know about these factors and work conditions. The text is organized as follows. First, this introduction was intended to offer an overview of the low presence of women in IT activities in quantitative terms in the international and national context, giving an account of the problem that this text addresses. Likewise, we specify the objectives of the text and offer conceptual definitions necessary for its approach (mainly "IT activities" and "barriers"). The second section presents the international background focusing on those delving into the factors that make it difficult for women to enter and remain in SIS. The third section characterizes the SIS in Argentina. It also presents a quantitative overview of the situation of women's participation in Argentinian SIS, disaggregating this data according to hierarchy and types of tasks, among others. Next sections describe barriers that are present in recruitment, evaluation and promotion processes, as well as in the labor dynamics in software firms. Finally, we present

the conclusions, highlighting the main findings and identifying lack of information and future lines for each dimension of analysis.

INTERNATIONAL BACKGROUND
Over the last few years, the literature has been trying to identify the factors that drive women away from IT activities. A first set of studies, which constitutes the vast majority, has focused on the trajectories of women prior to the time of admission to work, highlighting different factors in their educational trajectories that drive women away from the IT world (Yansen, 2020).

A second set of studies has delved into those factors that hinder the admission and permanence of women in IT occupations, focusing on the hindrances faced by women willing to enter or already working at software firms.

In the United States, for example, quantitative and qualitative studies of women working in IT activities in the private sector, show that most women claim to "love their work" but, at the same time, 56% of them leave their work in the middle of their career (after a period between 10 and 20 years). These attrition rates are greater than those in sciences and other engineering areas, and also greater than those measured among men (Ashcraft, McLain & Eger, 2016, p. 9).

The vast majority of those (50%) who leave their job go to other sectors to perform similar tasks, while a high percentage (30%) change their occupation for one that is "not linked to STEM", either within the same firm or in other firms. This is motivated by working conditions and environment, insufficient access to creative roles, and the feeling that their career is "stuck" (Ashcraft, McLain & Eger, 2016, p. 14). Similarly, a survey conducted among software developers in different countries found that while salary is the first variable to be considered by male developers deciding over a job offer, female developers decide on job offers based on the prospective work environment and culture (Stack Overflow, 2018). In Costa Rica, a study carried out by the chamber of software firms (Flórez-Estrada, 2007) points out that more than half of their personnel considered that there was "disadvantageous" treatment towards women in terms of hiring possibilities, type of tasks assigned, wages, and opportunities for promotion (p. 17).

Complementing these data with qualitative sources, these and other studies – Kenny & Donnelly (2020) in Great Britain; Tokbaeva & Achtenhagen (2021) and Boivie (2010) in Sweden; Bury (2011) in Canada, Great Britain and the United States - coincide in pointing out gender biases and barriers in firms that emerge in different dimensions of work. The recruiting process relies on the use of male language (pronouns and male descriptors) in job advertisements and interviews, the reproduction of the *status quo* (hiring men referred by other male employees), or the absence of women in recruiting teams, among other issues. These studies also highlight hurdles related to evaluation and promotion opportunities, such as lack of female mentors and networking of belonging, and experiencing greater work demands than their male peers. Issues such as underestimation of women's skills and a differential valuation or estimation of IT-related skills based on gender are also highlighted in these studies. When describing workers, among male workers, experience in project management, technical training, and reading skills, all traits considered appropriate for programming, are valued. They are also described as

having little socialization skills, untidiness, carelessness in their personal appearance, all features that are not important for programming. Among women, skills related to communication and tidiness stand out, which are deemed important for other areas (Flórez-Estrada, 2007, p. 107). Studies have also highlighted a number of difficulties experienced by women in IT work upon examining the labor environment or culture (which we refer to as "work dynamics"). These difficulties include integrating into a masculinized environment, difficulties in getting interesting tasks assigned to them, the need to overwork in order to gain visibility, firms' expectations of long working hours or overtime at home, and difficulties in balancing work and domestic life. In relation to the symbolic construction of these environments, these studies emphasize that programming is linked to features historically attributed to males, such as having "building" abilities, "a fully logic, abstract and unemotional thinking" (Bury, 2011), or the idea according to which "being a computer specialist" entails "an interest and commitment" to programming for life or "being a programming addict" (Boivie, 2010).

In sum, the literature identifies a series of barriers to the performance of female workers in IT throughout the four analytical dimensions we proposed above. However, knowledge of the situation in Argentina is still scarce[5] and, above all, dispersed[6].

What then do we know about the dynamics that hinder the presence and permanence of IT female workers in Argentinian software firms? More specifically, which barriers, whether normative or practical in nature, have been identified in the literature in relation to recruitment, evaluation, promotion processes, and work dynamics?

The next section characterizes the SIS in Argentina and presents a quantitative overview of the situation of women's participation.

THE ARGENTINIAN SIS SECTOR AND WOMEN'S PARTICIPATION IN IT
The Argentine software and IT services sector comprises organizations that produce, process, provide, maintain, and give support on software, databases and computing systems in general. Most Argentinian firms are specifically engaged in IT consultancy and software supply (OPSSI, 2019, p.8; Artana et al., 2018, p. 28) and are located primarily in the Metropolitan Area of Buenos Aires (López & Ramos, 2018, p. 4-6).

Beyond its qualitative importance, this sector is relevant in terms of amounts of employment and product generation in the Argentine context (López and Ramos, 2018). Although this is a relatively new sector, it has had an upward and steady growth, being "the area of greatest relative growth of employment" since the end of the so-called convertibility era in 2002 (Rabosto & Zukerfeld, 2019, p. 3). Even when approximately 70% of the firms in the sector are micro-enterprises, 80% of the employment is distributed in a relatively homogeneous way among small, medium, and large firms (OEDE, 2017; OPSSI, 2019). Workers are highly qualified (Artana et al., 2018), trained in IT and computing sciences and the like. However, it is unclear whether qualifications are especially valued, or whether formal education is the only relevant skill resource for workers (Rabosto & Zukerfeld, 2019; Dughera, Yansen & Zukerfeld, 2012).

Also, within SIS, work is mostly formal and registered, and, although wages are not necessarily trending upward, these remain above the average of registered workers in the private sector (Artana et al., 2018; Rabosto & Zukerfeld, 2019).

The participation of women in IT activities can be analyzed both from an occupational and from a sectorial perspective. In occupational terms (which exceeds the SIS) the most recent data show that in 2019 the rate of private registered female employment in IT activities at a national level was 31.3% (a proportion that remains practically unchanged since 1996) (OEDE, 2020).[7] In sectorial terms only 30% of employees in SSI were women in 2020 (OPSSI, 2020). Although there has been an increase (compared to 26% identified in 2018) (OPSSI, 2018), it is clear that the participation of women is still overwhelmingly lower.

Software production processes are characterized by their flexible and networked organization, with teams being the main organizational unit (Roitter, Erbes & Miglio, 2018; Dughera, Yansen & Zukerfeld, 2012). Production processes can be further divided into four different areas[8]: three of them involve workers with IT knowledge and one does not.

Table 1: SIS activity areas, size of areas according to number of employees, and percentage of women participation by area.

SIS activity area	Share of employment over total SIS	Percentage of female workers employed by area in the SIS
Software development	58%	21%
Functional analysis and quality	22%	30%
Technological infrastructure	9%	9%
Others (non tech)	11%	59%

Source: Analysis based on OPSSI, 2018.

Software development, where software is coded, constitutes the main employment area with 58% of the total employment in the SIS sector. This is followed by the functional analysis and quality area, which admits workers with programming skills who do not necessarily code software as part of their daily tasks and constitutes 22% of the total employment in the sector. Thus, while in the former mainly technical skills are required (e.g. programming languages), the latter requires combining technical knowledge with certain attitudinal skills specific for each job position (e.g. rapport with clients or negotiation skills) (Borello et al., 2005). This

distinction proves to be relevant since software development per se is the activity with the lowest proportion of women. Altogether, these are the two areas most closely linked to software production. Knowledge of frameworks for work management that relies on international certification, (e.g. Scrum or DevOps) and a good command of the English language are added to programming knowledge, particularly in large firms. The area of technological infrastructure, which requires IT knowledge in maintenance, networks, and IT security, but not necessarily in software development, constitutes, in turn, 9% of employment in the sector. The remaining 11% corresponds to non-technological occupations (OPSSI, 2018).

As can be noticed in Table 1, unequal distribution of men and women along these areas shows horizontal segregation at work. In 2018, only 21% of workers in software development and 30% in functional analysis or quality were female (OPSSI, 2018). Conversely, women account for more than half (59%) of all workers employed in non-technological occupations within the SIS sector.

Additionally, a study carried out by CEPAL (2014) in 4 Latin American countries including Argentina shows the distribution of women in SIS firms, combining the activity areas with the weight of the so-called "hard" and "soft skills" that predominate in each. This study stresses that women join work areas that require soft skills (e.g. rapport with clients, communication skills, empathy, or management of interpersonal relations) such as non-technological areas and, to some extent, also functional and quality (CEPAL, 2014, p. 24).

Despite enjoying high wages and formal employment, the SIS sector is also characterized by a high turnover rate (Beech, Artopoulos,& Davidziuk, 2008) and low union representation (Rabosto & Zukerfeld, 2017). These features entail a dynamic of individual negotiations on salary levels and overall working benefits and conditions (Krepki, 2020).

A second type of segregation stems from the gender pay gap or "wage gap", which refers to the difference between the average gross wage of men and women over the same period (OEDE, 2020). Measured for the registered private employment in IT activities from recent OEDE data, the gap was 20% in 2019 (OEDE, 2020). The International Labor Organization (ILO), on the other hand, reported a wage gap of 9% in Argentina (against 21% at a global level), measured in this case among "Information and communication" economic activities (ILO, 2019). In both cases, however, the data exceed (differently) the SIS and, as they are average values, they do not account for the wage difference between men and women in equivalent activities.

Both horizontal segregation and the gender pay gap combine with a third kind of segregation: that is, vertical segregation (Basco & Lavena, 2019). In software firms, the hierarchy ladder is built upon the so-called "seniority" levels for each job position, which distinguishes between trainee or intern, junior, semi-senior and senior (CESSI, 2016). While some job positions such as developer may include employees in various seniority levels; others such as project manager can only be accessed by the top seniority levels. According to OPSSI (2018) data, only 23% of senior workers in SIS were women. The same percentage was found among semi-seniors, rising to 34% in the case of juniors. In turn, 68% of firms in the sector were fully managed by men and did not include women in their board of directors.

BARRIERS FACING WOMEN IN THE SIS SECTOR: RECRUITMENT, EVALUATION, PROMOTION AND WORK DYNAMICS

We can now provide an outline of the potential barriers facing women in recruitment, evaluation, promotion, and work processes in software firms.

We provide here a summary of them for each dimension.

Table 2: Summary of the barriers for women in the recruitment, evaluation, promotion and work dynamics processes in software firms

Dimension	Potential barriers
Recruitment	• Absence of gender parity rules or laws until 2020 • Exclusionary language used in recruitment ads and job descriptions • Association between "technical" and "masculine" versus association between communication and interpersonal management and the "feminine" • Pregnancy and maternity discrimination: association between the "feminine" and "personal problems" which are linked with maternity • Male applicants preferred over female applicants for male-dominated areas
Evaluation	• Individual and non-socialized basis of performance reviews • Human resources control software coded by men • Association between maternity and loss of productivity • Association between women and greater absenteeism
Promotion	• Individual dynamics and "personal negotiation" • Men preferred for intermediate and high-level positions • Association between high-level positions, negotiation skills, big picture thinking and the masculine • Importance of time availability and flexibility hardly compatible with family or domestic care

Work dynamics	● Argentinian law stipulates care rights mainly for women
	● Complicated balance between flexibility demands and changing workflows, on the one hand, and domestic duties on the other
	● Male code of practice – need for "adaptation strategies"
	● Symbolic prestige associated with the area of software development (masculinized)
	● Traditionally masculine recreational workspaces
	● Unequal distribution of work responsibilities

Source: Author's analysis

Barriers in the recruitment process

The recruitment process varies among large and small firms. In large companies, which deploy the recruitment process in a more standardized and complex way, it includes a series of interviews, a psycho-technical test, and, sometimes, an English test. For tasks in the software development area, logical thinking or specific programming languages tests are included. Even so, recruiters claim that they have become less demanding in relation to the technical skills of applicants, and instead begin training employees once the hiring process is complete (Beech, Artopoulos & Davidziuk, 2008, p. 23-24). Conversely, they highlight possessing certain "soft skills" as desirable and, sometimes, readiness for work from a location different from the production unit (ibid, p. 21-35). While each company has its own rules on these processes, we were unable to find any study presenting a systematic overview with the main features of these processes. A general regulation to which the firms will have to comply with in order to access tax exemptions is the Knowledge-Economy Promotional Regime Law, passed in 2019 and modified in 2020, according to which they must include on their payroll a pre-determined percentage of women. However, at the time of writing the norm was still not in full effect.

The way in which firms guide their search for employees has been analyzed by Méndez and Aguilera (2018), who collected words that appear in IT job advertisements in the main portals in Argentina and found all of them to refer to the male gender. The same is observed in a systematic review of occupational profiles in the industry offered by CESSI.

Other barriers facing women appear in recruiters' ideas and representations. The literature has collected such ideas directly either from recruiters (Yansen & Zukerfeld, 2014; Faur & Zamberlin, 2008, Castillo et al., 2008) or through womens' testimonies (Basco & Lavena, 2019). In these studies, associations between male and "technical" skills, on the one hand, and, female and emotional, interpersonal and communication skills, on the other, emerge from the recruiters' discourse.

These ideas and representations combine with other ideas about gender that apply to all job positions. For example, recruiters suggest that the presence of a woman may result in discomfort in a masculinized space (sometimes referring to her own discomfort, and sometimes to the discomfort caused in men) (Yansen & Zukerfeld, 2014). Recruiters also link the feminine with what they refer to as "the presence of personal problems" at work (Yansen & Zukerfeld, 2014, p. 321). These problems are explicitly linked to maternity (Basco & Lavena, 2019, p. 63) and are part of the information that female workers are expected to disclose at job interviews (e.g. whether they have children, family members to look after, etc.) (Faur & Zamberlin, 2008, p. 110). Thus, even when employers state that they do not find differences in either gender regarding work performance or qualification levels at the time of admission, they point out that they prefer to hire men in areas of masculine predominance and women in areas of feminine predominance (Castillo et al., 2008, p 54).

Barriers in evaluation and promotion

In smaller firms, evaluation and promotion mechanisms are informal and poorly standardized, which makes them opaque and more prone to managers' subjective judgment. While in larger firms these processes are based on employee's performance stats and rely on more standardized procedures, they still depend on interpersonal input such as aptitude tests, or interviews with Human Resources managers.

The evaluation mechanisms, in general terms, are "flexible", with evaluation efforts geared towards projects or goals, rather than working hours per se (Zukerfeld, 2013; Dughera, Yansen & Zukerfeld, 2012). Control mechanisms prevail over disciplinary mechanisms focused on physical or in-person surveillance of workers. Larger firms rely on team evaluation to some extent, but most are individual in nature (Díaz Balmaceda et al., 2012; Krepki, 2020). For this purpose, firms utilize specialized software to register performance (e.g., working hours, meeting deadlines, completed training) and attitudinal matters, such as collaborating with other colleagues, teamwork, "creativity", problem-oriented mindset, etc. Some of these evaluation items and criteria appear in the so-called "induction manuals" and "codes of practice" (Díaz Balmaceda et al., 2012). Others, as we already mentioned, stem from software coded by men, which does not necessarily cause gender bias, neither prevents it extensively, excluding women from coding those software that affect their own work life (Sanz, 2016; Palermo et al. 2020).

In sum, evaluation processes in larger companies are comprehensive: they include "collective, individual, technical and affective-behavioral demands", and, despite a rhetoric of collaborative work, it is individualistic in nature (Krepki, 2020).

The evaluation process determines promotions along the hierarchy ladder but also annual salary rises of individual employees. Krepki (2020) points out that it is not usual to disclose or socialize evaluation results to other employees, and that both these results and salary are "taboo" topics in this type of firm. With union representation being virtually non-existent, these features in evaluation and promotion processes enable more opportunities for discretion.
Recruiters in these firms have expressed that there are no gender differences in evaluation and, specifically, that women are even more reliable, disciplined, more

committed to work and more interested in being trained" (Castillo et al., 2008, p. 52). However, 40% of respondents also agreed on the idea that productivity loss could be attributed to maternity leave, and 22% agreed on the idea that women report the greatest amount of absenteeism.

Similarly, promotion is described as a result of "having career opportunities" in the company that has to be driven and "negotiated" by workers themselves (Díaz Balmaceda et al., 2012; Krepki, 2020).

The recruiters claim that gender has proven unimportant when it comes to accessing different positions in the ladder. However, between 10% and 20% of them expressed a preference for men to fill intermediate positions and positions in management (Castillo et al., 2008: 60).

Furthermore, certain variables are especially taken into account in order to access high-level positions. On the one hand, those variables related to "soft skills" which, for these positions, refer to leadership skills and overall perspective (with less attention to detail), and are usually associated to the male gender (CEPAL, 2014; Faur & Zamberlin, 2008; Castillo et al., 2008). On the other hand, being available to travel or to undertake long and unplanned working shifts, which, as Castillo et al. point out (2008), are hardly compatible with family caregiving. In this regard, a report issued by the United Nation's Economic Commission for Latin America (CEPAL, 2014: 29-30) has claimed that the tension between work and personal life tends to increase in high-level positions, and, in practice, maternity leaves or shorter working hours undermine promotion opportunities.

Barriers in work dynamics
One of the main aspects of work dynamics highlighted in the literature is the issue of work-life balance (Rodríguez, Dabos & Rivero, 2018; CEPAL, 2014; Faur & Zamberlin, 2008; Castillo et al., 2008). This is an issue that in software firms presents greater complexity than in other work environments due to their flexible organization and frequent combination between on-site and remote work.
In terms of legislation, in Argentina, the law stipulates care rights mainly for women. For instance, paternity leave entitlement is only two days, and the presence of child care services at work depends on the total number of women employed by each firm (Sienra, 2020).[9]

Software firms comply with maternity leaves, breastfeeding time, and shorter working hours during the first months of maternity (Rodríguez, Dabos & Rivero, 2018; CEPAL, 2014; Faur & Zamberlin, 2008), although some barriers make work-life balance difficult in practice. Firstly, exercising these rights has consequences for labor practice a posteriori, imposing the need of self-demand in order to return to work. According to female workers, the dynamic nature of the software production processes demands a lot of effort because it requires them to be up-to-date (CEPAL, 2014). Secondly, shorter working hours usually come with remote work, where actual schedules do not usually take into account/coincide with assigned/planned schedules. Thirdly, family and care issues exceeding these basic labor rights (e.g., authorizations to assist family members, attend school meetings,

etc.) need to be negotiated on an individual and informal basis between the female workers and their line managers, which are in turn term deemed as special "favors" (Rodríguez, Dabos & Rivero, 2018; CEPAL, 2014).

In this regard, it is worth highlighting the new Teleworking Law, passed in 2020 in the context of COVID-19 pandemic, which states that "those who work under this modality and demonstrate they take care of, in a single or shared manner, people under thirteen (13) years old (…) living in the same household or requiring special care, shall have the right to working hours compatible with the caregiving tasks under their charge and/or to interrupt the working hours". The CESSI has already objected to this law, claiming that it is a "privilege" that on-site workers do not have (CESSI, 2020).

The second aspect highlighted by the literature refers to a male coexistence "code" in the workspace, a code that reproduces gender stereotypes and hinders women's work and non-work-related activities (Basco & Lavena, 2019; CEPAL, 2014). In addition, the software area, overwhelmingly masculinized, is endowed with more power and prestige than other areas (Faur & Zamberlin, 2008; Flórez-Estrada, 2007). The spatial design of workplaces operates in line with this. In software firms in general, and in larger ones in particular, masculinity is associated with an "infantilized youth" (Palermo, 2018) whereby workspaces must "pamper" "talented young people" (developers) with arcades or gyms, traditionally male spaces. Women thus face the additional challenge of adaptive "strategies of masculinization" (Basco & Lavena, 2019) with the aim of integrating into daily work life.

Finally, the literature references an overall tendency to unequally distribute work responsibilities, to question the technical skills of female workers, and to request women to carry out tasks not related to their job requirements (e.g. planning events, celebrations, etc.) (Basco & Lavena, 2019). Even in those areas where female workers are allegedly more valued, such as those that imply interaction with clients, women refer to "resistance and conflicts in their interaction" with men: clients would value their ability to understand their demands but would cast doubt on their planning skills and ability to successfully carry business deals through (CEPAL, 2014, p. 26). This is worth highlighting as it indicates that the barriers to women's career development are not limited to the programming area and, therefore, are not based solely on the above-mentioned association between the masculine and the "technical" realm.

CONCLUSIONS
In this paper we have explored the participation of women in software firms in Argentina. We have shown the low participation levels of women in the SIS sector and some other relevant variables such as the unequal distribution per activity area, hierarchy, and income. In this regard, it is worth emphasizing at least two gaps in literature coverage. On the one hand, the absence of disaggregated data per firm size. On the other hand, the absence of disaggregated data on income that would consider the existing salary gap in equivalent activities and positions.

Specifically, we attempted to systematically identify the contributions and limitations of existing analyses of the barriers and challenges facing women in software firms. For this purpose, we focused on four analytical dimensions: recruitment, evaluation, promotion and work dynamics. Both analysts and stakeholders in SIS have been paying attention to the lack of women in these firms for the past few years. However, the spotlight has been on those factors that drive women away from these activities prior to their admission to the labor market, leaving aside other studies that account for the barriers and obstacles facing women who are willing to work or already working in SIS.

A first general conclusion regarding these studies is that, despite being scarce, they provide a valuable account of existing stereotypes and practices that operate as barriers in terms of both the horizontal and vertical segregation of women. However, the task becomes much more challenging if the aim is to specifically determine the factors that have an influence on each dimension.

These findings are mixed and, in some cases, they only offer working hypotheses for further scrutiny. Regarding recruitment, there is significant empirical evidence that highlights stereotyped associations between the masculine realm and IT activities - particularly programming, as well as certain preference for male applicants when recruiting employees for masculinized areas. However, little information exists regarding other important aspects of the recruitment process: do women participate in its different processes? Are the interview guidelines (required information, performance expected for each position, etc.) tailored exclusively for a male audience? What language styles are used in interviews? Are women informed about the work conditions that they usually value the most when deciding on a job offer at software firms?

Regarding evaluation and promotion, we have seen that it may be more difficult for women to balance demands of intermediate and high-level positions with domestic life, and this is normally taken into account by recruiters. But little is known about the company policies and actual conditions from which these difficulties arise. Also, there are no accounts of specific gender biases in individual evaluations nor in the software used to collect work performance stats. In this regard, the individualistic and secret nature of the evaluation and promotion process, its impact on the rise in the hierarchy ladder and wage, put the purported transparency of labor standards into question, leaving more room for arbitrariness. Together with the absence of collective, formally established channels for discussion and the absence of union representation, gaining knowledge of these mechanisms becomes more pressing.

As regards to work dynamics, we identified male coexistence codes, to which women have to adapt. Spatial design also tends to offer leisure spaces with traditionally male activities. In this regard, it would be important to examine to what extent they are attractive to women. On the other hand, it is unknown whether spaces devoted to alleviating the demands of work-life balance are available.

Moreover, it is known that women face difficulties accessing programming areas (also considered an area of prestige), partly because of a differential association and assessment of their technical skills. However, there is uncertainty regarding the barriers facing women who do undertake programming tasks (in spite of being

fewer). Thus, although the accounts indicate that these tasks are not distributed equally, more specific questions about software development activities remain: what type of tasks is each gender assigned? Is there any relation between the level of technical complexity of tasks (e.g., type of languages or tools required) and their being assigned to each gender? How do firms assign projects to women or men with different qualitative importance? In this regard, it would be important, on the one hand, to know how work is distributed within the software development area and, on the other hand, to gain a more clear understanding of the careers of women who have worked in this area and then moved to other areas, as well as the careers of those women who wanted to be admitted or wanted to move from other areas into software development.

Finally, most of the barriers identified in the literature and described throughout the text are practical in nature. This means that there is a lack of literature coverage on the rules that govern IT firms regarding each analytical dimension. In this sense, we would like to point out the importance of conducting future research that delves not only into the workspace dynamics and the tacit codes and representations of their members, but also into the regulations, internal documents, procedure manuals, and internal systems that govern these activities. In this regard, it is worth including in these studies firms of different sizes, with the aim of providing a comprehensive overview of the work conditions in the SIS sector.

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ENDNOTES

[1] Up-to-date data sources on the situation of women in the SIS and IT activities specifically are scarce. The most up-to-date data mixes various activities into the same set (e.g. "STEM" or Information and communication Technology (ICT)-related activities). Whenever possible, we chose specific over up-to-date data.

[2] Business chamber of Software industry, CESSI, for its acronym in Spanish.

[3] Permanent observatory of Software industry, OPSSI, for its acronym in Spanish.

[4] Although seldom considered together or defined using the same terminology, these dimensions are often analyzed by authors studying scientific and technological trajectories (e.g. Ashcraft, McLain & Eger, 2016 for IT activities; but also in Argentina, Franchi et. al. 2016 and Nocetti, Palioff Nosal & Della Torre, 2018, for scientific activities).

[5] Similar to what happens with the international background, the vast majority of studies in Argentina have focused on the trajectories of women prior to entering the workplace. Indeed, the greatest efforts of the actors involved (the Chamber of Software firms, the Sadosky Foundation, firms in this sector and different non-profit associations related, such as the Club de Chicas Programadoras and Chicas en Tecnología- Medallia (2018) were aimed at attracting and training young women in these activities.

[6] Even if they make valuable contributions, some limitations in these studies should be pointed out. For example, Castillo et al. (2008) and Faur & Zamberlin (2008) studies on female participation in IT work take into account companies dedicated to other activities, so data from software firms specifically proves to be scarce. Another study carried out by CEPAL (2014) focused on promotion and the presence of women in top management

positions in Latin America entails similar limitations. A recent exception might be Basco & Lavena's (2019) analysis of barriers for women in STEM "with a focus on programming". However, their study is beyond the SIS scope.

[7] It refers to the relation between the number of female workers and the total workers. The total female rate of private registered employment is 32.1%.

[8] This classification is based on OPSSI (2018, 2016) and is mostly consistent with others previous classifications (Míguez & Lima, 2016; CEPAL, 2014; Castillo et al., 2008). (See https://cessi.org.ar/perfilesit, CESSI, 2016).

[9] In Argentina, there is an historical unequal distribution of care tasks by gender, and women take on most responsibility involving family and home, a phenomenon that has been deepened during the COVID-19 pandemic (CEPAL, 2020; Cosacov; 2022).

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