Career resilience of female professionals in the male-dominated IT industry in Sweden: Toward a process perspective

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Abstract

Sweden is known to be one of the most gender-equal societies in the world. Thus, it remains as an enigma why a large discrepancy continues to exist regarding the gender balance in career choice and progression in many professions. Drawing on Hirdman’s (1988) theory of gendered systems, in this paper, we explore the role of career resilience in the career progression of women who choose to work in the male-dominated IT sector. We draw attention to how the day-to-day process of practicing career resilience in a gendered workplace tends to evolve as women progress in their careers. Based on an interview study with 50 female IT professionals as well as a discourse analysis of 502 newspaper articles on women in this sector, we develop a process model of career resilience in gendered professions, outlining different coping strategies that allow women to develop and enhance such resilience over time. We conclude the paper by providing some practical recommendations.

Keywords

career development, career resilience, female programmer, IT, public discourse, Sweden, Yvonne Hirdman

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INTRODUCTION

In international rankings, Sweden typically is listed as one of the most gender-equal societies in the world (e.g., WEF, 2012). This top score is the result of a long commitment by the country’s government to promote gender equality, which has led to open discrimination against women being largely eradicated. Thus, it is somewhat surprising that the Swedish labor market continues to be highly gendered. This paper attempts to explore this apparent paradox by drawing attention to the importance of women’s career resilience for progressing in male-dominated professions.

As open discrimination in Sweden has been largely eliminated, it is evident that more subtle hidden dynamics must be at play that restrict women in their career choices and progression. Despite 86% of girls at the end of elementary school stating that they are interested in technology-oriented subjects (Swedish School Inspectorate, 2014), women end up highly underrepresented in tech-oriented higher education and professional careers—representing only 20% of the workforce in IT (SCB, 2020a). Drawing on the work of gender researcher Hirdman (1988), this can partly be explained by the continued existence of a hidden gendered system. Such system is characterized by distinguishing tasks, roles, and professions within a dichotomy of what is considered as “typically male” and “typically female.” Women themselves play an important role in the continuation of their social status, as they are part of (often invisible) “gender contracts” between the sexes, which operationalize the gendered system (Acker, 1990; Hirdman, 1988, p. 53). These contracts are based on mutual role expectations and form the boundaries of women’s opportunities. Through gendered practices, women take an active part in reproducing the gender order of society and the gendered relations within it (Connell, 2002; Martin, 2003), for example by supporting hegemonic masculinity and devaluing some women or certain types of femininity (Bettie, 2003; Bolzendahl & Myers, 2004; Hamilton, 2007; Pyke & Johnson, 2003).

Such gendered practices might explain why many women avoid professions labeled as “typically male,” while those who choose to enter such profession need to overcome boundaries posed by the gender contract. We propose that they do this by developing and practicing career resilience which they apply in a day-to-day manner over their entire career life-span. While resilience has emerged as a topic of increasing scholarly interest especially in organization and management research (e.g., Linnenluecke, 2017), individual-level resilience practiced to pursue and develop one’s career in specific professions has to date been understudied (Bimrose & Hearne, 2012; Kossek & Perrigino, 2016). This paper aims to explore how female IT professionals practice career resilience to overcome the challenges faced when pursuing a career in this male-dominated industry. We illustrate how even in a relatively gender-equal country like Sweden, such careers are impacted by invisible gendered systems, which are firmly anchored in society and perpetuated for example by socialization and mass media portrayals. With this study, we draw attention to the important role of career resilience over the entire career life-span and outline how more explicit attention to developing career resilience accompanied by a supportive mass media discourse could play an important role in changing this gendered system over time by breaking up the dichotomy of separating into typically female and male, thereby rendering the male norm illegitimate (Hirdman, 1988, p. 58).

The remainder of this paper is structured as follows: in the following section, we present our theoretical framework of career resilience of female professionals working in male-dominated industries, before introducing the context of Sweden. Thereafter, we present our mixed-method, including the samples, collection of data and analysis. Empirically, we combine an interview study with 50 female IT professionals with a study of 502 newspaper articles on the topic of women in IT to better understand how the public discourse in Sweden deals with this continuing gendered system. We then discuss our findings and propose a process model of women’s career resilience in male-dominated professions that captures the entire career span. We conclude the paper by outlining our theoretical contributions, as well as practical recommendations for IT companies.
1.1 Individual-level career resilience: toward a process-based view

While resilience has often been discussed as an organizational-level phenomenon of bouncing back after environmental jolts or other types of crises (e.g., Linnenluecke, 2017), a range of scholars have outlined resilience as an individual-level characteristic that facilitates adaptation to adversity (e.g., Robertson et al., 2015). Individual-level resilience has been labeled as individual, employee, and career resilience, respectively, with somewhat overlapping definitions. Despite some differences in definitions, it is important to note that individual-level resilience is not only demonstrated in response to crises, but can also be exercised as business-as-usual, everyday individual resilience (e.g., Branicki et al., 2019; Kuntz et al., 2017).

Coutu (2002) proposes that individual resilience is what influences why some people manage to succeed despite hardships and suggests three common characteristics of resilient individuals, namely “a staunch acceptance of reality; a deep belief, often buttressed by strongly held values, that life is meaningful; and an uncanny ability to improvise” (p. 4). This definition makes clear that individual resilience is conceptualized to be more of a personal attribute, attitude, or characteristic than necessarily connected to working life (Block & Kremen, 1996; Richardson, 2002). Employee resilience has been defined as a behavioral capability, supported by the organization, which reflects resource utilization and the ability to continually adapt at work (Kuntz et al., 2016). It is often associated with positive psychology (e.g., Bardoel et al., 2014). Kuntz et al. (2017, p. 421) state that it “comprises adaptive, proactive, support-seeking, learning, and crisis management behaviors that can be continually developed and enacted in everyday practice.” Thereby, employee resilience goes beyond the attitudinal and coping-related individual resilience construct (cf. Avey et al., 2010; Luthans et al., 2010) to capture more proactive and learning behaviors, also within adverse contexts (Kuntz et al., 2017). Empowering leadership, proactive personality, and optimism have been found to be significantly related to resilient behaviors (Chiaburu et al., 2006; Nguyen et al., 2016). Lastly, career resilience is related to the capability of navigating one’s individual career development that might be multifaceted, unstable, cyclical, and transitional over its life course (Bimrose & Hearne, 2012). Career resilience thus differs from employee resilience in that it is not restricted to an individual's functioning within a certain organizational setting, but to navigating in and proactively developing the own career over its entire life-span, that is, possibly across different employers (cf. Dix & Savickas, 1995; Mishra & McDonald, 2017). This calls for the need of a process perspective to better understand career resilience over time—which we attempt to develop in this paper.

As outlined by Bimrose and Hearne (2012), career resilience requires the development of coping strategies to manage to adapt, even to discouraging or disruptive circumstances (Goodman, 1994; Kohn et al., 2003; London, 1997). Such strategies might include emotional labor capacities to overcome structural and/or dispositional career barriers (Cordoso & Moreira, 2009; Jackson et al., 2007) such as developing a proactive personality (Chiaburu et al., 2006) and self-reliance (Collard et al., 1996; Fourie & van Vuuren, 1998), as well as competences (Caza & Milton, 2012) and well-being (Bimrose & Hearne, 2012). Career resilience affects career motivation (London, 1983) and can lead to improved career self-management (Chiaburu et al., 2006). Career resilience can be trained and enhanced through human resource development interventions (Luthans et al., 2007; Mishra & McDonald, 2017; Robertson et al., 2015). Kossek and Perrigino (2016, p. 737) draw attention to the dynamic nature of resilience, occurring within and across career stages, stating that the notion of “career” is the passage of time. Indeed, career resilience has been linked to being important at different life stages (Entrekin & Everett, 1981) and, therefore, it may be viewed as a means for managing career plateaus and occupational hierarchies (Tremblay et al., 1995; Yang et al., 2018). In this paper, we define career resilience as a conscientious process of developing one’s self-confidence, skills and competencies and drawing on hope, realistic optimism and support networks for the purpose of building a fulfilling career over its entire time-span.

There is a need for a better understanding of how occupational characteristics impact career resilience in general, as well as specifically that of women entering and staying in critical occupations such as IT (Kossek & Perrigino, 2016, p. 733). Career resilience differs across career stages (Mansfield et al., 2012) and it tends to
increase as employees become more experienced (London, 1993; Noe et al., 1990). Yet, to date, there remains a gap in understanding the dynamic processes of how career resilience impacts the work behaviors of professional women in a male-dominated industry, such as the decision to quit, stay in the same position, or advance further (cf. King et al., 2016, p. 784).

A number of studies have analyzed experiences of women in male-dominated occupations, though rarely explicitly addressing their resilience. Challenges perceived by women fall into different categories. To start with, psychological barriers might inhibit women from reaching their potential in male-dominated professions (Frome et al., 2006), relating to women’s own stereotypical gender role expectations, for example regarding their perceived level of competence, feeling inadequate (Webster & Caretta, 2019), and displaying low self-efficacy and self-confidence (e.g., Damaske, 2011). Gender stereotypes often underlie male colleagues’ behavior toward women ranging from excluding them from relevant networks, positioning women as deviant from the norm, or claiming their incompetence (Farh et al., 2020; Kelan, 2007). Davey (2008) identified political game playing, aggressiveness, backstabbing, point-scoring, overconfidence, and “stitching people up” as typical masculine behaviors related to success in a male-dominated environment. Such gendered behaviors have been found to lead to women feeling questioned and disadvantaged (Johansson et al., 2019).

On an organizational level, women might note payment inequalities and discriminatory practices related to their career progression such as a lack of challenging tasks given to them, devaluing of their skills and commitment, and gender bias in reward allocation (Feyerherm & Vick, 2005; Singh & Vinnicombe, 2000; Williams et al., 2012). That leads to the perception that their companies do not take them seriously. As many organizations lack visible strategies to empower women (Martin & Barnard, 2013), men tend to achieve a faster career advancement into better paying jobs that entail larger managerial responsibilities (e.g., Jagacinski, 1987). Also, workplace culture appears to play a crucial role in spreading subtle gender inequalities (e.g., Tijdens, 1997; WWW-ICT, 2004). As a coping strategy, women adopt male characteristics such as “macho” behavior and the use of “macho” language at work (Misa, 2010). Other coping mechanisms include speaking up about problems (Dashper, 2019), reflecting before engaging in action (Farh et al., 2020), developing strength, forethought, and self-directedness (Khilji & Pumroy, 2019), mitigating feelings of stress and isolation by maintaining work-life balance (Webster & Caretta, 2019), and developing optimistic expectations about future career opportunities (Martin & Barnard, 2013). Higher self-confidence, access to support networks, and improved sense of self-efficacy are found to enhance coping of those working in gendered occupations (Cross & Bagilhole, 2002; Näswall et al., 2013). Despite a variety of coping mechanisms, the difficulty of developing a career in male-dominated professions, coupled with the unwillingness to accommodate them in those jobs, makes such work environments unattractive for many women to enter and thrive in (Kelan, 2007; Khilji & Pumroy, 2019; Martin & Barnard, 2013). Even if choosing to pursue a career in a male-dominated profession, women might end up in professional “ghettos” of job positions that are characterized as feminine and inherently less prestigious (e.g., Van Zoonen, 1994). Some studies, however, also suggest that women fail to shatter the glass ceiling because they quit their jobs midcareer (Chambers et al., 2004) or distance themselves from other women rather than collectively work toward changing the gendered system (cf. Rhoton, 2011; Williams et al., 2012).

The IT sector in focus in this study is characterized by gendered and hierarchically structured occupations (Ahuja, 2002; Armstrong et al., 2017). Women tend to be gender-segregated into specific, technical fields within the sector that have less status and are associated with “female” characteristics, like product design and appearance, user-friendliness, marketing, and administration (Kelan, 2007; Peterson, 2007; Prescott & Bogg, 2011; Roman, 1994; Ruiz Ben, 2007). Moreover, evidence from Sweden suggests that women in IT remain stuck in entry-level jobs (Tjejerkodar, 2020). Several social and structural factors that influence women’s career choice, career persistence, and career advancement in IT are found to be enacted differently depending on one’s career stage (Ahuja, 2002; Armstrong et al., 2017). The level of available training, work-family conflicts, and the lack of role models affect women’s career choices in IT. Occupational culture affects the persistence of women to pursue IT careers, whereas institutional structures, informal networks, and lack of mentors influence their career
advancement (Ahuja, 2002; Armstrong et al., 2017). Similar to what has been found for different types of organizations in the US and the UK (Coogan & Chen, 2007; Dashper, 2019) and academia (Webster & Caretta, 2019), relationship-based assets such as mentorship and role models are as significant for career advancement in IT as personal assets such as talent and education (Luthans et al., 2007).

We aim to further explore these aspects in this paper by answering the research question “How do female IT professionals practice career resilience to overcome challenges faced when pursuing a career in the male-dominated industry?” We will next present the context of our study.

1.2 | Sweden as the context of our study

Resilience research is highly context-dependent (Linnenluecke, 2017, p. 15), and thus it is important to characterize the specific context in which empirical studies are set to facilitate the transferability of insights across different contexts. Our empirical setting is Sweden, which has a strong reputation to be one of the most gender-equal societies in the world (e.g., WEF, 2012). This top score is the result of a long commitment by the country’s government to promote gender equality (cf. Rothstein, 2012). First steps in this direction were taken in the middle of the 19th century, and since the 1960s the topic has gained substantial political attention (cf. Achtenhagen, 2014): Already in the years 1969/1970, a nation-wide curriculum was implemented which included gender equality as important topic in all schools. In the early 1970s, the Swedish government decided to promote gender equality as a core political agenda. Among other things, the joint tax assessment of married couples was terminated (which had constituted a major incentive for women to be housewives or work only part-time) and childcare and after-school facilities were greatly expanded. During the mid-1970s, parental leave was introduced, which allowed both parents to take time off work to care for their babies and young children. Currently, parental benefit is paid for 480 days for each child, with pay depending on the income level. Each parent has the exclusive right to 90 of these days. Thus, Sweden started to focus on reducing typical bottle necks for women's career advancement half a century ago (cf. Holst, 2001; Winn, 2004). This has shown quite some effect—in Sweden, women's participation in the labor market is 84% (of which 25% in part-time work) and more than 90% of 2-year-old children attend preschool, almost 70% of them all day (SCB, 2018). In addition, Sweden is often recognized for creating favorable working conditions for women (Elg & Jonnesgård, 2003).

Despite this progress toward gender equality in Sweden, there continues to be a more hidden gendered system (e.g., Hirdman, 1988; Sköld & Tillmar, 2015). Women and men work the same number of hours, but the work of men is more often remunerated than that of women (7 h for men vs. 5.5 h for women per average week day, according to Time Use Survey, in SCB, 2012, p. 38–39). Also in Sweden, women shoulder a larger responsibility for the household and family, which can be expected to have an impact on their career choices and development. In the past 2 decades, women in Sweden have reduced their unpaid labor by one hour per working day (from 4.5 to 3.5 h). At the same time, men have only increased theirs by 8 min/day (to 2.5 h) (SCB, 2012, p. 39). The continuing role separation into “female” and “male” responsibilities is also evident from the fact that 25% of women but only 8% of men work part-time (a choice which for women, but not for men, tends to be dependent on the number and age of children in the household). Rothstein (2012) shows how despite a gender-equal upbringing parents tend to fall into traditional gender roles after they have children. Though the government has taken a range of different measures to balance the length of parental leave taken by both parents, women still take 71% of the paid parental leave (as of 2018; Försäkringskassan, 2020).

The gendered system in Sweden also becomes evident when distinguishing between industry sectors in which women and men work. Only 3 out of the 30 largest professional groups are gender-balanced (i.e., at least 40% men and women are each represented), namely cooks, medical doctors, and university faculty. Thus, the labor market continues to be segregated regarding the choice of professions (Lindgren, 2008). This is confirmed by different studies that demonstrate how professions continue to be viewed as typically male or female (e.g., Ljunggren & Alsos, 2007; Sundin, 2002).
According to Statistics Sweden, women represent 20.4% of the Swedish IT workforce under the occupational category of “ICT architects, system analysts, and test managers” (Cordoso & Moreira, 2009), an increase by 2% since 2014 (SCB, 2020b). On one hand, it is not surprising that women are underrepresented in the IT sector in Sweden, given that in 2018 only 29% of all new engineering students at universities were female, and this level was the same as 5 years earlier (SCB, 2018). On the other hand, this is a drastic contrast to the 86% of girls expressing an interest in technology-oriented subjects at a younger age (Swedish Schools Inspectorate, 2014). This suggests that girls and young women are deterred from IT during their adolescence, that is, the gendered system outlined above (Hirdman, 1988) appears to take effect at this early age.

During the last 2 decades, a range of initiatives were launched to combat the effects of this system (see Table 1 below). Four types of initiatives can be identified. First, at different universities around, Sweden female IT students created networks as a platform for individual career preparation, through which they could share experiences, be inspired by role models and develop company contacts. Second, large IT companies initiated different activities aimed at teenage girls and young women, to increase their pool of potential future employees by triggering their interest in IT as a career option. Third, coding camps and courses for girls or women only were initiated all over the country, often by nonprofit associations, again aiming at the IT sector as an alternative for education and career. These three types of initiatives share as their point of departure the aim to increase the number of women choosing a career in the IT sector.

Only during the past years, a fourth type of initiative has emerged, in which IT companies attempt to make the sector attractive for women to continue their careers in. These initiatives actively support women’s career development through the creation of company networks and a commitment to promoting more women. This development is a reaction to the large percentage of women leaving their careers in IT, shifting the focus from enhancing an initial interest in IT as a career choice to pursuing career development in it.

In this paper, we focus on this group of women who make their way in the IT industry by exploring how female IT professionals practice career resilience to overcome challenges faced in the male-dominated industry. Next, we will present the method of our study.

2 | METHOD

Our method combines two different types of data, an analysis of the printed press discourse in Sweden on the topic of women in IT and an interview study with female IT professionals in different phases of their career. These two parts of our study are introduced below.

2.1 | Newspaper discourse

Above, we have outlined how Sweden, despite being considered as a role model of gender-equality is still characterized by hidden gendered systems that appear to play an important role not least for the gender-segregated labor market. Hirdman (1988) proposes that gendered systems are operationalized by, often invisible, gender contracts that are based on mutual role expectations and describe on the one hand the boundaries of women’s opportunities and, on the other hand, the relationship and the interface between what is masculine and feminine. Gendered systems can change over time—especially when the dichotomy of separating into what is typically female and male is broken down, as this renders the male norm illegitimate (Hirdman, 1988, p. 58). In a truly gender-equal society, no power differences would be produced or reproduced through dichotomizing. Such a change in gender contracts takes place on a societal level.

Society, thus, legitimizes or restricts opportunities for women in the IT sector, as culturally accepted role models influence whether IT-related professions, such as programmer or system developer, are viewed as viable
| Year of launch | Name of initiative | Characteristics of initiative | Organization behind it | Main aim | Impact made to date |
|---------------|-------------------|------------------------------|------------------------|----------|---------------------|
| 1998          | Datatjej          | Network among women and between companies and women, with company visits and information events | Non-profit association, founded of female IT students at Umeå and Uppsala university | Create role models and increase networking for female students and women in IT | 2800 members; 120 participants in yearly conference |
| 2001          | DigiGirlz (international initiative, not just Sweden) | Information sessions and hands-on computer and tech workshops | Microsoft | Let girls aged 14–18 learn about careers in IT | NA |
| 2003          | “Årets IT tjejer” (“IT girl of the Year,” this year renamed to Tech Girl of the Year) | Award based on nominations; winners are invited to different Microsoft events and receive a company mentor, are expected to act as ambassadors for IT for girls in Sweden | Microsoft | Create female role models to inspire young women who have not yet started their careers | 18 years of winner and runner-ups, indirectly the candidates initiatives as role models |
| 2008          | ITQ               | Network to bring together female IT students and practitioners | Karlstad University | Show breadths in educations and highlight examples of possible professional roles | 194 members in network’s Facebook group |
| 2009          | GeekGirlMeetup    | Network by and for women interested in IT, organizing "un-conferences" | Nonprofit organization | Inform about coding, design and start-ups, enhance networking among women with similar interest | Has developed into an international network |
| 2010          | #addher (previously WinIT) | Network for women in IT; activities in the 17 cities as well as nationally | Sogeti Capgemini | Create more publicity around women working in IT to attract more women to the industry | 5000 members in 17 cities in Sweden |

(Continues)
| Year of launch | Name of initiative       | Characteristics of initiative                                                                 | Organization behind it                                                                 | Main aim                                                   | Impact made to date                                                                                     |
|---------------|--------------------------|---------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
| 2013          | “Geek girl mini”          | IT-related activities and coding events for girls at 5th and 6th grade elementary school    | Project financed by the Swedish internet foundation                                    | Get girls interested in IT                                 | Limited number of workshops, in total reaching a few hundred girls                                     |
| 2014          | Next Up                  | Case competition around IT challenges for girls in 8th grade                                 | Swedish IT and telco industry association; part of EU project “e-skills for jobs”     | Interest girls in IT                                       | Yearly competition with around 1000 participants per year                                            |
| 2014          | Py Ladies Sweden         | Network and mentorship group, organizing outreach, conferences, events, and trainings for female professionals | Informal group                                                                        | Help more women to become active in Python coding          | 934 members                                                                                             |
| 2014          | TechEq                   | Network for women in IT                                                                      | Collaboration between Swedish IT companies                                             | Increase gender equality in IT sector to make sector more attractive for women | NA; Facebook group with a bit over 300 members                                                        |
| 2015          | Pink programming         | Code events for women                                                                         | Non-profit, voluntary organization                                                    | Increase number of female programmers                     | 25 activities per year organized                                                                       |
| 2015          | Tjejer kodar            | Courses, travels and inspiration evenings about coding for working women                       | Private company                                                                        | Inspire women to try coding                               | So far trained around 5000 women in coding                                                             |
| 2015          | Teklafestivalen          | “Festival” with one day of inspiration and workshops for 11–14-year-old girls                | Royal Institute of Technology (KTH)                                                    | Attract girls to tech through activities and role models, initiated by artist Robyn | Around 200 girls per year                                                                            |
| Year of launch | Name of initiative | Characteristics of initiative | Organization behind it | Main aim | Impact made to date |
|----------------|--------------------|------------------------------|------------------------|----------|---------------------|
| 2016 (with smaller start already in 2006) | Womentor | IT and telco companies commit contractually to work toward more women in leading positions and report their results on annual basis; women participate in mentorship and leadership development program | Strategic initiative of industry association, in practice run by consulting firm that launched the initiative in 2006 | 40% women in leading positions by 2025 | Networking events with approximately 200 participants; in 2018, 17 IT companies had signed up to mentorship program |
| 2017 | WiTech | Network for women studying or working in IT | Sigma IT consulting and Linné University, financed through kickstarter campaign | "network for us, by us"; meet and get inspired by women in IT in private and public firms | 200 active members |
| 2018 | Match and Go | Mentorship program connecting female IT students as mentees and women working in IT as mentors | Collaboration between #addher and Tjejer Kodar, organized by Sogeti | Provide guidance and role models to women aspiring a career in IT | Matching members of the two existing networks |

Source: Compiled by authors. Please note that many initiatives explicitly address not only females but also transgender and nonbinary people.
career options. As outlined by Achtenhagen and Welter (2011) in a study of women entrepreneurs in Germany, public discourses as transmitted by mass media, and especially newspapers, can here play an important role. They argue that newspapers are powerful producers, reproducers, and circulators of public discourses on career choices, as they persuade “our consent to ways of talking about reality that are often regarded as normal and acceptable beyond the confines of media” (Macdonald, 1995, p. 3).

In this part of our empirical study, we conduct a systematic analysis of how women in IT are discussed in the Swedish printed press. As we aim to gain a better understanding of the status of the gender contract related to careers in the IT sector, this analysis allows us to assess whether societal-level change in the gendered system appears to be ongoing. Such change might be supportive of or undermine women’s career opportunities in the IT sector, and the scope of the discourse also suggests whether women’s career resilience in the IT industry can be expected to remain largely an individual-level phenomenon in the future.

In order to capture this discourse and its changes over time, we employ a longitudinal perspective, covering reporting over almost 1 decade. From the Swedish online database Retriever Mediearkivet, which stores printed press articles published in Sweden and covers all major national and regional newspapers as well as industry press, we downloaded the 502 articles containing the search term “kvinn* OCH IT OCH programmerare” (woman/female AND IT AND programmer) and which were published between January 2011 and the end of February 2020. These articles were downloaded without preselection of what was covered in them, so as to gain an impression of all instances in which women in IT were considered noteworthy in these publications (cf. Achtenhagen & Welter, 2011).

For the analysis of this data, we analyzed each article based on its content, which is common in mass media studies (Sparks, 2002, pp. 19–20). Drawing on established procedures of content analysis, we developed categories for classifying the information in the articles (Merten, 1995). The articles were coded according to the following categories: title of the article, newspaper, date of publication, “women in IT” as main or side focus in the article, the main topic covered in the article, and issues related to women’s careers in IT. The resulting file allowed us to identify the topics discussed around women in IT in the Swedish public discourse as represented by newspapers as well as to trace changes in this discourse over time (cf. Achtenhagen & Welter, 2011).

2.2 | Interview study

For the second part of the study, we collected data from 50 interviews with female IT professionals, conducted in central and southern Sweden. The interviews focused on their career development in the IT sector and typically lasted 45–60 min each. The interviews were semistructured and questions differed somewhat depending on respondents’ length of experience in the IT industry. There were 18 early career respondents (0–5 years of experience since entering the industry), 12 midcareer respondents (6–14 years of experience), and 20 late-career respondents (15–35 years of experience) in our sample (see Table 2 below for a sample description). During the interviews, respondents were asked about their career progression and what was driving and/or hindering this progress. They were also asked to consider the significance of their gender and that of their colleagues, managers, and clients. Overall, the interviews aimed at mapping how female IT professionals navigate their careers in a highly male-dominated industry sector located in a country with a relatively high level of gender equality and gender awareness. From the interviews we attempted to capture whether and how these women develop and employ career resilience to balance this ambiguous context.

The sample of female IT professionals was established initially through personal contacts, by getting their help identifying further interview candidates, that is, snowballing, as well as by attending several events aimed at women in IT where further interviewees could be recruited. All interviewees were IT professionals working mainly in specialized IT companies, though some worked in IT units of larger companies, such as in the telco industry or banks. One of the interviewees was not employed at the time of the interview. The interviewees were aged
TABLE 2  Interview sample

| No. of respondents | Age | Professional position | Education | Professional experience in IT (years) |
|---------------------|-----|-----------------------|-----------|---------------------------------------|
| Early career stage  |     |                       |           |                                       |
| 1                   | 24  | Quality assurance     | Bachelor, Computer Science | 0.5 |
| 2                   | 24  | Tester                | Bachelor, System Development | 1   |
| 3                   | 24  | Quality assurance at a tech firm, full-time | Bachelor, Computer Science | 1.5 |
| 4                   | 25  | Project lead          | Bachelor, Computer Science | 2   |
| 5                   | 26  | Quality assurance     | Bachelor, Computer Science | 2   |
| 6                   | 24  | Quality assurance     | Bachelor, Computer Science | 2   |
| 7                   | 28  | IT freelance          | Bachelor, Physics, currently in a PhD program | 2.5 |
| 8                   | 26  | Web developer at a tech firm | Bachelor and Masters, Computer Science | 3   |
| 9                   | 25  | Back-end developer, tech support | Bachelor, Industrial Engineering, courses | 3   |
| 10                  | 25  | Quality assurance at a tech firm | Bachelor, Computer Science | 4   |
| 11                  | 27  | Data scientist at a tech company | Bachelor and Masters, Software Engineering | 4   |
| 12                  | 27  | Back-end developer    | Bachelor, Computer Science | 4   |
| 13                  | 30  | Tester                | Bachelor, Computer Science | 4   |
| 14                  | 28  | Front-end developer at a tech firm | Bachelor, Computer Science | 4.5 |
| 15                  | 28  | Marketing at a tech firm | Bachelor, Communications | 5   |
| 16                  | 29  | Owner of a co-working space, self-employed | Bachelor, Civil Economy | 5   |
| 17                  | 31  | Quality assurance     | Bachelor, Software Engineering | 5   |
| 18                  | 30  | Tester                | Bachelor, Computer Science | 5   |
| Midcareer stage     |     |                       |           |                                       |
| 19                  | 27  | Graphic design at a tech firm | Bachelor, Communications | 6   |
| 20                  | 30  | Worked mainly with helpdesk support, currently unemployed and looking for a job | No academic background in IT, self-learned | 6   |
| 21                  | 30  | Back-end developer    | Bachelor, Software Engineering | 6   |
| 22                  | 32  | IT consultancy at a tech firm | Bachelor in Communications; courses in graphic design and web development | 9   |
| 23                  | 33  | Back-end developer at a tech firm | Bachelor, Computer Science | 9   |
| 24                  | 36  | Back-end developer    | Bachelor, Systems Developer | 9   |

(Continues)
| No. of respondents | Age | Professional position | Education | Professional experience in IT (years) |
|--------------------|-----|-----------------------|-----------|--------------------------------------|
| 25                 | 40  | Back-end developer    | Computing courses at adult education center | 9         |
| 26                 | 49  | Operational head      | No academic background in IT | 10        |
| 27                 | 36  | Head of project delivery and business analysis at a tech firm | Bachelor, Software Engineering, and MBA | 11        |
| 28                 | 31  | CEO of IT firm specializing in graphic design | Polytechnic, 3D graphics | 12        |
| 29                 | 39  | IT-consultant at a tech firm | Bachelor, Software Engineering | 12        |
| 30                 | 45  | Leader price architect, develops company’s internal solutions | Bachelor, Innovation Technology with major in System Development | 13        |
| Late career stage  |     |                       |           |                                      |
| 31                 | 41  | Head of data and information governance at a large bank | Bachelor, Computer Science | 15        |
| 32                 | 49  | Solution Architect    | Bachelor, Data Engineer, Industrial IT | 15        |
| 33                 | 40  | CEO, IT consulting firm | Bachelor, System Developer | 15        |
| 34                 | 40  | IT architect          | Bachelor, IT architect | 17        |
| 35                 | 42  | Digital media and marketing consultant, self-employed | Bachelor, Sociology: Masters, Journalism | 19        |
| 36                 | 43  | Operational head      | Bachelor Network Technician | 19        |
| 37                 | 44  | Business consultant for IT firms, freelance | Bachelor, Business Administration | 20        |
| 38                 | 45  | Regional head for IT consulting firm | Bachelor, Telecommunications Engineer | 20        |
| 39                 | 40  | Specification analytic and quality assurance | Polytechnic, Developer | 20        |
| 40                 | 47  | Chief information officer at a paper manufacturer | Bachelor, Software Engineering | 21        |
| 41                 | 45  | Data scientist/statistician at a bioinformatics firm | Bachelor, Software Engineering | 22        |
| 42                 | 40  | Project lead and test leader | Bachelor, Data Engineering | 22        |
| 43                 | 48  | Marketing director at a tech firm | Bachelor, Communications | 24        |
| 44                 | 52  | Chief data officer at a tech company | Bachelor, Software Engineering | 24        |
| 45                 | 45  | Head of consulting firm focusing mainly on systems development | Bachelor, Industrial Engineering | 24        |
| 46                 | 46  | CEO, IT consulting firm | No background in IT, university courses in IT | 25        |
| 47                 | 54  | Sales responsible and strategic work for larger IT firm | Bachelor, System Development | 27        |
| 48                 | 50  | Project leader at IT consulting | Bachelor, Data systems technology | 30        |
between 24 and 58 years. This was also reflected in their current career positions ranging from IT helpdesk worker to CEO and other leading positions in IT companies of various sizes (see Table 2 above). This variation was important for our study to allow us to capture the process of how career resilience develops alongside the career life-span.

The interviews were recorded and transcribed. The data were first organized and analyzed by using thematic content analysis around the topic of our research (Silverman, 1997, 2006). Our analysis started with a first-order interpretation of the data, consisting of how respondents spoke about their career experiences and how they cognitively organized their position in a male-dominated industry. While interviews do not provide us direct access to facts, they represent an opportunity to explore particular discourses, in our case—women's careers in the IT sector (cf. Silverman, 2006). To make sense of the interviewees' interpretations, we complemented the first-order analysis with a second-order interpretation of our findings in the light of career development, applying the lens of career resilience introduced above. Moving back and forth between first-order and second-order analyses, we were able to tease out how our interviewees develop and make use of career resilience through different coping mechanisms. Finally, this allowed us to identify attributes of career resilience enacted by female professionals in IT firms across three career stages—early, mid, and late.

3 | FINDINGS—CAREER RESILIENCE OF FEMALE IT PROFESSIONALS

3.1 | Newspaper discourse

Of the 502 newspaper articles analyzed in this part of our study, the vast majority was published in regional and local press (396 articles), 74 articles appeared in national newspapers, and 32 in industry and business press. In 292 articles, women in IT were discussed as the main topic. From 2011 to 2017, the number of published articles showed an increasing trend, which however has been in decline since during the past few years (see Table 3).

When introducing Sweden as the context of this study, we had outlined the different initiatives that had been started to enhance females' interest in IT. These different initiatives and their development over time are also captured in the newspaper discourse, as especially the initiatives started by large IT companies like Microsoft receive much media attention (probably not least because of their professional public relations office). As a number of initiatives aim at fostering role models of successful women in IT, over time we witness an increasing number of portraits featuring such women—ranging from the candidates for Microsoft's “IT Girl of the Year” award, to the female founders of coding camps and successful IT leaders and entrepreneurs. In relation to Hirdman's (1988) theory of gendered systems, these portraits published in mass media play an important role in creating culturally accepted role models, positioning IT-related professions as viable career options. Less convincing in that respect are the articles arguing for the need of attracting more women into the IT sector to solve the shortage of talent. This argument views women plainly as a resource that would be valuable for the Swedish economy and welfare state. Yet, only attracting more women to an industry does not automatically change their standing in that industry, that is, there might be little change in the gendered system taking place despite a larger number of women entering...
| Year | No. of articles | Topics covered | Proclaimed reasons for lack of women in IT and why viewed as problematic |
|------|----------------|----------------|---------------------------------------------------------------------|
| 2011 | 29 (6 with main focus) | Gendered system, Visibility | Gendered system  
Women in IT demand less pay than men (and earn 7% less)  
Portraits of candidate for Microsoft’s “IT Girl of the Year” award, of female system developer, and of female CEO of IT consulting firm on maternity leave  
Gendered system  
Male-dominated industry: Men recruit men, value women’s contribution less women take on less challenging jobs (like back office) and ask for less money; not taking on jobs with close customer contacts restricts women’s career opportunities in IT  
Already at the end of university studies, women tend to choose “softer” courses, encouraged by instructors and teachers  
Socialized gender roles: Women are grateful for the salary they get and don’t argue for more  
Geeky image of girls with interest in IT portrayed in films and books  |
| 2012 | 14 (7 with main focus) | Visibility, Resource argument | Low sector attractiveness  
Schools and universities struggle to attract girls and women to IT programs  
Old stereotypes of programming being for guys sitting in dark rooms  
Sexualized image of women in video games and sexist behavior in gaming makes sector unattractive  
Gendered system  
Girls are afraid of IT  
To be only few female students in male-dominated study program makes them feel as outsiders  |
| 2013 | 27 (7 with main focus) | Resource argument, Visibility | Gendered system  
Recruiting in the Swedish IT sector based on sexism  
Talk about programming is masculine coded (logic, math...)  
“First we define IT as masculine and then we punish women who still try to get in”  
Lack of actors who drive change of gender issue in IT industry  |

Data sources:  
TOKBAEVA and ACHTENHAGEN
| Year | No. of articles | Topics covered | Proclaimed reasons for lack of women in IT and why viewed as problematic |
|------|----------------|----------------|----------------------------------------------------------------------------|
| 2014 | 42 (17 with main focus) | **Visibility**<br>Portraits female CEO trying actively to recruit more women to IT industry; IT girl of the year; vice-CEO of a game developing company; women-led initiative to introduce children to digital world and programming | Old stereotypes: Lonesome, male nerds without social competence as image of programmers |
|      |                | **Work Environment**<br>Action and goal-orientation as basis for more gender equality in IT companies | **Hidden discrimination**<br>Rumors that women get recruited only for their looks, not for their competence |
|      |                |                  | **Low sector attractiveness**<br>Women are excluded from men's informal networks in IT |
|      |                |                  | **Stereotypical image**<br>Stereotypical image that programmers sit in dark rooms in front of their computers all day deters more socially competent people |
|      |                |                  | **Unattractive for women to join a male-dominated industry**<br>Visibility |
|      |                |                  | **Lack of female role models and lack of gender equality in IT**<br>Women are never portrayed as heroes in video games, but as in need of help by men |
|      |                |                  | **Gendered system**<br>Girls do not lack interest for technical stuff, instead they lack knowledge about the IT industry and it is not part of their self-image to “do IT” |
|      |                |                  | **Resource argument**<br>More gender equality in technical professions will improve welfare in Sweden |
|      |                |                  | **Huge need of programmers to recruit, increasing need of service perspective**<br>Huge need of programmers to recruit, increasing need of service perspective |
|      |                |                  | **Gender-balanced employers more attractive for both men and women**<br>Gender-balanced employers more attractive for both men and women |
|      |                |                  | **Democracy/fairness argument**<br>The consequence of few women in IT is that tomorrow's society is created by men based on male values |
|      |                |                  | **As 50% of consumers are women, they need to be involved in creating experiences as they better understand female users**<br>(Continues) |
| Year | No. of articles | Topics covered | Proclaimed reasons for lack of women in IT and why viewed as problematic |
|------|----------------|----------------|---------------------------------------------------------------------|
| 2015 | 77 articles (47 with main focus) | **Visibility**<br>Portraits successful female system developer; founder Geek Girls mini; IT girl of the year; founder of initiative to teach programming at elementary school; women's role for emergence of IT industry; documentary film “Code” about gender issues in IT; event aimed at getting girls aged 9-18 interested in coding; summer camp for girls; initiative for working women to learn coding; female IT entrepreneur in Nairobi | **Gendered system**<br>Persisting gender roles are reason for few women in IT<br>Women feel they need to prove their worth every day in order not to be seen as the “one who gets coffee for all”<br>Among girls, it is seen as nerdy and not cool to be interested in IT and boys interested in IT don't view girls as equally competent<br>Narrative about IT industry changed from female- to male-dominated<br>IT was female-dominated until 1984, when PCs were marketed as “toys for boys” |
|      |                | **Resource argument**<br>Number of women in IT is currently decreasing in Sweden<br>Women don’t believe in a career within IT<br>Fewer women in IT than before, from 22% in 2005 down to 20% in 2013 | **Lack of sector attractiveness**<br>Stereotypical image of IT nerd is unattractive<br>IT sector has image of male nerds eating fast food<br>Prejudices, sexism, machoism and too little encouragement at school lead to making IT little attractive for women<br>Women do not apply for IT-related education and career development in the sector does not support women as much as men<br>**Visibility**<br>Lack of female role models in IT<br>Women in IT always in spotlight, as there are so few of them, impossible to be more “invisible”<br>**Resource argument**<br>Waste of resources if 50% of people are excluded from IT sector, which is in need of more resources<br>More women in IT means a larger competence pool for companies to choose from<br>If few women choose IT, much talent is missed out on<br>**Diversity argument**<br>Diversity among employees is good for companies, but also individuals<br>IT sector wants to have broad coverage of society among employees to develop for all<br>Women contribute with a different way of developing and different solutions, and mixed teams create a better working environment<br>More women needed to increase level of creativity for IT solutions for healthcare and education |
| Year | No. of articles | Topics covered                                                                                   | Proclaimed reasons for lack of women in IT and why viewed as problematic |
|------|----------------|-----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|
| 2016 | 64 (36 with main focus) | **Visibility**<br>Portraits “IT girl of the Year”; competition “Next Up”; founder of makerjet network for women; founder of “Datadamer,” an exhibition about women’s role for the development of the Internet; IT company Nethouse’s information events for girls; founder “Pink programming” and this initiative; “Code camp” for teenage girls; different activities at schools to get girls interested in IT; female IT student<br><br>**Gendered system**<br>Course materials at KTH changed to be gender-neutral led to increased number of women and men completing the course | **Visibility**<br>Lack of female role models<br><br>**Gendered system**<br>When boys are in the same room, girls’ self-confidence is limited<br>Media portray men as technically oriented breadwinners and women as caregivers<br>IT is linked to a certain image of men, and men receive the high status jobs, while women in IT get to work with less technical tasks, such as project leader or with communication. Even in start-ups women get excluded from informal communication<br>Recruitment process is homosocial, finding people who think and act similarly to one self<br>Unattractive portrayal of working tasks<br>Lack of women’s knowledge about different types of roles and jobs in IT, “not all is programming”<br>Can be difficult for girls to find a forum for developing an interest for IT<br>**Work environment**<br>While numbers of female IT students increase slowly (by 0.6% p.a.), the numbers of women working in the industry have decreased by 2% between 2006 and 2014.<br>IT companies have difficulties to keep recruited women employed<br>Women in IT need to proof themselves continuously<br>**Resource argument**<br>Lack of talent to recruit<br>A large number of engineers will be needed by 22030 – “we want to show that this is not only a job for boys, it's not all about programming”<br>Gender imbalance limits the development of Swedish IT companies |
| Year   | No. of articles | Topics covered                                                                                                                                                                                                                                                                                                                                 |
|--------|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2017   | 103 (80 with main focus) | **Resource argument**  
The IT and telco sector will be short of 60,000 people by 2020. Despite networks and mentorship programs % of women in IT has decreased from 32% 2010 to 28% 2016  
KTH is starting a fast-track education in programming for female immigrants  
**Visibility**  
Portraits “Pink programming”; “IT girl of the Year” candidates; female IT student (published in 42 local newspapers!); “Digital influencer of the year”; “Tjejer kodar”; “Womengineer”; “Girls on tech”; founder of IT education for teachers  
Report on IT conference for only women and transpersons  

**Proclaimed reasons for lack of women in IT and why viewed as problematic**  
- Competence in IT as scarce resource, women needed to fill it  
- To maintain Swedish welfare, the country needs to retain edge in technological developments. A lack of competence can threaten this welfare idea.  
- **Democracy argument**  
  Women should be part of developing the digital future  
  Programming is fun, and women miss out on it  
  Getting girls to become interested in IT is an issue of gender equality  
- **Gendered system**  
  Programming has a macho image; girls refrain from applying to IT education because of image; it is stressful for women to always be a minority at work  
  Women have the wrong idea that jobs in IT would just be about programming, while the interaction with customers and users is not in focus  
  Most IT companies state that they don’t know how to recruit more women, but would be highly interested in increasing the number of women employed  
  IT offers not only programming jobs, but also jobs with information, design, technology and as project leaders  
  Teachers struggle to teach more IT, due to their own lack of knowledge  
  Lack of female role models  
  **Resource argument**  
  Lack of recruits; lack of possible employees  
  **Democracy argument**  
  The best products are developed if as many different perspectives as possible are considered – which is not possible if all programmers are men  
  Everybody uses IT, so it is important to also have female developers  
  Team results are better if teams are mixed
| Year | No. of articles | Topics covered | Proclaimed reasons for lack of women in IT and why viewed as problematic |
|------|----------------|----------------|---------------------------------------------------------------------|
| 2018 | 79 (60 with main focus) |  | Question of democracy: If only one half of the population sets the agenda for digital development, democratic principles are lost |
|      |                | Visibility | Gendered system |
|      |                | Portraits of female CEO in IT; “Pink programming” (5 articles); network “WiTech” for women in IT; candidates for “IT girl of the Year”; female IT students; “Hello girl” (6 articles); “Geek girl mini”; network “#addher” for women in IT (4 articles); “Hack gärls,” Reports “Tjejer kodar” and “Compare”; hacks for girls Resource argument Lack of programmers problematic for Sweden | Women working in IT are sometimes questioned by customers, who address their male colleagues instead |
|      |                | Resource argument | Old stereotypes of coder being male, sitting in a dark room in front of a computer |
|      |                | Lack of role models; at conferences and for speeches, panels are often all male Resource argument | Parents don’t encourage their daughters to test technical activities like coding |
|      |                | Visibility | Visibility |
|      |                | Lack of female role models; at conferences and for speeches, panels are often all male Resource argument | Lack of female role models; at conferences and for speeches, panels are often all male Resource argument |
|      |                | Diversity argument | Diversity argument |
|      |                | Only half the population as possible employees, more employees needed in the sector Resource argument | Only half the population as possible employees, more employees needed in the sector Resource argument |
|      |                | Analytical skills and creativity of women could come to use in IT sector | Analytical skills and creativity of women could come to use in IT sector |
| 2019 | 56 (26 with main focus) | Resource argument | Gendered system |
|      |                | Large recruitment needs in IT sector; many women could imagine working in IT Diversity argument | Changed narrative about women’s role for development of IT sector led to fewer women in IT now compared to the 1980s |
|      |                | Role of women for development of IT Democracy argument | Image of math being fundamental for programming |
|      |                | Technical development driven by men Visibility | Lack of role models Democracy argument |
|      |                | Portraits Coding Girls; female app developer; IT company consciously working toward gender-equality | In a digital world, digital expertise means power and there is a risk that women are left out of that development |
|      |                | | Male-dominated IT leads to neglecting of women’s needs and perspective |
|      |                | | Resource argument |
|      |                | | Lack of competence in industry |

(Continues)
| Year | No. of articles | Topics covered | Proclaimed reasons for lack of women in IT and why viewed as problematic |
|------|----------------|----------------|--------------------------------------------------------------------------------|
| 2020 | 8 (6 with main focus) | Visibility  
Portraits IT girl of the year; "Coding Girls"  
Recension of “Hej Ruby” children’s book about a girl learning about computers and coding  
*Gendered system*  
Survey results about women in IT | *Gendered system*  
Lack of self-confidence among girls; girls are humbler in estimating and selling in their skills  
In survey, 40% of women answered they could imagine working in IT, but only 7% of the sample did; 80% lacked female role models in IT; 53% of women felt that their competences were questioned more often than men’s and one third reported that promotions are not based on merits  
*Resource and diversity argument*  
Lack of competence and diversity in IT due to lack of women  
*Work environment*  
Negative image of IT sector impacts recruiting despite large need of competence and IT companies work hard to hire more women. If these women are then unhappy, they are likely to leave again |
its workforce, as women might simply be recruited to low-level positions. An argument with more impact on renegotiating invisible gender contracts that is increasing in importance over time refers to the need of having more female programmers for reasons of fairness and democracy, as otherwise men might steer over what the digital future for women looks like, thereby cementing the gendered system for many years to come. Our analysis also illustrates a development of the discourse regarding “who is to blame” for the inferior role currently played by women in the IT industry. While articles published a decade ago tended to put blame on women themselves—for example, for choosing the “wrong” kind of subjects during their studies or the “wrong” kind of projects during their careers—only in the past years a more nuanced discussion is taking place, outlining the importance of not only attracting women to choose a career in IT, but to support them in wanting to continue those careers. Thus, the public discourse is now calling on employers to take an active role in changing the gendered system to become more equal.

Overall, our analysis in Table 3 above clearly illustrates how the discourse on women in IT has moved from rather simplistic arguments blaming women themselves or gendered socialization for the continuing male-dominance in the industry toward presenting a more multifaceted discourse, in which different actors play different roles, and where a range of approaches are needed to bring about societal change of the gendered system. An important aspect addresses the perceived lack of attractiveness of the industry for women, due to the overly “geeky” and “nerdy” image and “male” notions used to market it, where the newspaper discourse encourages stressing creative, problem-solving, and communicative aspects of careers in IT. To conclude, this first part of our empirical study suggests a beginning shift in public discourse toward acknowledging that it will be difficult for women alone to resolve the current gendered system in IT, and that instead different actors need to continue to focus on attempting to bring about change—not least IT companies as employers interested in keeping the women they recruited in the workforce. Whether this change has moved beyond the public discourse to also become visible in female IT professionals’ working experiences will be discussed in the second part of our empirical study below.

### 3.2 Interview study

Career resilience has been proposed to be subject to one’s career stage (Mansfield et al., 2012). Indeed, we identified three stages of career resilience development exhibited by the female IT professionals in our sample (see Table 4 below). Table 4 illustrates the coping mechanisms identified in our study with example quotes from the interviews. These are then related to career resilience attributes, such as locus of control, self-efficacy, self-esteem, competence and skills, career-related attitudes, and PsyCap elements such as hope and realistic optimism (e.g., Luthans et al., 2010; Mishra & McDonald, 2017).

While identifying three stages of career resilience development and the attributes that correspond to them, we considered also the nature of IT organizations. This is in line with the career plateau concept which implies that the years of service and professional efficiency may not directly translate into promotion (Yang et al., 2018). Therefore, we connected career resilience stages to the years of service in the industry rather than to formal positions. This allowed us to compare the attributes of career resilience enaction during three career stages—early, mid, and late—and the coping mechanisms that female IT professionals employ.

Our findings reveal that it is during the second stage of career resilience development when many female IT professionals consider exiting their careers. Therefore, we argue that the most crucial career development stage is the second one, where adaptation and awareness transform into gaining control over one’s self-evaluations (Mishra & McDonald, 2017), that is, beliefs that one has about oneself. If this transformation does not happen, due to the absence of supportive workplace measures and/or supportive family, the individual career resilience might not develop, and the individual might not be able to respond to workplace adversity and uncertainty.
Despite representing a highly skilled sample, with the majority having completed university-level studies of IT subjects, many of the female IT professionals in our study perform jobs such as tester and quality assurance specialist. Those more advanced in their careers might hold somewhat more prestigious and strategic roles, such as system integration architect, solutions architect, and cloud security architect. Only a few women are CIOs (chief information officers) or CEOs of their own companies (see Table 2). Thus, the labor market encountered by the women in our sample is both vertically and horizontally segregated, that is, not only is the industry male-dominated, but women tend to end up within less valued career paths within the hierarchy of IT jobs. In the public discourse, this aspect was also discussed and tended to be attributed to the choices made by the women themselves—which the female IT professionals in our study clearly express differently. Instead, they tend to experience career progression challenges, such as a glass ceiling. Indeed, for most women in our sample, developing and practicing career resilience is a necessity for mastering daily working-life challenges and a key determinant for their career progression.

There are different typical career paths in the IT industry, and career progression occurs at varying pace due to individual, organizational, and sector-specific variables. Typically, our interviewees either expected or had experienced significant promotions to take place at least twice during their career, often after around 6–9 and 12–15 years of service (i.e., roughly corresponding to our career stages), with smaller career steps taken throughout the career life-span (cf. Ahuja, 2002; Armstrong et al., 2017). However, as we will outline below, the IT industry often does not offer equal prospects for career advancement for females as for their male colleagues, though this differs among companies. Moreover, we find that underdeveloped career resilience hinders women's promotion opportunities, for example, if they do not develop strategies to convince male colleagues of their competence, which in several cases led women to become so frustrated about being constantly belittled in their professional roles that they chose to exit from this career. Below, we present our findings on how female professionals in IT develop and practice career resilience, following the three typical career stages and outlining the different challenges faced and coping strategies applied in each of these.

3.2.1 | Stage 1: women in entry-level IT positions—developing career resilience

This career stage is represented by 18 interviewees in our sample. These women's professional experience in the IT industry ranges from half a year to 5 years. The first stage is characterized by women's newly emergent, limited career resilience, and having no control over one's self-evaluations, that is, the beliefs they have about themselves (Mishra & McDonald, 2017). Their development of career resilience is context-specific, and dependent on supportive workplace, supportive family, networking, and adaptability (Näswall et al., 2013). At this stage, female professionals in IT find themselves questioning their professional contributions, values, and roles within the organizations they work for, at the same time as they are adapting to this uncertainty.

To start with, most women in our sample stated that they did not have any problem with finding a job in IT and attributed this to the lack of talent in the industry—a situation which is also commonly discussed in the newspaper discourse following a resource-based reasoning. IT companies were perceived as desperate to hire staff with proven competences from IT-related studies, even if lacking prior work experience.

Early on in this first phase of their careers in IT, women tend to feel that they have to prove that “they weren't hired just because of a quota system for girls,” as expressed by several interviewees. This feeling of being questioned in their competence—ranging from subtle signs to explicit comments—starts early in their careers and leads women to change their behavior in response to the adversity of the gendered organizational cultures surrounding them. Women's coping strategies in entry-level positions include imitating male behaviors by speaking with more assertive tones of voice, becoming invisible by dressing in unisex attire, and outperforming men by thoroughly preparing for meetings with managers and business clients.
Also, I’ve been thinking about the way I talk and I use my voice because I realized I speak with my stomach more and I started to think, honestly this is sad, but I tried to lower my voice to get some power, to have people listen to me. (...) But I’ve been toning down these things that I’m good at, like, women qualities, to make sure people know about the other things I’m also good at. You know, being affirmative and decisive and technically good at programming and things like that. (Interviewee 8)

The clients of IT firms usually do not have an IT background and rely on their consultants’ expertise. Interpersonal trust nurtured during regular meetings is viewed as crucial for project completion and further business opportunities. Some female IT professionals in our sample described how meeting a new client for them is similar to discussing a promotion—they provide explicit evidence of and prepare arguments to prove their professional value, for example starting the meeting by providing a reference to their rank in order to avoid being perceived as holding a lower rank or being the secretary. Clients—often older men—still tend to question female IT professionals’ competence and view them as a “risk to project completion”:

One of my clients always addresses his questions to the male [colleague]. When I speak at meetings with that client, all the time it feels like: ‘Ok, good, we heard you, but can we ask someone who actually knows what they are talking about?’ Even though I might be more experienced in that topic [than my male colleague]. (...) You need to prove yourself. You need to show clearly that you actually know what you are doing. (Interviewee 14)

Here, the aforementioned coping strategies employed by women not only contribute to their career resilience but also serve as a risk management strategy toward the client. Yet, the adversity caused by constantly having to prove oneself at meetings is sometimes magnified when women observe junior male colleagues promoted ahead of them, leading to an accumulated level of frustration that might lead to a career exit from the IT sector. Our newspaper analysis shows an increasing level of awareness of this hidden discrimination by IT companies, reporting on different initiatives that have been launched in recent years to support women’s career development.

Moreover, it appears that at this early stage of career development, resilience can be enhanced by gaining further professional skills and competencies, such as certificates proving the mastery of additional programming languages. This seems to be due to a twofold process: on one hand, these additional skills can increase women’s self-confidence, and thereby their psychological capital, which can then translate into higher resilience levels. On the other hand, the more certified professional skills an IT professional has, the more difficult it becomes for male colleagues or clients to belittle this competence. In the IT sector, there is a constant need for further training, skills improvement and certifications. However, access to those opportunities might not be as willingly provided to women and require more persuasion, compared to male counterparts:

I experienced exclusion when I learned about a training I was very interested in. I had told my boss and the person in charge of organizing the training that I would really like to participate. Then I found out afterward, when the guys came back from the training, that there had been 20 places for it, and that they had not managed to fill all spaces and even asked people from other offices to participate to fill them up. There I really felt excluded, I found this so unfair, it was only guys who had participated in that training that I had wanted and asked to attend, but I was not asked to participate. (Interviewee 17)

Despite such events, nurturing positive career-related attitudes and gaining the locus of control over one’s career path by continuing to pursue self-development appear to contribute to developing career resilience in this early career stage.
## TABLE 4  Career resilience among female IT professionals over three career stages

### 1. Emergent career resilience of female IT professionals in the early career stage

| Example quotes from interviews | Coping mechanism | Attribute |
|--------------------------------|------------------|-----------|
| “As a woman in programming, I am very visible. Therefore, I need to be more careful how I express myself and I try not to show any emotions. I needed to learn how to speak more decisively, to argue for my case, and to be more direct.” (Respondent #11) | Camouflaging: Look and act like the men, act more assertive, lower voice, more confident sentence structure with more action verbs (in written and oral communication), change the dress-style (more dark or neutral colors, less make-up); | Locus of control |
| “I have noticed that women in IT who use make-up or maybe color their hair and look differently are not treated with the same respect as women with a more natural look. Many men have difficulties to see that it is possible to wear high heels and be a super competent programmer, only if you care about your looks, if you don’t tone down the female side to fit in. Women tend to adjust, I believe that you gain more respect if you act like a man. Otherwise, there is a risk to be treated differently.” (Respondent #18) | Adapting | |
| “You are judged harder just because you are female. Thus, as a woman you need to prove yourself more. I realize that many think that just because I am a woman I am incompetent, and only once I have demonstrated my competence I gain respect and even as much respect as a man.” (Respondent #12) | Speak up at the meetings; Show one’s professionalism to all parties concerned (clients, bosses, colleagues), take an independent stand | Self-efficacy |
| “I think girls need to be in control, and they have a tendency to care a lot about details. Girls often end up having finer and more readable code than guys, while guys tend to care mainly about that it works in some way.” (Respondent #1) | Boost up one’s confidence. Perfectionism (e.g. trying to write the finest code), which may not be appreciated on the organizational level. | |
| “Interestingly, I have received quite a number of negative comments outside of work about my choice of profession, like “what are YOU doing there?” (Respondent #8) | Women's professionalism in IT is constantly questioned. | Self-esteem |
| “The competence of women in IT often is not taken seriously; especially in the eyes of male colleagues and customers” (Respondent #13) | Women’s competence and skills is undervalued and questioned. | Competence & skills |
| “In the IT industry, I have the impression that women are generally viewed as less competent than men. Already at university, teachers treated us differently than the boys, explaining everything on a much lower level.” (Respondent #17) | | |
| “Girls tend to be more uncertain about their capabilities. They might know the answer and how to solve a problem, but they don’t know whether their solution is correct, so instead of saying something they keep quiet. That is then perceived as if they don’t know. While guys don’t think much about it and just say something without being sure about being correct.” (Respondent #6) | Underdeveloped confidence - women may lose opportunities because of lack of confidence and prejudices of customers and colleagues. | Career-related attitudes |
**TABLE 4**  (Continued)

| Example quotes from interviews                                                                 | Coping mechanism                                                                 | Attribute                      |
|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|--------------------------------|
| “I know that the first programmer was a woman, I found information about her on the Internet. I don’t understand why women in IT are so much less talked about than men. When I went to university, nobody talked about female programmers, everybody just talked about people like Steve Jobs and Steve Wozniak.” (Respondent #1) |                                                                                   |                                |
| “I don’t have any female role models, because I don’t know any. I think it is important that women take more space in the IT sector. There are many competent female programmers, but they are not very visible. For me it would be very important to have a role model to aspire to.” (Respondent #6). | There is a call for more female role models among IT professionals.               | Hope                           |
| “It would be very important for women’s development in IT to have more role models.” (Respondent #2)                                                                 |                                                                                   |                                |
| “Women contribute to a different kind of culture at work and also tend to collaborate in a different way. But how competent we are really is not based on gender.” (Respondent #5)                                                                 | There is a call for better recognition of women’s contribution to IT on an organizational and societal level. | Realistic optimism              |
| “I don’t know any female role models. I just recently learned that the first programmer was a woman. I was surprised that the view about female programmers outlined above still existed in today’s society, where everybody talks about gender equality. It really should not be an issue if a woman is better at programming that a man.” (respondent #8)                                                                 |                                                                                   |                                |

**2. Enhanced career resilience of female IT professionals in the midcareer stage**

| Example quotes from interviews                                                                 | Coping mechanism                                                                 | Attribute                      |
|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|--------------------------------|
| “At the beginning, my colleagues thought I was incompetent, just because I am a woman. This only changed, after I was given a difficult task, which I managed to solve. After I managed to demonstrate my programming skills in that way, everybody started to respect me, and today I feel respected as much as the men are.” (Respondent #21) | Adaptation to the gendered organizational practices by taking an independent stand in an organization and proving one's high professionalism. | Locus of control                |
| “I try to find opportunities to demonstrate my competence early on in projects” (Respondent #30)                                                                 |                                                                                   |                                |
| “If you are a woman, you have to use more patience, you have to show more of what you can do, you have to be more extraverted and market yourself more.” (Respondent #28)                                                                 |                                                                                   |                                |
| “Women are often encouraged to take on less technical roles, based on what your bosses believe your personal interests are. Thus, assumed interest ranks higher than actual competence.” (Respondent #20)                                                                 | Contributing to manifesting the “otherness” of career-oriented women in IT and cementing positions such as project lead and quality assurance tester as “female”; | Self-efficacy                   |
### TABLE 4  (Continued)

| Example quotes from interviews                                                                 | Coping mechanism                                                                 | Attribute               |
|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|-------------------------|
| “Right now I am not very interested in taking on a leading role. But there are a number of IT firms that really try to pave the ground for women. But if you see women in leading positions, they tend to be in HR, not project leader or consulting heads.” (Respondent #29) | Fighting with stereotypes when it comes to appreciation of input and promotion;    | Self-esteem             |
| “Men are often hired or promoted instead of women” (Respondent #25)                                                                                      |                                                                                  |                         |
| “They prefer to select a more junior man rather than a woman” (Respondent #24)                                                                         | Threatened work-life balance, job position is sustained, rather slow career advancement |                         |
| “I have worked here for a few years, and I am still trying to figure out why my colleagues don’t really listen to me. I am often wondering, is it because I am still rather junior or is it because I am a woman? Maybe not all I say is that important? I am afraid that gender in combination with young age can lead to an even worse power position.” (Respondent #21) |                                                                                  |                         |
| “In meeting situations with clients, I have often come across situations where men tried to marginalize me through comments that would play down my competence and professional level” (Respondent #30) | Working longer hours, taking more assignments to keep up with the colleagues who are technically more advanced after, for example, a woman returns from a maternity leave; | Competence & skills     |
| “Not too long ago, I tried to advance in my career and applied for a higher-level job. My boss supported me and said I had good chances to receive the position, as I had the required experience and competence. But it ended with the company taking on a male manager instead, who was junior to me. It had been my boss’ boss to decide whom to select. And I learned afterward that I was considered not to have all experience needed. They had made a change in the demand profile to be able to argue for that choice. It was very evident what had happened, but I chose not to say anything” (Respondent #26)” | Not giving up in the face of adversity, e.g. career advancement challenges.      |                         |
| “I have always felt like an outsider, but in the end of the day I have greater freedom to express my femininity because I can live out my nerdy and my feminine side without restrictions.” (Respondent #22) | Unwillingness to challenge gendered organizational practices and willingness to remain part of the job because one likes the job (or is trying to save the job for the sake of family, work-life balance, other commitments, unable to move to another place or change jobs, etc.) | Career-related attitudes |
| “It is very easy to get a job in this industry. I have worked in the IT industry for 12 years now. I have made some progress in my career, but I am not sure that I will manage to advance much further. The higher positions are all taken by men, and thus I don’t believe it is very likely that I will manage to break into that circle.” (Respondent #29) |                                                                                   |                         |
TABLE 4  (Continued)

### 2. Enhanced career resilience of female IT professionals in the midcareer stage

| Example quotes from interviews | Coping mechanism | Attribute |
|-------------------------------|------------------|-----------|
| "We tried to develop a mentorship program at the local university, for female students in data engineering. We started with 15 women, and now we only have 2 left. The others have changed programs." (Respondent #28) | Professionals express mixed feelings. If the situation does not change for the industry, then it will be difficult both to attract new people into IT jobs and keep the ones who are already in. | Hope |
| "I have enjoyed working there. But sometimes, I feel somewhat excluded. I will simply never become one of the guys. As woman, I am always assessed more thoroughly, and I need to prove myself more than guys do." (Respondent #30) | | |
| "The entire image of IT will have to change. The developer role in IT has changed. Everybody must become more communicative now. Thus, the stereotypical image of the non-communicative programmer will die out. As developer you will need to meet customers." (Respondent #27) | | |
| "Not many girls feel attracted by a demand list of 25 points, if they don't match like two of those, they won't apply, as they don't feel qualified. But if a guy only matches a few of them, he will still apply, as he believes he is a rockstar. So I am trying to change this. And I spend a lot of time networking, getting in girls from different forums, and finding new ways to recruit. it takes a lot of time. And I try to stay true to my own values." (Respondent #30) | There is an impression and common belief that the industry will become more inclusive, should women help each other. | Realistic optimism |

### 3. Advanced career resilience of female IT professionals in the late career stage

| Examples/quotes from interviews | Coping mechanism | Attribute |
|---------------------------------|------------------|-----------|
| "Women should not be afraid of working in this area. It's not that scary." (Respondent #43) | Strong self-identification with one's occupation (usually among long-term IT workers) and valuing one's professional qualities; Gaining confidence. | Locus of control |
| "You actually have earned another type of confidence by going that far. On a strategic level and on the level of details. So you can speak to anyone at any level. That is comfort for me. I need to have that depth to be on the executive level. And I earned it to be on that level by hard work, by experience." (Respondent #50) | | |
| "I can cope with a lot, but in this sector, you really need to develop a tough skin to have a chance to be accepted." (Respondent #42) | Become "one of the men" (women in top leadership and hard-skinned – heads of banks, IT departments) | Self-efficacy |
| "You have to give up a lot. This is a very competitive culture" (Respondent #33) | | |
| "If I say when women face the most problems in the industry, I think it would be right on top. That's where you face the males, and you have to be stronger." (Respondent #43) | | |

(Continues)
| Examples/quotes from interviews                              | Coping mechanism                                                                 | Attribute                |
|---------------------------------------------------------------|-----------------------------------------------------------------------------------|--------------------------|
| “Over the years, I have started to always start meetings     | Learning to foresee the circumstances and                                        | Self-esteem              |
| with mentioning my professional role, as otherwise clients   | stand up for oneself.                                                            |                          |
| would typically assume that I had a much less important role.”| (Respondent #42)                                                                  |                          |
| “I have one experience that I remember very clearly. I once | Confronting the men.                                                             |                          |
| was in the room with a lot of male colleagues and I asked   |                                                                                   |                          |
| for an explanation of some solution and I was told, “you    |                                                                                   |                          |
| won’t understand that because it is technical.” And that    |                                                                                   |                          |
| made me so angry. And I said, “then you will explain to    |                                                                                   |                          |
| me in my language so that I understand.” Then he explained |                                                                                   |                          |
| it to me.” (Respondent #46)                                  |                                                                                   |                          |
| “I show more respect to men, especially older men because   | Developed competence and skills, including professional skills, skills like      | Competence & skills      |
| they have the attitude.” (Respondent #43)                    | prioritizing and soft skills.                                                     |                          |
| “I think that women in general take too much responsibility | Considering gendered systems as the norm of industry/occupation, OR in some cases: | Career-related attitudes |
| and that you actually should be aware of that you can get    | Denying the presence of gendered systems in the industry, blaming specific        |                          |
| help and prioritize. Don’t do good everywhere. That is      | individuals (men and women) for creating uneasy atmosphere in teams, sometimes   |                          |
| impossible.” (Respondent #50)                                | blaming early career women for not being able to stand up for themselves          |                          |
| “Typically, men in this sector try to exclude or marginalize | Considering gendered systems as the norm of industry/occupation, OR in some cases: |                          |
| women and assign inferior roles to them, but this is often  | Denying the presence of gendered systems in the industry, blaming specific        |                          |
| done rather implicitly and in secret, which makes it        | individuals (men and women) for creating uneasy atmosphere in teams, sometimes   |                          |
| difficult to counter.” (Respondent #42)                      | blaming early career women for not being able to stand up for themselves          |                          |
| “Many companies in the IT sector are rather young, and then  |                                                                                   |                          |
| small companies merge into larger ones. People from the     |                                                                                   |                          |
| smaller companies continue into the larger ones and are     |                                                                                   |                          |
| all friends. As it was mainly men who founded IT companies, |                                                                                   |                          |
| even the leadership teams in the larger companies build on   |                                                                                   |                          |
| these old friends’ gangs.” (Respondent #41)                  |                                                                                   |                          |
| “There is a tendency of men in the industry to look down on |                                                                                   |                          |
| women and set norms which exclude women from participating, |                                                                                   |                          |
| for example by defining what kind of leadership style is    |                                                                                   |                          |
| acceptable in the organization. Even women who receive     |                                                                                   |                          |
| leadership roles in the IT industry have a harder time to   |                                                                                   |                          |
| get accepted for their competence. After all, it is defined |                                                                                   |                          |
| by men in the organization, who are in majority and hold    |                                                                                   |                          |
| more power, how female leaders are supposed to act as       |                                                                                   |                          |
| managers, and they can easily make use of marginalization    |                                                                                   |                          |
| and exclusion techniques to show their dominance.” (Respondent #38) |                                                                                   |                          |
3. Advanced career resilience of female IT professionals in the late career stage

| Examples/quotes from interviews | Coping mechanism | Attribute |
|---------------------------------|------------------|-----------|
| "When I started my career, I was 10 years younger than everyone else. And they were all men. So I was the only woman. Then I had a manager who was a woman and she supported me a lot." (Respondent #49) | Women empowerment and serving as a personal example is a way out within the gendered occupation, which is meant to help other women enter the IT sector and advance in it. Acting as a role model for all women, not only in IT - women IT consultants (in high demand): | Hope |
| "I've got three daughters. I'm very happy that I can be a role model for them. I say them, "Never take this discrimination, take what you want. So don't come and say "I wasn't offered something." Nobody's going to come to you and offer you a job and tell you "Do you want this?" So you need to be very clear in communicating. I want this and this. You need to go to your manager and say, I want this and that. Otherwise, it's not going to happen unless you take imitative. So I think women need to take a bigger part in investing in themselves." (Respondent #46) | Inspiring others at events, plus an active online presence which serves both ways – it increases the professional status of the inspirer among work colleagues, and it encourages young women who are potential recruits. | |
| "Now women are more aware. We want more women, including in leadership positions in data and technology. I think it's the awareness that we need to work on. We are creating that, through events and so on that put us on that journey, but I think it is going to be awhile before we are there." (Respondent #45) | There is a shared view that the industry is able of changing and attracting more women. | Realistic optimism |
| "In our company our vision is to digitalize the world and to thereby contribute to a better world. But we are not very good in communicating this to the outside, so it might appear a bit scary to work in IT, though we have trainee programs there you can learn all skills you need to work in IT. But I think the sector has difficulties in communicating how fun it is to work here. Maybe we should change the titles of the positions that men and women tend to work with here, they do not sound very attractive." (Respondent #47) | | |
| "Women are more open to each other. Because we do not have that barrier as men that we don't take their space. In these circumstances, it is easier for us to open up for each other and help each other." (Respondent #43) | | |
This career stage is represented by 12 IT professionals in our sample, whose experience in the IT industry ranges from 6 to 14 years. In this stage, women are in the process of gaining control over their self-evaluations, that is, their beliefs about themselves (Mishra & McDonald, 2017). They have developed a skillset and some fruitful work relations, and they continue to adapt to uncertainty. The ability to enhance one’s career resilience in this stage is still highly dependent on the context, that is, a supportive workplace.

Female IT professionals advancing their careers to middle-level IT positions commonly tell about encountering an unspoken status quo of gendered organizations—that they are expected not to be too ambitious. Indeed, it tends to beat this stage of career progression that the gender-related challenges for female IT professionals become difficult to handle. Within the existing gendered hierarchies of the IT sector, an ambition of not just working with testing or programming, but wanting to design, manage, and strategize system integrations is regarded as a bold statement for a woman—at the same time as the newspaper discourse claims that women too rarely express such ambitions. Once female employees reveal their career ambitions, they notice that the previously relatively subtle and implicit biases start to take overt forms. Being reminded of their minority status in IT organizations can create some insecurities for even the most resilient women. In such situation, positive feedback could serve as a trigger for career resilience (Kossek & Perrigino, 2016) and potentially counteract these insecurities, yet it is not always explicitly provided. Here, mentorship programs and leadership development, as outlined in some newspaper articles published in recent years, could play an important role—but the women in our sample had not (yet) benefitted from such programs, though some of them worked at companies who publicly expressed their commitment toward achieving gender equality. Currently, women might waste psychological capital trying to prove their professionalism, as this struggle with one’s own gender identity to camouflage into the masculine environment can lead to a rejection of their own gender identity:

> I never talk about women in tech. Why? Because I want to talk about something technical and show code. I don’t want to be the one who has to talk about women in tech all the time, because when women do that, it’s only women who come to listen. I want to be a woman who talks about technology. (Interviewee 21)

In this career stage, on one hand, many women develop their networks by organizing and/or joining events especially aimed at women in IT, but also for IT professionals more generally, partly in order to compensate for the lack of support received from their own organizations. Above, we had presented a whole list of such networks established over the past years (see Table 1). Indeed, such networks can play an important role for women to feel supported when challenging the existing implicit gender contracts segregating tasks, roles, and professions in IT (cf. Hirdman, 1988). On the other hand, many women give up on their previous career ambitions and might change occupational sectors and/or employers in an attempt to be better accommodated within the industry. Many women give up their ambitions at this career stage because they feel unable to balance multiple roles—despite the generous parental leave system in Sweden outlined above—and still keep up with the rapid pace of developments in IT.

> I have two kids. With my first kid, I was home for one year. And when I came back, in the IT industry there were new frameworks, new languages, everything was new. So, I went back to the same project and everything was different. [...] All the men are home only for six months [for paternity leave] or even only a couple of months here and there. Only part-time maybe. So, they can work a lot more than I could. That’s the big difference I noticed now. [...] Yeah, [I do] a bit [of] late nights to keep up. (Interviewee 23)
This quote illustrates a potential weakness of the current parental leave system, which is aimed at providing economic security, but neglects the effects of the rapidly degraded knowledge basis after the leave. Even if women manage to maintain or upgrade their competence base by taking further programming training and certification courses, the persisting gendered structures lead many to leave the profession. The “survivors” are typically the ones that have managed to gain influence within their teams by nurturing self-esteem and self-efficacy:

I have always felt that I needed to do more and perform better than my male colleagues. One time, I was presented as ‘expert, Swedish and woman’. That was very strange, of course, it was not me who had chosen that introduction, but the client. And there was a man in that meeting who really had a problem with a woman coming in and leading the process. After the meeting, the others went for lunch, but I was never asked whether I wanted to come along. But over time, (...) they started to note my competence, and then their behavior changed. (Interviewee 24)

Women who continue to pursue their career in IT maintain their psychological capital by exercising self-efficacy, supporting other women rather than imitating men, and having a realistically optimistic outlook on their careers. Being ambitious requires a “one-woman army of perseverance and energy”—a common theme in the interviews. This perseverance and high energy levels are based on earlier aggregated psychological capital and risk-avoidance skills to further enhance career resilience. Obstacle avoidance planning and motivating other women become important practices at this stage, allowing female professionals in IT to tackle higher workloads and move on to the next career level.

3.2.3 | Advanced-level IT positions: mastering career resilience

This career stage is represented by 20 interviewees in our sample whose professional experience in the IT industry ranges from 15 to 35 years (see Table 2). This stage is characterized by women's developed career resilience and having control over their self-evaluations and career-related attitude (Mishra & McDonald, 2017). In this stage, women professionals tend to be able to influence the organizational agenda to suit their values. The career resilience development is still context-specific and depends on job- and industry-specific characteristics, such as one's position in a company.

Having reached a relatively high organizational rank (such as that of CIO) or progressed in one's careers to the level of an esteemed, widely acknowledged and prestigious job position, such as system architect, the women in our sample belonging to this group tend to no longer perceive bias or hidden discrimination during meetings with clients or other managers. This can be attributed to legitimacy established by persistently developing one's career, or, as Chambers et al. (2004) put it, by having earned the right to be “one of the boys.”

The interviewed female IT professionals with advanced careers disagree on whether their higher hierarchical position might serve as a mitigator of implicit gender bias. Some explain how their career advancement has changed their perceptions of themselves, making them more comfortable to also serve as mentors for other women. These women, who have become true masters of career resilience, are motivated to support junior female colleagues, and by these means, they enact hope and realistic optimism toward their professional setting (cf. also Petrucci, 2020). Nevertheless, being a relatively small number of highly resilient women in advanced career positions in the IT industry does not encourage them to take collective action to dramatically alter the gendered organizational cultures. The experiences of women who have succeeded with their career in IT share a view that it remains each woman's individual responsibility to navigate through the gendered organizational practices and develop their own career resilience—thus they tend to take little action to renegotiate the invisible gender contract (cf. Hirdmann, 1988).
Despite the efforts by the government, higher education institutions, nonprofit organizations, and private companies to attract more girls and women to receive an education and work in the IT sector noted in Table 1 and in our newspaper analysis, we find in our interview study that these efforts have mainly paid off in removing obstacles at career entry levels, such as addressing education requirements and recruitment processes. After entering this career, women feel rather left alone regarding their development over the life-span of their career. While some minor increase in the ratio of women active in the sector has been witnessed, women continue to perceive that within their organizations they are largely stuck in “skills ghettos” and are left to themselves to develop and practice career resilience to tackle the day-to-day adversities faced in this gendered industry. Interestingly, this is in contrast to the public discourse, which has started to outline the need for more career development focus by IT companies to maintain women in this career—but even the IT professionals in our sample who work at the companies involved in these activities have not yet benefitted from them. Nonetheless, this change in public discourse suggests that a change in the gendered system is currently emerging, but it make take years to fully take effect (cf. Hirdman, 1988).

It has been claimed that women play an important role in the reproduction of their inferior social status within gendered systems (Hirdman, 1988). Here, the popularity of initiatives like coding camps for girls can over time contribute to challenging the gender order. Still, our interview study clearly shows that to date IT organizations continue to be highly gendered and tend not to value female IT specialists’ career ambitions. Women in IT still tend to be gender segregated into specific, technical roles that have less status and are associated with female characteristics, as design, user-friendliness, and appearance as had been suggested for example by Roman (1994) and Peterson (2007). Similar to what has been shown for restaurant kitchens and newsrooms (Chambers et al., 2004; Harris & Giuffre, 2015), women in IT tend to be responsible for the more monotonous, routine tasks, with reference to “preserving traditions” and “testing the work quality,” while men retain the activities requiring innovation, creativity, and strategizing, such as system analysis, design, and control. Thereby, “skills ghettos” are maintained, and women are segregated into less important positions which are difficult to leave through career progression.

Following the argument of Hirdman (1988, p. 53), we confirm that female IT professionals are part of a “gender contract” between the sexes, and these invisible contracts operationalize the gendered system within IT organizations. As outlined above, gender contracts are based on mutual role expectations and describe, on one hand, the boundaries of women’s opportunities and, on the other hand, the relationship and interface between what is considered as masculine and feminine. Hirdman’s (1988) theory helps us to understand why women in the Swedish IT sector struggle to challenge the gendered practices they encounter. It is easy to find a job in IT, and many of our interviewees stated that they would rather have full-time employment with the social security this entails than accept the higher level of freedom to pick which clients to work for that freelancing would allow. Thus, even if they are treated unfairly in processes of selection for trainings and career advancements, they often prefer to remain part of this gendered system and act as if organizational practices were ungendered. Thereby, they contribute to manifesting the “otherness” of career-oriented women in IT, and to cementing positions such as project leads and quality assurance testers as “typically female.”

It also marginalizes those women who reveal their career progression ambitions relative to their less ambitious female colleagues who more readily accept gendered positions. One challenge for these women is to develop the resilience to get to grips with their own role as esteemed IT specialists as part of their professional self-identity. Several women in our sample reported their inner conflicts of how to combine their feminine side with their “nerdy” side. In that struggle, they are constantly reminded of their minority status, questioned regarding their competence, and at times mistaken by clients as secretaries. Consequently, female programmers sometimes fall into the trap of reproducing hegemonic gender structures by “othering” themselves and even “othering” fellow women in IT, instead of supporting each other.
Our interview study sheds light on the challenges of career progression and the need for developing career resilience over time. Indeed, the need for resilience is perceived as more acute for career progression than for the early career stage. Failing to develop career resilience over time deprives many women the opportunity of advancing in the field—and women feel largely left alone in managing this process. Perceived challenges relate to the “glass ceiling,” implicit biases, and diminishing of their professional outputs. Female IT professionals need to develop career resilience to face a work situation characterized by a continuous devaluation of their skills on both organizational and individual levels, as they are placed in “professional ghettos” of lower status and are assigned lower valued IT jobs such as quality assurance and testing. Positions requiring innovative thinking and strategic decision-making as well as leadership positions such as system architects are still difficult for women to acquire even if expressing the ambition for career progression. Women who make it to these positions have typically focused on becoming resilient, making up for the lack of organizational support. However, the rather newly launched company-level initiatives committing to the promoting of women in IT companies identified in our newspaper analysis can be expected to soon bring about some change.

Our findings of women’s career trajectories in IT suggest a conceptualization of career resilience as a long-term, conscientious process of developing one’s self-confidence, skills and competencies and drawing on hope, realistic optimism, and support networks for the purpose of building a fulfilling career over its entire time-span. Enacting career resilience tones down the effects of career plateau and allows women to gain professional legitimacy within gendered organizations. In a male-dominated work environment—even in a relatively gender-equal context such as Sweden—this adversity triggers the need of women programmers to legitimize themselves in gendered organizations. Reaching a legitimized status opens doors to further professional opportunities, such as professional trainings, and acknowledgment by “influential outsiders” with high status-quo (Harris & Giuffre, 2015) or the clients of IT firms.

We integrate our findings into a process model of female IT professionals’ career resilience enaction (see Figure 1). In this model, we capture career resilience enaction as taking place from career entry to career development over one’s entire career life-span. Based on typical progressions in the industry, the process of career resilience of female IT professionals can be divided into three main stages—emerging, enhanced, and advanced career resilience. In our interview study, these stages were captured by interviewing relatively new entrants, midcareer specialists, and experienced IT professionals, to outline how enacting career resilience practices occurs over the course of their careers.

We have identified that career resilience is enacted through seven attributes: locus of control, competence and skills, career-related attitudes, self-efficacy, self-esteem, hope, and realistic optimism. These seven attributes of career resilience and Psy Cap resources (cf. Luthans et al., 2010) are enacted differently throughout the three career stages of early, mid, and late-career. Considering the hierarchical and competitive nature of IT occupations, it appears crucial to develop competences and skills as well as an internal locus of control within the first years after career entry. In addition, nurturing a positive career-related attitude appears as an important step toward emerging career resilience.

During the second career stage, self-efficacy and self-esteem serve as the building blocks for further development of career resilience. If these personal attributes remain underdeveloped, combined with a lack of organizational interventions promoting women, such as gender-specific trainings, female professionals may end up deciding to exit the industry during the midcareer stage.

In a later stage, hope and realistic optimism play a key role in allowing women to develop career resilience to an advanced level. Hope and realistic optimism are enacted through women’s empowering of others within their workplace and beyond, such as mentoring new colleagues, serving as role models, and contributing to a better recognition of women’s contribution toward the IT industry. In the absence of gender-specific human resource development initiatives, women get involved in supportive communities rooted in professionalism such as women’s IT forums or organizing and leading coding courses. The mentorship role serves as a source of development of hope and realistic optimism. If these attributes are underdeveloped during the midcareer stage (i.e., women prefer not to network with others), then women may remain in the industry, have a strong career-identification but may not be
Three stages of career resilience enaction among female professionals in IT organizations

First stage: Emergent career resilience
Early career stage (0-5 years of service)

Coping mechanisms:
- Camouflage (looks, dress, and act like the rest) and adaptation;
- Demonstration of professionalism; speaking up at meetings;
- Boosting up one's confidence;
- Developing a skill-set.

Second stage: Enhanced career resilience
Mid-career stage (6-14 years of service)

Coping mechanisms:
- Adaptation to the gendered practices by taking an individual stand;
- Working longer hours;
- Developing a skill-set;
- Building relations within an organization and outside through networking events;
- Either fighting with stereotypes openly or giving up and contributing to the "otherness" of women in IT to keep the job and avoid going freelance.

Third stage: Advanced career resilience
Late career stage (15+ years of service)

Coping mechanisms:
- Empowering other women and serving as a role model;
- Gaining confidence;
- Developed skill-set incl. soft skills;
- Becoming "one of the men" or developing hard skin to deal with adversity;
- Learning to foresee circumstances and confront men;
- Strong self-identification through one's occupation and valuing one's professional qualities.

FIGURE 1 Three stages of career resilience enaction among female professionals in IT organizations
able to effectively deal with the effects of career plateau. The importance of role models and mentors for aspiring women also received abundant attention in the newspaper discourse and might contribute to changing the current gendered system by more firmly establishing IT professions as culturally accepted viable career options for women (cf. Hirdman, 1988).

Our findings add a gender perspective on career resilience, considering female employees in highly gendered occupational settings. Therefore, they can be assumed to hold beyond IT to other male-dominated sectors such as STEM, journalism, and military. Our findings expand prior literature on individual-level resilience by contextualizing career resilience to an occupational setting and national context, capturing how female professionals practice career resilience in a long-term dynamic, continuous process. This process is not tied to extreme events or crises and instead considers career resilience as an essential prerequisite for smoothing the effects of possible career plateaus and succeeding with one's career.

Our findings suggest that due to prevailing, subtle gendered practices, hidden discrimination, and gendered organizational cultures even in knowledge-intensive sectors like IT—and even in relatively gender-neutral countries like Sweden—career resilience is a prerequisite for women professionals to advance in their careers. Furthermore, our findings can be used to advance knowledge on developing career resilience as a form of emotional labor among both male and female professionals in other gendered occupations, such as in nursing or the military. Several studies have identified the importance of resilience of males working in professions gendered as “typically female” (Hart et al., 2014; Jackson et al., 2007), for example, showing how career resilience can positively influence their intent to retrain and more smoothly return to work after a leave of absence or a career break (Cottingham, 2015; Hudgins, 2016). Studies of male nurses point out how they challenge and reframe traditional role identities in the workplace and relinquish control of their own emotions to perform professional duties (Cottingham, 2015). It can be assumed that such challenging of hidden gender systems not only by women entering "male" professions, but also by men entering "female" jobs can accelerate the breaking up of such dichotomy, thereby rendering not only the male norm illegitimate (Hirdman, 1988), but also facilitating career choices of nonbinary transgender people.

4.1 Practical recommendations

Several studies have noted that individual career resilience can be enhanced, trained, and developed (e.g., Shin et al., 2012). Career resilience can positively influence one’s intent to remain within a profession (cf. Hudgins, 2016) and encourage employees to return to work and retrain after a career break—a key workforce management determinant for occupations with reported shortages of workers, such as IT. Though IT organizations tend to be highly gendered, companies often approach employee resilience from a gender-blind or purely stress-management perspective (Kossek et al., 2016; Witmer, 2019). Previous research in the Swedish context suggested that such interventions might not be effective for female employees (Thunman, 2015). Therefore, resilience training could benefit from more explicit gender awareness. If more women join the IT sector, organizational performance might otherwise be jeopardized. Higher levels of job satisfaction among female IT professionals could possibly be achieved if organizations better recognized and responded to the challenges faced by women throughout the different phases of their career life-span.

5 CONCLUSION

The aim of this paper was to explore how female IT professionals develop and practice career resilience to overcome challenges faced when pursuing a career in this male-dominated industry. This study is relevant, as career resilience appears to be a differentiator in women’s career advancement in the male-dominated IT sector.
Besides, the current career and workplace uncertainty and social isolation caused by COVID-19 impacts professionals (Özkazanç-Pan & Pullen, 2020) and increases the importance of developing one’s career resilience.

We suggest a process-based view on career resilience for capturing women’s coping strategies in gendered organizations. The day-to-day adversity, triggered by gendered organizations with their hidden discrimination, requires women to continuously practice resilience, rather than only in response to extreme, sporadic events as had been suggested by prior research (e.g., London, 1997; Youssef & Luthans, 2007). Accordingly, career resilience is a conscientious and arduous long-term process of developing one's self-confidence, skills, and competencies and drawing on hope, realistic optimism, and support networks for the purpose of building a fulfilling career over its entire time-span. Therefore, career resilience includes not only the conservation but also the expansion of psychological capital resources such as hope, self-efficacy, and realistic optimism (Luthans et al., 2010). Successful individual-level career resilience can contribute to dissolving the existing hidden gendered system.

CONFLICT OF INTERESTS
The authors declare that there are no conflict of interests.

DATA AVAILABILITY STATEMENT
Data available on request from the authors.

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ENDNOTE
1 This interviewee ended up changing her employer after returning back from maternity leave and not being able to keep up with the workload. She decided, however, to stay within the IT industry.

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