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Reference:

van Acker Wouter, Wynen Jan, Op de Beeck Sophie.- Illuminating the gender divide in public sector innovation : evidence from the Australian public service
Public personnel management - ISSN 0091-0260 - 47:2(2018), p. 175-194
Full text (Publisher's DOI): <https://doi.org/10.1177/0091026017747299>
To cite this reference: <https://hdl.handle.net/10067/1477560151162165141>

Illuminating the Gender Divide in Public Sector Innovation: Evidence from the Australian Public Service

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Abstract

Like many other aspects of the work environment, “innovation” is a gendered term that creates a barrier to women taking part in innovation processes, and in particular, in male-dominated and “masculine” industries. This article looks into the role of gender, as well as other potential determinants, in explaining differences in the perceived innovation climate for public sector employees. This innovation climate depicts the opportunities and support employees receive with creating, promoting and implementing innovative ideas in the workplace. Even though the public sector is often regarded as a more “feminine” work environment, our results show that women feel less encouraged in the innovation process when compared to men. Moreover, length of service and red tape appear to have a detrimental effect on individuals’ experiences of the innovation climate.

Keywords

Public sector innovation, gender, innovation climate, red tape, length of service

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Introduction

An organization's ability to innovate is regarded as a vital factor for productivity, growth, and overall success (Patterson et al., 2009) in both the private (Audretsch & Frisch, 2003; Dorenbosch et al., 2005; Dess & Pickens, 2000) and the public sectors (Rosenblatt, 2011; Arundel et al., 2015; Stewart-Weeks & Kastle, 2015). Both practitioners and academics, therefore, increasingly recognize the need for organizations to continuously innovate their products, services, and internal work processes (Agarwal, 2014; de Jong & den Hartog, 2010). The innovative potential of an organization resides, to a large degree, in the knowledge, skills, and abilities of individual employees, who create, introduce, and put new ideas into practice (Kanter, 1988; Patterson et al., 2009; Agarwal, 2014). In this article we therefore focus on innovation at the level of individuals in organizations.

Although the role of individuals in fostering innovations has been well documented, research in more recent years has demonstrated an increased interest in uncovering the factors that encourage employees to innovate (Yuan & Woodman, 2010 in Agarwal, 2014). In this regard, a large amount of work is being done on the factors that possibly stimulate or inhibit the innovative potential of individuals (e.g. Rost et al., 2007; Bankins et al., 2016; Goduscheit, 2014; Patterson et al., 2009). There is, however, one key characteristic of employees that has received relatively little attention in this field, namely that of gender (Alsos et al., 2016). Although innovation is considered a term with specific gender roles attached to it (Alsos et al., 2013; Minniti, 2009; Nählinder et al., 2015), the gender issues of innovation have seldom been discussed or examined, especially in a public sector context (Alsos et al., 2016). Due to the (mistaken) inherent connection between innovation and technology, and the assumption that men have superior technological skills to women, men are (often subconsciously) expected to be more involved in innovation processes than women (Ranga & Etzkowitz, 2010; Cooper, 2012). Consequently, women tend not to be perceived as innovators, making it more difficult for innovative ideas advanced by women to be heard from the outset (Alsos et al., 2013; Bray, 2007). In other words, the organizational innovation climate that supports and encourages the creation, promotion, and implementation of new ideas may be different for women than it is for men. As a result, the gendering of the innovation process may be a barrier hindering women from engaging in innovation and promoting their innovative ideas (Foss et al., 2013; Nählinder et al., 2015), which, in turn, poses a barrier to the innovative potential of the organization as a whole.

This article investigates whether women in a public sector context perceive their organization's innovation climate differently than men. There are a number of reasons to examine this subject.

Firstly, although studies on the connection between innovation and gender have increased over the preceding five to ten years, they still remain sparse (Nählinder et al., 2015). Innovation studies, on the whole, remain rather gender-blind, meaning that “[t]he implementation and formulation of innovation policies and innovation research are often designed as if innovation is gender-neutral” (Nählinder et al., 2012, p. 357, see also Kvidal & Ljunggren, 2010). Furthermore, when the gender issue of innovation has been studied, the studies have mainly focused on highly technological and male-dominated sectors, suggesting the continuing need for more research in services and female-dominated sectors. In this type of setting, such as the public sector, the common assumption is that gender differences are less influential in everyday work, but that assumption has not been tested yet (Alsos et al., 2013; Ljunggren et al., 2010; Nählinder et al., 2015).

Secondly, there has been a growing interest in innovation in the public sector as a means of increasing the efficiency and quality of government services (Hartley, 2005; Osborne & Brown, 2013; both in Torugsa & Arundel, 2016). Generally, however, the innovativeness of public sector employees is assumed to be lower than that of private sector employees, due to such issues as bureaucracy, red tape, and a lack of competition (Bysted & Hansen, 2015). This observation alone indicates that the public sector as a setting for innovation research requires attention, and yet, we found no actual research regarding the role of gender in innovative activities in public sector organizations.

Overall, the objective of this article is to contribute to the limited knowledge regarding the innovation process from a gender perspective in the public sector. We thus address two gaps in the existing literature: (1) we combine the issue of gender with public sector innovation literature, and (2) we introduce a female-dominated setting to the literature surrounding gender in innovation: the public sector. The importance of efficient and effective innovation processes for the public sector combined with the dearth of research on the issue of gender in public sector innovation, along with the need to test the findings from “masculine” and male dominated sectors in a more “feminine” and female dominated sector, make for a compelling case to investigate the ways in which gender affects public servants engaging in innovation activities. Based on data from the 2014 Australian Public Service (APS) census, we examine the relationship between gender and innovation processes in the Australian government. In

particular, we assess the role of gender, as well as other potential determinants, in the perceived innovation climate in the workplace.

The remainder of the paper is organized as follows. In the following section, we discuss the relationship between gender, innovation and innovation climates: why and how gender can influence the perceived organizational innovation climate. We then describe the data, control variables, and method, before clarifying the results of the analyses. Finally, we discuss our findings, offer concluding remarks, suggest further opportunities for research, and discuss the implications for practice resulting from our analysis.

Innovation Climates and Gender

Gender plays an important role in work environments. Issues such as gender roles and status (Eagly & Karau, 2002), gender segregation (Connel, 2006; Sneed, 2007; Johnson & Crum-Cano, 2011), and the gender pay gap (Bishu & Alkadry, 2016; Mandel & Semyonov, 2014) are well established research fields. The work done in these areas shows us that there are still strong stereotypes connected to both men and women. Men and women are supposed to behave a certain way, have certain jobs, and work in certain sectors, other than the opposite sex (Deaux & Lewis, 1984; Eckes, 1994). To investigate the relevance of gender in the innovation process, and the gender stereotypes therein, we first have to go back and ask ourselves what innovation actually is.

Innovation has been academically distinguished from invention. In the Oxford Handbook of Innovation, it is described as follows: “Invention is the first occurrence of an idea for a new product or process, while innovation is the first attempt to carry it out into practice” (Fagerberg et al., 2005, p.4). The scope of innovation can vary, from smaller-scale innovations to the development of radical new ideas, or products, or services (Foss et al., 2013). In the public sector, specifically, innovation may take several forms: policy (e.g. new policy instruments), service (e.g. quality improvement), service delivery (e.g. altered form of delivery), along with administrative and organizational (e.g. change in procedures), and conceptual (e.g. new worldviews and missions) forms (Torugsa & Arundel, 2016; Windrum, 2008). Innovation is thus more than just technology.

Despite the academic distinction, most people tend to regard innovation and invention as synonymous, leading people to still see innovation as something best captured in terms of patents, R&D, and products containing metal and micro-chips. Such an operationalization of innovation, however, creates the foundation for a gender bias, since men are dominant in the

sectors where such an operationalization applies (Nyberg, 2009). However, considering the social perception of innovation as taking place solely in male-dominated sectors (engineering, IT, chemistry, etc.), women are consequently viewed as being less innovative (Ranga & Etzkowitz, 2010). This, then, makes innovation a gendered term, and as a result, women tend to be overlooked as innovators.

This issue relates to so-called descriptive gender roles. Stereotypes about gender roles can be divided into two categories: descriptive ones ('this is what women do'), and prescriptive ones ('this is what women *should* do') (Eagly & Karau, 2007; Cialdini & Trost, 1998). Innovation is linked with technology, and technology with men. This leads to women being less visible as innovators (Nyberg, 2009). The issue is thus not that women *shouldn't* innovate, which prescriptive norms would infer, but that we don't see women innovate, and thus don't associate innovation with women. Consequently, women will have to strive harder to be regarded as potential innovators, to have their innovative ideas put forward in the innovation process, and to find support for the implementation of their ideas. Overall, women's innovative potential thus remains unexploited, with their gender as an important barrier (Foss et al., 2013).

So what does this barrier look like? In this article, we hypothesize that this barrier takes shape in the form of a different innovation climate for man and women. The innovation climate is defined here as the "employees' perception of the degree to which an organization supports and encourages its staff to take the initiative to explore creative ideas that foster innovation within the organization" (Chan et al., 2014, p. 2). The innovation climate of an organization is judged as essential in determining how much innovation can take place at the employee level (Sarros et al., 2008; Martins & Terblanche, 2003). This climate, we hypothesize, may be different for women due to the gendering of the term 'innovation.' Considering that women aren't seen as (potential) innovators, their perceived support and encouragement to innovative can be hypothesized to be lower than for men. In order to understand how this might influence the innovative activities of women in practice, however, it is important to describe the innovation process that takes place within such a climate.

The type of innovative activities that are encouraged among employees in such a climate, also called innovative work behavior (IWB), are conceived here as "the intentional creation, introduction, and application of new ideas within a work role, group, or organization, in order to benefit role performance, the group, or the organization" (as adopted by Janssen, 2000: 288). Although this paper does not specifically measure or address IWB, it does draw

inspiration from it. Most notably we consider the employee-driven innovation process to consist of separate stages: idea generation, idea promotion or championing, and idea implementation (Janssen, 2000; Kanter, 1988; Reuvers et al., 2008; Scott & Bruce, 1994). We thus view innovation as a process, at variance with the predominant viewpoint of innovation as a result or product (Salazar & Holbrook, 2004). The problem for women is anticipated to be located on the second and third stage of this process.

Idea generation relates to the formulation of novel and useful ideas. This is the part of the innovation process which overlaps the most with the concept of creativity. The research on differences in creativity between the two sexes is longstanding, and an overview of this research notes that a “lack of differences between girls and boys, and between men and women, is the most common outcome.” (Baer & Kaufman, 2008, p.98) This is true for both self-assessments and tests scores such as the Torrance Tests. This would imply that, since women have been found to be equally creative as men, the gendering of innovation is not anticipated to have an impact at the idea creation stage of the innovation process.

Further, once an employee has generated an idea, sponsors and allies with the necessary influence and authority need to be attained in order to provide the power necessary to capitalize on the idea (Janssen, 2000; Kanter, 1988; Reuvers et al., 2008). This activity is labeled as the “idea promotion” or “idea championing” stage. Considering that innovation is a male-gendered term, women are expected to have more problems in “selling” their ideas. Another issue, further strengthening the problems of women at this stage, is that women prefer not to be labeled as innovators since it is considered a male concept. Women tend to understate their role in innovation processes, and downplay innovations from their hands and minds (Nyberg, 2009). This, combined with the previously discussed stereotypes about the connection between innovation and technology on the one hand, and technology and gender on the other hand, mean that women are generally not perceived as innovators (Alsos et al., 2013; Bray, 2007; Cooper, 2012). This, consequentially, means that women might have greater difficulty in being heard when they have a new idea, even though they are on average as creative as men (Alsos et al., 2013; Cooper, 2012; Nählinder, 2010). The championing and promotion of innovative ideas thus expected to be significantly more difficult in this context. Subsequently, this leads to more difficulties at the idea implementation stage as well.

In other words: it is harder for women to sell and eventually implement their ideas as they receive less support and encouragement. This means that within the same organization the innovation climate, as defined earlier on, might be different for men than it is for women.

Apart from the ethical and moral arguments for equality in the innovation process, “[r]ecognising female innovativeness is crucial to exploit an important potential for innovation” (Nählinger, 2010, p. 27). If the innovation climate is indeed less encouraging for women, the overall innovative potential of an organization is curtailed, along all the possible negative consequences that may follow (Yang & Konrad, 2011). In industries such as the public sector, where over half the work force consists of women, the results of this would not be insignificant, which renders the public sector a primary area of investigation. In addition, we anticipate that gender has less significance in the public sector than in the private sector (where most previous research has focused on), owing to the fact that the public sector is considered more ‘feminine’ and women constitute the majority of the work force. For example, in Australia, women are more highly represented in the public sector (59.4% in 2014) when compared to the whole economy where women’s employment as a share of the total employment reached only 47.1% in 2014 (ILOSTAT data). Research on innovation amongst nurses, for example, shows that in a sector heavily predisposed towards women “there are gender differences in favor of women in the creativity and indirectly, also in the innovativeness of employees” (Nählinger, 2010, p. 13). Group dynamics in particular, important in the process of championing ideas, are expected to be more responsive to female innovators in the public sector.

The main objective of this article is thus to investigate whether or not the perceived innovation climate is different between the two genders. Based on the above issues (the public sector being a more female-dominated, ‘feminine’ and service-oriented sector) we anticipate and hypothesize that women and men perceive the innovation climate in a public sector workplace similarly. The following two paragraphs explain the method of investigation.

Data and Method

Our analyses make use of the 2014 wave of the Australian Public Service (APS) employee census. The employee census was designed to measure key issues such as employee engagement, leadership, health and wellbeing, job satisfaction, and general impressions of the APS. It was administered to all available APS employees (recorded in the Australian Public Service Employment Database (APSED)), providing a comprehensive view of the APS and ensuring that no eligible respondents were omitted from the survey sample (reducing sampling bias and sample error). The total targeted population equaled 151,792 out of which 99,392 employees responded, leading to a response rate of 68%. The methodology used minimized sampling bias and sample error by ensuring that all APS employees had been

invited to participate. Some employees who had only recently entered the APS, however, were not recorded in APSED at the time the invitations were issued. The omission of these employees or those who had recently changed agencies may have introduced some sampling errors. Agencies were, however, given the opportunity to review or provide their own email lists and were encouraged to contact the organization in charge of the census if they did not receive copies. Non-sampling bias was checked by comparing the survey sample against the overall APS population on gender, classification, location, and employment category. No significant difference could be detected.² We were forced to use a subsample of the APS employee census since respondents did not always answer all of the questions. The final sample offered a representative sample of 47,305 employees. Due to these missing data for the explanatory or dependent variables, the data used for the analyses is limited. Consequently, we compared the estimation subsample used in the regression analyses with the representative full sample of employees. Values were similar, suggesting that missing values were randomly distributed, and that the observations used to estimate the regressions constituted a representative subsample of all the employees that were originally included in the survey.

Operationalization of Variables

The dependent variable – innovation climate – was defined earlier as “employees’ perception of the degree to which an organization supports and encourages its staff to take the initiative to explore creative ideas that foster innovation within the organization” (Chan et al., 2014, p. 2). This definition of innovation climate was measured through an index based on the following question from the APS employee census:

Please rate (on a scale from 1 (strongly agree) to 5 (strongly disagree)) your level of agreement with the following statements:

- *I believe I would be supported if I tried a new idea, even if it may not work.*
- *In my work group I feel comfortable to voice an opinion that differs from my colleagues*
- *In my work group, we are allowed to voice an opinion that differs from our supervisor*
- *In my current job, I am able to explore new ideas about how I do my job.*

² This part comes from the State of the Service Report 2013-14. Further information on the survey methodology is available at: <http://www.apsc.gov.au/publications-and-media/current-publications/state-of-the-service/state-of-the-service-2013-14/appendices/survey-methodologies>

- *In my current job, I have the time to explore new ideas about how I do my job.*

These responses were aggregated, after which they were divided by 25, resulting in a value between 0 and 1.³ The index was found to be reliable (Cronbach's Alpha is 0.8033). This was also confirmed by running an exploratory factor analysis (using a polychoric matrix in order to account for the ordinal nature of the items). This operationalization differs from other frequently used measuring scales (e.g. Ekvall et al., 1983; Scott & Bruce, 1994; and Siegel & Kaemmerer, 1978), since we had to rely on data from a survey not specifically intended to measure innovation climates. Nonetheless, recurrent issues from the previously mentioned scales are present in our scale as well: debate, risk-taking, support for creativity, and freedom. Future research should try to use one of these more established measuring scales in order to further validate the results displayed in this article.

Besides this measure of innovation climate, indexes were created for several control variables which have been found to be linked to innovation climates and employee creativity and innovativeness.

Supervisor support is perhaps the most investigated factor for its role in constituting an innovation climate. Employees are highly dependent on their supervisors for information, resources, and sociopolitical support in order to develop, promote, and realize their new ideas (Kanter, 1988). Employees are thus more likely to carry out innovative activities when they perceive their supervisors as being supportive (of innovation) (Janssen, 2005). Innovation climates are additionally greatly dependent on the support employees receive from their supervisors (Aarons & Sommerfeld, 2012; Chan et al., 2014).

Co-worker support and the reliability of this supportive relationship is believed to contribute to various perceptual, attitudinal, and behavioral outcomes, such as an individual's job performance (Chiaburu & Harrison, 2008; Paarlberg, Perry & Hondeghem, 2008; Perry & Porter, 1982), as well as being a cornerstone for an innovation climate (Arad et al., 1997; Tushman & O'Reilly, 1997; Martins & Terblanche, 2003).

Self-efficacy, a personal judgment of "how well one can execute courses of action required to deal with prospective situations" (Bandura, 1982: 122), is also understood to have a positive effect on individual innovative behavior (Michael et al., 2011; Farr & Ford, 1990; Mumford &

³ In principle, the level of measurement of a Likert-type index is ordinal. However, we are treating the measurement as if it were interval. This practice allows us to create an index and it is our opinion that treating Likert-type scales as if they were interval measures provides more advantages than disadvantages in this case (7-point Likert scales).

Gustafson, 1988). The same applies to innovation and creativity-focused training (Woodman et al., 1993; Tesluk et al., 1997). A negative relationship is found between the existence of red tape, that is, unnecessary bureaucratic burdens on the one hand, and employees' innovative potential on the other (Bozeman & Kingsley 1998 cited in Tummers et al. 2016; Ren & Zhang, 2015; Cavanaugh et al., 2000; Ronquillo, 2013). DeHart-Davis (2009), on the other hand, does not find a relationship between creativity and red tape. Finally, we controlled for the length of service, level of education and place of employment (Australian Capital Territory or Other).

All independent variables were directly implemented from the APS employee census⁴ excluding supervisor support, co-worker support, and self-efficacy. For these variables indexes were created. The precise items on which these indexes were created can be found in the appendix. All indexes proved to be reliable with Cronbach's alphas ranging from 0.84 to 0.92.

Table 1 shows descriptive statistics as well as a (Pearson) correlation analysis of the variables used.

Please include Table 1 here

The linear correlation analysis among regressors is reported in Table 1. Not surprisingly, there appears to be a strong correlation between the supervisor and co-worker support variables. Consequently, we tested for multicollinearity using the variance inflation factor (VIF). The mean VIF equals 1.37 whereby, as expected, the highest VIFs exist for supervisory support (1.50) and co-worker support (1.60). These values indicate that no collinearity exists between the variables, or in other words, that the shared variance of the variables is rather low and their discriminant validity is potentially high.

Analysis and Results

As previous sections have demonstrated, we anticipated that the perceived innovation climate Y depended on individual X and organizational U as well as non-observable factors ε ⁵.

$$Y = \beta_0 + \sum_k \beta_1 X_k + \sum_k \beta_2 U_k + \varepsilon.$$

⁴ the precise wording of the underlying question can be found online at https://www.stateoftheservice.com/2014_APS_employee_census.pdf

⁵ For simplicity, we suppress agency subscripts i .

To estimate the relationship between the variables outlined above and Y a specific econometric model was required. The ordinary least squares (OLS) method was not suitable because it does not take into account that Y is bounded between zero and one, which can result in impossible predictions. We, therefore, used a Tobit model, where one can set the lower and upper bounds, to deal with this kind of dependent. The coefficients in the Tobit model can be interpreted in a number of ways, depending upon one's interests. We were only interested in the latent variable, and following Cameron and Trivedi (2005), the marginal effect is the following:

$$\frac{\partial E\{y_i^*\}}{\partial x_{ik}} = \beta_k$$

We must factor in some assumptions underlying the Tobit model such as normal distributed errors and homoscedasticity, so $\varepsilon \sim N(0, \sigma^2)$. Departure from homoscedasticity or normality will cause the estimators to be inconsistent (Wooldridge, 2002). In order to test the normality assumption, we estimated the Tobit model with polynomials (quadratic, cubic) of the fitted values as additional regressors. A Wald test was then performed to check whether these polynomials had jointly significant explanatory power. For all of our models, the null hypothesis of normality could not be rejected.

If the assumption of homoscedasticity is violated in Tobit models, regressions may result in inconsistent coefficient estimates. Consequently, we also estimated heteroscedastic models where we modeled a heteroscedasticity term. The heteroscedasticity term included the workplace and length of service variables. When performing likelihood ratio tests on heteroscedasticity for all models, we noticed that the null hypothesis (homoscedasticity) could not be rejected in any of the models. When performing a Wald test on the joint significance of the variables in the heteroscedasticity term, the assumption of homoscedasticity was again satisfied. As a robustness check, we also estimated a generalized linear model (GLM) as proposed by Papke and Wooldridge (1996). Since this kind of regression led to similar results as those of the Tobit analysis, they were omitted.⁶ It does provide evidence, however, that the results of the Tobit model are reliable.

Please include Table 2 here

⁶ GLM estimates are available upon request from the authors.

The results of the Tobit estimations are presented in Table 2. A first glance at the results reveals a large number of significant factors affecting the perceived innovation climate. As proposed by the literature, gender does indeed appear to have a significant negative effect on innovation climate. Based on these results, it appears that women perceive the innovation climate more negatively than men. They feel less supported in trying out new ideas, feel less comfortable voicing adverse opinions, and have less time and ability to explore new ideas. Similarly, length of service and red tape appear to be negatively related to individuals' experiences of the innovation climate. Some of these results are to be expected; more red tape leads to more rules and procedures which, in turn, diminishes flexibility and autonomy thereby affecting employees' perceptions of the innovation climate. Although length of service has led to ambiguous results in previous research, it had a clear significant effect ($\chi^2(5)=5.48^{***}$) in our case. It appears, however, that the employees with a length of service of 15 years or more, in particular, have a more negative perspective of the innovation climate in their organization. A possible explanation could be that these employees become fixed in their "old" ways of working, which negatively affects the perception of the innovation climate.

Training, supervisor support, co-worker support, and self-efficacy all appear to be significantly and positively related to innovation climate. More training will, as proposed by the literature, have a positive effect, though it is important to note that one or two days of training per year do not appear to be sufficient. Positive effects only exist if a sufficient amount of training (at least 3 to 5 days per year) is offered to employees. The perceived innovation climate is further positively impacted by the support employees receive from their supervisor or co-workers. Finally, it appears that employees who work in the Australian Capital Territory have a more positive perception of their innovation climate than their colleagues in other workplaces. Perhaps the attention of innovation policies in the APS has focused on the capital territory, or perhaps most of the innovation in the APS takes place in the organizations located in this particular territory.

Conclusion and Discussion

This paper investigated the divide in public sector innovation climates for women and men in the Australian Public Service. It addressed an important gap in the literature of both innovation and gender research. The role of gender in public sector innovation has, up until

now, received little to no attention in public sector innovation literature. Nor has the public sector, as a more “feminine” sector of employment, received sufficient attention in literature on the role of gender in innovation in general. We used the 2014 APS employee census data, offering a representative sample of 47,305 public service employees. A Tobit model regression was used to investigate whether there were significant differences between men and women in how they perceived the innovation climate at their workplace. Based on the literature we expected there to be no difference between the two sexes, since the public sector is considered a more ‘feminine’ sector. We controlled for supervisor support, co-worker support, self-efficacy, length of service, education, training, red tape, and workplace.

Our results demonstrate that women experience a less supportive innovation climate than their male colleagues, even in a public sector environment. Even though researchers have found that the level of inequality between men and women has reduced over time (Bolitzer & Godtland, 2012). The more negative perception of the innovation climate by women holds when controlling for issues such as education, workplace, length of service and self-efficacy. Women are likely to encounter less support for new ideas than their male counterparts, and feel less comfortable to voice these ideas in the first place. It is thus more difficult for women to engage in two of the three innovation stages identified in the innovative work behavior literature: innovation championing and innovation implementation. This is an important type of “stealth” discrimination which needs to be a crucial focal point for practitioners wishing to optimally exploit the innovative ability and creativity of public servants. In the public sector, where women comprise a majority of the workforce, the fact that they are obstructed (whether deliberately or sub-consciously), places an important limit on the public sector’s innovative potential.

These findings add to the occupation segregation (or ‘glass wall’) literature, which finds differences between genders in terms of sectors, organizations or occupations (e.g. Connel, 2006; Sneed, 2007; Johnson & Crum-Cano, 2011). Our results indicate that there might also exist glass walls within organizations when it comes down to innovation. An alternative explanation might be that women find themselves in less innovative units than men (again referring to the occupation segregation literature), or reside in occupancies within the public sector where innovation is less opportune. Future research should take these issues into account, to further isolate the effects of gender in the public sector innovation process.

Besides the effect of gender, we also found that length of service had a negative impact on the perceived innovation climate after 15 years. This could be explained by employees becoming weary of struggling to get their innovative idea “out there”, or by the fact that they

move into more senior positions where innovation is less of a priority and the support for innovative ideas subsequently declines. Education, surprisingly, does not have an impact on the perceived innovation climate. A possible explanation for this could be the particular design of this variable. Finally, some “usual suspects” were found to be influential in the ways in which the innovation climate was viewed by public service employees. As such, the amount of red tape had a negative effect, whereas supervisor and co-worker support (aside from specific support for innovations) and self-efficacy were found to have a positive influence on the appreciation of the innovation climate. This further strengthens earlier findings on these topics.

Although this study did not lead to a “solution” for gender differences in the perceived innovation climate, it indicates that even in a sector which is maintained to be more female-oriented, women are still facing a gender barrier. This emphasizes the need for renewed attention to stereotypical perceptions. A firm and effective human resource management (HRM) policy and system are necessary to confront this disparity, and eventually level out the playing field (Curtis & Dreachslin, 2008; Richard & Johnson, 2001; Moon, 2016). Nählinder (2010) has shown that pro-active HRM projects, which improve the innovation climate and stimulate innovative behavior for both sexes, can have a profound impact on the innovation rate amongst women. Besides the moral issue and ethical arguments surrounding this restrained role for women in the innovation process, drivers and heterogeneous groups are also found to be more innovative and creative than homogenous ones (Van Knippenberg, et al., 2004), that is, when that heterogeneity can actually establish itself and come to fruition. As long as women encounter the barriers they currently do, the result of more innovative organizations through diversity, cannot be attained. Although, as represented in this study, organizations can create environments that foster an innovation climate, the challenging of the gender bias in innovation also has to happen on a societal level. Disentangling the concept of innovation from the masculinity to which it is currently attached must also happen outside of organizational boundaries.

A point of attention is the fact that our study made use of cross-sectional data which is sensitive to reversed causality. In future research, it would be interesting to have large N panel data. This way reversed causality could be examined while more explanatory variables could be included, thereby reducing the likelihood of having omitted variable bias. For instance, more information on job characteristics would offer a more detailed picture, particularly if interactions and mediations were taken into account. Additionally, men tend to be overrepresented in higher levels of the organizational hierarchy, which may also explain

part of the located gender difference in the perceived innovation climate. Unfortunately, this distinction on the basis of hierarchical position could not be made in a sophisticated way with the ASP data. Further research should, therefore, examine whether and in what ways this might play a role. In addition, this article only displays a first step in possible analyses; additional steps should attempt to consolidate the conclusions. Future research could expand our model by examining and adding factors which are difficult to integrate in a quantitative study. Consequently, a qualitative study on this issue, encompassing multiple case studies of different organizations across several countries with document analysis and interviews, would not only be useful as a robustness check for the findings of this paper, but also expand the explanatory model employed herein.

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Tables

Table 1: Descriptive statistics and correlations

Variable	Question	Mean	Sd.	Min.	Max.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Innovation climate	62	3.641416	.7892059	1	5	1									
Female	1	1.524532	.4994031	1	2	-0.0290***	1								
Workplace	3	1.602452	.4893962	1	2	-0.0783***	0.0147***	1							
Length of service	5	2.83674	1.081826	1	6	-0.0806***	-0.00196	0.162***	1						
Education	10	2.435345	.8475512	1	3	0.0372***	-0.0868***	-0.123***	-0.123***	1					
Red tape	40	6.457985	2.282473	1	10	-0.212***	-0.0414***	0.0847***	0.0232***	0.00941**	1				
Training	54	2.749265	1.176833	1	5	0.104***	-0.00484	0.0751***	-0.114***	0.0414***	-0.00894*	1			
Supervisor support	20	3.898094	.7303404	1	5	0.602***	0.000851	-0.0314***	-0.0797***	0.0140***	-0.161***	0.111***	1		
Co-worker support	19	4.026439	.6966166	1	5	0.513***	-0.0275***	-0.0377***	-0.0433***	0.0558***	-0.166***	0.0839***	0.607***	1	
Self-efficacy	29	4.14608	.5909279	1	5	0.349***	0.0234***	-0.00491	-0.0495***	0.0262***	-0.132***	0.0533***	0.280***	0.299***	1

N=47305 * p<0.10, ** p<0.05, *** p<0.01

Table 2: Regression (Tobit) results on Innovation Climate

Variables	Mfx
Female	-0.0488*** (0.00583)
Workplace	-0.0807*** (0.00609)
Length of service	$\chi^2(5)=5.48***$
1 to less than 5 years	-0.0176 (0.0139)
5 to less than 10 years	-0.0341 (0.0141)
10 to less than 15 years	-0.0349 (0.0153)
15 to less than 20 years	-0.0512** (0.0191)
More than 20 years	-0.0892*** (0.0211)
Education	$\chi^2(2)=3.66$
Completed vocational qualification	-0.0218 (0.0113)
Completed tertiary qualification	0.00563 (0.00705)
Redtape	-0.0317*** (0.00130)
Training	$\chi^2(4)=26.34***$
1 to 2 days	0.00459 (0.00920)
3 to 5 days	0.0487*** (0.00924)
6 to 10 days	0.0797*** (0.0109)
More than 10 days	0.0676*** (0.0120)
Supervisor support	0.479*** (0.00506)
Co-worker support	0.225*** (0.00533)
Self-efficacy	0.234*** (0.00521)
Constant	0.312*** (0.0339)
Observations	47305
McFadden's R2	0.228
ML (Cox-Snell) R2	0.434
McKelvey & Zavoina's R2	0.437
Cragg-Uhler R2	0.473

Standard errors in parentheses

*** $p < 0.001$, ** $p < 0.005$, * $p < 0.01$

Appendix

Construction indexes

Co-worker support	Supervisory support	Self-efficacy
<ul style="list-style-type: none"> - The people in my work group are honest, open and transparent in their dealings - The people in my work group cooperate to get the job done - The people in my work group are committed to workplace safety - The people in my work group are accepting of people from diverse backgrounds - The people in my work group treat each other with respect 	<ul style="list-style-type: none"> - My supervisor provides me with regular and constructive feedback - My supervisor appropriately deals with employees that perform poorly - My supervisor works effectively with people from diverse backgrounds - My supervisor is committed to workplace safety - My supervisor is accepting of people from diverse backgrounds - My supervisor treats people with respect - My supervisor communicates effectively regarding the business risks that impact my workgroup 	<ul style="list-style-type: none"> - I feel prepared for most of the demands in my job - I meet the goals that I set for myself in my job - Whatever comes my way in my job, I can usually handle it - My past experiences in my job have prepared me well for my future work