

The Impact of Innovation on Job Satisfaction: Evidence from U.S. Federal Agencies

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Received: August 26, 2015 Accepted: September 28, 2015 Online Published: December 22, 2015

doi:10.5539/ass.v12n1p274

URL: <http://dx.doi.org/10.5539/ass.v12n1p274>

Abstract

Organizational innovation has been commonly considered as the strategic means for performance improvement in an organization. However, there is little research regarding how innovative practices influence individual work satisfaction in public organizations. Thus, this paper aims to examine how innovative practices will affect public employees' job satisfaction using the results of the 2013 U.S. Federal Employee Viewpoint Survey (FEVS). The findings indicate that organizational practice toward innovation has a positive impact on job satisfaction. On the other hand, supervisors, underrepresented groups such as females and ethnic minorities, and older employees perceive that innovation has a negative impact on job satisfaction. However, employees with a higher level of work experience and payment grade believe that innovation leads to more job satisfaction. Moreover, employees in regulatory agencies perceive that innovation is negatively related to job satisfaction, while employees in distributive agencies perceive that innovation is positively related to job satisfaction.

Keywords: innovation, job satisfaction, incentive structure, human resource management (HRM)

1. Introduction

Innovation has been commonly considered as one of the strategic means for advancing efficiency and performance in an organization (Damanpour & Evan, 1984; Loof & Heshmati, 2006). However, innovation is considered to relate to private organizations more than the public sector (Hull & Lio, 2006), since the government has been stereotyped as the strict-structured, change-resistant, and less inventive organization. Accordingly, organizations in the public sector have been predisposed as less efficient and less innovative than those in the private sector. This might be because innovation seems to conflict with the traditionally perceived bureaucratic structure of the public sector. The bureaucratic structure in the public sector could require public institutions to adopt fewer new practices. Moreover, the pressure to meet the innovative obligation in the organization can adversely cause employee job dissatisfaction or employee wellbeing.

Promoting job satisfaction has been recognized as one of the significant influences in improving work performance (Smith, Kendall, & Hulin, 1969). The managerial innovation practice is one of the motivating means of enhancing in private sector. However, it is still questionable if organizations in the public sector use an innovative approach as one of the motivating means of enhancing employee satisfaction as well as producing efficiency. This is because innovation function under particular organizational contexts is different in the public sector than it is in the private sector. The relationship between innovation and job satisfaction is worth exploration.

Innovation has been recognized as a strategic approach to advance organizational efficiency, performance, and growth. Promoting innovation in the public sector, in terms of public administration, has flourished in recent decades (Behn, 1994; Borins, 1998, 2008; Cohen & Eimicke, 1998). How innovative practices affect organizations and individuals in the public sector has been increasingly discussed. There are a large number of previous studies on organizational innovation and performance from an organizational perspective (Damanpour & Evan, 1984; Loof & Heshmati, 2006); however, there has been relatively little research regarding how innovation practices in the organization influence individual work satisfaction (Bryson, Dale-Olsen, & Barth,

2009).

This study attempts to explore the relationship between the employees' perception of innovation practice and job satisfaction in the public sector. Specifically, this study seeks to examine if organizational innovation leads to job motivation from an employee's perception. It is meaningful to explore whether an innovative approach can provide incentives for motivating public employees, as other extrinsic rewards, such as money or promotion, and intrinsic rewards of achievement contribute to organizational enhancement. This study will also examine whether individual characteristics such as demographic features are interrelated with innovation, and whether innovation influences job satisfaction as well. To investigate the relationship, this research constructed an ordinary least square (OLS) regression model by using the results of the 2013 Federal Employee Viewpoint Survey and adding interaction terms such as age, gender, race, payment grade, supervisory status, agency category, and the length of work experience, which would affect the perception of innovation, to determine the impacts of innovation on job satisfaction in federal agencies.

2. Literature Review

This section contains two primary theoretical components of innovation and job satisfaction. Innovation includes the examination of innovation in the public sector, barriers to innovation, and organizational practices related to innovation. Job satisfaction is discussed with the two-factor theory related to motivation in the public sector.

2.1 Innovation in the Public Sector

Following the productive definitions of innovation since Schumpeter (1934), innovation has referred to a wider range of innovative approaches, from social innovation to organizational, institutional, and political perspectives more recently (Halvorsen, Hauknes, Miles, & Røste, 2005, p. 2). In terms of innovation, the definitions of innovation seem similar in many dimensions such as products, services, processes (Hartley, 2005) or business models (Birkinshaw, Bessant, & Delbridge, 2007) in both the public and private sectors. However, increasingly, studies have examined the effects of innovation on the performance or program outcomes in the public sector during the past two decades. For example, the distinctive differences in forms of innovation in the public sector are implemented to achieve extensive improvements in governance, service performance (Salge & Vera, 2012), and efficiency in order to increase public value (Moore, 1995).

Nevertheless, until recently, fit seems there has been no commonly agreed-upon definition of innovation in the public sector (Perry, 2010). Innovation emphasizes inventiveness through "introducing new processes and practices, or by creating new goods or services, or adopting a new pattern of intra- or inter-organizational relationships, including the delivery of goods and services" (Green, Howells, & Miles, 2001, p. 9). Another definition of innovation emphasizes that the creation and implementation of new processes or services should bring about significant improvement and efficiency (Albury, 2005).

According to Hartley (2005), "some writers reserve the notion of innovation for 'radical' or 'breakthrough' novelty, while others emphasize a spectrum of innovation, from large-scale, dramatic, 'headline-making' innovations to small-scale, incremental changes" (p. 27). Innovation can change the decision-making mechanism for policies and resources in public organizations, which would affect public personnel at work as well (Hartley, 2005; Moore & Hartley, 2008; Voß, 2007). For example, employees in the public sector have resisted the innovation because they fear the change (risks), and thus, it can influence employees' welling negatively. Thus, when public organizations undertake innovation practice, they consider a broad public domain from a public perspective (Hartley, 2012).

2.2 Barriers to Innovation in the Public Sector

Public organizations face several challenges from both organizational and individual perspectives when organizations implement innovation practices because innovation practices affect their employees. It is commonly observed that innovation has not helped public institutions achieve their goals as expected due to various reasons, including the multi-layered structure, the lack of economic motivations, divided administrative governance, and the complex and strict rules and regulations (Halvorsen et al., 2005). There are particular organizational barriers, such as hierarchy and cultural constraints, for example, and the risk-averse culture would limit the development of innovation in public organizations and discourage employees from participating in the innovation (Bommert, 2010). In addition, innovation in the public sector would usually be stalled due to lack of competition and less monetary incentives for improvement (Petkovšek & Cankar, 2013). The shortages of human resources with relevant skills could also impede the implementation of innovation. Overall, public organizations are normally cautious of carrying out changes that might cause some unexpected adverse outcomes for employees and operators (Petkovšek & Cankar, 2013).

Besides the organizational factors affecting innovative results in the public sector, individuals' favorability or reaction to innovation or changes would be another major stream affecting the innovative development of work (Wittig, 2012). Witting (2012) found that employees' reactions, including resistance and acceptance, would be significant factors that affect organizational innovation. In particular, employees' resistance on the innovation could be the leading cause for the failure of initiatives (Bovey & Hede, 2001). Knowing the benefits of innovation to the organization, public employees may feel stressed but not satisfactory toward managerial practices of encouraging innovative tasks from the organization. For example, some public employees don't want to acquire new knowledge or technology necessary for advanced development due to the lack of capability when compared with other peers or specific personal considerations in the organization. The innovation cannot be the incentive for employees to cooperate in particular with the public institution (Wittig, 2012). For these reasons, innovation can be considered less favorably in organizational management from an employee's perspective in the public sector.

2.3 Organizational Practice toward Innovation

Even though there are some barriers to innovation, innovation undertaken by public organizations can still bring in efficiency through organizational commitment, such through the establishment of a direct reward method or personal recognition for any creativity and innovation to enhance performance (Eisenberger, Fasolo, & Davis-LaMastro, 1990). Organizational commitment to innovation practices has been the focus in the study of organizational and individual performance over the past several decades (i.e. Agarwala, 2010; Calantone, Cavusgil, & Zhao, 2002). An examination of those factors that would affect organizational commitment, such as employee characteristics and job features, can improve innovation in the public sector (Allen & Meyer, 1990).

Similarly, organizations can find factors influencing employees' decisions about whether to engage in innovative behavior for application to new changes or innovation at work. The study found that individuals' innovativeness was affected by their expectations of positive outcomes from the action, so that an organization can adopt strategies to encourage employee participation, such as identifying what employees perceive as positive performance outcomes, as mentioned above (Yuan & Woodman, 2010). Employees in public organizations are more likely to engage in innovative behavior if they expect to receive benefits in their work. Similarly, employees would be hesitant to engage in innovative behavior if they perceive a negative expectation (Yuan & Woodman, 2010). Organizations can explore factors that affect employee expectation, such as perceived organizational support for innovation, in order to influence the engagement of public innovation.

Some scholars suggest that the organization can apply it not only to human resources management (HRM) (Guest, 1987), but should also focus on encouraging employees to display innovative behavior more often (Karin, Matthijs, Nicole, Sandra, & Claudia, 2010). Currently, organizations in the public sector provide the rewards as the incentive for innovative practice to employees, which promote them towards innovation (Cankar & Petkovšek, 2013). Similarly to this, agency heads make a supportive climate for the innovation by mentoring staff, establishing formal rewards and informal acknowledgment for innovators (Borins, 2002). Thus, organizational practice toward innovation can influence the employee's work attitude and job satisfaction through these motivators (Barth, Bryson, & Olsen, 2009).

2.4 Importance of Job Satisfaction

Promoting job satisfaction has been recognized as one of the significant influences in improving work performance (Jacobs & Solomon, 1977; Ochwarter, Perrewé, Ferris, & Brymer, 1999; Wright & Cropanzano, 2000). There are various definitions of job satisfaction or employment satisfaction. For instance, job satisfaction represents how satisfied individuals are with their job, or under which perspective they like their job: the nature of the work or the management (Spector, 1997). Much of previous the literature has indicated that job satisfaction involves an individual's psychological responses to the job on a multidimensional level (Hulin & Judge, 2003) or based upon an employee's individual well-being at work (Judge & Klinger, 2007). Locke (1976) presented the most accepted definition of job satisfaction as "a pleasurable or positive emotional state resulting from the appraisal of one's job or job experiences" (p. 1304).

Numerous studies have yielded evidence that job satisfaction is positively correlated with organizational outcomes. For example, the higher the level of job satisfaction, the more workers are likely to have a positive attitude toward their job (Wang & Feng, 2003), and the more they can commit to the organization (Brown & Peterson, 1993). The interrelation between job satisfaction and different managerial practices in the public sector has been discussed at length (Khan, Ghauri, & Akram, 2012; Sokoya, 2000). In order to increase satisfaction of public employees, many public sector organizations have emphasized the development of motivational strategies to enhance employees' satisfaction for performance efficiency as well. Therefore, job satisfaction has become a

central topic in many theories as an incentive to improve organizational efficiency and performance (Akintoye, 2000; Judge & Klinger, 1992; Luthans, 1998).

The preferences and incentive structures of public employees are likely more intricate and individual-oriented so that the work attitude of public workers is not necessarily motivated by monetary incentives (Borzaga & Tortia, 2006). Hence, jobs in the public sector should serve to offer numerous opportunities with both monetary and non-monetary incentives so that employees can realize their distinctive goals (Kaiser, 2014). Theoretically, public workers likely become more satisfied when their motives match their performance and achievement (Kaiser, 2014). According to Kaiser (2014), public organizations should provide an encouraging job environment and managerial practices so that they can respond to employees' needs, as well as drives that enhance employees' job satisfaction (Kaiser, 2014). Innovation practices are considered as one of the motivating means. Creativity, as one component of innovation, is discussed with the importance of intrinsic motivation (Eisenberger & Shanock, 2003). Eisenberger and Shanock (2003) argue that "creativity is commonly assumed to be enhanced by perceived self-determination and reduced by perceived constraints on autonomy, including reward. It is because employees" (Eisenberger & Shanock, 2003, p. 122). Therefore, the two-factor theory can be applied to explain the motivators of employees related to innovation practice.

2.3.2 Measures and Covariates
Include in the Method section information that provides definitions of all primary and secondary outcome measures and covariates, including measures collected but not included in this report. Describe the methods used to collect data (e.g., written questionnaires, interviews, observations) as well as methods used to enhance the quality of the measurements (e.g., the training and reliability of assessors or the use of multiple observations). Provide information on instruments used, including their psychometric and biometric properties and evidence of cultural validity.

2.5 Two-Factor Theory with Innovation

The two-factor theory has been widely applied to job satisfaction, suggesting two independent aspects of satisfaction and dissatisfaction (Herzberg, Mausner, Peterson, & Capwell, 1957). It represents hygiene factors and motivators. Hygiene factors refer to extrinsic incentives, including external rewards such as salary and organizational environment. Extrinsic factors may directly affect individual job satisfaction, although they cannot enhance the degree of satisfaction, but can prevent dissatisfaction (Herzberg, 1959). For example, in innovation practice, public sector organizations have attempted to provide some incentives or rewards in order to boost the organizational practice of innovation for employees' acceptance or participation. Thus, employees perceive some extrinsic rewards may be provided if they actively participate in innovation practice in the organization (Amabile, 1997). This organizational commitment may reduce employees' dissatisfaction related to organizational change or innovation practice.

In addition, intrinsic factors increase the level of motivation (MacDonald, 1996; O'Toole, 1980; Rainey, 2014). These motivators or intrinsic factors include a sense of achievement, fulfillment, and growth from the job, which represent higher-level needs of human beings (Rainey, 2014; Amabile, 1997). In innovation practice, the common objectives for innovation in the public organization are improved efficiency, improved quality of service, and an improved user satisfaction (Petkovšek & Cankar, 2013). Therefore, it is important that employees experience achievement and fulfillment from attaining the goals of innovation, and contribute their commitments to the innovation in order to achieve organizational enhancement (Petkovšek & Cankar, 2013). As a result, "the primary organization-wide supports for innovation appear to be mechanisms for developing new ideas; open, active communication of information and ideas; reward and recognition for creative work; and fair evaluation of work—including work that might be perceived as a "failure." (Amabile, 1997, p. 52).

Regarding how the organization can make the job more interesting and satisfy the workers' needs for achievement and growth, Herzberg's propositions have received attention from motivation theory (Rainey, 2014). The two factors are considered contributive when we discuss organizational motivation with innovation practice. Overall, intrinsic factors, based upon interest, and extrinsic factors, relying on their importance, are both related to satisfaction in the workplace (Gagné & Deci, 2005, p. 356). However, in the public sector, intrinsic motivators play a more prominent role compared to extrinsic motivators (Kaiser, 2014). Job satisfaction, particularly regarding individual well-being at work, is a very substantial topic in organizational management (Judge, 1992; Judge & Klinger, 2007). Thus, employees should identify values in their work and workplace environment related primarily to their intrinsic motivation (Perry & Vandenabeele, 2008). Innovation practice in the organization is an intrinsic motivator in terms of fulfillment from attaining the goals of innovation and the contribution of employees' commitments to the innovation in order to enhance organizational performance (Petkovšek & Cankar, 2013).

3. Hypotheses

Based on the literature, the study will test some assumptions empirically in this analysis. The first hypothesis to draw from the literature is that a more positive perception of innovation practice in the organization will lead to a higher level of job satisfaction in the organization. When employees think that innovation practice is well executed, they recognize that the innovation practice is resulting in rewards (incentives), task achievements, and organizational enhancement from innovation (Amabile, 1997; Petkovšek & Cankar, 2013). Thus, innovation practice in an organization has a positive relationship with job satisfaction.

Hypothesis 1: A higher level of innovation practice in the public organization will increase employees' job satisfaction.

The second hypothesis pertains to the relationship between perceptions of innovation practice of the organization and job satisfaction based on employees' gender, race, and age. Employees' perceptions of fairness are related to innovation practice (Warr, 2007). It is because innovations may lead to perceptions of justices (both distributive and procedural) depending upon the distributions of rewards and the procedure of the innovation practice (Bryson, Dale-Olsen, & Barth, 2009). Thus, employees who are categorized into an underrepresented group perceive the innovation practice of a public organization differently. In addition, the innovation practice can be implemented in more open organizations. Female and minority employees might prefer the innovative organizational practice. However, older employees favor innovation less because they are less receptive to newly adopted policies. Thus, the innovation practice of the organization can be perceived differently based on the employees' individual characteristics.

3.1 Statistics and Data Analysis

Analysis of data and the reporting of the results of those analyses are fundamental aspects of the conduct of research. Accurate, unbiased, complete, and insightful reporting of the analytic treatment of data (be it quantitative or qualitative) must be a component of all research reports. Researchers in the field of psychology use numerous approaches to the analysis of data, and no one approach is uniformly preferred as long as the method is appropriate to the research questions being asked and the nature of the data collected. The methods used must support their analytic burdens, including robustness to violations of the assumptions that underlie them, and they must provide clear, unequivocal insights into the data.

Hypothesis 2-1: Female employees will feel that the innovation practice results in a higher level of job satisfaction more than males.

Hypothesis 2-2: Ethnic minority employees will feel that the innovation practice results in a higher level of job satisfaction more than whites.

Hypothesis 2-3: Older employees will feel that the innovation practice results in a lower level of job satisfaction more than younger employees.

The third hypothesis pertains to the relationship between the perception of organizational innovation and job satisfaction based on employees' job characteristics, such as work experience, payment grade, and supervisor status. In the public sector, innovations are considered to be started by middle managers and front-line staff (Borins, 2001). Moreover, the public sector is regarded as by "asymmetric incentives that punish unsuccessful innovations much more severely than they reward successful ones, by the absence of venture capital to seed creative problem solving, and by adverse selection by innovative individuals against public service careers" (Borins, 2001, p. 310). Employees who are non-supervisors, have less experience, and have a lower payment grade are more willing to devote time toward the innovation because innovation can provide rewards and make them experience achievement through innovation. This study assumes that employees can perceive that the innovation practice of organization may result in job satisfaction differently when employees work in the public sector for a long time or if they are supervisors and are able to recognize the importance of innovation.

Hypothesis 3-1: Employees with more work experience will feel that the innovation results in a lower level of job satisfaction compared to those with less experience.

Hypothesis 3-2: Employees in a higher payment grade will feel that the innovation leads to a lower level of job satisfaction compared to those in the lower grade.

Hypothesis 3-3: Supervisors will feel that the innovation results in a lower level of job satisfaction compared to employees in the nonsupervisory groups.

As we consider innovation practices, agency characteristics can influence job satisfaction with innovation. Thus, agency categories are included as follows in order to examine job attributes: distributive, regulatory,

redistributive, and constituent agencies (Joaquin & Park, 2009; Lowi, 1985; Newman, 1994). Distributive agencies have attributes that include “professional and occupational norms, promotion of specialists rather than generalists, limited due process requirements, relatively wide fields of discretion, and limited sensitivity to discriminatory practices” (Kerr, Miller, & Reid, 2002, p. 414). Regulatory agencies work with policies for “formulating or implementing rules, imposing obligations on individuals, and sanctioning noncompliance (Lowi, 1985, p. 85). Redistributive agencies try to balance resources between the poor and the wealthy in order to address social inequity (Lowi, 1985). Finally, constituent agencies, according to Lowi (1964), “carry out a residual group of policies that do not fit among the other three: serving government in general or the nation as a whole” (Joaquin & Park, 2009, p. 10).

Hypothesis 4-1: Employees in the distributive agency category will feel that the innovation leads to more job satisfaction in a work unit more than those in the constituent agency category.

Hypothesis 4-2: Employees in the regulatory agency category will feel that the innovation leads to more job satisfaction in a work unit less than those in other agency categories.

4. Data and Methodology

4.1 Data and Measurement

In our analysis, we use a data set from the 2013 Federal Employee Viewpoint Survey (FEVS) provided by the U.S. Office of Personnel Management (OPM). The FEVS is one of the best administrative to representative samples to study regarding management of human resources in federal organizations, with more than 376,000 employees in 57 subagencies under executive branch agencies that participated in the survey. In order to test the hypotheses in our study, a series of ordinary least square (OLS) regression models is used to provide a coefficient and measures of significance in using a continuous variable as a dependent variable.

4.2 Dependent Variable

In our analysis, we use job satisfaction as a dependent variable in order to examine whether employees think that they are satisfied with their job based upon answers to the following two questions: (1) “Considering everything, how satisfied are you with your job?”; and (2) “Considering everything, how satisfied are you with your organization?” Answers are rated on a Likert scale from 1, representing “very dissatisfied” to 5, representing “very satisfied.” By using a factor analysis, these items are combined with one index variable. According to results from the factor analysis, the initial eigenvalue is 1.773, and the Cronbach’s alpha is 0.820, which means that the factor is sufficient to be reliable.

4.3 Independent Variable

The key independent variable is the perception of innovation practice in the organization. The extent to which employees perceive innovation in an organization is reflected by responses to the following survey question: “Creativity and innovation are rewarded.” Respondents answer each statement with a value from 1 (strong disagreement) to 5 (strong agreement) based on a Likert scale.

4.4 Control Variable

In our analysis, resource variables for job satisfaction and seven control variables are considered, in reference to Pitts (2009). First of all, the resource variable accounts for “the influence of resource munificence on outcomes and then job satisfaction” (e.g., Fernandez, 2005; O’Toole & Meier, 1999; Pitts, 2005) (Pitts, 2009, p. 13). Six survey questions are included as values of resources for organizational performance. This is reflected based on the responses to the following questions: (1) “My work unit is able to recruit people with the right skills;” (2) “I have sufficient resources (for example, people, materials, budget) to get my job done;” (3) “My workload is reasonable;” (4) “Physical conditions (for example, noise level, temperature, lighting, cleanliness in the workplace) allow employees to perform their jobs well;” (5) “How satisfied are you with the training you receive for your present job?” and (6) “Considering everything, how satisfied are you with your pay?” While the questions are related to one another indirectly, they reflect an underlying reliability on factor analysis. The initial eigenvalue is 2.788, and the Cronbach’s alpha for these items is 0.766, indicating that the factor is reasonably reliable.

Second, we include demographic variables in the analysis based on supervisory status, gender, ethnic minority, payment grade, the length of work experience, and age as a dummy or a series of dummy variables. On the ground of much of the previous literature, demographic backgrounds of respondents prove to affect the innovation and job satisfaction in an organization as well. Thus, in order to reflect the impact of the demographic variables, this study sets a dummy variable that is coded 1 if the respondent is a supervisor or manager, a female

group, or in an ethnic minority group, respectively. In terms of age, payment category, and work experience, on the other hand, we contain the respondents' characteristics by using a series of dummy variables. Third, this study includes dichotomous variables of agency categories to examine the relationship between agency characteristics and job satisfaction, as well as between agency category with innovation and job satisfaction. According to Lowi (1985) and Newman (1994), we include three dichotomous agency categories: distributive, regulatory, and redistributive agency categories, setting constituent agency as a base group in this analysis (Miller, Kerr, & Reid, 1999). Table 1 describes the general characteristics and the number of each agency category in the federal organizations.

Table 1. Description of distributive, regulatory, and redistributive agencies

Agency	N	Example
Distributive Agencies	14	Department of Air Force, Army, or Navy Department of Agriculture Department of Transportation
Regulatory Agencies	19	Department of Commerce Department of Justice Department of Labor
Redistributive Agencies	9	Department of Education Department of Health and Human Service Department of Housing and Urban Development
Constituent Agencies	15	Residual group of agencies
Total	57	

4.5 Model Specification

In this analysis, the model of innovation and job satisfaction categorizes the independent variables into three steps and places them in the following order: (1) the basic effect of control variables (Model 1: model with control variables), (2) the effect of the innovation practice (Model 2: model with innovation and control variables), and (3) the full effect of innovation with interactions of gender, supervisory status, ethnic minority groups, age, payment grade, duration of employees' work experience, and agency categories (Model 3: Full model of innovation with its interaction terms). The basic descriptive statistics are listed in Table 2, and survey questions and factor analysis results are shown in Table 3.

Table 2. Descriptive statistics

Variables	Mean	Std. Dev.	Min	Max	Unit
Supervisor	0.18	0.39	0	1	Supervisor or manager=1
Female	0.44	0.50	0	1	Female=1, Male=0
Minority	0.30	0.46	0	1	Minority=1
Ages 40-49	0.25	0.43	0	1	Ages 40 to 49=1
Ages 50-59	0.33	0.47	0	1	Ages 50 to 59=1
Age 60 or older	0.12	0.33	0	1	Age 60 or older=1
GS 7-12	0.39	0.49	0	1	Pay category/grade from GS 7 to 12=1
GS 13-15	0.36	0.48	0	1	Pay category/grade from GS 13 to 15=1
6-14 years	0.29	0.45	0	1	Work experience for 6 to 14 years=1
Over 15 years	0.42	0.49	0	1	Work experience for more than 15 years=1
Distributive	0.44	0.50	0	1	Distributive agency=1
Regulatory	0.25	0.43	0	1	Regulatory agency=1
Redistributive	0.14	0.35	0	1	Redistributive agency=1
Job Satisfaction	0	0.93	-2.29	1.30	Factor score
Innovation	3	1.17	1	5	Likert Scale from 1 to 5
Resource	0	0.89	-2.36	1.89	Factor score

Note. $n=376.577$

Table 3. Factor analysis results

Variables	Factor Loading
(1) Considering everything, how satisfied are you with your job?	0.879
(2) Considering everything, how satisfied are you with your organization?	0.879
Job Satisfaction Initial Eigenvalue	1.773
Cronbach's Alpha	0.820
(1) My work unit is able to recruit people with the right skills.	0.627
(2) I have sufficient resources (for example, people, materials, budget) to get my job done.	0.746
(3) My workload is reasonable.	0.660
(4) Physical conditions (for example, noise level, temperature, lighting, cleanliness in the workplace) allow employees to perform their jobs well.	0.460
(5) How satisfied are you with the training you receive for your present job?	0.623
(6) Considering everything, how satisfied are you with your pay?	0.452
Resource Initial Eigenvalue	2.788
Cronbach's Alpha	0.766

5. Results

The results of each model in the regression are provided in Table 4. The first model uses only control variables as independent variables. It proves that the resources, supervisor, female, older, and high level of payment grade groups are positively related to job satisfaction, and all of them are statistically significant at the level of 1 percent. However, work experience and ethnic minority group have a negative impact on job satisfaction. They show that more experienced federal employees feel less satisfied with their job than less experienced employees, and minority federal employees are less satisfied with their job than white employees. In addition, employees in the distributive, redistributive, and regulatory agency categories are more satisfied with their job than those in the constituent agency category. According to the results of the second model (Model 2), the innovation variable has a positive impact on job satisfaction, and it is statistically significant at the 1 percent level. In terms of control variables, resources, supervisor, female, and age variables are positively related to job satisfaction, and all of them are statistically significant at the 1 percent level. However, the variables of payment grades are not statistically significant if the innovation variable is considered in the second model. Job experience and minorities are negatively related to job satisfaction. Additionally, when controlling the innovation variable, employees in the distributive, redistributive, and regulatory agency categories are more satisfied with their job than those in the constituent agency category.

Finally, the full model (Model 3), which includes an innovation variable and its interaction terms between the innovation practice and other demographic variables, shows more specific relationships between innovation and job satisfaction. First of all, the innovation variable has a positive impact on job satisfaction, and it is statistically significant at the level of 1 percent. Supervisors, female, minority, and older employees are less satisfied with the innovation practice than are non-supervisors, male, white, and young employees. They are statistically significant at the level of one percent. However, employees with more work experience and higher payment grades show a higher level of job satisfaction with the innovation practice, and all are statistically significant at the 1 percent level. Finally, employees in a distributive agency are more satisfied with innovative practice than those in a constituent agency. However, employees in a regulatory agency are less satisfied with innovative practice than those in a constituent agency.

Interestingly, female employees show different attitudes toward their job satisfaction with interaction with innovation. For example, they feel more satisfied with their job but are less satisfied with their job if we interact with the effects of innovation in the model. Moreover, federal employees with a high level of payment grade show negative job satisfaction when compared with those from other payment grade groups in Model 3. They, on the other hand, perceive positive effects of innovation toward job satisfaction. If we consider innovation and its interaction terms with individual demographic characteristics and agency categories, federal employees in the supervisory, female, ethnic minority, and older groups feel that innovation is negatively related to job satisfaction, while employees in a higher level of payment grade and work experience, on the other hand, believe that

innovation makes them more satisfied with their job. In terms of agency categories, employees in the distributive agency category regard innovation as a positive tool for better job satisfaction. On the contrary, those in the regulatory agency category think that innovation is negatively related to job satisfaction.

Table 4. Regression model results for job satisfaction

Variables	Model 1		Model 2		Model 3	
	Coefficient	Std. Err.	Coefficient	Std. Err.	Coefficient	Std. Err.
Resource	0.703 ***	0.001	0.483 ***	0.002	0.485 ***	0.002
Supervisor	0.204 ***	0.003	0.100 ***	0.003	0.121 ***	0.009
Female	0.027 ***	0.002	0.022 ***	0.002	0.092 ***	0.006
Minority	-0.039 ***	0.003	-0.029 ***	0.002	0.069 ***	0.007
Ages 40-49	0.040 ***	0.003	0.041 ***	0.003	0.049 ***	0.009
Ages 50-59	0.077 ***	0.003	0.073 ***	0.003	0.105 ***	0.009
Age 60 or older	0.104 ***	0.004	0.099 ***	0.004	0.158 ***	0.011
GS 7-12	0.006 *	0.003	-0.005	0.003	-0.014 *	0.008
GS 13-15	0.035 ***	0.003	-0.004	0.003	-0.108 ***	0.008
6-14 years	-0.058 ***	0.003	-0.038 ***	0.003	-0.067 ***	0.008
Over 15 years	-0.072 ***	0.003	-0.063 ***	0.003	-0.102 ***	0.009
Distributive	0.025 ***	0.003	0.013 ***	0.003	-0.040 ***	0.009
Regulatory	0.062 ***	0.004	0.053 ***	0.004	0.073 ***	0.010
Redistributive	0.045 ***	0.004	0.037 ***	0.004	0.026 **	0.011
Innovation (Inn)			0.287 ***	0.001	0.286 ***	0.004
Inn×Supervisor					-0.007 ***	0.003
Inn×Female					-0.023 ***	0.002
Inn×Minority					-0.032 ***	0.002
Inn×Ages 40-49					-0.003	0.003
Inn×Ages 50-59					-0.011 ***	0.003
Inn× Age 60 or older					-0.020 ***	0.004
Inn×GS 7-12					0.003	0.003
Inn×GS 13-15					0.034 ***	0.003
Inn×6-14 years					0.010 ***	0.003
Inn× Over 15 years					0.013 ***	0.003
Inn×Distributive					0.018 ***	0.003
Inn×Regulatory					-0.006 **	0.003
Inn×Redistributive					0.004	0.003
R ²	0.681		0.741		0.742	

Note. ***, **, and * indicate significance at the level of 1%, 5%, and 10%, respectively.

6. Conclusion and Discussion

There are several findings that warrant highlighting according to the results of this study. First of all, innovation generally has a positive impact on job satisfaction, and these findings reveal that federal employees regard innovation as necessary for a more satisfactory job. This confirms the two factor theory related to the innovation in that employees expect the external rewards or realize the fulfillment from attaining the goals of innovation. However, we find changes in the perception of job satisfaction based on the respondents' demographic characteristics. Underrepresented groups perceive that the innovation practice has a negative impact on their job satisfaction. This might be justice in the innovation process (both distributive and procedural) in that the distributions of rewards and the procedure of the innovation practice are not perceived fairly by underrepresented groups. Future research should further investigate why these groups feel less satisfied with innovation practice. In addition, employees in the higher level of payment grade and work experience pursue innovation and think

that innovation is positively related to their job satisfaction. Supervisors are resistant to change and it is because they concern about the punishment of unsuccessful innovations. But, employees with high salaries pursue innovation more frequently owing to asymmetric incentives in order to attain stronger performance and job satisfaction in the end.

Regarding agency categories, employees in the distributive agency category are in pursuit of innovation because the distributive agencies concentrate on professional norms. As a result, they need to consistently evolve. However, employees in the regulatory agency category are resistant to changes, and, related to this, they seem pessimistic about innovation as well. Innovation reminds employees of the same image that changes engender. Even though it is not statistically proven, employees in the redistributive agency are open to change or innovation and the results show a positive relationship. According to the work characteristics, employees are more likely to support underrepresented groups and pursue equity, and so they pursue new changes or innovation practices.

Previous studies explain that innovation results in either positive or negative impacts on job satisfaction (Bryson, Dale-Olsen, & Barth, 2009). For example, using private sector data, Bryson et al. (2009) show the effects of innovations are negatively related to workers' well-being. On the other hand, our research shows that innovation practice in the public sector is positively associated with workers' job satisfaction. It is because two studies are conducted from different contexts. Even though that, it implies that public organizations should implement diverse innovation practices in order to improve the job satisfaction of employees.

Moreover, our results claim a "contingency perspective" on public sector innovation and provide implications. Procedure and distributive justice should be conditioned in order for public organizations to get benefits from their innovative practice. Because a positive sense of innovation in the work is important for employee's expectation of intrinsic and extrinsic rewards, it is necessary to promote people to work that expands their creatives through well designed innovation practice. Managerial practices in innovation should be considered to increase intrinsically motivating aspects. In addition, this study suggests that public organizations should exhibit a strong innovation-oriented context through the whole organization.

Even though we identified some meaningful results in this study, there are also some limitations. First of all, innovation does not account for only one question from the survey, and job satisfaction is not built solely on innovation itself. In order to achieve greater generalization, multifaceted dimensions of characteristics of innovation must be studied: the work process in decision making or interpersonal relationships. Moreover, in this analysis, we merely analyze the relationships between innovation and job satisfaction under control of some demographic characteristics. In future research, a wide array of organizational characteristics should necessarily be considered.

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