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Differences in perceptions of Innovation: Evidence from the healthcare sector

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Abstract

This study delves into the relationship between employee subgroup perceptions and innovation within the healthcare sector. The results reveal substantial differences in perceptions according to gender, age, and tenure. Men are more likely than women to perceive the need for technological innovation, potentially due to a different attitude toward risk. However, no significant gender differences were found regarding organizational innovation. Older and more senior employees are less likely to perceive the need for technological and organizational innovation, possibly due to greater familiarity with the organization and a greater reluctance to be critical. In contrast, younger and less senior employees, being less entrenched in routines, may offer new perspectives. Furthermore, the study highlights the interconnected nature of employees' perceptions that generates a ripple effect in the employee's decision-making archetype. The practical implications of these findings include the need to value gender differences, promote the inclusion of younger employees, and manage the employee's ripple effect. These findings are insightful and engaging, as they provide a

deeper understanding of the dynamics of employee innovation perception within the healthcare sector.

Introduction

In the rapidly evolving landscape of modern organizations, human resources management remains a critical driver of competitive advantage and long-term success. In this context, understanding the workforce's diverse perspectives becomes increasingly essential. In this sense, group composition has long been recognized as a central factor in organizational studies (Gruenfeld et al., 1996). However, few studies focused on the different perceptions that individuals may have on their organization (Croson and Gneezy, 2009; Choi and Rainey, 2014), and even fewer analyzed innovation (Ostergaard, Timmermans and Kristinsson, 2011; Van der Vegt and Janssen, 2003), pointing out as primary outcomes technological and organizational innovation (Yang and Konrad, 2011). Technological innovation plays a relevant role in society in fulfilling needs, accomplishing objectives, and addressing challenges to facilitate corporate, industrial, economic, and societal transformations (Dosi, 1997). Organizational innovation is the ability of the organization to optimize the organizational outcome, changing the social and administrative systems and empowering organizational processes (Rowe & Boise, 1974).

Against this backdrop, we conducted a cross-sectional survey across five healthcare organizations. We investigated employees' perceptions, differentiating employees by gender, age, and tenure (Richard et al.,

2019), and we delved into the perceptions of meritocracy and empowerment, relating them to innovation perception. This study provides several contributions to the literature by answering two main questions: (1) Do different subgroups have different perceptions of technological and organizational innovation? (2) Are the perceptions of meritocracy and empowerment connected with the perception of enhancing technological and organizational innovation?

This article is divided into five sections. After the introductory section, the subsequent part presents the conceptual framework and the hypotheses tested. The third section delves into the empirical study's methodology, while the fourth section presents the findings. In the final section, we highlight the contributions, acknowledge limitations, and suggest potential avenues for future research.

2. Conceptual framework and hypotheses

2.1 Gender Differences in Perception of Enhancing Innovation

Gender differences in innovation have been widely discussed in the literature (Wajcman, 2010; King et al., 2012). Men are often linked to 'masculine' traits, including assertiveness and achievement focus, while women are associated with 'feminine' attributes, such as commonality and supportiveness (Schein, 1973). The prevailing stereotype stems from the perception that women are less actively involved in technology, contributing to the widely acknowledged technological gender gap (Card and Di Nardo, 2002). A stronger male connotation characterizes technological innovation because of the higher

representation of men in STEM disciplines since women tend to focus more on medical sciences, social sciences, and humanities, exhibiting lesser representation in engineering, mathematics, and computer science fields (European Commission, 2013). Moreover, evidence indicates that women, in comparison to men, frequently undervalue their skills and performance, and they seldom attribute their success to themselves, underestimating their capabilities in roles and tasks perceived as masculine, such as innovation. They also tend to be more risk-averse, less competitive, and less prone to criticize their organization. (Niederle and Vesterlund, 2011; Gneezy and Rustichini, 2004).

H1a: Female employees perceive less that their organization should enhance technological innovation.

H1b: Female employees perceive less that their organization should enhance organizational innovation.

2.2 Age and Tenure Differences in Perception of Enhancing Innovation

The relationship between age-related differences in perception and innovation encompasses a broad spectrum of arguments. Prior research on the correlation between age and innovation suggests that the peak for inventiveness is observed in individuals between the ages of 35 and 50 (Frosch, 2011). Younger employees who have grown up with modern technology bring distinct skills to their organizations, such as adaptability, enthusiasm, creativity, and a higher level of education

(Beaver and Hutchings, 2005). Conversely, older workers seem to be less creative, less adaptive, slower in decision-making, less ambitious, more challenging to train, and more resistant to change (Simsek, 2007). Possible explanations for this phenomenon propose that older employees, compared to their younger counterparts, exhibit a reduced interest in technology and diminished innovation due to heightened conscientiousness (Lyon and Pollard, 1997). Moreover, according to self-determination theory, seniority often correlates with greater acceptance of established organizational norms and practices (Vansteenkiste and Niemiec, 2010; Ryan and Deci, 2000). Therefore, due to senior employees' heightened sense of compassion, responsibility, and resilience in comparison to their younger counterparts and their tendency to remain with the same organization for an extended period, we hypothesize that:

H2a: Younger and low-tenure employees perceive that their organization should enhance technological innovation more.

H2b: Younger and low-tenure employees perceive that their organization should enhance organizational innovation more.

2.3 Meritocracy and Empowerment and Perception of Enhancing Innovation

Meritocracy is a societal structure wherein an individual's progress is dictated by their skills and accomplishments rather than factors such as familiar connections, wealth, or social origins (Young, 2011). In a meritocratic system, everyone has equal opportunity to progress and

receive rewards according to their merits and endeavors, irrespective of gender, race, class, or other non-merit-related factors (Castilla and Benard 2010). The widespread appeal of meritocracy can be attributed to its positive impact on various crucial outcomes. For instance, meritocracy has been linked to increased job satisfaction and a lower likelihood of leaving the organization (Ghosh et al., 2013).

Although various elements can contribute to a successful meritocratic system, we emphasize employee empowerment. The literature discusses two viewpoints on empowerment (Hassan, Wright, and Park, 2016; Miao et al., 2018). The first perspective is managerial, defining empowerment as the transfer of decision-making authority from higher to lower organizational levels, which involves the sharing of authority, information, and rewards between supervisors and subordinates (Fernandez and Moldogaziev, 2013a; Fernandez and Moldogaziev, 2013b). Conversely, the second perspective considers empowerment from the psychological standpoint of employees, emphasizing the conditions that cultivate their belief in exerting control over their work and motivating them to assume more responsibilities willingly (Spreitzer, 1995; Cho and Faerman, 2010). This article adopts the perspective of psychological empowerment.

Empowerment entails social action that encourages the involvement of individuals, organizations, and communities, aiming to improve the quality of community life, promote social justice, and enhance an organization's ability to foster innovation (Seibert et al., 2004). In this regard, the empowerment theory suggests that when employees take on

greater responsibilities, their organizational commitment increases, making them less critical of the organization (Perkins and Zimmerman, 1995; Zimmerman et al., 1992). However, the application of these theories could lead to a twofold effect: on the one hand, it could be hypothesized that employees who perceive themselves as empowered and be part of a meritocratic setting could be more inclined to enhance technological and organizational innovation; on the other hand, it might prevail their tendency to criticize less their organizations which does not necessarily imply that they perceive the organization should not innovate. Therefore, the third and fourth hypotheses reflect the latter as follows:

H3: Employees' perceptions of meritocracy are negatively associated with their perceptions that their organization should enhance technological and organizational innovation.

H4: Employees' perceptions of empowerment are negatively associated with their perceptions that their organization should enhance technological and organizational innovation.

3 Material and Methods

The organizational climate questionnaire, provided by the collaboration between the Management and Healthcare Laboratory (Scuola Superiore Sant'Anna, Pisa, Italy) and several Healthcare organizations, tested in previous works (Cantarelli and Vainieri, 2022; Vainieri, 2019), allows for the assessment of employees' perceptions. We collected 12.839 observations. Responses were collected using a 5-point Likert-type

scale, ranging from 5 for "strongly agree" to 1 for "strongly disagree," except for bureaucracy, whose five- Likert scale was negative. We performed the principal component analysis (PCA) and the varimax rotation method to analyze the independent and control variables. PCA, which has been widely accepted in literature, especially in the study of surveys, also related to employee perception (Farndale et al., 2011; Somers, 2018), is a mathematical technique designed to decrease the dimensionality of data while preserving most of the variability present in the dataset (Jolliffe, 2022; Jackson, 1991). To evaluate the data appropriateness for factor analysis, we performed the Kaiser-Meyer-Olkin Measure of Sampling adequacy (Kaiser, 1974). Low values of the KMO-MSA suggest issues with the sampling, and values exceeding 0.5 are deemed satisfactory. Cronbach's alpha was utilized to measure the internal consistency, considering acceptable values higher than 0.7 (Cronbach, 1951). Eigenvalue of the scale, Cronbach's α coefficient, KMO-MSA, and Factor loadings are reported in Table 1.

3.1 Dependent Variable

We developed a single-item measure aiming at testing organizational and technological innovation, representing the dependent variable in the context of this study. The single-item measures that we tested as questions are: "Shall your organization improve the technological innovation?" and "Shall your organization improve the organizational innovation? The answers were based on a 5-point Likert scale (5 = "strongly agree" to 1 = "strongly disagree").

3.2 Independent Variables

To test the relationship between perception and innovation, gender and age have been used as independent variables. The employment of this variable in our research has previously been tested in numerous studies related to sociopsychological conditions, behavioral change, and job satisfaction (Santos et al., 2003; Jung et al., 2007). Gender was coded as a “0” for male respondents and as a “1” for female respondents. We recorded age by considering employees' age and tenure, reporting employees' years of experience within the same organization. Regarding meritocracy, this variable encompasses three inquiries related to the employee’s perception of meritocracy in the organization: merit as the organization's core value (Woodard, 2005), recognition of employees' professional contributions (Hellman, 1997), and equitable management of subordinates by supervisors (Wat and Shaffer 2005). Empowerment was measured involving four single-item measures. We examined crucial factors reflecting employees' empowerment within the organization, including workers' empowerment in outcomes (Spreitzer et al., 1997), failures reacting (Collins, 1999), changes and innovations (Bhatnagar, 2012), proposals and suggestions (Pitts, 2005).

3.3 Control Variables

We include bureaucracy and planning as control variables, which have been linked to innovation. Bureaucracy, characterized by excessive procedures, rules, and dispositions often associated with low innovative capacity, was assessed by gathering responses to five questions

concerning 'the bureaucratic procedures that must be fulfilled at work' (Thompson, 1965). Planning is the process whereby an organization defines its vision, develops strategies, and determines how to allocate resources to support those strategies. It emerges as a strategic innovation driver, facilitating the exchange of new ideas and value creation (Allison and Kaye, 2011). This aspect was assessed using three questions related to organizational planning.

(Table n.1 here)

4. Findings

In this article, we examined the impact of subgroup differences in perception based on gender, age, and tenure on employees' perceptions of technological and organizational innovation enhancement. Furthermore, we delved into the issue of analyzing the impact of meritocracy and empowerment. Descriptive statistics for the dependent, independent, and control variables, along with their respective correlations, are presented in Table 2. To investigate these relationships further, we performed an ordered logistic regression (see Table 3). Overall, the results affirmed that diverse subgroups exhibit distinct perceptions of innovation.

(Table n.2 here)

Specifically, the findings regarding women’s perception of innovation are particularly intriguing. The results showed that an increase in female composition is negatively associated with employees' perception that their organization should enhance technological innovation. However,

it is not significantly associated with employees' perception that their organization should enhance organizational innovation, confirming H1a and rejecting H1b. The proportional odds ratio for women's perception of technological and organizational innovation is 0.921 and 1.037, respectively. This implies that for a one-unit increase in the proportion of females in the employee composition, the odds of perceiving technological and organizational innovation versus the combined middle and low categories are 0.921 and 1.038 times greater, holding other variables constant in the model.

(Table n.3 here)

Moreover, the analysis reveals a negative association between increased employee age and the perception that the organization should enhance technological and organizational innovation. The results underscore the significant impact of employees' age on the perception of technological and organizational innovation.

For each increase of one unit of age, the likelihood of perceiving technological and organizational innovation, compared to the combined medium and low categories of technological and organizational innovation, increases by 0.997 and 0.996, respectively, holding constant all other variables in the model. This result aligns with the tested hypotheses, supporting H2a. Similarly, we found a negative relationship between tenure and employees' perception of improving technological and organizational innovation, with a proportional odds ratio of 0.995 and 0.995, respectively, confirming H2b.

Furthermore, a more in-depth exploration reveals a negative and significant relationship between meritocracy and both organizational innovation enhancement (OR=0.890, p-value=0.000) and technological innovation enhancement (OR= 0.737, p-value=0.000) and between empowerment and both organizational innovation enhancement (OR=0.711, p-value=0.000) and technological innovation enhancement (OR=0.715, p-value=0.000) providing support for Hypotheses 3 and 4.

Moreover, findings suggest that individuals with specific perceptions of certain subjects tend to express homogeneous views on related topics. In this line, the analysis revealed a positive and significant relationship between bureaucracy and technological (OR=1.255, p-value=0.000) and organizational innovation (OR= 1.308, p-value=0.000), as well as a negative significant negative relationship between planning and technological (OR=0.930, p-value=0.000) and organizational innovation (OR=0.806, p-value=0.000).

5. Discussion and Conclusion

Despite the centrality of group composition in the organization's study, few studies contemplate the consequences of being distinct within groups. This study aims to contribute to the literature by identifying diverse healthcare employee subgroup perceptions of technological and organizational innovation. The findings reveal that different subgroups effectively have different perceptions. Males perceive more than women that technological innovation should be improved by the organization. A possible reason can be found in the different risk attitudes between males and females, leading men to have a riskier

attitude toward technology, which allows organizations to react rapidly to the external environment needs (Niederle and Vesterlund, 2007; Gneezy, Niederle and Rustichini, 2003). Conversely, we did not find a significant propensity of men to criticize organizational innovation. In this sense, several authors elucidated women's attitude toward transformational leadership style, aiming at enhancing the importance of organizational innovation, fostering an inclusive and diverse thinking and collaborative work atmosphere, promoting more family-friendly work practices, and embracing more ethical behavior (Bloom, Kretschmer & Van Reenen, 2011; Ingram and Simons, 1995).

Shifting the attention to the age and the tenure subgroup’s perception, we observed that as a worker's age or tenure years increase within an organization, the employee is increasingly likely to find less reason to criticize their organization's innovative processes. According to the self-determination theory, this tendency can often be attributed to a deeper understanding and familiarity with the organization’s operations and greater acceptance of its established norms and practices. Conversely, low tenure and younger employees' perspectives, less committed but also free from years of organizational routines, can introduce new ideas and unconventional solutions to long-standing challenges.

Additionally, evidence suggests that as perceptions of meritocracy and the feeling of being empowered by the organization increase, there is a reduced tendency to criticize organizational and technological innovation. This finding aligns with other studies that have

demonstrated that when employees feel they are in a meritocratic environment and are empowered by their organization, they are more satisfied (Fernandez and Moldogaziev 2015), less likely to intend to leave the organization (Kim and Fernandez 2017;), and generally experience a greater sense of well-being (García-Juan, 2023). Moreover, the results suggest that individuals with a negative view of strategic organizational drivers, such as bureaucracy or planning, also tend to express reservations about innovation.

The results highlight the intricate web of interconnected perceptions within the organizational context. This interconnectedness implies that efforts to address and improve specific areas of concern within the organizational strategy could have a ripple effect on other strategic-related dimensions (Barsade, 2002).

This study provides important implications. From a practical standpoint, this involves integrating diverse employee perceptions, increasing the representation of women in health leadership positions, promoting equal representation at executive positions to value gender differences (Trinchese et al., 2024), implementing policies to boost the presence of young and low tenure workers, and valorizing differences in the workplace while ensuring that these differences do not lead to negative consequences, such as intergroup conflicts (Tajfel at al., 1978). Finally, managers and policymakers can effectively disrupt the adverse ripple effect of employee perceptions by cultivating an environment that fosters employee differences, empowers employees, and promotes a meritocratic environment.

Finally, it is important to recognize some limitations in this study. Firstly, despite the application of Principal Component Analysis, which offers distinct advantages over the examination of individual survey questions and enhances the robustness of the analysis, it introduces challenges related to construct validity. Unlike the direct examination of individual survey items, PCA aggregates variables, potentially losing nuanced information about each question. Notably, the questions used in the analysis were drawn from pre-existing studies or validated tests, providing a foundation for their reliability and relevance. However, the inherent limitation lies in the potential mismatch between the aggregated components and the theoretical underpinnings, which may impact the overall construct validity. Secondly, the research is not exhaustive and cannot capture every possible aspect. Several contextual factors, such as the type of industry, geographical location, and organization size, can influence the perceptions of innovation among different subgroups. It is also worth noting that we could not consider all control variables related to technological and organizational innovation, which may have led to issues of variable bias omission. Moreover, the study does not delve deeply into subgroup variations. Hence, further research may focus on specific factors affecting perceptions within these subgroups to provide a more comprehensive understanding. Therefore, the study tests different perceptions of innovations; further research could investigate different topics to deeply understand how different subgroups' perceptions can be integrated to foster organizational processes.

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Table 1: Eigenvalue of the scale, Cronbach's α coefficient, Factor loadings, and KMO-MSA

Factor and Loadings	Loadings	KMO-MSA
Meritocracy (Eigenvalue= 2.24 , Cronbach's alpha= 0.82)		
In my organization, merit is considered a core value	0.93	0.58
My organization, properly recognize employees contribution	0.93	0.57
My supervisor is fair in employee management	0.71	0.92
Empowerment (Eigenvalue= 2.63 , Cronbach's alpha= 0,83)		
I feel empowered about the quality of results/services related to my work	0.80	0.84
In my organization I am reassured and empowerd to react after a failure	0.85	0.75
My organization encourages change and innovations	0.71	0.88
My organization takes in consideration my proposal	0.87	0.73
Bureaucracy (Eigenvalue= 3.49 , Cronbach's alpha=0.90)		
The bureaucratic procedures I have to fulfil in my work are difficult to learn	0.84	0.81
The bureaucratic procedures I have to fulfil in my work are a cause of work stress for me	0.81	0.84
The bureaucratic procedures I have to fulfil in my work reduce my autonomy	0.80	0.84
The bureaucratic procedures I have to fulfil in my work require a lot of effort	0.84	0.86
The bureaucratic procedures I have to fulfil in my work are complex	0.88	0.77
Planning (Eigenvalue= 1.88 , Cronbach's alpha= 0.70)		
In my organization, there is a plan that clearly defines objectives and expected results	0.73	0.73
Within my organization, the work is well planned	0.84	0.62
The objectives of planning activities, controlling costs, and verifying results help guide my work.	0.81	0.63

Table 2: Descriptive statistics and correlations

Variables	Mean	SD	1	2	3	4	5	6	7	8	9
1. Technologica Innovation	3.93	1.08	1								
2. Organizational Innovation	3.98	1.06	0.70***	1							
3. Sex	0.77	0.42	- 0.03***	- 0.01	1						
4. Age	49.3	9.98	- 0.04***	- 0.06***	0.03***	1					
5. Tenure	12.5	10.5	- 0.03**	- 0.03**	0.04***	0.53***	1				
6. Meritocracy	2.64	1.24	- 0.21***	- 0.32***	0.02**	0.04***	- 0.04***	1			
7. Empowerment	2.93	1.24	- 0.24***	- 0.31***	0.03**	0.05***	0.003	0.69***	1		
8. Planning	3.12	1.22	- 0.17***	- 0.26***	- 0.02	0.10***	0.04***	0.51***	0.50***	1	
9.Bureaucracy	3.06	1.18	0.16***	0.19***	- 0.09***	0.04***	0.07***	- 0.18***	- 0.18***	- 0.17***	1

Note(s): *Significant at .10 level ** Significant at .05 level * Significant at .001 level**

Table 3: Hierarchical Ordered Logistic Regression Modelling of Technological and Organizational Innovation's Perception

	Technological Innovation			Organizational Innovation		
	b	SE	Odds Ratio	b	SE	Odds Ratio
Sex	- 0.082**	0.039	0.921	0.037	0.040	1.038
Age	- 0.003*	0.002	0.997	- 0.004**	0.002	0.996
Tenure	- 0.004**	0.002	0.996	- 0.005**	0.002	0.995
Meritocracy	- 0.116***	0.023	0.891	- 0.305***	0.024	0.737
Empowerment	- 0.341***	0.024	0.711	- 0.336***	0.024	0.715
Bureaucracy	0.227***	0.017	1.255	0.269***	0.018	1.309
Planning	- 0.072***	0.020	0.930	- 0.215***	0.020	0.806
cut 1	- 3.885	0.104		- 4.084	0.107	
cut 2	- 2.612	0.095		- 2.835	0.097	
cut 3	- 1.011	0.092		- 1.126	0.094	
cut 4	0.193	0.092		0.177	0.093	
Log-likelihood	- 16.795.016			- 15.939.158		
Observation	12.839			12.839		

Note(s): *Significant at .10 level ** Significant at .05 level * Significant at .001 level**