

# The social side of innovation: When and why advice network centrality promotes innovative work behaviours

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Drawing from a social network perspective on innovation, this study aims to explore the relationship between advice network centrality, and innovative work behaviour by focusing on the mediating role of voice behaviour and the moderation of organizational tenure. Hypotheses were tested using a sample of 478 employees in an Italy-based aerospace organization. The results indicated that a central position in the advice network was positively associated with innovative work behaviour and that voice behaviour mediated this relationship. Additionally, moderated mediation analysis highlighted that the path between advice network centrality and voice behaviour was stronger for individuals with shorter organizational tenure. These findings offer guidance for organizations that aim to strengthen employee-driven innovation by highlighting the importance of a social network approach. Several implications for theory and practice are discussed.

## KEYWORDS

advice network centrality, innovative work behaviour, organizational tenure, voice behaviour

## 1 | INTRODUCTION

Innovation represents a crucial factor for the success and survival of any kind of organization (N. Anderson et al., 2014). As business environments are getting increasingly dynamic, the ability to quickly adapt and re-modulate processes, products and services has become a key element for achieving organizational goals (Janssen & Van Yperen, 2004). The innovative process originates from the ideas of individuals; for this reason, organizations increasingly rely on their employees' innovative work behaviours to introduce new products/services, improve business processes and develop new working methods (Potočnik & Anderson, 2016).

Innovative work behaviour (IWB) represents the intentional generation and realization of new ideas within a role, group or organization aimed at benefitting the unit of adoption (Janssen, 2004). Multiple theories emphasize the importance of social factors in enabling innovative behaviours (e.g., Amabile, 1983), and research evidence has confirmed that innovation is not the domain of solitary

efforts in a fixed environment but rather the product of the continuous interpersonal exchanges between employees and their social surrounding (e.g., Baer et al., 2015).

From this perspective, relations are at the core of individual innovation; in their work context, employees constantly share contents with their social surrounding, both receiving and providing information; during this process, the elements of knowledge collide and combine, bringing out new ideas and solutions (e.g., Perry-Smith & Shalley, 2003; C. Tang et al., 2014). Compared to traditional measures of social perception, the social network analysis offers a closer perspective on the dynamics of workplace relations when addressing the social side of innovation (Perry-Smith & Mannucci, 2017). Therefore, researchers have begun using this methodology to examine employees' social networks as possible sources of the various resources needed for their innovative behaviours (e.g., Burt, 2004).

Based on these premises, the social perspective on innovation has focused on explaining how employees' positions in their social

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networks affect their innovative behaviours (e.g., Perry-Smith & Shalley, 2003). Even if some theoretical and empirical efforts have linked different network positions to innovative-related constructs, there are still remarkably few applications of the social network perspective to employees' innovation, and the existing literature is lacking in several important respects (Mehra et al., 2006).

First, the effects of specific types of networks on innovation are still not fully understood. Different types of networks simultaneously coexist in the workplace, each one transmitting different content (Brass et al., 2004). As recent reviews have pointed out, it is important to focus on the specific content of exchanges as this can result in different innovative outcomes (e.g., Perry-Smith & Mannucci, 2017). In addressing this issue, the current paper centres on the organizational advice network, arguing that occupying a central position will hold benefits for IWB (Wong & Boh, 2014). Advice networks are important channels for information in organizations; thus, advice network centrality confers advantages in terms of work-related knowledge (Burt, 2004). Besides, holding a central position in an advice network often translates to greater influence in the workplace (e.g., Bono & Anderson, 2005). Hence, due to their social reach and prestige, central individuals can proficiently signal their ideas and consequently receive more support for their innovative efforts from colleagues and supervisors.

Additionally, although network centrality has been associated with innovative-related constructs (e.g., Ibarra, 1993), existing literature has examined chiefly their direct relationship, paying little attention to how network positions influence employees' attitudes, beliefs and behaviours that precede their innovative efforts (Baer et al., 2015). There are a few exceptions (Grosser et al., 2017; G. Tang et al., 2017), but these studies did not consider central positions as an antecedent (e.g., individual structural holes and alter-centric perspective). This is partly because implicit in the social network perspective of innovation is the idea that advantaged social positions will directly offer the resources for innovation. However, recent findings seem to question this assumption and underline the importance of individual agency (Tasselli & Kilduff, 2021; Wong & Boh, 2014), as in order to successfully innovate employees must take purposeful actions to appropriate the resources offered by their network position (Emirbayer & Goodwin, 1994).

The social exchange theory suggests that voice behaviours can be used as a means to regulate the flow of resources with others and act upon them (Ng & Feldman, 2012). Voice behaviours concern the expression of stimulating and constructive ideas for the organization, though employees can be reluctant to express their opinions if the suggested changes are ignored or not adopted. In organizational contexts, ideas are successfully implemented based on the consensus they attract and the social influence of those who propose them (Brass, 2018). As a result, employees with a high centrality will be more willing to give voice to their ideas by perceiving them as more listened to and feasible, in turn, by making suggestions to encourage positive changes central employees gain new opportunities to acquire additional salient information that can be utilized for their innovative ideas. Consequently, drawing upon this perspective, the present study

set up to explain the mechanism of voice behaviour in the relationship between advice network centrality and IWB.

Moreover, the majority of studies on advice networks and innovation has not considered the interaction with contextual conditions, such as organizational tenure. Organizational tenure is associated with greater work experience and thus to work-related knowledge. Consistent with human capital theory (Becker, 1962), tenure helps individuals accrue domain-related knowledge; thus, long-tenured employees tend to find new and valuable information in their advice network. Conversely, short-tenure less experienced employees are more likely to draw useful resources from their position (Brimeyer et al., 2010).

Overall, this study makes three contributions to social networks and innovation literature. First, it extends the social perspective on individual innovation by suggesting that employees' advice network centrality is related to their IWBs. This aims at providing further evidence for the limited findings on the relationship between network positions and innovative behaviours (Baer et al., 2015). Second, drawing on an agentic perspective, it introduces voice behaviour as a mechanism explaining the relationship between a central position in the advice network and individual innovative behaviour. This helps to clarify the way employees' advice network centrality affects their innovative behaviours, especially for studies testing the intermediate processes through which networks antecedents impact individual innovation are still scarce (Baer et al., 2015). Finally, by examining the joint relationship of network centrality and organizational tenure on voice behaviour and, in turn, on IWB, it also highlights the importance of contextual boundary conditions for the outcomes of network centrality.

## 2 | THEORY AND HYPOTHESES

### 2.1 | Advice network centrality and innovative work behaviour

The fundamental assumption of research on social networks is that the pattern of relationships between employees can explain their behaviours and attitudes, because the nature of their social interaction creates specific conditions for obtaining access to key organizational resources that influences results at the individual level (e.g., Brass et al., 2004). Scholars often distinguish between networks upon their specific content of ties or the type of sources exchanged in the relationship (Brass & Borgatti, 2019). Several different kinds of networks are present in organizations at any given time, among others advice networks, trust networks, hindrance networks and friend networks (Sparrowe et al., 2001).

Advice networks are defined as 'the relations through which individuals share resources such as information, assistance, and guidance that are related to the completion of their work' (Sparrowe et al., 2001, p. 7). Through advice networks employees efficiently share unique work-related features, delivering and receiving information regarding their tasks and shaping their social influence on work-related issues (Ibarra, 1993). The number of ties between a member

and all others reflects his centrality within a given network (Sparrowe et al., 2001). Theory and research emphasize that central positions tend to provide better access to information and other supplies enhancing the likelihood of performing innovative behaviours (Erdogan et al., 2020). There are several different approaches for understanding network centrality; one is in-degree centrality. This measure is widely relevant in organizational research and indicates an individual's level of activity, popularity or prominence (e.g., Burkhardt & Brass, 1990). Individuals with higher advice in-degree centrality are sought after for advice and information (Erdogan et al., 2020) and enjoy greater informal influence due to their social reach and prestige (e.g., Brass, 2018). On the theoretical ground, there are two main reasons why centrally positioned individuals in the advice network are likely to achieve successful innovations.

First, from an information exchange perspective, innovation is fostered by expertise on the job (Amabile, 1983). Central employees have access to important organizational knowledge and task mastery because advice networks channel valuable work-related contents (Morrison, 2014). When people are sought after for advice, they have the opportunity for unique insights into different aspects of the organizational network (Zagenczyk & Murrell, 2009). Thus, a central position in the advice network exposes employees to a bigger number and a wider array of professional information (about tasks, practices and technologies) that they can combine to generate and implement new ideas in their work context (C. Tang et al., 2020; C. Tang & Ye, 2015).

Second, from a psychological safety perspective, innovation is conceptualized as a risky endeavour that habitually faces substantial resistance from others (e.g., Kessel et al., 2012). Novel ideas can fail or be perceived as a threat; for this reason, employees tend to be more innovative when perceiving a safe interpersonal atmosphere (N.R. Anderson & West, 1998; Cangialosi, Odoardi, & Battistelli, 2020a). Holding a central position in an advice network is associated with a greater influence in the workplace (Bono & Anderson, 2005). Central individuals are likely to be seen as having higher status (Ibarra, 1993), and this results in perceptions of freedom and power, which often translate in increased confidence and personal discretion needed for calculated risk-taking (Schulte et al., 2012). Hence, due to their social reach and prestige, central individuals can proficiently signal their ideas and consequently receive more support from their colleagues and supervisors. Perry-Smith and Shalley (2003) proposed that employees with high centrality are likely to feel more comfortable taking informed risks. As more people would go to them for advice, central individuals would enhance their perception of psychological safety and consequently stimulating their IWB (Bonacich, 1987).

Empirical evidence has also partially confirmed that centrality is associated with innovative related constructs. For example, studies have shown central individuals to endure in managerial innovativeness (Wong & Boh, 2014), influence the use of new consumer products (e.g., Baumgarten, 1975), adopt innovations (Burkhardt & Brass, 1990), affect innovation implementation in an advertising agency (Ibarra, 1993) and influence the introduction of a new service-quality initiative in a bank (Lam & Schaubroeck, 2000). Based on the

forementioned rationale, this study posits that holding a central position in the advice network will be associated with IWB.

**Hypothesis 1.** Advice network centrality is positively related to innovative work behaviour.

## 2.2 | The mediating role of voice behaviour

Central positions in the advice network provide individuals with tangible and intangible resources and psychological safety needed for innovation (Gulati & Srivastava, 2014). However, the realization of new and useful ideas also necessitates proactively engaging in promotion attempts and social influence efforts, as successful innovation requires convincing key actors and assembling supporters (Kim, 2019; Messmann & Mulder, 2012). Implicit in these arguments is the notion that resource access and mobilization lead to innovative results through strategic individual actions. Thus, this study proposes that an agentic mechanism connecting the effects of centrality on IWB, voice behaviour.

Voice behaviour represents constructive change-oriented communication intended to improve the situation (LePine & Van Dyne, 1998). Voice behaviours include proposing constructive suggestions to improve working operations and complete the organizational objectives and expressing concerns regarding matters that may have a negative impact on the organization's growth (Hammond et al., 2019). A preliminary condition for voice behaviour is the employees' awareness of a problem or opportunity that might be important to convey (Morrison, 2014). Central employees in the network of advice, thus, are more likely to speak up, having more opportunity to be informed of the different parts of the work processes and different types of work issues. Moreover, a core premise throughout the voice literature is that a prosocial attitude is in nature the underlying motivation for voice (Grant & Ashford, 2008). Social exchange theory predicts that the more employees are central in the social network, the more prosocial in general they are likely to perform to maintain their advantageous social position. Consequently, a central actor is likely to speak up motivated by wanting to bring about a positive change for the organization.

Some social network research provides evidence supporting this perspective. For example, based on the assumption that central employees possess knowledge and information that provides them with real expertise, Settoon and Mossholder (2002) found that employees with greater centrality in communication and advice networks demonstrated higher levels of citizenship behaviour. Similarly, Bowler et al. (2009) highlighted a positive and linear relationship between communication network centrality and citizenship behaviour. Additionally, Venkataramani et al. (2016) found that employees who hold central positions are more likely to speak up with ideas and suggestions.

For Ng and Feldman (2012), voice behaviour is instrumental in gaining various resources conducive to innovation at the individual level. This is for the reason that voice behaviours provide

opportunities for the speaker to acquire additional information, which is an important factor that influences the innovative process. In the process of speaking up, employees often instigate discussions on specific work-related issues. Thus, by speaking up, one can gain access to a variety of perspectives present in the network further facilitating the innovative process (Song et al., 2017). Moreover, voice behaviour is a prosocial endeavour; when speaking up suggestions, employees signal their efforts to constructive change for the organization or for one or more stakeholders. Employees actively exhibiting voice behaviour obtain positive feedback from the supervisors or colleagues, including appreciation and respect thus more support for their ideas (Fuller et al., 2007).

For this reason, this study posits that voice behaviour may serve as an active mechanism to acquire extra information (Katila & Ahuja, 2002) and garner support from others (Dutton et al., 2001) existing in one's advice network, thus connecting their centrality with IWB.

**Hypothesis 2.** The relationship between advice network centrality and innovative work behaviour is mediated by voice behaviour.

### 2.3 | The moderating effect of organizational tenure

Organizational tenure indicates the length of employment one holds in an organization (Liu et al., 2016). Employees who have different organizational tenure tend to differ from each other in psychological characteristics, cognitive level, experience and career strategies (Ng & Feldman, 2013). Mowday et al. (1982) speculated that diverse experiences may affect work-life at various stages; in the early years of employment, factors such as relations with supervision and with co-workers are more important than at later stages. Thus, time over the organizational life course can expand or diminish the importance of certain workplace conditions. Accordingly, this study argues that the strength of the association of advice network centrality with voice behaviour could vary depending on the length of organizational employment, more specifically, positing that the relationship will be stronger at short, and conversely weaker at long, tenure.

The Human Capital Theory (Becker, 1962) offers insight into why the relations under study may be expected to be less strong for highly tenured employees. This theory argues that with increasing tenure, employees accumulate more specific task-related knowledge and skills, causing behaviour to be more dependent on consolidated routines and less on new exchanges (Hunter & Thatcher, 2007). Organizational tenure increases employees' familiarity with daily work allowing a deeper understanding of their work environment and tasks (Clark et al., 1996).

However, research shows that job knowledge increases at a fast rate early in organizational tenure and then starts to asymptote as one acquires experience (Bal et al., 2013). Subsequently, gains in work-related knowledge become smaller and harder to realize when one already has substantial job experience (Sturman, 2003). As such,

holding a central position in the advice network for longer-tenured employees can offer only more of the same types of work-related knowledge, which will result in less reason to speak up (Madjar et al., 2002).

Accordingly, this study argues that the strength of the association between advice network centrality and voice behaviour will be greater in short-tenured employees. Moreover, taken together, these hypotheses suggest a first-stage moderated mediation model, as shown in Figure 1.

**Hypothesis 3.** Organizational tenure moderates the relationship between advice network centrality and voice behaviour such that the association is stronger when organizational tenure is short.

**Hypothesis 4.** Organizational tenure moderates the relationship of advice network centrality on innovative work behaviour such that the indirect effect through voice behaviour is stronger when organizational tenure is short.

## 3 | METHOD

### 3.1 | Research setting and participants

This study was carried out in a company belonging to the aerospace sector based in central Italy. The whole firm's population was invited to complete the survey ( $N = 612$ ); 478 questionnaires were returned fully answered (response rate = 78.2%). Respondents' mean tenure was 14.8 years ( $SD = 8.9$ ), and age was 43.1 years ( $SD = 9.4$ ) on average. The gender composition of the sample was 25 females (6%) and 453 males (94%). The sample consisted of 285 technical workers (58.8%), 117 office workers (24.4%), 48 middle managers (10.4%) and 28 managers (6.4%). Finally, the employees' education level was as follows: 76 (16.3%) master's degree, 347 (71.7%) high school diploma and 55 (12%) secondary school diploma. To minimize the usual risk of desirability bias, respondents were guaranteed full confidentiality and requested to answer the questions as truthfully as possible (Podsakoff et al., 2003).

### 3.2 | Measures

#### 3.2.1 | Advice network centrality

Advice network centrality was assessed using standard network survey techniques (e.g., Wasserman & Faust, 1994). Specifically, participants were asked to make an inventory of all co-workers usually contacted for work-related advice, by answering the question 'list the names of all employees in the organization you frequently go to for job-related advice' (Erdogan et al., 2020). Subsequently, in-degree centrality was operationalized as the total number of employees who

## Conceptual model

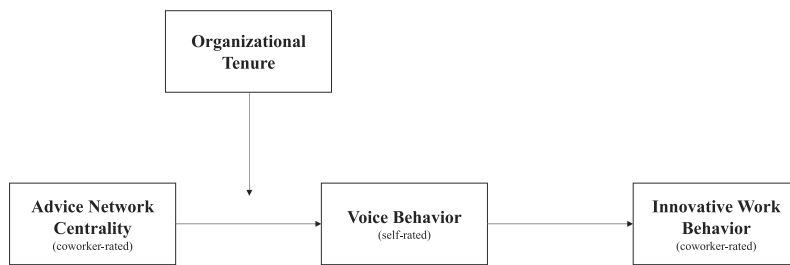


FIGURE 1 Conceptual model

named the focal person as their source of advice using UCINET 6.347 (Borgatti et al., 2002). In-degree centrality was chosen in line with recent studies on networks as it directly reflects the extent to which a certain person in a network is listed by others (e.g., Mehra et al., 2006; Venkataramani & Tangirala, 2010).

### 3.2.2 | Voice behaviour

Voice behaviour was measured with LePine and Van Dyne's five-item scale (1998). Workers assessed their voice behaviour by applying a frequency scale ranging from (1) *never* to (5) *always*. Items included the following: (1) 'I develop and make recommendations concerning issues that affect the organization'; (2) 'I speak up and encourage others to get involved in issues that affect the workplace'; (3) 'I communicate my opinions about work issues to others even if my opinion is different and others disagree with me'; (4) 'I get involved in issues that affect the quality of work life here'; and (5) 'I speak up with ideas for new projects or changes in procedures'.

### 3.2.3 | Innovative work behaviour

In line with recent networks analysis-based studies on innovation (e.g., Grosser et al., 2017), respondents were requested to indicate with whom they had interacted regularly over the past 6 months and subsequently to evaluate the IWB of those co-workers. Employees were asked to rate each indicated co-worker on a 5-point scale, ranging from (1) *never innovative* to (5) *always innovative*, in response to the following: 'Innovative employees have the ability to effectively generate and implement novel ideas in the workplace. Please rate how innovative you believe each of your co-workers is' (Grosser et al., 2017).

### 3.2.4 | Organizational tenure

Organizational tenure was assessed with the number of years an employee had worked for the organization (e.g., Ng & Feldman, 2013). This information, along with other demographic data (age and education), was obtained from the host organization's department of human resources.

### 3.2.5 | Control variables

Previous studies have shown that age and education can be correlated with IWB (e.g., Zhang & Bartol, 2010). Therefore, those variables were included as controls. Affective commitment may influence one's innovativeness by increasing one's familiarity with the organizational culture and goals, which is important both for gaining support and implementing new ideas (Obstfeld, 2005). Work-based learning, on the other hand, can promote individual innovativeness by affecting one's depth of work-related understanding, which is important for generating insightful ideas (Cangialosi, Odoardi, & Battistelli, 2020b). Thus, employees' affective commitment and work-based learning were controlled using the Meyer et al. (1993) and Nikolova et al. (2014) scales, respectively. Both scales have been previously translated and adopted in several studies in the Italian language (e.g., Battistelli et al., 2019). A sample item was 'I really feel as if this organization's problems are my own' for affective commitment and 'In my work I am given the opportunity to contemplate about different work methods' for work-based learning.

## 4 | RESULTS

### 4.1 | Preliminary analyses

Table 1 contains the means, standard deviations, bivariate correlations and Cronbach's alpha of the study's variables. Internal consistency analysis of the variables was further investigated complementing Cronbach's alpha with McDonald's omega statistic. Coefficients omega exhibited consistent results to Cronbach's alpha reliability: excellent reliability for voice behaviour ( $\omega = 0.944$ ) and affective commitment ( $\omega = 0.954$ ), satisfactory to good reliability for work-based learning ( $\omega = 0.845$ ).

IWB was rated by co-workers which introduces the possibility of non-independence due to common raters (Bliese, 2000). The mean rating provided by each employee's set of co-workers was operationalized as IWB. On average, each employee was rated by 7.68 co-workers ( $SD = 7.09$ ). The degree of consistency and consensus among multiple judges rating each employee's innovativeness was assessed by measuring inter-rater reliability (ICC1, ICC2) and inter-rater agreement ( $r_{wg}$ ). Results indicated acceptable levels of reliability and agreement (ICC1 = .12; ICC2 = .82; Mean  $r_{wg} = .71$ ), implying

that averaging multiple innovation ratings to a single innovation score for each employee was appropriate (Bliese, 2000).

## 4.2 | Hypothesis testing

The ordinary least square (OLS) regression models were used to test the hypotheses. In-degree centrality was treated as the independent variable while controlling for age, education, affective commitment

and work-based learning. All dependent variables were hierarchically entered into the OLS regression model. The standardized coefficients for testing main effects are presented in Table 2.

Hypothesis 1 stated that advice network centrality was positively related to IWB. Results show that this relationship is positive and significant (Model 2:  $\beta = .24$ ,  $t = 5.311$ ,  $p < .01$ ), thus supporting Hypothesis 1.

Hypothesis 2 posited that voice behaviour mediated the relationship between advice network centrality and IWB. The unconditional

**TABLE 1** Descriptive statistics and bivariate correlations

	M	SD	1	2	3	4	5	6	7
1. IWB	3.71	.78							
2. ANC	7.82	.713	.23**						
3. VB	3.44	.75	.27**	.29**	(.91)				
4. OT	14.86	8.94	-.05	.23**	.19**				
5. Age	43.12	9.41	-.09*	.07	.02	.62**			
6. Education	3.04	.54	-.03	-.04	-.06	.01	.04		
7. AC	4.25	.63	-.08	-.06	-.04	.01	-.01	-.09*	(.92)
8. WBL	4.07	.63	-.05	-.01	-.07	-.01	-.05	-.03	.67** (.84)

Note:  $N = 478$ . Education was coded 1 = elementary school diploma, 2 = high-school diploma, 3 = bachelor's degree, 4 = master's degree.

Abbreviations: AC, affective commitment; ANC, advice network centrality; IWB, innovative work behaviour; OT, organizational tenure; VB, voice behaviour; WBL, work-based learning.

\* $p < .05$ . \*\* $p < .01$ .

**TABLE 2** Results of regression analysis

Predictor variables	Criterion variables					
	Innovative work behaviour			Voice behaviour		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Control variables						
Age	-.09*	-.11*	-.11*	-.01	-.11*	-.11*
Education	-.04	-.02	-.02	-.03	-.02	-.03
AC	-.08	-.06	-.06	.02	.01	.02
WBL	-.01	-.02	-.01	-.09	-.09	-.09
Independent variable						
ANC		.24**	.17**	.29**	.25**	.29**
Mediator variable						
VB			.21**			
Moderator variable						
OT					.21**	.22**
Interaction						
OT X ANC						-.14**
R-square	.02	.07	.11	.09	.12	.14
$\Delta$ R-square		.05	.04		.03	.02

Note:  $N = 478$ . Education was coded 1 = elementary school diploma, 2 = high-school diploma, 3 = bachelor's degree, 4 = master's degree.

Abbreviations: AC, affective commitment; ANC, advice network centrality; OT, organizational tenure; VB, voice behaviour; WBL, work-based learning.

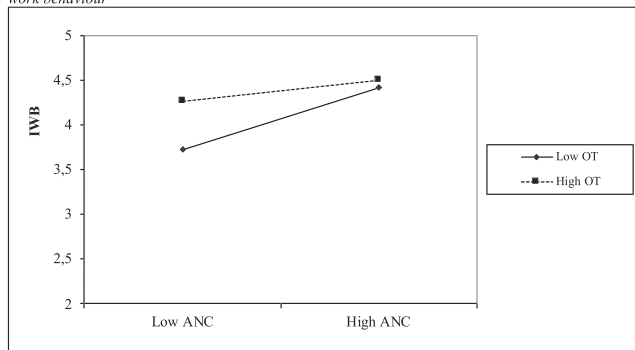
\* $p < .05$ . \*\* $p < .01$ .

indirect effect of advice network centrality on IWB through voice behaviour was tested employing Preacher and Hayes bootstrapping methodology (2004; 2007). Bias-corrected bootstrap results based on 5000 resamples indicated a significant unconditional indirect effect of advice network centrality on IWB through voice behaviour (.06; 95% CI = [.015, .034]). However, also, the direct effect was found significant (.02; 95% CI = [.009, .028]) suggesting a partial mediation effect. Therefore, Hypothesis 2 was supported.

Hypothesis 3 stated that organizational tenure moderated the relationship between advice network centrality and voice behaviour. The interaction coefficient is positive and significant in the regression model (Model 6:  $\beta = .14$ ,  $t = -3.244$ ,  $p < .01$ ). To further clarify the moderating effect of organizational tenure, following Dawson's (2014) recommendations, the interaction was plotted using simple slopes one standard deviation below and above the mean (Figure 2). A simple slopes test indicated that the positive relationship between advice network centrality and voice behaviour is stronger when levels of organizational tenure are low ( $-1$  SD;  $\beta = .05$ ,  $p < .01$ ) than high ( $+1$  SD;  $\beta = .01$ ,  $p < .05$ ). Therefore, Hypothesis 3 was supported.

Finally, Hypothesis 4 implied a moderated mediation, thus suggesting that advice network centrality is associated with IWB via voice behaviour, with this mediation being moderated by organizational tenure. Consequently, a moderated mediation model was tested using a bootstrapped model of conditional indirect effects (Preacher et al., 2007). Results based on 5000 resamples are displayed in Table 3 and suggest that the indirect effect of advice network centrality on IWB through voice behaviour is stronger under shorter (.012; 95% CI = [.005, .018],  $-1$  SD) rather than longer organizational tenure (.003; 95% CI = [.001, .016],  $+1$  SD). Finally, the index of moderated mediation was calculated to assess the statistical significance of the moderated mediation effect following Hayes' recommendations (2015). The coefficient was  $-.0004$  and bias-corrected bootstrap results based on 5,000 resamples implying a significant effect: 95% CI [ $-.0008$ ,  $-.0001$ ]. These analyses, therefore, lend support for Hypothesis 4, suggesting the existence of an overall moderated mediation model.

Organizational tenure moderates the relationship between advice network centrality and innovative work behaviour



**FIGURE 2** Organizational tenure moderates the relationship between advice network centrality and innovative work behaviour

## 5 | DISCUSSION

### 5.1 | Theoretical implication

This study offers some important insights into the employee innovative work behaviour literature beyond that of past research. First, at a general level, it emphasizes the importance of a social perspective for individual innovation. This viewpoint has been relatively unexplored as previous research on IWB has predominantly focused on individual (e.g., motivation, personality and psychological factors) and contextual antecedents (e.g., leadership, climate and work characteristics).

More specifically, results showed the direct association of advice network centrality and IWB. This outcome underlines the fact that individual innovation is not an isolated behaviour, driven solely by individual attributes, but rather a phenomenon deeply embedded in the interconnected organizational fabric. By doing so, this investigation joins a growing body of research that elucidates the role of specific social network positions in influencing individual behaviours (e.g., Carnabuci & Diószegi, 2015; C. Tang et al., 2020). Some authors have previously theorized and examined the relationship between network centrality measures and innovation related constructs (e.g., Erdogan et al., 2020; Perry-Smith & Shalley, 2003); nevertheless, prior studies on the matter have been quite scarce, hence giving only limited support to confirm this relationship (Baer et al., 2015). Therefore, this study offers further evidence that individuals with a central position in the organizational advice network are more likely to successfully perform individual innovations.

Second, the current research empirically examined the role of voice behaviour in mediating the relationship between advice network centrality and IWB. The results indicated that voice behaviour mediates the relationship between advice network centrality and IWB. Consequently, this study specified a mechanism through which social networks can influence innovative behaviours, contributing to a more comprehensive understanding of how advice network position promotes individual innovation. This result is important as, opposed to prior research that focuses on motivation to act or ability to act (Wong & Boh, 2014), it highlights an agency driven process by which individual behaviours are not mere results of individuals' social position but rather results of active strategies aimed at signalling others to maximize advantages through sets of social connections. This is in line with an emerging body of literature (e.g., Brass & Borgatti, 2019) assuming that actions matter in realizing potential resources in social networks for innovation as 'position reveals the potential for action, but potential can be used or not used in a variety of ways' (Stevenson & Greenberg, 2000, p. 653).

Another key contribution of this study relates to the examination of organizational tenure as a moderator of the influence of advice network centrality and voice behaviour. The present work tested the interaction of organizational tenure and advice network centrality on voice. The results showed that advice network centrality has a stronger effect on voice behaviour when organizational tenure is low and that this affects the indirect effect on IWB in a similar manner. Although contextual factors are expected to be important boundaries

**TABLE 3** Moderated mediation results for voice behaviour across levels of organizational tenure

Variable	Level	Conditional indirect effect	Lower 2.5%	Upper 2.5%
ANC → VB → IWB	Low OT fit	.012	.005	.018
	High OT fit	.003	.001	.006

Note:  $N = 478$ .

Abbreviations: ANC, advice network centrality; IWB, innovative work behaviour; OT, organizational tenure; VB, voice behaviour.

for this relationship, only a few studies have provided empirical evidence for this argument (Liu et al., 2016). The results highlighted that organizational tenure served as a substitute for the positive relationship between advice network centrality and voice behaviour. That is to say that both advice network centrality and organizational tenure had positive relationships with voice behaviour; however, neither adds value beyond the other, pointing at an antagonistic interaction where longer organizational tenure acts to neutralize the effect of a central position in the advice network on the voice and innovation.

This result emphasizes that network resources activate voice behaviour more in individuals with shorter organizational tenure. For the reason that long-tenured employees are more satisfied with the status quo especially when they occupy more central positions thus less inclined to adopt risky voice behaviours (Bergh, 2001). In their early tenure, central employees may voice their ideas to achieve social recognition and for signalling the attainment of organizational standards (Woods et al., 2018). However, over time, central employees, having been accustomed to the workplace norms and procedures, may be more inclined to conform and comply and less likely to speak up their ideas. This progression is also consistent with models that differentiate job stages in transitional and maintenance (shorter and longer tenure, respectively; e.g., Zyphur et al., 2008). Previous studies (Venkataramani et al., 2016) advanced that holding central positions is a key element for employees to speak up with ideas and suggestions. The presented findings supplement the existing knowledge by adding an antagonistic factor that decreases the strength of the association between advice network centrality and voice behaviour.

## 5.2 | Practical implications

The present study bears several implications for managers and practitioners. First, as advice-receiving can be directly related to employees' innovation, managers need to pay attention to informal networks in their organizations, particularly advice networks. Finding which employees are central to the advice network can be particularly important as this allows the identification of the key individuals for the innovation process. This will help management to provide them with additional support to facilitate their innovative endeavours. At the same time, employees seeking to improve their innovative performance need to focus on developing awareness of their advice network position, because obtaining a central position is key to gaining the resources and support to successfully innovate. Past research has

highlighted that people often fail to identify their position in the social network (Janicik & Larrick, 2005) and that they find it hard to map and manipulate the structure of their network (Marineau et al., 2018). Thus, it is important to counter this issue with specialized training and activities. Studies have shown that specific network-oriented training activities can help employees developing a deeper understanding of their position in their social network (Burt & Ronchi, 2007).

Second, because voice behaviours resulted in mediating the effect of network centrality and individual innovation, managers should encourage voice as a means to obtain more innovative behaviours. In order to enhance the innovative performance of their employees, organizations need to develop a keen understanding not only of their social networks but also of their employees' voice behaviours. This can be done by integrating voice behaviours into the performance-appraising system, thus motivating employees to speak up to achieve higher performance evaluations (Hung et al., 2012). Organizational climate is another possible incentive, as it can offer signals that speaking up is socially accepted and appreciated. Moreover, managers can stimulate employees to voice by adopting specific leadership behaviours; for instance, ethical, servant and authentic leadership have been associated with an open communication atmosphere facilitating employees' voice (Chen & Hou, 2016).

Finally, this study indicates that the effect of advice network centrality on voice behaviour and in turn on innovative work behaviour is stronger with short-tenured employees. This result shows the appropriate length of tenure in exerting maximum gain resources from one's position in the social network for promoting voice and consequently innovation. Thus, advising managers and employees that the first years at work is when one can profit the most from the network position in terms of resources and status for voice and innovation. Conversely, as results have shown that the effects of network centrality on employees' voice behaviours decrease over the years, managers should encourage employees with long organizational tenure to speak up their innovative ideas.

Despite its theoretical and practical implications, this study also suffers from some limitations. First, its cross-sectional research design, thus, it is not possible to draw any causal inference. Moreover, in principle, the presented process could be reversed; future researchers should examine this prospect, analysing the causal relations via alternative longitudinal designs.

Second, the measure adopted to assess employees' innovative behaviour did not account for different dimensions of idea generation and implementation. Although the unidimensional construct approach



is widely adopted in the vast majority of prior research (e.g., O. Janssen & Van Yperen, 2004). Future studies should consider measuring these stages separately to enable a finer examination of how social network antecedents might differentially affect each innovation phase.

Third, the sample was for the most part composed of male participants, as the aerospace sector is mainly male-oriented. The female population responding concerned mostly women working in management and administrative positions. Upcoming research should include samples with more balanced gender proportions. Nevertheless, it is important to note that different studies have shown no significant direct effect of gender on change-oriented constructs (e.g., Reuvers et al., 2008).

Finally, the sampling strategy focused on the study of a medium-sized manufacturing company from a single country, which limits the generalizability of the results. Future investigations should increase both the sample size and the number of organizations involved and should diversify its geographical origin.

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## DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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