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Organizational and Individual Innovation Decisions in an Interorganizational System: Social Influence and Decision-Making Authority

Jiawei Sophia Fu[1], Michelle Shumate[2], & Noshir Contractor[3]

1 Department of Communication, School of Communication and Information, Rutgers, The State University of New Jersey, New Brunswick, NJ 08901, USA

2 Department of Communication Studies, School of Communication, Northwestern University, Evanston, IL 60208, USA

3 Department of Communication Studies, School of Communication; Management and Organizations, Kellogg School of Management; Industrial Engineering and Management Sciences, McCormick School of Engineering, Northwestern University, Evanston, IL 60208, USA

This study examines the processes of complex innovation adoption in an interorganizational system. It distinguishes the innovation adoption mechanisms of organizational-decision-makers (ODMs), who make authority adoption decisions on behalf of an organization, from individual-decision-makers (IDMs), who make optional innovation decisions in their own work practice. Drawing on the Theory of Reasoned Action and Social Information Processing Theory, we propose and test a theoretical model of interorganizational social influence. We surveyed government health-care workers, whose advice networks mostly span organizational boundaries, across 1,849 state health agencies in Bihar, India. The collective attitudes of coworkers and advice network members influence health-care workers' attitudes and perceptions of social norms toward four types of innovations. However, individuals' decision-making authority moderates these relationships; advisors' attitudes have a greater influence on ODMs, while perceptions of social norms only influence IDMs. Notably, heterogeneity of advisors' and coworkers' attitudes negatively influence IDMs' evaluations of innovations but not ODMs'.

Keywords: Social Networks, Innovation Adoption, Advice Network, Organizational Boundary, Normative Influence, Social Information Processing, Social Influence, Global Health, Heterogeneity, Decision-Making

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Corresponding author: Jiawei Sophia Fu; e-mail: sophia.fu@rutgers.edu

Understanding the processes of innovation adoption is critical to organizational learning (Leonardi, 2007; Monge, Cozzens, & Contractor, 1992) and has significant consequences for systemic change (Greenhalgh, Robert, MacFarlane, Bate, & Kyriakidou, 2004). However, research indicates that organizations often fail to adopt or implement innovations, and communication problems are the leading causes of failures in organizational innovation (Lewis, 2011). Communication research has found that social influence may be both the cause of and solution to failures in innovation adoption and implementation (Leonardi, 2009; Rimal, Limaye, Roberts, Brown, & Mkandawire, 2013). In particular, understanding how potential adopters' attitudes toward an innovation are socially influenced by others' attitudes "should be a central concern in innovation and implementation research" (Rice & Aydin, 1991, p. 219).

This study employs a holistic perspective by examining both individual members' and organizational actors' innovation adoption, which we refer to as *complex innovation adoption*. Analogous to the idea of complex innovation generation (Dougherty & Dunne, 2011), *complex innovation adoption* posits that various agents (e.g., individuals and organizations) in an interorganizational system "interact with and react to the actions of others" (p. 1214).[1,2] Hence, the central research question of this project is: *What sources of social influence drive the adoption of innovations by organizational-decision-makers (ODMs) and individual-decision-makers (IDMs) within an organization in an interorganizational system*?

Studying *complex innovation adoption* is theoretically important for at least two reasons. First, the successful adoption of proposed innovations depends on the synergistic actions of individuals and organizations in a social system. Prior research reveals that organizational adoption by ODMs is not equivalent to individual adoption by IDMs (Leonard-Barton & Deschamps, 1988). Although formal ODMs may decide to adopt innovations on behalf of their organizations, IDMs may resist adopting these innovations (Leonardi, 2009; Lewis, 2011; Rice & Aydin, 1991). Conversely, IDMs may informally adopt innovations in their work practice but lack the authority to make decisions on behalf of their organization (Rogers, 2003). Studying *complex innovation adoption* can help disentangle these processes, resulting in a fuller representation of the dynamics governing innovation adoption of ODMs versus IDMs.

Second, previous research in intraorganizational adoption has commonly highlighted the influence of the attitudes and behaviors of members of a single organization (e.g., Leonardi, 2007; Lewis & Seibold, 1996; Rice & Aydin, 1991). But, one factor that has received recent attention is the extent to which a broader set of stakeholders, such as community groups (Lewis, 2011) and customers (Leonardi, 2009), socially influence individual decisions in organizational change and innovation. Such extra-organizational stakeholders include individuals' advice networks that span organizational boundaries (McDonald & Westphal, 2003). Taken together, these studies reveal that social influence may be embedded in individuals' interpersonal networks, group and organizational environment, and interorganizational

networks (for a review, see Gupta, Tesluk, & Taylor, 2007). Studying *complex innovation adoption* can further our understanding of the distinct sources of social influence and their relative impact (Rice, 1993).

The purpose of this study is to identify the factors that socially influence ODMs' and IDMs' adoption intentions for proposed innovations. Our theoretical model is grounded in the assumption that social networks and a socionormative organizational environment provide ample cues to shape individuals' reasoned action processes; it integrates the Theory of Reasoned Action (TRA) and Social Information Processing Theory (SIP). Collective attitudes from coworkers and advisors, which span organizational boundaries, represent organizational-wide and interorganizational social influence on individuals, respectively. Furthermore, we argue that individuals' *decision-making authority* moderates the impact of different sources of social information about each proposed innovation. To investigate these assertions, we surveyed government health-care workers in 1,849 public health agencies in Bihar, India. We used a name generator approach to map their advice networks across organizations and assessed the influence of the *self-reported* (i.e., not perceived) attitudes of coworkers and advisors.

To the best of our knowledge, this study is the largest empirical study to examine innovation adoption in an interorganizational system, with social influence originating from both inside the organization and via advice networks that span organizational boundaries. Our results suggest two distinct innovation adoption mechanisms for organizational adopters (i.e., ODMs) and individual adopters (i.e., IDMs), contributing to a richer picture of the *complex innovation adoption* processes. We contend that social influence is not only about the magnitude and valence of the collective attitudes of other members in one's organization and social networks; *heterogeneity* of others' attitudes also serves as a signal of social information that impinges on individuals' evaluations of innovations. Key findings of this study also shed light on how to effectively design strategies and interventions to encourage individual and organizational innovation adoption, particularly in public health domains.

An integrative framework toward complex innovation adoption: TRA and SIP

Organizations do not evaluate or implement innovations; leaders and employees do. Therefore, we examine innovation adoption among individuals, located in organizations, within an interorganizational system. Specifically, we distinguish the decision-making processes of ODMs from IDMs because IDMs only make optional innovation adoption decisions in their own work practice, but ODMs make innovation adoption decisions on behalf of the organization. Although their organization may formally decide to adopt an innovation, IDMs may voluntarily adopt or reject an innovation (Leonardi, 2009; Rice & Aydin, 1991). In contrast, ODMs have the authority to make decisions about proposed innovations on behalf of their organization.

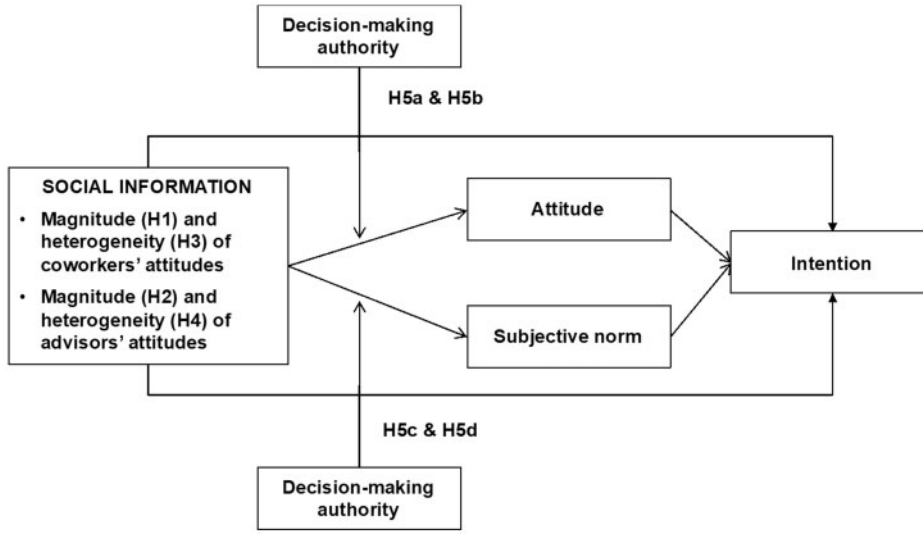

Figure 1 An integrative framework of the theory of reasoned action and social information processing theory for complex innovation adoption.
Note. Theoretically, previous TRA research and its extensions have demonstrated that social information can indirectly influence behavioral intentions via attitude and subjective norm, as well as directly influence behavioral intentions. Methodologically, our SEM results favored a partially mediated SEM model over a fully mediated SEM model (see Supporting Information Appendix Table 3). In combination, we also plotted direct links from social information to behavioral intentions.

The attitudes of others, including coworkers and advisors, influence IDMs' and ODMs' decision-making processes. To account for these social influences, we investigate the collective attitudes of organizational coworkers (i.e., the mean attitude of the respondent's coworkers' in the same organization who responded to the same survey, excluding the focal respondent's attitude) and members of individuals' advice networks (i.e., the mean attitude of all the respondent's advisors who responded to the same survey). We draw on two theories to ground this research: TRA and SIP. Figure 1 provides an overview of our theoretical model.

TRA has been a useful conceptual framework for understanding the adoption of innovations, particularly health innovations (Ajzen & Fishbein, 1980). Several meta-analyses have provided evidence for the effectiveness of TRA in predicting human behavior across conditions and contexts (e.g., Sheppard, Hartwick, & Warshaw, 1988). According to TRA (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975), behavioral intention directly determines behavior. Furthermore, behavioral intention is a joint function of attitude and subjective norms, or perceived social pressures and expectations from significant others (e.g., coworker).

TRA sheds light on the cognitive processes of innovation adoption, and extensions of TRA usually contain a social influence component (Fishbein & Ajzen, 2010;

Rimal & Real, 2005). However, TRA lacks a coherent theoretical explanation for the sources of social influence that lead to the reasoned action process. To offer a more generalized and richer description of such processes, we integrate SIP (Salancik & Pfeffer, 1978) and TRA. SIP asserts that individuals construct their attitudes and cognitions as a result of the informational social influence and their job and task environment (Fulk, Schmitz, & Steinfield, 1990; Salancik & Pfeffer, 1978). Extending the original SIP model, Rice (1993) advocates for the empirical test of the full networked social influence model, distinguishing multiple sources of social information, such as the *actual* attitudes of supervisors, advisors, coworkers, and the adopting individual (for an empirical study, see Rice & Aydin, 1991). These two theories, together, describe both the sources of social influence and the focal individuals' reasoned action process. Following prior studies, we argue that social information from the organizational environment and social networks serves as the basis for conscious evaluation of proposed innovations (Borgatti & Cross, 2003; Chen, Takeuchi, & Shum, 2013; Leonardi, 2009; Rice, Grant, Schmitz, & Torobin, 1990).

In summary, our theoretical framework posits that research seeking to explain *complex innovation adoption* must detail both the cognitive processes (i.e., attitudes, subjective norms in TRA) leading to adoption intentions and the sources of social influence (i.e., SIP). Although TRA focuses on the *perceived* attitudes of others (i.e., subjective norms), SIP and its extensions accentuate the impact of the *actual* attitudes of others in one's organization and social network (Rice & Aydin, 1991). To distinguish organizational-wide and interorganizational social influence and gauge their relative weight, we investigate two sources of social information that influence ODMs' and IDMs' innovation adoption intention: (a) collective attitudes of coworkers based on the aggregation of their self-reported attitudes (i.e., coworkers' attitudes), and (b) collective attitudes of members in one's advice network based on the aggregation of their self-reported attitudes (i.e., advisors' attitudes). We argue that coworkers' attitudes represent a kind of organizational-wide social influence. To the degree that advice networks span organizational boundaries, advisors' attitudes represent a potential source of interorganizational influence.

Social influence of coworkers in an organization

Building on previous SIP (e.g., Fulk et al., 1990) and health communication research (e.g., Rimal et al., 2013), we argue that individuals tend to develop similar attitudes, perceptions, and behavioral intentions as their coworkers. Collective coworker attitudes, hereafter coworkers' attitudes, describe the *actual* attitudes that others in one's organization, excluding the focal individual, have toward a particular innovation. SIP posits that social information from coworkers shapes individuals' perceptions, attitudes, and behaviors (Fulk et al., 1990; Salancik & Pfeffer, 1978). Consistent with SIP, research has shown the convergent influence of coworkers in inducing focal individuals' attitudes and adoption intentions to be similar (Chen

et al., 2013; Leonardi, 2009; Lewis & Seibold, 1996; Rice & Aydin, 1991; Rice et al., 1990). Individuals evaluate the composite influence of coworkers' attitudes as a common socionormative environment and develop attitudes and behavioral intentions similar to those of others (Rimal et al., 2013). The information from the socionormative environment provides signals about what attitudes are appropriate, directs an individual's attention to make certain aspects of the environment more salient, and shapes an individual's interpretation of environmental cues. As such, social information from coworkers in an organization environment significantly influences individuals' attitudes, perceptions of innovations, and intentions.

In sum, coworkers' attitudes are the mechanism by which organizational boundaries constrain individuals' attitudes and behavioral intentions. That is, sharing an organizational affiliation induces similar attitudes and behavioral intentions about workplace innovations. Also, based on the definition of subjective norm, the socionormative environment directly influences individuals' perception of their colleagues' approval or disapproval of a particular innovation.

> ***Hypothesis 1.*** *Coworkers' attitudes positively influence individuals' (a) attitudes, (b) subjective norms, and (c) behavioral intentions about proposed innovations.*

Social influence from advice networks

In addition to coworkers, social networks, which can span organizational boundaries (McDonald & Westphal, 2003; Perry-Smith & Shalley, 2014), may influence innovation adoption decisions. In particular, organization and communication scholars have extensively examined the role of advice networks for innovation generation and adoption (e.g., Leonardi, 2007, 2013; Reagans & McEvily, 2003; Rice & Aydin, 1991). Advice-seeking networks describe employees' patterns of seeking "information, assistance, and expert knowledge from one another to perform their jobs" (c.f. Sykes, Venkatesh, & Johnson, 2014, p. 53). Advisors may exist within one's organization or in another organization. In this study, the vast majority (i.e., 86–89%, see Method section) of the advice networks transcend organizational boundaries, so advice networks primarily represent a source of interorganizational social influence.

In sum, social influence models suggest that actors in one's advice networks provide essential cues about a particular innovation, affecting an individual's attitudes, interpretation of these innovations' utilities, and subsequent behavioral intentions (Leonardi, 2007, 2013; Rice & Aydin, 1991). Also, based on the definition of subjective norm, actors in one's advice network are direct sources of the perceived social norm (i.e., the individual's evaluation of others' attitudes). Therefore, advisors' attitudes positively influence an individual's attitudes, subjective norms, and behavioral intentions. On the basis of TRA and SIP, we deduce the following hypothesis:

Hypothesis 2. *Advisors' attitudes positively influence individuals' (a) attitudes, (b) subjective norms, and (c) behavioral intentions about proposed innovations.*

Innovation adoption contingent on heterogeneity of source others' attitudes

In addition to the effects of the magnitude of collective attitudes on an individual (i.e., H1 and H2), another question that logically follows is what is the effect of *heterogeneity*, or variance, in coworkers' and advisors' attitudes (Coleman, 1958). Coworkers reflect internal, organizational-consistent attitudes and norms, whereas external advisors represent a wide range of attitudes and norms unrelated to the focal organization. Assessing variance in others' attitudes can shed light on the uncertainty and ambiguity of the innovation adoption situation, which is one key component of SIP research (Rice, 1993).

In contrast to previous research that specifies group-level heterogeneity (Perry-Smith & Shalley, 2014), we examine the heterogeneity of each focal individual's coworkers or advisors. In other words, heterogeneity of coworkers' attitudes is the variation of attitudes among individuals in the same organization, not including the focal participant. Heterogeneity of advisors' attitudes is the average difference in the attitudes of individuals from which the focal individual reports they seek advice. We argue that the level of heterogeneity of coworkers' attitudes and advisors' attitudes would each influence the focal respondent's own attitude.

In an innovation adoption situation, uncertainty concerns are negatively related to behavioral responses (Lewis & Seibold, 1996). Previous social psychology and SIP research demonstrate that heterogeneity of others' attitudes, as an indicator of the ambiguity and uncertainty of the innovation adoption situation (Rice, 1993), negatively influences an individual's attitudes and evaluations. On the positive side, attitudinal heterogeneity "creates [a] positive environment of constructive conflict and debate" (Mannix & Neale, 2005, p. 33). In the presence of heterogeneity, individuals tend to elaborate more on arguments because of their desire to maintain their social relationships; hence they may have a deeper understanding of the proposed innovations (Loyd et al., 2013). However, heterogeneity of others' attitudes creates cognitive conflict in individuals' SIP (Loyd, Wang, Phillips, & Lount, 2013). As a result, individuals may be more ambivalent and have a harder time deciding whether or not to adopt an innovation. Moreover, greater variance in others' attitudes creates uncertainty in how an individual might conform their attitudes to that of others' in order to be part of the majority opinion (Cialdini & Goldstein, 2004). These studies suggest that greater heterogeneity of others' attitudes will reduce the likelihood that an individual develops positive attitudes, perceptions, or behavioral intentions about a particular innovation in anticipation of controversy and conflict. Thus, we hypothesize:

Hypothesis 3. *Heterogeneity of coworkers' attitudes negatively influences individuals' (a) attitudes, (b) subjective norms, and (c) behavioral intentions about proposed innovations.*

Hypothesis 4. *Heterogeneity of advisors' attitudes negatively influences individuals' (a) attitudes and (c) behavioral intentions about proposed innovations.*

Innovation adoption contingent on decision-making authority

We contend that social influence of these sources is not uniform. Instead, the relationship between the sources of social influence and an individual's reasoned action depends on their decision-making authority (Leonard-Barton & Deschamps, 1988). Decision-making authority determines whether an individual's innovation adoption decision has individual or organizational consequences. In this study, we examine whether decision-making authority, defined as whether or not government healthcare workers have the authority to adopt proposed health innovations on behalf of their organization, moderates the four above-hypothesized relationships (H1 – H4). We argue that by virtue of their position, IDMs have less decision-making authority than ODMs, and thus are more susceptible to the social influence from their coworkers and advisors.

Organization research suggests that formal authority and responsibility in organizations has a profound impact on individuals' psychological, cognitive, and behavioral processes. Following prior research, we contend that ODMs and IDMs are engaged in distinct reasoned action processes regarding innovation adoption. Specifically, we argue that the influence of others' (coworkers or advisors) attitudes is stronger for IDMs than for ODMs. Social psychology literature suggests that social and normative pressures do not constrain individuals with higher power as much as those with less (Cialdini & Goldstein, 2004; Gergen & Taylor, 1969). Empirical research has found that managers and leaders are more "self" oriented in innovation adoption and employees who are more "other" oriented (Carlson & Davis, 1998). Moreover, individuals higher in an organizational hierarchy are less susceptible to the social influence from their peers and coworkers (Wang, Meister, & Gray, 2013). In combination, these studies suggest that individuals' decision-making authority may influence the differential effects of coworkers' and advisors' attitudes on potential adopters' attitudes, subjective norms, and behavioral intentions. Specifically, the social influence of advisors' and coworkers' attitudes may be stronger for IDMs than for ODMs. In combination with H1 and H2, we hypothesize that:

Hypothesis 5a. *The positive influence of coworkers' attitudes on individuals' attitudes, subjective norms, and behavioral intentions is stronger for IDMs than for ODMs.*

Hypothesis 5b. *The positive influence of advisors' attitudes on individuals' attitudes and behavioral intentions is stronger for IDMs than for ODMs.*

In the meantime, we hypothesize that the negative influence of heterogeneity of coworkers' and advisors' attitudes would vary by individuals' decision-making authority. Prior organization and psychology research indicates that decision-

makers and leaders tend to have higher tolerance for ambiguity and uncertainty in a given situation (Daft & Lewin, 1993; DiTomaso & Hooijberg, 1996). Hence, heterogeneity of coworkers' and advisor' attitudes, as signals of uncertainty and ambiguity (Rice, 1993), would influence ODMs to a lesser extent than IDMs. As an extension to H3 and H4, we thus hypothesize that:

> ***Hypothesis 5c.*** *The negative influence of the heterogeneity of coworkers' attitudes on individuals' attitudes, subjective norms, and behavioral intentions is stronger for IDMs than for ODMs.*
>
> ***Hypothesis 5d.*** *The negative influence of the heterogeneity of advisors' attitudes on individuals' attitudes and behavioral intentions is stronger for IDMs than for ODMs.*

Method

This study examines state health agencies' and individual health-care workers' adoption of health innovations in Bihar, India. The neonatal mortality rate (NMR) in India is 10 times larger than that in the developed world. Historically, the state of Bihar has the highest NMR and the highest total fertility rate given the number of women of childbearing age (c.f. Contractor & DeChurch, 2014). In India, the state government is the key decision-maker for public health-care delivery. At the time of the study, the state of Bihar was making significant efforts to scale-up public primary care services with measurable impact on the health of women, neonates, and young children under 5 years of age. Public agencies focused on scaling up four types of health innovations by health-care workers (see Table 1) via the Bihar Technical Support Program.

Sample

We conducted surveys using face-to-face interviews with government health-care workers ($N = 9{,}119$) in the state health system in 2014. We had a complete roster of all health-care workers in the region ($N = 16{,}517$), and our sample accounted for about two thirds of these workers. The mean response rate across all organizations was 45% ($SD = .45$, $min = 0$, $max = 1$). After excluding respondents who did not seek advice ($N = 1{,}230$) and those who were the only respondent in their organization ($N = 1{,}113$), the final sample consisted of 6,776 health-care workers from 1,849 state health agencies (e.g., referral hospitals, public health centers).

Measures

In this research, we collected government health-care workers' attitudes, subjective norms, behavioral intentions, and advice networks separately for each of the four

Table 1 Key Definitions and Descriptions of the Four Types of Health Innovations Promoted in Bihar, India

Health innovations to	
1. Improve maternal and newborn health	• Counsel families for birth and emergency preparedness • Quality management of routine deliveries at primary health centers • Facility-driven facilitation process to build basic emergency obstetric and newborn care capabilities • Postpartum evaluation of the mother and newborn • Referral package for maternal and neonatal complications • Essential package of newborn care for all births • Extra care for small baby • Umbilical cord on cleaning of neonates with 4% chlorhexidine • Identification, referral, and management of neonatal infections
2. Improve nutrition	• Encouraging breastfeeding, including encouraging early initiation, exclusive breastfeeding for the first 6 months, and continuing breastfeeding for 24 months • Appropriate complementary feeding • Iron and folic acid uptake and use during pregnancy • Home fortification of complementary foods
3. Improve immunization	• Fully immunized child by ensuring no left-outs and reducing dropouts for various vaccines
4. Improve family planning	• Community-based counseling: integrate postpartum and postabortion family planning counseling and referrals • Facility-based counseling services: Promote family planning use in the public sector through family planning corners • Expand access to quality services for family planning • Leverage private sector providers to increase the availability of injectables • Improved uptake in birth spacing methods

types of health innovations. Hence, coworkers' and advisors' attitudes and heterogeneity of these attitudes could vary for each type of health innovation. Tables 1 and 2 in the Supporting Information Appendix present the descriptive statistics and pairwise correlations for each variable, for each type of innovation.

Following previous TRA research (e.g., Ajzen & Fishbein, 1980; Sheppard et al., 1988), we measured *attitude* by presenting descriptions of each health innovation (see Table 1) and asking respondents whether they think adopting each of the four health innovations was necessary (from 1 = *unnecessary* to 7 = *necessary*). Asking respondents whether people in their organization who were important to them approved of their adopting each innovation provided a measure of *subjective norms* (from 1 = *strongly disagree* to 7 = *strongly agree*). *Behavioral intention* was evaluated

by asking respondents if they planned to adopt each of the four types of innovations in the next 6 months (from 1 = *extremely unlikely* to 7 = *extremely likely*).

Following Rimal et al. (2013), *coworkers' attitudes* represent the average attitudes regarding a specific type of innovation among all the health-care workers, excluding the focal participant, who worked in the same organization with the respondent. For each respondent, we first identified their organizational affiliation and then calculated the average attitude of all members, excluding the focal participant, based on the survey responses of all others in that organization. This measurement approach ensured that the coworkers' attitudes varied across individuals from the same organization. On average, 9.28 ($SD = 12.04$) other workers completed the survey in each health agency. We used standard deviations of attitudes among coworkers to assess the *heterogeneity of coworkers' attitudes*.

We operationalized *advisors' attitudes* as the average attitudes about each innovation among all health-care workers from whom the participant sought advice. For each innovation, we used the name generator approach and asked respondents to whom they went for advice. We then calculated the average attitude of all the advisors they identified based on the survey responses of those advisors whom we also interviewed. Hence, advisors' attitudes are derived from survey responses of the named advisors, not projected attitudes based on focal respondents' estimations. Our results indicated that health-care workers sought advice from 1.41 ($SD = 0.62$) to 2.02 advisors ($SD = 1.01$), depending on the type of innovation. Depending on the type of innovation, only from 10.76% ($SD = 0.26$) to 14.38% ($SD = 0.33$) of their advisors shared the same organizational affiliation with the participant, indicating that advisors' attitudes primarily represent a source of interorganizational influence from the other 1,848 public health agencies in the state of Bihar. We used the standard deviations of advisors' attitudes to assess the *heterogeneity of advisors' attitudes*. By computing coworkers' and advisors' attitudes from their surveys (i.e., actual attitudes as opposed to projected attitudes), we avoided common method bias (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003).[3]

Decision-making authority indicates whether respondents had the power to determine if their organization would adopt the health innovations involved in participating in the Bihar Technical Support Program. We asked each respondent to identify all the ODMs responsible for deciding whether their organization would adopt those innovations. We then coded all the health-care workers they identified, including self-identification, as ODMs ($N = 953$, 14.06%). We carried out further sensitivity tests to explore the robustness of decision-making authority in this study by operationalizing ODMs as only those who were self-nominated ($N = 488$, 7.23%). The sensitivity analyses results were consistent with the results reported in this study.[4]

Control variables. To account for individual differences, we included variables that previous TRA and SIP research has identified as significantly influencing individuals' attitudes and behaviors—gender, previous experience, rank, and age (e.g., Salancik & Pfeffer, 1978; Sykes et al., 2014). Additionally, drawing on social network

research (e.g., Reagans & McEvily, 2003), we controlled for the number of alters (i.e., organizational size and advice network size). *Gender* was a binary variable where 1 indicated female. *Previous experience* described whether participants had engaged in the decision to adopt proposed innovations in the past year. *Rank* was an ordinal variable that described participants' job rank within their organization. *Age* was a continuous variable referring to the age of the participant. Finally, *organizational size* and *advice network size* were continuous variables indicating the number of employees in the participant's organization and the number of advisors an individual sought advice from for each innovation.

Procedure and analysis

We conducted structural equation modeling (SEM) in *R* (version 3.5.1) for each type of health innovation. SEM allows researchers to examine the relationships between endogenous and exogenous variables and obtain the factor loadings on the paths (Bollen, 1989). We created four SEM models,[5] one for each type of innovation because the types of innovations can influence adoption and diffusion mechanisms (Rogers, 2003). We report four set of results for each of the four types of health innovations. A χ^2, χ^2/df (less than 3), RMSEA (less than .08), CFI (higher than .95), TLI (higher than .95), and SRMR (less than .08) indicate goodness of fit (GOF) for SEM models (Hooper, Coughlan, & Mullen, 2008; Kline, 2011). After estimating the four SEM models and evaluating their GOF, we tested for invariance (or lack thereof) between ODMs and IDMs in SEM by conducting a joint Ward test for the null hypothesis that all structural coefficients were constrained to be equal across the subsamples of ODMs and IDMs (Wooldridge, 2010) for each type of innovation. If the parameters were not equal across the subsamples in the SEM models of ODMs and IDMs, it suggests that ODMs and IDMs had distinct innovation adoption mechanisms, supporting the moderating effect of decision-making authority (i.e., H5a—H5d). Once variance in structural coefficients of the overall SEM model was detected, the next logical step was to examine the sources of variance. That is, we examined which variables in each SEM model had significantly different parameter estimates (i.e., magnitude and direction) for ODMs than IDMs at $p < .05$ level, with the help of post-hoc individual Wald tests.[6]

Results

Nearly three-fifths ($N = 3{,}885$, 57.37%) of the participants reported previous experience participating in the decision to adopt similar health innovations in the past 12 months. The average age of participants was 40.44 years ($SD = 10.11$). About 90% of the participants were female subjects ($N = 5{,}909$, 87.27%). Since the fully mediated model was a nested model of the partially mediated model, a significant reduction in Chi-square suggests an improvement in the fit to the data (James, Mulaik, & Brett, 1982). In all four models, the decrease in Chi-square from the full-mediation

Table 2 Summary of Hypotheses and Findings

Hypothesis	Findings	Status
H1: Main effect of coworkers' attitudes on (a) attitudes, (b) subjective norms, (c) and intentions	Coworkers' attitudes positively influenced the attitudes and subjective norms for ODMs; coworkers' attitudes positively influenced the attitudes, subjective norms, and intentions for IDMs	H1a and H1b were supported for ODMs and IDMs; H1c was supported for IDMs only
H2: Main effect of advisors' attitudes (a) attitudes, (b) subjective norms, (c) and intentions	Advisors' attitudes positively influenced the attitudes and subjective norms for both ODMs and IDMs	H1a and H1b were supported for ODMs and IDMs; H1c was rejected for ODMs and IDMs
H3: Main effect of heterogeneity of coworkers' attitudes on (a) attitudes, (b) subjective norms, (c) and intentions	Higher heterogeneity of coworkers' attitudes was related to less favorable attitudes, more negative subjective norms, and lower adoption intentions for IDMs; heterogeneity of coworkers' attitudes did not influence ODMs	H3a, H3b, and H3c were supported for IDMs; H3 was rejected for ODMs
H4: Main effect of heterogeneity of advisors' attitudes on (a) attitudes, (b) subjective norms, (c) and intentions	Higher heterogeneity of advisors' attitudes was related to less favorable attitudes and more negative subjective norms, but higher adoption intentions for IDMs. The total effect was significantly negative for neonatal and maternal health innovations and child immunization innovations; heterogeneity of advisors' attitudes did not influence ODMs	H4a and H4b were supported for IDMs, H4c was rejected for IDMs; H4 was rejected for ODMs
H5: Moderating effect of decision-making authority	Major differences between ODMs and IDMs 1. Compared to IDMs, advisors' attitudes exerted a more significant effect for ODMs 2. The influence of subjective norms on intentions was stronger for IDMs; the relationship between subjective norms and intentions was absent for ODMs 3. Heterogeneity of coworkers' and advisors' attitudes negatively influenced IDMs but did not influence ODMs	H5c and H5d were supported, H5a and H5b were rejected

model to the partial-mediation model was significant (see Supporting Information Appendix Table 3). Moreover, the GOF measures for the partially mediated models suggested excellent model fit. Therefore, we retained the partially mediated model for results and interpretations (see Supporting Information Appendix Tables 4a &

4b). Figure 2 illustrates the SEM results for significant hypothesized variables for ODMs and IDMs, respectively.

Differences between ODMs and IDMs

Before we turn to the other hypotheses, we first report the test of invariance based on health-care workers' decision-making authority. According to H5, decision-making authority moderates the relationship between social information and individuals' reasoned action processes; the effects of the magnitude (H5a & H5b) and heterogeneity (H5c & H5d) of coworkers' and advisors' attitudes on ODMs and IDMs are distinct. First, the joint Wald test results suggested that the structural parameters for ODMs and IDMs could not be constrained to be the same for all four types of innovations (e.g., the Wald test results for the family planning innovation was $\chi^2 = 324.32$, $df = 31$, $p < .0001$). Thus, we constructed two SEM models for ODMs and IDMs for each innovation, a total of eight models. We report the results for ODMs and IDMs separately throughout the Results section. Furthermore, we conducted post-hoc individual Ward tests and explored the sources of significant difference in structural parameters between the SEM models of ODMs and IDMs at the $p < .05$ level for each of the four types of innovations. Those parameters that show a significant difference are highlighted in boldface in Figure 2.

Influence of subjective norm on behavioral intention

Notably, results from individual Ward tests suggest significantly different parameter estimates for the relationship between subjective norms and intentions. More specifically, the influence of subjective norms on intentions was significantly stronger for IDMs (β's ranged from .12 to .21), whereas the relationship between subjective norms and intentions was absent for ODMs, as shown in Figure 2.

Main effects of coworkers' and advisors' attitudes

According to H1, coworkers' attitudes positively influence the focal individual's attitude (H1a), subjective norm (H1b), and intention (H1c). H1a and H1b were supported for both ODMs and IDMs. For ODMs, coworkers' attitudes positively influenced health-care workers' attitudes (β's ranged from .15 to .30) and subjective norms (β's ranged .14 to .24) for all four types of innovations. Similarly, coworkers' attitudes positively influenced IDMs' attitudes (β's ranged from .23 to .26) and subjective norms (β's ranged from .22 to .28) for all four innovations. H1c was only supported for IDMs; coworkers' attitudes positively influenced health-care workers' behavioral intentions for all four types of innovations (βs ranged from .04 to .08).

H2 posited that advisors' attitudes positively influence an individual's attitude (H2a), subjective norm (H2b), and intention (H2c). The evidence supported H2a and largely supported H2b. For ODMs, advisors' attitudes positively influenced health-care workers' attitudes (β's ranged from .20 to .37) and subjective norms (β's

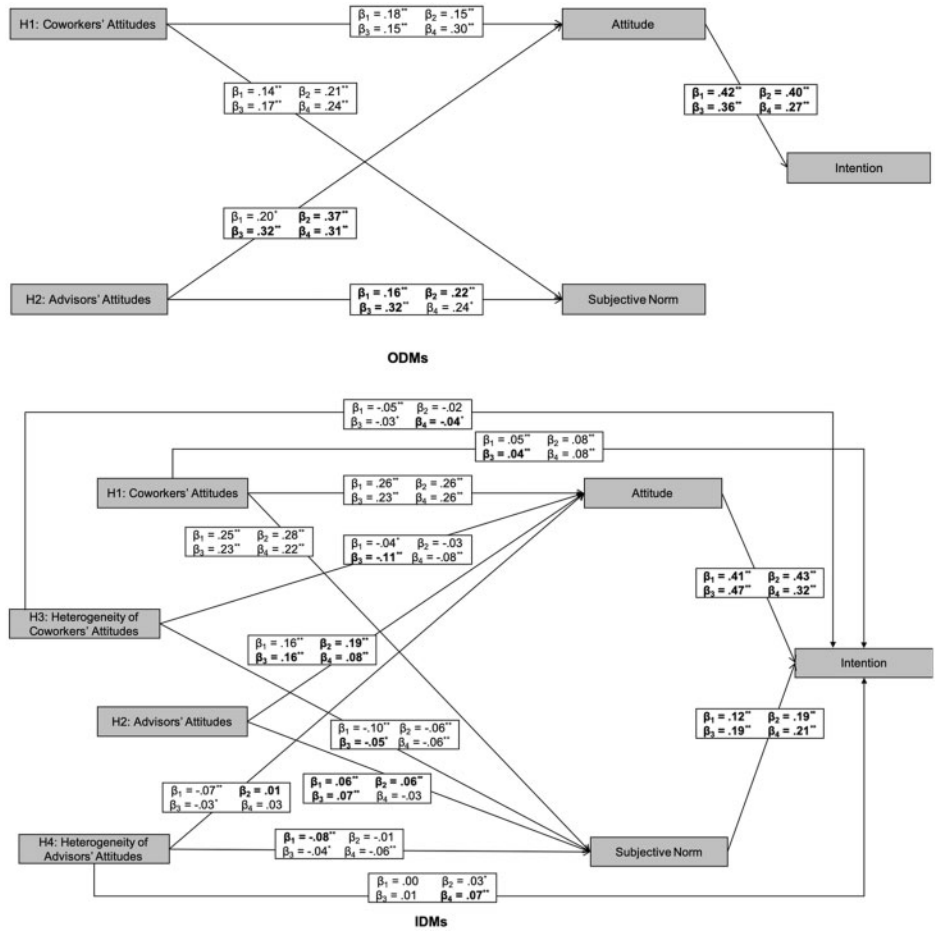

Figure 2 SEM results for organizational-decision-makers (ODMs) and individual-decision-makers (IDMs), respectively.

Note: Only significant paths are plotted. Models also accounted for advice network size, organizational size, previous experience, rank, gender, and age (see Supporting Information Appendix Tables 4a & 4b). Boldface indicates significantly different parameter estimates at $p < .05$ level between ODMs and IDMs. Subscripts of coefficients represent the four types of innovations: (a) maternal & neonatal health, (b) nutrition, (c) child immunizations, and (d) family planning.

$^{*}p < .05$. $^{**}p < .01$.

ranged from .16 to .32) for all innovations. For IDMs, advisors' attitudes positively influenced individuals' attitudes (β's ranged from .08 to .19) for all innovations and positively impacted their subjective norms for all innovations (β's ranged from .06 to .07) except family planning innovations ($\beta = -.03$, $p = .09$). The influence of

advisors' attitudes on an individual's intention was not significant for ODMs or IDMs, rejecting H2c.

Through post-hoc individual Ward tests, we identified significantly different parameter estimates at $p < .05$ level (see boldface in Figure 2). Expressly, the results indicated a significantly stronger relationship between advisors' attitudes and healthcare workers' attitudes for ODMs than IDMs for three types of innovations, maternal and neonatal innovation being the insignificant exception. Therefore, there was evidence for the moderation effect of decision-making authority. However, it led us to reject our hypotheses that the positive influence of coworkers' attitudes (H5a) and advisors' attitudes (H5b) was stronger for IDMs than for ODMs.

Heterogeneity of coworkers' and advisors' attitudes

H3 and H4 stated that heterogeneity of coworkers' (H3) and advisors' attitudes (H4) negatively influenced individuals' (a) attitudes, (b) subjective norms, and (c) intentions. The results suggested that variance in coworkers' attitudes or advisors' attitudes had no apparent influence on ODMs' attitudes, subjective norms, or intentions, rejecting H3 and H4 for ODMs.

However, heterogeneity of both coworkers' and advisors' attitudes negatively influenced IDMs' evaluations toward proposed innovations. First, heterogeneity of coworkers' attitudes negatively influenced IDMs' attitudes (β's ranged from $-.04$ to $-.11$), subjective norms (β's ranged from $-.05$ to $-.10$), and intentions (β's ranged from $-.03$ to $-.05$) for all innovations except those that were nutrition-related. This implies that greater heterogeneity of coworkers' attitudes leads IDMs' to make more negative evaluations of innovations. Thus, the evidence supported H3a, H3b, and H3c for IDMs.

Second, heterogeneity of advisors' attitudes negatively influenced IDMs' attitudes (β's ranged from $-.03$ to $-.07$). As advisors' attitudes became more divided, IDMs' evaluations of innovations became less favorable. H4a for IDMs was supported (see Table 2 for a summary of hypotheses and findings). However, the influence of the heterogeneity of advisors' attitudes on intentions was significantly positive for nutrition-related and family planning innovations ($\beta_2 = .03$, $p < .05$; $\beta_4 = .07$, $p < .01$), rejecting H4c for IDMs. Given their opposite effect on attitudes and intentions, we then calculated the total effect of heterogeneity of advisors' attitudes on adoption intentions for IDMs. The results suggested that the total effect was not significant for nutrition-related ($B = .02$, $SE = .04$, $p = .55$) and family planning innovations ($B = .07$, $SE = .04$, $p = .07$) but was significantly negative for maternal and neonatal health innovations ($B = -.24$, $SE = .04$, $p < .001$) and child immunization innovations ($B = -.17$, $SE = .04$, $p < .001$). In combination, these findings provided further evidence for the hypotheses that the negative influence of coworkers' attitudes (H5c) and advisors' attitudes (H5d) was stronger for IDMs.

Post-hoc tests of indirect effects

Following Preacher and Hayes (2004), we used bootstrapping methods to generate confidence intervals to estimate indirect effects to validate the SEM results (see Supporting Information Appendix). The results confirmed the significance of all indirect effects posited in Figure 2.

Discussion

The purpose of this study is to (a) examine the holistic processes of *complex innovation adoption* by organizational actors and individual members within them in an interorganizational system, and (b) identify the social influence on ODMs' and IDMs' innovation adoption intentions. The collective attitudes of coworkers and advice network members, as measured by surveys of coworkers and advisors, influence health-care workers' attitudes and perceptions of social norms toward four types of innovations. However, members of an organization do not have uniform decision-making processes for innovation adoption. Instead, potential adopters' decision-making authority moderates the influence of different sources of social information about the innovation. We argue that because ODMs have the authority to make innovation adoption decisions on behalf of their organization, but IDMs make optional innovation decisions in their own work practice, different mechanisms are at work in their respective decision-making processes. We review each of these sources of social information and their influence on ODMs and IDMs, respectively.

ODMs' versus IDMs' innovation adoption decision-making mechanisms

ODMs' innovation adoption processes are more straightforward than IDMs' (Figure 2). Both coworkers' attitudes and advisors' attitudes are positively related to health-care workers' evaluations of proposed innovations overall. However, advisors' attitudes have a more significant impact on ODMs than for IDMs. Previous research shows that ODMs often act as brokers and gatekeepers to proactively seek expert opinions to enhance their decision-making capacity and lead the decision-making processes for innovation adoption of their organization (Perry-Smith & Shalley, 2014). As such, advice networks provide ample information and expert knowledge (Sykes et al., 2014) that influence ODMs' innovation adoption decisions. In contrast, our findings suggest that subjective norms only influence IDMs, not ODMs. Past research explains that IDMs often conform their attitudes to others to gain social approval, be liked, and reduce tension (Cialdini & Goldstein, 2004). Taken together, our results confirm prior social psychology research that normative pressures from coworkers place fewer constraints on ODMs.

Furthermore, heterogeneity, as an indicator of the ambiguity and uncertainty of an innovation adoption situation (Rice, 1993), has different effects on ODMs and IDMs and amplifies their differences. Specifically, greater heterogeneity of coworkers' attitudes and advisors' attitudes leads to more negative evaluations of

proposed innovations among IDMs but does not affect ODMs. This result could suggest a higher tolerance for ambiguity and uncertainty among ODMs (Daft & Lewin, 1993; DiTomaso & Hooijberg, 1996). It implies that ODMs seek the best available information and expert opinions to guide their innovation adoption decisions; variation in the attitudes of members of their organization and social networks has little effect on their decision-making. In contrast, IDMs may see heterogeneity of their coworkers' and advisors' attitudes as controversy about the proposed innovations, which leads them to evaluate them less favorably. Extending previous research (Lewis & Seibold, 1996), we show how the negative influence of uncertainty on behavioral responses is contingent on decision-making authority.

The proposed TRA–SIP model for innovation adoption

Our theoretical model, which integrates the TRA (Fishbein & Ajzen, 1975) and SIP (Salancik & Pfeffer, 1978), proves to be useful in understanding *why* individuals and organizations in an interorganizational system will adopt an innovation or not. This integrative model connects the social influence of others within an organization, advice networks that span organizational boundaries, variance in coworkers' and advisors' attitudes, perceived socionormative environment, and the cognitive processes leading to the intentions to adopt innovations. Thus, this framework incorporates both organizational-wide and interorganizational social influence on individuals' decision-making processes in innovation adoption (Gupta et al., 2007), responding to Rice's (1993) call for the investigation of the relative social influence of multiple source others' *actual* attitudes.

The empirical results suggest that the volume and variance of coworkers' and advisors' attitudes jointly shape individuals' attitudes toward innovations and intentions to adopt them. This study underscores the importance of social influence originating from an individual's work environment and boundary-spanning advice networks. We note that this influence is only partially mediated through subjective norms, suggesting that the combined SIP–TRA model better captures the influence of others' attitudes than TRA alone. Additionally, we contend that *variance* in the attitudes of important advice-providing alters also carries social information that shapes individuals' attitudes and intentions. To gain a more complete picture of the dynamics governing the adoption of innovation, researchers should specify alters' attitudes and *how* those attitudes *vary* across alters; this heterogeneity is particularly salient for optional innovation decisions (Rogers, 2003).

Theoretical contributions

This research makes three theoretical contributions to the study of innovation adoption in communication and organization literature. First, this study simultaneously examines the innovation adoption process of ODMs and IDMs. In doing so, it challenges the conventional top-down view of individual workers as passively complying

with their organizations' decisions to adopt and implement innovations in their work practice. We find that individual innovation adoption by IDMs (i.e., optional innovation decisions) is distinct from innovation adoption on behalf of an organization by ODMs (i.e., authority innovation decisions). The study contributes to a more nuanced understanding of the *complex innovation adoption* process within and across organizations in an interorganizational system. Future research should simultaneously study individual members' and organizations' innovation adoption decisions to catalyze *complex innovation adoption*.

Relatedly, this study's second contribution consists of preliminary evidence for the two social influence mechanisms that influence scaling up innovations across organizations in interorganizational systems: social information from coworkers and advisors. We are not the first to study the social influence from organizational coworkers (e.g., Rice & Aydin, 1991) or advice networks (e.g., Sykes et al., 2014). But by relying on surveys of workers and advisors instead of a participant's perception of those attitudes, we distinguish potential adopters' subjective norms from the actual attitudes of sources others (Rice, 1993). Our research supports the partial-mediation model for complex innovation adoption, indicating that advisors' and coworkers' attitudes influence individuals' innovation adoption intentions both directly and indirectly.

Third, this research reveals the differences between how ODMs and IDMs attend to social information and environmental cues. As the Wald tests of the SEM models reveal, advisors' attitudes have a more considerable influence on ODMs, and subjective norms have a greater influence on IDMs. This result suggests that ODMs are more attuned to the information as diffused across an interorganizational system. However, ODMs may face significant challenges (i.e., the attitudes of their advisors) when they make innovation decisions that impact the work practices of IDMs. In contrast, the prevailing attitude in organizations (i.e., subjective norm) has more effect on IDMs. IDMs also react negatively to greater heterogeneity of coworkers' and advisors' attitudes, although this does not affect ODMs. Essentially, ODMs are more tolerant of ambiguity (Daft & Lewin, 1993; DiTomaso & Hooijberg, 1996). This research highlights the crucial importance of addressing individuals with distinct levels of decision-making authority (Leonard-Barton & Deschamps, 1988) differently in adopting innovations.

Practical implications for strategizing innovation adoption in public health

The differences between ODMs' and IDMs' innovation adoption mechanisms highlight the necessity for designing different types of interventions and strategies to scale-up innovations and best practices, particularly in public health domains. First, advice networks strongly influence the top-down organizational adoption of innovations by ODMs. Drawing on existing scholarship, we suggest several mechanisms to influence advice networks, including mapping advice networks in and across organizations (Greenhalgh et al., 2004; Leonardi, 2007), seeking the support of critical hubs of influence in the advice networks (Contractor & DeChurch, 2014;

Goldenberg, Han, Lehmann, & Hong, 2009), and holding field configuring events (e.g., conferences) to catalyze network rewiring (Oliver & Montgomery, 2008).

Second, to influence individual adoption by IDMs, an essential aspect of implementation in any organization, interventions must influence the social norms of the organization. In this case, interventions should not focus on interorganizational networks (e.g., advice networks) but on the generation of collective understanding and achievement of homogeneity in members' attitudes within an organization. Coalescing a critical mass of persuaded actors will drive innovation adoption by IDMs (Rogers, 2003; Valente, 1996). Interventions that target these efforts include developing communities of practice in organizations to tell positive stories (Cairney, Oliver, & Wellstead, 2016; Lewis, 2011), advocating the usefulness of innovations (e.g., compatibility and relative advantage) (Rogers, 2003), and leveraging existing networks among IDMs (Abrahamson & Rosenkopf, 1997; Cairney et al., 2016; Leonardi, 2009).

Limitations and future research

This research has several limitations. First, it relies solely on self-reported survey data. Future research should supplement with behavioral data collected from other sources such as their use of digital media (Leonardi & Contractor, 2018) and use mixed methods, such as interviews and field observations, to fully understand the mechanisms of complex innovation adoption. Second, this study only examined health-care workers' intentions to adopt innovations as a proxy for their actual behaviors. Although meta-analyses (e.g., Sheppard et al., 1988) reveal that intention to adopt a behavior and adopting the behavior is consistently and strongly related, future research should investigate adopters' actual adoption behaviors. Moreover, this study did not have measures of the extent to which each organization had in fact already adopted any of the four innovations. Like Rice and Aydin (1991) and Leonardi (2009) that examine individual implementation decisions after organizational adoption, future research should examine how organizational adoption of innovations may influence the implementation attitudes and intentions of individual members in an interorganizational system. Finally, this research is cross-sectional, hence causality claims need to be interpreted with caution. Future research should employ longitudinal design to ascertain the causal relationships between social information and innovation adoption intentions and behavior.

This study also points to some promising areas for future research. First, future research should map the social networks within each organization and specify the type of proximity mechanism (e.g., relational, spatial, positional; see Rice & Aydin, 1991) to weigh each coworker's attitude and better understand the relative influence of different sources of social information within an organizational boundary. Second, we surveyed government health-care workers in the state health system as key adopters of health innovations in Bihar, India. Future research should examine the interaction of a variety of organizations, such as community centers, hospitals,

research institutions, human service organizations, and pharmaceutical companies, in an ecology of organizations. Third, this research provides some preliminary evidence for the susceptibility of different types of innovations to different sources of social influence. Future research should further investigate how SIP varies based on the nature of the innovation. Finally, contexts matter for innovation adoption and diffusion (Greenhalgh et al., 2004). The relative importance of interpersonal networks, socionormative environment, and decision-making authority could depend on such variation. As such, future research should explore the dynamics of complex innovation adoption across institutional contexts. This research direction has the potential to inform scaling up evidence-based innovations in the global health field.

Conclusion

This project's central research question is: *What sources of social influence drives the innovation adoption intentions of ODMs and IDMs*? Our findings suggest that decision-making authority plays a crucial role in governing innovation adoption. Although both coworkers' and advisors' attitudes positively influence ODMs' and IDMs' evaluations of innovations, our findings highlight some differences between ODMs versus IDMs. ODMs adopt innovations when their advisors think highly of these innovations; IDMs do so (a) when they believe that people who are important to them in their organization approve these innovations, and (b) when their coworkers and advisors have more homogeneous attitudes toward proposed innovations.

In an era of complex innovation (Dougherty & Dunne, 2011), scholars increasingly seek to understand innovation generation, adoption, and diffusion in interorganizational systems, particularly in public welfare domains such as healthcare and renewable energy. No single organization can address grand challenges like climate change, improving healthcare systems, and improving vocational outcomes for youth alone. Instead, an interorganizational system must synergistically adopt new practices to make any sizable mark. Although researchers theorize the necessary collective learning processes and synergy across organizations and interorganizational systems, this study suggests that organizational boundaries and organizational norms can still inhibit innovation adoption. As such, the priority of future innovation and health communication studies is to illuminate *how* policymakers and organizational leaders can leverage and strategize the processes of complex innovation adoption by individuals in an organization and by organizations across interorganizational systems at the same time.

Supporting Information

Additional Supporting Information may be found in the online version of this article. Please note: Oxford University Press is not responsible for the content or functionality

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Notes

1. In Doughtery and Dunne's (2011) original work, they refer to businesses, nongovernmental, and governmental actors in a system. In this work, we apply this concept to a sizable interorganizational system providing healthcare to the state of Bihar, India.
2. We correlated individuals' perceived attitudes (i.e., subjective norm) with observed corporate organization attitudes (i.e., actual coworkers' attitudes) for each type of innovation (r ranged from .28 to .33 for each). The modest correlations suggested discrepancies between individuals' perceptions of their coworkers' attitudes and their coworkers' actual attitudes. We also computed the correlations between advisors' attitudes and individuals' subjective norms for each type of innovation (r ranged from .12 to .21). These low correlations also indicated that advisors' attitudes differed from their subjective norms. Therefore, we included advisors' attitudes, coworkers' attitudes, and subjective norms in our analysis.
3. We also conducted SEM by limiting advisors' attitudes to those advisors not affiliated with the same organization with the focal respondent (i.e., external advisors) and the heterogeneity of external advisors' attitudes (see Supporting Information Appendix). The results are consistent for ODMs. For IDMs, the results are largely consistent except for the insignificant effect of heterogeneity of external advisors' attitudes on attitudes, subjective norms, and intentions.
4. See Supporting Information Appendix for robustness check and sensitivity analyses results.
5. Methodologically, the pairwise correlations among attitudes toward each type of innovation were not high ($r < .80$), indicating that respondents' attitudes varied based on the type of innovation. Similarly, their subjective norms and behavioral intentions varied across different types of innovations. As such, we did not combine the four innovations into one model.
6. Understanding the joint Ward test and individual Ward tests for variance in parameters in SEM resembles using ANOVA tests to evaluate whether different categories have significantly different numeric values. The joint Ward test is similar to the idea of an F-test to test the overall difference in all categories, and individual Ward tests work similarly to pairwise t-tests for variance in every two categories.

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Conflict of Interest Statement

The authors declare no conflict of interest for this research.

References

Abrahamson, E., & Rosenkopf, L. (1997). Social network effects on the extent of innovation diffusion: A computer simulation. *Organization Science*, *8*(3), 289–309.

Ajzen, I., & Fishbein, M. (1980). *Understanding attitudes and predicting social behavior*. Englewood Cliffs, NJ: Prentice-Hall.

Bollen, K. A. (1989). *Structural equations with latent variables*. New York, NY: Wiley.

Borgatti, S. P., & Cross, R. (2003). A relational view of information seeking and learning in social networks. *Management Science*, *49*(4), 432–445.

Cairney, P., Oliver, K., & Wellstead, A. (2016). To bridge the divide between evidence and policy: Reduce ambiguity as much as uncertainty. *Public Administration Review*, *76*(3), 399–402.

Carlson, P. J., & Davis, G. B. (1998). An investigation of media selection among directors and managers: From "Self" to "Other" orientation. *MIS Quarterly*, *22*(3), 335–362.

Chen, Z., Takeuchi, R., & Shum, C. (2013). A social information processing perspective of coworker influence on a focal employee. *Organization Science*, *24*(6), 1618–1639.

Cialdini, R. B., & Goldstein, N. J. (2004). Social influence: Compliance and conformity. *Annual Review of Psychology*, *55*, 591–621.

Coleman, J. S. (1958). Relational analysis: The study of social organizations with survey methods. *Human Organization*, *17*(4), 28–36.

Contractor, N. S., & DeChurch, L. A. (2014). Integrating social networks and human social motives to achieve social influence at scale. *Proceedings of the National Academy of Sciences*, *111* (Suppl 4), 13650–13657.

Daft, R. L., & Lewin, A. Y. (1993). Where are the theories for the "new" organizational forms? An editorial essay. *Organization Science*, *4*(4), i–vi.

DiTomaso, N., & Hooijberg, R. (1996). Diversity and the demands of leadership. *The Leadership Quarterly*, *7*(2), 163–187.

Dougherty, D., & Dunne, D. D. (2011). Organizing ecologies of complex innovation. *Organization Science*, *22*(5), 1214–1223.

Fishbein, M., & Ajzen, A. (1975). *Belief, attitude, intention, and behavior: An introduction to theory and research*. Reading, MA: Addison-Wesley.

Fishbein, M., & Ajzen, I. (2010). *Predicting and changing behavior: The reasoned action approach*. New York, NY: Psychology Press.

Fulk, J., Schmitz, J., & Steinfield, C. W. (1990). A social influence model of technology use. In J. Fulk & & C. Steinfield (Eds.), *Organizations and communication technology* (pp. 117–140). Newbury Park, CA: Sage.

Gergen, K. J., & Taylor, M. G. (1969). Social expectancy and self-presentation in a status hierarchy. *Journal of Experimental Social Psychology*, *5*, 79–92.

Goldenberg, J., Han, S., Lehmann, D. R., & Hong, J. W. (2009). The role of hubs in the adoption process. *Journal of Marketing*, *73*(2), 1–13.

Greenhalgh, T., Robert, G., MacFarlane, F., Bate, P., & Kyriakidou, O. (2004). Diffusion of innovations in service organizations: Systematic review and recommendations. *The Milbank Quarterly*, *82*(4), 581–629.

Gupta, A. K., Tesluk, P. E., & Taylor, M. S. (2007). Innovation at and across multiple levels of analysis. *Organization Science*, *18*(6), 885–897.

Hooper, D., Coughlan, J., & Mullen, M. (2008). Structural equation modeling: Guidelines for determining model fit. *Electronic Journal of Business Research Methods*, *6*(1), 53–60.

James, L., Mulaik, S., & Brett, J. M. (1982). *Causal analysis: Assumptions, models, and data*. Beverly Hills, CA: Sage.

Kline, R. B. (2011). *Principles and practice of structural equation modeling*. New York, NY: Guilford.

Leonard-Barton, D., & Deschamps, I. (1988). Managerial influence in the implementation of new technology. *Management Science*, *34*(10), 1252–1265.

Leonardi, P. M. (2007). Activating the informational capabilities of information technology for organizational change. *Organization Science*, *18*(5), 813–831.

Leonardi, P. M. (2009). Why do people reject new technologies and stymie organizational changes of which they are in favor? Exploring misalignments between social interactions and materiality. *Human Communication Research*, *35*(3), 407–441.

Leonardi, P. M. (2013). When does technology use enable network change in organizations? A comparative study of feature use and shared affordances. *MIS Quarterly*, *37*(3), 749–995.

Leonardi, P., & Contractor, N. S. (2018). Better people analytics: Measure who they know, not just who they are. *Harvard Business Review*, *96*, 70–81.

Lewis, L. K. (2011). *Organizational change: Creating change through strategic communication*. New York, NY: Wiley-Blackwell.

Lewis, L. K., & Seibold, D. R. (1996). Communication during intraorganizational innovation adoption: Predicting users' behavioral coping responses to innovations in organizations. *Communication Monographs*, *63*(2), 131–157.

Loyd, D. L., Wang, C. S., Phillips, K. W., & Lount, R. B. (2013). Social category diversity promotes premeeting elaboration: The role of relationship focus. *Organization Science*, *24*(3), 757–772.

Mannix, E., & Neale, M. A. (2005). What differences make a difference? The promise and reality of diverse teams in organizations. *Psychological Science in the Public Interest*, *6*(2), 31–55.

McDonald, M. L., & Westphal, J. D. (2003). Getting by with the advice of their friends: CEOs' advice networks and firms' strategic responses to poor performance. *Administrative Science Quarterly*, *48*(1), 1–32.

Monge, P. R., Cozzens, M. D., & Contractor, N. S. (1992). Communication and motivational predictors of the dynamics of organizational innovation. *Organization Science*, *3*(2), 250–274.

Oliver, A. L., & Montgomery, K. (2008). Using field-configuring events for sense-making: A cognitive network approach. *Journal of Management Studies*, *45*(6), 1147–1167.

Perry-Smith, J. E., & Shalley, C. E. (2014). A social composition view of team creativity: The role of member nationality-heterogeneous ties outside of the team. *Organization Science*, *25*(5), 1434–1452.

Podsakoff, P. M., MacKenzie, S. B., Lee, J. Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology*, *88*(5), 879–903.

Preacher, K. J., & Hayes, A. F. (2004). SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior Research Methods*, *36*(4), 717–731.

Reagans, R., & McEvily, B. (2003). Network structure and knowledge transfer: The effects of cohesion and range. *Administrative Science Quarterly*, *48*, 240–267.

Rice, R. E. (1993). Using network concepts to clarify sources and mechanisms of social influence. In W. Richards Jr., & G. Barnett (Eds.), *Progress in Communication Sciences* (pp. 43–62). Norwood, NJ: Ablex.

Rice, R. E., & Aydin, C. (1991). Attitudes toward new organizational technology: Network proximity as a mechanism for social information processing. *Administrative Science Quarterly*, *36*, 219–244.

Rice, R. E., Grant, A. E., Schmitz, J., & Torobin, J. (1990). Individual and network influences on the adoption and perceived outcomes of electronic messaging. *Social Networks*, *12*, 27–55.

Rimal, R. N., Limaye, R. J., Roberts, P., Brown, J., & Mkandawire, G. (2013). The role of interpersonal communication in reducing structural disparities and psychosocial deficiencies: Experience from the Malawi BRIDGE project. *Journal of Communication*, *63*(1), 51–71.

Rimal, R. N., & Real, K. (2005). How behaviors are influenced by perceived norms: A test of the theory of normative social behavior. *Communication Research*, *32*, 389–414.

Rogers, E. M. (2003). *Diffusion of innovations*. New York, NY: Free Press.

Salancik, G. R., & Pfeffer, J. (1978). A social information processing approach to job attitudes and task design. *Administrative Science Quarterly*, *23*(2), 224–253.

Sheppard, B. H., Hartwick, J., & Warshaw, P. R. (1988). The theory of reasoned action: A meta-analysis of past research with recommendations for modifications and future research. *Journal of Consumer Research*, *15*(3), 325–343.

Sykes, T. A., Venkatesh, V., & Johnson, J. L. (2014). Enterprise system implementation and employee job performance: Understanding the role of advice networks. *MIS Quarterly*, *38*(1), 51–72.

Valente, T. W. (1996). Social network thresholds in the diffusion of innovations. *Social Networks*, *18*, 69–89.

Wang, Y., Meister, D. B., & Gray, P. H. (2013). Social influence and knowledge management systems use: Evidence from panel data. *MIS Quarterly*, *37*(1), 299–313.

Wooldridge, J. M. (2010). *Econometric analysis of cross section and panel data* (2nd ed.). Cambridge, MA: MIT Press