

Predictors of Perceived Organizational Innovation Among Allied Health and Pharmacy Professionals

Yuan Zhi Seah^{1,*}, Sophia Song Danial^{1,*}, Lita Sui Tjien Chew², Jasper Weng Kong Tong³

¹Behavioural Insights Centre of Excellence, Singapore University of Social Sciences, Singapore; ²SingHealth Group Pharmacy, Singapore Health Services, Singapore; ³SingHealth Group Allied Health, Singapore Health Services, Singapore

*These authors contributed equally to this work

Correspondence: Yuan Zhi Seah, Behavioural Insights Centre of Excellence, Singapore University of Social Sciences, 463 Clementi Rd, 599494, Singapore, Tel +65 6240 8873, Email victorseahyz@suss.edu.sg

Purpose: Rising healthcare costs have intensified the need for innovation within healthcare systems, with organizational innovation being seen as a key enabler for the development of strategies to improve affordability and accessibility for long-term sustainable health care delivery. While research has long examined innovation among physicians and nurses, studies focusing on Allied Health Professionals (AHPs) and pharmacists are nascent. This study investigates the innovation culture among AHPs and pharmacists in Singapore's largest healthcare cluster. It specifically examines how components of the Innovation Quotient model—Values, Behaviors, Climate, Processes, Resources, and Success—predict perceived changes in innovation.

Methods: A cross-sectional survey was distributed via Email to 4413 AHPs and pharmacists, yielding 620 complete responses. The survey instrument, the InnoQuotient, comprised 54 items categorized into 18 factors that correspond to six building blocks of innovation. Structural equation modeling (SEM) in R Studio evaluated model fit and the relationships between these factors and self-reported change in innovation. Complementing the quantitative analysis, a thematic analysis was conducted using MAXQDA on 65 verbatim responses.

Results: SEM analysis indicated that three innovation building blocks of *Behaviors*, *Processes*, and *Success* were significantly associated with reported innovation change. Specifically, positive innovation change correlated with enhanced *Behaviors* and *Success*, whereas a negative relationship between innovation change and *Processes* suggested that overly centralized and top-down initiatives may impede grassroots innovation. The thematic analysis reinforced these findings by highlighting the pivotal role of leadership in driving effective innovation while also revealing concerns regarding the unilateral implementation of innovation initiatives and the challenges of fostering interdisciplinary collaboration.

Conclusion: The findings advocate for a balanced approach that synergizes leadership direction with organic, collaborative efforts to cultivate a robust innovation culture. Future studies should focus on refining strategies to bolster less effective innovation components and include perspectives across different organizational levels.

Plain Language Summary: Healthcare costs are rising worldwide, putting pressure on hospitals and clinics to find new ways to deliver care affordably. Our study explored how innovation happens among Allied Health Professionals (AHPs) and pharmacists in Singapore's largest healthcare cluster. We wanted to understand which factors help drive innovation and how leadership can support these changes. A survey was distributed to over 4400 healthcare workers and received responses from 620 participants. The survey asked questions about different aspects of innovation, such as teamwork, leadership behavior, and the systems used to develop new ideas. We then used a statistical method to see which factors were most important for changes in innovation. We also analyzed written comments from participants to get deeper insights. Our findings showed that the way leaders and teams work together strongly influences innovation. Positive actions and successful projects were linked with higher levels of innovation. However, we also found that a top-down approach, where decisions are made without enough input from the team, might actually reduce innovation. These results suggest that a balanced approach is best. Leaders should guide and support change while also encouraging input and collaboration from all team members. This balanced strategy can help healthcare organizations improve care delivery and manage rising costs better. This study helps us understand how to foster a culture of innovation in healthcare, especially among AHPs and pharmacists, which can benefit patients, staff, and the wider community.

Keywords: allied health professionals, pharmacists, healthcare innovation, InnoQuotient, leadership

Introduction

Healthcare costs have been rising in correspondence to the ageing population globally,^{1,2} with the average healthcare expenditure per Singaporean household increasing by 26.48% from 2013 to 2023.³ Healthcare systems are thus under pressure to manage these rising costs,^{4,5} with organizational innovation viewed as a key catalyst for developing strategies to enhance affordability and accessibility for sustainable long-term healthcare delivery.⁶ Although the rise of emerging technologies such as artificial intelligence, digital health, and robotics has become a prominent vector for enhancing affordability through automation optimization,⁷ innovative change is argued to emerge from micro-level individual and collaborative efforts,⁸ and many academic health systems have embedded an innovation agenda to transform healthcare delivery.⁹

Innovative cost-saving initiatives in Singapore's healthcare^{10,11} have often depended on healthcare staff taking the lead in their conception, implementation, and deployment. Even cost-saving measures that leverage AI^{12,13} require innovative thinking to ensure their effective integration into existing systems for seamless operation.

Rao and Weintraub's InnoQuotient Model¹⁴ posits that innovation culture is predicated on six "building blocks": Values, Behaviors, Climate, Processes, Resources, and Success. Their InnoQuotient survey has been implemented in several industry studies,^{15–17} with these building blocks considered key determinants of a company's innovation culture,^{18,19} and here we deploy the survey to assess which blocks predict innovation among Allied Health Professionals (AHPs) and pharmacists.

In Singapore, pharmacists and Allied Health Professionals²⁰ (AHPs) are distinct groups of healthcare professionals with their own regulatory bodies. They are not medical doctors or nurses and are not considered to be engaging in paramedical activities. With healthcare institutions facing growing patient volumes and increasing pressure to meet needs in a timely manner,^{21,22} AHPs have been pivotal in innovating strategies to moderate demand through auxiliary medical support. For example, AHPs have been critical in triaging patients on out-patient waitlists by directing them towards lower-cost alternative care pathways through innovating patient flow.^{23,24}

Similarly, pharmacists play an important role in medical management such as supply chain and inventory functions,²⁵ and innovations within this group are viewed as a key driver in reducing the costs of services and drugs. Dalton and Byrne (2017)²⁶ point out that pharmacists are integral in evaluating effective medication-based interventions that contribute to an efficient cost benefit ratio, with incorporation of pharmacists-led initiatives shown to have led to savings up to USD397,400 annually.²⁷

Although numerous studies have examined innovation among physicians,^{28,29} and nurses,^{30,31} research focusing on AHPs and pharmacists is nascent.³² This study thus focuses on the innovative culture of AHPs and pharmacists working at the largest healthcare cluster in Singapore.

Methods

A total of 3717 AHPs and 696 pharmacists from Singapore's largest healthcare cluster were invited to participate in the InnoQuotient survey through email. The healthcare cluster comprises 12 public healthcare institutions serving more than 1.5 million patients,³³ out of the country's population of 6.04 million.³⁴ In total, 620 respondents (including 72 pharmacists) completed the survey (Table 1).

In addition to the InnoQuotient survey, perceived change in innovation was assessed through participants' response to the question, "Based on your perception, how has the innovation culture changed for the Allied Health & Pharmacy community in the organization?". Participants responded using a 5-point Likert scale (1 = Significantly Worsened; 3 = No Change; 5 = Significantly Improved) with the option of indicating "Unable to comment". Participants were also provided with a textbox to optionally provide verbatim comments on innovation culture within the healthcare cluster.

To provide context to the study's findings, the authors also examined innovation initiatives that had been implemented between 2021 and 2023 which sought to increase and improve innovation within the organization.

Table 1 Distribution of Allied Health Professional Groups and Pharmacists in the Study Sample

Allied Health Professional	N	Percentage of Total Sample %
Medical Laboratory Technologist / Medical Laboratory Scientist	87	14.03%
Radiographer	77	12.42%
Pharmacist	72	11.61%
Physiotherapist	54	8.71%
Medical Social Worker	47	7.58%
Occupational Therapist	32	5.16%
Optometrist	31	5.00%
Respiratory Therapist	28	4.52%
Speech Therapist	25	4.03%
Psychologist	23	3.71%
Dietitian	19	3.06%
Transplant & Renal Coordinator	18	2.90%
Podiatrist	17	2.74%
Radiation Therapist / Dosimetrist	14	2.26%
Orthoptist	13	2.10%
Audiologist	12	1.94%
Art, Child Life, Educational & Music Therapist	10	1.61%
Sonographer	9	1.45%
Cardiac Technologist / Physiologist	7	1.13%
Technologist (Neuro, Sleep & Pulmonary Function)	6	0.97%
Prosthetist / Orthotist	4	0.65%
Clinical Counsellor	3	0.48%
Medical Physicist	3	0.48%
Oral Health Therapist	3	0.48%
Perfusionist	3	0.48%
Embryologist	2	0.32%
Radiochemistry Technologist	1	0.16%

Innovation Quotient

The Innovation Quotient survey¹⁴ consisted of 54 items, classified into 18 factors that were further categorized into six “building blocks of innovation” (Table 2).

Table 2 Six Building Blocks of Innovation

Values	The collection of shared beliefs across an organisation that shapes decisions and priorities. This is typically reflected in actions undertaken by organisation staff, such as time dedicated to a cause or money invested in specific lines of research.
Behaviors	The observable conduct of leaders and employees that demonstrate how organisational values are enacted in practice. This can include role-modelling innovative practices, providing mentorship and coaching, and the extent to which senior management openly reviews and draws lessons from unsuccessful initiatives
Climate	The day-to-day workplace atmosphere as experienced by staff, which in turn shapes and reflects the broader organisational culture. It encompasses perceptions of empowerment, opportunities for self-directed learning, degree of autonomy, and the extent to which risk-taking and experimentation are supported.
Resources	The tangible enablers devoted to innovation, such as time, money, space and talent. This can include ring-fenced clinician time dedicated to service re-evaluation, micro-grants to encourage rapid tests of triage protocols or the provision of virtual sandboxes that enable staff to prototype ideas.

(Continued)

Table 2 (Continued).

Processes	The structure of repeatable mechanisms that move ideas from discovery to diffusion. This refers to how idea development and deployment is operationalised. For example, stage-gate management during prototype scaling across clinics or Plan-Do-Study-Act (PDSA) cycles to improve quality of ideas.
Success	How the organisation measures, defines outcomes and uses them to reinforce innovation. For example, how success is articulated in standardised and transparent terms so that performance indicators are consistently understood both internally and externally, thereby enhancing accountability.

Results

A structural equation modelling (SEM) analysis was conducted in R Studio to assess model fit of the data and examine the relationship between building blocks and perceived change in innovation amongst all participants. Perceived change in innovation was treated as a continuous variable during data analysis. SEM was preferred over typical regression methods as it allowed for the simultaneous estimation of multiple relationships between observed and latent variables while accounting for measurement error, providing a more comprehensive test of theoretical models than regression alone.^{35,36} The 53 individuals who had indicated “Unable to comment” when asked about perceived change in innovation were deleted during data screening.

Initial confirmatory factor analysis indicated that the standardized factor loadings of Engage ($\lambda = 1.006$) was above 1, with a negative variance estimate (-0.01) presenting a Heywood case. To address this, Engage was removed from the model before re-running the analysis. In the InnoQuotient framework, Engage refers to the degree to which employees feel involved, motivated, and committed to contributing to innovation efforts, reflecting their sense of ownership and participation in the innovation process.

Scaled model fit indices for the refined model indicated a general good model fitness (RMSEA = $0.066 < 0.08$, CFI = $0.981 > 0.95$, TLI = $0.98 > 0.95$, SRMR = $0.029 < 0.08$).

The relationship between innovation change and building blocks was analyzed, with Behaviors, Processes, and Success significantly predicting innovation change (Table 3). While Behaviors and Success were positively linked to change in innovation, Processes was negatively associated with perceived change in innovation.

To contextualize and better interpret significant quantitative findings, an inductive thematic analysis was conducted using qualitative analysis software MAXQDA on 65 verbatim comments collected during the survey. These open-text comments were voluntarily provided by participants in response to an optional survey question inviting them to share their feelings about the state of innovation within the healthcare cluster. Three emergent themes include: 1) Recognizing leadership’s efficiency in producing and carrying out innovation processes, 2) Leader-driven innovation initiatives, rather than AHP-led organic efforts, may not always yield positive on-the-ground outcomes, and 3) Difficulty establishing interdisciplinary collaboration.

Table 3 Results of Regression Analysis of Building Blocks

Variables	β	SE	p-value	R ²
Values	-0.027	0.196	0.863	0.001
Behaviors	0.340	0.140	0.006**	0.115
Climate	0.320	0.228	0.122	0.102
Resources	0.256	0.283	0.315	0.065
Processes	-0.878	0.242	0.000***	0.770
Success	0.749	0.153	0.000***	0.561

Notes: **Indicates $p < 0.01$. ***Indicates $p < 0.001$.

Discussion

The current study extends the literature by examining the state of innovation specifically amongst AHPs and pharmacists, positioning individual-level innovation within the context of institutional innovation practices.

The proactive launch of innovation initiatives since 2021 may have signaled to the broader AHP and pharmacy community that leadership was fostering a significant shift in mindset and attitude toward innovation. This may have boosted perceptions of the Innovation Quotient building block of *Behaviors*,³⁷ particularly with respect to leadership, as active participation in seminars and innovation acceleration programs reinforced the notion that their actions were innovation driven.³⁸ By role modelling such behaviors, leaders can not only foster an environment where staff feel encouraged to engage in innovation but also signal that innovation is aligned with broader organizational priorities such as efficiency and sustainability.³⁹ In this way, leadership behaviors can contribute indirectly to cost-management initiatives by promoting practices that emphasize innovating solutions designed to mitigate rising healthcare costs.

However, verbatim comments suggest that while the innovation push between 2021 and 2023 motivated staff, the diffusion of innovation⁴⁰ may have been hindered by factors such as poor macro-power balances⁴¹ and rigid interprofessional relationships and boundaries.⁴² In the *Processes* domain, while respondents acknowledged leadership's ability to capture innovation opportunities and set goals, there was also criticism of the perceived unilateral nature of this process. For example, procurement processes within the healthcare cluster for innovation-related purchases, such as encompassing sourcing, requests for proposals, evaluation and conflict-of-interest declarations, are often lengthy. As a result, by the time acquisitions are approved and completed, the innovation under development may already have been superseded by competing initiatives elsewhere. This can negatively affect perceived innovation outcomes by discouraging AHPs and pharmacists during the innovation process and constrains the pace at which ideas are actualized and refined. In turn, opportunities for cost-saving initiatives may be restricted, particularly in a context where rising healthcare costs risk outpacing the development and testing of innovations.

At the same time, perception of the building block of *Success* was likely strengthened by the innovation push, particularly through a successful rollout of grants that resulted in 28 implemented projects. This tangible impact likely reinforced the broader organizational narrative that innovation was both valued and achievable,^{43,44} with demonstrated success potentially providing an impetus to AHPs and pharmacists to engage in innovation initiatives that can translate into efficiency gains and strategies to manage escalating healthcare costs.

Conclusion

These findings underscore how innovation initiatives shape perceptions of innovation improvement and its alignment with key innovation drivers. Organizational innovation has been recognized as a critical enabler for improving affordability and accessibility in healthcare, but healthcare organisations should be mindful of how on-the-ground realities, such as leadership behaviors and procurement processes, can shape perceptions of organizational innovation through the building blocks of innovation.

Although the push reinforced *Behaviors* and *Success* as key factors, further research is warranted to refine implementation strategies that strengthen other building blocks, such as *Resources*. The issue of a Heywood case with the Engage factor further suggests that Rao and Weintraub's Innovation Quotient model may not perfectly capture the data, an issue noted in validation studies by Danks et al^{45,46} possibly due to missing confounders.^{47,48} Additionally, given that respondents were sampled horizontally across the corporate hierarchy, future research should consider sampling middle or upper-level management to provide a more comprehensive depiction of innovation within the healthcare cluster.^{49,50}

Data Sharing Statement

The survey questionnaire and data that supports the findings of this study are available from the corresponding author YZ, upon reasonable request.

Ethics Approval and Informed Consent

This study was carried out in accordance with the Declaration of Helsinki and reviewed by the SingHealth Centralised Institutional Review Board. A "Category S2" exemption was obtained on the basis that the research only involves

educational tests, surveys, interviews, or observation of public behavior and that the information obtained was recorded by the investigators in such a manner that the identity of the human subjects cannot readily be ascertained, directly or through identifiers linked to the subjects.

The requirement for informed consent from study participants prior to study commencement was waived by the SingHealth Centralised Institutional Review Board on the basis that only deidentified and non-clinical data would be used.

Acknowledgement

This article would not have been possible without the administrative support rendered by Tang Wen Han and Charmaine Tan Shuying.

Disclosure

The authors report no conflicts of interest in this work.

References

1. Jakovljevic M, Getzen TE. Growth of global health spending share in low- and middle-income countries. *Front Pharmacol*. 2016;7:21. doi:10.3389/fphar.2016.00021
2. Navaneetham K, Arunachalam D. Global population aging, 1950–2050. In: *Handbook of Aging, Health and Public Policy: Perspectives From Asia*. Springer Nature; 2022:1–18. doi:10.1007/978-981-16-1914-4_154-1
3. Singstat. Key indicators of the Household Expenditure Survey, 2023. Department of Statistics Singapore; 2024. Available at: https://www.singstat.gov.sg/-/media/files/find_data/household/hes2023-key-indicators.ashx. Accessed October 31, 2025.
4. Owaid O. The death of private practice: how the rising cost of healthcare is destroying physician autonomy. *Brookl J Corp Financ Commer Law*. 2016;11:521.
5. Toader E. The effects of rising healthcare costs on the US economy. *Am J Med Res*. 2014;1(2):44–50.
6. Sukhatme NU, Bloche MG. Health care costs and the arc of innovation. *SSRN Electron J*. 2019. doi:10.2139/ssrn.3514238
7. Mohammed MA, Mohammed MA, Mohammed VA. Impact of artificial intelligence on the automation of digital health system. *Int J Softw Eng Appl*. 2022;13(6):23–29. doi:10.5121/ijsea.2022.13602
8. Milella F, Minelli EA, Strozzi F, Croce D. Change and innovation in healthcare: findings from literature. *Clinicoecon Outcomes Res*. 2021;13:395–408. doi:10.2147/CEOR.S301169
9. Ellner AL, Stout S, Sullivan EE, et al. Health systems innovation at academic health centers: leading in a new era of health care delivery. *Acad Med*. 2015;90(7):872. doi:10.1097/ACM.0000000000000679
10. Pua Y-H, Yeo S-J, Clark RA, et al. Cost and outcomes of Hospital-based Usual Care versus Tele-monitor self-directed Rehabilitation (HUATR) in patients with total knee arthroplasty: a randomized, controlled, non-inferiority trial. *Osteoarthritis Cartilage*. 2024;32(5):601–611. doi:10.1016/j.joca.2023.11.017
11. W-S-Y W, Sun CM, Koh HY, et al. Reducing wait times and medical costs for patients: the physiotherapy-led Spine Triage and Rehabilitation (STAR) clinic. *BMJ Open Qual*. 2024;13(2):e002670. doi:10.1136/bmjopen-2023-002670
12. Pang EPP, Tan HQ, Wang F, et al. Multicentre evaluation of deep learning CT autosegmentation of the head and neck region for radiotherapy. *Npj Digital Med*. 2025;8(1):312. doi:10.1038/s41746-025-01624-z
13. Tang SLS, Lee W, Chong Y, et al. Improving efficiency of antimicrobial stewardship reviews using artificial intelligence modelling. *Open Forum Infect Diseases*. 2021;8(Supplement_1):S166–S167. doi:10.1093/ofid/ofab466.306
14. Rao J, Weintraub J. How innovative is your company's culture? *MIT Sloan Manag Rev*. 2013;54(3):29–37.
15. Çubukcu A, Karaboğa K, Ayaz HI. İnovasyon kültürünün ölçülmesi: inovasyon Quotient modelinin doğrulanması ve Türkiye'deki bir savunma sanayi firmasında uygulanması. *Girişimcilik ve İnovasyon Yönetimi Derg*. 2023. doi:10.15659/jeim.12.2.002
16. Vassallo JP, Banerjee S, Zaman H, Prabhu JC. Design thinking and public sector innovation: the divergent effects of risk-taking, cognitive empathy and emotional empathy on individual performance. *Res Policy*. 2023;52(6):104768. doi:10.1016/j.respol.2023.104768
17. Zhang Q, Larkin CJ, Lucey BM. Innovative culture in Ireland's higher education institutions: an assessment. *SSRN Scholarly Paper*. 2015;2604196. doi:10.2139/ssrn.2604196
18. Dobni CB, Wilson GA, Klassen M. Business practices of highly innovative Japanese firms. *Asia Pac Manag Rev*. 2022;27(3):155–162. doi:10.1016/j.apmr.2021.06.005
19. Sutiyatno S, Santoso KI, Susilo G. The role of innovation leadership in teacher commitment: a study of organizational culture. *Int J Educ Methodol*. 2022;8(3):595–607. doi:10.12973/ijem.8.3.595
20. Chadwick M, Larmer P, Smythe L. The history of allied health: an international perspective. *J Allied Health*. 2020;49(4):285–289.
21. Khalik S, Lee N. Trend of longer waiting times to see polyclinic doctors [Internet]. 2017. Singapore: SingHealth Polyclinic. [cited 2025 Aug 27]. Available from: <https://polyclinic.singhealth.com.sg/news/trend-longer-waiting-times-see-polyclinic-doctors>. Accessed October 31, 2025.
22. Yap JCH, Yang Q. Understanding hospital waiting times [Internet]. 2019. Singapore: Saw Swee Hock School of Public Health. [cited 2025 Aug 27]. Available from: https://sph.nus.edu.sg/wp-content/uploads/2019/06/SSHSPH_Understanding-Hospital-Waiting-Times.pdf. Accessed October 31, 2025.
23. Saxon R, Gray M, Oprea F. Extended roles for allied health professionals: an updated systematic review of the evidence. *J Multidisciplinary Healthcare*. 2014;479. doi:10.2147/JMDH.S66746

24. Stute M, Moretto N, Waters R, et al. Allied health primary contact services: results of a 2-year follow-up study of clinical effectiveness, safety, wait times and impact on medical specialist out-patient waitlists. *Aust Health Rev.* 2020;45(3):344–352. doi:10.1071/AH19225
25. Costantino RC. The U.S. medicine chest: understanding the U.S. pharmaceutical supply chain and the role of the pharmacist. *J Am Pharm Assoc.* 2021;61(1):e87–e92. doi:10.1016/j.japh.2020.07.018
26. Dalton K, Byrne S. Role of the pharmacist in reducing healthcare costs: current insights. *Integrat Pharm Res Pract.* 2017;6:37–46. doi:10.2147/IPRPS108047
27. De Rijdt T, Willems L, Simoens S. Economic effects of clinical pharmacy interventions: a literature review. *Am J Health Syst Pharm.* 2008;65(12):1161–1172. doi:10.2146/ajhp070506
28. Putzer GJ, Park Y. Are physicians likely to adopt emerging mobile technologies? Attitudes and innovation factors affecting smartphone use in the southeastern United States. *Perspect Health Inf Manag.* 2012;9(Spring):1b.
29. Svensson PO, Hartmann RK. Policies to promote user innovation: makerspaces and clinician innovation in Swedish hospitals. *Res Policy.* 2018;47(1):277–288. doi:10.1016/j.respol.2017.11.006
30. Masood M, Afsar B. Transformational leadership and innovative work behavior among nursing staff. *Nurs Inq.* 2017;24(4):e12188. doi:10.1111/nin.12188
31. Wang YX, Yang YJ, Wang Y, et al. The mediating role of inclusive leadership: work engagement and innovative behaviour among Chinese head nurses. *J Nurs Manag.* 2019;27(4):688–696. doi:10.1111/jonm.12754
32. Baker S, Ballantine L. Allied health professions in research: the forgotten workforce. *Internet J Allied Health Sci Pract.* 2023;21(4). doi:10.46743/1540-580X/2023.2360
33. Duke-NUS S. 2024. SingHealth Duke-NUS Academic Medical Centre impact report 2023/2024 [Internet]. Singapore: SingHealth Duke-NUS. [cited 2025 Aug 27]. Available from: <https://www.singhealth.com.sg/content/dam/singhealth-web/singhealth/imported-assets/assets/annualreport/documents/shs/assets/SingHealth-Duke-NUS-Impact-Report-2023-24.pdf>. Accessed October 31, 2025.
34. Department of Statistics Singapore (SingStat). 2025. Singapore in figures: population and households [Internet]. Singapore: Department of Statistics Singapore. [cited 2025 Aug 27]. Available from: <https://www.singstat.gov.sg/publications/reference/singapore-in-figures/population-and-households>. Accessed October 31, 2025.
35. Kline RB. *Principles and Practice of Structural Equation Modeling*. 5th ed. New York (NY): Guilford Press; 2023.
36. Hair JF, Black WC, Babin BJ, Anderson RE. *Multivariate Data Analysis*. 8th ed. Boston (MA): Cengage; 2019.
37. Berkhout C, Berbra O, Favre J, et al. Defining and evaluating the Hawthorne effect in primary care: a systematic review and meta-analysis. *Front Med.* 2022;9:1033486. doi:10.3389/fmed.2022.1033486
38. Milesi P. Identity leadership, procedural justice, and group identification in uncertain organizational contexts. *J Appl Soc Psychol.* 2022;52(9):886–911. doi:10.1111/jasp.12897
39. van den Hoed MW, Backhaus R, de Vries E, et al. Factors contributing to innovation readiness in health care organizations: a scoping review. *BMC Health Serv Res.* 2022;22(1):997. doi:10.1186/s12913-022-08185-x
40. Robertson TS. The process of innovation and the diffusion of innovation. *J Mark.* 1967;31(1):14–19. doi:10.1177/002224296703100104
41. Kim N, Pae JH. Does intra-firm diffusion of innovation lead to inter-firm relationship benefits? The cases of innovation providers and adopters. *J Bus Ind Mark.* 2014;29(6):514–524. doi:10.1108/JBIM-03-2012-0053
42. Rong X, Mei Q. Diffusion of innovations revisited: from social network to innovation network. In: *Proceedings of the 22nd ACM International Conference on Information & Knowledge Management*; 2013:499–508. doi:10.1145/2505515.2505587.
43. Hogan SJ, Cooate LV, Pua Y-H. Organizational culture, innovation, and performance: a test of Schein's model. *J Bus Res.* 2014;67(8):1609–1621. doi:10.1016/j.jbusres.2013.09.007
44. Anderson N, Potočník K, Zhou J. Innovation and creativity in organizations: a state-of-the-science review, prospective commentary, and guiding framework. *J Manage.* 2014;40(5):1297–1333. doi:10.1177/0149206314527128
45. Danks S, Rao J, Allen JM. Measuring culture of innovation: a validation study of the innovation quotient instrument (part one). *Perform Improv Quart.* 2017;29(4):427–454. doi:10.1002/piq.21236
46. Danks S, Rao J, Allen JM. Measuring culture of innovation: a validation study of the innovation quotient instrument (part two). *Perform Improv Quart.* 2017;30(1):29–53. doi:10.1002/piq.21241
47. Jian Z, Zhou Y. Corporate social capital, market orientation, organizational learning and service innovation performance: an empirical survey in the Pearl River Delta of China. *J Ind Eng Manag.* 2015;8(2):303–321. doi:10.3926/jiem.1318
48. Joshi AW. When does customer orientation hinder (help) radical product innovation? The role of organizational rewards. *J Product Innov Manag.* 2016;33(4):435–454. doi:10.1111/jpim.12301
49. Graham JR, Harvey CR, Popadak J, Rajgopal S. *Corporate culture: evidence from the field*. NBER Working Paper No. 23255. 2017. doi:10.3386/w23255.
50. Nongo E, Ikyanyon D. The influence of corporate culture on employee commitment to the organization. *Int J Bus Manag.* 2012;7(22):22. doi:10.5539/ijbm.v7n22p21

Journal of Healthcare Leadership

Publish your work in this journal

The Journal of Healthcare Leadership is an international, peer-reviewed, open access journal focusing on leadership for the health profession. The journal is committed to the rapid publication of research focusing on but not limited to: Healthcare policy and law; Theoretical and practical aspects healthcare delivery; Interactions between healthcare and society and evidence-based practices; Interdisciplinary decision-making; Philosophical and ethical issues; Hazard management; Research and opinion for health leadership; Leadership assessment. The manuscript management system is completely online and includes a very quick and fair peer-review system. Visit <http://www.dovepress.com/testimonials.php> to read real quotes from published authors.

Submit your manuscript here: <https://www.dovepress.com/journal-of-healthcare-leadership-journal>

Dovepress
Taylor & Francis Group