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Designing a Model for Employees' Information Technology Adoption with a Focus on the Role of Transformational Leadership

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Abstract

The present study aims to design a model for employees' information technology adoption with a focus on the role of transformational leadership. The research is exploratory-applied in terms of purpose, qualitative in terms of data type, cross-sectional in terms of data collection time, inductive-deductive in terms of philosophical approach, and descriptive-survey in terms of data collection method and research nature. The statistical population of the study consists of experts and managers from governmental organizations in the city of Karbala, with a final sample of 10 individuals who participated in interviews. The research instrument in the qualitative section was a semi-structured interview. In this study, four main dimensions were identified, including leadership characteristics, leadership impact, trust in technology within the organization, and valuation and reward. Furthermore, 239 initial codes were extracted from the 10 interviews, from which 20 secondary codes were derived. This finding can be explained by noting that leaders who emphasize innovation and change can facilitate technology adoption by inspiring employees and fostering an open and change-accepting culture. These leaders typically encourage employees to adopt new technologies by creating transparency, providing support, and ensuring the availability of necessary resources.

Keywords: Information technology adoption, transformational leadership, governmental organization, leadership

1. Introduction

The exponential development of new technologies leads to new leadership challenges and necessitates modern leadership to adapt to ongoing global changes (Barnes, 2020). Leaders, organizations, and societies worldwide require evidence-based frameworks to effectively guide technological changes within organizations, particularly when they are rapidly transitioning toward new technologies. In response to technological changes, innovations are considered a key pillar of organizational success and social well-being (Philip, 2021). Consequently, organizations and their employees are compelled to adopt information technology innovations, which is defined as a process in which emerging technology is identified and integrated into previous technology use. Alongside technology adoption resulting from change, volatility, and complexity, organizations



are also challenged to engage in management innovation, defined as the generation and implementation of new processes, structures, and management practices at the organizational level (Rohlfert et al., 2021).

In this context, transformational leadership plays a crucial role in encouraging employees to adopt new technologies and engage in new processes and practices. The ability of transformational leaders to inspire employees to participate in technological innovations and processes is indispensable (Klasmeier & Rowold, 2020; Millar et al., 2018). However, for an individual leader, managing all the knowledge and skills required for technological change is difficult. Therefore, in the digital age, leadership is expected to be a collective effort rather than solely the responsibility of a single leader (Ting et al., 2021). Instead of focusing solely on hierarchical leadership, this study emphasizes the importance of leadership based on transformational leadership and innovation, which encompasses digital transformation within organizations.

Unlike hierarchical leadership, which is exemplified by a single leader, shared leadership is conceptualized as the extent to which individuals perceive themselves as leaders and are motivated to lead. Essentially, employees are also expected to take on leadership roles. However, shared leadership does not replace hierarchical leadership; rather, without the latter, shared leadership is unlikely to develop (Millar et al., 2018). This idea is rooted in implicit leadership theory, with previous research indicating that individuals are more inclined to lead when they perceive themselves as similar to their leaders. Followers compare the traits of their actual leader with their idealized perception of a leader, thereby shaping their final perception of leadership, which may encourage them to pioneer the adoption of information technology innovations (Miller, 2024).

The adoption of information technology innovations, defined as "the diffusion of technology within an organization," is a primary research area in the information systems (IS) literature. Convincing individuals to adopt new technology in the workplace is not easy. Human nature tends to resist change, even when it is beneficial. To successfully implement technology in the workplace, IT adoption requires substantial organizational resources and the concerted efforts of all involved parties. Leaders serve as a powerful driving force behind technology adoption in organizations. Therefore, in addition to key attributes such as ease of use, usability, and utility as prerequisites for adopting new technology, individuals require a clear leadership vision regarding technology use to encourage its adoption (Shafiq et al., 2024; Sharif et al., 2024).

Previous studies have shown that transformational leadership influences knowledge sharing among individuals, which may facilitate the process of information technology innovation adoption. Similarly, transformational leadership is associated with successful digital transformation in organizations, which may be positively linked to the leader's information literacy and innovative processes within the organization. Research indicates that adopting new technology necessitates changes in business processes, which are unattainable without senior management involvement, effective communication among stakeholders in the change process, and ultimately, the successful implementation of technology-driven innovative ideas. Scholars associate strategic organizational choices and performance with managerial characteristics. Thus, the involvement of senior management in technology adoption within organizations is of significant importance (Belhaj, 2024; Bunjak et al., 2022; Eng et al., 2023).

Although the relationship between transformational leadership and innovation has been extensively studied in traditional work environments, there is a need for integrating the transformational leadership approach into contemporary organizational settings that promote new technological advancements and perspectives. Additionally, a recent systematic review of transformational leadership underscores the necessity of employing more robust research methodologies capable of capturing the intrapersonal dynamics between leaders and followers. Similarly, information systems (IS) researchers advocate for more multi-level research to address gaps in understanding why and how information technology is used (Appio et al., 2021). Studies in the IS domain have considered the positive impact of leadership on workplace innovation adoption. However, recent research confirms that the relationship between leadership and IT adoption requires further support in terms of transformational leadership behaviors and contextual conditions that may contribute to the successful adoption of digital technologies in the workplace (Petry, 2018).

The core concept of leadership is rooted in influencing followers. Generally, leaders impact employees by setting goals and assignments, providing feedback that results in rewards or punishments, and ultimately shaping employees' motivation for high performance. Transformational leadership is defined as a leadership behavior approach through which leaders influence employees' behaviors by aligning employees' values with the leader's values, encouraging them to act beyond self-interest for the betterment of the organization (Tiware et al., 2023; van Dun & Kumar, 2023). In this process, leaders inspire, motivate,



and support employees to innovate and initiate changes that drive organizational growth and long-term success (Appio et al., 2021).

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Research in information systems suggests that implementing innovation and managing information must go beyond merely securing senior management support. Specifically, based on leader-follower interdependence (e.g., shared leadership), an integrated model of vertical leadership influence within information systems is proposed to enhance the understanding of successful technological innovation implementation in organizations. Previous research has largely focused on what management should do, but less on what managers actually do (Wu et al., 2016). This may be linked to how employees perceive managerial actions in real workplace situations and how such perceptions shape their behavior toward IT adoption and usage at work. Based on these aspects, employee expectations regarding leadership behaviors—which, in turn, influence employees' perceptions and behaviors—may be explained through transformational leadership (Klasmeier & Rowold, 2020).

Although transformational leadership and its connection to innovation have been widely examined through the lens of traditional work environments, an integration of the transformational leadership approach within contemporary organizational settings is needed to promote new perspectives and technological advancements in organizations (Ready et al., 2020). Furthermore, a recent systematic review of transformational leadership highlights the necessity of employing more rigorous research methods to depict intrapersonal dynamics between leaders and employees. Previous studies in information systems have confirmed the positive impact of leadership on organizational innovation adoption. However, recent research affirms that the relationship between leadership and IT adoption requires further support in terms of specific leadership behaviors and contextual conditions that facilitate the successful adoption of digital technologies in organizations.

Transformational leadership simplifies the complex dynamics of IT innovation adoption by providing support when innovation remains ambiguous. Transformational leaders demonstrate trust in employees' novel ideas and support their "out-of-the-box" thinking (Wong et al., 2020). Transformational leadership facilitates intellectual stimulation, positively influencing employees' critical thinking, altering pre-established work routines, and encouraging new techniques in approaching tasks. Due to its empowering role, transformational leadership fosters proactive and innovative employees by setting high expectations and welcoming progressive problem-solving solutions within their tasks. Such leadership may encourage employees to engage in innovative behaviors and technological changes (Zhang et al., 2019).

This study seeks to develop a model that examines how transformational and innovative leadership can enhance employees' IT adoption. Specifically, as transformational leadership aligns with technology innovation and employee participation in the change process, the core premise of this research is to (1) develop a model where transformational leadership encourages employees to engage in transformational leadership and IT innovation adoption at the workplace and (2) explore how management innovation serves as an organizational-level enabler, facilitating the implementation of new managerial practices essential for digital transformation.

Managers and leaders in Iraqi governmental organizations continuously seek ways to enhance employees' IT adoption. Some managers aim not only to improve IT adoption but also to drive transformation and innovation within governmental institutions. In this regard, designing a model to increase employees' IT adoption with a focus on transformational leadership could be highly effective. This model should enhance employees' IT-related skills and knowledge, boost their motivation for optimal technology utilization, and provide them with the necessary tools and resources to perform their tasks using IT. Additionally, the model should promote an organizational culture that fosters IT innovation and transformation while encouraging transformational leaders to instill this culture within their organizations. Thus, designing an employee IT adoption model centered on transformational leadership can enhance organizational efficiency and effectiveness in IT usage, helping organizations stay competitive and sustain long-term progress. Given these gaps, this study aims to develop a model for employees' IT adoption focusing on the role of transformational leadership.

Accordingly, this research seeks to establish a comprehensive model of IT adoption based on transformational leadership and innovation. Specifically, it builds a bridge between leadership and management innovation, while examining how management innovation functions as a contextual enabler when implementing new management practices, processes, and structures within organizations. Given that management innovation may impact all hierarchical levels, the focus is placed on innovation management as an enabler. This study, therefore, addresses the following research question:

What is the model of employees' IT adoption with a focus on the role of transformational leadership?



2. Methods and Materials

Given that the objective of this study is to design a model for employees' information technology adoption with a focus on the role of transformational leadership, the research methodology is classified as exploratory-applied in terms of purpose, qualitative in terms of data type, cross-sectional in terms of data collection timeframe, inductive-deductive in terms of philosophical approach, and descriptive-survey in terms of data collection method and research nature.

The first part of the study involves the use of a qualitative approach aimed at identifying, categorizing, and extracting concepts based on the perspectives of experts and relevant specialists. The qualitative method employed in this section is thematic analysis. The second part of the study, which follows a quantitative approach, utilizes the opinions of the research population to examine the relationships between the research dimensions and the subject under study, as well as to test and evaluate the components and dimensions of the research model. In this method, thematic analysis is used to analyze interviews conducted with 10 experts in the relevant field.

The statistical population consists of managers and employees of governmental organizations in the city of Karbala. The criteria for expert interviews include having an academic background in public management and relevant professional experience.

The research data were collected through semi-structured interviews. In qualitative research, the researcher must align data collection strategies with the type of information being sought. Scholars have identified three primary qualitative data collection strategies: in-depth interviews, observation, and sampling and enumeration, which the researcher can employ in the study. Additionally, document analysis, wall writings, and both stable and unstable documentary sources can be considered. The data collection method adopted in this qualitative study is exploratory interviews. The reason for selecting exploratory interviews is their high level of flexibility, as they can be conducted in almost any setting and have the capacity to generate deep and comprehensive information. Furthermore, this method is preferred by most research participants (interviewees), as they feel more comfortable with it compared to other qualitative methods such as participatory observation.

For data analysis, this study employs thematic analysis. Thematic analysis is a method used to identify, analyze, and report patterns (themes) within data. At a basic level, this method organizes data and describes them in detail. However, it can also extend beyond description to interpret various aspects of the research topic. Given the complexity, diversity, and subtlety of qualitative approaches, thematic analysis should be considered a fundamental method for qualitative research. In this study, thematic analysis was applied to analyze the codes extracted from the interviews.

3. Findings and Results

An analysis of the demographic data revealed that managers of governmental organizations had the highest average age at 42.22 years, while employees of governmental organizations had the lowest average age at 39.33 years. In terms of work experience, managers of governmental organizations had the highest level of experience, averaging 14.66 years, while employees of governmental organizations had a comparatively lower work experience average of 12.33 years. Among the participants in this study, three individuals held a Doctor of Philosophy (Ph.D.) degree, while seven individuals held a Master of Arts or Master of Science (M.A./M.Sc.) degree.

Thematic analysis was conducted to extract key dimensions and indicators related to employees' information technology (IT) adoption with a focus on transformational leadership. The analysis identified four main components: leadership characteristics, leadership impact, trust in technology within the organization, and valuation and reward. The study extracted 239 initial codes from 10 interviews, which were categorized into 20 secondary codes, as shown in Table 1.

Table 1. Extracted Dimensions and Secondary Codes

Row	Secondary Codes (Main Indicators)	Primary Codes (Initial Codes Extracted from Interviews)
1	Employee Motivation	Providing an inspiring vision for the team—Creating training and learning opportunities—Offering training courses, workshops, and educational resources—Enhancing employees' knowledge and skills—Providing



		psychological and material support—Encouraging participation in leadership and development programs—Recognizing employee efforts.
2	Stimulating Innovation in Employees	Encouraging innovation in IT adoption—Promoting a culture of innovation—Creating an environment for idea generation—Recognizing and rewarding innovative contributions—Facilitating access to knowledge and resources—Encouraging problem-solving and experimental approaches.
3	Open Communication with Employees	Open communication about IT adoption—Providing opportunities for interaction and knowledge-sharing—Ensuring transparent discussions on technological goals—Encouraging two-way feedback and participation—Creating structured meetings and workshops.
4	Focus on Employee Learning	Providing IT training and learning resources—Designing and implementing structured learning programs—Encouraging independent and group learning—Promoting knowledge-sharing and skills development—Creating continuous education opportunities.
5	Trust in Employee Creativity	Valuing employee creativity—Encouraging innovative solutions—Recognizing and rewarding creative contributions—Creating a safe space for experimentation—Providing necessary infrastructure for innovation.
6	Collaboration and Interaction in IT Adoption	Promoting teamwork and interaction in IT adoption—Facilitating collaborative environments—Encouraging knowledge-sharing and group learning—Establishing virtual collaboration tools—Providing structured opportunities for joint problem-solving.
7	Fostering an Innovation Culture in the Organization	Establishing an organizational innovation culture—Providing up-to-date technological knowledge—Encouraging adaptability to technological advancements—Promoting continuous skill development—Creating a risk-tolerant environment for technology experimentation.
8	Knowledge and Information Sharing	Encouraging knowledge-sharing and collaboration—Creating platforms for exchanging best practices—Facilitating knowledge-sharing workshops and mentorship programs—Implementing knowledge management systems.
9	Ensuring Security in IT Usage	Raising awareness about IT security risks—Providing cybersecurity training—Implementing strict data protection protocols—Encouraging adherence to security guidelines—Developing organizational security policies.
10	Transforming Perceptions of IT	Transforming employee perceptions about IT—Educating on the impact of IT in organizational success—Encouraging positive attitudes toward digital transformation—Highlighting real-world benefits of IT adoption—Enhancing IT literacy.
11	Transparency in Information Dissemination	Enhancing transparency in information sharing—Providing clear guidelines on IT implementation—Organizing regular updates on IT policies—Creating communication channels for addressing IT concerns—Fostering openness in IT decision-making.
12	Change Management in IT Adoption	Managing resistance to IT adoption—Providing change management training—Encouraging a growth mindset—Offering support structures for employees struggling with IT transitions—Implementing gradual technology integration strategies.
13	Fostering Intellectual and Creative Freedom	Encouraging intellectual freedom in IT adoption—Creating a space for critical thinking and idea exchange—Supporting unconventional problem-solving approaches—Providing employees with autonomy in technology-related decision-making.
14	Sharing IT-Related Experiences	Encouraging employees to share IT experiences—Facilitating internal case studies—Promoting real-world success stories—Organizing peer-to-peer learning initiatives—Ensuring institutional memory through knowledge documentation.
15	Developing Employees' IT Skills	Enhancing employees' IT skills—Providing specialized IT training—Developing IT competency frameworks—Encouraging cross-functional IT learning—Facilitating hands-on technical workshops.
16	Encouraging IT-Related Idea Generation	Encouraging IT-related idea generation—Providing incentives for technological innovations—Creating structured brainstorming sessions—Recognizing employees' contributions to IT development.
17	Recognition of Employees' IT Achievements	Recognizing employees' IT achievements—Providing rewards and career growth opportunities—Highlighting employee contributions publicly—Creating recognition programs tied to IT milestones.
18	Creating Growth and Development Opportunities in IT	Creating opportunities for IT growth—Providing structured career pathways in IT—Encouraging professional development in emerging technologies—Offering mentorship and coaching in IT fields.
19	Supporting Employees' Professional Growth in IT	Enhancing employees' professional growth in IT—Providing IT leadership training—Developing career advancement opportunities—Facilitating participation in IT conferences and professional networks.
20	Fostering an Effective Organizational Culture	Developing an effective organizational culture for IT adoption—Encouraging IT integration into daily operations—Promoting digital literacy across all levels—Establishing best practices for IT implementation—Embedding technology-driven thinking in corporate strategy.

The final research model, derived from these findings, is presented in Figure 1. The model integrates the four primary dimensions of leadership characteristics, leadership impact, trust in technology, and valuation and reward, illustrating their relationships with IT adoption in organizational settings.



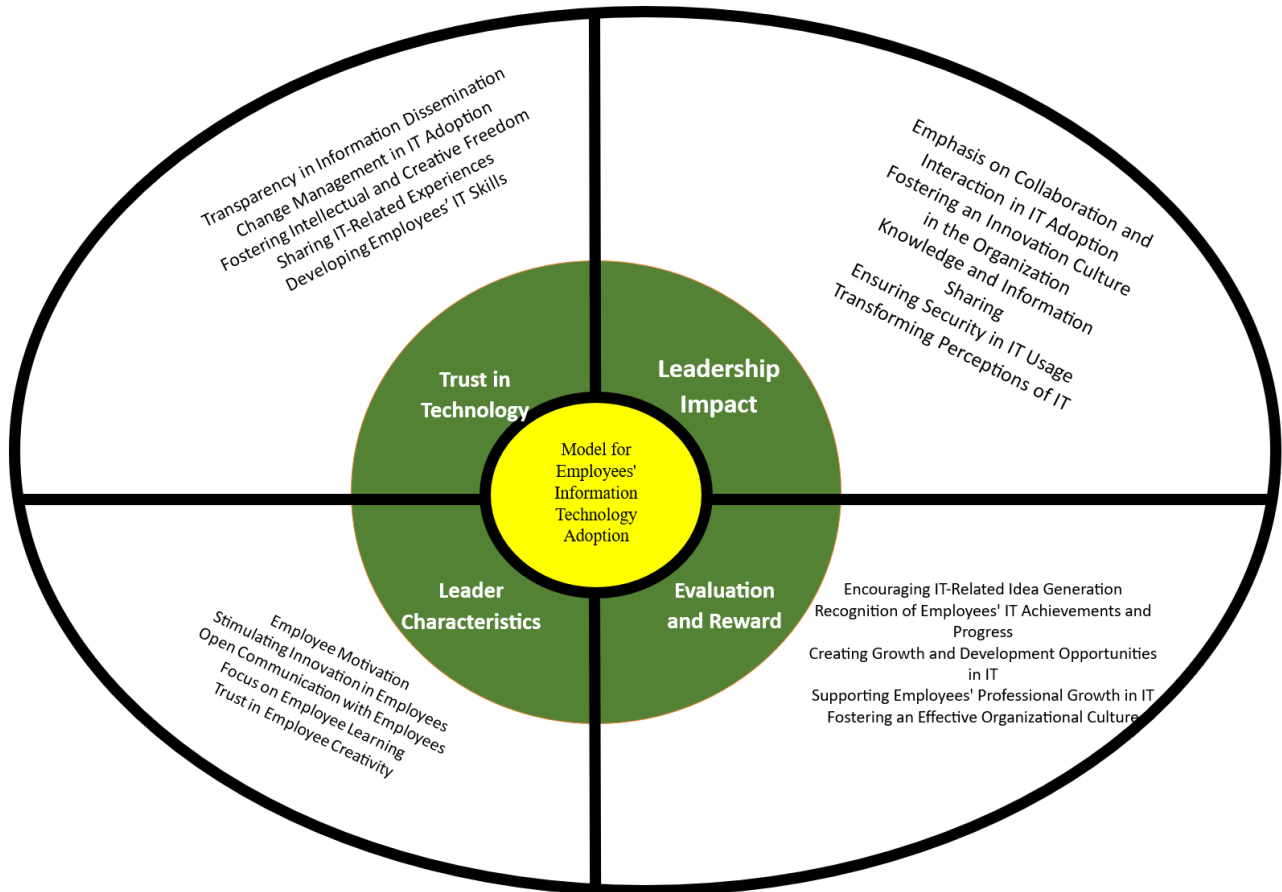


Figure 1. Final Research Model Depicting the Effect of Each Variable on IT Adoption

4. Discussion and Conclusion

Based on the findings, the key components in designing the model for employees' information technology adoption with a focus on transformational leadership include leadership characteristics with indicators such as employee motivation, stimulating innovation in employees, open communication with employees, focus on employee learning, and trust in employee creativity. Another main component, leadership impact, includes indicators such as emphasis on collaboration and interaction in IT adoption, fostering an innovation culture in the organization, knowledge and information sharing, ensuring security in IT usage, and transforming perceptions of IT. The third key component, trust in technology within the organization, includes indicators such as transparency in information dissemination, change management in IT adoption, fostering intellectual and creative freedom, sharing experiences in IT, and enhancing employees' IT skills. The final component, valuation and reward, includes indicators such as encouraging IT-related idea generation, recognizing employees' IT achievements and progress, creating growth and development opportunities in IT, supporting employees' professional growth in IT, and fostering an effective organizational culture.

In explaining these findings, it can be argued that transformational leaders, by establishing a clear vision for achieving technological goals, can encourage employees to adopt new technologies. These leaders enhance employees' sense of purpose and motivation within teams. Transformational leaders typically prioritize employee training and support. By offering educational programs and necessary resources, they can alleviate employees' concerns regarding new technologies and boost their confidence. Leaders can foster an open organizational culture that is receptive to change, motivating employees to embrace new technologies. This type of culture often includes promoting innovation and establishing feedback loops. By recognizing and appreciating employees' efforts in adopting new technologies, transformational leaders can further reinforce their motivation for continued engagement in this process. Reward systems designed around IT adoption and its associated successes can serve as strong incentives. Transformational leaders possess specific skills in change management. They can help

employees overcome natural resistance to change and support them throughout the transition. These factors collectively instill a sense of commitment and responsibility among employees, enabling them to effectively adopt and implement new technologies.

It can also be inferred that leaders who emphasize innovation and change can facilitate IT adoption by inspiring employees and fostering an open and change-oriented culture. These leaders typically promote transparency, provide necessary support, and offer essential resources to encourage employees to embrace new technology.

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Trust in technology is a key factor in IT adoption. Leaders should build employees' trust in technology through education and awareness regarding its benefits and capabilities. An organizational culture that promotes continuous learning and innovation can further facilitate the adoption of new technologies. Involving employees in the process of selecting and implementing technologies increases their sense of ownership and responsibility, leading to a higher likelihood of successful adoption.

The study's findings on IT adoption as a key factor influencing trust in technology align with prior findings (Aditya et al., 2024; Bunjak et al., 2022; Novitasari & Cahyono, 2024; Tiwari et al., 2023; van Dun & Kumar, 2023; Yang et al., 2023). Additionally, there was no statistically significant correlation between actual usage and perceived benefits. Moreover, a significant correlation was observed between perceived benefits and behavioral intentions. Based on these findings, recommendations were made for improving user interfaces, providing training programs, enhancing security and data protection, and integrating ChatGPT as a supplementary tool in university curricula. Yang et al. (2023) found that an organizational reference model within a conventional system paradigm guides users in selecting manufacturing elements, configuring required components in a production system, modeling system options for evaluation processes, and comparing system solutions against predefined performance criteria (Yang et al., 2023). Currently, digital innovation is closely linked to corporate sustainability, with sustainability and digital innovation serving as two fundamental components of the circular economy.

Based on the research findings, the following recommendations are proposed:

- a) A transformational leader can facilitate employee motivation for IT adoption and ensure the success of IT projects.
- b) Stimulating innovation in employees for IT adoption involves inspiring them to generate new ideas and improve work processes. In this process, the transformational leader plays a fundamental and decisive role. By emphasizing leadership and fostering an innovation culture, the leader should encourage employees to adopt and utilize IT effectively.
- c) A transformational leader can provide specialized training programs for employees in IT-related areas. These training programs may include courses on emerging technologies, programming skills, cybersecurity, IT project management, and other IT-related competencies.
- d) A transformational leader should create opportunities for participation and collaboration in IT security. They can establish security teams and involve employees in these teams. These opportunities enable employees to share their experiences and knowledge in IT security and play an active role in decision-making and the implementation of organizational security strategies.

Ethical Considerations

All procedures performed in this study were under the ethical standards.

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Conflict of Interest

The authors report no conflict of interest.

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