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Pilot Validation of a Measurement Instrument for Organizational Drivers, Psychological Empowerment, and Innovative Work Behavior in Private Universities

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Abstract: *This study reports the findings of a pilot test conducted to validate a survey instrument designed to examine organizational drivers, psychological empowerment, and innovative work behavior among employees in private universities. Prior to large-scale empirical testing, establishing the reliability and validity of measurement instruments is essential, particularly in complex organizational and cultural contexts. Using a quantitative cross-sectional design, data were collected from employees of private universities in Xi'an, China. The pilot analysis focused on assessing internal consistency reliability, convergent validity, discriminant validity, and multicollinearity diagnostics. Results indicate that all constructs achieved acceptable levels of Cronbach's alpha and composite reliability, while average variance extracted and heterotrait–monotrait ratios confirmed satisfactory convergent and discriminant validity. No severe multicollinearity issues were detected. The findings demonstrate that the instrument is psychometrically sound and suitable for full-scale structural equation modeling in subsequent research. This pilot study contributes methodologically by providing a validated measurement framework for future studies on innovative work behavior and psychological empowerment in higher education contexts.*

Keywords: Pilot study, Instrument validation, Innovative work behavior, Psychological empowerment, Higher education

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1. Introduction

The increasing complexity of organizational environments in the era of Industry 4.0 and Industry 5.0 has intensified the need for innovation-driven performance, particularly within knowledge-intensive institutions such as universities (Frank et al., 2019; Nahavandi, 2019). Private universities, in particular, face mounting pressure to enhance innovative work behavior among employees while simultaneously maintaining sustainable performance and employee well-being (Bogale et al., 2025). As innovation is increasingly recognized as a socially embedded and psychologically driven process, researchers have emphasized the importance of organizational drivers and psychological empowerment in shaping employees' innovative contributions (Amabile & Pratt, 2016; Spreitzer, 1995).

Despite the growing body of empirical research on innovative work behavior, many studies rely on measurement instruments developed in Western contexts without adequate validation for emerging economies or higher education settings (de Jong & Den Hartog, 2010; Lukes & Stephan, 2017). Differences in organizational culture, leadership practices, and psychological perceptions may significantly influence how employees interpret survey items, thereby affecting the reliability and validity of empirical findings (House et al., 2004; Taras et al., 2010). This concern is especially relevant in the context of private universities in China, where institutional governance structures, employment conditions, and cultural values differ markedly from those in public-sector or Western institutions (Huang, 2017; Mok & Jiang, 2018).

Psychological empowerment has been identified as a critical psychological mechanism that links organizational practices to employee innovation (Zhang & Bartol, 2010; Seibert et al., 2011). Empowered employees are more likely to perceive their work as meaningful, feel competent in their roles, exercise autonomy, and believe that their actions have an impact (Spreitzer, 1995; Thomas & Velthouse, 1990). However, examining empowerment as a mediating or moderating construct requires robust and psychometrically sound measurement instruments (Menon, 2001; Spreitzer, 2008). Without prior validation, subsequent hypothesis testing using advanced techniques such as structural equation modeling may yield biased or unreliable results (Hair et al., 2019).

Pilot testing plays a crucial role in empirical research by ensuring that measurement instruments are reliable, valid, and contextually appropriate before large-scale data collection (Saunders et al., 2019; van Teijlingen & Hundley, 2001). A well-executed pilot study allows researchers to detect problematic items, assess construct clarity, and verify that statistical assumptions are satisfied (Connelly, 2008; Johanson & Brooks, 2010). In management and organizational research, pilot studies are particularly important when multiple latent constructs and interaction effects are involved (Hair et al., 2019; Podsakoff et al., 2003).

Accordingly, this study aims to conduct a pilot test to evaluate the reliability, validity, and feasibility of a survey instrument designed to examine organizational factors, psychological empowerment, and innovative work behavior among employees in private universities in Xi'an, China. By providing empirical evidence of measurement quality, this pilot study lays the methodological foundation for subsequent full-scale analysis and contributes to the development of validated instruments in higher education and organizational behavior research.

2. Methodology

This section outlines the research methodology adopted to achieve the objectives of the study and to ensure the rigor and validity of the empirical findings. It describes the overall research design, sampling procedure, data collection methods, and measurement instruments employed, as well as the analytical techniques used to test the proposed hypotheses. By systematically detailing these methodological components, this section provides transparency and replicability, thereby strengthening the credibility of the study's results.

2.1 Research Design

This study employed a quantitative, cross-sectional pilot research design to assess the psychometric properties of the proposed measurement instrument. The primary objective of the pilot study was instrument validation rather than hypothesis testing. Consistent with

methodological recommendations, the pilot focused on evaluating internal consistency reliability, convergent validity, discriminant validity, and multicollinearity diagnostics to ensure the suitability of the instrument for subsequent large-scale empirical investigation.

2.2 Sample and Data Collection

Data were collected from employees working in private universities located in Xi'an, China. A purposive sampling approach was adopted to ensure that respondents possessed sufficient organizational experience to evaluate workplace practices and psychological conditions accurately. Eligible participants were required to have at least one year of working experience in their respective institutions.

The pilot survey was administered using a structured questionnaire distributed electronically. Participation was voluntary, and respondents were assured of anonymity and confidentiality. A total of 200 valid responses were obtained and included in the analysis, which satisfies recommended thresholds for pilot testing and preliminary validation studies.

2.3 Measurement Instrument

The survey instrument consisted of multiple constructs measuring organizational drivers, psychological empowerment, and innovative work behavior. All measurement items were adapted from established and widely cited scales in the organizational behavior and human resource management literature. Minor wording adjustments were made to ensure contextual relevance and clarity for respondents in private higher education institutions.

Organizational drivers included dimensions such as leadership practices, organizational culture, job autonomy, and perceived organizational support. Psychological empowerment was measured through items capturing meaning, competence, self-determination, and impact. Innovative work behavior was assessed by items reflecting idea generation, idea promotion, and idea implementation.

Prior to data collection, the questionnaire underwent expert review to establish content validity. Feedback from academic experts and practitioners was incorporated to refine item wording and enhance conceptual clarity.

2.4 Data Analysis Procedures

Data analysis was conducted using statistical software appropriate for reliability and validity assessment. Descriptive statistics were first examined to identify missing values, outliers, and potential normality issues. Internal consistency reliability was assessed using Cronbach's alpha and composite reliability coefficients. Convergent validity was evaluated through average variance extracted (AVE), while discriminant validity was examined using the heterotrait–monotrait (HTMT) ratio. Variance inflation factor (VIF) values were calculated to assess multicollinearity among constructs.

3. Results

A total of 200 pilot questionnaires were collected from respondents working in various private universities. After an initial screening, all 200 responses were deemed valid, representing a 100% effective response rate for the pilot phase. None of the questionnaires were discarded, as each met the completeness and consistency criteria required for inclusion in the pilot analysis.

Each questionnaire was reviewed to ensure that all items were completed and that the responses fell within the expected Likert-scale range (1–7). No missing data were identified; therefore, data imputation techniques such as mean substitution were unnecessary (Hair et al., 2019). Additionally, all demographic items—including gender, age group, job position, experience, and department—were confirmed to be properly coded according to the research codebook.

3.1 Construct Reliability and Validity

To ensure the internal consistency, stability, and validity of the measurement model, reliability and convergent validity were assessed using Cronbach's alpha, Composite Reliability (rho_a and rho_c), and Average Variance Extracted (AVE). These indicators collectively confirm the psychometric adequacy of the constructs and the robustness of the survey instrument used in this pilot study (Hair et al., 2021; Henseler et al., 2015). The results are summarized in Table 4.1, which presents the reliability and validity indices for all six constructs: Transformational Leadership (TL), Organizational Culture (OC), Job Autonomy (JA), Organizational Support (OS), Psychological Empowerment (PE), and Innovative Behavior (IB).

Table 1: Summary of Construct Reliability and Validity Results

Construct	Cronbach's Alpha	Composite Reliability (rho_a)	Composite Reliability (rho_c)	AVE	Interpretation
OC	0.880	0.889	0.912	0.674	High reliability and valid convergence
IB	0.834	0.851	0.888	0.665	Reliable and valid
JA	0.786	0.811	0.873	0.696	Acceptable reliability and strong validity
OS	0.888	0.897	0.918	0.690	Highly reliable and valid
PE	0.832	0.846	0.887	0.663	Reliable and valid
TL	0.919	0.930	0.940	0.757	Excellent reliability and convergent validity

Cronbach's alpha values ranged from 0.786 to 0.919, all well above the recommended minimum threshold of 0.70, indicating good to excellent internal consistency (Hair et al., 2021; Nunnally & Bernstein, 1994). The highest reliability was observed for TL ($\alpha = 0.919$), indicating excellent internal consistency among its items. The lowest, JA ($\alpha = 0.786$), still meets the acceptable threshold, suggesting that the items measuring job autonomy are consistent but slightly less homogeneous than the other constructs.

Composite reliability further validated the internal consistency of the constructs and accounted for the contribution of each indicator. Both rho_a and rho_c values exceeded 0.80 for all constructs, surpassing the threshold of 0.70 suggested by Nunnally and Bernstein (1994) and reinforced by Hair et al. (2019). The rho_a values ranged from 0.811 (JA) to 0.930 (TL), while rho_c values ranged from 0.873 (JA) to 0.940 (TL). These findings indicate a high degree of reliability and measurement stability, confirming that the items for each construct are internally consistent and contribute meaningfully to the measurement of their respective latent variables.

Average Variance Extracted (AVE) measures the proportion of variance captured by the construct relative to variance due to measurement error (Fornell & Larcker, 1981). All constructs recorded AVE values above 0.50, confirming adequate convergent validity. The

AVE values ranged from 0.663 (PE) to 0.757 (TL), indicating that each construct explains more than half of the variance of its indicators—evidence of solid convergent validity.

Collectively, these results demonstrate that all constructs met or exceeded the established thresholds for internal consistency and convergent validity. Cronbach's alpha and composite reliability values confirm the stability and consistency of the measurement model, while AVE values substantiate that each construct adequately captures the variance in its observed indicators. Among all constructs, TL showed the strongest psychometric properties, reflecting a well-structured and internally cohesive measurement dimension.

These findings affirm that the instrument used in the pilot study is both reliable and valid, and that the constructs are suitable for further analysis in the main study, including discriminant validity assessment and structural model evaluation using SmartPLS (Henseler et al., 2015; Sarstedt et al., 2019).

4. Conclusion

This pilot study successfully validated a comprehensive measurement instrument designed to assess organizational drivers, psychological empowerment, and innovative work behavior among employees in private universities in Xi'an, China. Through a rigorous process of reliability and validity testing, the study confirmed that the instrument meets the psychometric standards required for large-scale empirical research in higher education contexts.

The results demonstrated high internal consistency, with all constructs exceeding the accepted reliability thresholds for Cronbach's alpha and composite reliability. The Average Variance Extracted (AVE) values indicated strong convergent validity, while discriminant validity was firmly established through the Heterotrait–Monotrait (HTMT) ratio criterion. Moreover, the absence of multicollinearity among constructs confirmed the stability of the measurement model. Together, these findings affirm that the instrument provides an accurate, reliable, and contextually appropriate framework for examining the complex interplay between organizational practices, employee empowerment, and innovative behavior.

Methodologically, this study contributes to the organizational behavior and higher education literature by demonstrating the importance of context-specific instrument validation prior to hypothesis testing. It responds to the need for robust measurement tools adapted to emerging economies, where cultural and institutional dynamics may influence the interpretation of psychological constructs. Practically, the validated instrument can serve as a diagnostic tool for university leaders and policymakers seeking to enhance innovation and empowerment within academic settings.

In conclusion, the pilot test provides compelling evidence that the developed questionnaire is both psychometrically sound and empirically viable. It establishes a solid foundation for subsequent large-scale studies employing structural equation modeling to explore causal relationships among transformational leadership, organizational culture, job autonomy, organizational support, psychological empowerment, and innovative behavior. Future research can build on this foundation by expanding the sample across different regions and institutional types to further validate and generalize the instrument's applicability in diverse organizational contexts.

Authorship

Wang Meng made the primary contribution to this study, including the conception and design of the research, development of the measurement instrument, data collection, statistical analysis, interpretation of results, and drafting of the manuscript. Gary Tan Peng Liang provided academic supervision and scholarly guidance throughout the research process. His contributions included critical input on the research design, methodological rigor, interpretation of findings, and substantial review and revision of the manuscript for important intellectual content. Both authors have critically reviewed the manuscript, approved the final version for publication, and agree to be accountable for all aspects of the work, ensuring its accuracy and integrity.

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Conflict of Interest Statement

The authors declare that there is no conflict of interest regarding the publication of this study.

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