

Adaptation and Psychometric Validation of the Playful Work Design Scale in the Thai Context: A Behavioral Science Perspective

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Abstract

Playful work design (PWD) enhances economic outcomes through intrinsic motivation and engagement, with its dimensions of *fun* and *competition*. However, a Thai version of the PWD scale was yet to be developed. This research aimed to translate, adapt, and test the psychometric qualities of the PWD scale in the Thai context to make it culturally meaningful. The study employed mixed methods, involving the translation and validation of the scale through 6 expert reviews and 6 cognitive interviews, followed by the testing of its psychometric properties with 200 Thai participants selected via stratified random sampling. Confirmatory factor analysis showed a two-factor model fit the data, confirming the Thai PWD scale mirrors the original's two factors: *designing fun* (6 items) and *designing competition* (6 items). Ordinary least squares regression revealed that PWD significantly

predicted innovative work behavior ($\beta = 0.72$, $p < .001$). Thus, the adapted scale with twelve-item is a valid and reliable tool, with the potential to predict work behavior.

Keywords: Playful Work Design, Designing Fun, Designing Competition, Scale Validation, Confirmatory Factor Analysis.

1. Introduction

Our global environment has experienced dynamic and often unprecedented changes, which have made a big impact on work life as well. The COVID-19 pandemic has had a depressing impact on economic growth, employment, and income inequality, particularly for informal workers (Hoang et al., 2025; Sukamdi et al., 2024). There is a further concern about the displacement of jobs due to automation (Franco & Roach, 2023). These concerns highlight the need for human-oriented job design to foster adaptability and engagement. One such area is about how jobs can be crafted to reduce the strain due to job demands and increase the motivational potential of job resources. Researchers argue that job crafting complements job design (Tims et al., 2016; Wrzesniewski & Dutton, 2001), and aligns well with the seminal job demands-resources (JD-R) theory (Bakker et al., 2023) for defining which aspects of the job employees can proactively change (Scharp et al., 2023; Tims et al., 2012). In contemporary discourse, there exists a burgeoning concept known as Playful Work Design (PWD), representing an intriguing paradigm worthy of scholarly investigation for its potential application within work environments. Through accepting economic intuitions, PWD is an employee-driven job design tool, showing how workers can re-design their workplace so that it leads to more fun, creativity, and intrinsic motivation.

The concept of PWD is also grounded in various behavioral science theories and research-based evidence shows the contribution of PWD directly at the employee level (linked to psychological outcomes) and organizational levels (linked to productivity and economic outcomes). Bakker et al. (2020) drew on job demands-resources (JD-R) (Bakker & Demerouti, 2017), and proactive work behavior theories to suggest that employees can practice job crafting and playful work design to improve the work environment. Scharp et al. (2022) showed how PWD, grounded in

self-determination theory (SDT; Deci et al., 2017; Deci & Ryan, 2000) and play theories, allows employees to satisfy their needs and leads to employee work engagement. In recent research, using the individual adaptability theory (Ployhart & Bliese, 2006), researchers showed how PWD could be used as an unconventional approach to adapting to their workplace (Hoang & Le, 2024).

PWD refers to the processes through which employees can “proactively create conditions within work activities that foster enjoyment and challenge without changing the design of the job itself”. The PWD embodies a binary construct encompassing (1) ludic play, termed "fun design," and (2) agonistic play, labeled "competition design (Scharp et al., 2019). The conceptualization of "designing fun" is founded on studies elucidating how individuals employ personal attributes such as humor and imagination to generate a sense of lighthearted positive emotion for themselves and potentially for others as well. "Designing competition" involves employees adopting an adversarial mindset to approach and execute tasks, characterized by setting objectives and guidelines to cultivate diligence, challenge, and competitiveness throughout their endeavors (Scharp et al., 2023). The PWD represents a proactive work process aimed at optimizing work tasks rather than entire job roles. It embodies a more episodic or momentary approach to work dynamics. Additionally, PWD does not entail altering the fundamental nature of work but rather advocates for a distinct approach to its execution (Ployhart & Bliese, 2006). PWD could provide a “bottom-up perspective” on the integration of play with work and for enhancing work engagement (Scharp et al., 2023). Leveraging self-determination and play theories, PWD exhibits a constructive relationship with employees' daily work engagement, facilitated by the gratification of their core psychological needs. Many days were characterized by the infusion of playful elements into work tasks which witnessed heightened employee engagement, propelled by the fulfillment of

autonomy, relatedness, and competence needs. Furthermore, as predicted, differences emerged in the mechanisms through which designing fun and designing competition impacted work engagement (Scharp et al., 2022). Furthermore, the integration of playful elements into work design stimulates creativity and encourages employees to approach tasks with a fresh perspective, ultimately resulting in more innovation. While, researchers have developed a scale to measure PWD in a Western context (Scharp et al., 2023), and the emerging evidence supports the positive outcomes of PWD on work outcomes, the validity of this scale hasn't been confirmed in the Association of Southeast Asian Nations (ASEAN) context.

Cultural differences can significantly impact the effectiveness of scales measuring concepts such as personality or emotions (Hofstede, 2001). Some cultures emphasize personal achievement, independence, and self-expression. Scales designed for individualistic cultures might not capture the nuances of emotions or personality traits in collectivistic cultures, where group harmony and interdependence are prioritized (van de Vijver, 2015). This can lead to inaccurate data and biased comparisons across cultures. In Thai culture, for example, individuals often strive to present themselves favorably in surveys. This tendency can be further amplified in Thai cultures that emphasize saving face or politeness (Ambele & Boonsuk, 2018). Social desirability bias might not reflect the true personality or emotions of people from another culture who might be more inclined to give socially desirable answers (Fisher & Katz, 2000).

While the Western concept of PWD in terms of having fun and competition has been identified to guarantee more favorable outcomes at workplaces, its application in the Thai context has yet to be clearly investigated. Thai work culture leans towards internalizing high hierarchy, collectivism, and femininity (Harada, 2017; Pimpa, 2012). These are values that, despite building a unifying sense of

community, may not match the individualism and competitiveness embedded in authentic PWD measurement developed in the Western context. Therefore, it is worthwhile to understand the degree to which the concepts of enjoyment and competition converge within Thai culture. By re-calibrating the PWD scale to align with Thai values, businesses can ultimately create a measure to be used in Thai workplaces that is enjoyable and attuned to local tradition. Cultural sensitivity is essential in utilizing the strategy of PWD in a specific cultural context while avoiding possible cultural clashes. There is a need to warrant the validity of PWD scale translation to Thai to maintain cultural sensitivity and strengthen the validity of findings.

The core research issue examined in this investigation pertains to the potential discrepancy between the original PWD scale, which was formulated in Western settings, and its relevance in Thai workplaces. The main concern includes cultural diversity, as the original scale may not accurately reflect the Thai work's cultural nuances, such as community values and respect for hierarchy (Prativedwannakij, 2009). Furthermore, a noticeable research gap exists regarding the application of PWD in different cultural milieus like Thailand. To address these issues, researchers aimed to develop a culturally sensitive scale and pilot-test it in the Thai context. This process combined quantitative methods, such as confirmatory factor analysis, with qualitative methods, including cognitive interviews—a technique used to clarify questionnaire items for a richer understanding of human behavior (Balza et al., 2022). By carefully adapting and validating instruments, researchers can ensure they are collecting accurate and culturally relevant data, leading to a more comprehensive understanding of human behavior across different cultures (van de Vijver, 2003). Thus, the purpose of this study is to translate, adapt, and test the PWD scale's psychometric properties of the Thai version. Finally, the validation process will

confirm that the Thai version retains the original two-factor structure (designing fun and designing competition) and demonstrates good psychometric properties for use in Thai workplaces.

2. Literature review

Playful work design (PWD) is a process where workers proactively try to approach existing tasks in such a way that these tasks become more fun and more challenging (Bakker et al., 2020). In this process, employees actively create work conditions that promote enjoyment and challenge without changing the job itself (Bakker & van Woerkom, 2017; Scharp et al., 2019). More specifically, playful work design is an active behavioral approach that creates "fun" and "competition" elements by incorporating playfulness into the work experience (Scharp et al., 2019). PWD was established from a deliberate plan that want to improve the quality of work through active activities based on cognitive-behavioral orientation for employees. Hence, the conceptualization of PWD is based on play theory and proactivity theory (Bakker et al., 2020). The duality of play theory distinguishes the actions into *ludic* and *agonistic* activities. The Greek word ludic means fun, while agonistic means competition (Scharp et al., 2023). Ludic play is enchanted in enjoyment. It is characterized by casual, informal rules, and open goals to enhance well-being using humor or creativity in activities. Engaging in ludic play at work involves incorporating fun and imagination into work tasks. For example, redesigning a work-related activity to make it more enjoyable. On the other hand, the agonistic play emphasizes generating employee satisfaction by fostering one's skills and engaging in proactive behaviors. Agonistic activity is more competitive in achieving goals. Employees design their work by creating personal challenges to execute their work, for example, to finish their tasks before a schedule.

PWD influences intrinsic motivation by building an environment of pleasure, autonomy, and creativity that enhances job satisfaction and worker commitment. This leads to enhanced productivity as employees become more engaged with their jobs. For organizations, PWD leads to increased performance by encouraging a healthy work culture that fosters creativity and collaboration (Dishon-Berkovits et al., 2023; Radhika, 2024). In the context of Thailand's economy, the adoption of PWD can enhance economic outcomes through improved job satisfaction and reduced turnover, as well as promote the development of the country through enhanced innovation and competitiveness in the labor market.

Theoretical Underpinnings

The concept of PWD is grounded in various behavioral science theories and research-based evidence shows the contribution of PWD directly at the employee level (linked to psychological outcomes) and also organizational levels (linked to productivity and economic outcomes). Bakker et al. (2020) applied theories such as job demands-resources (JD-R) and proactive work behavior to suggest that employees are able to utilize job crafting and playful work design to enhance their work conditions. Scharp et al. (2022) showed how PWD, grounded in self-determination theory (SDT; Deci et al., 2017; Deci & Ryan, 2000) and play theories, allows employees to enthusiastically pleasure themselves and leads to work engagement. In recent research, using the individual adaptability theory (Ployhart & Bliese, 2006), researchers showed how PWD could be used as an unconventional approach to adapting to their workplace (Hoang & Le, 2024).

The PWD also integrates several aspects of psychology and behavioral economics by designing work tasks more engaging and fostering intrinsic motivation.

From a behavioral economics perspective, PWD aligns with concepts like intrinsic motivation (Deci & Ryan, 1985), nudging (Thaler & Sunstein, 2009), and flow theory (Csikszentmihalyi, 1990), demonstrating how playfulness can reduce burnout and increase employee satisfaction. It also makes work feel more rewarding without monetary incentives. By integrating behavioral economic perspectives, PWD offers a novel approach to improving workplace well-being while aligning with both modern behavioral insights and economic principles.

Many researchers have established a scale to measure PWD in the European context (Scharp et al., 2023), and the emerging evidence supports the positive outcomes of PWD on work outcomes such as work engagement, having more creative ideas, and performing better (Scharp et al., 2023). The development of PWD was derived from the theoretical paradigms of play and the individual theories of work design. Scharp et al. (2023) developed a framework of playful work design consisting of designing fun and designing competition, which was found to be related to work engagement through self-determination and play theories. The results revealed that workers were more engaged when they were playful because they fulfilled their needs for autonomy, relatedness, and competence. Moreover, the researchers found that playful work design fluctuates from day to day. It also enlarges self-determination and play theories by illustrating the extent to which a proactive and playful approach to work fosters work engagement.

Similarly, Scharp et al. (2023) executed three different studies to validate the new measurement of PWD and question the traditional work value which belief that work is entirely about productivity and not about enjoyment is becoming increasingly obsolete. Through the first study, the authors used an exploratory factor analysis to construct a playful work design measurement scale with a two-dimensional structure: fun at work and competition at work. They also investigated the convergent and

discriminant validity of the new instruments that were designed and tested their inter-exclusivity. The dimension of *designing fun* was positively correlated with playful traits, whereas *design competition* negatively correlated with evil traits. The second study cross-validated the two-factor model of the PWD scale, and it was found that playful work design is a distinct concept, different from job crafting. Study 3 examined the instrument reliability of the PWD, and the findings showed that the twelve-item measure improved the conceptualization of worker-initiated play.

The validity of the PWD scale has been tested in some studies in different cultural settings. Caracuzzo et al. (2022) examined the Italian context of the PWD questionnaire from 253 Italian employees. The findings validated the two-factor model of *designing fun* and *designing competition* and demonstrated acceptable reliability in the Italian context. In addition, the further confirmatory factor analysis confirmed that playful work design is a distinct concept, different from job crafting. In another study, Dishon-Berkovits et al. (2023) translated the PWD scale and developed the Israeli version of the instrument. The results established the validity of the instrument, showing the potential of applying the PWD scale across several cultures.

Though, the emerging research in the context of developed countries shows that PWD is a meaningful concept in the workplace, however, there is no research in the context of developing and Asian nations like Thailand. Therefore, the main purpose of this research was to translate and adapt the PWD scale to the Thai context by following the best practices of scale adaptation given by researchers (Boateng et al., 2018; Hernández et al., 2020).

3. Methodology

Translation and Adaptation Procedures

First, the original Playful Work Design (PWD) scale (Scharp et al., 2023) in English was translated into the Thai language. Next, the data were collected to test the psychometric properties of the Thai version of the PWD scale. The PWD scale consists of twelve items and is a two-dimensional instrument. The translation and contextual adaptation process of the PWD scale was based on the best practice guidelines (Boateng et al., 2018). The 29 criteria from the ITC guidelines (Hernández et al., 2020) for test adaptation were looked at in all of the stages: planning, development, confirmation, administration, score interpretation, and documentation.

The steps for the scale translation and checking of the psychometric properties included:

1. Select the instrument for translation (PWD).
2. Seek formal approval from the authors to translate and test the scale in the Thai context (Scharp et al., 2023). The authors contacted the original authors and took emailed approval.
3. Select qualified translators (who are fluent in English and Thai languages).
4. Process of translation
 - Translation by experts in English and the translated language, Thai (n = 2)
 - Back translation by experts (n = 2)
 - Examining the back-translated version with the original (n = 3)
 - Editing the translated version
5. Select a multi-disciplinary team of qualified experts (n = 6) to check the translated version for content, linguistic, and cultural meaning of the items.

6. Conduct cognitive interviews.
7. Conduct a pilot study and examine the validity and reliability of the scale.
Furthermore, conduct a small-scale validity study, to examine playful work design PWD as a predictor of innovative work behavior.
8. Make any necessary revisions to the adapted instrument.

Measure

Innovative work behavior was assessed in the validity study using a 9-item scale originally developed by Janssen (2000). This scale evaluates the degree to which individuals engage in activities related to the initiation and execution of novel ideas, processes, or products. The scale comprises three components: idea generation (3 items), idea promotion (3 items), and idea implementation (3 items). Participants rated each item on a 5-point Likert scale ranging from 1 (never) to 5 (always). In the present study, the overall scale demonstrated high internal consistency, with a Cronbach's alpha of .94.

Participants in the Pilot Study

An important step in this research was to conduct a pilot study. The target population was employees working in various organizations in Thailand. Data was collected using online platforms. The inclusion criteria were: i) the participant should be working in an organization in Thailand for at least 1 year; ii) the participant should be over the age of 21; and iii) the participant should be able to read Thai language.

According to Comrey (1988), a sample size ranging from 200 to 300 is typically recommended for conducting factor analysis (CFA). The CFA assists in determining the relationship between latent variables and observable variables,

as well as calculating the number of factors needed to validate or invalidate the measurement theory. In this study, data were gathered from a total of 200 employees via stratified random sampling. A majority of the participants were female (69.5%). On average, participants were 38.7 years old ($SD = 10.7$), had been employed in their current job for 9.3 years ($SD = 9.0$), and had a total work experience of 14.1 years ($SD = 9.9$). The highest level of education attained by most participants was a bachelor's degree (59.5%), followed by a master's degree (26.0%). Participants represented various sectors, including education (57.5%), healthcare (20.0%), business services (12.0%), governmental agencies (8.0%), and industry (2.5%).

Data Analysis

Quantitative data analysis techniques were used to evaluate the data. To confirm the validity of a pre-established scale in its Thai version rather than explore new factors through exploratory factor analysis (EFA), confirmatory factor analysis (CFA) was employed to evaluate whether the measurement model aligned with the empirical data, which is more appropriate for validating an existing hypothesized factor structure (Henson & Roberts, 2006; Kline, 2016). Model fit was evaluated using multiple goodness-of-fit indices, including a non-significant chi-square (χ^2), a root mean square error of approximation (RMSEA) of .08 or lower, a comparative fit index (CFI) greater than .95, a Tucker–Lewis index (TLI) greater than .95, and a standardized root mean square residual (SRMR) below .08 (Brown, 2015). In addition, ordinary least squares (OLS) regression analysis was conducted to assess the predictive relationship between the study's key variable, PWD, and innovative work behavior. Specifically, the analysis assessed the extent to which PWD predicted innovative work behavior.

Ethical Procedure

The research team got ethical clearance from the university's ethics committee for this research project (ref: SWUEC-662029, dated 04.10.23). The researchers took various measures to safeguard the anonymity of the participants. Participants were provided with extensive details on confidentiality measures, such as the use of pseudonyms, safe data storage, and a comprehensive informed consent procedure. The procedures were established to preserve the participants' privacy and respect the ethical requirements of the study.

4. Results

The results of this research describe the process of scale translation, content validity, cognitive interviews, pre-testing, confirmatory factor analysis, validity, and reliability testing.

The PWD Scale Translation

The PWD scale was translated and back-translated based on the guidelines by Hernández et al. (2020) for translating and adapting instruments. Some items were discussed for appropriate cultural meaning, such as item #1: "I look for humor in the things I need to do". The linguist expert shared that the Thai term for "humor" relates to emotion. In conclusion, items were finalized after review by two experts, one linguist, and the members of the research team.

Content Validity

After translation, the content validity of the 12 items was assessed by six experts in the field of organizational psychology, behavioral science, and

psychometric evaluation. Experts rated the relevance of each item on a 3-point scale (−1 = not relevant, 0 = uncertain, +1 = clearly relevant). The Index of Item-Objective Congruence (IOC) was computed, and all the items scored greater than the .50 threshold (Rovinelli & Hambleton, 1977), indicating adequate content validity. These items were then formatted a 5-point Likert scale for further testing.

Cognitive Interviews

Cognitive interviewing is a powerful tool that helps researchers see the world through the eyes of participants. It explores how participants process information to understand and respond to survey questions (Willis, 2004; Willis & Artino, 2011). The researchers conducted cognitive interviews with a diverse group of six Thai workers including a female Generation Y professor in management, a male Generation X professor in organizational psychology, a male Generation Z administrative staff, a female Generation X office manager, a female Baby boomer factory supervisor, and a male generation Z factory worker. The scope of cognitive interviews is generally small and may include around 10 to 20 participants. For a small-scale project like our study, as few as 5 or 6 participants may sufficiently provide valuable information to enhance the quality survey. The process included:

- 1) The participants read and reviewed the questionnaires.
- 2) The researchers asked the participants to "think aloud" as they read through the questions. This means the participants would verbalize their thoughts and thought processes as they encountered each question. The researchers would listen carefully, noting any confusion, difficulty understanding the wording, or hesitation in responding.

3) The researchers asked follow-up or probing questions based on the participants' thought processes to gain a meaningful understanding of their perceptions.

4) The researchers asked questions to help the participants recall specific details or experiences relevant to the questionnaires.

5) The researchers asked the participants to consider the questions from different viewpoints, depending on the nature of the questionnaire. This information can then be used to improve the accuracy, clarity, and cultural relevance of the survey for future use with Thai populations.

Cognitive interviews were helpful in pinpointing issues that might lead to invalid responses, such as those found in this research. Some of these were

Jargon or unfamiliar words might leave participants confused. As one male participant mentioned, *“Language is characterized by a lot of translation, for professional workers, we are understanding but might be difficult for unprofessional workers to understand.”*

Awkward sentence structure can make it difficult to grasp the question's meaning. As a male participant claimed, *“The sentence such as I look for humor is not used in everyday life, this sentence must be interpreted”*.

Limited response options might not accurately reflect the participant's experience. As a female participant claimed, *“Language such as playful and fun are not used in the car manufacturing business”*.

Cultural Disconnect and some questions that don't resonate with local realities can lead to misleading responses. As a male participant suggested, *“Keep scoring and set time record is hard to understand-please adjust sentence to fit with Thai context”*.

Cognitive interviews helped researchers ensure the scale items truly tapped into the right areas of thought, leading to more valid and reliable data for the Thai context.

Pre-Testing

The refined version of the PWD scale was then pre-tested with a sample of 30 Thai respondents. The goal was to evaluate the psychometric performance of each item. Results indicated strong item discrimination, with corrected item-total correlations ranging from .50 to .81—well above the recommended threshold of 0.30 (Boateng et al., 2018). The overall Cronbach's alpha was .92, reflecting excellent internal consistency and supporting the scales' readiness for confirmatory factor analysis.

Confirmatory Factor Analysis

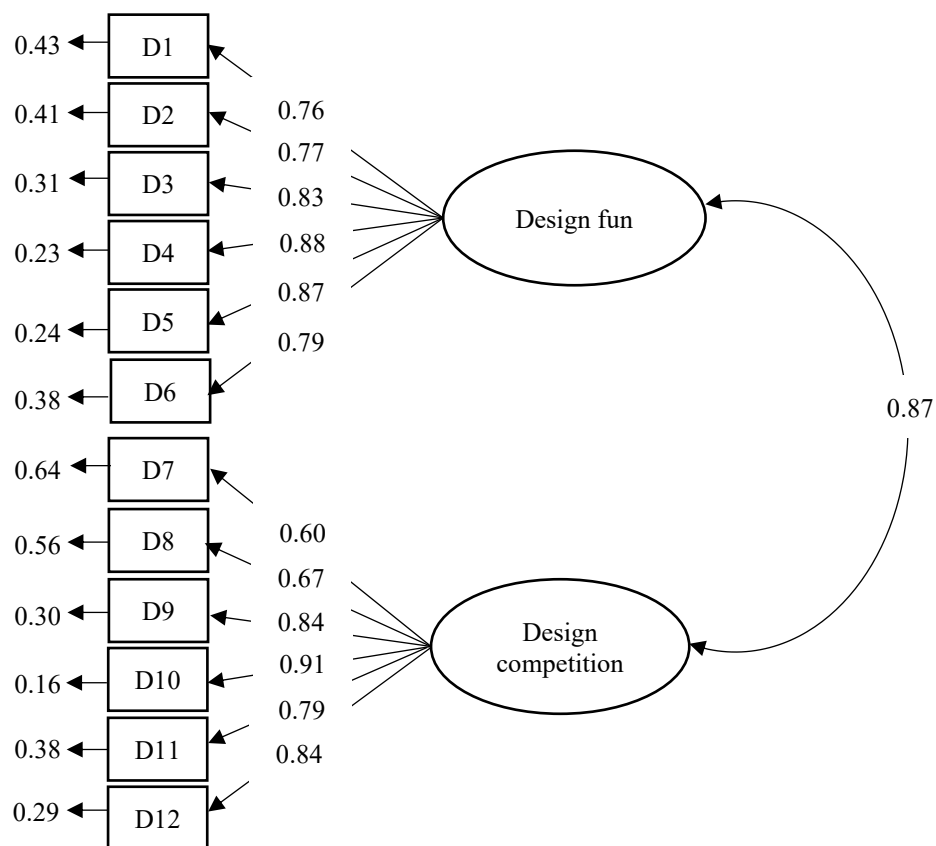
The initial results of the confirmatory factor analysis (CFA) indicated that the hypothesis-based model did not align well with the empirical data. Consequently, the researchers utilized the modification index (MI) to enhance model fit by adding covariances between item errors that are similar in wording and also belong to the same subscales (Brown, 2015). The findings revealed that a two-factor model demonstrated a satisfactory fit to the data ($\chi^2 = 58.23$, $df = 43$, $p = .060$, CFI = 1.00, TLI = .99, RMSEA = .04, SRMR = .03), whereas a one-factor model showed a less adequate fit ($\chi^2 = 147.80$, $df = 44$, $p = .000$, CFI = .98, TLI = .97, RMSEA = .11, SRMR = .05). Consequently, the two-factor model outperformed the one-factor model ($\Delta \chi^2 = 89.57$, $\Delta df = 1$, $p < .01$) (Table 1). The results confirmed that in the Thai context too, the playful work design model has two factors and 12 items: *design fun* (6 items), and *design competition* (6 items), as illustrated in Figure 1.

Table 1. Model fit analysis for the Thai version of the PWD scale

Model	χ^2	df	p-value	CFI	TLI	RMSEA	SRMR	Comparison	$\Delta \chi^2$	Δdf
Null model	375.23	54	< 0.01	0.94	0.93	0.17	0.07			
1-factor model	147.80	44	< 0.01	0.98	0.97	0.11	0.05			
2-factor model	58.23	43	0.06	1.00	0.99	0.04	0.03	1 vs. 2	89.57**	1

Note. * $p < .05$. ** $p < .01$, *** $p < .001$

Figure 1. Confirmatory factor analysis of the Thai version of the PWD scale.



Convergent Validity

To establish convergent validity, the standardized factor loadings, average variance extracted (AVE), and construct reliability (CR) were examined. All item loadings exceeded .50 (range = .60–.91), AVE values ranged from .61 to .67, and CR values were between .90 and .92. These values satisfy the criteria proposed by Cheung et al. (2023), supporting the convergent validity of the two-factor model (see Table 2).

Internal Consistency

Finally, internal consistency was reassessed for both the overall scale and its subcomponents. The full 12-item PWD scale showed excellent reliability ($\alpha = .94$). Subscale reliability was similarly strong, with Cronbach's alpha values of .92 for “design fun” and .90 for “design competition”. All corrected item-total correlations ranged from .57 to .84, surpassing the .30 criterion and reaffirming the scale's internal coherence (see Table 2).

Table 2. Reliability and validity of the Thai version of the PWD scale

No	Item	CITC	Cronbach's Alpha	AVE	CR
Design Fun			.92	.67	.92
D1	I look for humor in the things I need to do.	0.76			
D2	I approach my work in a playful way.	0.77			
D3	I look for ways to make tasks more fun for everyone involved.	0.83			
D4	I approach my tasks creatively to make them more interesting.	0.88			
D5	I look for ways to make my work more fun.	0.87			
D6	I use my imagination to make my job more interesting.	0.79			
Design Competition			.90	.61	.90
D7	I try to set time records in my work tasks.	0.60			
D8	I try to keep score in all kinds of work activities.	0.67			
D9	I compete with myself at work, not because I have to, but because I enjoy it.	0.84			
D10	I try to make my job a series of exciting challenges.	0.91			

D11	I push myself to do better even when it isn't expected.	0.79
D12	I approach my job as a series of exciting challenges.	0.84
Total		.94

Note: CITC = Corrected Item-Total Correlation, AVE = Average Variance Extracted, CR = Construct Reliability

Economic Relevance of PWD

The effect of PWD on innovative work behavior (IWB) was examined using OLS regression analysis. Preliminary diagnostic checks confirmed that the assumptions of linearity, normal distribution of residuals, and absence of multicollinearity were met, with variance inflation factor (VIF) values equal to 1.00. Additionally, Cook's distance values indicated no influential outliers that would distort the model's estimates.

The regression analysis revealed that PWD significantly predicted IWB ($\beta = 0.72, p < .001$), suggesting a strong and positive association between employees' engagement in playful work activities and their expression of innovative behaviors in the workplace. The model explained 51.0% of the variance in IWB (Adjusted $R^2 = .51, F(1, 198) = 207.82, p < .001$), indicating a meaningful contribution of PWD to employees' innovation-related outcomes.

Discussions and conclusions

The Playful Work Design (PWD) scale can be adapted and validated to ensure cultural relevance and accurate assessment. Insights from behavioral science and behavioral economics support PWD's effectiveness in enhancing intrinsic motivation, self-determination, and engagement. As PWD has gained attention globally, its effectiveness in Thai organizations was not researched, and hence, this research adapted and tested the psychometric properties of the Thai version of the

PWD scale (see Appendix 1). The results showed that the PWD scale fits well with the Thai context and the scale has good psychometric properties.

Playfulness is deeply valued in Thai culture, often serving as a way of life (Chuenphitthayavut, 2023). This core concept highlights both deriving amusement and challenge from work activities (Kislenko, 2004). Since Thai culture leans towards collectivism, where group happiness takes precedence (Varnum et al, 2010), the PWD scale in the Thai context should consider how PWD can promote teamwork and shared humor, not just individual achievement. This study is a preliminary step before undertaking a larger project to compare PWD across different cultural contexts in Asia. The initial validation of the PWD scale in Thailand established a foundational understanding of how playful work design operates within a collectivist culture. Subsequent research can build on this foundation to examine and compare PWD across different cultural environments, offering valuable insights into how playful work design can be effectively adapted to diverse cultural contexts.

The PWD scale in the Thai context confirmed the two factors as the original scale, with the highest factor loading in a designing fun has a factor loading value of .92. It was found that it can be measured with six indicators with factor loading values at a statistically significant level of .01. In the Thai context, integrating fun into work design is essential for enhancing flow and positive emotions, which significantly benefits emotional well-being and employee engagement (Suavansri et al., 2022). However, the generational gap presents a critical research gap to explore how various age groups perceive and respond to playful work design. Older workers, accustomed to a more serious work ethic, may view fun as incompatible with diligence and dedication (Trif & Fodor, 2019). In contrast, younger employees, particularly millennials, tend to embrace fun in the workplace, associating it with higher job satisfaction and performance, but may resist challenging job demands

(Beugelsdijk & Welzel, 2018; Ruangkanjanases & Chen, 2019). To address this gap, future research should explore how age affects the effectiveness and perception of playful work design. Comparing generational attitudes will help in developing strategies that cater to diverse age groups and optimize workplace engagement.

The next important factor is *designing competition* which has a factor loading value of .90. It was found that it can be measured with six indicators with factor loading values at a statistically significant level of .01. Competition is a powerful motivator, but in the Thai context, it requires a delicate touch because the Thai culture leans towards collectivism, emphasizing group harmony and social responsibility (Panpothong & Phakdeephasook, 2023). Designing competition in the Thai context should ideally share success alongside personal accomplishment (Harada, 2017). Instead of purely individual competitions, consider incorporating team-based challenges that encourage collaboration and shared success that aligns with Thai collectivist values (Louhapensang et al., 2021). This cooperative approach not only benefits Thai employees' mental health but also enhances their productivity and teamwork (Chuenphitthayavut, 2023).

The results of the regression analysis in this research showed that PWD significantly predicted innovative work behavior (IWB). This has important implications from the perspective of behavioral economics since it validates a strong and positive association between employees' engagement in playful work activities and their expression of innovative behaviors in the workplace. The relationship between PWD and IWB could be applied in the workplace to enhance employee-centered design strategies, such as fostering a playful work environment, in order to increase innovation at the individual level. This has economic relevance because innovation contributes to competitive advantage and maintains organizational sustainability, as reported in the systematic review (AlEssa & Durugbo, 2021).

The managerial implications of using the culturally adapted PWD scale are substantial. First, the PWD scale can be used to empirically measure its impact on work-related outcomes such as work engagement. By encouraging PWD at the workplace managers can design effective interventions to enhance employee engagement that resonate with Thai cultural values, contributing initiatives that are both relevant and impactful. The Thai version of the PWD scale could be utilized in the pretest-posttest of the effectiveness of such interventions. This tailored approach enhances the accuracy of assessments and promotes the successful implementation of playful work design elements. Incorporating principles of PWD—such as fostering fun and competition—creates a more engaging and stimulating work environment (Bakker et al., 2020; Scharp et al., 2019). This data-driven approach facilitates personalized interventions, including the introduction of gamification, the promotion of a culture of experimentation, and the creation of spaces for social interaction. This proactive approach not only increases employee satisfaction and performance but also enhances creativity and productivity (Chuenphitthayavut, 2023).

The psychometric testing validates the PWD scale confirms its reliability and validity in the Thai context, and provides a robust measurement tool for assessing playful work environments. Future research recommendations are pertinent. PWD, which enhances tasks to be more enjoyable and challenging through play and competition, fosters a positive work environment without altering the core job (Bakker et al., 2020; Bakker & van Woerkom, 2017). Integrating cross-cultural competence training, by adapting PWD, is essential for helping employees manage stress and productivity, prevent burnout, and contribute to a healthier work-life balance.

To fully understand the complexities of playful work design, future research should delve deeper into how these factors interact with cultural nuances, organizational characteristics, and employee demographics. Understanding these impacts and exploring the relationship between PWD and work engagement will provide insights into how playful work design influences motivation and commitment, offering a comprehensive view of its effects on workplace outcomes.

For other limitations, this study did not investigate the influence of personal characteristics, such as age, gender, and work experience, on the outcomes of the Playful Work Design (PWD) scale. Future research that examines these variables would offer valuable insights, especially regarding contextual and cultural differences. Additionally, demonstrating the validity of the scale within the Thai context helps establish it as both a research and practical tool for organizational applications. This would empower Thai organizations to implement evidence-based interventions aimed at enhancing employee motivation, engagement, and productivity. To mitigate potential endogeneity concerns and prevent selection bias or reverse causality, future research could adopt an identification strategy, such as instrumental variable (IV) analysis or natural experiments, to more precisely estimate causal relationships. This approach will help determine whether playful work design is influencing job satisfaction and productivity, or if the reverse is true. Future studies could employ stratified or cluster sampling to enhance a more representative sample from various industries, hierarchical levels, and regions, thereby capturing Thailand's diverse workplaces. Additionally, the next studies must incorporate statistical controls, including Harman's single-factor test and partial correlation analysis, to minimize potential response biases. Longitudinal or quasi-experimental designs must also be employed to examine the long-term sustainability of PWD interventions. Pre- and post-intervention measurements may yield more conclusive observations of

the cause-and-effect processes between PWD and employee responses. In addition, future studies must incorporate robustness checks such as multi-group confirmatory factor analysis (CFA) and test-retest reliability tests to ensure the findings.

Conclusions

In conclusion, in the 21st-century workplace that is evolving rapidly, playful work design (PWD) is gaining traction as a strategy to boost not just efficiency and productivity, but also employee well-being and satisfaction. However, effectively utilizing the PWD scale across diverse cultural contexts requires addressing cultural differences. By prioritizing cultural adaptation and validation of measurement scales, researchers can ensure that playful work design becomes a truly global force for fostering employee well-being and satisfaction.

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Appendix

Appendix 1: Thai Version of the Playful Work Design Questionnaire

การออกแบบงานอย่างสนุกสนาน

โปรดทำเครื่องหมาย ✓ ลงใน ☐ ที่ตรงกับตัวท่าน

ข้อที่	การออกแบบงานอย่างสนุกสนาน	ระดับการรับรู้ของท่าน				
		มากที่สุด	มาก	ปานกลาง	น้อย	น้อยที่สุด
1	ฉันค้นหาความสนุกในสิ่งที่ฉันต้องทำ	5	4	3	2	1
2	ฉันทำงานของฉันด้วยวิธีที่สนุกสนาน	5	4	3	2	1
3	ฉันค้นหาวิธีที่จะช่วยให้งานสนุกขึ้นสำหรับทุกคน	5	4	3	2	1
4	ฉันทำงานอย่างสร้างสรรค์เพื่อให้งานน่าสนใจยิ่งขึ้น	5	4	3	2	1
5	ฉันค้นหาวิธีทำให้งานของฉันสนุกขึ้น	5	4	3	2	1
6	ฉันใช้จินตนาการเพื่อทำให้งานของฉันน่าสนใจยิ่งขึ้น	5	4	3	2	1
7	ฉันพยายามบันทึกเวลาการทำงานเพื่อแข่งกับตัวเอง	5	4	3	2	1
8	ฉันพยายามวัดผลเพื่อติดตามความก้าวหน้าในทุกกิจกรรม	5	4	3	2	1
9	ฉันแข่งขันกับตัวเองในการทำงาน ไม่ใช่เพราะว่าฉันต้องทำ แต่เป็นเพราะฉันสนุกกับมัน	5	4	3	2	1
10	ฉันพยายามทำให้งานของฉันเป็นงานที่ทำหายที่น่าตื่นเต้นอย่างต่อเนื่อง	5	4	3	2	1
11	ฉันผลักดันตัวเองให้ทำงานดีขึ้นแม้ไม่มีใครคาดหวัง	5	4	3	2	1
12	ฉันทำงานของฉันเหมือนเป็นงานที่ทำหายที่น่าตื่นเต้นอย่างต่อเนื่อง	5	4	3	2	1