IJEMR
INTERNATIONAL JOURNAL OF ECONOMICS AND MANAGEMENT REVIEW

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From Extrinsic and Intrinsic Motivation to Innovative Work Behavior: A Two-Factor and Self-Determination Perspective

Alifah Widya Rachmawati [1*], Eni Purnasari [2]
[1] *Universitas Mercu Buana Yogyakarta, Indonesia*
[2] *Universitas Teknologi Yogyakarta, Indonesia*

ARTICLE INFO

Keywords:
Extrinsic motivation, Intrinsic motivation, Innovative work behavior, Self-determination theory, Two-factor theory, PLS-SEM

Article History:
Received
09 June 2026
Revised
1 August 2026
Accepted
29 August 2026

DOI:
10.58765/ijemr.v4i2.450

*** Corresponding author:**
Alifah Widya Rachmawati
alifahwidya@mercubuana-yogya.ac.id

Abstract

Purpose – Drawing on self-determination theory (SDT) and Herzberg's two-factor theory, this study examines how extrinsic motivation, which arises from the conditions surrounding work, and intrinsic motivation, which arises from the work itself, are jointly associated with employees' innovative work behavior (IWB), and whether one form is more strongly associated with IWB than the other. It responds to the tendency of earlier research to study a single motivational form, which leaves the combined and relative contributions of the two forms unclear.

Design/methodology/approach – A cross-sectional census survey was conducted in 2026 among all 144 employees of a private-sector population, which gave a response rate of 100%. Using structural equation modeling (PLS-SEM) in SmartPLS 4, using 5,000 bootstrap resamples.

Originality – The study estimates extrinsic and intrinsic motivation, specified through the two-factor and self-determination perspectives, simultaneously in a single parsimonious PLS-SEM model, and complements the usual path coefficients with effect sizes and a formal comparison of the two paths. Using a fully enumerated private-sector population, it offers context-specific evidence on how motivation arising from the work context and motivation arising from the work itself stand relative to each other in explaining IWB.

Findings and Discussion – The measurement model showed adequate reliability and validity (outer loadings .678–.834, composite reliability .821–.881, AVE .535–.636, HTMT ≤ .469). Extrinsic motivation (β = .340, $p < .001$) and intrinsic motivation (β = .239, $p < .001$) were both positively associated with IWB and together explained 21.8% of its variance (R^2 = .218). The effect size of extrinsic motivation was small to medium (f^2 = 0.136) and that of intrinsic motivation was small (f^2 = 0.067), but the difference between the two path coefficients was not statistically reliable.

Practical implications – Managers who want to stimulate innovation should treat the context and the content of work as complementary levers rather than substitutes: keep the workplace comfortable, allow time to rest and support collaboration among colleagues, and provide recognition, ability-matched training and learning opportunities that make the work itself satisfying. Because motivation accounts for roughly one-fifth of the variance in IWB, these levers should be combined with climate, leadership and capability-building measures.

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Introduction

Employees' innovative work behavior (IWB), understood as the intentional generation, promotion and realization of new ideas that benefit a job, a team or an organization (Janssen, 2000; Scott & Bruce, 1994), has become a practical necessity for organizations that must keep pace with technological change and shifting customer demands (Liehr & Hauff, 2025; Nguyen & Vu, 2026). Because IWB is discretionary and can be taxing for those who practice it (Segarra-Ciprés et al., 2026), the question of what energizes employees to engage in it is central. Research on the antecedents of IWB has grown quickly and now spans leadership (Hamid et al., 2026; Kriswijayanto et al., 2026; Liehr & Hauff, 2025; Oh & Sabharwal, 2026), human resource systems and employer branding (Shamaileh et al., 2026; Zografou et al., 2026), organizational climate and culture (Fominiene et al., 2026; Li et al., 2026; Nguyen & Vu, 2026), individual resources such as creative or innovation self-efficacy (Campodonico & Guevara, 2026; Lailla et al., 2025) and empowerment, work arrangements and workforce characteristics (Aldossary & Aldhmour, 2026; Brandt & Schmoll, 2026; Kistyanto et al., 2026). Motivation, however, has mostly entered this literature indirectly: as a link between leadership and innovation or creativity (Alshahrani et al., 2026; Mollah et al., 2026; Santiago-Torner, 2026), or as a background state that supportive contexts are assumed to supply.

Which kind of motivation matters most for IWB is therefore less settled than it appears. Self-determination theory (SDT) distinguishes intrinsic motivation, which arises from the inherent satisfaction of an activity, from extrinsic motivation, which is directed at outcomes separable from the activity (Ryan & Deci, 2000a), and Herzberg's two-factor theory draws a related line between the content of work, such as achievement, recognition and growth, and its context, such as working conditions and relations with colleagues (Herzberg et al., 1959; Muchowe & Rajlal, 2026). Studies that place both forms in one model reach different conclusions depending on the outcome and the setting. Intrinsic motivation carried the larger coefficient for the job satisfaction of gig workers (Ong et al., 2026); the two forms had nearly equal effects on knowledge sharing in the automotive industry (Mantegh et al., 2026) and comparable direct effects on consumers' intentions to keep sharing used goods (Urbonavicius et al., 2026); and extrinsic rewards, but not intrinsic rewards, were directly related to employee performance (Qerimi et al., 2026). Conceptual work cautions that heavy reliance on extrinsic incentives may erode intrinsic values (Hoevel, 2026), whereas the notion of motivational synergy suggests that some extrinsic motivators can reinforce intrinsic motivation (Amabile, 1993). For IWB itself, evidence exists for the role of intrinsic motivation (Alshahrani et al., 2026; Lailla et al., 2025), but relatively few studies estimate intrinsic and extrinsic motivation side by side as predictors of IWB, which makes it difficult to judge whether the two forms are complementary or competing.

The gap matters for practice. If IWB depends mainly on the content of the work, namely recognition, learning and satisfaction in the job itself, human resource (HR) investment should favor development and recognition practices and job design; if the conditions surrounding the job, such as a comfortable workplace, time to rest and supportive colleagues, carry weight of their own, they cannot be treated as mere background. This study therefore asks (a) whether extrinsic motivation, arising from the work context, and intrinsic motivation, arising from the work itself, are each positively associated with IWB when modeled simultaneously, and (b) whether one form is more

strongly associated with IWB than the other. The empirical setting is the private sector, where reward systems are treated as strategic HR practices rather than narrow compensation tools (Qerimi et al., 2026); the data come from a census of all 144 employees of the study population in 2026. Theoretically, the study contributes to research on motivation and innovation by testing the two basic motivational forms side by side, through the combined lens of SDT and the two-factor theory, and by treating their relative standing as an empirical question rather than an assumption. Practically, it gives HR managers evidence on how strongly each lever is associated with employees' innovative behavior. Methodologically, the study employs variance-based structural equation modeling (PLS-SEM), an approach suited to prediction-oriented models and to survey data that depart from normality (Hair et al., 2019), and complements the path estimates with effect sizes and a direct comparison of the two paths.

Theoretical Background

Self-Determination Theory and the Two-Factor View of Motivation

Self-determination theory (SDT) treats motivation as differing in quality as well as in quantity (Deci & Ryan, 1985; Ryan & Deci, 2000b). At one end, intrinsic motivation describes doing an activity for the interest and enjoyment it affords; at the other, extrinsic motivation describes doing it to obtain an outcome separable from the activity, such as a reward or the avoidance of sanctions (Ryan & Deci, 2000a). SDT does not regard extrinsic motivation as uniformly controlling. Externally prompted behavior can be internalized to varying degrees, so that extrinsically motivated action may be experienced as more or less autonomous, and the satisfaction of the needs for autonomy, competence and relatedness supports the more autonomous forms of work motivation (Gagné & Deci, 2005; Ryan & Deci, 2000a). Employees can also actively craft their work to satisfy these needs (Olafsen et al., 2025). The theory has since been applied well beyond the workplace, for example to sustainability-oriented entrepreneurial intentions (Duong, 2026) and to tourist experiences (Moliner-Tena et al., 2026), and the two motivational forms are also distinguished in recent empirical work on technology-supported learning (Olórtegui-Alcalde & Cordova-Buiza, 2026). In organizations the distinction has practical bite because motivation can be sustained through different levers: the work itself and the competence it builds on the one hand, and the conditions, rewards and relationships that surround the work on the other (Hoevel, 2026; Qerimi et al., 2026).

Herzberg's two-factor theory offers a complementary and more concrete way of sorting workplace motivators. It separates hygiene factors, which belong to the context of work (for example company policy, supervision, working conditions, pay and relations with colleagues) and which prevent dissatisfaction without motivating by themselves, from motivators, which belong to the content of work (achievement, recognition, the work itself, responsibility and growth) and which stimulate effort when present (Herzberg et al., 1959; Muchowe & Rajlal, 2026). Recent studies combine the two perspectives when measuring employee motivation: Muchowe and Rajlal (2026) drew their intrinsic and extrinsic motivators from the two-factor theory and SDT, and Ong et al. (2026) adapted their survey mainly from the two-factor theory and other scholarly articles. Classifications nevertheless differ across studies. Muchowe and Rajlal (2026), for instance, treat recognition at work as an extrinsic motivator and affiliation with co-workers as an intrinsic one, whereas Qerimi et al. (2026) advise private enterprises to combine financial incentives with recognition, autonomy, feedback and development opportunities.

This study follows the content–context logic of the two-factor theory and reads it through SDT to specify its two motivational constructs. Extrinsic motivation (EM) denotes motivation that arises from the conditions surrounding the job, which the organization and colleagues supply: a comfortable workplace, adequate time to rest during work, motivational support from and effective collaboration with colleagues, and training that employees enjoy. Intrinsic motivation (IM) denotes motivation that arises from the work itself and from the employee's growth in it: recognition of hard work, training that matches one's abilities, opportunities to learn new skills and genuine satisfaction with the work. The grouping is consistent with SDT insofar as the intrinsic content concerns competence-related experiences, namely mastery, learning and informative recognition, and satisfaction in the activity (Gagné & Deci, 2005; Ryan & Deci, 2000a), whereas the extrinsic content concerns conditions that lie outside the activity and are supplied by others. The two labels therefore refer to this operationalization and should not be read as a general classification of every workplace motivator.

Innovative Work Behavior as Discretionary, Effortful Action

IWB is usually described as a sequence of activities rather than a single act. Scott and Bruce (1994) portrayed individual innovation as a path running from problem recognition and idea generation, through the search for sponsorship, to the realization of the idea; Janssen (2000) condensed it into idea generation, idea promotion and idea realization; and De Jong and Den Hartog (2010) added an initial stage of opportunity exploration, a four-stage view that Nguyen and Vu (2026) describe as widely applied. Common to these views is that IWB is discretionary. It is rarely prescribed in job descriptions, it exposes the employee to uncertainty and possible resistance, and it consumes time and attention. Its consequences are correspondingly double-edged: IWB can raise job performance and work engagement but can also heighten exhaustion, and the climate for innovation can modify these effects (Segarra-Ciprés et al., 2026).

Effortful, self-initiated behavior of this kind should be responsive to the reasons employees have for acting. The antecedent literature nonetheless tends to emphasize the conditions that surround motivation rather than motivation itself. Motivation-enhancing and opportunity-enhancing leader behaviors were related to IWB whereas ability-enhancing behaviors were not (Liehr & Hauff, 2025); transformational leadership operated through job autonomy in public organizations (Oh & Sabharwal, 2026); agile HR systems operated through climate and creative self-efficacy (Shamaileh et al., 2026); and innovation climate operated through knowledge sharing and creative self-efficacy (Li et al., 2026). Each of these accounts points to employees' psychological states as the proximal mechanism, yet few measure employees' own motivation in both its intrinsic and its extrinsic form.

Substitution or Synergy: How the Two Forms of Motivation Relate

Two readings of the relationship between intrinsic and extrinsic motivation run through the literature. The first is substitution: where intrinsic interest is strong, extrinsic incentives lose influence, and where incentives dominate, intrinsic interest may be displaced. Urbonavicius et al. (2026) found that the influence of economic benefits on sharing intentions weakened as intrinsic engagement rose, and Hoevel (2026) argues on conceptual grounds that management regimes built on extrinsic incentives risk undermining the intrinsic value of academic work. The second reading is synergy.

Amabile (1993) proposed that intrinsic motivation can combine with extrinsic motivators that confirm competence or provide information instead of controlling behavior, so that the two forms jointly support creative effort.

Empirical work that places both forms in one model is consistent with coexistence. Duong (2026) found that intrinsic and extrinsic motivation each strengthened entrepreneurial intentions, that closer alignment between them amplified these effects and that an imbalance between them did not significantly hinder intentions, while Mantegh et al. (2026) reported nearly equal and moderate effects of the two forms on knowledge sharing. For IWB, Liehr and Hauff (2025) summarize the same view: both forms matter, intrinsic motivation fosters curiosity, cognitive flexibility and risk-taking, and extrinsic motivation becomes influential when employees lack intrinsic motivation and perceive innovation as additional effort. Combining SDT's qualitative distinction with the synergy argument yields the working proposition of this study: intrinsic and extrinsic motivation are best treated as parallel, correlated drivers of IWB rather than as mutually exclusive ones, and their relative contribution is an empirical matter that may depend on how work is organized and rewarded.

Conceptual Model and Hypotheses Development

The proposed model (Figure 1) positions extrinsic motivation and intrinsic motivation as two parallel drivers of IWB. Extrinsic motivation is the motivation that arises from the conditions surrounding the job (workplace comfort, time to rest, collegial support and collaboration, and training provision), and intrinsic motivation is the motivation that arises from the work itself (recognition, ability-matched training, learning opportunities and satisfaction with the work), as set out in the theoretical background. IWB is defined as the set of individual actions through which employees explore opportunities and generate, promote and realize novel ideas that benefit their job, team or organization (De Jong & Den Hartog, 2010; Janssen, 2000; Scott & Bruce, 1994). Each construct is modeled as a reflective construct. The two motivational constructs are allowed to covary and are expected to correlate positively, because supportive conditions can help to satisfy the needs for competence and relatedness that sustain autonomous motivation (Gagné & Deci, 2005) and because both forms can coexist within the same person. Because the literature offers no consistent ordering of the two forms, a directional hypothesis is stated for each path, and their relative size is examined afterwards as an exploratory question.

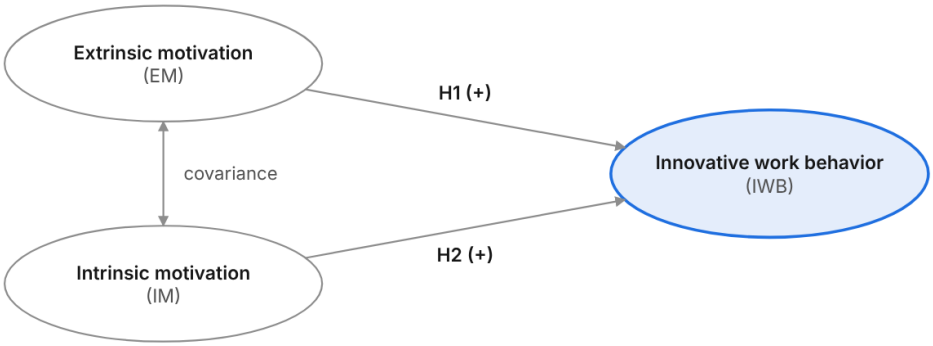


Figure 1. Proposed Conceptual Model

Note. EM = extrinsic motivation; IM = intrinsic motivation; IWB = innovative work behavior. H1 and H2 denote the hypothesized positive direct effects. The double-headed arrow denotes the covariance between

EM and IM, which is allowed but not hypothesized. The shaded ellipse marks the outcome construct; all three constructs are reflective. Source(s): Authors' own work.

Extrinsic Motivation: The Work Context as an Enabling Condition for IWB

Extrinsic motivation, as defined here, is energized by the context in which work takes place rather than by the task itself: a comfortable workplace, adequate time to rest, motivational support from colleagues, effective collaboration and training that employees enjoy. Three arguments make IWB a plausible target of such motivation. First, IWB is effortful and can heighten exhaustion (Segarra-Ciprés et al., 2026); a comfortable workplace and adequate rest help to preserve the energy that opportunity exploration, idea generation and implementation demand. Second, the later stages of IWB depend on other people. Ideas have to be shared, promoted and implemented together with colleagues, and supportive peers and effective collaboration provide the exchange of knowledge and the sponsorship that this requires: team support was one of the components of an innovation climate that predicted IWB (Li et al., 2026), and relational crafting, the proactive modification of social interactions to gain support, predicted IWB (Campodonico & Guevara, 2026). Third, employees who feel fairly rewarded may feel obliged to reciprocate through innovative behavior, as Liehr and Hauff (2025) note with reference to Janssen (2000), and the same exchange logic can be extended to the working conditions that the organization provides; moreover, extrinsic factors and rewards have been related to performance in earlier work (Muchowe & Rajlal, 2026; Qerimi et al., 2026). Against this, the two-factor theory holds that hygiene-type conditions prevent dissatisfaction without motivating by themselves (Herzberg et al., 1959; Muchowe & Rajlal, 2026), perceived financial support added no explanatory power for IWB once organizational climate was taken into account (Fominiene et al., 2026), and rewarding innovative contributions was only weakly related to IWB among leader behaviors (Liehr & Hauff, 2025), which shows that the link is not automatic. A positive but not trivially large association is therefore expected.

H1. *Extrinsic motivation is positively associated with employees' innovative work behavior.*

Intrinsic Motivation: The Work Itself as a Driver of IWB

Intrinsic motivation, as defined here, is energized by the work itself and by the employee's growth in it: recognition of hard work, training suited to one's abilities, opportunities to learn new skills and genuine satisfaction with the work. These experiences build the sense of competence that SDT identifies as a condition for autonomous work motivation (Gagné & Deci, 2005; Ryan & Deci, 2000a, 2000b), and recognition that confirms competence is the kind of extrinsic input that Amabile (1993) expects to combine with, rather than undermine, intrinsic motivation. Innovation draws on the same qualities: opportunity exploration and idea generation require new skills and knowledge, while the tolerance of ambiguity and the persistence needed to carry ideas into practice depend on feeling competent and on finding the work worthwhile. Intrinsic motivation has been linked to curiosity, cognitive flexibility and risk-taking, which promote idea generation in particular (Amabile, 1993; Liehr & Hauff, 2025). Empirically, intrinsic motivation was positively related to IWB among life-insurance employees in Indonesia (Lailla et al., 2025); job satisfaction was likewise positively related to IWB in that study and among employees of manufacturing and service firms in Vietnam (β = .305; Nguyen & Vu, 2026); intrinsic motivation was the first link in a chain from entrepreneurial leadership to

IWB via creative self-efficacy in small and medium-sized enterprises (Alshahrani et al., 2026); the effect of ethical leadership on creative personality was stronger when intrinsic motivation and self-confidence were high (Santiago-Torner, 2026); and intrinsic motivation fully transmitted the effect of leader–member exchange to organizational innovation (Mollah et al., 2026). These findings lead to the second hypothesis.

H2. *Intrinsic motivation is positively associated with employees' innovative work behavior.*

Earlier studies disagree on whether intrinsic or extrinsic motivation is the stronger correlate of work outcomes (Mantegh et al., 2026; Ong et al., 2026; Qerimi et al., 2026; Urbonavicius et al., 2026). The two-factor theory would lead one to expect the content-related form to outweigh the context-related form, and the two studies that built their measures on it reported larger coefficients for intrinsic than for extrinsic motivation (Muchowe & Rajlal, 2026; Ong et al., 2026), whereas other studies found near-equal effects or the reverse. No directional hypothesis about the relative size of the two paths is therefore proposed; the difference between the two path coefficients is examined as an exploratory question once H1 and H2 have been tested.

Methods, Data, and Analysis

Research Design and Sample

This study used a quantitative, cross-sectional survey to examine how extrinsic and intrinsic motivation are associated with IWB in a field setting, an approach well suited to testing theoretically grounded relations among latent constructs with PLS-SEM (Campodonico & Guevara, 2026; Hair et al., 2022). The study population comprised 144 employees in the private sector. Because the population was small and fully accessible, a census (total enumeration) was used instead of sampling: every member of the population was surveyed in 2026, and all 144 questionnaires were completed and usable, a response rate of 100%. The 144 cases therefore constitute the entire population rather than a sample drawn from it. Under a census, the inferential statistics reported below (bootstrap intervals and significance tests) are read as indicators of how stable the estimated relations are against random variation in the responses, and the findings are not generalized beyond this population.

Although a census fixes the number of cases at the size of the population, the adequacy of that number for the model was checked with the post-hoc power module of SmartPLS, which reports the minimum sample size needed to detect each observed path coefficient (Cohen, 1988; Hair et al., 2022). At a 5% significance level and 80% power, the observed paths required 54 cases for extrinsic motivation and 109 cases for intrinsic motivation. The 144 cases therefore meet both requirements, with achieved power of .99 and .89, respectively. At the more demanding level of 90% power the requirements rise to 75 and 151 cases, so the test for the intrinsic motivation path is somewhat less well powered.

Measures

The questionnaire contained three multi-item scales, each rated on a five-point Likert scale and specified as a reflective construct (Table 1). The statements are presented in simplified, paraphrased form, and the dimensions covered by each scale correspond to those found in the sources listed in Table 1.

Extrinsic motivation (EM) was measured with six indicators (EX1–EX6) on the context of work. Workplace comfort and rest time correspond to the conducive working environment and work–life balance items that Muchowe and Rajlal (2026) classify as extrinsic motivators; collegial support and collaboration correspond to the team support component of the innovation climate (Li et al., 2026) and to relational crafting (Campodonico & Guevara, 2026); and training for development corresponds to the development opportunities discussed by Qerimi et al. (2026). All of these belong to the context of work in the sense of the two-factor theory (Herzberg et al., 1959). Intrinsic motivation (IM) was measured with four indicators (IN1–IN4) on the work itself. Recognition for hard work is a motivator in the two-factor theory (Herzberg et al., 1959), was among the most positively rated determinants in the survey of Ong et al. (2026) and is one of the non-financial rewards that Qerimi et al. (2026) recommend combining with financial incentives; training matched to one's abilities and opportunities to learn new skills correspond to career growth (Muchowe & Rajlal, 2026) and to perceived competence (Ryan & Deci, 2000a; Tutul et al., 2026); and satisfaction with the work corresponds to job satisfaction, which has been related to IWB (Lailla et al., 2025; Nguyen & Vu, 2026).

IWB was measured with four indicators (INN1–INN4), one for each stage of the innovation process distinguished by De Jong and Den Hartog (2010): opportunity exploration, idea generation, idea promotion and idea realization (see also Janssen, 2000; Scott & Bruce, 1994). Recent studies have measured IWB with five items (Li et al., 2026), six items (Liehr & Hauff, 2025) or nine items (Nguyen & Vu, 2026); the four-item measure used here keeps the questionnaire short but covers each stage with a single indicator. No respondent used the lowest scale point; observed responses ranged from 2 to 5, and item means ranged from 4.10 to 4.26 (Table 1), which indicates generally favorable and somewhat negatively skewed answers.

Table 1. Measurement Items: Paraphrased Content, Dimensions, Descriptive Statistics, Outer Loadings and Collinearity

Item	Item content (paraphrased)	Dimension	*M*	*SD*	Loading	VIF
Extrinsic motivation (EM) *Sources: Campodonico & Guevara (2026); Herzberg et al. (1959); Li et al. (2026); Muchowe & Rajlal (2026); Qerimi et al. (2026)*						
EX1	My workplace is comfortable.	Workplace comfort	4.10	0.84	.754	1.58
EX2	I have enough time to rest while working.	Rest time	4.19	0.77	.726	1.73
EX3	My colleagues encourage me.	Collegial support	4.15	0.80	.776	1.77
EX4	I like training that helps me grow.	Training for development	4.15	0.76	.776	1.81
EX5	I work together well with my colleagues.	Collaboration	4.17	0.77	.697	1.55
EX6	I receive fair pay for my work	Fair pay	4.16	0.79	.725	1.52
Intrinsic motivation (IM) *Sources: Herzberg et al. (1959); Lailla et al. (2025); Muchowe & Rajlal (2026); Nguyen & Vu (2026); Ong et al. (2026); Qerimi et al. (2026); Ryan & Deci (2000a); Tutul et al. (2026)*						
IN1	My hard work is recognized.	Recognition	4.24	0.71	.678	1.33
IN2	I can take skills training that fits my abilities.	Ability-matched training	4.26	0.65	.736	1.34
IN3	I have chances to learn new skills.	Learning opportunity	4.11	0.74	.779	1.36
IN4	I am truly satisfied with my work.	Job satisfaction	4.12	0.76	.730	1.36
Innovative work behavior (IWB) *Sources: De Jong & Den Hartog (2010); Janssen (2000); Liehr & Hauff (2025); Nguyen & Vu (2026); Scott & Bruce (1994)*						

Item	Item content (paraphrased)	Dimension	*M*	*SD*	Loading	VIF
INN1	I often look for ways to improve my work.	Opportunity exploration	4.24	0.74	.804	1.83
INN2	I often suggest ideas to solve problems.	Idea generation	4.19	0.83	.773	1.47
INN3	I try to win my colleagues' support for new ideas.	Idea promotion	4.24	0.77	.834	1.84
INN4	I take an active part in putting new ideas into practice.	Idea realization	4.22	0.77	.777	1.76

Note. N = 144 (census). All items were rated on a five-point Likert scale, and item content is paraphrased in simplified form. The sources listed in each construct row support the dimensions covered by its items. *M* and *SD* are those reported by SmartPLS 4 (*SD* computed with *n* as the divisor). Loading = standardized outer loading; all loadings were significant at $p < .001$ in the bootstrap. VIF = variance inflation factor of the indicator.

Robustness and Common Method Bias

Because all variables were self-reported by the same respondents at one point in time, common method bias (CMB) was considered (Podsakoff et al., 2003), and two statistical checks were applied. In Harman's single-factor test, an unrotated principal component analysis of all 14 indicators showed that the first component accounted for 32.8% of the total variance, well below the 50% benchmark, and three components had eigenvalues above 1, in line with the three intended constructs. In the full collinearity assessment (Kock, 2015), the variance inflation factors (VIF) obtained by regressing each latent construct on the other two were 1.23 (EM), 1.16 (IM) and 1.28 (IWB), far below the conservative threshold of 3.3. These diagnostics suggest that CMB is unlikely to distort the estimates materially, although the limits of cross-sectional self-reports remain (see Limitations and research opportunities).

Data Analysis: Justification for PLS-SEM

Data were analyzed with SmartPLS 4 (Ringle et al., 2024). PLS-SEM was preferred for three reasons. First, the aim is to explain and predict IWB rather than to confirm a common-factor model (Hair et al., 2019, 2022), and the approach has been used in comparable IWB research (Campodonico & Guevara, 2026; Liehr & Hauff, 2025). Second, the data depart from normality: the Cramér–von Mises test rejected normality for all 14 indicators (all $p < .001$) and for the construct scores of EM ($p = .005$), IM ($p = .011$) and IWB ($p < .001$), and PLS-SEM relies on non-parametric bootstrapping rather than distributional assumptions (Hair et al., 2019). Third, the population is small (144 cases), and PLS-SEM generally performs well with limited numbers of cases provided that minimum requirements are met (Hair et al., 2019), as checked with the power analysis above. The relative merits of composite-based and factor-based estimation remain debated (Henseler & Schuberth, 2025); the composite-based choice here follows the prediction-oriented aim of the study.

The model was estimated with the path weighting scheme (maximum of 3,000 iterations, stop criterion of 10^{-7}, initial weights of 1) and evaluated in two steps (Hair et al., 2019; Roni et al., 2015):

1. **Measurement model evaluation.** Indicator reliability was assessed with outer loadings (≥ .70 preferred; values between .40 and .70 retained when composite reliability and the average variance extracted were adequate), internal consistency with Cronbach's alpha, rho_A and rho_C (acceptable between .70 and .95), and convergent validity with the average variance extracted (AVE ≥ .50). Discriminant validity was assessed with the Fornell–Larcker criterion (Fornell & Larcker, 1981),

the heterotrait–monotrait ratio (HTMT < .85; Henseler et al., 2015) and cross-loadings.

2. **Structural model evaluation.** Collinearity was checked with inner VIF values (< 3). Path coefficients were tested by bootstrapping with 5,000 resamples (percentile intervals; one-tailed test at the 5% level because H1 and H2 are directional, so the reported intervals run from the 5th to the 95th percentile and correspond to 90% two-sided intervals; bias-corrected intervals were also inspected). Explanatory power was judged with R^2, and effect sizes with f^2 (0.02, 0.15 and 0.35 for small, medium and large effects; Cohen, 1988). Model fit was examined with SRMR, d_{ULS} and d_G against their bootstrapped reference values. The difference between the two path coefficients was assessed from the bootstrap distribution of their difference across the 5,000 resamples.

Results

Model Measurement Evaluation

Figure 2 presents the estimated model with standardized outer loadings, path coefficients and R^2, and Tables 2 to 4 summarize the evaluation of the reflective measurement models. All 14 outer loadings were significant ($p < .001$; t values from 8.05 to 29.16) and ranged from .678 to .834 (Table 1). Two loadings, IN1 (.678) and EX5 (.697), fall marginally below the preferred level of .70, but both exceed .40 and were retained because the composite reliability and AVE of their constructs were adequate (Hair et al., 2019, 2022). Internal consistency was satisfactory (Table 2): Cronbach's alpha ranged from .714 (IM) to .839 (EM), rho_A from .727 to .848 and rho_C from .821 to .881, all within the .70–.95 band. The AVE exceeded .50 for every construct (EM = .552, IM = .535, IWB = .636). IM is the least reliable of the three measures, with alpha and AVE only just above their thresholds; this point is taken up in the Limitations.

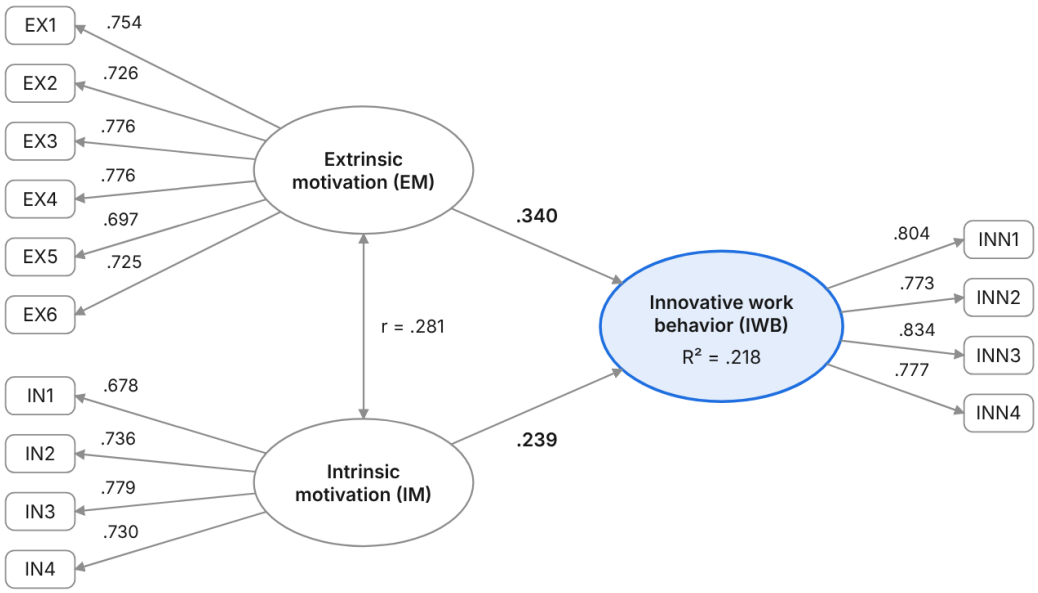


Figure 2. Estimated Measurement and Structural Model

Note. $N = 144$. Values on arrows from a construct to its indicators are standardized outer loadings; values on arrows between constructs are standardized path coefficients; r = correlation between EM and IM; R^2 =

variance in IWB explained by EM and IM. EX1–EX6, IN1–IN4 and INN1–INN4 are the items of EM, IM and IWB, respectively. Source(s): Authors' own work (SmartPLS 4 output).

Table 2. Reliability and Convergent Validity of the Constructs

Construct	Items	Cronbach's α	rho_A	rho_C	AVE
Extrinsic motivation (EM)	6	.839	.848	.881	.552
Intrinsic motivation (IM)	4	.714	.727	.821	.535
Innovative work behavior (IWB)	4	.810	.814	.875	.636

Note. $N = 144$. AVE = average variance extracted; rho_A and rho_C = composite reliability coefficients. Values from SmartPLS 4.

Discriminant validity was supported by three criteria (Tables 3 and 4). First, the square root of each construct's AVE (.732–.797) exceeded its correlations with the other constructs (.281–.407; Fornell & Larcker, 1981). Second, all HTMT ratios (.372–.469) were well below .85, and the upper limits of their bootstrapped intervals (≤ .604) stayed below that threshold as well (Henseler et al., 2015). Third, every indicator loaded more strongly on its intended construct than on the other two. The moderate correlation between EM and IM ($r = .281$) indicates that the two motives are related but empirically distinct. Indicator VIF values of 1.33–1.84 (Table 1) signal no redundancy among items.

Table 3. Discriminant Validity: Fornell–Larcker Criterion and HTMT

Construct	1	2	3
1. EM	**.743**	.372	.469
2. IM	.281	**.732**	.426
3. IWB	.407	.334	**.797**

Note. Diagonal (bold) = square root of the AVE; below the diagonal = latent variable correlations (Fornell–Larcker criterion); above the diagonal = HTMT ratios. Bootstrapped 90% percentile intervals of HTMT: EM–IM [.269, .528]; EM–IWB [.336, .604]; IM–IWB [.266, .595].

Table 4. Cross-Loadings

Indicator	EM	IM	IWB
EX1	**.754**	.163	.361
EX2	**.726**	.126	.183
EX3	**.776**	.229	.321
EX4	**.776**	.197	.313
EX5	**.697**	.342	.245
EX6	**.725**	.199	.323
IN1	.037	**.678**	.186
IN2	.286	**.736**	.252
IN3	.223	**.779**	.294
IN4	.236	**.730**	.228
INN1	.286	.280	**.804**
INN2	.385	.266	**.773**
INN3	.320	.302	**.834**
INN4	.292	.210	**.777**

Note. Bold = loading on the intended construct. EM = extrinsic motivation; IM = intrinsic motivation; IWB = innovative work behavior.

Structural Model Evaluation

Collinearity between the predictors was negligible (inner VIF = 1.09). The model explained 21.8% of the variance in IWB (R^2 = .218; adjusted R^2 = .207; bootstrapped 90% CI [.156, .350]). This is a modest share and leaves considerable room for other antecedents of IWB, such as leadership, climate and self-efficacy (Li et al., 2026; Liehr & Hauff, 2025; Shamaileh et al., 2026).

Table 5 reports the hypothesis tests. EM was positively and significantly related to IWB (β = .340, t = 5.08, p < .001, 90% CI [.236, .460]), which supports H1. IM was also positively and significantly related to IWB (β = .239, t = 3.10, p < .001, 90% CI [.122, .377]), which supports H2. Bias-corrected intervals ([.206, .433] and [.098, .352]) led to the same conclusions. The effect of EM was between small and medium (f^2 = 0.136) and that of IM was small (f^2 = 0.067; Cohen, 1988).

Table 5. Structural Model Results and Hypothesis Tests

Hypothesis	Path	β	*M*	*SD*	*t*	*p*	90% CI	f^2	Decision
H1	EM → IWB	.340	.352	.067	5.08	< .001	[.236, .460]	0.136	Supported
H2	IM → IWB	.239	.252	.077	3.10	< .001	[.122, .377]	0.067	Supported
Exploratory	Δβ (EM − IM)	.101	.100	.124	0.82	.21	[−.102, .310]	–	Not significant

Note. N = 144. β = standardized path coefficient; M and SD = mean and standard deviation of the 5,000 bootstrap estimates; p values are one-tailed; 90% CI = percentile bootstrap interval from the 5th to the 95th percentile. Bias-corrected intervals: H1 [.206, .433], H2 [.098, .352]. Percentile intervals of f^2: EM [0.063, 0.278], IM [0.017, 0.186]. R^2 (IWB) = .218, adjusted R^2 = .207 (bootstrap M = .247, SD = .059, 90% CI [.156, .350]). Inner VIF = 1.086 for both paths. The exploratory row ($\Delta\beta = \beta_{EM} - \beta_{IM}$) was computed from the 5,000 bootstrap resamples in an independent replication of the estimation.

Although the EM coefficient is numerically larger, the difference between the two paths (Δβ = .101) was not statistically distinguishable from zero (bootstrap SD = .124, 90% CI [−.102, .310], one-tailed p = .21), and the intervals of the two paths overlap substantially. The data are therefore consistent with both motives contributing to IWB to a similar degree, and the ordering EM > IM should not be read as an established difference.

Model fit is reported in Table 6. Because the structural model is saturated (the two motivational constructs covary and both predict IWB), the saturated and estimated values coincide, and any misfit arises from the measurement part of the model rather than from the hypothesized paths. SRMR (.086) and d_{ULS} (0.770) exceeded the 95% and 99% reference values obtained from the bootstrap, whereas d_G (0.196) stayed within them. Fit was therefore only partly satisfactory. Because PLS-SEM is oriented toward explaining the variance of the outcome construct rather than toward reproducing the covariance matrix, these indices are read as diagnostic information, and the partial misfit is acknowledged as a limitation (Hair et al., 2019; Henseler & Schuberth, 2025).

Table 6. Model Fit Indices

Index	Value	95% reference value	99% reference value	Assessment
SRMR	.086	.075	.081	Above both limits
d_{ULS}	0.770	0.594	0.681	Above both limits
d_G	0.196	0.212	0.236	Within both limits
NFI	.766	–	–	–

Note. Reference values are the 95th and 99th percentiles of the bootstrap distribution of each index (SmartPLS 4, 5,000 resamples). Saturated and estimated model values are identical because the structural model is saturated. χ^2 = 165.6.

Discussion

This study asked whether extrinsic motivation, arising from the conditions surrounding the job, and intrinsic motivation, arising from the work itself, are each positively associated with employees' IWB and whether either form stands out as the stronger correlate. Both hypotheses were supported. Extrinsic motivation (β = .340) and intrinsic motivation (β = .239) were positively associated with IWB when modeled simultaneously, jointly accounting for 21.8% of its variance, and the numerically larger coefficient of extrinsic motivation did not differ significantly from that of intrinsic motivation. The pattern suggests that employees who feel motivated by a comfortable, restful and collaborative work context and by recognition, learning and satisfaction in their work also report more innovative behavior, and that the two forms of motivation coexist rather than substitute for each other.

The Roles of Extrinsic and Intrinsic Motivation

The positive association between extrinsic motivation and IWB (H1; $f^2 = 0.136$) indicates that the conditions surrounding the job matter for discretionary, improvement-oriented behavior. IWB is effortful and can heighten exhaustion (Segarra-Ciprés et al., 2026), so a comfortable workplace and adequate time to rest may protect the energy it requires, while supportive colleagues and effective collaboration supply the exchange of knowledge and the sponsorship through which ideas are promoted and realized (Campodonico & Guevara, 2026; Li et al., 2026). The result parallels the direct link between extrinsic rewards and employee performance reported by Qerimi et al. (2026), the positive effect of extrinsic motivation on the performance of non-academic staff (Muchowe & Rajlal, 2026) and the significant, moderate effect of extrinsic motivation on knowledge sharing found by Mantegh et al. (2026). It also departs from a strict reading of the two-factor theory, according to which hygiene-type conditions prevent dissatisfaction but do not motivate (Herzberg et al., 1959; Muchowe & Rajlal, 2026): in this population, context-related motivation was, if anything, the numerically stronger correlate of IWB. Two cautions apply. First, perceived financial support added no explanatory power for IWB once organizational climate was taken into account (Fominiene et al., 2026), so the extrinsic path may partly reflect a climate in which innovation is valued; the present model contains no climate variable. Second, extrinsic motivation is not benign in every setting. Team leaders' extrinsic motivation, combined with cost-reduction attributions, weakened the effectiveness of high-performance work systems (Wang et al., 2026), and donors who inferred extrinsic motives behind AI-labeled appeals engaged less (Zhao et al., 2026). Those studies concern the motives of leaders or the motives inferred by others, whereas the present measure captures employees' own experience of supportive working conditions.

The positive association between intrinsic motivation and IWB (H2; $f^2 = 0.067$) agrees with evidence that intrinsic motivation supports innovation-related outcomes. In the present operationalization intrinsic motivation combines recognition, ability-matched training, learning opportunities and satisfaction with the work, that is, experiences of competence and of worthwhile effort, and the association is in line with the positive relation between job satisfaction and IWB in earlier studies (Lailla et al., 2025; Nguyen & Vu, 2026). Intrinsic motivation was related to IWB among life-insurance employees in Indonesia with a coefficient of similar size (β = .196; Lailla et al., 2025), it opened the chain from entrepreneurial leadership to IWB in small and medium-sized enterprises (Alshahrani et al., 2026), and it transmitted the effect of leader–member exchange to

organizational innovation (Mollah et al., 2026). Intrinsic motivation has also predicted another discretionary behavior, organizational citizenship, among academics (Malik & Kaur, 2026). The small effect size observed here may reflect, in part, the weaker measurement of this construct (α = .714, AVE = .535), because measurement error tends to attenuate estimated relationships, and the limited variability of the answers, which clustered at the upper end of the scale.

The difference between the two coefficients was not significant (Δβ = .101, 90% CI [−.102, .310]). This agrees with studies that found near-equal effects of the two forms (Mantegh et al., 2026; Urbonavicius et al., 2026) and with evidence that both forms strengthen outcomes within one model (Duong, 2026). Findings elsewhere lean in either direction. Intrinsic motivation had the larger coefficient in two studies that also drew on the two-factor theory, for the job satisfaction of gig workers (Ong et al., 2026) and for the performance of non-academic staff (Muchowe & Rajlal, 2026), whereas the numerical ordering here is reversed, although not significantly. In nature tourism the intrinsic motive of pursuing nature predicted travel satisfaction more strongly (β = .614) than the extrinsic motive of destination attractiveness (β = .207; Gupta et al., 2026), whereas only extrinsic rewards were directly related to employee performance in private-sector firms (Qerimi et al., 2026). Given such differences in outcomes, populations and measures, neither form can be called generally stronger, and the relative weight may depend on workforce characteristics: generational cohort, for example, has been reported to moderate the effects of both forms on performance (Muchowe & Rajlal, 2026).

Theoretical Implications

First, the study contributes to research on motivation and innovation by showing, through the combined lens of SDT and the two-factor theory, that IWB is associated with both context-related and content-related motivation in a single model. SDT implies that supportive conditions help to satisfy the needs for competence and relatedness and thereby foster more autonomous motivation (Gagné & Deci, 2005; Ryan & Deci, 2000a), and the positive correlation between the two motivational constructs (r = .281; HTMT = .372) is consistent with that view, as is the motivational-synergy argument that inputs conveying competence or information can complement intrinsic interest (Amabile, 1993). The data show no sign that stronger extrinsic motivation goes with weaker intrinsic motivation, which a strong substitution account would predict. Crowding-out is, however, a dynamic process that unfolds when incentives are introduced or withdrawn (Hoevel, 2026; Urbonavicius et al., 2026), and a single cross-section cannot capture it.

Second, the study speaks to the two-factor theory. Hygiene-type conditions, here workplace comfort, rest time, collegial support, collaboration and training, were associated with IWB about as strongly as motivator-type experiences, and the difference between the two paths was not significant. This is consistent with Muchowe and Rajlal (2026), who found extrinsic factors to be significant for performance although the theory assigns them a purely preventive role, and it suggests that a strict separation of the two sets of factors should not be assumed for discretionary behaviors such as innovation.

Third, the study complements antecedent-based accounts of IWB. Leadership, human resource systems and climate are usually said to work through employees' psychological states such as creative self-efficacy (Li et al., 2026; Shamaileh et al., 2026), yet motivation is seldom measured directly in both of its forms; Shamaileh et al. (2026) themselves name intrinsic motivation as a construct worth adding to such models. The present results show that directly measured motives carry their own associations with

IWB, and the modest R^2 indicates that motivation should be combined with contextual and cognitive factors rather than replace them. A model with creative self-efficacy, intrinsic motivation and job satisfaction explained 43.3% of the variance in IWB in Indonesia (Lailla et al., 2025), whereas innovation-specific leader behaviors alone explained 7.5% in Germany (Liehr & Hauff, 2025).

Fourth, the study illustrates a transparent way of comparing competing drivers in PLS-SEM: effect sizes and a bootstrap test of the difference between paths, rather than an inference of dominance from the ordering of coefficients.

Practical Implications and HR Implementation

The findings suggest three levers for human resource managers. First, the context of work should not be treated as mere background. Because motivation arising from the work context was associated with IWB about as strongly as motivation arising from the work itself, a comfortable workplace, adequate time to rest, supportive colleagues, structured opportunities for collaboration and training that employees enjoy are worth maintaining deliberately, for example through peer mentoring and cross-team collaboration (Campodonico & Guevara, 2026) and through an innovation climate in which teams support one another (Li et al., 2026). Arrangements that change where and when people work should be designed and evaluated rather than assumed to help: among German knowledge workers working from home, spatial and task flexibility were positively related to IWB but temporal flexibility was negatively related (Brandt & Schmoll, 2026).

Second, the content of work should be built through recognition and development. Recognition, ability-matched training, opportunities to learn and satisfying work were associated with IWB, and private enterprises are advised to combine financial incentives with recognition, autonomy, feedback and development opportunities (Qerimi et al., 2026). Recognition should be framed with care: inputs that convey competence and information are more compatible with intrinsic interest than rewards experienced as controlling (Amabile, 1993), and heavy reliance on extrinsic incentives can erode intrinsic values (Hoevel, 2026). Recognition that is tied to the contribution of ideas, with feedback on how those ideas were used, may therefore be preferable to purely transactional bonuses. Job design that offers autonomy and empowerment is a further lever, although neither was measured here: transformational leadership operated through job autonomy among public employees (Oh & Sabharwal, 2026), and empowerment was related to IWB among women employees (Aldossary & Aldhmour, 2026).

Third, the costs of innovating and the composition of the workforce deserve attention. IWB can raise performance and engagement but also exhaustion (Segarra-Ciprés et al., 2026), so motivational levers should be accompanied by workload monitoring and a supportive climate for innovation (Fominiene et al., 2026; Li et al., 2026). Because the effect of motivation may differ across groups, managers should check how employees in their own setting respond before committing to a single lever. Intrinsic motivation strengthened the effect of HR development practices on work engagement for one of two employee groups but not the other (Sammarra et al., 2026), and for Generation Z employees digital IWB has been linked mainly to psychological and social capital (Kistyanto et al., 2026).

Conclusion

This study examined how extrinsic motivation, arising from the conditions surrounding the job, and intrinsic motivation, arising from the work itself, are associated with employees' innovative work behavior (IWB). Drawing on self-determination theory and Herzberg's two-factor theory, it estimated a PLS-SEM model with census data from all 144 employees of a private-sector population surveyed in 2026. Both forms of motivation were positively and significantly associated with IWB (extrinsic $\beta = .340$; intrinsic $\beta = .239$) and together explained 21.8% of its variance. The extrinsic path was numerically larger, but the difference between the two paths was not statistically significant, so the evidence supports the coexistence of the two motivational forms rather than the dominance of either. For human resource practice, the findings argue for maintaining a comfortable, restful and collaborative work context while providing recognition, ability-matched training and learning opportunities that make the work itself satisfying, and for paying attention to the costs of innovating and to differences between employee groups. Because the design is cross-sectional, based on self-reports and confined to one population, the results describe associations rather than causal effects and cannot be generalized beyond that population; replication with other populations and longitudinal designs is needed.

Limitations and Research Opportunities

Limitations

Several limitations should be acknowledged. First, the study covers a single population of 144 private-sector employees, enumerated in full in 2026. The results therefore describe this population and should not be generalized to other organizations, sectors or countries without replication, and the significance tests are best read as indications of how stable the estimated relations are rather than as inferences from a sample to a larger population. The 144 cases met the power requirements of both hypothesized paths at 80% power but fell short of the 151 cases needed to detect the intrinsic path at 90% power, and they offer little power for subgroup comparisons or for the exploratory test of the difference between paths. Answers also clustered at the upper end of the five-point scale (observed range 2–5; item means 4.10–4.26), which restricts variability and may reflect social desirability. Second, the cross-sectional, self-reported design precludes causal inference and temporal ordering and leaves the results exposed to common method variance despite Harman's test and the full collinearity check (Kock, 2015; Podsakoff et al., 2003). The associations may also run in the opposite direction: employees who innovate may come to enjoy their work more or may receive more recognition. Third, measurement was limited. The scales consist of short statements representing dimensions drawn from the literature, and their psychometric properties beyond the PLS-SEM evaluation reported here have not been tested in other settings. The assignment of dimensions to extrinsic and intrinsic motivation follows a two-factor logic that differs from at least one earlier study, which treats recognition as extrinsic (Muchowe & Rajlal, 2026), so the two labels apply to the operationalization used here. Intrinsic motivation had the lowest reliability ($\alpha = .714$, AVE = .535), and two loadings (IN1 and EX5) fell slightly below .70. Both motivational constructs combine several dimensions in a single reflective composite, so the contribution of individual dimensions cannot be separated and SDT's distinction between types of regulation, such as introjected and identified

regulation, is not captured (Gagné & Deci, 2005; Ryan & Deci, 2000a). IWB was measured with one item for each of its four stages (De Jong & Den Hartog, 2010), so no stage is covered by more than one indicator. Finally, the model explained 21.8% of the variance in IWB, contained no mediators, moderators or control variables, and showed only partly satisfactory fit (SRMR and d_{ULS} above their bootstrapped limits). PLS-SEM prioritizes prediction and offers limited means of evaluating global model fit (Hair et al., 2019; Henseler & Schuberth, 2025). The one-tailed tests used for the directional hypotheses are less conservative than two-tailed tests, although both paths would also be significant in two-tailed tests (two-tailed $p \leq .002$).

Research Opportunities

Future research could proceed in five directions. First, replicating the model across sectors, countries and larger samples would test its generalizability, and comparing employee groups would show whether the weight of each motive differs, for instance by generational cohort (Kistyanto et al., 2026; Muchowe & Rajlal, 2026) or between employee groups (Sammarra et al., 2026). Second, longitudinal, panel or experience-sampling designs could establish temporal ordering and capture crowding-out or synergy dynamics as incentives change (Hoevel, 2026; Urbonavicius et al., 2026), and field or laboratory experiments could manipulate recognition and autonomy, as experiments have done to study motive inferences and intrinsic motivation elsewhere (Tutul et al., 2026; Zhao et al., 2026). Third, richer models could add mediators and moderators that the literature links to IWB: creative self-efficacy (Alshahrani et al., 2026; Li et al., 2026; Shamaileh et al., 2026), job satisfaction (Lailla et al., 2025; Nguyen & Vu, 2026), innovation climate (Fominiene et al., 2026; Segarra-Ciprés et al., 2026), knowledge sharing (Hamid et al., 2026; Li et al., 2026; Mantegh et al., 2026), leader behavior (Kriswijayanto et al., 2026; Liehr & Hauff, 2025; Oh & Sabharwal, 2026) and job crafting (Campodonico & Guevara, 2026; Zografou et al., 2026). Motivation itself could also be positioned as a mediator, as in studies of knowledge transfer and academic performance (Olórtegui-Alcalde & Cordova-Buiza, 2026; Yuqui Ketil et al., 2026), or as a boundary condition, as in work on techno-stressors and task performance (Deng et al., 2026) and on technology engagement (Singh et al., 2026). Fourth, measurement could be refined by testing whether the classification of workplace motivators as extrinsic or intrinsic holds across settings, by modeling the dimensions of each construct separately or as second-order constructs, and with multidimensional instruments, such as the Intrinsic Motivation Inventory used by Tutul et al. (2026), which separates interest, perceived competence, effort, perceived choice and pressure, and with push-and-pull distinctions between internal and external motives (Gupta et al., 2026). Finally, factor-based PLS or covariance-based SEM could be used alongside composite-based PLS-SEM to examine global fit (Henseler & Schuberth, 2025).

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