

Intrinsic and extrinsic reward synergies for innovative work behavior among South African knowledge workers

Aveshan Venketsamy and Charlene Lew
*Gordon Institute of Business Science, University of Pretoria,
Sandton, South Africa*

Reward synergies for innovative work behavior

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Abstract

Purpose – The purpose of this paper is to investigate whether organizational support for innovation and informational extrinsic rewards moderate the relationship between intrinsic motivation and innovative work behavior.

Design/methodology/approach – Multiple and hierarchical regression analyses based on data from 150 knowledge workers tested the hypotheses for a South African sample.

Findings – The results confirmed a positive relationship between intrinsic motivation and innovative work behavior, and found positive relationships between both organizational support for innovation and informational extrinsic rewards and innovative work behavior. While organizational support positively moderated the relationship between intrinsic motivation and innovative work behavior, acting in synergy with intrinsic motivation, informational extrinsic rewards had a negative moderating effect.

Practical implications – When organizations want to encourage knowledge workers to generate, promote and realize innovative ideas, they should create an environment that encourages autonomy, competence and relatedness, with support for creativity and differences of ideas.

Originality/value – The study provides new indications of the interactions of synergistic extrinsic rewards and intrinsic motivation to affect innovative work behavior.

Keywords Intrinsic motivation, Organizational support, Extrinsic rewards, Innovative work behavior

Paper type Research paper

Introduction

Personnel can play an important role in creating and implementing new ideas to sustain business success (Devloo *et al.*, 2015), therefore it is important for organizations to understand the factors that result in innovative work behaviors (Saether, 2019; Shanker *et al.*, 2017). Innovative efforts are fuelled by the development and use of knowledge in tasks, especially amongst knowledge workers (De Jong and Den Hartog, 2007).

Innovative work behavior is a multi-stage, interrelated behavioral process that involves the creation, promotion and implementation of innovative ideas (Pieterse *et al.*, 2010; Saether, 2019). It involves discretionary employee actions that are not acknowledged by formal reward systems (Janssen, 2000) and thus rely on intrinsic motivators. Nonetheless, innovative work behaviors are linked to job performance, therefore rewarding these behaviors may enhance individual innovation (Ramamoorthy *et al.*, 2005). For this reason, it is critical for

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organizations to understand how they can promote the innovative work behavior of intrinsically motivated knowledge workers.

Recent research on the antecedents of innovative work behavior abounds, and has focused on a wide range of determinants such as cognitive processes (Kmieciak, 2021), psychological processes including self-efficacy (Bak *et al.*, 2022; Nilasari *et al.*, 2022) and psychological thriving (Kim and Beehr, 2022), interpersonal processes of knowledge sharing (Abualoush *et al.*, 2022) and organizational practices such as job design (Almahamid and Ayoub, 2022) and support for creativity (El-Kassar *et al.*, 2022). Because the research domain of innovative work behavior is extensive, we limit the scope of this research to the interaction of intrinsic and extrinsic motivating factors of innovative work behavior.

From the individual perspective, an employee's intrinsic interest in a task is positively related to innovative work behavior (Devloo *et al.*, 2015). Even though research has found this positive effect (Devloo *et al.*, 2015; Saether, 2019; Yidong and Xinxin, 2013), its interaction with organizational factors to promote innovative work behavior is largely unexplored. To increase the understanding of the relationship between intrinsic motivation and innovative work behavior, this study examines two organizational factors.

Firstly, the environment that the organization creates to support innovation is important for influencing organizational performance (Shanker *et al.*, 2017). This is termed "organizational support for innovation", and refers to support that encourages creativity to bring about positive change (Yuan and Woodman, 2010). More recent literature begins to show the significance of organizational-level mechanisms, such as job and social resources (Afsar and Umrani, 2019), and organizational identification (Mazumder *et al.*, 2022) in developing innovative work behavior. Our study investigates whether and how organizational support for innovation interacts with intrinsic motivation to predict innovative work behavior.

Secondly, Amabile and Pratt's (2016) componential framework of creativity shows that some forms of extrinsic rewards may act in synergy to intrinsic motivation to promote an individual's creativity. These "synergistic extrinsic rewards" are informational in nature, and according to Amabile and Pratt (2016) are complementary to intrinsic motivation. Hence, our study is one of the first to investigate the direct effect of these rewards on innovative work behavior, as well as their interaction effect on the relationship between intrinsic motivation and innovative work behavior. Previous research also indicates that a supportive work environment, which includes both management and co-worker support, interacts with enabling human resource practices to encourage innovative work behavior (Ma Prieto and Pilar Pérez-Santana, 2014).

Self-determination theory (Ryan and Deci, 2000) explains the intrinsic and extrinsic mechanisms through which innovative work behavior occurs, but research has not yet shown how extrinsic recognition, rewards and organizational support for innovation, interact with intrinsic motivation to predict innovative work behavior.

This paper takes the stance that the relationship between intrinsic motivation and innovative work behavior can be influenced by both organizational support for innovation and informational extrinsic rewards. This study thus offers a new perspective on the combined intrinsic and extrinsic antecedents of innovative work behavior based on self-determination theory. The findings have practical value since innovative behavior supports organizational adaptability in a context of change and complexity (Shanker *et al.*, 2017). A deeper understanding of the interaction of intrinsic and organizational motivators of innovative work behavior may further strengthen organizational performance.

Theoretical background and hypotheses

Intrinsic motivation and innovative work behavior

Innovative work behavior is concerned with the intentional creation of ideas and the implementation of those ideas by individuals to improve processes, products or services (De Jong and Den Hartog, 2010; Yidong and Xinxin, 2013). This behavior includes the introduction of ideas (“idea generation”), obtaining the necessary support and acceptance of those ideas (“idea promotion”), and then finally materializing those ideas by implementing them (“idea realization”).

Research suggests multiple organizational antecedents of innovative work behavior. Transformational leadership (Afsar and Umrani, 2019; Khalili, 2016; Pieterse *et al.*, 2010), as well as inclusive leadership (Javed *et al.*, 2019), have positive effects on innovative work behavior. Person–organization fit, or the match between the organization and an individual’s capabilities and personality, also relates positively to innovative work (Afsar and Badir, 2016; Saether, 2019). Positive leader–member exchange coupled with psychological empowerment leads to engagement with the creative process and ultimately innovative work behavior (Bibi and Afsar, 2018).

Literature on the relationship between organizational support and innovation is emergent. Khalili (2016) found a positive moderating effect of organizational support on the transformational leadership and innovation relationship for an Iranian sample. Work motivation, including intrinsic motivation (Devloo *et al.*, 2015; Yidong and Xinxin, 2013), identified motivation (Saether, 2019) and psychological empowerment (Afsar and Badir, 2016; Bibi and Afsar, 2018; Pieterse *et al.*, 2010) may be antecedents to innovative work behavior. Intrinsic motivation is central to this study and is elaborated upon further.

Self-determination theory holds that people are motivated by intrinsic factors based on their psychological needs for autonomy, competence and relatedness, or extrinsically from external sources. Intrinsic motivation is a sub-component of self-determination theory because it is concerned with an individual’s personal interest and satisfaction that motivates them to perform an action, thus allowing them to become self-determined as their needs are fulfilled (Ryan and Deci, 2000). One of the assumptions of self-determination theory is that an individual’s motivation varies in the degree to which the individual is autonomous versus controlled (Gagné and Deci, 2005). Intrinsic motivation relates to autonomy needs. In workplace settings, employees are empowered by intrinsic motivation to be creative (Auger and Woodman, 2016) and productive (Dewett, 2007). Creativity forms part of the multi-stage process of innovative work behavior (Saether, 2019).

The intrinsic motivational drivers for individual innovation mentioned by Ramamoorthy *et al.* (2005) have a positive effect on innovative work behavior (Devloo *et al.*, 2015; Saether, 2019; Yidong and Xinxin, 2013; Yuan and Woodman, 2010). These findings relate to specific groups (Yidong and Xinxin, 2013), as Devloo *et al.* (2015) used data from engineering personnel, Saether (2019) from research and development employees, and Yidong and Xinxin (2013) from diverse employees. Therefore, studying the relationship between intrinsic motivation and innovative work behavior for diverse samples is encouraged (Saether, 2019). The below hypothesis is therefore posited:

- H1. Intrinsic motivation is positively associated with knowledge workers’ innovative work behavior.

Organizational support for employee innovation

An organization’s support for innovation is based on the perceptions of its employees. Organizations should therefore aim to cultivate an innovative atmosphere by allowing for creativity and tolerating differences (Scott and Bruce, 1994; Yuan and Woodman, 2010). Leaders become instrumental in driving this support and De Jong and Den Hartog (2007)

found that they have an influence on individual innovation. Despite the scarcity of empirical studies on the effects of organizational support on individual innovative work behavior, [Scott and Bruce \(1994\)](#) and [Khalili \(2016\)](#) found that organizational support for innovation has a positive effect on innovative work behavior.

When an organization creates an environment that supports innovation and tolerates differences, employees feel psychologically safe ([Yuan and Woodman, 2010](#)). Organizational support for innovation also reduces concerns about image risks, which in turn encourages innovative behavior ([Yuan and Woodman, 2010](#)). In contrast, the absence of organizational support may lead to personnel withholding innovative efforts. Thus organizational support reinforces creativity and tolerates differences ([Khalili, 2016](#)), which in turn fosters openness ([De Jong and Den Hartog, 2007](#)) and allows organizations to be responsive to change. The below hypothesis is therefore posited:

H2a. Organizational support for innovation is positively associated with knowledge workers' innovative work behavior.

A qualitative study by [De Jong and Den Hartog \(2007\)](#) found that leaders should give ample autonomy to employees who are conducting a task and also provide support in order to increase individual innovation. [Gagné and Deci \(2005\)](#) proposed that organizations can bolster intrinsic motivation by providing a degree of autonomy to individuals, which will lead to an increase in individual innovation ([Saether, 2019](#)). Given this, it may be argued that organizational support for innovation can enhance the positive effect that intrinsic motivation has on innovative work behavior, however this synergistic and moderating relationship has yet to be studied. This study thus aims to fill this gap. Since it is known that intrinsic motivation has a positive effect on innovative work behavior ([Saether, 2019](#)), and since it is known that organizational support positively relates to innovative work behavior ([Khalili, 2016](#)), it is hypothesized that:

H2b. Organizational support for innovation strengthens the association between knowledge workers' intrinsic motivation and innovative work behavior.

Informational "synergistic" extrinsic rewards

Informational extrinsic motivators are organizational actions that provide recognition for a job well done, as well as encouragement to perform activities ([Malik et al., 2015](#)). As opposed to controlling or coercive factors, informational extrinsic motivators offer information that build self-determination ([Deci and Ryan, 1985](#)). These motivators work in synergy with intrinsic motivation to enhance creativity ([Amabile and Pratt, 2016](#)). The reward for extrinsic motivation lies in an outcome, rather than in the activity itself ([Ryan and Deci, 2000](#)). Extrinsic motivators in an organizational context can either have a financial or non-financial source ([Malik et al., 2015](#)). According to [Gagné and Deci \(2005\)](#), external motivators or tangible rewards undermine intrinsic motivation as they externalize one's locus of control. However, [Malik et al. \(2015\)](#) found that an internal locus of control enables extrinsic motivators to increase the intrinsic motivation to be creative. There are clearly boundary conditions under which extrinsic motivation complements intrinsic motivation ([Baer, 2012; Amabile and Pratt, 2016](#)). This notion is central to this part of the study on motivational synergy with innovative work behavior.

Cognitive evaluation theory posits that individual feelings of competence (self-efficacy) and autonomy (self-determination) are central to maintaining intrinsic motivation if extrinsic motivators are used ([Deci et al., 2017](#)). Thus, extrinsic rewards weaken intrinsic motivation and creativity only when a reduction in self-control occurs ([Gagné and Deci, 2005](#)). Additional research affirms that extrinsic rewards have a negative effect on creativity ([Burroughs et al., 2011](#)), however creativity must not be confused with innovative work behavior

(Saether, 2019); innovative work behavior includes creativity but incorporates idea promotion and implementation as well.

Amabile and Pratt (2016) explained that “informational” extrinsic motivators support intrinsic motivation by confirming a person’s competence. Therefore, the authors modified their componential framework of creativity to include synergistic extrinsic motivation together with the original intrinsic motivation. Amabile and Pratt (2016) proposed that rewards that confirm competence and recognition, as well as encouragement, are types of synergistic extrinsic motivators. Given this, it may be argued that these types of extrinsic rewards are not only beneficial for those conducting uncreative or mundane tasks (Malik *et al.*, 2015), but also for knowledge workers who are central to innovation (De Jong and Den Hartog, 2007).

The direct effects of extrinsic rewards are mostly studied in relation to creativity (Malik *et al.*, 2015) rather than innovative work behavior. One study that examined financial extrinsic rewards in relation to innovative work behavior found no significant effect (De Spiegelaere *et al.*, 2018). In contrast, Gupta (2020) showed that financial extrinsic rewards negatively affect innovative work behavior.

While it is known that the symbolic meaning of financial incentives relates to the innovative work behavior of knowledge workers (Tsai, 2018), extrinsic rewards are not uniform in their effect. Zhou *et al.* (2011) found that financial extrinsic rewards, but not excessive financial rewards, encourage innovative behavior. Malik *et al.* (2015) found positive relationships between both financial and non-financial extrinsic rewards (including items of recognition) and employee creative performance only when creative self-efficacy and the personal importance of the reward were used as moderators.

The direct relationship between informational extrinsic rewards (recognition and encouragement) and innovative work behavior has not yet been studied. In keeping with the analysis by Amabile and Pratt (2016), and since creativity forms part of innovative work behavior, the below hypothesis is postulated:

H3a. Informational “synergistic” extrinsic rewards (recognition and encouragement) are positively associated with knowledge workers’ innovative work behavior.

Given the notion of the potential synergistic relation between extrinsic motivators and intrinsic motivation in creativity (Amabile and Pratt, 2016), this interrelation should also be studied in for innovative work behavior. Since intrinsic motivation has a positive effect on innovative work behavior (Saether, 2019), and since informational rewards affect creativity (Amabile and Pratt, 2016), one may hypothesize that:

H3b. Informational “synergistic” extrinsic rewards (recognition and encouragement) strengthen the relationship between knowledge workers’ intrinsic motivation and innovative work behavior. Figure 1 displays all the hypothesized relationships.

Method

Sample and data collection

Due to the incomplete list of the population of knowledge workers in South Africa, the study made use of non-probability sampling (Hair *et al.*, 2019) to select participants. Snowball sampling within the professional networks of the researchers assured the heterogeneous representation of knowledge workers from multiple industries. Knowledge workers refer to personnel involved in knowledge-related work and tasks that require developing and using knowledge, as opposed to doing repetitive tasks (Drucker, 1999). Knowledge workers were identified through job ranking, which included skilled workers, technical and academically qualified personnel, specialists, middle management, senior management and top management.

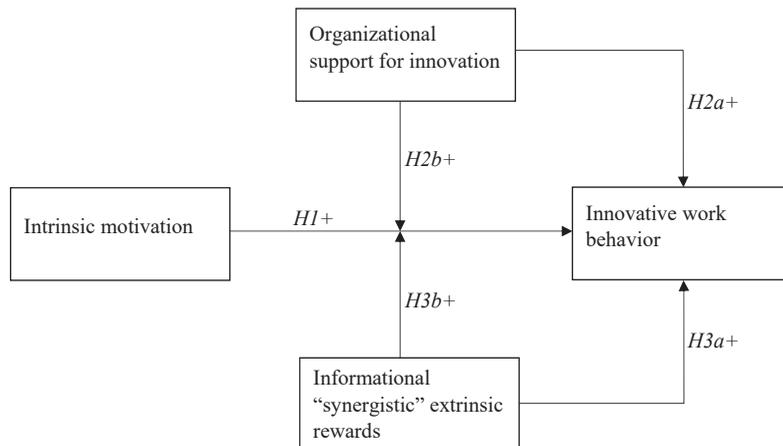


Figure 1.
Research model

Making use of an electronically distributed survey in Google forms, data were collected from 213 skilled knowledge workers employed in firms in South Africa. After the exclusion of unreliable response patterns, 150 usable responses were retained.

The final sample represented diverse industries, with the majority coming from the electricity, gas and water, manufacturing, mining and financial services sectors. All the respondents were knowledge workers: 46% were professionally qualified and experienced specialists, 25% were skilled workers, a further 25% were in senior management roles and 5% were in the top management level in their organization. A total of 67% had more than 10 years of work experience.

The sample consisted of 34% female and 64% male respondents. A large portion of the sample (85%) were aged between 26 and 45 years. The educational background of the respondents was diverse; 65% respondents had postgraduate degrees and 21% had undergraduate degrees (see Table 1).

In terms of quality measures, the sample size of 150 respondents fell within the required sample size of 137–154 respondents to allow for the measurement and detection of larger interaction effect sizes with statistical power of around 90% (Dawson, 2014). Moreover, to control for common method variance typical of self-reported responses, the anonymity and confidentiality of responses were ensured (Saether, 2019). The clarity of questionnaire items was improved following a pilot study (Podsakoff *et al.*, 2003).

Measures

All measurement items were adopted from established scales with adequate validity and reliability, and Cronbach's alpha measures of internal consistency were above 0.7 (Hair *et al.*, 2019). All study variables besides demographic variables were measured on a seven-point Likert-type scale. The independent variable scales ranged from strongly disagree to strongly agree, while the dependent variable scale ranged from never to always.

Innovative work behavior: Innovative work behavior was measured with a nine-item scale used by Janssen (2000). The scale reflects on the three stages of innovative work behavior, namely idea generation, promotion and realization (Janssen, 2000). This scale relies on the self-reporting of the respondents' innovative activities. Saether (2019) indicated that self-reported measures for innovative work behavior may be preferable as individuals are aware of their own innovative activities. Sample items included: How often do you – "Create new

Industry	Construction	4	3%
	Education	6	4%
	Electricity, gas and water	37	25%
	Financial and insurance	22	15%
	Government	8	5%
	Information and communication	4	3%
	Manufacturing	28	19%
	Mining and quarrying	21	14%
	Professional, scientific and technical	7	5%
	Transport and storage	3	2%
	Other	10	6%
Age	22–25	3	2%
	26–30	21	14%
	31–35	52	35%
	36–45	54	36%
	46–55	9	6%
	56+	8	5%
Gender	Male	96	64%
	Female	51	34%
Education	School leaving certificate	4	3%
	Higher certificate	2	1%
	National diploma	15	10%
	Undergraduate degree	31	21%
	Honors degree or post graduate diploma	67	45%
	Masters degree	29	19%
	Doctoral degree	1	1%
Career level	Skilled worker	37	25%
	Senior management	37	25%
	Professional/specialist	69	46%
	Top management	7	5%
Work experience	1–3 years	2	1%
	3–5 years	15	10%
	5–10 years	32	22%
	10–15 years	51	35%
	>15 years	48	32%

Table 1. Sample characteristics

ideas for difficult issues?” and “Transform innovative ideas into useful applications?” The Cronbach’s alpha for the scale in this study was 0.90, compared to the 0.95 and 0.96 alphas of the original sample (Janssen, 2000).

Intrinsic motivation: Intrinsic motivation was measured using a five-item scale adapted from Yuan and Woodman (2010) instead of the three-item scale used by Yidong and Xinxin (2013), which originated from Tierney *et al.* (1999). It must be noted that the scale used the word “products’ in some items, but as innovation is not limited to the development of products (Kahn, 2018), the words “processes’ and “services’ were added to these questions. Sample items included: “I enjoy finding solutions to complex problems” and “I enjoy coming up with new ideas for processes, products or services”. The Cronbach’s alpha for this scale was 0.83, compared to the alpha of 0.74 for Tierney *et al.’s* (1999) assessment.

Organizational support for innovation: The organizational support variable was measured using a thirteen-item scale adapted from Yuan and Woodman (2010), which had been adapted from research conducted by Scott and Bruce (1994). This scale measures an organization’s support for innovation through two sub-dimensions, “support for creativity” and “tolerance of differences” (Scott and Bruce, 1994). All 13 items loaded on a single factor in the study by Scott and Bruce (1994), however Yuan and Woodman (2010) found that a two-factor model

fitted their data better when conducting a confirmatory factor analysis (CFA). Contrary to the research by [Yuan and Woodman \(2010\)](#), a CFA for this sample yielded a one-factor model which fitted the data better ($\chi^2 = 81.52$, $df = 40$, $p = 0.00$, $\chi^2/df = 2.04$, CFI = 0.97, RMSEA = 0.08). During the pilot study, some respondents did not understand items that included the word “here”. For example, one of the items read “creativity is encouraged here”. To clarify the item, the word “here” was replaced with “in my organization”. Sample items thus included: “Creativity is encouraged in my organization” and “Our ability to function creatively is respected by the leadership”. The Cronbach’s alpha for this scale was 0.94, which is comparable to the alpha of 0.92 in [Yuan and Woodman’s \(2010\)](#) study.

Informational “synergistic” extrinsic rewards: Extrinsic rewards for performing innovatively is underexplored in innovative work behavior literature, however a study conducted by [Malik et al. \(2015\)](#) provided a validated and reliable scale. Six items were adopted from this scale, which represented only the non-controlling informational type rewards that are linked to recognition and encouragement. Sample items included: “I get recognized by my supervisor when I suggest new ideas for tasks, processes, products or services” and “I receive encouragement by my supervisor when I am working on new ideas”. The Cronbach’s alpha was 0.90 for the scale in this study, compared to the alpha values of the full scale of 0.85 ([Malik et al., 2015](#)).

Control variables: Three control variables were coded and used in this study which were also used in previous innovative work behavior research ([Gupta, 2020](#); [Saether, 2019](#); [Yuan and Woodman, 2010](#)). These were the qualification level (education level) of each respondent, their current job level and their total work experience.

Results

Data quality

Firstly, to address any potential statistical biases in the study, common method bias was excluded through Harman’s one-factor test ([Podsakoff et al., 2003](#)). Accordingly, the test indicates common method bias if a single factor accounts for the majority of covariance among the measures, but with the total variance explained of 34.01% being far less than the widely used threshold of 50% in this study, we could exclude the possibility of common method bias in the data ([Hair et al., 2019](#)).

Construct validity ([Li et al., 2010](#)) was established through bivariate correlation analysis and CFA. All items per scale correlated significantly with their respective item total score ($p = 0.00$). Items 4 and 12 of the original Organizational Support scale did not meet the minimum 0.3 reliability threshold ([Hair et al., 2019](#)) for eight of the 12 intercorrelations.

Through CFA, overall model fit was evaluated against fit indices including root mean square error of approximation (RMSEA), normed chi-squared (χ^2/df) and the comparative fit index (CFI). Convergent validity was found for all items with standardized factor loadings above 0.4, except for items 4 and 12 of the Organizational Support scale, which were then removed. Discriminant validity was established through average variance extracted for each latent variable (above 0.5), which were higher than the squared correlations between factors ([Hair et al., 2019](#)). The CFA results indicated a good fit to the data ($\chi^2 = 736.52$, $df = 421$, $p = 0.00$, $\chi^2/df = 1.75$, CFI = 0.91, RMSEA = 0.07).

Descriptive statistics, correlations and regression results

[Table 2](#) represents the measurement scale means, standard deviations and the inter-scale correlations. The control variable qualification level was significantly correlated to the dependent variable, but job level and work experience had no effect. Two of the main independent variables, organizational support and informational extrinsic rewards, had

significant correlations, with no issues of collinearity ($VIF = 1$). A significant correlation between intrinsic motivation and organizational support were included as interactions in [hypothesis 2b](#), with no issue of collinearity ($VIF = 1$).

A summary of the results of the hypotheses testing for this study is depicted in [Table 4](#). [Hypothesis 1](#) proposed that intrinsic motivation is positively related to innovative work behavior, with data analyzed through a weighted least squares regression analysis approach. As reported in Model 1 ([Table 3](#)), intrinsic motivation had a significant direct effect on innovative work behavior ($b = 0.73, p = 0.00$), which provides support for [Hypothesis 1](#). The effect size in Model 1 was 0.36, denoting a large effect ([Hair et al., 2019](#)). The results supported [hypothesis 2a](#) for Model 2, as organizational support predicted innovative work behavior ([Table 3](#)), indicating that a significant direct effect exists ($b = 0.36, p = 0.00$). This model's effect was large: $f^2 = 0.38$. Support for [hypothesis 3a](#) (Model 3, [Table 3](#)) was also indicated by the significant direct effect of informational extrinsic rewards on innovative work behavior ($b = 0.35, p = 0.00$), with a large effect size ($f^2 = 0.41$). In all three models, the qualification level control variable had a significant positive effect on innovative work behavior (Model 1: $b = 0.27, p = 0.00$; Model 2: $b = 0.26, p = 0.001$; Model 3: $b = 0.23, p = 0.003$).

Variable	Mean	SD	1	2	3	4	5	6
1. Qualification	4.65	1.12						
2. Job level	2.09	0.83	0.38**					
3. Total experience	3.86	1.02	0.17*	0.49**				
4. Intrinsic motivation	6.28	0.72	0.07	0.12	-0.04			
5. Organizational support	4.40	1.34	-0.00	0.09	0.06	0.17*		
6. Informational extrinsic rewards	4.19	1.48	0.97	0.17*	0.14	0.12	0.69**	
7. Innovative work behavior	4.68	1.09	0.27**	0.16	0.12	0.33**	0.44**	0.49**

Note(s): $N = 150$ * $p < 0.05$; ** $p < 0.01$; SD, standard deviation

Table 2. Means, standard deviations and correlations of the variables

Variables	Dependent variable: Innovative Work Behavior				
	Model 1	Model 2	Model 3	Model 4	Model 5
1. Qualification	0.27***	0.26**	0.23**	0.25***	0.24**
2. Job level	-0.07	-0.02	-0.03	-0.07	-0.05
3. Total experience	0.16	0.06	0.03	0.09	0.01
4. Intrinsic motivation	0.73***			0.52***	0.50***
5. Organizational support		0.36***		0.28***	
6. Informational extrinsic rewards			0.35***		0.35***
7. Intrinsic motivation × Organizational support				0.25*	
8. Intrinsic motivation × Informational extrinsic rewards					-0.24**
R^2	0.27***	0.27***	0.29***	0.36*	0.39**
R^2_a	0.25***	0.25***	0.27***	0.33*	0.37**
$\Delta R^{2\ddagger}$				0.03*	0.03**
f^2^*				0.04	0.05
f^2^{\S}	0.36	0.38	0.41	0.56	0.64

Note(s): $N = 150$ * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

† The ΔR^2 for when the interaction term XZ was added to the hierarchical regression model

* The effect size of the moderation

§ The effect size of the model (models 4 and 5 represent the final model after the interaction term was added in)

Table 3. Results of the regression analyses

Table 4.
Summary of
hypotheses tests

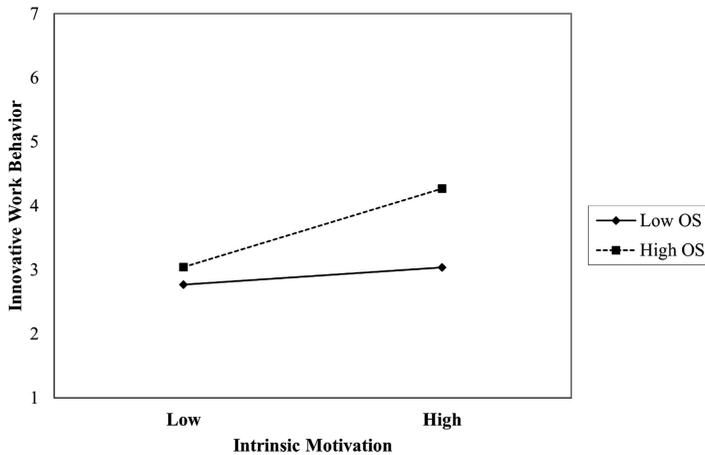
Hypothesis	Result
H1: Intrinsic motivation is positively related to innovative work behavior	(Supported, $b = 0.73$, $p = 0.00$)
H2a: Organizational support for innovation is positively related to innovative work behavior	(Supported, $b = 0.36$, $p = 0.00$)
H2b: Organizational support for innovation positively strengthens the relationship between intrinsic motivation and innovative work behavior	(Supported, $b = 0.25$, $p = 0.016$)
H3a: Informational “synergistic” extrinsic rewards (recognition and encouragement) is positively related to innovative work behavior	(Supported, $b = 0.35$, $p = 0.00$)
H3b: Informational “synergistic” extrinsic rewards (recognition and encouragement) positively strengthens the relationship between intrinsic motivation and innovative work behavior	(Not supported, $b = -0.24$, $p = 0.007$)

In the hierarchical regression analysis for testing hypotheses 2b and 3b, the interaction terms were entered after introducing the control variables, intrinsic motivation and the respective interactor variables. The interaction terms were mean-centered to avoid multicollinearity (Dawson, 2014). Hypothesis 2b proposed that organizational support positively interacts with intrinsic motivation to predict innovative work behavior by strengthening their relationship. The results (Model 4, Table 3) confirmed that organizational support positively predicts innovative work behavior with the inclusion of intrinsic motivation ($b = 0.28, p = 0.00$), and it significantly moderates the relationship between intrinsic motivation and innovative work behavior ($b = 0.25, p = 0.016$).

The positive unstandardized beta coefficient showed that the effect of intrinsic motivation on innovative work behavior will increase with increasing organizational support. The moderation effect size ($f^2 = 0.04$) was small. Previous studies on moderation research involving individual innovation reported very low but significant ΔR^2 values when adding the interaction term (Pieterse *et al.*, 2010; Zhou *et al.*, 2011); these low values are typical for management studies (Dawson, 2014). The simple slopes analysis (Malik *et al.*, 2015) in Figure 2 indicates that the relationship between intrinsic motivation and innovative work behavior is positive for employees with high organizational support ($b = 0.85, p = 0.00$), while the relationship is insignificant for those with low organizational support ($b = 0.19, p = 0.15$). The slope of the low organizational support line in the graph is therefore not statistically significant from zero ($t = 1.20, p = 0.23$), while the slope of the high organizational support line is statistically significant from zero ($t = 7.16, p = 0.00$). Thus, intrinsic motivation has a positive effect on innovative work behavior for those with high organizational support for innovation. This interaction effect provides support for hypothesis 2b.

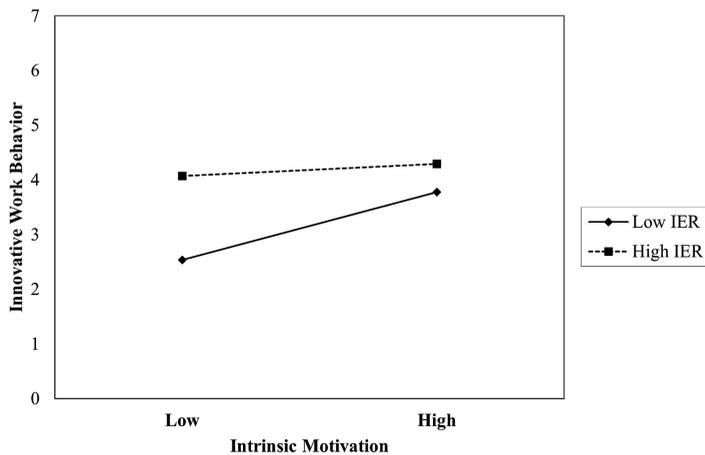
Hypothesis 2b proposed that informational “synergistic” extrinsic rewards positively strengthen the relationship between intrinsic motivation and innovative work behavior. Model 5 (Table 3) shows that these rewards significantly predict innovative work behavior with the inclusion of intrinsic motivation ($b = 0.35, p = 0.00$), and they also significantly moderate the relationship between intrinsic motivation and innovative work behavior ($b = -0.24, p = 0.007$). In this interaction effect, however, the unstandardized beta coefficient was negative, noting that the effect of intrinsic motivation on innovative work behavior decreases with increasing informational extrinsic rewards.

In Model 5, the effect size was between low to medium ($f^2 = 0.05$). The simple slopes analysis shown in Figure 3 reveals that the relationship between intrinsic motivation and innovative work behavior is insignificant for employees with high informational extrinsic rewards ($b = 0.15, p = 0.26$), whereas the relationship is positive for those with low informational extrinsic rewards ($b = 0.86, p = 0.00$). This represents results that are statistically significant from zero for the low informational extrinsic reward line ($t = 6.69$,



Note(s): OS: Organizational support for innovation

Figure 2. Interaction of intrinsic motivation and organizational support (OS) on innovative work behavior



Note(s): IER: Informational extrinsic rewards

Figure 3. Interaction of intrinsic motivation and informational extrinsic rewards (IER) on innovative work behavior

$p = 0.00$), but not the high informational extrinsic reward line ($t = 1.19, p = 0.24$). The interaction suggests that when the level of informational extrinsic rewards is low, intrinsic motivation has a positive effect on innovative work behavior. Given the negative interaction, [hypothesis 3b](#) is not supported.

Discussion and conclusion

This study contributes to showing how intrinsic motivation and extrinsic factors of organizational support, recognition, and encouragement interact as antecedents of innovative work behavior. Specifically, the study finds support for moderating effects of organizational support for motivation and informational extrinsic rewards in the intrinsic rewards-innovative work behavior relationship.

Although previous studies have shown that intrinsic motivation can contribute to innovative behavior at work (Saether, 2019; Yidong and Xinxin, 2013), researchers are still building a picture of the role of extrinsic factors in this relationship. For this reason, this study first investigated whether support for innovation, when defined as organizational support for creativity and difference, can help reinforce this relationship. Secondly, it investigated whether informational extrinsic rewards, specifically recognition and encouragement, which are perceived as synergistic to intrinsic motivation, can strengthen the relationship for knowledge workers.

Three hypotheses focused on determining whether each of the independent variables, i.e. intrinsic motivation, organizational support and informational “synergistic” extrinsic rewards, positively predict innovative work behavior. The findings confirmed that all three variables had a significant positive effect on innovative work behavior. Assessing the interaction effect of organizational support and informational “synergistic” extrinsic rewards on the relationship between intrinsic motivation and innovative work behavior was the primary purpose of this study. The findings indicate that organizational support strengthens the relationship between intrinsic motivation and innovative work behavior. In other words, knowledge workers who see themselves as autonomous, competent and connected with others will bring more new ideas to fruition, especially when the organization supports creativity and tolerates new ideas. Moreover, when the level of informational extrinsic rewards is low for knowledge workers, intrinsic motivation has a positive effect on innovative work behavior. In other words, where recognition and encouragement are low, the relationship between the knowledge workers’ intrinsic motivation and idea generation, production and realization increases in comparison to when it is high. Although this direction was against expectations, literature suggests that extrinsic rewards can undermine intrinsic motivation (Gagné and Deci, 2005) and there are unknown conditions that affect motivational synergy (Amabile and Pratt, 2016), which requires further investigation.

Theoretical implications

The outcomes of this study provide three distinct contributions to the role of motivation in innovative work behavior. Firstly, with relation to self-determination and innovative work behavior theory, the results confirm that intrinsic motivation has a significant positive effect on an employee’s innovative work behavior, as seen in other studies (Saether, 2019; Yidong and Xinxin, 2013). This further substantiates the assumptions in self-determination theory that intrinsic motivation plays a key role in individual innovation (Gagné and Deci, 2005). The findings provide support for the motivating role of autonomy in performance (self-determination theory), with specific emphasis on innovative work behavior. Although not originally postulated, the control variable of qualification level had a positive effect on innovative work behavior. Thus, in this research context, those knowledge workers with higher levels of education exhibited higher levels of innovative work behavior. This suggests that educational level interacts with intrinsic motivation to drive innovative work behavior, which future research can further examine.

Secondly, this study contributes to the understanding of the role of informational extrinsic rewards in the intrinsic motivation and innovative work behavior relationship. The research rested on a hypothesized motivational synergy between intrinsic motivation and informational extrinsic rewards (Amabile and Pratt, 2016). The findings indicate that as a direct path to individual innovation, these rewards of recognition and encouragement have a positive effect on innovative work behavior with a larger effect size than intrinsic motivation.

Contrary to theoretical expectations (Amabile and Pratt, 2016), we found a larger effect for the extrinsic motivators than for the intrinsic motivators of innovative work behavior. The results provide alternative explanations to studies that found no direct relationship between

informational rewards and creativity (Malik *et al.*, 2015). The findings confirm the “synergistic” interaction of these rewards with intrinsic motivation. However, the extrinsic rewards negatively moderate the relationship between intrinsic motivation and innovative work behavior. The moderating effects are significant for high organizational support and for low informational rewards (recognition and encouragement). This result raises questions about further variables in play for the expected synergy between intrinsic motivation and informational rewards. It further substantiates the controlling nature of externally regulated motivation that undermines intrinsic motivation (Deci *et al.*, 2017). Amabile and Pratt (2016) and Gagné and Deci (2005) advocated that for extrinsic motivation to enhance the effects of intrinsic motivation, it needs to serve the purpose of ensuring competence and autonomy, hence the term “synergy”. Autonomy is, however, important in maintaining intrinsic motivation (Zhang and Bartol, 2010), thus the results propose that while these informational rewards, specifically recognition and encouragement, may confirm competence for personnel (Amabile and Pratt, 2016), they may not maintain or promote autonomy, and thus may lead to more controlled motivation (Deci *et al.*, 2017). This is an area for further study.

Finally, this study measured organizational support for innovation through a measure of support for creativity and difference of ideas, to further understand the antecedents of innovative work behavior. The initial results showed that organizational support for innovation has a positive direct effect on innovative work behavior. This adds further empirical evidence to the scarce literature (Khalili, 2016; El-Kassar *et al.*, 2022) on directly relating organizational support for innovation to innovative work behavior. Further to this, the study examined the interacting effects of organizational support in the relationship between intrinsic motivation and innovative work behavior. The results revealed that organizational support for innovation is a positive moderator in the relationship, thus while organizational support positively influences innovative work behavior as a direct effect, it also has an effect in enhancing the relationship between intrinsic motivation and innovative work behavior.

Managerial implications

This study has important implications for managers who wish to foster an environment that increases employees innovative work behavior among knowledge workers. Organizational activities and policies that develop intrinsic motivation, organizational support for innovation and informational extrinsic rewards are likely to result in increased idea generation, promotion and realization among knowledge workers.

Intrinsic motivation can be enhanced by ensuring that a work environment meets the psychological needs of autonomy, competence and relatedness (Deci *et al.*, 2017), i.e. knowledge workers can be given a degree of freedom in the choice of tasks that best suit their interests. De Spiegelaere *et al.* (2014) found a positive relationship between job autonomy and innovative work behavior, and proposed that by allowing a degree of autonomy, employees may be more engaged in the workplace. Regular feedback on the task itself would create transparency and enhance competence (Gagné and Deci, 2005). Organizations can further make tasks more interesting and challenging to enhance intrinsic motivation.

This study also found that informational extrinsic rewards, which provide recognition and encouragement, have a negative moderation effect on the intrinsic motivation and innovative work behavior relationship. Managers would do well to allow the autonomy of knowledge workers, rather than encourage them to come up with new ideas. Informational recognition and encouragement may fail when knowledge workers have high interest in their task, as they may feel controlled rather than autonomous (Deci *et al.*, 2017). Although this research showed that these rewards have a significant positive direct effect on innovative work behavior, exploring the use of these rewards must be in line with an employee’s values

and motivational state (Baer, 2012; Malik *et al.*, 2015). Thus, managers need to understand their employees' motivational attributes, as the use of informational extrinsic rewards may be detrimental to their intrinsic motivation (Baer, 2012).

Finally, an important practical implication in this study is the systems and processes created by organizations that support innovation. Since this support may increase the effect that an employee's intrinsic motivation has on innovative work behavior, organizations should place emphasis on this notion for intrinsically motivated employees by encouraging and supporting creativity. Organizations must also be adaptive and open to change, and be tolerant of the differences in ideas coming from knowledge workers. Leadership is required to encourage innovative work behavior (Saether, 2019), thus leaders should be coached and empowered on how to cultivate a supportive climate within their organizations.

Limitations and recommendations for future research

A few limitations in this study must be considered. First, causality cannot be determined as this study was cross-sectional in nature (Echambadi *et al.*, 2006) and the data analyzed were based on self-reported measures. Future research could employ field experiments or longitudinal studies, additional supervisor and follower ratings, or observations of idea generation, promotion and realization. Future studies on the innovative work behaviors of knowledge workers should also consider the impact of organizational size.

Secondly, this research was one of the first studies to examine the moderating effects of informational extrinsic rewards that were thought to act in synergy with intrinsic motivation in relation to innovative work behavior. Since the results showed that informational extrinsic rewards can counter intrinsic motivation, the study of additional cultural and contextual variables in this relationship could further clarify intrinsic and extrinsic motivation synergies.

Thirdly, future research should include different stages of innovative work behavior. This study, like many others (Devloo *et al.*, 2015; Janssen, 2000; Yidong and Xinxin, 2013), used a one-dimensional measure of the construct. However, since innovative work behavior is a multi-stage process and different motivational types may affect different innovation stages (Amabile and Pratt, 2016), intrinsic and extrinsic motivators should be studied at the various stages of innovation.

Finally, future studies may combine motivational and cognitive antecedents of innovative work behavior. For instance, Kmiecik (2021) showed the importance of processes of critical reflection and unlearning knowledge in innovative work behavior. Likewise, Chen *et al.* (2019) showed the importance of teams' cognitive diversity to bring about innovative work behavior. One may argue that in as far as organizational support involves tolerance of different ideas, it may strengthen the impact of critical reflection on innovative work behavior.

While future avenues for research abound, this study provides useful insights into how organizations can create an environment that is conducive to innovative work behavior, particularly for those who have an intrinsic interest in a task. This research shows that organizational support for innovation positively enhances the effect that knowledge workers' intrinsic motivation has on their innovative work behavior. In addition, this study provides an indication that informational extrinsic rewards, which predict innovative work behavior, can have a negative effect on an employee's intrinsic motivation to innovate.

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Corresponding author

Charlene Lew can be contacted at: lewc@gibs.co.za

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