

# Fostering Innovative Behavior in Health Organizations – a PLS-SEM Analysis of Norwegian Hospital Employees

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## Research article

**Keywords:** Internal market-oriented culture (IMOC), Psychological capital (PsyCap), Individual innovative behavior (IIB), Organizational commitment (OC), Hospital employees

**Posted Date:** August 12th, 2020

**DOI:** <https://doi.org/10.21203/rs.3.rs-45004/v1>

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**Version of Record:** A version of this preprint was published at BMC Health Services Research on May 18th, 2021. See the published version at <https://doi.org/10.1186/s12913-021-06505-1>.

# Abstract

**Background:** Health organization research is experiencing a strong refocus on employees' individual innovative behavior (IIB), revealing that many of its influential factors at work remain uncertain. Hence, this study empirically examines how hospital employees' IIB is fostered by focusing on antecedents such as organizational culture (here labeled an internal market-oriented culture, IMOC), psychological capital (PsyCap), and outcomes such as organizational commitment (OC). In addition, the study examines the mediating role of PsyCap.

**Methods:** The study focused on a sample of 1008 hospital employees, using a partial least squares structural equation modeling method to analyze and test the relationships hypothesized in this study. A multigroup comparison was performed to test the heterogeneity of personal characteristics. The indirect effects of PsyCap were tested by mediator analyses.

**Results:** Our results reveal that IMOC has a positive and significant influence on employees' PsyCap and IIB. PsyCap is directly related to IIB and acts a mediator between IMOC and IIB. Furthermore, the study found that IIB is related to the outcome variable OC.

**Conclusions:** This study extends the current debate on how IIB is fostered at work by examining PsyCap and IMOC as antecedents of IIB. The study has added to the IIB research area by introducing OC as an outcome variable. The study is among the first attempts in its category to contribute to health organizations and managers by empirically examining the influence of IMOC on employees' PsyCap and IIB and in turn their OC.

## Background

Individual innovative behavior (IIB) has been termed "an important asset that enables organizations to succeed in a dynamic business environment" ([1], p. 13). Today, "employees are increasingly expected to actively contribute to their organization's success" ([2], p. 518), such as through idea generation and idea implementation [3]. Idea generation refers to creativity; in contrast, idea implementation refers to IIB and involves the successful implementation of creative ideas and solutions at work [4, 5]. Thus, IIB relies on both the generation of novel ideas (creativity) and their active application at work (innovation). IIB is understood to be the intentional use of a creative idea at work to perform tasks well, benefiting the group and the organization [6].

Worldwide, with the current technological advances and increased performance expectations for hospital employees [7], there has been an apparent increase in challenges faced by health sector organizations [8]. Hospital employees' IIB has been identified as a key factor in increasing innovation at work [7], improving effectiveness and performance [9] as well as efficiency [10]. Therefore, the creative and innovative solutions of hospital employees play a central role in responding to the increasingly challenging circumstances in which health organizations operate today [11].

As the study of IIB steadily gains attention [e.g. 7, 12, 13], some consider that employees' IIB is a key factor in improving overall job performance [10, 14]. We build on this notion by investigating the antecedents and outcomes of IIB among hospital employees. Specifically, this study examines how a supportive organizational culture, here labeled an "internal market-oriented culture" (IMOC), that focuses on hospital employees, affects their psychological capital (PsyCap) and IIB, and how in turn IIB influences their organizational commitment (OC). Therefore, the study contributes important practical knowledge for managers desiring a competitive advantage from their employees.

Despite the criticality of fostering IIB to promote innovation at work, particularly in health organizations [14], few studies have explored its antecedents and outcomes among hospital employees [7, 14]. For instance, Xerri and Brunetto [15] examined the influence of nursing employees' commitment and organizational citizenship behavior on IIB. Slåtten [16] explored the antecedents and effect on IIB of frontline hospital employees' feelings of joy. Moreover, Knol and Van Linge [17] examined the effects of structural and psychological empowerment on nursing employees' IIB. To the best of the authors' knowledge, no previous studies have explored the outcomes of IIB among hospital employees. For that, "the conditions that promote the innovative performance of employees in organizations as well as factors that affect process innovation at the individual level still remain to be explored more in depth" ([7], pp. 2050014-7). Few studies have adequately examined the IIB of hospital employees [7] and even fewer have empirically examined the antecedents and outcomes of IIB in a health sector context [8].

To date, theoretical and empirical studies on the influence of IIB on hospital employees remains limited [10, 14]. This is particularly true in health sector organizations, "where more studies exploring the factors affecting innovative behavior of employees are invoked" ([7], pp. 2050014-8). To the best of the authors' knowledge, no existing research on hospital employees has examined the links between IMOC, PsyCap, and IIB or the relationship between IIB and OC. Hence, this study provides unique contributions to research on health organizations, innovation, and hospital management.

The present study makes three important contributions. First, it contributes new knowledge about fostering IIB in health organizations. Second, it empirically examines the close relationship between hospital employees' perceptions of their organizations' IMOC and their PsyCap and IIB. It offers new insights for health managers into the value of an employee-supportive organizational culture and IMOC to engender positive thoughts and actions. Third, the study contributes unique knowledge on the outcomes of IIB, such as OC. To the authors' knowledge, no previous empirical health organization research has focused on these relationships. Consequently, this paper seeks to provide fresh knowledge on fostering hospital employees' IIB at work.

Next, the paper proposes a conceptual model and relationships followed by the theoretical background and hypotheses. Then, the methodology and results of the partial least squares structural equation modeling (PLS-SEM) analyses are described. The paper concludes with a discussion of the empirical results and their implications for hospital managers, as well as the limitations of the study.

## **Conceptual model**

As illustrated in Figure 1, the conceptual model of this study includes both direct and indirect relationships. Specifically, this study proposes that IMOC is directly connected to PsyCap and IIB, PsyCap is directly related to IIB, IIB is directly related to OC, and PsyCap mediates the relationship between IMOC and IIB. Therefore, Figure 1 depicts the effect of environmental factors such as IMOC on PsyCap, a personal resource. Figure 1 further illustrates how IMOC and PsyCap promote employees' IIB. Further, Figure 1 shows how IIB promotes hospital employees' OC. In addition, in the conceptual model of the study we propose that a personal resource, PsyCap, mediates the relationship between IMOC and IIB.

In the following sections, we discuss each of the elements and hypothesize linkages between them.

### **Individual innovative behavior (IIB)**

IIB is an established and a complex concept [4, 12, 18, 19]. It refers to the adoption, implementation, or use of novel ideas and solutions by employees to solve problems at work [12]. IIB consists of individual behaviors and intentions to generate, promote, and implement novel ideas or solutions at work [6, 20]. Given the crucial role that employees' IIB plays in overall organizational performance [21], success [22], competence [1], and effectiveness [23], fresh knowledge of hospital employees' IIB is vital for modern health organizations to sustain their competitive advantage in the current turbulent environment [7].

Managers can improve their organizations' competitive advantage in various ways [24], one of which is through employees' IIB [25]. For instance, it is advised that health organizations "encourage and develop the innovative potential of all their employees" [7]. In other words, the innovative potential of hospital employees lies in their ability to innovate. Improving their psychological states and the internal culture of the organization are key factors in encouraging innovation, innovativeness, and IIB. This in turn brings fruitful outcomes, such as greater commitment to the organization.

Although the factors shown in Figure 1 have previously been found to be related to innovative behavior [26, 27, 28], determinants (PsyCap, IMOC), and outcomes (OC), hospital employees' IIB has yet to be studied. Furthermore, numerous studies have focused on nurses, [29], doctors [14], or medical students [30] to explore the effects of IIB at work. However, studying IIB from a partial perspective limits our general understanding of its effects on all hospital employees [7]. Carlucci [7] expanded the focus of her study to include all hospital employees, as this study does. By including all employees, regardless of their role, one may capture not only the overall influence of IIB but also the variance in each group (i.e., doctors, nurses, and administrators). Given the important roles of hospital employees in health organizations [14], specifically in terms of overall organizational innovation [7], it is vital to examine the influence of IIB to understand how to engage them actively in innovation processes.

Current empirical evidence shows that the dynamics between employee and organization are far more complex than previously acknowledged [19], in that hospital employees do not always complete tasks in a straightforward fashion [14]. Consequently, Bos-Nehles et al. [18] and Mutonyi et al. [6] argued for further research on IIB at the individual level. Moreover, Slåtten et al. [26] recently called for an empirical exploration of the effects of IMOC on employees' IIB. Thus, there is still a significant gap in our current

knowledge of IIB at work—specifically, the influence of IMOC on employees' PsyCap and IIB, the effect of their IIB on OC, and the mediating role of PsyCap. The following sections will elaborate on the antecedents and the outcomes of IIB, its relationships, as well as the hypotheses proposed in Figure 1.

## **The antecedents of individual innovative behavior (IIB)**

### **Psychological capital (PsyCap)**

Figure 1 indicates that psychological capital (PsyCap) promotes IIB. PsyCap has previously been described as a meaningful and important construct in both psychological and organizational literature [31, 32]. PsyCap is a relatively new recognized concept; its roots are in the positive psychology literature [32]. PsyCap is understood to be “the positive psychological state of the individual towards positive development” ([33], p. 340), characterized by “HERO,” which stands for hope, efficacy, resilience, and optimism. Luthans et al. [34] argue that PsyCap should encompass all of the HERO characteristics to capture employees' positive psychological states fully. For instance, confidence, optimism, perseverance, and resilience are all positive states that can greatly influence employees' capability to innovate. Although PsyCap has previously been studied in the health sector [35, 36], these studies focused strongly on factors such as well-being and burnout [37] as consequences of employees' PsyCap. Other studies have explored PsyCap as a determinant of employees' creativity [38], work engagement [39], and morale [40]. Nonetheless, the psychological state of an employee affects their feelings of psychological safety [33, 40] in promoting their ideas to others or seeking new working methods. Moreover, while examining the links between the PsyCap, social capital, and work performance of service sales representatives, Slåtten et al. [31] found PsyCap to have positive direct and indirect effects on innovative behavior. In addition, examining the role of PsyCap for working adults in the USA, Sweetman et al. [41] found that PsyCap and all its HERO components were positively related to creative performance. Moreover, studying business graduates, leaders, and employees, Lan [27] found PsyCap to be positively related to IIB. However, in this study, the focus on PsyCap was twofold: on the effects of PsyCap on hospital employees' IIB and on employees in the Norwegian context. According to previous studies, there is a positive link between PsyCap and innovative behavior [27, 31, 41, 42]; this study proposes a positive relationship between PsyCap and IIB among hospital employees. This relationship can be formally stated as the following hypothesis:

**Hypothesis 1:** *Psychological capital (PsyCap) is positively related to individual innovative behavior (IIB).*

### **Internal market-oriented culture (IMOC)**

A review by Scott et al. ([43], p. 924) revealed that organizational culture is a key factor “to be wrought alongside structural change in order to deliver improvements in quality and performance.” Therefore, this paper focuses on the importance of promoting a supportive organizational culture in health organizations to influence overall organizational performance and competitive advantage [44, 45]. Specifically, this study examines the value of a supportive organizational culture, IMOC, on employees' IIB at work. Furthermore, research has proposed that (supportive) organizational culture is a key variable in

innovation success [46]. Consequently, there is a need to extend current understanding of how IMOC can be developed and promoted in health organizations.

In this study, IMOC is viewed through a focus on hospital employees. IMOC is a rather new re-conceptualized concept by Slåtten et al. [26], based on an established literature of marketing [47, 48, 49] and organizational culture [50, 51, 52]. IMOC reflects the “more tangible or visible aspects of organizational culture ... the observable norm-based behavior that constitutes organizational culture” ([26], p. 6). Therefore, it is a requirement that employees, especially hospital employees, “are motivated not only by their own sense of self ... but also by the contextual conditions of the organization” ([21], p. 44). Previous research has paid attention to the influence of internal market orientation [53] and organizational culture [54] on IIB. Market orientation, as a form of organizational culture, has traditionally focused on customers [53]. With an internal market orientation, the focus is on employees’ wants and needs [47]. With IMOC, the attention is on “employees’ experience, beliefs, and expectations regarding the degree to which managers actually care about them” ([26], p. 6). Recent research by Slåtten et al. [26] studied the direct and indirect effects of IMOC on organizational attractiveness and found IMOC to be positively related to the attractiveness of organizations to employees. Because it is based on employees’ beliefs and expectations, IMOC can have a great impact on their IIB in the work environment. For instance, previous research has argued that culture relates to and defines employee attitudes and behavior [1, 51, 55]. For this reason, it is reasonable to assume that hospital employees’ perceptions of their organization’s IMOC is closely related to their willingness to implement new ideas and solutions at work. In addition, this study answers the call of Slåtten et al. [45] to explore the role of IMOC in employees’ IIB. Conversely, IMOC is related to whether employees perceive that an organization promotes the implementation of new ideas. Similar to the perceived relationship between a work environment and IIB [6], IMOC can be a powerful determinant of long-term efficiency and performance in an organization.

As IIB refers to the adoption of novel ideas at work [12], the influence of IMOC on employees’ perceptions of their organization being a desirable employer [26] is underestimated. To sustain organizational success and effectiveness in the long term [56, 57], it is essential to explore the potential influences of IMOC on IIB. In other words, a good internal hospital culture that focuses on and cares about its employees can improve its efficiency and performance through its employees’ IIB. This relationship can be formally stated as the following hypothesis:

**Hypothesis 2:** *Internal market orientation culture (IMOC) is positively related to individual innovative behavior (IIB).*

As mentioned above, PsyCap (consisting of HERO attributes) refers to the positive psychological state of individual development. PsyCap is the employees’ evaluation of who they are, their confidence, their dedication to their roles, their level of perseverance in hardships, and their resilience [33]. Based on this evaluation, an employee may develop positive or negative associations, experiences, and attitudes towards their organization’s IMOC, with varying consequences for their work life. To the best of the authors’ knowledge, no previous research has explored the effects of IMOC on PsyCap, especially with a

focus on hospital employees. Consequently, exploring the relationship between IMOC and PsyCap is important, as employees' well-being has a great impact on organizational performance and success [58]. In addition, IMOC has previously been found to add value to employees' positive behaviors [53], showing that overall organizational culture is influential at all levels [59], especially at the individual level [55]. For example, Luthans et al. [60] noted that a strong (internal) organizational culture can influence internal behaviors positively or negatively. In addition, the call to examine the role of IMOC on PsyCap in health organizations "would add knowledge and insight regarding the role and value of IMOC" ([45], p. 178). Consequently, to build trust between the organizational leadership and individual employees, it is necessary to proactively invest in and foster employees' PsyCap. Therefore, it is proposed in this study that there is a positive relation between IMOC and PsyCap. This relationship can be formally stated by the following hypothesis:

**Hypothesis 3:** *Internal market-oriented culture (IMOC) is positively related to psychological capital (PsyCap).*

## **The outcomes of individual innovative behavior (IIB)**

### **Organizational commitment (OC)**

In the literature, two approaches to the study of OC can be found. These are labeled (i) the one-dimensional approach and (ii) the multidimensional approach [61]. The focus of the one-dimensional approach is on the strength of the employees' identification and involvement with the organization [61]. In contrast, in the multidimensional approach, OC is seen as a psychological state consisting of a combination of three factors: affective, continuance, and normative commitment [62, 63]. These three factors are often referred to as the three-component model of OC. A comparison of the popularity of the two types of approaches suggests that the multidimensional approach has been the most frequently used since it was introduced. OC in this study is rooted in the multidimensional approach. There are two main reasons for this choice. First, as mentioned above, this approach is most often used to study the OC of employees. Second, for OC in the multidimensional approach, each of the three components is considered to be a psychological state. Studying it as a trait implies that the OC construct is dynamic rather than static and therefore changeable. This latter aspect is important as it is in line with one aim of this study, i.e., to explore the links between IIB and OC, and specifically whether IIB can have a positive influence on the OC (trait) of employees. Although this study is rooted in the multidimensional approach to OC it includes only one of the three components. Specifically, it focuses on the OC represented by the affective commitment component. The reason for this choice is that affective commitment in its nature and content, in comparison with the other two components, is clearly the most positive. This is true of OC whether from an employee or organizational point of view. Affective commitment refers to a psychological state that binds employees to the organization in a positive manner. Specifically, it is "the employee's positive emotional attachment to the organization" ([64], p. 64). Consequently, OC as an affective component captures a desire-based or "wants to" reason to commit to the organization. Studying OC as an affective component clearly contrasts with the other two components of OC (in the

multidimensional approach): to capture the obligation-based or “has to” (normative) or the “ought to” or cost-based (continuance) commitment [65]. Clearly, it is reasonable to assume that the affective component of OC is the most desirable type because it provides insight into employees’ perceptions of what is “good,” creating positive bonds with the organization. It is therefore not surprising that a substantial amount of research on OC has “centered on the affective component of OC” ([64], p. 66).

As shown in Figure 1, IIB is linked to OC. There are several examples in previous studies exploring the direct or indirect linkages between IIB and OC [28, 65, 66]. However, to the authors’ knowledge, in the domain of health services no study has examined the linkage between IIB and OC. Furthermore, previous studies on the linkage between IIB and OC have limited their focus to OC as an antecedent to IIB. No previous study has examined OC as an outcome of IIB, as this study does. Although several plausible arguments have been proposed in the literature that OC drives IIB, there are good reasons to expect that IIB may also drive OC. This study defines OC as “positive emotional attachment to the organization” ([64], p. 64). Research has shown that emotions are always caused by something or someone [67]. Consequently, there must be one or more identifiable reason(s) for a person’s emotional attachment. Based on this logic, is it natural to expect triggering or motivational factors in the organizational sphere or context that are the true cause of OC. One such factor could be IIB. IIB, as mentioned above, concerns employees’ freedom or autonomy to adopt or implement novel creative ideas to solve problems [22, 68]. Is it reasonable to assume that employees consider this freedom and autonomy to be positive and good? The converse would be a highly specific and controlled work situation where employees had no freedom or autonomy to solve problems creatively. Naturally, employees’ IIB ranges from low to high. However, it is reasonable to assume that the more employees use their ability to experiment and be proactive in finding creative solutions, the more they perceive their organization as an exciting and enjoyable workplace to which they will commit (in a positive way). Consequently, it is expected that IIB is positively associated with OC. This relationship can be formally stated by this hypothesis:

**Hypothesis 4:** *Individual innovative behavior (IIB) is positively related to employees’ organizational commitment (OC).*

### **The mediating effect of psychological capital (PsyCap)**

PsyCap originated in the positive psychology literature [33], and mediation is prominent in psychological research [69]. In addition, it has previously been argued that to capture “the real and true internal mechanism to explain why there is a linkage” ([31], p. S201), certain individual factors need to be included in the equation. For this reason, PsyCap is a proposed mediator between IMOC and IIB. A mediating factor is in an intermediate position between an independent variable and a dependent variable. In Figure 1, PsyCap mediates the relationship between IMOC and IIB. As argued by MacKinnon et al. ([69], p. 594), “attitudes cause intentions, which then cause behavior ... memory processes mediate how information is transmitted into a response.” In other words, employees’ attitudes and beliefs, specifically about IMOC, will predict or influence how they perceive themselves at work, which in turn will influence their response; in this case to implement novel ideas. This also implies that “when cultural



values of an organization match employees' expectations" ([55], p. 3), its positive effect will result in employees feeling more inclined to promote and implement novel solutions. Consequently, the following hypothesis is proposed:

**Hypothesis 5:** *Psychological capital (PsyCap) mediates the relationship between internal market orientation culture (IMOC) and individual innovative behavior (IIB).*

## Methods

Data were collected in February 2020 from an online questionnaire survey of 2000 hospital employees in the inland counties of Norway. The health organization covers over 40 sites, with close to 10,000 employees, and is one of the largest health expert communities in its region. It services both psychiatric and somatic illnesses. Initial contact with the hospitals was sought through the Director of Research (DOR), followed by several meetings and exchanges of emails. With the help of the DOR, an information email was sent to division managers to inform their employees of the study. The survey information and URL were distributed by the DOR through emails to division managers, who passed them to their employees. To maintain participant anonymity and avoid nonresponse bias, the study used a platform called *Nettskjema*. The platform ensured full anonymity, such as automatic deletion of IP addresses when each participant had completed the survey. While there were some minor differences among divisions, it is important to note that the focus of the study is on individual behavior, and not on divisional differences. As such, this study offers fresh insights in analysis focused on the individual level and the issues related to IIB among hospital employees. Through convenience sampling, the study collected a total of 1008 completed questionnaires: a response rate of 50.4%. Of the respondents in the study, 73% were female, reflecting the Norwegian context where the health sector is dominated by female workers and 84% of all employees [70] are women. In this study, about 37% of the hospital employees were under the age of 45, 77% worked full time, and over 55% had been employed at the organization for more than 10 years, amassing considerable work experience. The study's respondents' characteristics are summarized in Table 1.

**Table 1** Personal Characteristics of the Study Sample ( $N = 1008$ )

		%
Sex	Female	73.0
	Male	27.0
Work as:	Nurse	33.0
	Doctor	8.7
	Others (admin. staff, other health professionals, etc.)	58.3
Employed:	Less than 5 years	26.9
	Between 6 and 10 years	18.0
	Between 11 and 20 years	30.3
	More than 20 years	24.8
Part-time or full-time:	Part-time job	22.5
	Full-time job	77.5
Age:	Younger than 45 years	37.3
	Between 46 and 55 years	32.2
	Older than 55 years	30.5

## Instruments

Four main instruments, derived from the current literature, were used to measure the conceptual model of the study (Figure 1): PsyCap, IMOC, IIB, and OC. All participants responded to the validated survey items on a seven-point Likert response scale (1 = strongly disagree to 7 = strongly agree). In addition to survey statements, the demographic characteristics shown in Table 1 were included. As the survey was conducted in the Norwegian language, several workshops with academic experts and employees were held to verify the back translation. Moreover, to ensure quality in the overall research design, two experts in the field, with 34 randomly selected hospital employees, completed a pre-test.

PsyCap was measured using four items adopted from Luthans et al. [33]. IMOC was measured using eight items from Slåtten et al. [26]. IIB was measured using five items from Janssen [71] and Scott and Bruce [4]. Finally, OC was measured using five items from Allen and Meyer [62]. All items used in this study, as summarized in Table 2, were adjusted to the context of hospital employees in inland Norway. In addition, the survey used in this study is part of a larger survey research project focusing on various aspects of employee relations in health organizations. The statements used in this study are appended accordingly (see Appendix 1).

## Table 2 Latent Variables and Claims Used in the Study

Latent variable	Statement label	Statements
Psychological capital (PsyCap)	PsyCap1	I feel confident that I can set goals for myself in my work area.
	PsyCap2	I am optimistic about my future at this organization.
	PsyCap3	When faced with challenges in my job, I can find alternative solutions to them.
	PsyCap4	I can find alternative ways to achieve my goals.
Internal market-oriented culture (IMOC)	IMOC1	Employees have the opportunity to discuss their needs with management.
	IMOC2	Training is seen in the context of individual needs.
	IMOC3	Management spends time talking to their employees when needed.
	IMOC4	Management wants employees to enjoy their work.
	IMOC5	Management shows a sincere interest in any problems faced by employees.
	IMOC6	Management understands that personal problems may affect my performance.
	IMOC7	The division's policies help meet employees' individual needs.
	IMOC8	Management meets regularly to discuss issues related to employees' challenges.
Individual innovative behavior (IIB)	IIB1	I create new ideas to solve problems in my job.
	IIB2	I search out new working methods or techniques to complete my work.
	IIB3	I investigate and find ways to implement my ideas.
	IIB4	I promote my ideas so others might use them in their work.
	IIB5	I try out new ideas in my work.
Organizational commitment (OC)	OC1	I am proud to tell others that I work here.
	OC2	I feel I belong to this organization.
	OC3	I feel personally attached to my organization.
	OC4	I envision a career at this organization.
	OC5	I want to continue my career here.

## Data analysis

PLS-SEM was employed to test the conceptual models and the hypothesized relationships, using SmartPLS 3 software [72]. The first step in evaluating PLS-SEM results involved examining a set of criteria for the measurement model. Reflective measurement model specifications were applied, meaning that the direction of causality is from the constructs to their observed variables or claims. When the measurement model assessment was satisfactory, the next step was to assess the structural model. Then, mediating effects were estimated and analyzed based on the PLS-SEM results. Finally, as robustness checks of the PLS-SEM results, we performed an observed heterogeneity test ([73], ch. 4) and an unobserved heterogeneity test ([73], ch. 5). We followed the “rules of thumb” of Hair et al. [73, 74] to assess the quality of the measurement and structural model results.

## Results

### Measurement model

To assess the reflective measurement model, we examined convergent validity, internal consistency reliability, and discriminant validity. Convergent validity is the extent to which a variable correlates positively with alternative variables used to measure the same construct, and it was evaluated using variable loadings and average variance extracted (AVE). Internal consistency reliability provides estimates of a construct’s reliability based on the magnitudes of the intercorrelations of the observed variables, which were evaluated with composite reliability and Cronbach’s alpha. Discriminant validity is the extent to which a construct is distinct from other constructs and as suggested by Hair et al. [74, 75], this was assessed with the heterotrait–monotrait (HTMT) ratio of correlations between constructs. The test is whether the 95% confidence interval of the HTMT value does not include the value of 1, as was the case for all four constructs in this study (IMOC, PsyCap, IIB, and OC). The remaining “rules of thumb” assessment criteria, all based on Hair et al. [74, 75], are reported in Table 3. As can be seen, all criteria were met, providing evidence of a measurement model that is both reliable and valid.

**Table 3** Results of the Measurement Model for the Constructs of Psychological Capital (PsyCap), Internal Market-Oriented Culture (IMOC), Individual Innovative Behavior (IIB) and Organizational Commitment (OC)

		Convergent validity		Internal consistency reliability		Discriminant validity
Latent variable	Claims label	Indicator reliability	AVE*	Composite reliability	Cronbach's alpha	HTMT criterion*
"Rule of thumb"		Loading >0.7	>0.5	0.7–0.95	0.7–0.95	HTMT interval does not include 1
Psychological capital (PsyCap)	PsyCap1	0.82	0.74	0.92	0.88	Yes
	PsyCap2	0.82				
	PsyCap3	0.89				
	PsyCap4	0.90				
Internal market-oriented culture (IMOC)	IMOC1	0.84	0.73	0.95	0.94	Yes
	IMOC2	0.76				
	IMOC3	0.89				
	IMOC4	0.86				
	IMOC5	0.90				
	IMOC6	0.84				
	IMOC7	0.83				
	IMOC8	0.90				
Individual innovative behavior (IIB)	IIB1	0.85	0.77	0.94	0.92	Yes
	IIB2	0.88				
	IIB3	0.90				
	IIB4	0.88				
	IIB5	0.87				
Organizational commitment (OC)	OC1	0.85	0.72	0.93	0.90	Yes
	OC2	0.88				
	OC3	0.84				
	OC4	0.85				
	OC5	0.83				

\*AVE = Average variance extracted, HTMT = Heterotrait–monotrait ratio of correlations.

## Structural model

Before assessing the structural model, collinearity between the latent variables were examined by looking at the variance inflation factor (VIF) values. All VIF values were lower than 2, indicating no multicollinearity problems. The direct effects in the structural model are shown in Figure 2. All direct effects were statistically significant and positive. The model's in-sample predictive power for the endogenous constructs was examined with the coefficient of determination,  $R^2$ . Based on "the rules of thumb" by Hair et al. [74, 75], the values for PsyCap (0.24) and IIB (0.34) were moderate and weak for OC (0.17).

The standardized path coefficient between PsyCap and IIB was the highest at 0.51, the second highest of 0.49 was between IMOC and PsyCap, and the third highest, 0.42, was between IIB and OC. There was also a statistically significant positive relationship between IMOC and IIB, but it was lower, at 0.13. The findings support all the four proposed direct relationships (see Figure 1) and the hypotheses of this study.

We tested the mediator effect, i.e., whether PsyCap intervenes between IMOC and IIB, and found an indirect effect of 0.25 (Table 4), concluding that PsyCap partially mediated the relationship between IMOC and IIB.

**Table 4** Test of Mediation Effect of PsyCap

Effect <sup>a</sup>	Mediator <sup>a</sup>	Indirect effect <sup>b</sup>	Total effect <sup>b</sup>	VAF <sup>c</sup>	Mediator effect <sup>d</sup>
IMOC → IIB	PsyCap	0.249***	0.383***	0.65	Partial

<sup>a</sup> Latent variables (Internal market-oriented culture (IMOC), Individual innovative behavior (IIB), Psychological capital (PsyCap)).

<sup>b</sup> \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$  are significance levels.

<sup>c</sup> VAF (variation accounted for) is the size of the indirect effect in relation to the total effect.

<sup>d</sup> Almost no mediation effect is observed when VAF is less than 0.20; VAF larger than 0.20 and less than 0.80 can be characterized as partial mediation, and VAF equal to and above 0.80 can be assumed to be full mediation [74].

We tested for observed heterogeneity ([73], ch. 4) by dividing the sample into two groups: those employed at a hospital for 10 years or less and those employed for more than 10 years. We then performed a multigroup analysis/permutation test. For these two groups we found full measurement invariance and no statistically significant differences in the parameters of the structural model, suggesting that the data could be pooled. The test for unobserved heterogeneity using the finite mixture PLS-SEM technique (described in Hair et al. [73], ch. 5) found the optimal number of segments to be one, suggesting that unobserved heterogeneity was not prevalent.

## Discussion

The results of our PLS-SEM analyses revealed four significant findings. First, IMOC was related to both PsyCap and IIB. Second, PsyCap was related to IIB. Third, IIB was related to OC. Fourth, PsyCap partially mediated the relationship between IMOC and IIB. The implications of these findings are discussed below.

### Theoretical implications

First, our finding that PsyCap is positively and significantly related to IIB highlights the importance of employees' positive psychological development. Although the findings are consistent with previous studies of the role of PsyCap on IIB among graduate students [e.g. 27], they did not examine the role of PsyCap among hospital employees or its role on IIB. Additionally, our finding is consistent with those of Sun and Huang [76], who explored the effects of PsyCap on IIB among university teaching staff in China. Furthermore, the findings of Sameer [42] on the role of PsyCap in the IIB of Egyptian professionals was consistent with ours on the relationship between PsyCap and IIB. Consequently, our findings add new knowledge on the contextual aspects of the effects of PsyCap on the IIB of hospital employees in Norway. The findings of this study suggest that in organizations seeking long-term effectiveness and success, innovative employees' IIB will be increased through PsyCap, rather than through prescribed work roles.

Second, our finding that IMOC has a positive and significant relationship with both PsyCap and IIB underscores the relevance of employees' perception of their internal organizational culture. In particular, the visible and tangible characteristics of an organizational culture require not only training and opportunities for employees but also a genuine interest in employees' work life to satisfy their individual needs and wants. Thus, IMOC satisfies the individual employees' wants and needs, as they are motivated by the organizational environment. Although prior research [26] found IMOC to be related to the attractiveness of organizations to employees, it did not examine the role of IMOC in PsyCap nor in the IIB of employees. This study is the first to examine the role of IMOC for all types of health organization employees, complementing previous findings regarding the central role of IMOC in employees' perceptions that their organization promotes innovation.

Third, our finding that IIB is positively and significantly related to OC indicates that employees' positive emotional attachment to their organization is a result of their cognitive motivation to implement novel ideas at work. This study, among the first to examine the effects of IIB on OC, underscores the key role of hospital employees' IIB on their desire to remain in the organization. Additionally, our focus on OC as an outcome of IIB sheds light on the driving motivational force of IIB on employees' "positive emotional attachment to the organization" ([64], p. 64), while providing fresh and valuable insights into the role of IIB in OC at work.

Fourth, our findings showed that PsyCap partially mediates the relationship between IMOC and IIB, reinforcing the notion that this mediation strengthens the relationship between IMOC and IIB. In other words, the contextual conditions, or IMOC, have a positive and significant influence on the psychological

state of hospital employees, or PsyCap, which in turn positively influences IIB. As previous research has examined PsyCap as a mediating factor between management support and readiness for change [77] and between organizational innovation climate and IIB [78], our focus on the relationship between IMOC and IIB underscores the importance of focusing on and caring about employees to foster IIB.

### **Practical limitations**

The empirical findings of this study depicted in Figure 2 and the mediation analysis shown in Table 4 suggest that health organizations must seek to understand the antecedents and outcomes of employees' IIB. While we acknowledge the quandary that this poses for health organizations in terms of resource management and quality service [8], the increased attention to the importance of IIB at work suggests that health managers should encourage individual implementation of novel ideas to promote autonomous job performance while maintaining high-quality health care delivery.

Furthermore, the findings of this study suggest that IIB may be fostered through the psychological state of employees and an internally coherent IMOC equipped to develop the framework and the competence necessary to motivate IIB at work and sustain competitive advantage. Unlike emotions, PsyCap is a state-like resource that is open to development and is flexible [33, 79]. As such, managers can invest in it to improve their organization's effectiveness and performance. This study shows the strength of PsyCap both in its direct effect on IIB and as a mediator between IMOC and IIB. This is particularly important given the various calls for health organization research to help health managers understand the implications of IIB [15, 17]. These implications include how to foster IIB at work [7], strategically invest in employees' psychological state [80], promote a culture where employees perceive management to be present [26], and develop strategic bonds to increase their emotional attachment to their organization [81]. The increasing need for innovative employees [6], especially in health organizations [7], has resulted in managers seeking strategic sustainable solutions to current challenges [9, 10]. Consequently, these findings provide fresh insights into how health managers can create an organizational setting that instills the HERO attributes to promote idea implementation at work. In addition, health managers are advised to focus on and care about employees by taking the time to listen to and show interest in them and discuss issues with them. As important as it is for employees to feel emotionally motivated to implement novel ideas at work, it is also vital that health managers invest resources in developing positive perceptions of their organizations to strengthen commitment to the organization.

This study also found that PsyCap partially mediated the relationship between IMOC and IIB. The implications for health managers are that IMOC predicts positive PsyCap, which in turn raises IIB among hospital employees. Failing to recognize the predictive power of this personal resource can reduce the HERO attributes. Thus, this study reveals the importance of possessing tools and skills to develop ideal workplace environments, or IMOCs, that improve employees' practical IIB and boost their cognitive PsyCap, which in turn generates commitment to the organization. Consequently, health managers who are responsible for implementation should be suitably trained to ensure the desired outcomes for the organization.



## Limitations and future research

The limitations of the current study offer opportunities for future research. First, although we followed the steps and guidelines for a cross-sectional study [82], the design has various limitations. For example, data obtained in this study were collected at one time from one region: the counties of inland Norway. Therefore, the results have limited generalizability to other health organizations. Scholars who undertake future cross-sectional studies are advised not only to test the causality of the relationships in this study but also to collect data from a range of sites. However, support for the partial mediation of PsyCap in the relationship between IMOC and IIB suggests that our results are not entirely attributable to method bias. Nevertheless, to minimize method bias, future research may broaden the sample across regions and nations.

Second, although the antecedents (IMOC and PsyCap) are grounded in previous research and were positively related to IIB, we did not measure the discrepancies and variations within the antecedents to explain the positive relationship with IIB. As the first study of its kind to examine the relationship between hospital employees' IIB and OC, we consider the findings to be a stepping-stone to further exploration. In addition, while previous research has focused on IIB as an outcome variable [18], there is limited understanding of the outcomes of IIB at work, especially in health organizations. Given the strategic role of employees' IIB in the overall innovation success of an organization [83], it will be crucial for research to uncover the outcomes of IIB in achieving competitive advantage.

Third, the findings in this study receive further credibility not only from our focus on the positive aspects of employee behavior, such as IIB, but also because we included all types of hospital employees to understand better the role of PsyCap in health organizations. Therefore, future research can explore further the mediating role and discrepancies of PsyCap among hospital employees, as well as the role of health managers in the implementation of IIB.

## Conclusion

In this study, we proposed and tested a conceptual model to analyze the drivers and outcomes—the direct and indirect relationships—of IIB among hospital employees in counties of inland Norway. Our findings revealed that IMOC influences both PsyCap and IIB. Furthermore, PsyCap directly influences employees' IIB. We examined the outcomes of IIB at work, and found a positive and significant relationship with OC. In addition, we explored the mediating role of PsyCap and found that it partially mediates the relationship between IMOC and IIB. We hope the findings of this study inspire future research into how health managers can invest in employees' PsyCap, develop an IMOC with long-term benefits, foster IIB at work, and improve employees' emotional attachment to their organization. In this way, health managers will be equipped with the required skills and competence to develop capabilities to sustain competitive advantage through employees.

## List Of Abbreviations

IIB: Individual innovative behavior; PsyCap: Psychological capital; IMOC: Internal market-oriented culture; OC: Organizational commitment; PLS-SEM: Partial least square – structural equation modeling; SET: Social exchange theory; DOR: Director of research; AVE: Average variance extracted; PLS: Partial least square; SEM: Structural equation modeling; HTMT: Heterotrait-monotrait; VIF: variance inflation factor; VAF: Variation accounted for

## **Declarations**

### **Ethics and consent to participate**

The Personal Data Act §§2–7 and 8 no. 1 entails that participants of online survey should freely give their consent before participating in a study. In accordance, information about the project was provided, as well as information on voluntary participation. In addition, consent was required prior to participation of the online questionnaire. They consented to that the data would be used for research purpose and informed that all data would be anonymized. The Norwegian Centre for Research Data (NSD) in Norway approved the study to be conducted (ref no. 239029). Additionally, Data Protection Official at Innlandet Hospital Trust approved the study to be conducted among their employees (ref nr. 126325).

### **Consent for publication**

Not applicable

### **Competing interests**

The authors declare that they have no competing interests.

### **Funding**

Not applicable

### **Availability of data and material**

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

### **Authors' contributions**

BRM: preparation, development and draft and of the manuscript. TS: development and draft of the manuscript. GL: Statistical analyses, interpretation of data, draft of the manuscript. All authors read and approved the final manuscript.

### **Acknowledgements**

We would like to acknowledge Director of Research Ingeborg Hartz for the assistance before, during and after the process of data collection. In addition, a gratitude to the hospital employees' willingness to

participated in this study.

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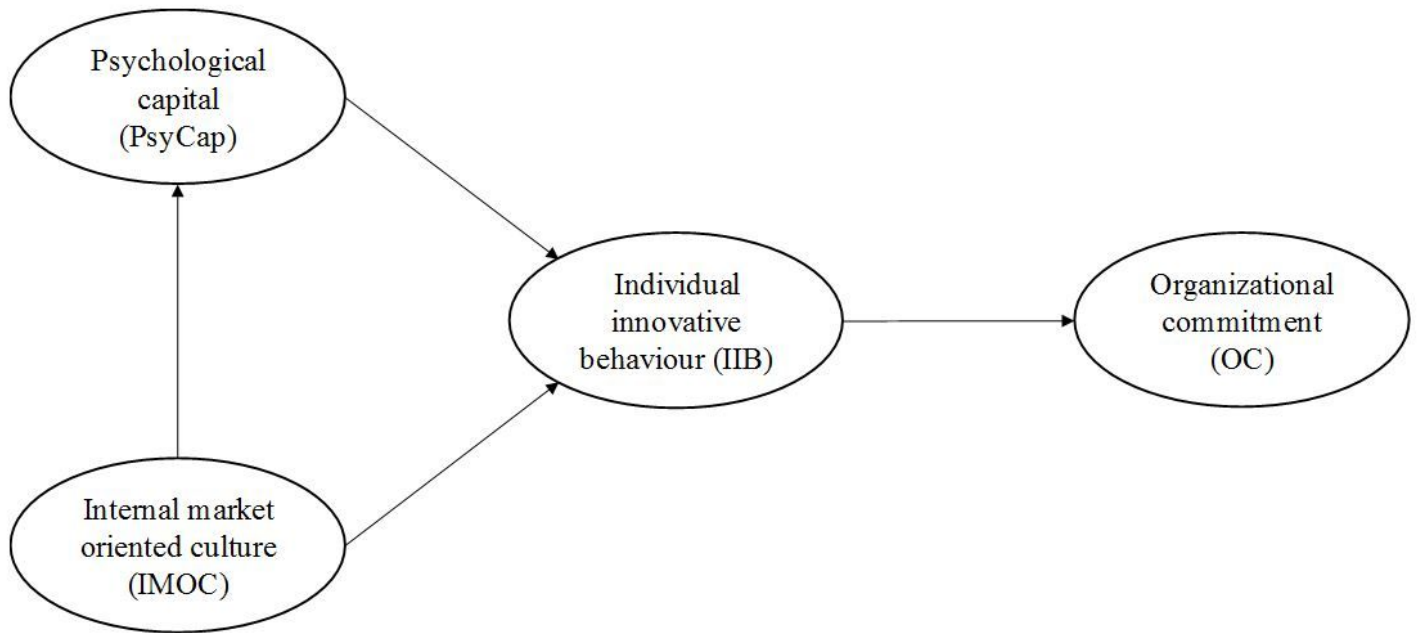
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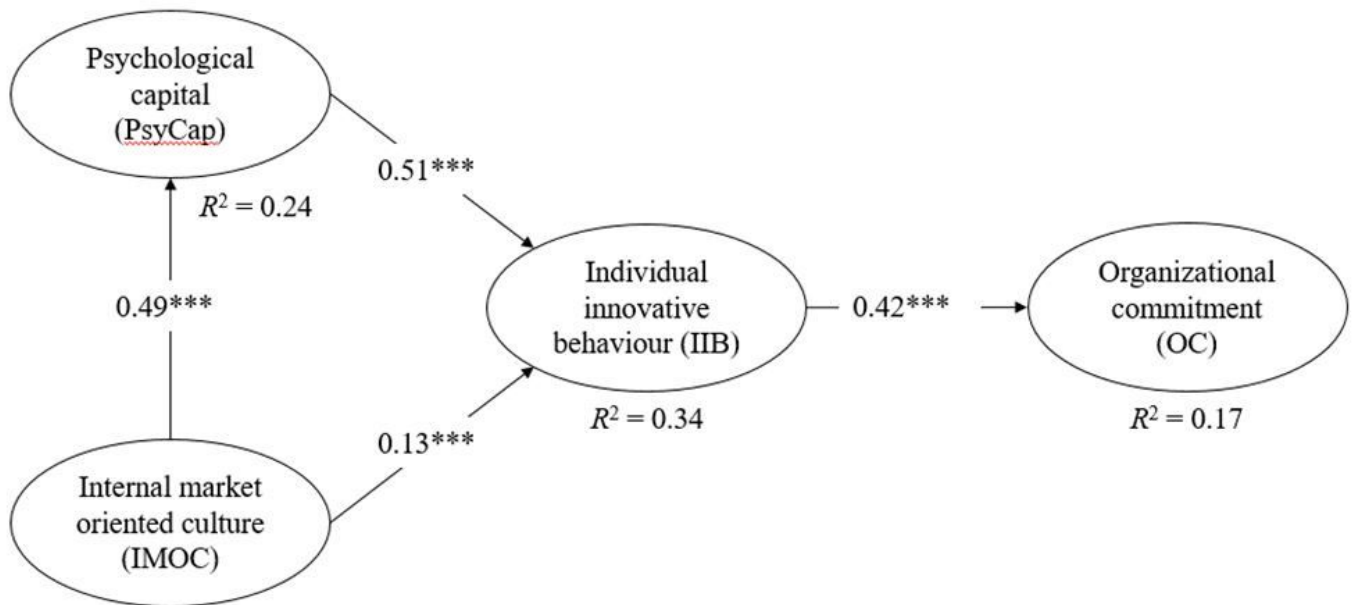
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## Figures



**Figure 1**

Conceptual Model of Drivers and Outcomes of Hospital Employees' IIB.



**Figure 2**

Results of the Structural Model of Drivers and Outcomes of Hospital Employees' IIB. Standardized coefficients (\*\*\*) < 0.01).

## Supplementary Files



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- [APPENDIX1QUESTIONNAIREDEVELOPEDFORTHISSTUDY.docx](#)