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Role of office presence and space in innovative work behavior

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Abstract:

This research-in-progress paper examines how office attendance and workplace design relate to innovative work behavior (IWB) in a post-pandemic setting, treating idea generation and idea application as distinct innovation phases. Using a longitudinal location-month panel of 306 observations across 26 locations in seven countries within a multinational energy-technology firm, we estimate two-way fixed-effects regressions with cluster-robust standard errors and test whether space density moderates office attendance effects. Preliminary findings show no statistically significant association between office attendance and either idea generation or idea application, and no significant moderation effect of space density. A likely explanation is the limited within-location variation in attendance over time, which constrains identification. The study contributes objective post-pandemic evidence and points to the need for richer workplace-design measures and broader datasets.

Keywords: office attendance; workplace design; innovative work behaviour; idea generation; idea application; knowledge-based view; panel data; post-pandemic work; hybrid work

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1 Introduction

The debate over return-to-office policies has evolved into a high-stakes innovation management question, with firms and employees holding increasingly divergent expectations about where and when work should take place. While some firms argue that physical co-location is indispensable for corporate culture, collaboration and innovation, employees increasingly question whether presence is required for effective knowledge work (Smite, 2025; Gibson et al., 2023). Innovative work behavior (IWB) is an essential prerequisite for organisational success, as regular innovation at the product, service and process levels is necessary to master competitive challenges (AlEssa & Durugbo, 2022).

Evidence on the consequences of where work is performed remains mixed and context-dependent (Gibbs et al., 2024). Some studies find that working from home is negatively related to innovation, while others report non-significant or positive effects (Brandt & Schmoll, 2026). Flexibility is multidimensional: spatial and task-related flexibility may support IWB, whereas temporal flexibility can undermine it through reduced synchronous collaboration (Brandt & Schmoll, 2026). Physical work environments matter too: home contexts can support individual creativity via psychological freedom, while office contexts support team creativity via psychological safety (Rücker et al., 2024). Workplace design can foster creative problem-solving capacity partly through internal knowledge exchange (Lucius & Damberg, 2024), and knowledge sharing strengthens innovation outcomes in remote settings (Nwankpa & Roumani, 2024).

Despite this body of knowledge, post-pandemic longitudinal evidence linking office attendance and workplace design to objective innovation outcomes that separate idea generation from idea application at scale is scarce. Innovation is notoriously hard to study, and few measures capture how it takes place within the firm (Gibbs et al., 2024). Prior work relies heavily on self-assessed IWB measures whose subjective character is repeatedly acknowledged as a limitation (Brandt & Schmoll, 2026). Decision-makers therefore, need evidence beyond the pandemic shock evidence that isolates actionable levers for ideation and for implementation rather than treating innovation as a homogeneous activity (Biemans & Malshe, 2024).

Against this background, this paper addresses the following research question: how do office attendance and workplace design affect innovative work behavior, specifically idea generation and idea application, in the post-pandemic period? We estimate how changes in location-level office attendance relate to the number of ideas submitted and the number of ideas implemented per location-month, and we test whether workplace design, operationalised as space density, moderates these relationships. The study contributes post-pandemic longitudinal evidence with objective location-level outcomes that treats innovation as a two-stage process, and it links workplace design to innovation outcomes through a moderation test consistent with task-contingent mechanisms and knowledge-exchange pathways (Rücker et al., 2024; Lucius & Damberg, 2024). The remainder of the paper develops the theoretical framework and hypotheses, describes data and methods, reports preliminary results and outlines open questions for which feedback is sought.

2 Theoretical framework and hypotheses development

IWB can be understood as the intentional creation, introduction and application of new ideas that benefit the work role, group or organisation (Janssen, 2000). IWB is a multi-stage process typically decomposed into idea exploration, generation, championing and

implementation (Stoffers et al., 2014). A complexity perspective argues that creativity and the later stages of IWB are intertwined and unfold recursively (Rosing et al., 2018). Following recent work that measures innovation through idea management systems, we focus on idea generation and idea application as complementary, objectively observable phases (Gibbs et al., 2024).

We draw on the knowledge-based view (KBV), which treats knowledge as a firm's most strategically significant resource (Grant, 1996). Knowledge sharing among peers is a valuable source of competitive advantage, and productivity and innovation are outcomes of knowledge sharing, application and integration (Nwankpa & Roumani, 2024). Because much organisational knowledge is tacit and embedded in cultural routines, co-presence matters: spatial co-location facilitates richer flows of knowledge and unlocks horizons for innovation (Coradi et al., 2015). Weak network ties, particularly important for innovation, decrease when employees work from home (Gibbs et al., 2024), and workplace design shapes internal knowledge exchange (Lucius & Damberg, 2024).

Higher office attendance should therefore increase opportunities for spontaneous interaction, exposure to diverse perspectives and synchronous collaboration – the very conditions under which ideas are generated (Brandt & Schmoll, 2026; Gibbs et al., 2024). Videoconferencing groups generate fewer creative ideas than in-person groups due to narrowed visual focus (Brucks & Levav, 2022). Co-located employees have numerous opportunities to collaborate and share ideas (Burleson et al., 2023). We therefore expect office attendance to be positively associated with idea generation and given that implementation depends on refinement and problem-solving that also benefit from face-to-face exchange – also with idea application (Gibson et al., 2023; Nwankpa & Roumani, 2024).

Hypothesis 1: Higher office attendance is positively associated with idea generation at the location level.

Hypothesis 2: Higher office attendance is positively associated with idea application at the location level.

Workplace design shapes the extent to which co-presence translates into effective knowledge exchange. Greater workstation density at a location increases the probability that colleagues encounter one another, share information and build the weak ties that support innovation (Lucius & Damberg, 2024). When density is low, employees on site are physically dispersed, which reduces short-distance interaction and face-to-face communication, both of which Lucius and Damberg (2024) identify as key drivers of creativity. However, density alone does not guarantee productive exchange. Yet, it is a necessary spatial pre-condition for the interaction patterns highlighted in coworking-space and activity-based-workspace research (Del Sarto et al., 2023; Rücker et al., 2024). We therefore expect space density to amplify the effect of attendance during both IWB phases.

Hypothesis 3: Space density positively moderates the relationship between office attendance and idea generation, such that the relationship is stronger at locations with higher space density.

Hypothesis 4: Space density positively moderates the relationship between office attendance and idea application, such that the relationship is stronger at locations with higher space density.

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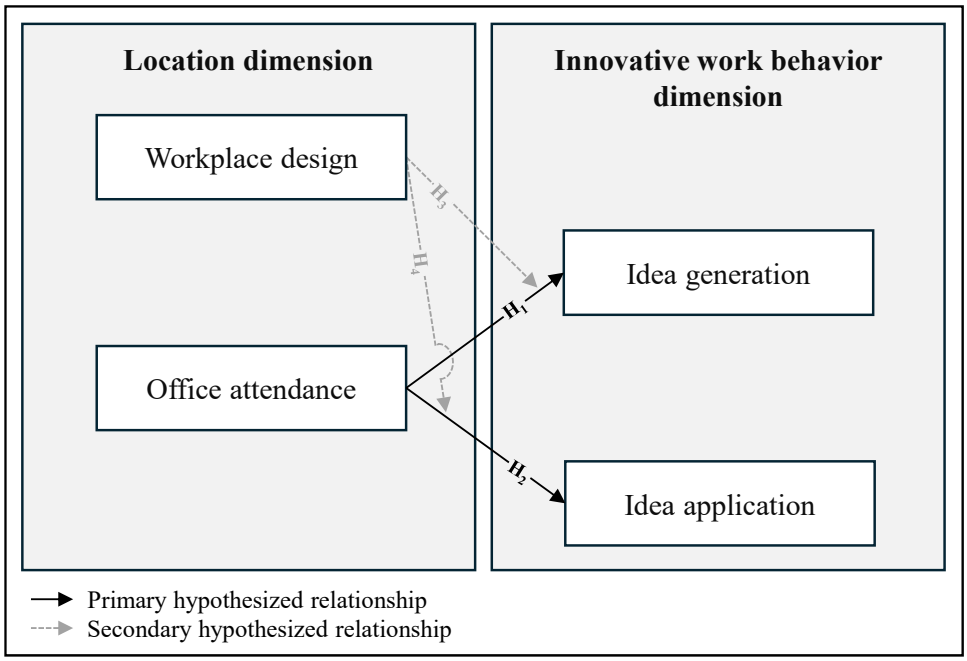

Figure 1 Research model

3 Methodology

3.1 Data collection and sample

This study uses a longitudinal panel at the office-location level in a large multinational enterprise in the energy technology sector. The dataset includes over 30,000 knowledge workers across more than 100 locations on six continents. Data collection began in October 2023 and continues, with monthly aggregation into a location-month panel. For this research-in-progress stage, an unbalanced panel of 306 location-month observations is available, covering 26 locations in seven countries (Austria, Czech Republic, Germany, Romania, Sweden, United Kingdom, and United States) and 15 non-consecutive months.

3.2 Measures

Innovation outcomes are derived from an established idea management system, following recent work that uses such systems to capture innovation activity objectively (Gibbs et al., 2024). Idea generation is measured as the number of ideas submitted per location per month. Idea application is measured as the number of ideas implemented per location per month. Office attendance is measured as the share of physical presence per location per month, based on digital traces of employees' physical presence. Space density is operationalised as the number of workstations per assigned white-collar headcount at each location. Control variables include the natural logarithm of the white-collar headcount as a size proxy, together with time fixed effects that control for period-level trends and location fixed effects that control for time-invariant characteristics such as country, property type,

and unobserved local culture. To reduce multicollinearity and improve interpretability, all independent variables are mean-centred.

3.3 Empirical approach

We estimate two-way fixed-effects panel regressions with fixed effects for location and month. Standard errors are clustered at the location level. Four models are specified. In Models 1 and 3, we regress idea generation on the explanatory variables; in Models 2 and 4, we regress idea application on the same variables. In models 1 and 2, office attendance is included as independent variable, along with the control variables. In models 3 and 4, the interaction term between office attendance and space density is added to models 1 and 2. All analyses are carried out in R. The two-way fixed-effects regression analyses are performed using the 'plm' package. Clustered standard errors are estimated using the packages 'lmtest' and 'sandwich'.

4 Preliminary results

Table 1 summarises the analysis sample. Across the 306 location-month observations, mean office attendance is approximately 50 per cent. Between-location standard deviation that is substantially larger than the within-location standard deviation, indicates limited monthly variation per site. Space density averages 0.59 workstations per white-collar headcount; locations range from small industrial sites with fewer than 100 knowledge workers to office hubs with more than 6,000.

Table 1 Descriptive statistics for the analysis sample

Variable	***N***	***Mean***	***SD***	***Min***	***Max***
Office attendance	306	0.504	0.158	0.194	0.850
Space density	306	0.590	0.164	0.171	1.097
White-collar headcount	306	1,079.4	1,417.0	43.0	6,155.0
Ideas submitted (generation)	306	22.71	31.1	0.00	237.86
Ideas implemented (application)	306	15.24	41.1	0.00	534.00

Source: Authors' own calculation based on company data, 2026.

Table 2 presents the four-panel fixed-effects models. In Model 1, the effect of office attendance on idea generation is not significant ($\beta = 25.612$, $p = 0.204$), so H1 is not supported. Likewise, Model 2 shows a non-significant effect of Office Attendance on Idea Application ($\beta = -54.739$, $p = 0.422$), and thus H2 is not supported. Including the interaction with space density in Models 3 and 4 does not alter these findings. Neither Model 3 ($\beta = -50.221$, $p = 0.531$) nor Model 4 ($\beta = 28.058$, $p = 0.743$) yields a significant interaction effect, resulting in a lack of support for H3 and H4 as well.

Table 2 Two-way fixed-effects panel regressions (cluster-robust SE in parentheses)

Variable	***Model 1:*** ***Idea Generation***	***Model 2:*** ***Idea Application***	***Model 3:*** ***Idea Generation***	***Model 4:*** ***Idea Application***
log(Headcount) (mean-centred)	17.196 (12.681)	-27.634 (25.269)	38.017 (26.730)	7.929 (29.000)
Office Attendance (mean-centred)	25.612 (20.098)	-54.739 (68.061)	66.393 (53.122)	16.059 (60.579)
Space Density (mean-centred)			-37.350 (33.376)	-65.094 (45.859)
Office Attendance (mean-centred) × Space Density (mean-centred)			-50.221 (80.042)	28.058 (85.381)
Location FE	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes
N	306	306	306	306
Locations	26	26	26	26
Within R^2	-0.144	-0.144	-0.131	-0.143

Source: Authors' own calculation, 2026. Significance: * p<0.10, ** p<0.05, *** p<0.01.

Several factors may explain the null findings for H1-H4. First, and most importantly, office attendance in this post-pandemic sample exhibits limited within-location variation: in contrast to the COVID-era discontinuity that has driven much recent evidence (Gibbs et al., 2024; Jaiswal & Arun, 2022), attendance now moves only slowly around a location-specific mean, which reduces the identifying variation available to fixed-effects estimators. This is, in itself, part of the research gap: isolating attendance effects outside the pandemic regime – where other factors such as uncertainty, fear and enforced isolation do not dominate – requires different identification strategies than those exploited during the lockdown period. Second, aggregation to the location-month level may mask individual- and team-level IWB effects (Garlatti Costa et al., 2023). Third, space density captures only the quantitative side of workplace design; it does not measure design quality dimensions such as activity-based workspaces, collaboration areas or lighting, all of which have been shown to matter for creativity (Rücker et al., 2024; Lucius & Damberg, 2024).

5 Feedback and development

As this is research in progress, we seek targeted feedback on three themes that would materially strengthen subsequent analyses, with particular emphasis on expanding the empirical basis so that attendance effects can be estimated with sufficient statistical capacity. First, on the measurement of workplace design: beyond space density, which additional non-identifying design indicators should be prioritised to capture collaboration and knowledge-exchange potential? Candidate indicators include the share of collaborative

floor area, the presence of activity-based zones and the availability of informal meeting space (Rücker et al., 2024; Lucius & Damberg, 2024). We would welcome views on which of these are both theoretically defensible and organisationally feasible to collect without revealing site identity.

Second, and most pressing given the null results reported above, we actively seek partners willing to share complementary data so that attendance effects can be identified with sufficient statistical power. The current panel of 306 location-month observations across 26 sites exhibits limited within-location variation in attendance, which suppresses detectable effects in a two-way fixed-effects design. We therefore invite conference participants, research groups and corporate partners to contribute comparable location- or team-level attendance and innovation-outcome data from other multinational firms that would enable a multi-firm meta-panel. Expanding the empirical base would materially increase the identifying variation available and move the estimated coefficients toward statistical significance. We would value community input on which of these data-expansion strategies is most viable in a multinational-enterprise context and welcome direct contact from potential data-sharing partners.

Third, on model specification and outcome definition: which robustness tests and alternative operationalisations would best triangulate the initial null findings? Candidates include idea quality measures (estimated and realised benefit per idea) rather than quantity, count-data estimators suited to zero-inflated implementations, and mechanism tests that examine whether knowledge-sharing intensity mediates any attendance effect (Nwankpa & Roumani, 2024). Feedback on prioritisation among these extensions – especially on tests that can be run before additional panel waves accrue – would directly shape the next analytical stage.

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