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The relationship between work environment and employees' innovative work behaviours: A proposed model

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Abstract: Employees' innovative work behaviours (IWB) emphasize the multifaceted nature of employee contributions to organizational innovation, encompassing both the ideation stage and the necessary implementation behaviours that translate innovative ideas into tangible performance improvements. Fostering a work environment that encourages and celebrates IWB becomes crucial for organizations seeking to maximize their innovation potential. This study delves into the intricate relationship between work environment, encompassing both its social and physical facets, and IWB. Building upon theoretical foundations in innovation, innovative behaviour, and work environment research, the article presents an analytical framework to unravel the influence of these factors. The proposed framework leverages an integrated approach by combining insights from Affective Events Theory (AET) and Expanded Person-Environment Fit (PEF) theory. This integrated lens posits that IWB are shaped by both the social and physical environment, mediated by innovation trust, with personal innovativeness acting as a moderator. This framework paves the way for further research in the fields of innovation management.

Keywords: Innovation, work environment, IWB, AET, PEF.

1. Introduction

Innovation is not a new concept, but it is multifaceted and remains the key to creating competitive advantages for businesses (Zhang & Bartol, 2010; Phung & Le, 2013; Pham, 2014; Nham et al., 2021; Abioye et al., 2021). Organizations face differing innovation challenges; some seek to capitalize on new opportunities, while others aim to overcome critical issues impacting their survival. Furthermore, researchers acknowledge that

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common indicators for measuring innovation, such as R&D spending, R&D employee numbers, and patents, are not suitable measures for every specific context (Afsar, 2016). This highlights the need for a deeper understanding of what innovation is, how it occurs, and the impact of specific work environment characteristics on employees' innovative work behaviours (IWB).

A multitude of factors, encompassing individual characteristics and contextual elements, have been identified as influencing innovation (Afsar, 2016; Emiralioglu & Sonmez, 2021). One critical link lies in the reciprocal relationship between individual behaviour and the work environment. As Afsar (2016) posits, individuals' interactions with their work environment shape their behaviour, including propensity for innovation. Consequently, fostering a work environment that encourages and celebrates IWB becomes crucial for organizations seeking to maximize their innovation potential.

Employees play a pivotal role in this process, serving as the engines of idea generation, adaptation, and implementation - actions collectively termed "innovative behaviour" (Lee, 2008). However, engaging in such behaviour can be perceived as venturing outside established norms and potentially risky for individual employees (Lee, 2008). Therefore, nurturing and managing an internal context that actively supports and incentivizes IWB becomes imperative for organizational success (Alpkan et al., 2010). This paper will develop a theoretically grounded framework for the work environment-innovative behaviour relationship through comprehensive research synthesis.

2. Literature review

2.1. Innovation and Innovative work behaviour

The concept of innovation has been interpreted and defined in various ways. Accrording to Baregheh et al. (2009): "Innovation is the multi-stage process whereby organizations transform ideas into new/improved products, service or processes, in order to advance, compete and differentiate themselves successfully". Pham (2014) defines innovation as the utilization of new ideas, initiatives, or knowledge, transforming them into commercially viable products or services. Nham et al. (2021) emphasize the transformative nature of innovation, viewing it as the introduction of radically new or substantially improved products (or services) alongside novel production processes, marketing approaches, and organizational structures. This fact leads to enhanced organizational value creation or widespread societal adoption. Nguyen et al. (2023) focus on the processual dimension of innovation, defining it as a value-creation process involving the construction, development, and realization of ideas, new technologies, products, and services. This study, acknowledging the merits of each perspective, conceptualizes innovation as the application of an enterprise's available knowledge, skills, and resources to undertake technical or non-technical innovation activities.

Amidst intensifying global competition, the role of innovation in enhancing organizational productivity and efficiency has become demonstrably paramount (Crespi & Zuniga, 2011). While competitive advantages may stem from diverse sources, successful organizations in today's landscape are often those adept at mobilizing knowledge and technology, wielding them to pioneer novelties in their product offerings, service portfolios, and even market penetration strategies (Strobl et al., 2018). In fact, innovations that cater to user needs and amplify operational efficiency are the very lifeblood of business survival, growth, and sustained competitive edge (Rozman & Kovac, 2015; Nham et al., 2021).

Innovative work behaviours are a multifaceted concept encompassing a variety of employee actions and dispositions that contribute to the development, introduction, and implementation of new ideas for products, processes, or working methods within an organization (Scott & Bruce, 1994; Bilal et al., 2020; Grošelj et al., 2021). IWB encompass diverse activities within an organization. They transcend the singular act of identifying problems and generating solutions. As de Jong and Hartog (2010) outlined, IWB include mobilizing resources, both tangible and intangible, to operationalize and nurture nascent ideas. Strobl et al. (2018) further elaborated on this point, highlighting that IWB extend beyond conceptualizing novel products, services, or

processes. They encompasses the refinement of existing work practices, and the inventive reconfiguration and combination of readily available resources to address perceived challenges. Hence, IWB emerge not solely from designated innovation sessions. They can occur at any time and in any context within an organization.

2.2. Work environment

2.2.1. Social environment

Social environment refers to the dynamic interplay of people's interactions, activities, and capabilities (Dul & Ceylan, 2014). This is where ideas are created and developed, shaped by the perceptions and knowledge shared within an organization. Building on this concept, West and Anderson (1998) proposed a model of an organizational environment supportive of innovation, highlighting four key elements: vision, safety for members, mission orientation, and organizational support. Furthermore, corporate culture, as defined by Tomi et al. (2014), also constitutes a crucial aspect of the social environment. The influence of corporate culture on facilitating innovation has been well-documented, with several key characteristics emerging from empirical research. These include: supportive and secure environment, constructive conflict management, high value placed on creativity and diversity, long-term vision and risk tolerance, leadership commitment to innovation, open communication culture.

The organizational social environment plays a decisive role in shaping the behaviours and outcomes of business members. Notably, Amabile et al. (1996) developed the KEYS model, a widely used instrument for assessing the creative climate within organizations (Almelegy et al., 2016). This model posits that the creative work environment emerges from the dynamic interplay of individual personalities, leadership styles, organizational policies, and interpersonal interactions across all levels, from upper management to frontline employees (Amabile et al., 2013).

2.2.2. Physical environment

The physical environment of a business, encompassing aspects like layout, atmosphere, design, lighting, and aesthetics, has emerged as a key differentiator impacting business success (Elsback & Stigliani, 2018). Organizations are increasingly leveraging strategic design interventions to craft unique spatial experiences for stakeholders, including partners, customers, and employees, setting themselves apart from competitors.

Within a business setting, physical environment encompasses the tangible elements and prevailing conditions that shape its space. This includes both natural aspects, such as air quality and lighting, and human-made components, encompassing layout, design, furnishings, and equipment (Oksanen & Stahle, 2013; Blomberg & Kallio, 2022). Notably, humans actively define this environment through the design and construction of buildings, the implementation of floor plans, and the selection of surrounding objects. Furthermore, the physical environment exerts a reciprocal influence on its inhabitants, impacting the individuals who work within it.

The physical environment acts as a critical moderator of organizational activities, simultaneously enabling and restricting them (Kamarulzaman et al., 2011; Elsback & Stigliani, 2018; Peng & Jia, 2023). From production processes to research endeavors and new product development, every organizational endeavor is demonstrably influenced by the design and configuration of machinery, workspaces, environmental controls, and equipment. Moreover, the relative permanence of physical environments necessitates meticulous consideration during design decisions. A thorough understanding of the impact on both the organization and its members is crucial in shaping these spaces (Oksanen & Stahle, 2013).

2.3. The relationship between work environment and employees' innovative work behaviours

2.3.1. The relationship between social environment and employees' innovative work behaviours

Extant research has established a robust relationship between social environment and IWB. This stems from the understanding that creativity acts as the seedbed for innovation, as aptly put, "all innovation begins with creative ideas" (Amabile et al., 2013). Notably, IWB manifest within the organizational context through intricate interactions between members,

thus highlighting the undeniable influence of social environment on fostering or hindering such behaviours.

Assessments of work environments conducive to innovation primarily focus on factors pertaining to the social dimension. For instance, the Creative Climate Questionnaire (CCQ) by Ekvall (1996) measures elements like challenge, freedom, support for idea development, trust, dynamism, humor, debate, conflict, risk-taking, and time for idea development. Similarly, the KEYS scale by Amabile et al. (1996) assesses factors such as organizational and supervisory encouragement, workgroup support, resource availability, challenges, autonomy, obstacles, pressure, creativity, and productivity. Further examples include the Siegel Scale of Support for Innovation (SSSI) by Siegel and Kaemmerer (1978), which examines leadership, ownership, norms of diversity, continuous development, and consistency. Additionally, the Team Climate Inventory (TCI) by Anderson and West (1998) emphasizes factors like vision, safety, task orientation, and support for innovation.

Previous researches support the notion that employees across all hierarchical levels possess the potential to contribute directly or indirectly to organizational innovation (Lizarelli et al., 2023). This is particularly true in less hierarchical organizational structures, where opportunities for all employees to engage in IWB are more readily available (Hull et al., 2020). Studies have further demonstrated a positive association between innovation-supportive social environments and increased employee engagement in IWB. Employees within such environments are not only more likely to generate innovative ideas themselves, but they also exhibit greater openness to novel concepts and a higher propensity for risk-taking.

2.3.2. The relationship between physical environment and employees' innovative work behaviours

Physical environment, an artifact of human design and utilization, acts as a physical manifestation of an organization's desires and strategies, including its innovation endeavors (O'Toole, 2001; Cheah & Ho, 2019; Peng & Jia, 2023). By serving as a tangible representation of organizational values and objectives, physical environment facilitates employee understanding and alignment with desired behaviours and goals, including those pertaining to innovation. This intricate relationship forms the basis of Moultrie et al.'s (2007) theoretical framework for innovation, which highlights the physical environment's role in shaping and reflecting innovation strategies.

For decades, environmental psychologists have explored the intricate relationship between physical surroundings and human behaviour. The Stimuli-Organism-Response model, pioneered by Mehrabian and Russell, serves as a robust cognitive framework for analyzing this dynamic (Horng et al., 2013). This model posits three independent emotional dimensions - pleasure, arousal, and dominance - that collectively define a person's state. Notably, it allows us to understand employees' emotions and subsequent behavioural responses within the context of their work environment.

Specifically, sensory inputs such as brightness, ambient noise levels, color schemes, materials, and even atmospheric factors like temperature and humidity all contribute to shaping specific behavioural reactions in employees. By understanding these intricate connections, we can design workspaces that optimize emotional well-being and potentially enhance IWB.

2.4. Work environment assessment tools

2.4.1. Creative Climate Questionnaire- CCQ

The Creative Climate Questionnaire (CCQ), developed by Ekvall (1996), serves as an instrument for assessing organizational factors that either stimulate or impede innovation. This tool delves into the concept of organizational climate, defined as the collective "attitudes, emotions, and behaviours that characterize life in an organization" (Ekvall, 1996). The work environment itself operates as an intermediary variable, influencing critical organizational processes like problem-solving, communication, and creativity. Research suggests that this work environment significantly impacts various outcomes, including quality, productivity, innovation, employee satisfaction, and overall organizational profitability (Ekvall, 1996). Furthermore, a reciprocal relationship exists between the work environment and organizational resources, such as personnel,

infrastructure, and financial capital. These resources shape the work environment, while the environment itself influences how effectively these resources are utilized. Notably, Ekvall (1996) emphasizes the CCQ's ability to measure conditions that foster creativity among organizational members, ultimately promoting innovation within the organization.

The development of the Creative Climate Questionnaire (CCQ) was informed by a comprehensive literature review. This review identified four key domains associated with fostering innovation within organizations: Trust and Openness, Challenge and Commitment, Information and Expression, Diversity and Knowledge Exchange. Based on these four domains, the CCQ was constructed with fifty questions, each mapped to a specific domain. Four response categories were provided for each question, ranging from "strongly disagree" to "strongly agree." This structure allowed for the measurement of ten factor groups, each composed of five items. Notably, nine of these factor groups were hypothesized to positively influence creativity, while one was postulated to have a negative association with creativity.

2.4.2. KEYS: Assessing the Climate for Creativity

KEYS, originally designed to assess work environments conducive to creativity, demonstrates potential applicability in evaluating innovation as well. This stems from the widely held belief that creativity serves as the seed for all innovation (Amabile et al., 1996). KEYS operates under the premise that individual perceptions of the work environment directly influence organizational creativity. Its theoretical foundation lies in a component model of creativity and innovation within organizations. This model identifies five key environmental factors that contribute to fostering creativity: encouragement of creativity, autonomy or freedom, provision of necessary resources, management of appropriate pressure levels, and minimization of organizational impediments to creativity.

KEYS offers a multi-level approach by capturing data at the organizational, team, and supervisory levels. This 78-item instrument employs a four-point Likert scale (never, sometimes, often, always) and comprises ten distinct scales. Six of these scales are hypothesized to positively influence creativity by measuring factors such as encouragement, autonomy, and resource availability. Two scales, "organizational constraints" and "workload pressure," are conversely hypothesized to negatively impact creativity. The remaining two scales assess cognitive factors potentially associated with actual organizational creativity and productivity.

2.4.3. Siegel Scale of Support for Innovation- SSSI

SSSI was developed to assess work environment factors within innovative organizations (Siegel & Kaemmerer, 1978). The definition of organizational climate emphasizes measurable attributes, perceived by employees, that influence their motivation and behaviour (Siegel & Kaemmerer, 1978). This approach utilizes individual perceptions as the foundation for measurement. SSSI defines an "innovation organization" as one that promotes IWB, while a "traditional organization" does not. The scale identifies five key groups of hypothesized work environment factors believed to foster innovation. It comprises 61 items rated on a Likert scale ranging from strongly agree to strongly disagree.

While SSSI offers potential utility in measuring perceived support for innovation within work environments, its generalizability to business settings requires further consideration. Notably, the scale's development primarily relied on a sample comprising students and educators, raising questions about its applicability to the distinct dynamics and cultures found in business organizations.

2.4.4. Team Climate Inventory- TCI

TCI, developed by Anderson and West (1998), aims to assess the work group's climate in relation to fostering innovation. The "proximal work group" is defined as the permanent or semi-permanent unit where individuals are assigned and regularly interact for work tasks (Anderson & West, 1998). This instrument operationalizes the "work environment" as the shared perceptions within the group, reflecting the "way of working together" that has been established. Notably, TCI was primarily designed as a tool to facilitate

the development of teams that actively support and promote innovation.

TCI leverages items from existing questionnaires aligned with the four-factor model, including four items from SSSI and 15 items from the study by Tjosvold et al. (1986). Additionally, TCI incorporates original items tailored specifically to its focus on team climate. The initial version of the TCI comprised 61 items, employing various response scales ranging from 1 (not at all) to 7 (completely) or 1 (strongly disagree) to 5 (strongly agree).

2.5. Research gap

The literature review revealed a dearth of comprehensive studies that analyze the combined influence of working environment factors on IWB. Existing research tends to focus on isolated aspects of the work environment, such as leadership, corporate culture, workspace design, or knowledge sharing (Standing et al., 2016). While prior research acknowledges the importance of individuals in driving innovation, there is a paucity of research that examines the holistic interplay between individuals and the work environment.

Research gaps also exist in the conceptualization of work environment factors that support IWB. While most studies define an innovation-supportive work environment as a combination of various factors that contribute to an overall assessment, these factors often focus primarily on social aspects. Common themes include challenging work, job autonomy, teamwork, leadership style, and rewards (Cheah & Ho, 2019). Although some studies acknowledge the potential influence of physical aspects on innovation, existing frameworks primarily emphasize social environmental features within organizations and neglect deeper exploration of the physical environment's role. Notably, research on the physical environment's influence on innovation remains confined to the enterprise and workgroup levels. Similarly, work environment assessment tools tend to focus solely on measuring social factors. This research aims to address this gap by proposing a comprehensive approach to the work environment that incorporates both social and physical environmental factors to understand their combined effect on IWB at the individual level.

2.6. Theoretical frameworks

2.6.1. Affective events theory- AET

AET, developed by Weiss and Cropanzano (1996), is a framework that explains how employees' emotions, triggered by specific events in their work environment, influence their job performance, satisfaction, and behaviour. Although work environment factors exert a direct influence on employee attitudes and behaviours, AET underscores the critical role of emotions as intervening variables in this dynamic (Figure 1). AET has been applied to various workplace contexts and has shown promise in understanding employee behaviour (Zoghbi & Sharifiatashgah, 2020; Ashkanasy et al., 2014).

This theory holds that employee behaviour is influenced by a string of elements, including:

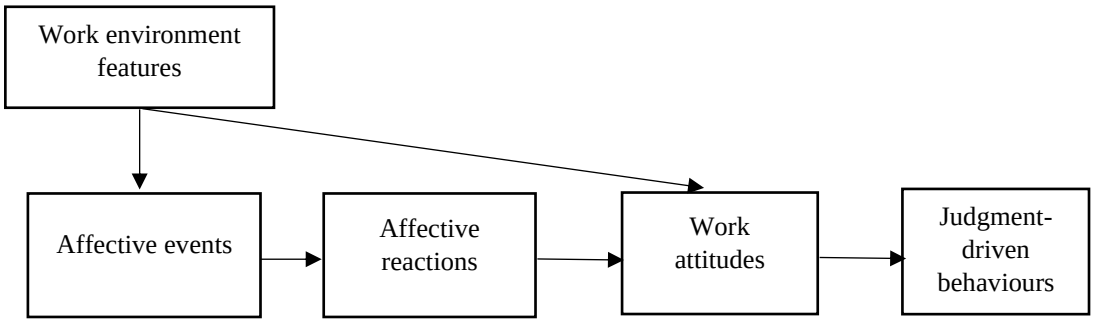

Figure 1: Affective events theory
Source: Weiss and Cropanzano (1996).

Affective events: Work experiences are categorized as positive, negative, or neutral based on their emotional impact on employees. These events can be individual or shared by a group.

Affective reactions: Events trigger emotional responses like joy, anger, or frustration, which vary in intensity and duration.

Work Attitudes: Individuals interpret and evaluate their emotional reactions, considering factors like fairness, control, and personal implications.

Judgment- Driven Behaviours: Work Attitudes influence various work-related behaviours such as performance or IWB.

2.6.2. Expanded Person-environment fit theory- PEF

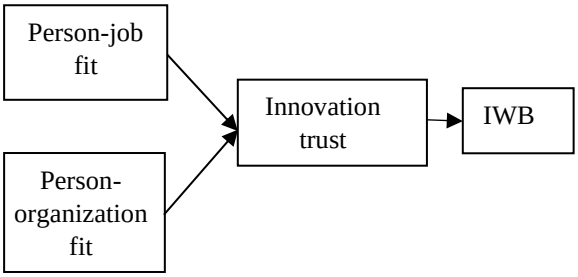

Figure 2: Expanded person-environment fit theory
Source: Afsar et al. (2015).

PEF, developed by Donald E. Super, posits that compatibility between individuals and their environments is crucial for positive outcomes like wellbeing, satisfaction, performance, and behaviours (Afsar et al., 2015). This theory emphasizes the interplay between individual characteristics and environmental demands, arguing that good fit leads to better outcomes than misfit.

Building upon the existing foundation, Afsar et al. (2015) provided an expanded version of the PEF model, furthering our understanding of innovation and IWB. Person-job fit refers to the compatibility between an individual's skills, abilities, needs, and values and the demands and expectations of a specific job. Person-organization (PO) fit refers to the compatibility between individual characteristics and environmental demands. These include expectations, pressures, resources, and opportunities offered by the environment. The theory suggests that these elements interact in a complex manner, influencing employee behaviour and the relationship mediated by innovation trust (Figure 2). However, some criticisms exist regarding this theory. These criticisms focus on the theory's emphasis on individual-environment fit, neglecting broader social and organizational factors, and the difficulty in objectively measuring fit.

3. Research methodology

This study employed a desk research approach to gather secondary data and gain a comprehensive understanding of the relationship between work environment and employees' innovative work behaviours. Desk research involves systematically analyzing existing information from various sources (Saunders et al., 2021). It allows researchers to synthesize current knowledge on the issue of interest, enabling the formulation of preliminary assessments of the current landscape (Creswell & Creswell, 2018).

Specifically, this research utilized secondary data retrieved from reputable academic databases, including ScienceDirect, ISI Web of Science, and Scopus. Additionally, databases from prominent publishers such as Springer, Sage, Taylor & Francis, Emerald, Wiley, and Elsevier were accessed. Google Scholar was also employed to identify relevant supplementary materials. Leveraging secondary data analysis, this study builds upon existing knowledge to develop a research framework that examines the influence of the work environment on IWB.

4. Proposed research framework

Drawing on the theoretical foundation of earlier research, the authors propose a framework for analyzing environmental factors influencing IWB, as depicted in Figure 3.

Based on expanded PEF theory, this framework examines the work environment's influence on IWB through the lens of innovation trust. It posits that the work environment shapes individual perceptions of trust and confidence in innovation, ultimately impacting their IWB. As mentioned before, PEF gives difficulty in measuring fit. This limitation can be mitigated by aligning individual-environment fit in both the social and physical domains (as emphasized in AET).

In the framework, innovation trust refers to the belief and confidence individuals or groups have in the organization's ability to successfully innovate. This extends beyond mere trust in the organization itself and encompasses trust in its

capabilities, processes, and commitment to innovation. Besides, building on the established relationship between the work environment and IWB, this study investigates the moderating role of personal innovativeness, as conceptualized within PEF, in the relationship between innovation trust and IWB.

The constructs utilized in the theoretical framework are defined and operationalized in Table 1.

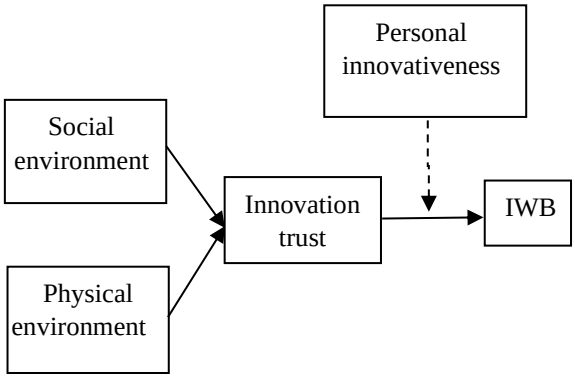

Figure 3. Proposed research framework
Source: Authors.

Table 1: The constructs in the proposed research framework

Factors	Definitions
Social environment	Social environment refers to the dynamic interplay of people's interactions, activities, and capabilities
Physical environment	The physical environment of an organization encompasses the totality of physical objects and stimuli present within the organizational space.
Innovation trust	Innovation trust is conceptualized as the reciprocally held belief and confidence between employees and colleagues in the value and feasibility of innovation within the organizational context.
IWB	IWB emphasize the multifaceted nature of employee contributions to organizational innovation, encompassing both the ideation stage and the necessary implementation behaviours that translate innovative ideas into tangible performance improvements.
Personal innovativeness	Personal innovativeness encompasses an employee's cognitive and behavioural capabilities, as well as intrinsic motivation, to generate, develop, and implement novel ideas that contribute to organizational objectives.

Source: Author's compilation.

5. Conclusion

This study delves into the multi-faceted drivers of IWB, exploring the influence of both the social environment and the physical environment. Drawing on established theoretical frameworks, the research develops an analytical framework that leverages insights from Affective Events Theory (AET) and Expanded Person-Environment Fit (PEF) theory. This integrated approach posits that IWB are shaped by a confluence of factors:

- Social environment: refers to the dynamic interplay of people's interactions, activities, and capabilities.
- Physical environment: encompasses the totality of physical objects and stimuli present within the organizational space.
- Innovation trust: conceptualized as the reciprocally held belief and confidence between employees and colleagues in the value and feasibility of innovation within the organizational context.
- Personal innovativeness: encompasses an employee's cognitive and behavioural capabilities, as well as intrinsic motivation, to generate, develop, and implement novel ideas that contribute to organizational objectives.

The framework positions innovation trust as a mediating variable, translating the influence of both the social and physical environment into IWB. Additionally, personal innovativeness moderates this relationship, suggesting that individual differences play a role in how environmental factors impact IWB.

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