

Analyzing Barriers to Innovative Work Behavior for Sustainable Development

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Abstract

In the modern business environment, employees' innovative behavior has become an important determinant of sustainable development, particularly in the tourism and hospitality industry. This industry is highly competitive, dynamic, and service-oriented. It relies heavily on continuous innovation to optimize resource utilization, adopt sustainable practices, enhance customer experiences, and respond effectively to changing market demands. Employees' innovative work behavior facilitates the development of new services and processes essential for achieving long-term sustainability and competitive advantage. It is the main driver of sustainable development, as it enables employees to generate novel ideas that improve service quality, organizational resilience and operational efficiency. Despite its significance, the promotion of innovative work behavior is often hindered by numerous organizational, individual, and environmental barriers. This study aims to examine the main barriers to innovative work behavior in the context of sustainable development within the tourism and hospitality industry. In the current study, data were collected from industry experts and professionals. The Decision-Making Trial and Evaluation Laboratory technique is used to identify the causal relationships among these barriers and to distinguish between driving and dependent factors. The DEMATEL technique was applied by constructing and normalizing the direct-relation matrix, developing the total-relation matrix, and computing the prominence (R+C) and relation (R-C) indices to determine interrelationships and relative importance of the identified barriers. The findings of this study show that the primary obstacles to innovative work behavior for sustainable development are organizational and individual employee barriers. The study shows that innovative work behavior plays an important role in the growth of the organization. This study provides stakeholders, including business leaders and policymakers, with valuable insights to develop more effective, inclusive, and forward-thinking innovation strategies for sustainable tourism and hospitality businesses by examining the cause-and-effect relationships among the identified barriers. It contributes to sustainable organizational growth, consistent with Sustainable Development Goal 8 (Decent work and Economic Growth). It is essential for the development of service businesses that are not only economically advantageous but also socially equitable and environmentally responsible.

Keywords- Innovative work behavior, Innovative behavior, Sustainable development, Hospitality industry, Tourism industry, Decision Making Trial and Evaluation Laboratory (DEMATEL).

1. Introduction

Business organizations and employees need to be proactive to survive and achieve their business objectives in the current environment of ongoing industrial disruptions. Successful organizations utilize innovation as a strategic tool to drive change and sustain their operations. An idea, thought, or behavior that is totally novel and distinct from those that are currently in use or practice can be considered innovative. Most people agree that a firm's competitive advantage is largely determined by its level of innovation (Battistelli et al., 2014; Gogoi & Barua, 2021). Innovation is the capacity and tendency of people to think and act in a manner that is distinct from the norm. It offers customers the best products, services, and experiences from the service industry's perspective. It is important to prioritise delivering unique customer service while maintaining revenue and profitability. This requires leaders of all service organizations, particularly those in the Hospitality and Tourism (HT) sector, to establish a platform that encourages active, innovative employee participation in their work. This will lead to the creation of new, useful products, processes, and approaches. Therefore, organizations need to understand the process by which innovations develop. According to Janssen (2000), innovative behavior is "the deliberate development, introduction, and application of new ideas at the workplace, to benefit role performance, the group, or the organization". Innovative work behavior (IWB) is defined as the culmination of all cognitive or physical work activities in which employees engage, either alone or in a group, to produce, disseminate, and implement ideas that are novel and relevant to their particular workplace (Messmann & Mulder, 2012). It is considered a multi-stage process as its operationalization was divided into five stages: idea generation, idea exploration, idea promotion, idea implementation, and idea reflection (Gogoi & Barua, 2021).

However, the significant social and environmental impact of the HT sector receives special attention as sustainable concerns grow and the need for sustainable practices across the service industries increases. Sustainability in the context of the HT businesses means the ability of firms and destinations to operate in ways that balance social well-being, long-term environmental protection, and economic viability while continuously fostering innovation. It involves minimizing ecological footprints (e.g., energy use, emissions, waste), supporting local communities and cultures, and ensuring stable economic growth and competitiveness. The need to improve economic and social benefits for local people and to minimize ecological damage makes it imperative for HT businesses to adopt sustainable practices (Streimikiene et al., 2021). In this study, sustainability aligns with the triple bottom line approach, such as environmental (resource efficiency, climate responsibility), social (employee well-being, community engagement, cultural preservation), and economic (profitability, resilience, and innovation-driven growth). Additionally, it connects to the United Nations Sustainable Development Goals (SDGs), particularly SDG 8 (Decent Work and Economic Growth), SDG 9 (Industry, Innovation, and Infrastructure), and SDG 11 (Sustainable Cities and Communities). Despite a common understanding of these needs, integrating innovative work practices to promote sustainability in the HT sector remains challenging. According to Elkhwesky et al. (2024) and Avilés-Sacoto et al. (2026), these challenges range from organizational obstacles to individual-employee barriers, infrastructural deficiencies, and financial constraints to technological gaps and cultural resistance to change, etc. These obstacles (barriers) influence the operational activities of businesses as well as the strategic sustainability decisions they make.

Numerous studies have been conducted to measure and comprehend the various factors that influence or drive IWB (Janssen, 2000; Kim & Lee, 2013; Widmann & Mulder, 2018; Bahuguna et al., 2024). But it is also necessary to know the impact of barriers that often hinder the innovative activities of businesses (Leal-Rodríguez et al., 2014; Adeyeye et al., 2018). Also, the literature remains fragmented in scope and methodological integration. Previous studies have mainly focused on the direct effects of internal versus external obstacles on innovativeness, as well as the moderating role of various leadership styles in mitigating these barriers (Durmusoglu et al., 2018). Furthermore, research on technological and smart

tourism has identified dimensions such as usage, risk, and value barriers that influence behavioral intentions (Zhang et al., 2024). Others have implemented techniques such as DEMATEL to differentiate between cause-and-effect relationships among financial, strategic, and policy-related constraints, with a focus on stakeholder collaboration and leadership support as the main causes (Chountalas et al., 2024). Inter-industry analyses have identified psychological, cultural, and structural barriers as major predictors, while individual-level studies have examined motivational and knowledge-sharing factors that influence innovative behavior. Furthermore, the application of multi-criteria decision-making techniques (e.g., AHP-TOPSIS) in research has primarily focused on identifying sustainability drivers and strategies, rather than on the systematic linking of barrier categories (Li et al., 2024). Despite these contributions, there is an evident research gap in the provision of a comprehensive, integrated framework that explicitly maps the interrelationships of barriers in the context of sustainable development, categorizing them into organizational, individual, technical (as causal factors), team, cultural (as effect factors), and environmental influences. In addition, there has been inadequate consideration of integrating multi-level barriers (individual, team, organizational, and environmental) into a single causal model using DEMATEL. The Decision-Making Trial and Evaluation Laboratory (DEMATEL) technique used in the current study can help HT firms focus their policies by breaking down barriers into causes and effects. This makes the study unique and novel, and the results obtained from a review of available literature serve as the motivation for our investigation. The study employs the DEMATEL approach due to its effectiveness in assessing interdependencies among variables. It is necessary to know that the barriers should be analyzed together, not individually. A setback or improvement in a single barrier cannot be interpreted as a decline or growth in the overall performance of employees. Therefore, the DEMATEL approach is used to map the relationships among the factors.

Hence, the study aims to address the challenges faced by the HT industries as they move to innovative work practices for sustainable development. It contributes to the body of existing research by offering a comprehensive framework for IWB, which bridges the gap between micro- and macro-level perspectives. It also provides a more systematic comprehension of how various barrier categories interact to influence sustainable innovation in the HT sectors. The study provides policymakers with more information and encourages employees to show creativity in the workplace. Therefore, the objective of the study is to fill the gap found by analyzing previous studies by offering a list of barriers specific to the HT industry. Thus, this study provides answers to the following research questions:

RQ 1. What are the important barriers to IWB in the HT Industry?

RQ 2. In the HT businesses, what are the cause-and-effect relations among the barriers to IWB?

RQ 3. What steps should be taken to remove or minimize these barriers?

The present study provides policymakers, stakeholders, and business leaders with crucial insights essential for developing effective future strategies by clarifying these relationships. As a result, this study makes a distinctive contribution to the literature by showing how multi-criteria decision-making procedures can be applied to encourage IWB that promotes sustainable practices in the service industry. The study comprises five sections. It begins with the introduction, which outlines the research gap and highlights the importance of investigating the HT sector. This section clarifies the objective of the study. Further, the literature review of barriers in Section 2 provides the theoretical and historical context of IWB. It consists of a list of barriers based on previous studies. Section 3 of the study identifies the research model. Moreover, Section 4 consists of the discussion and managerial implications. Finally, Section 5 includes the conclusion, study limitations, and future research scope of the study.

2. Literature Review

This section examines the barriers to IWB that help in the sustainable development of HT industries through a thorough review of the previous literature. Extant literature delineates various barriers that act as obstacles in the firm's innovativeness (Zeng et al., 2010; Zhang et al., 2022). The studies also indicate that some of these obstacles may actually aid organizational learning and stimulate innovation activities (Durmusoglu et al., 2018). Some studies differentiate barriers to innovation into external and internal factors to the firm (Hadjimanolis, 1999; Galia & Legros, 2004). Access to resources (such as technical expertise and internal funds), the organization's culture, and human nature (such as employee resistance to innovation and the top management team's attitude toward risk) are some factors that lead to an industry's exposure to internal innovation barriers. Whereas industries may experience external barriers to innovativeness due to supply (like difficulties in obtaining raw materials, external financial resources, and access to cutting-edge technologies), demand (like generation of customer demand, limitations of the foreign and domestic markets), and environmental (such as government mandates and policy prescriptions) factors. Previous studies revealed various barriers that act as obstacles to IWB in the sustainable HT industry. All these are divided into six main barriers, such as organizational barriers, team and interpersonal barriers, individual employee barriers, external environmental barriers, cultural and social barriers, and technological barriers, as shown in **Figure 1**. These barriers are further elaborated into eighteen sub-barriers, which are shown in **Figure 3** in the methodology section.

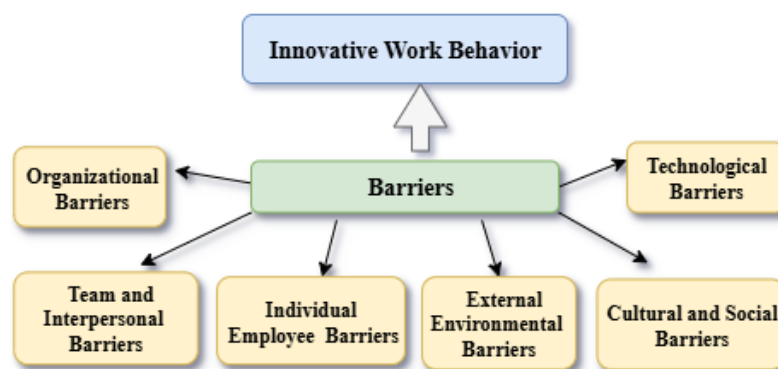


Figure 1. Main barriers to innovative work behavior in the HT industry.

2.1 Organizational Barriers

Organizational barriers are the structural and managerial factors that are derived from the organization's internal system. These factors include organizational policies, leadership styles, decision-making processes, resource availability, and management support. The organizational barriers are the most important internal issues that limit sustainable development and IWB within the workplace in the HT industry. Service industries require creativity and flexibility to compete. The inflexibility in the organization, manifested through rigid rules, old systems, and short-term financial perspectives, stifles innovation, encourages inertia, and weakens socio-economic and environmental sustainability innovations by focusing on short-term monetary gains instead of long-term socio-economic and environmental objectives (Cordeiro & Vieira, 2012; Bigliardi & Galati, 2016). Moreover, resource limitations such as lack of finances, qualified human capital and technology augment risk perceptions, which limit investments in research, training and green technologies, leading to decreased experimentation (Najda-Janoszka & Kopera, 2014). These barriers are further intensified by leadership style since conservative, authoritarian, or efficiency-oriented leadership strategies reduce IWB and discourage risk-taking activities, resulting in slow transitions towards

sustainability. Conversely, green creativity, employee motivation, and community-oriented innovation are improved by the use of ambidextrous and transformational types of leadership styles, which are characterised by vision, empowerment, and balancing between exploitation and exploration (Orfila-Sintes & Mattsson, 2009; Ajmal et al., 2025). Thus, the barriers enhance risk aversion and a lack of interest, which highlights the significance of sufficient resources, elastic systems, and visionary leadership to incorporate innovation as a source of sustainable growth.

2.2 Team and Interpersonal Barriers

Team and interpersonal barriers are important obstacles to IWB within the HT industry, as the delivery of services and creativity heavily rely on human interaction (Sadi & Al-Dubaisi, 2008). These barriers reduce trust, morale and readiness of employees to work innovatively. Also, a lack of effective communication reduces cooperation and alignment, and exclusion from decision-making activities makes employees less motivated and committed to innovative activities. The stagnant environments that reduce risk-taking activities among employees occur due to poor team dynamics, lack of cohesion, resistance to change, and interpersonal conflicts. Whereas Cooperative activity is positively related to innovativeness (Sundbo et al., 2007; Trigo & Vence, 2012). Therefore, these barriers occur due to dysfunctional teamwork, weak communication and a lack of supportive relationships between management and employees. However, interpersonal barriers can be overcome by promoting teamwork, enhancing communication, and developing healthy management-employee trust to reduce resistance.

2.3 Individual Employee Barriers

Individual employee factors are another important group of impediments to IWB in HT firms, where employee competencies, psychology, and motivation have a direct impact on their ability to contribute to sustainability-oriented innovation. They prevent firms from building new products and services to the full extent because of a lack of labour and reduced absorptive capacity that is exacerbated by seasonal demand, low wages, and lack of training opportunities (Najda-Janoszka & Kopera, 2014; González-González & Garcia-Almeida, 2021). The lack of skills and knowledge among the employees is an important obstacle that prevents IWB in the service industries. Industries that penalize failures create an inertia that hinders the importance of adopting sustainable practices and experimentation due to fear of failure, resistance to change, and risk aversion, which in turn hinders creativity (Saleem et al., 2021; Mandić et al., 2025). Therefore, these personal-level obstacles undermine the creativity of the workers and halt the achievements of sustainable development, and thus it is necessary to ensure that organizations invest in constant training, enabling environments, and incentive systems that help workers to be creative.

2.4 External Environmental Barriers

The effect of these barriers on sustainable innovation in the HT industry is tremendous, and it presents various challenges that most organizations cannot easily handle. Market and customer pressures frequently delay or derail innovation, as lack of awareness, reluctance to switch from established services, and low societal readiness restrict the adoption of new. In hospitality, where responsiveness to customer needs is critical, conservatism and demand volatility make sustainability-oriented innovations appear risky, while high competition and seasonal fluctuations push firms toward incremental rather than transformative changes (Sembiring & Sitorus, 2022). It has been shown by previous research that external pressures may weaken creativity unless organizations strategically adapt and build network-based collaborations (Kitsios and Grigoroudis, 2020; Espino-Rodríguez & Berdejo-Farina, 2025). The regulatory constraints also serve as another source of challenge, as rigid laws, high compliance costs, unstable institutional support, and misaligned policies lower the flexibility of organizations and deter risk-taking actions (Wong & Pang, 2003). Thus, such market, competition and regulatory barriers lower the innovativeness of firms, and it is

crucial that customers should be educated, stronger partnerships and supportive policy frameworks be put in place to align the sector with the long-term sustainability objective.

2.5 Cultural and Social Barriers

Social and cultural barriers are the shared values, beliefs, norms, communication patterns, interpersonal relationships, diversity & inclusion issues, and social expectations that influence employees' willingness to generate and implement new ideas. Social and cultural factors are the most crucial barriers to innovative behavior, as they influence personal attitudes and corporate processes, including absorptive capacity, knowledge sharing, and employee engagement. Workplace Culture typically determines whether IWB is nurtured or suppressed. It has been found that a rigid workplace culture, low managerial commitment, and a lack of emotional intelligence inhibit innovation and knowledge creation (Rivera-Vazquez et al., 2009). In hospitality businesses, fostering openness, trust, and recognition supported by reward systems and participatory practices is essential to counter cultures of conformity that discourage risk-taking activities. Furthermore, there is the issue of diversity and inclusion that makes it complex. Even though diversity may enhance innovation due to the provision of different perspectives, but lack of proper inclusion strategies, prejudices, and insufficient use of talent management may result in marginalization, poor collaboration and under-exploration of talent, which consolidates cultural silos and minimizes innovation processes (Rivera-Vazquez et al., 2009). Thus, culture is not the only factor limiting sustainable innovation, and more extensive social norms and expectations are in place to prevent any type of employee who is facing hierarchical control, pressure to conform and fear of failure (Mandić et al., 2025).

2.6 Technological Barriers

Technological barriers are also significant in facilitating or limiting innovation in the HT sector (Bahuguna et al., 2024), with physical and digital infrastructure as a core of sustainable development. Nevertheless, the adoption remains limited due to a lack of investment, IT skills, and systemic factors such as compatibility, security, and privacy risks that are disproportionately high in developing countries. Limited access to advanced tools and financial constraints restrict the use of smart technologies, such as AI, IoT, and automation, due to their transformative potential (Ivanov & Webster, 2019; Singh & Taterh, 2023; Ersoy, 2024). Simultaneously, technology overload, characterized by a rapid rate of change and data saturation, results in inefficiency, fragmented decision-making, and burnout among employees. This reduces organizational absorptive capacity and introduces change resistance (Shin et al., 2023; Ersoy, 2024). In addition, the employment of employees perceived as being threatened by automation and AI, and concerns regarding their privacy, security, and legal aspects, also create an organizational inertia. Consequently, these points highlight the possibility that firms may fall behind in sustainable innovation without strategic leadership, training in digital literacy, and policy support. On the other hand, organizations can effectively address the technological barrier and create resilience to develop sustainably in the long term through promoting adaptability, collaboration, and learning (Ersoy, 2024).

3. Research Methodology

3.1 Research Model

A comprehensive strategy and a holistic approach are required to expedite the process of IWB of employees of HT businesses. Hence, it is necessary to adopt strategies that incorporate both research findings and business practice criteria, which are pertinent to service industry barriers. Consequently, the research paradigm illustrated in **Figure 2** was implemented.

According to the previous research studies for applying the DEMATEL approach, the expert panel size should range from 5 to 15 participants (Okoli & Pawlowski, 2004; Ada et al., 2023). In this study, eight experts from the HT firms have been selected, such as the Head of Sales & Marketing, the Senior Project

Manager, and the General Manager. To ensure their participation in executive decisions, the experts were chosen on the basis of their seniority level, experience in the HT sector, organizational position, and the involvement of their companies in motivating creative activities at the workplace.

In the DEMATEL methodology, the adequacy of the sample size is determined by the expertise of the participants, rather than the number of respondents. DEMATEL is an expert-driven technique that is based on pairwise comparisons, in contrast to statistical models that require large datasets. The chosen panel size ($n = 8$) is within the permissible range recommended in the literature and is adequate for the establishment of a consistent causal relationship among factors. Prior research confirms that small, well-qualified expert groups are appropriate for such methodologies. Further, reliability and consistency were ensured through the structured DEMATEL framework and the use of a predefined influence scale, which promotes uniform interpretation among experts. Responses are compiled to further reduce subjective inconsistencies. Furthermore, we tested the logical consistency of the matrices resulting from the responses and investigated any extreme deviations. Moreover, to minimize expert bias, multiple methodological precautions were implemented. Initially, experts were selected from diverse professional backgrounds to ensure heterogeneity of knowledge and perspectives. However, to standardize responses and mitigate subjective ambiguity, a structured questionnaire based on the DEMATEL scale (0-4) was employed. Additionally, aggregating individual expert judgements into an average matrix helps dilute individual biases and provides a collective representation of opinions. Furthermore, the risk of dominance bias and social desirability effects was reduced as anonymity was maintained during the data collection. Moreover, expert judgements were validated through a consensus-based approach. The compilation of multiple expert opinions gave a stable and representative outcome, while the use of a standardized DEMATEL scale reduced ambiguity in responses. Furthermore, the total relation matrix was examined for logical consistency and coherence in the responses. Where necessary, clarifications were obtained from experts. This approach aligns with widely accepted validation practices in expert-based decision-making methods (Dalkey & Helmer, 1963). **Table 1** below displays the details related to the expert group.

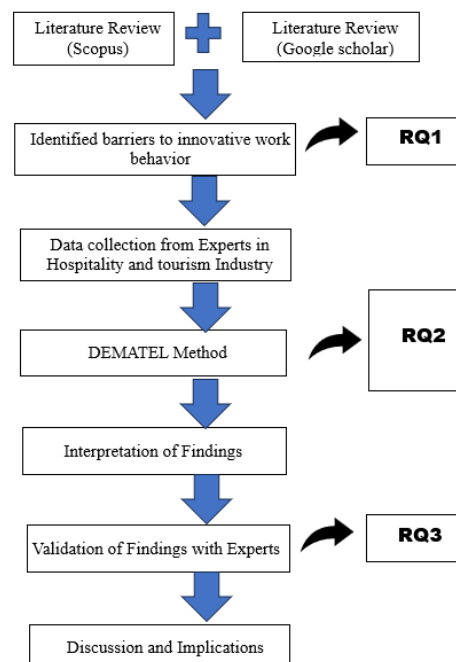


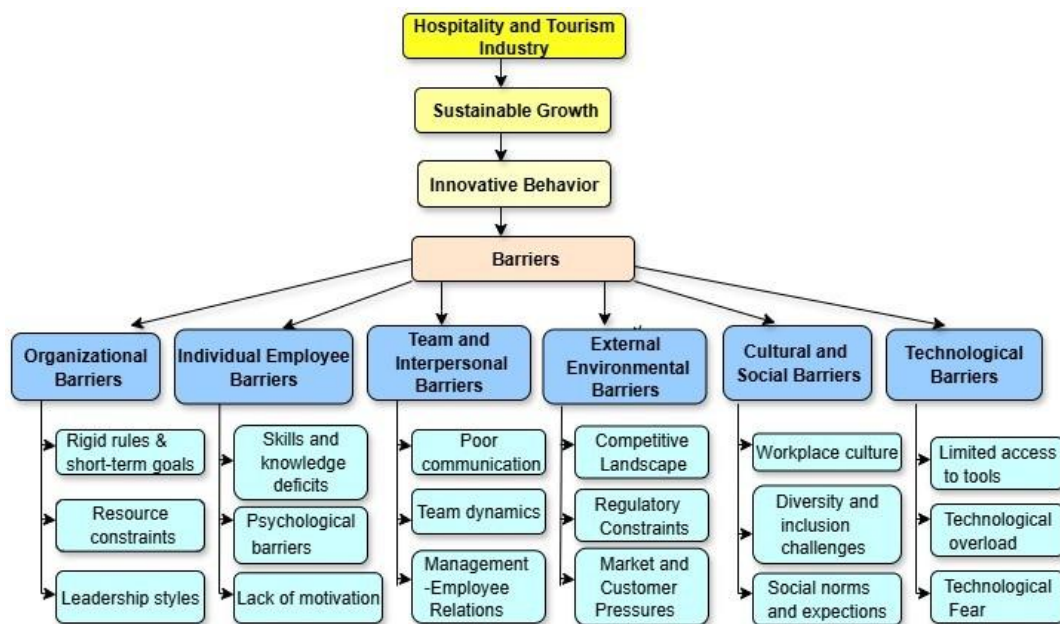
Figure 2. Research model of the study.

Table 1. Experts' experience.

S. No.	Job profile	Experience (Years)
1.	Senior Manager HR	21
2.	Junior Manager HR	5
3.	HR Recruiter	11
4.	Deputy Project Manager	8
5.	Senior Project Manager	12
6.	Team leader	7
7.	Head of Sales and Marketing	19
8.	General Manager	24

3.2 Barriers against IWB in Hospitality and Tourism Businesses

Six main barriers and eighteen sub-barriers that hinder IWB in HT businesses were discovered from previous studies and validated by the experts. The resulting barriers in the present study and the answer to RQ1 of the research are shown in **Figure 3**. All these main barriers and sub-barriers are discussed in **Table 11**.

**Figure 3.** Main and sub-barriers of IWB in the HT industry.

3.3 DEMATEL Method

Radulescu & Radulescu (2025) developed the DEMATEL at the Geneva Research Centre of the Battelle Memorial Institute in the early 1970s. DEMATEL has been widely applied across diverse disciplines. A comprehensive systematic review of its applications is provided by Si et al. (2018) in their study. This method of structural modelling is particularly useful for the analysis of system components and can be used to verify the interdependence of elements (factors). As a result, it offers the chance to depict the relative relationships between the elements. Besides its utility in elucidating cause-and-effect relationships among

the elements, it is also effective in identifying critical elements and sorting them by impact (Si et al., 2018; Ada et al., 2023). It is executed with the following stages(steps).

First- Generating the group direct influence matrix $[Z]$

In the first step, a five-level integer scale is made. It ranges from zero (0) to four (4), as illustrated in **Table 2**. The experts used this scale to assess the relationships between elements.

Table 2. Comparison scale.

Integer value	Linguistic variables
0	No - Influence
1	Low - Influence
2	Medium- Influence
3	High-Influence
4	Very high - Influence

To evaluate the relationships between n number of criteria $C = (C_1, C_2, C_3, C_4, \dots, C_n)$, experts are expected to assess the pairwise effect of each criterion on the other criteria (Ada et al., 2023). This entails assigning an integer value from the scale in **Table 2** to know the influence of C_x on C_y . The outcome obtained is a direct relation matrix that is unique to each expert. The judgment of each expert regarding the influences of elements on other elements in a matrix with a principal diagonal value of zero is represented by individual direct relation matrixes. The group direct relation matrix Z is derived by aggregating all experts' judgments (Ada et al., 2023).

$$Z = 1/n (\sum Z_{xy}) \quad x, y = 1, 2, 3, 4, \dots, n \quad (1)$$

Second- Normalized direct influence matrix $[X]$

By employing the group direct relation matrix, Z , formulas (2) and (3), the normalized direct influence matrix, X , is generated as

$$X = Z / s \quad (2)$$

$$s, \max 1 \leq x \leq n \sum_{y=1}^n Z_{xy} \quad (3)$$

Third- Total relation matrix $[T]$

The "total relation matrix" is the total of all effects, both direct and indirect. It is calculated as follows. where, I stand for the identity matrix.

$$T = X + X^2 + X^3 + X^4 + \dots + X^h = X(I - X)^{-1}, \text{ if } h \rightarrow \infty \quad (4)$$

Fourth- Matrix of Influential Relation $[IRM]$

As the experts' assessments are based on the degree of influence of an element in a row on all other variables in the columns, the total effect is calculated by adding up the values in a row from rx to all other elements. Using the same technique, the values in a column are summed to determine the overall impact cy receives. The vectors of C and R are the sums of the rows and columns of the total relation matrix, and they are constructed as follows:

$$R = [rx]_{nm1} = [\sum_{y=1}^n t_{xy}]_{nm1} \quad (5)$$

$$C = [cy]_{1mn} = [\sum_{y=1}^n t_{xy}]_{1mn} \quad (6)$$

The sum of the above two vectors (R+C) is hence referred to as prominence. It provides details on the strength of the impacts that a factor gives and receives, which can be stated as the order of the system's components based on their relative importance. Similarly, a relation is the difference between the vectors (R-C), which shows the information about the net influence of a factor. In other words, the positive-valued elements affect the others (cause group). The factors that are affected (the effect group) are the ones that are adversely evaluated. The graph of prominence and relation is therefore a useful tool for establishing cause-and-effect links among the components of a system as well as for carrying out assessments and analyses to make decisions.

3.4 Findings

Eight professionals from top hospitality firms took part in the study. Every expert is focusing on innovative practices within their companies. Additionally, respondents' levels of experience in the HT industries range from 5 to 24 years. The focus group's dependability and representativeness are derived from the variety of specialists and their experience in the service industry. Experts in the study have employed six primary criteria and eighteen sub-factors to formulate their judgments. Microsoft Excel is utilized to solve matrixes. Eight experts' views were gathered, and their perspectives were then combined to create the group direct-relation matrix presented in **Table 3** for main barriers and **Table 4** for sub-barriers.

Table 3. Direct relation matrix (TF) of main barriers.

Main barriers	B1	B2	B3	B4	B5	B6
B1	0	4	4	0	4	4
B2	3	0	3	1	3	1
B3	3	4	0	4	3	3
B4	4	1	3	0	3	2
B5	3	3	3	2	0	3
B6	3	2	3	3	3	0

Table 4. Direct relation matrix (TF) of sub-barriers.

Sub barriers	B11	B12	B13	B21	B22	B23	B31	B32	B33	B41	B42	B43	B51	B52	B53	B61	B62	B63
B11	0	3	2	4	0	2	2	0	4	2	3	0	4	2	0	4	2	1
B12	3	0	3	3	3	3	3	3	3	1	3	2	4	3	3	4	3	3
B13	3	3	0	2	3	3	3	4	4	0	2	0	3	2	3	2	3	3
B21	4	3	1	0	0	1	0	0	0	2	3	0	3	0	0	2	1	0
B22	0	3	4	1	0	4	2	3	3	0	0	0	3	0	2	2	2	3
B23	2	3	4	2	4	0	4	4	4	0	2	1	4	2	3	0	3	3
B31	0	3	4	0	3	4	0	4	4	2	3	2	3	2	3	3	2	4
B32	1	2	4	0	2	1	3	0	4	2	1	0	4	3	3	3	3	4
B33	0	0	4	0	1	3	4	3	0	0	1	0	4	2	2	0	2	4
B41	4	4	3	2	0	1	2	2	2	0	3	4	3	3	2	1	2	3
B42	4	4	3	3	1	3	4	3	2	3	0	2	3	2	3	3	3	3
B43	4	4	3	4	0	0	3	3	3	4	3	0	3	3	3	4	3	3
B51	4	4	3	3	4	4	4	3	3	3	3	3	0	3	3	3	3	3
B52	3	3	2	2	3	4	4	3	2	2	2	3	3	0	3	3	3	3
B53	2	3	3	2	2	3	3	2	3	0	2	2	3	2	0	2	0	3
B61	3	2	4	3	1	2	4	3	3	3	3	2	3	0	0	0	2	3
B62	3	3	3	3	1	2	4	3	3	3	2	0	3	0	0	2	0	3
B63	2	3	3	3	2	3	4	4	3	2	2	0	3	1	1	3	4	0

Equations (2) and (3) are used to obtain the normalized direct influence matrix once the group direct-influence matrix has been obtained. These equations represent the experts' overall assessment, which is presented in **Table 5** (main barriers) and **Table 6** (sub-barriers).

Table 5. Normalized direct relation matrix (TF) of main barriers.

Main barriers	B1	B2	B3	B4	B5	B6
B1	0	0.235	0.235	0	0.235	0.235
B2	0.176	0	0.176	0.058	0.176	0.058
B3	0.176	0.235	0	0.235	0.176	0.176
B4	0.235	0.058	0.176	0	0.176	0.117
B5	0.176	0.176	0.176	0.117	0	0.176
B6	0.176	0.117	0.176	0.176	0.176	0

Table 6. Normalized direct relation matrix (TF) of sub- barriers.

Sub barriers	B11	B12	B13	B21	B22	B23	B31	B32	B33	B41	B42	B43	B51	B52	B53	B61	B62	B63
B11	0	0.054	0.036	0.072	0	0.036	0.036	0	0.072	0.036	0.054	0	0.072	0.036	0	0.072	0.036	0.018
B12	0.054	0	0.054	0.054	0.054	0.054	0.054	0.054	0.036	0.054	0.054	0.054	0.072	0.054	0.054	0.072	0.054	0.054
B13	0.072	0.072	0	0.054	0.072	0.054	0.054	0.072	0.072	0	0.072	0	0.072	0.054	0.072	0.054	0.072	0.072
B21	0.072	0.054	0.018	0	0	0.018	0	0	0	0.036	0.054	0.018	0.054	0	0.018	0.036	0.018	0
B22	0.018	0.036	0.036	0.018	0	0.036	0.018	0.054	0.036	0.018	0.018	0	0.054	0	0.036	0.036	0.036	0.036
B23	0.036	0.036	0.018	0.036	0.036	0	0.054	0.036	0.054	0.018	0.036	0.018	0.054	0.036	0.054	0	0.054	0.036
B31	0	0.054	0.072	0	0.054	0.072	0	0.072	0.072	0.036	0.054	0.036	0.054	0.036	0.054	0.054	0.036	0.072
B32	0.018	0	0.054	0	0.036	0.018	0.054	0	0.054	0.036	0.018	0	0.054	0.054	0.054	0.054	0.054	0.072
B33	0.072	0.036	0.054	0.036	0.072	0.054	0.072	0.054	0	0.054	0.072	0.036	0.072	0.054	0.036	0.036	0.054	0.072
B41	0.018	0.054	0.036	0.036	0	0.018	0.036	0.036	0.036	0	0.054	0.036	0.018	0.036	0.036	0.018	0.036	0.036
B42	0.072	0.072	0.054	0.054	0.018	0.054	0.072	0.054	0.036	0.054	0	0.036	0.054	0.036	0.054	0.054	0.054	0.054
B43	0.072	0.072	0.054	0.072	0	0	0.054	0.054	0.054	0.072	0.054	0	0.054	0.054	0.054	0.072	0.054	0.054
B51	0.036	0.018	0.036	0.054	0.036	0.018	0.036	0.054	0.054	0.036	0.054	0.018	0	0.054	0.036	0.054	0.036	0.036
B52	0.018	0.036	0.018	0.036	0.036	0.018	0.018	0.036	0.018	0.036	0.036	0.036	0.054	0.036	0	0.018	0.036	0.036
B53	0.018	0.018	0.036	0.036	0.018	0.036	0.054	0.036	0.036	0.018	0.036	0.036	0.018	0.036	0	0.036	0.018	0.018
B61	0.054	0.036	0.018	0.054	0.018	0.036	0.054	0.018	0.036	0.054	0.054	0.036	0.054	0.018	0.018	0	0.036	0.054
B62	0.054	0.072	0.054	0.054	0.036	0.054	0.072	0.054	0.072	0.054	0.054	0.036	0.054	0.036	0.036	0.036	0	0.054
B63	0.072	0.054	0.054	0.054	0.036	0.054	0.072	0.072	0.054	0.054	0.036	0.036	0.054	0.054	0.054	0.054	0.072	0

Table 7. Total relation matrix (TF) of main barriers.

Main barriers	B1	B2	B3	B4	B5	B6
B1	0.898	1.055	1.111	0.626	1.111	0.974
B2	0.809	0.634	0.825	0.499	0.825	0.636
B3	1.091	1.072	0.954	0.821	1.104	0.956
B4	0.968	0.797	0.940	0.517	0.940	0.785
B5	0.954	0.911	0.969	0.645	0.819	0.846
B6	0.962	0.869	0.975	0.696	0.975	0.703

Table 8. Total relation matrix (TF) of sub-barriers.

Sub barriers	B11	B12	B13	B21	B22	B23	B31	B32	B33	B41	B42	B43	B51	B52	B53	B61	B62	B63
B11	0.107	0.157	0.130	0.169	0.076	0.125	0.146	0.102	0.178	0.125	0.167	0.066	0.193	0.124	0.092	0.174	0.137	0.126
B12	0.202	0.150	0.191	0.194	0.159	0.180	0.213	0.201	0.212	0.164	0.213	0.143	0.246	0.182	0.186	0.222	0.201	0.209
B13	0.227	0.226	0.149	0.201	0.186	0.191	0.224	0.227	0.239	0.137	0.237	0.097	0.258	0.189	0.211	0.215	0.227	0.235
B21	0.136	0.119	0.078	0.066	0.044	0.073	0.071	0.062	0.071	0.092	0.124	0.057	0.130	0.057	0.074	0.104	0.082	0.066
B22	0.098	0.113	0.110	0.093	0.060	0.105	0.106	0.133	0.122	0.086	0.104	0.048	0.147	0.072	0.108	0.117	0.116	0.120
B23	0.133	0.134	0.113	0.128	0.108	0.087	0.160	0.136	0.160	0.104	0.142	0.079	0.170	0.122	0.142	0.103	0.151	0.140
B31	0.139	0.188	0.199	0.130	0.156	0.189	0.153	0.212	0.218	0.152	0.198	0.119	0.215	0.158	0.181	0.192	0.176	0.217
B32	0.120	0.105	0.150	0.098	0.113	0.110	0.166	0.107	0.165	0.124	0.130	0.065	0.174	0.143	0.146	0.157	0.156	0.180
B33	0.218	0.187	0.194	0.177	0.177	0.182	0.231	0.204	0.163	0.181	0.229	0.125	0.247	0.183	0.171	0.190	0.203	0.227
B41	0.111	0.146	0.122	0.122	0.067	0.097	0.135	0.128	0.133	0.080	0.151	0.093	0.127	0.116	0.119	0.113	0.127	0.132
B42	0.211	0.213	0.186	0.188	0.120	0.176	0.223	0.194	0.190	0.174	0.154	0.122	0.222	0.160	0.181	0.199	0.194	0.201
B43	0.216	0.217	0.189	0.209	0.104	0.126	0.209	0.195	0.208	0.196	0.211	0.091	0.225	0.179	0.181	0.221	0.196	0.204
B51	0.142	0.125	0.134	0.152	0.111	0.109	0.149	0.157	0.164	0.127	0.166	0.083	0.126	0.143	0.130	0.161	0.141	0.147
B52	0.108	0.125	0.101	0.120	0.097	0.093	0.114	0.124	0.113	0.113	0.1302	0.107	0.140	0.077	0.098	0.127	0.124	0.145
B53	0.101	0.102	0.113	0.112	0.078	0.106	0.141	0.118	0.124	0.089	0.1247	0.086	0.117	0.107	0.075	0.120	0.101	0.106
B61	0.159	0.144	0.118	0.154	0.092	0.126	0.166	0.123	0.149	0.145	0.1675	0.100	0.178	0.110	0.113	0.109	0.140	0.162
B62	0.197	0.214	0.188	0.188	0.141	0.177	0.225	0.197	0.224	0.176	0.2082	0.123	0.224	0.162	0.166	0.184	0.145	0.204
B63	0.217	0.202	0.192	0.193	0.143	0.181	0.230	0.217	0.214	0.1807	0.196	0.126	0.230	0.182	0.186	0.205	0.217	0.158

Equation (4) is used to compute the total relation matrix, which is presented in **Table 7** for the primary barriers and in **Table 8** for the sub-barriers.

To demonstrate the structural model, the R+C and R-C values are calculated using Equation (5) and are shown in **Table 9** for major barriers and **Table 10** for sub-barriers, along with a summary of the numerical results.

Table 9. R+C and R-C dataset of the main barriers.

Main barriers	R	C	R+C	R-C	Cause/effect
B1	5.779	5.683	11.463	0.095	Cause
B2	4.230	5.340	9.571	-1.110	Effect
B3	6.002	5.777	11.780	0.224	Cause
B4	4.950	3.806	8.757	1.143	Cause
B5	5.146	5.777	10.923	-0.631	Effect
B6	5.182	4.903	10.085	0.278	Cause

Table 10. R+C and R-C dataset of sub barriers.

Sub barriers	R	C	R+C	R-C	Cause/effect
B11	2.403	2.850	5.253	-0.447	Effect
B12	3.478	2.876	6.355	0.601	Cause
B13	3.682	2.665	6.348	1.016	Cause
B21	1.514	2.701	4.215	-1.187	Effect
B22	1.866	2.040	3.906	-0.174	Effect
B23	2.320	2.443	4.763	-0.122	Effect
B31	3.200	3.070	6.270	0.130	Cause
B32	2.417	2.848	5.265	-0.431	Effect
B33	3.498	3.056	6.554	0.442	Cause
B41	2.129	2.454	4.583	-0.325	Effect
B42	3.316	3.058	6.374	0.257	Cause
B43	3.385	1.736	5.121	1.649	Cause
B51	2.474	3.376	5.851	-0.902	Effect
B52	2.066	2.475	4.541	-0.409	Effect
B53	1.929	2.570	4.499	-0.640	Effect
B61	2.465	2.921	5.387	-0.456	Effect
B62	3.351	2.842	6.194	0.509	Cause
B63	3.478	2.988	6.466	0.490	Cause

Based on these values, the resulting prominence-relation summary is illustrated in **Figures 4** and **5** for the main and sub-barriers, respectively.

A summary is provided in **Table 11** based on the numerical findings presented in **Tables 7** and **9** for main barriers and **Tables 8** and **10** for sub-barriers. In addition to the cause-and-effect groupings of elements about barriers to IWB in the HT industries, the table provides a detailed description. R+C values are used to determine the criteria's relevance, as a higher value indicates that the component in question is more important. The managerial implications explanations, which address RQ2, are provided below.

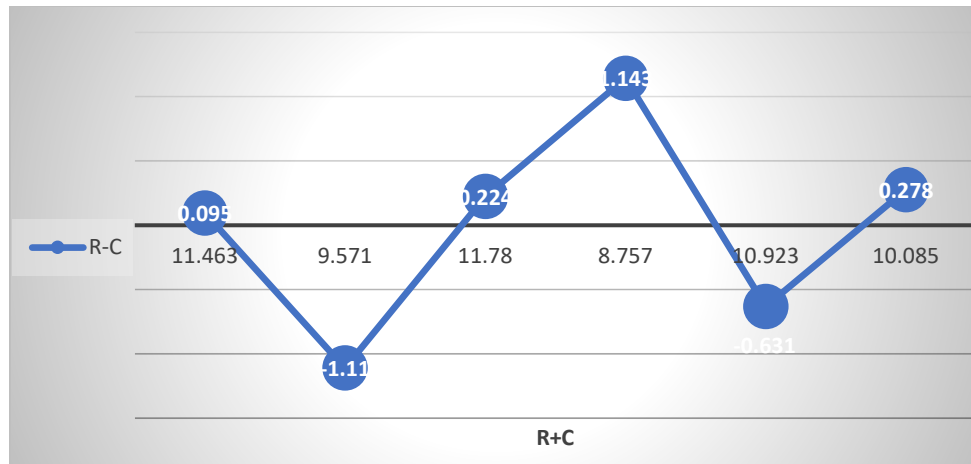


Figure 4. Prominence-relation summary for main barriers.

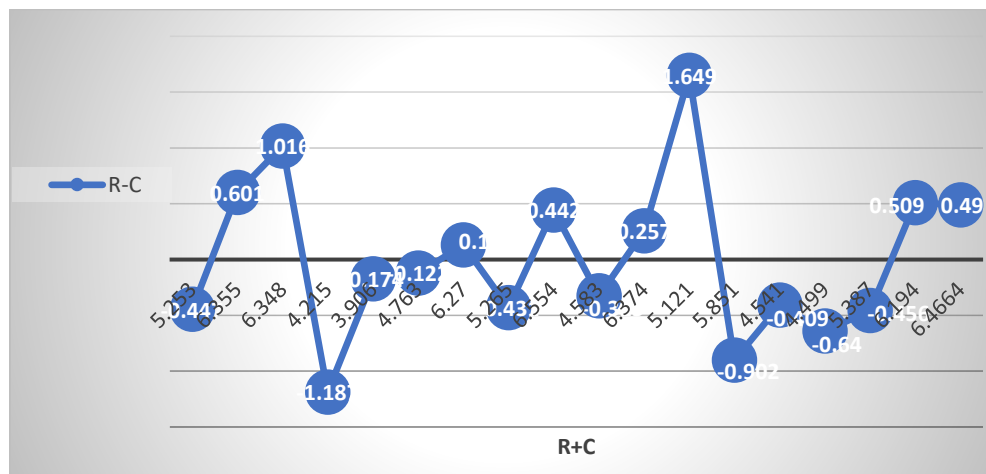


Figure 5. Prominence-relation summary for sub-barriers.

Table 11. Description of all main and sub barriers.

Barriers (Cause/Effect)		R-C	Description
B1	EXTERNAL ENVIRONMENTAL BARRIERS (Cause)	0.095	The external environmental barriers have a strong impact on sustainable development through the innovative behavior of firms. The primary factors that make companies concentrate on short-term survival and imitation rather than innovation are competitive pressures and changing demand (Kitsios & Grigoroudis, 2020; Espino-Rodríguez & Berdejo-Fariña, 2025). The additional factors that restrict the level of organizational flexibility and risk-taking include regulatory and political restraint, time pressure (inflexible rules) and bureaucratic evaluation (Wong & Pang, 2003). These external challenges are also enhanced by uncertainty and fear of failure. These factors are expressed in the form of effects on the market and customers (low awareness, unwillingness to change) and the unreadiness of society that is impacted by sustainable innovations.

Table 11 continued...

B11	Competitive Landscape (Effect)	-0.447	Competitive landscape is the effect that is shaped by the market dynamics and regulatory conditions. Intense competition and demand fluctuation are the strong external drivers of innovation. Although competition might stimulate creativity in some cases, it frequently leads to the fear of rapid obsolescence, high risk and imitation, discouraging long-term investment in sustainable innovation (Kitsios & Grigoroudis, 2020; Espino-Rodríguez & Berdejo-Fariña, 2025).
B12	<i>Regulatory Constraints</i> (Cause)	0.601	Compliance costs, rigid procedures, and uncertainty are a few of the issues associated with regulatory and political environments that constrain the ability of firms to be more flexible and risk-takers (Wong & Pang, 2003). Frequent contradictions in legislation and evaluation pressures intensify risk-aversion, making regulation a causal factor that indirectly influences organizational strategies.
B13	<i>Market and Customer Pressures</i> (Cause)	1.016	In the HT industry, organizations are encouraged to continuously enhance their products, services, and operational processes due to quickly changing customer preferences, increased need for customized & sustainable services, technology advancements and strong competition in the marketplace. Such external pressures encourage management to invest in new technologies, employee training, and a culture that promotes creativity and innovation. Thus, consumer and market pressure are the driving forces that stimulate innovative behavior and provide businesses with the possibilities to increase customer satisfaction, accomplish sustainable development and sustain long-term competitive advantage. Moreover, these barriers are the customer-side effects, including lack of awareness, unwillingness to change, and social inability to adopt new products or services. The conservative nature of customers restricts businesses from investing in sustainability-oriented innovation (Espino-Rodríguez & Berdejo-Fariña, 2025).
B2	TEAM AND INTERPERSONAL BARRIERS (Effect)	-1.110	Team and interpersonal barriers are mainly the effect that arises due to the organization and its leaders. When employees aren't involved in organizational decision-making activities, and their peers don't support them, team dynamics suffer. This leads to low commitment and less willingness to try new things. The organization's workplace activity is positively correlated with innovativeness (Sundbo et al., 2007; Trigo & Vence, 2012). However, its absence leads to interpersonal conflicts that are caused by ineffective leadership and rigid systems instead of the root causes. Thus, team and interpersonal barriers manifest themselves as reduced cooperation, communication issues, and low levels of relational trust, which make it harder for people to be creative in ways that lead to long-term growth.
B21	<i>Poor Communication</i> (Effect)	-1.187	Poor communication at the workplace is a result of a strict system and leadership that does not help. When managers don't want people to take risks and reject ideas too soon, creativity suffers, and employees lose trust in open dialogue (Wong & Pang, 2003; Cheng & Cho, 2011). Thus, communication issues are not primarily the problem but are the result of the problems with management and the organization.
B22	<i>Team Dynamics</i> (Effect)	-0.174	Weak team dynamics are caused by poor communication and a lack of cooperative practices. Research has shown a high level of correlation between cooperation and innovativeness (Trigo & Vence, 2012). However, in cases where workers do not feel valued and supported, peer cohesion is reduced, resulting in conflict and low morale. Consequently, team dysfunction is seen as an impediment that follows another thing in the causal chain.
B23	<i>Management–Employee Relationships</i> (Effect)	-0.122	The employee and management relationship is affected by the organizational culture. The morale of employees drops when feedback at the workplace is ignored, making workers less committed and less open to new innovative ideas (Wong & Pang, 2003). Hence, such relationships depend on the organizational rigidity and leadership style, which show up as less collaboration and trust that prevent innovation.
B3	TECHNOLOGICAL BARRIERS (Cause)	0.224	Technological barriers are an important factor that limits innovation in HT businesses because they create impacts like the inaccessibility of tools. These causes are enhanced by fear of technology and psychological resistance, which form great barriers and lead to reduced sustainable innovative behavior (Xu et al., 2024). The industry is entering an intelligent era due to the use of IoT, AI, and robotics (Ivanov & Webster, 2019), and to survive, strategic adoption is required (Kitsios & Grigoroudis, 2020; Shin et al., 2023).
B31	<i>Technology Overload</i> (Cause)	0.130	The rapid rise of AI, IoT, and service automation (Ivanov & Webster, 2019; Singh et al., 2019) has restructured the hospitality industry but also created data complexity and overload. Ersoy (2024) found barriers like a lack of understanding, data saturation, and speed of change, which act as causes that overwhelm firms' absorptive capacity, leading to poor utilization of technologies.
B32	<i>Technological Fear</i> (Effect)	-0.431	Technological fear is an effect factor. It occurs due to inadequate technological readiness, inadequate training, lack of access to technology, and inadequate organizational support. Also, Job insecurity, low engagement, and resistance to new systems are primarily caused by fear of technology. According to Xu et al. (2024), due to structural and cultural impediments, staff members are reluctant to incorporate e-learning. Additionally, employees in the HT sector are not adequately equipped to implement innovations. Therefore, these factors impede experimentation by suppressing the motivation to employ digital tools.

Table 11 continued...

B33	Limited Access to Tools (Cause)	0.442	Limited access to tools is a causal factor because insufficient technological resources directly constrain employees' capacity to experiment, learn, and implement novel ideas into practice. Additionally, firms in the HT businesses often face technical limitations such as privacy and security issues, a lack of compatibility, legal complexities, and insufficient IT skills, which reduce access to various technical tools required for innovation. These constraints emerge as a result of deeper systemic causes such as underinvestment and poor strategic adoption (Kitsios & Grigoroudis, 2020; Shin et al., 2023).
B4	ORGANIZATIONAL BARRIERS (Cause)	1.143	The presence of organizational barriers is a powerful hindrance to innovation, as it creates structural inertia that triggers downstream effects, including resource constraints and low employee motivation. The style of leadership is decisive because supportive leadership encourages vision and risk-taking (Ajmal et al., 2025). Rigid rules, conservative attitudes, and outdated processes make organizations resistant to change and creativity, thus slowing their adaptation to dynamic environments. This rigidity is supported by weak learning cultures, low-risk attitudes, and poor knowledge sharing (Cordeiro & Vieira, 2012).
B41	<i>Resource constraints</i> (Effect)	-0.325	Resource constraints are a result of management decisions. Limited time and financial resources, as well as limited access to technology, are a serious threat to innovation, which stops investing in training. It also prevents research & development programs. Small-sized HT businesses usually face difficulties of high costs and insufficient funds (Najda-Janoszka & Kopera, 2014). Further, it is hard to protect new ideas from being copied (Hjalager, 2010), which makes employees less likely to come up with new ideas.
B42	<i>Rigid rules and Short-term goals</i> (Cause)	0.257	Two significant reasons that stop IWB in an organization are rigid guidelines and the short-term focus of the organization. This rigidity increases due to inadequate knowledge sharing, outdated structures, and the inability to tolerate risk (Cordeiro & Vieira, 2012). It makes employees resist change and perceive procedures as an end in themselves, making an obstacle in the path of creativity (Wong & Pang, 2003). Organizations are not ready to use long-term sustainable innovation because of short-term profit, which exacerbates the problem. Therefore, rigidity is an underlying factor that causes issues such as a lack of adequate resources and employee disengagement.
B43	<i>Leadership Style</i> (Cause)	1.649	The other significant cause of the lack of innovation is the leadership style. Innovation leads to sustainability and is supported by supportive leadership styles that encourage employees to be innovative (Ajmal et al., 2025). Unsupportive leadership, on the other hand, stifles employee voice, discourages risk-taking and reinforces rigid systems (Orfila-Sintes & Mattsson, 2009). When leaders don't do their jobs properly, innovative activities stop at the workplace, which decreases sustainability.
B5	CULTURAL AND SOCIAL BARRIERS (Effect)	-0.631	The cultural and social barriers are effects of the underlying organizational factors, including ineffective leadership and the presence of rigid policies. The work culture that is characterized by low openness, low trust, and reduced knowledge sharing lowers the absorptive capacity and inhibits innovativeness (Leal-Rodríguez et al., 2014). These consequences underscore the effect of ineffective leadership and resource deficit in terms of cultural limitations of innovative behavior leading to sustainable development. Also, the social norms and expectations that dominate an organization prevent the possibility of taking risks and experimentation, which makes conformity stronger (Rivera-Vazquez et al., 2009).
B51	<i>Workplace Culture</i> (Effect)	-0.902	If the culture is unsupportive and lacks transparency, acknowledgement and trust, it negates experimentation and sharing of knowledge in the workplace. According to previous studies, such an environment minimizes the capacity to innovate, as well as innovation processes in the HT businesses (Rivera-Vazquez et al., 2009; Leal-Rodríguez et al., 2014).
B52	<i>Diversity and Inclusion Challenges</i> (Effect)	-0.409	Absence of inclusive rules makes the voices of employees ignored, thus hindering team effort and the sharing of ideas. Ajmal et al. (2025) reveal that through inclusive leadership programs that promote the involvement and expression of the employees, innovative ideas and a sense of ownership can be created.
B53	<i>Social Norms and Expectations</i> (Effect)	-0.640	The current social norms of conformity or risk-aversion heighten the resistance to change. Weak leadership and organizational inertia make this cultural rigidity an effect and limit the creativity and innovation of employees.
B6	INDIVIDUAL EMPLOYEE BARRIERS (Cause)	0.278	Employees are the basis of innovation at the workplace, but their ability to do so is limited due to a lack of skills & knowledge, psychological barriers, and a lack of motivation. A lack of skilled workers, not enough training, and a low capacity to take in new information make it hard to improve services (González-González & García Almeida, 2021). So, when people are demotivated, they don't try as hard to learn, which makes them more resistant to change and leads to gaps in their skills and knowledge.

Table 11 continued...

B61	<i>Psychological Barriers</i> <i>(Effect)</i>	-0.456	Organizational cultures that are not very open and have a zero-tolerance policy for failure make psychological barriers worse. It reduces employee confidence and discourages experimentation in pursuing innovative solutions (Hernandez-Mogollon et al., 2010). Resistance to change, low awareness, and risk aversion to the value of innovation are widespread, especially in small-scale HT businesses (Joachim et al., 2018).
B62	<i>Skills and Knowledge Deficits</i> <i>(Cause)</i>	0.509	Inadequate employee knowledge and skills are the main barriers to IWB. Employees who lack the required skills implement less innovative ideas, which can affect communication, motivation, team collaboration, and technology adoption. Hence, to develop new, innovative, and improved services at the workplace, employees need to have the right skills and technical knowledge (González-González & García Almeida, 2021). Low wages and changes in demand over the course of time make it even harder to find skilled employees, which makes problems worse that stop employees from turning ideas into long-lasting innovations (Najda-Janoszka & Kopera, 2014).
B63	<i>Lack of Motivation</i> <i>(Cause)</i>	0.490	Low employee motivation driven by limited career opportunities, weak HR practices, and blame-oriented cultures acts as a primary cause barrier (Orfila-Sintes & Mattsson, 2009). The lack of motivation is the main cause, and it is caused by poor HR practices, a culture of blame, and low pay (Najda-Janoszka & Kopera, 2014). This lack of drive cascades into reduced willingness to acquire new skills and exacerbates psychological resistance to change. Employees without intrinsic or extrinsic motivation are less likely to pursue training, resist risk-taking, and ultimately contribute to an environment that inhibits innovative behavior for sustainable development.

4. Discussion

In the current study, the results obtained by using the DEMATEL technique show a multifaceted interaction among the barriers. The causal analysis provides crucial information that determines the IWB of employees in HT businesses.

External Environmental Barriers (B1): The findings of the study categorize ‘External environmental barriers’ as a cause group (R-C = 0.095). Among the sub-barriers, Regulatory Constraints (B12; 0.601) and Market and Customer Pressures (B13; 1.016) are causal variables, whereas Competitive Landscape (B11; -0.447) is classified as an effect. In the current study, External environmental barriers (B4) were identified as one of the cause groups. Among its sub-barriers, Customer and market pressures (B43) were the strongest causal factor in this category with the positive R-C value (1.016), which highlights that fast-changing customer preferences and growing market expectations give pressure on HT organizations to innovate and improve service quality continuously. Regulatory constraints (B42) (R-C = 0.601) were also identified as a causal barrier, because the restrictions of the government and the obligation to follow regulations directly impact the flexibility of the organization and the decision-making process related to innovation. Whereas the competitive landscape (B41) (R-C = -0.447) was in the effect group, indicating that competitive intensity is mostly driven by regulatory constraints and market dynamics, and is not an independent driver. These findings suggest that HT firms need to focus on customer and market needs and regulatory obstacles, since changes in these underlying causes can enhance IWB and strengthen long-term competitiveness.

Team and Interpersonal Barriers (B2): The findings of the study categorize ‘Team and Interpersonal barriers’ as an effect group (R-C = -1.110). All its sub-barriers, Poor Communication (B21; -1.187), Team Dynamics (B22; -0.174) and Management–Employee Relationships (B23; -0.122), are also classed as an effect. This study indicates that communication problems, weak teamwork, and poor employee–management relationships are often the consequences of deficiencies in leadership, organizational systems, employee capabilities and technological readiness. When organizations lack supportive leadership, adequate training, or appropriate technological infrastructure, collaboration and communication naturally decline. Therefore, these interpersonal problems are consequences and not the main causes of poor IWB.

Technological Barriers (B3): The findings of the study categorize 'Technological barriers' as a cause group ($R-C = 0.224$). Among the sub-barriers, Technology Overload (B31; 0.130) and Limited Access to Tools (B33; 0.442) are causal variables, while Technological Fear (B32; - 0.431) is classed as an effect. The DEMATEL results show that the technology Barriers (B6) are a cause group ($R-C = +0.2$), which means that technology concerns are the main trigger of other barriers rather than only a consequence of them. Specifically, Technology Overload (B62; +0.50) and Limited Tools Access (B61; +0.45) are driving barriers, as excessive digital demands, constant technological changes, and limited access to modern tools may decrease employee confidence, increase work complexity and impede the adoption of innovative practices. These difficulties lead to uncertainty and resistance to technology. Thus, Fear of Technology (B63; -0.49) emerges as an effect barrier, because employees' technology anxiety is mostly a result of inadequate technical infrastructure and an overwhelming digital environment, rather than an independent cause. Therefore, enhancing technical resources, creating user-friendly systems and offering regular training can reduce technology-related fear and improve inventive work behaviour.

Organizational Barriers (B4): The findings of the study categorize 'Organisational barriers' as a cause group ($R-C = 1.143$). Among the sub-barriers, Leadership style (B43; 1.649) and Rigid rules & short-term goals (B42; 0.257) are causal variables, while Resource constraints (B41; -0.325) are classed as an effect. The study indicates that Leadership style is the strongest causal factor that affects IWB. Additionally, rigid organizational rules restrict flexibility, slow down decision-making, and discourage employees from proposing new ideas. Conversely, resource constraints appear as an effect because limited financial, technological, or human resources often arise from broader organizational priorities and external pressures rather than acting as the source of innovation barriers. Thus, enhancing supportive leadership and making flexible organizational policies can generate positive cascading effects across multiple innovation barriers.

Cultural and Social Barriers (B5): The findings of the study categorize 'Cultural and social barriers' as an effect group ($R-C = -0.631$). And all its sub-barriers, such as Workplace culture (B51; -0.902), Diversity and inclusion challenges (B52; -0.409) and Social norms & expectations (B53; -0.640), are also classed as an effect. These findings indicate that workplace culture is not created in a vacuum. It is developed through leadership practices, organizational policies, communication strategies and employees' day-to-day interactions. In the same way, challenges related to diversity and inclusion, employees' expectations and social norms develop over time as organisations establish shared values, behavioural standards and working practices. Hence, social and cultural barriers can be seen as the consequences of underlying organizational and management factors, not as the main drivers of innovative conduct. The results suggest that organisations should first improve leadership effectiveness, communication channels, employee development, and organisational structures to enhance innovative behavior. Such adjustments are likely to produce a positive workplace culture that supports collaboration, inclusivity and innovation.

Individual Employee Barriers (B6): The findings of the study categorize 'Individual Employee barriers' as a cause group ($R-C = 0.278$). Among the sub-barriers, Skills and knowledge deficits (B62; 0.509) and Lack of motivation (B63; 0.490) are causal variables, whereas Psychological barriers (B61; - 0.456) are classed as an effect. Employees' ability to creatively solve problems, to recognise opportunities, and to implement innovative ideas is based on skills and knowledge. Similarly, motivated personnel tend to take prudent risks, learn new technology and provide inventive solutions at the workplace. On the other hand, psychological barriers such as fear of failure or change often sprout from a lack of organizational support, inadequate leadership, or ineffective communication at the workplace. In this way, improving employees' skills and drive through systems for ongoing learning and rewards can indirectly lower psychological barriers while supporting IWB.

The DEMATEL results indicate that the cause group consists of Organizational, Individual employee, External environmental, and Technological barriers, while the effect group consists of Team & interpersonal barriers and Cultural & social barriers. Results show that organizational barriers are the strongest causal barrier among all six main barriers. Additionally, among the eighteen sub-barriers, Leadership style is the most important causal factor affecting IWB, as it receives the highest value ($R-C = 1.143$). This is because leaders set a vision for the organization, allocate tasks, encourage or discourage experimentation, and establish an innovation-supportive climate. Therefore, managers should prioritize interventions that address the cause barriers, as improvements in leadership, employee competencies, technological readiness, and responses to external environmental pressures are likely to have cascading positive effects on communication, teamwork, workplace culture, and social inclusion, as indicated by this cause-effect structure. These results serve as a practical guide for organizations that are motivated to enhance IWB and contribute to Sustainable Development Goal 8 (Decent Work and Economic Growth) by fostering more productive, innovative, and inclusive work environments. They also serve to reinforce the systemic nature of innovation barriers in the HT sector.

Nonetheless, service organizations must address these obstacles by focusing on causal factors. Adopting supportive leadership models, modifying rigid policies, investing in skill development, and strategically managing technological adoption can balance readiness and overload. At the organizational level, supportive regulatory frameworks and educational marketing campaigns can reduce external pressure. On the technological level, overload and fear can be avoided by striking a balance between adoption and absorptive capacity through digital literacy and strategic planning. Nonetheless, the presence of certain obstacles, such as a lack of long-term focus and financial constraints, serves as a critical barrier. It amplifies the effects of numerous causes, fostering a pattern of underinvestment and risk aversion. Addressing these root causes of barriers reduces downstream effects like financial stress, weak teamwork, and rigid cultures. It also increases systemic resilience by enabling the HT industry to integrate innovation more effectively into sustainable development. Moreover, all three research questions have been answered by the study.

RQ1: The existing research uses experts' opinions and prior literature to identify six key barriers, which were further divided into eighteen sub-barriers of innovation for sustainable development, thereby answering RQ1. The barriers were evaluated by the same experts.

RQ2: The DEMATEL technique was used to establish causal relationships that identify the interrelations among the elements. This method enables a deep understanding of the complex interdependencies among barriers such as organizational, technological, individual, team, environmental, and Cultural & Social barriers. The answer to RQ2 about the cause-and-effect relationship among the identified barriers of innovation is more clearly explained in the methodological section.

RQ3: The answer to RQ3 about minimizing the effect of barriers is disclosed in the discussion and conclusion sections.

4.1 Implications for Managers

CEOs should analyze that barriers to innovation are not isolated problems but part of a causal chain. Investing only in technology or expecting employees to innovate without addressing organizational structures will yield limited results. Leaders should prioritize creating flexible organizational systems, fostering a pro-innovation culture, and upskilling employees while integrating sustainability into core strategy. Strategic interventions at the “cause” level will naturally improve teamwork, culture, and ultimately organizational sustainable performance. Hence, to improve organizational performance and productivity, as well as individual effectiveness, managers/CEOs must identify and develop employees'

potential, such as creativity and innovation. Moreover, innovative ways to improve customer happiness are seen as essential to the organization's success. Therefore, managers must provide rapid attention to address the obstacles that prevent innovative activity in firms. Additionally, managers could develop strategies to reduce the impact of barriers and foster an innovative environment where employees feel more psychologically empowered. As the bridge between management and employees, a manager can help both parties to understand the value of innovation. They can develop a shared understanding and inspire each other's motivations. Additionally, management has to change its conservative approach and be open to innovative suggestions.

Further, policymakers and managers should recognize that innovation depends on both internal firm dynamics and external support systems. Policies should go beyond regulation and include incentives for digital transformation, workforce development programs, and frameworks that encourage sustainable innovation practices. Supporting collaboration platforms, knowledge-sharing ecosystems, and sustainability standards can help reduce environmental and cultural resistance, enabling firms to overcome structural barriers and contribute effectively to broader sustainable development goals. Furthermore, creativity is hampered when management adopts a leadership style that suppresses ground-level feedback, discourages risk-taking and experimentation, and kills ideas prematurely. Further, conflicts, failure, and resistance to change are some of the employee-related obstacles to innovation. However, to create new dishes, enhance customer service, and rejuvenate themselves, hotels actually require creative thinking. But workers have very little time for creative practices because of the extreme workload. The management should reschedule the jobs to fit the specified time frame and increase flexibility to handle the routine tasks in order to minimize the time and work stress that reduces the employees' creativity. After that, workers will have more free time to relax and refresh, which will enable them to contribute more innovative ideas to routine tasks consistently. Both management and staff must also recognize the value of creativity, be adaptable, and put new ideas into action. Nonetheless, it is highly recommended that management and employees communicate well to boost morale, which will, in turn, encourage hotel staff to be more dedicated to the business while also removing barriers to their creativity.

5. Conclusion

This paper has examined the barriers to innovative working practices towards sustainable development in the HT sector. These barriers have cause-and-effect relationships, which are mapped in the study using the DEMATEL approach. The research identified the key areas for planned changes that can be very useful in enhancing innovative work. Previous studies on barriers were limited to only some elements. This study is the first to give a holistic picture of the barriers to innovation in the HT industry by using the DEMATEL Technique. This makes the investigation unique and novel. It provides a detailed understanding of the complex relationships among the different barriers, laying a solid foundation for the study's subsequent findings. Six key obstacles, according to the study, prevent people from working creatively at the workplace and halt the organization's long-term growth. These obstacles include organizational barriers, team & interpersonal barriers, individual employee barriers, external environmental barriers, technological barriers, and cultural & social barriers. According to the study, organizational and individual barriers are the most significant factors that prevent employees from being creative.

Moreover, the study contributes by demonstrating that IWB is not merely an individual or technological issue but a systemic phenomenon shaped by interdependent organizational, human, and cultural dynamics. Applying DEMATEL clarifies that addressing root causes, particularly organizational rigidity, employee capability gaps, and technological limitations, can significantly reduce downstream effects such as poor teamwork and resistant cultures. The research highlights that sustainability- oriented innovation requires

holistic transformation, where leadership, employee empowerment, and technological readiness are aligned with external environment pressures and sustainability goals.

The DEMATEL analysis classifies barriers into cause-and-effect groups, revealing causal relationships that influence innovative behavior. The cause group consists of organizational barriers, individual employee barriers, environmental barriers, and technical barriers. They represent the driving elements that hinder innovation at the root level. Organizational barriers include rigid hierarchies, a lack of leadership support, and insufficient innovation strategies. Individual employee barriers involve resistance to change, lack of skills, or low motivation. Technical barriers include inadequate infrastructure, outdated technologies, and limited access to digital tools. These causal factors significantly influence the effect group, which includes team barriers and cultural barriers. Team barriers emerge as poor collaboration, lack of trust, and ineffective communication, while cultural barriers relate to entrenched norms, risk aversion, and resistance to new ideas. Environmental barriers act as external moderating forces, such as regulatory pressure, market uncertainty, or sustainability demands, that intensify or reshape the relationships among all barriers.

5.1 Future Research Directions and Limitations

The current study has many limitations that should be considered by future work. The study has applied a comprehensive approach by utilizing the DEMATEL methodology to investigate the IWB for the sustainable development of the HT industries. There have been several constraints that should be taken into account by these service firms. One of the drawbacks is that there may be a subjective bias in experts' judgment, as the majority of experts are from India, a popular tourist destination worldwide. Hence, the findings may not be as applicable to less tourism-driven countries. Additionally, experts' interpretations of barriers may differ from one another, which can affect the accuracy of the DEMATEL results. As the experts were from the HT industry, the findings may not be fully applicable to other service industries. Further, due to the dynamic nature of the HT industry, the results obtained may not accurately reflect future changes. To get more accurate results, future studies can take a broader group of experts from different cultural backgrounds. As this research is cross-sectional, future research work can focus on longitudinal research to understand the effect of these barriers over time and how they respond to external pressures. Hence, studies can focus on reducing these barriers by focusing on new technologies and analyzing the effects of rules & regulations properly. Moreover, future studies can do quantitative research for better applicability with the help of various theoretical frameworks such as Institutional Theory, Complexity Theory, Diffusion of Innovations Theory, and Resource-Based View. Further, due to the changing technology and competitive environment, there is a need for more research on determinants and barriers of IWB for sustainable businesses in such types of service industries.

Conflicts of Interest

The authors disclosed no potential conflicts of interest.

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