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Innovativeness In The Hotel Industry: An Exploratory Study In The City Of Fortaleza/Ce, Brazil

Francisca Lucélia Souto Da Silva[1], Adriana Santos Brito[2], André Riani Da Costa Perinotto[3], Priscila Cembranel[4]
[1](Federal Institute Of Ceará /Ifce, Fortaleza/Ce, Brazil)
[2](University Of São Paulo /Usp-Each, São Paulo/Sp, Brazil)
[3](Parnaíba Delta Federal University/ Ufdpar, Painaíba/Pi, Brazil)
[4](Educational Society Of Santa Catarina/ Unisociesc, Jaraguá Do Sul/Sc, Brazil)

Abstract:
The article explores the innovative profile of hotels in Fortaleza, Ceará, focusing on management, technology, and environmental sustainability. It uses mixed research methods, combining qualitative approaches and descriptive, exploratory, and bibliographical typologies. Through forms and interviews with hotel managers, it identifies that innovation in the evaluated sample is of an intermediate level, mainly in technological and structural improvements. Own resources and cash reserves are the main sources for innovation, but the high cost is a major challenge. The main innovations carried out in the hotel industry are characterized by incremental, radical or improvement innovations, being primarily of a technological or structural nature. The main sources of resources for innovation are cash reserves and own resources and the biggest obstacle to innovation is the high cost involved in the innovative process. It is concluded that the results offer data that can help solve problems in the tourism sector, increase efficiency and competitiveness through innovation.
Key Word*: Fortaleza Brazil; Hospitality; Innovation; Measuring Innovation; Innovation radar.*

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I. Introduction

Innovation represents a crucial tool for boosting the productivity and competitiveness of organizations, while also driving economic development resulting from efforts to identify new opportunities within the market (Costa & Neto, 2022). According to Dosi (1988), innovation encompasses everything from research to experimentation, development, imitation, and adoption of new products.

Innovation in the tourism sector is addressed in the National Tourism Plan (NTP) 2018-2022. This plan establishes guidelines to modernize the sector, increase investments, streamline processes, and stimulate competitiveness, innovation, and the promotion of Brazil as a destination both nationally and internationally (BRASIL, 2018).

Hospitality, an essential part of the tourism production chain, plays a fundamental role in welcoming travelers and has a significant influence on global economic activity. In Brazil, in 2019, the country received 6.35 million tourists, generating a tourism foreign exchange revenue of U$$5.99 billion and accounting for 10,457 lodging establishments, totaling 530,491 Housing Units (HU) according to the Statistical Tourism Yearbook of 2019 (base year 2018). The hotel supply is a fundamental basis for tourism development (Brasil, 2018).

For this reason, understanding the innovative process in lodging establishments and measuring the quantity, extent, and nature of innovations launched in the market, as well as their impact on customer satisfaction and business development, is crucial for diagnosing innovation in the hotel industry (Martins, 2013).

The study of innovation in hotel services is a relatively new area, making this investigation particularly intriguing. Therefore, this research is justified by pointing out directions and possibilities for innovation in a sector strongly impacted by the recession resulting from the COVID-19 pandemic. Thus, in the case of Fortaleza, Ceará, intense competition makes innovation a necessity and requires an analysis of management, technologies, and sustainability aspects (Marcos, 2021). For this reason, the formulated research problem was: "How is the innovative profile of the hotel industry characterized in Fortaleza, Ceará, considering management, technology, and environmental sustainability?"

This research contributes to the understanding of innovation in the hotel industry by offering an adapted tool to measure innovation in the sector, based on existing models in the literature. To do this, it relies

on important theorists such as Schumpeter (1997), Dutrénit (2004), Dosi (1988), and complements the study on innovation in services proposed by authors like Barras (1986), Hjalager (2010), Gallouj and Weinstein (1997). Regarding innovation management in services, articles by contemporary authors, such as Valença (2017), Costa and Neto (2022), and Marcos (2021), were analyzed. Thus, the analysis provides data on the current state of hotels and contributes to finding solutions to problems and improving effectiveness in crisis management.

II. Literarure Review

The capitalist economy thrives on the creation of new products or services, new consumer profiles, new production methods, new markets, and new organizational forms created by entrepreneurs (Schumpeter, 1997). Innovation has proven to be a key point for business growth and competition, not only in the general market but also in the hospitality sector (Marcos, 2021).

Failure to adopt technological advances and neglecting both technological and non-technological innovations to enhance the quality of services offered can lead to the obsolescence of enterprises and a loss of market value. Innovation systems and the relationships between their specific agents play a crucial role in influencing technological learning processes, developing capabilities, and the region or locality where these systems are embedded. This results from interactions with networks of companies, universities, customers, suppliers, and other agents that influence the innovative process (Dutrénit, 2004).

The OECD (2005, p. 9) defines innovation as "[...] the implementation of a new or significantly improved product (good or service), or a process, or a new marketing method, or a new organizational method in business practices." In the dynamic tourism/hospitality sector, characterized by instability, changes in consumer profiles, seasonality, and uncertainty, there is a conducive environment for innovation. Robbins (2002) highlights that the level of uncertainty in the environment affects organizational structure and its posture in the face of external adversities.

Several authors, such as Barras (1986), Hjalager (2010), Gallouj and Weinstein (1997), provide insights into service innovation, contributing to understanding the innovative process in hotel companies. Barras' model (1986, p. 165) investigates "[...] how innovation occurs in industries of goods and services," focusing on incremental service innovation in the first phase, followed by more radical processes as a competitive effort, and finally, in the third phase, the creation of a new service differentiated from the initial one, a precursor to a theory of service innovation.

Another relevant model is that of Gallouj and Weinstein (1997), which analyzes innovation by integrating goods and services into a single theory. According to this perspective, innovation in services involves both technological and non-technological forms, such as the creation of new knowledge, processes, or information.

According to Gallouj and Weinstein (1997), innovations in services encompass a diversity of approaches. There are radical innovations, characterized by the creation of completely new products, capable of transforming existing markets with significant performance or cost changes. In contrast, improvement innovations seek to enhance features without modifying the structure of the system or service, while incremental innovations maintain the overall structure, introducing changes through additions or replacements of elements. Additionally, ad hoc innovations are developed to solve specific customer problems, while recombination innovations explore different combinations or reorganizations between technical or final features of a product or service. Finally, formalization innovations focus on better specifying products or organizing service features to make information clearer and less dispersed.

Innovations can cover different areas in the business context. Product or service innovations refer to visible changes for customers, involving the development of new products or improvements to existing ones, adding value, or expanding offered experiences. Process innovations focus on new action flows to promote efficiency and productivity, often making extensive use of information and communication technologies or facilitated execution forms. Managerial or administrative innovations occur in the field of leadership and people management, aiming to improve work environments, retain talent, and promote knowledge dissemination, directly impacting the business, the company, or its network of partners. Meanwhile, management innovations are linked to relationship marketing between companies and consumers, as well as involving processes and technologies aimed at management. Lastly, institutional innovations refer to efficient organizational structures that redirect or enhance tourism business within networks and business and territorial alliances to drive growth in specific areas of tourism (Hjalager, 2010).

There are two ways to develop models to analyze the innovation profile. Quantitative evaluations can offer indicators that set goals and enable control and analysis of results. According to Edison, Bin Ali, and Torkar (2013), this is vital for measuring the results of innovation processes and assessing the need for innovation. On the other hand, the qualitative approach to innovation analysis is based on interpretation, experiences, and context, offering a broader and contextualized view of results (Stake, 2011).

In both cases, Amorim and Mortara (2014) emphasize the importance of creating effective indexes to estimate and measure innovation processes, given the increasing demand for innovation. These indexes serve as monitoring and guidance tools. However, there are different scales for measuring innovation, some focused only on products and services, without considering other essential innovative elements, such as organizational processes and marketing strategies, especially in highly competitive sectors, such as hospitality (Costa & Neto, 2022).

Regardless of the choice, more robust scale models, such as Redesist and Radar da Inovação, offer comprehensive approaches to measure innovation (Costa & Neto, 2022). The Radar da Inovação, based on the work of Sawhney, Wolcott, and Arroniz (2006) and expanded by Bachmann and Destefani (2008), is a tool that indicates the innovative dimensions explored by companies in a sector and the areas still underexplored that can provide differentiation from competitors (Carvalho et al., 2015).

The Radar de Inovação, proposed by Sawhney, Wolcott, and Arroniz (2006), comprises four fundamental dimensions, such as offerings, customers, processes, and market presence points, and has been expanded to include eight more dimensions, providing a more complete view of innovation. These additional dimensions encompass aspects such as platform, brand, solutions, relationship, value capture, organization, supply chain, and network.

As a way to develop a new application, Valença (2017) adapted the Radar da Inovação for the hotel industry, creating the Radar de Inovação do Turismo (RITUR), used in hotels in Recife, Pernambuco. This highlights the importance of indicators validated by the literature to understand the effectiveness of innovative activities and the need for a solid theoretical foundation when dealing with innovations in the Tourism/Hospitality sector (Valença, 2017).

This Radar model uses a score that quantifies a company's innovations over a three-year period, considering this period ideal for evaluating the effects of an innovation. Additionally, this methodology considers innovation as a management process, not as an isolated case, and prompts companies to identify which dimensions need more attention (SEBRAE, 2010). For Sawhney, Wolcott, and Arroniz (2006), each dimension represents a way of innovating through the relationships of the dimensions of the Radar da Inovação with hospitality (Valença, 2017).

The relationships between the dimensions of the Radar da Inovação and activities in the hotel industry are close and comprehensive. The "Offer" dimension involves the introduction of new products, such as virtual check-ins or checkouts. The "Platform" dimension considers resource optimization in multiple activities, such as using the restaurant to serve both guests and events. The "Solution" encompasses the creation of differentiators to solve customer problems, increasing satisfaction and generating additional revenue. The "Customer" dimension checks the identification of unmet needs and service enhancements according to demands (Ritur, 2017; Sawhney, Wolcott & Arroniz, 2006).

Next, the improvement of the customer experience is addressed, represented by the "Experience" dimension, including actions to enhance relationships through technologies and interactions. "Value" analyzes partnerships that generate revenue through interactions between customers and business partners. The "Process" dimension verifies improvements in efficiency, effectiveness, and quality, as well as infrastructure changes for enterprise differentiation and sustainable cost reduction. The "Organization" dimension considers organizational changes to generate innovative ideas and partnerships to improve services. "Supply Chain/Supply" analyzes changes in purchasing processes, stock, and the distribution of materials and information. The "Presence" dimension evaluates the creation of sales channels and marketing points, whether using technology or not. The "Networks" dimension considers the improvement in company-customer relationships, particularly with the integrated use of technology. Finally, the "Brands" dimension checks whether the brand is used in partnerships or expanded into new domains and business areas (Ritur, 2017; Sawhney, Wolcott & Arroniz, 2006).

Bachmann and Destefani (2008) add a 13th dimension to the radar. This is the 'Innovative Ambience' dimension, which includes understanding the intellectual capital of company employees as the main source of innovation and actions aimed at obtaining innovative knowledge, personnel management, and entrepreneurship. It analyzes whether the hotel management uses consulting for market guidance, training, and development, whether companies seek new knowledge from suppliers and customers, and whether they use any formal system to collect suggestions from employees or offer some form of recognition. It also seeks to know if companies acquire technical information by paying fees for patents.

Thus, measuring this dimension provides information about the organizational climate of companies and suggests the existence or not of an environment conducive to the emergence of innovations, given that innovation is not an isolated case or event but a management process (SEBRAE, 2010).

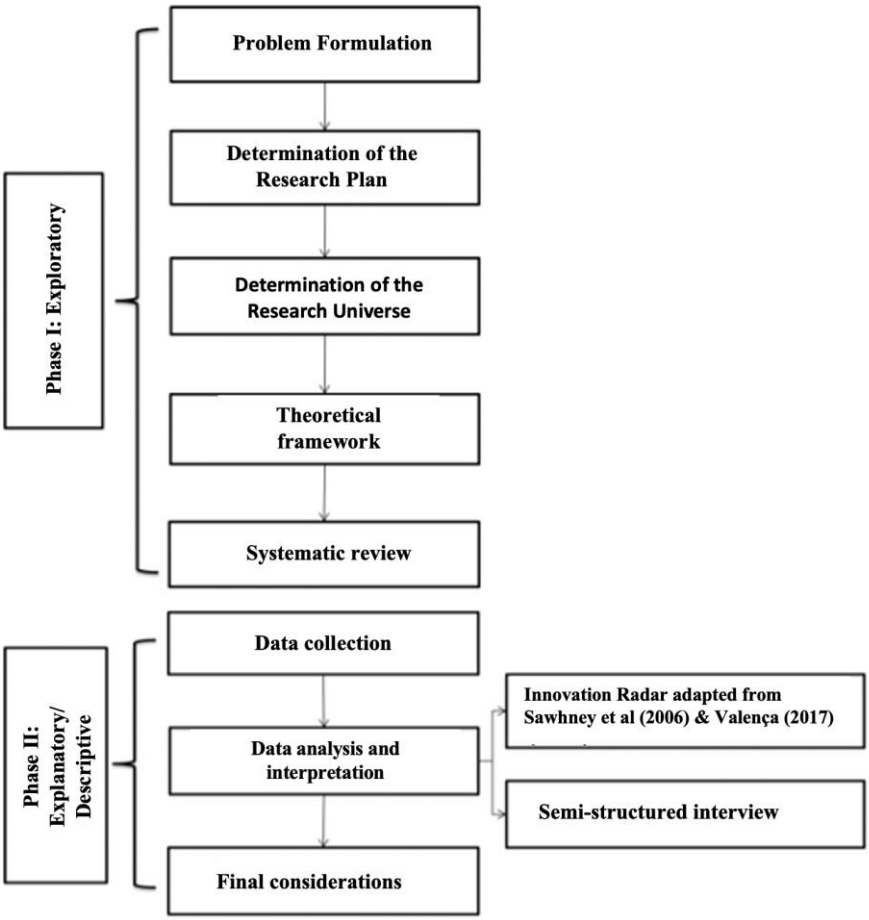
III. Material And Methods

The methodological approach adopted for this study was a combination of mixed methods, following the idea of Galvão, Pluye, and Ricarte (2018), aiming to investigate complex problems to produce more

comprehensive results. The adopted approach was predominantly qualitative, but with the collection of quantitative data to support the analysis, where the results were used to confirm or generalize the qualitative findings (Jones, 2016). This approach, known as convergence study, involves the simultaneous conduct of qualitative and quantitative phases (King et al., 2015).

This study was characterized as descriptive, utilizing documents, surveys, and field approaches to describe, record, analyze, and interpret current phenomena, investigating their operation in the present (Marconi & Lakatos, 2007). Additionally, it was exploratory, contributing to the formulation of hypotheses and the possibility of discovering new approaches in research (Andrade, 1999). Finally, it was bibliographic, as it relied on existing and applied material, aligned with the research phases (Figure 1).

Figure 1: Investigation Phases



Source: Adapted from Gil (2002).

In the exploratory phase, the research plan and scope initially identified a universe of 37 Lodging Facilities associated with ABIH (Brazilian Hotel Industry Association) in the city of Fortaleza, Ceará. However, only 12 of these establishments agreed to participate in the study. From this universe delimitation, we proceeded to construct the theoretical framework and literature review, combining classical studies with current publications to solidly underpin our research.

In the second phase, with the available sample, interviews were conducted using the Hotel Innovation Radar - HIR, and semi-structured questions were applied. The dual data collection was crucial, ensuring more comprehensive and robust information about innovation in the participating establishments.

The HIR, a structured form with 50 questions, provides variables that can be extrapolated to a population through statistical inferences. It is analyzed and improved from the strategic tool called the Tourism Innovations Radar (Valença, 2017), an adaptation of the innovation radar developed by Sawhney (2006).

To compose the Innovation Radar, the questions were organized in correlation with their respective dimensions. Questions related to the "Offer" dimension are between 13.1 and 13.4 based on Valença's study (2017) and Neto and Teixeira (2011). The "Platform" dimension is represented by questions 14.1 and 14.2, while questions related to "Solutions" encompass items 15.1 to 15.4. The "Customer" dimension is covered by questions from 16.1 to 16.4, while the "Customer Experience" is evaluated through questions 17.1 and 17.2.

"Value Capture" is addressed in question 18.1. Regarding "Processes," questions range from 19.1 to 19.6, while the "Organization" dimension is represented by questions 20.1 and 20.2. The "Supply Chain" is analyzed through questions 21.1 to 21.3, and Presence is evaluated by question 22.1. "Networks" are explored in question 23.1, and "Brands" are represented by questions 24.1 and 24.2 in the Radar form. All these dimensions were based on studies by Valença (2017) and Neto and Teixeira (2011).

The last dimension, "Innovative Ambience," is mapped by questions from 25.1 to 25.5, grounded in the National Innovation Award (2021), Neto and Teixeira (2011), and Oliveira et al. (2011). This organization of questions allowed for comprehensive and thorough coverage of various facets of innovation in lodging facilities.

To document innovations in the hotel industry in Fortaleza, Ceará, the Radar form and the semi-structured interview were preferably answered by managers, given the need for access to specific managerial information, or by individuals designated by managers as qualified for such. Following the guidelines of the Oslo Manual (OECD, 2005), the study focused on innovations that promoted significant improvements in products, processes, or services performed in the last three years.

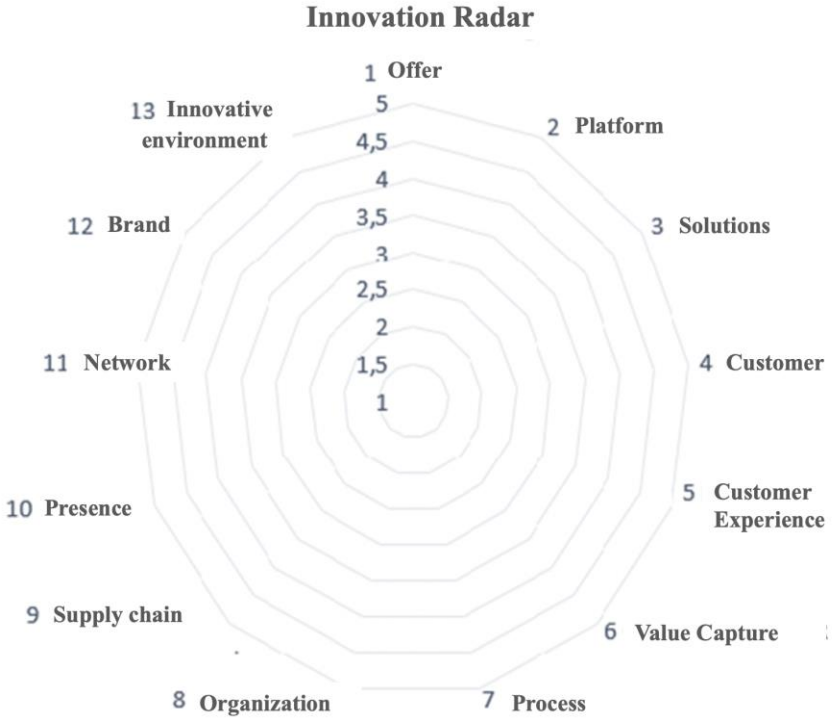
Each questionnaire underwent testing before its field application, following the recommendations of the OECD (2005). Thus, a pre-test was conducted in April 2021, allowing necessary adjustments to the form and interview. Data collection took place between July and October 2021, via the Google Meet platform, with interviews lasting an average of 55 minutes and recorded in writing.

The choice of filling out the form during the interview, instead of using electronic forms, aimed to ensure the quality of the collected data. To ensure accuracy in transcribing the answers, the form was shared on the Google Meet screen during the interviews.

The constructs measured in the twelve dimensions of the radar were based on studies by Valença (2017) and Neto and Teixeira (2011). The elements associated with the innovative environment were grounded in the research by Oliveira et al. (2011), covering external sources of knowledge, idea generation, innovation financing, and intellectual property. All 38 constructs were converted into questions, and the obtained answers provide evidence or justifications to determine the scores within each dimension.

In the HIR form, the Likert scale with five degrees of alternatives was used for the answers, assigning scores from 1 to 5 to represent the level of innovation in the evaluated actions. In the scheme, "1" indicates the absence of innovation, while "5" denotes more than three innovations performed (Valença, 2017), as shown in Figure 2 below.

Figure 2: Innovation Radar Model.



Source: Sawhney et al. (2006); Bachmann and Destefani (2008) and adapted by the authors (2023).

The Innovation Degree (ID) corresponds to the arithmetic mean of the scores of each of the 13 dimensions (Bachmann & Destefani, 2008). Thus, the innovation degrees of each lodging facility were calculated based on the evaluations of each of the variables that make up the thirteen dimensions worked on, as mentioned by Neto and Teixeira (2011). The collected data were analyzed and provided Innovation Radars with the help of the Microsoft Excel spreadsheet, whose information was interpreted based on the innovation stage analysis method proposed by Figueiredo et al. (2010) and adapted by Valença (2017), presented in Table 1.

Table 1. Innovation

Stages	Stages Description
0>1 Basic Operational	Basic Operational Ability to offer hospitality services in accordance with sector-accepted standards.
1>2 Advanced Operational	Offering quality services; Investing in infrastructure, communication services, online technologies, and check-in/check-out facilities.
2>3 Basic Innovative	Offering specialized services; Intermediating business with third parties, travel agencies, and others; Working with senior or business groups; Organizing events.
3>4 Intermediate Innovative	Working on projects aimed at sustainability and waste treatment; Offering specialized services, such as concierge, gastronomic events, and entertainment services; Working on projects with universities, innovation institutions, and others.
4>5 Advanced Innovative	Participating in events to develop national tourism; Participating in projects with the local trade; Participating in international tourism events; Participating in projects to implement tourist complexes.

Source: Valença (2017); Figueiredo et al. (2010) and adapted by the authors (2023).

For data interpretation, basic and advanced operational stages reflect the execution by the lodging facility to perform basic tasks inherent to hospitality, using already consolidated technologies, such as traditional check-in and checkout through usual hotel information systems.

In the basic innovative stage, the lodging facility would already have innovative maturity to generate innovations within the company. In the intermediate innovative stage, innovations reached regional or national levels, and the last stage, advanced innovative, would be a differentiated venture, capable of bringing innovations to a worldwide level (Valença, 2017).

Immediately after completing the Radar form, due to the absence of a specific tool for measuring innovation in hospitality that considered technology, management, and environmental sustainability in the way proposed in this work, qualitative data collection continued with a semi-structured interview with 13 questions with the same managers of the lodging facilities.

The interview script contains some basic questions formulated in open-ended questions supported by theories and hypotheses directly related to the dissertation's theme, and the interviewee is free to position themselves on innovations without necessarily being constrained by the formulated question (Minayo, 2010). The questions were adapted and supplemented so that the information could be collected to capture the necessary data for analysis.

In this second data collection moment, non-generalizable results were obtained, that is, in-depth analyses involving few individuals to corroborate results and enrich the work (Galvão et al., 2018). Key questions about innovations in technology, management, and environmental sustainability were used from the methodology used in the National Innovation Award (2021), which is important for having a conceptual basis with international literature references, such as the Oslo Manual in its methodology.

However, in this specific case, no measurement scales were assigned, but the content analysis (CA) technique was used to interpret the obtained answers. This technique involves the use of methodological instruments applied to discourses for qualitative research data treatment (Bardin, 2011).

The interviews were conducted with screen sharing, and the contents of the answers were recorded directly in the Excel spreadsheet and later organized as suggested by Bardin (2009), with the identification and classification of words, phrases, or even paragraphs into content categories focusing on three dimensions (Management, Technology, and Sustainability), including identifying the parallel between the variables found with the intention of responding to the study in-depth.

In the pre-analysis of the data, the collected data were coded, selecting what was or was not analyzed, following the rules proposed by Bardin (2009): exhaustiveness, representativeness, homogeneity, and relevance. Next, the coding and categorization of information were done with the cutouts of the registration units, and finally, the treatment of the obtained results and interpretation through inference or controlled interpretation was performed. Respondents were named MH1, MH2, and so on.

For the integration of the obtained data, the comparison technique was used, in which qualitative and quantitative results are analyzed separately, being integrated only at the time of interpretation (Galvão et al., 2018). After categorization, fundamental data for interpretation were extracted and reduced, and a logical explanation was built, relating the data and theoretical foundation.

Thus, it is understood that the integration of information characterizes the final phase of the investigation, through which quantitative and qualitative data are integrated into a coherent whole, providing an organizational analysis of the innovative process in management, technology, and sustainability, as presented by Santos et al. (2017).

IV. Result

The sample consisted of 12 lodging facilities. All hotels in the sample are located in tourist areas. Among the establishments in the sample, 42% (5) are part of hotel chains, and 58% (7) operate independently. Regarding size, 75% (9) of the hotels are large (with more than 100 rooms) and 25% (3) are small (with fewer than 100 rooms), with an average market presence of 22 years. Only two hotels have less than 16 years of operation (MH3 and MH9, which have been in the market for six years). The average number of employees per establishment was 62 (a number affected by workforce reduction due to the pandemic), and the average daily rate is R$285.00.

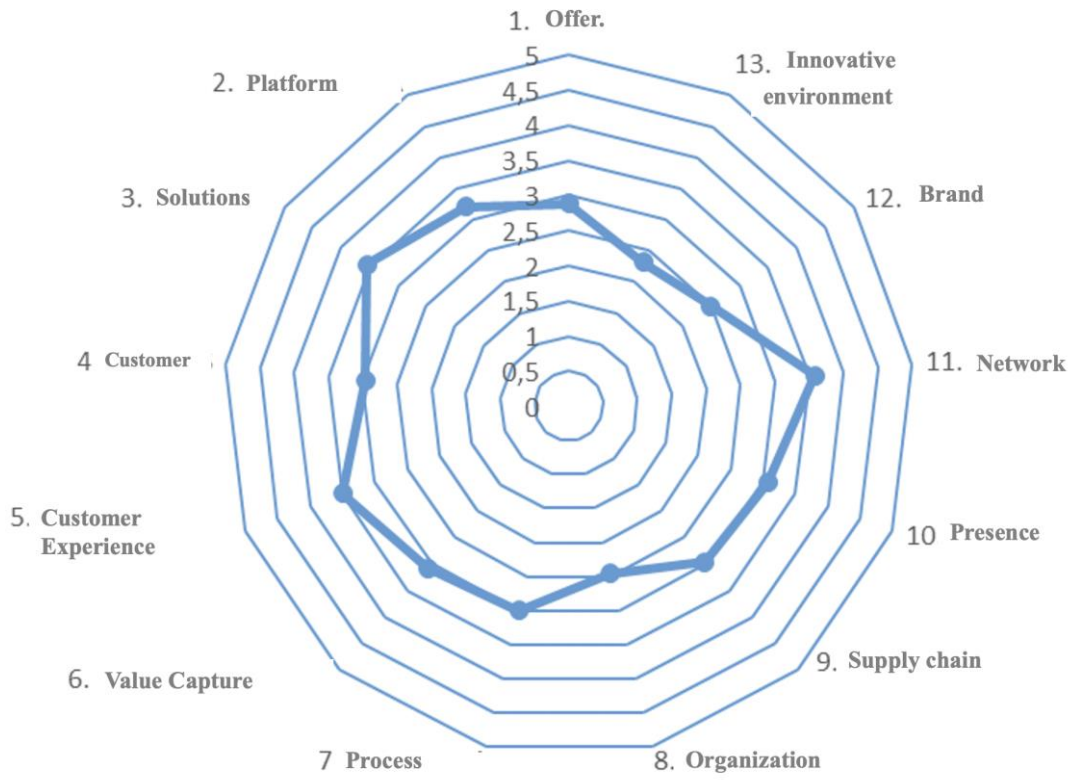
The respondents were mostly managers, accounting for 75% (9), reinforcing the credibility and quality of the obtained data. In MH5, MH7, and MH12, although not managers, professionals were designated due to their knowledge and tenure in the company to provide the requested information.

Among the respondents, 58% (7) have a background in Tourism/Hotel Management/Administration, while 42% (5) have diverse unrelated backgrounds. According to Tajeddine and Trueman (2012), the education level of managers influences innovative actions, as knowledge makes them more capable of understanding customer demands. The average age of the respondents is 40 years, and only 33% (4) are female.

After analyzing the collected data, the Innovation Degree (ID) of the researched hotels was determined. With this information, the innovation stage can be characterized according to the adapted scale of Figueiredo, Gomes, and Farias (2010).

According to the Innovation Radar applied to the 12 hotels, their innovation degrees range from 1.82 to 4.47, and the General Innovation Degree of the Hotel Industry (according to the studied sample), calculated from the average of all IDs, is 3.03. The graph below represents the result of the overall diagnosis, constructed from the averages of all dimensions. Each vertex of the radar represents a dimension, with the numerical representation shown in Figure 3.

Figure 3: Hotel Innovation Radar – HIR.



Source: Authors' elaboration (2023).

As observed in the HIR, the hotels collectively excel in Solutions (3), Customer Experience (5), and Networks (11), concentrating their investments and efforts primarily in these dimensions. In the Solutions dimension, innovations or differentiators that addressed customer problems, resulting in increased satisfaction and additional revenue, are recorded, including the creation of integrated and customized offerings.

In the Customer Experience dimension, innovations that improved customer relationships, or created touchpoints through the use of technologies, aimed to increase interaction with the customer and enhance the relationship, covering any point of interaction (contact) with the customer.

In the third highlighted dimension, Networks, innovations that improve the relationship between the company and the customer, involving mainly the use of information and communication technologies integrated with offerings. With these highlighted dimensions, it can be inferred that the customer is at the center of innovations, starting from an unmet demand and implemented with their satisfaction and loyalty in mind. When applying the HIR individually, it is observed that hotels are at different innovation stages.

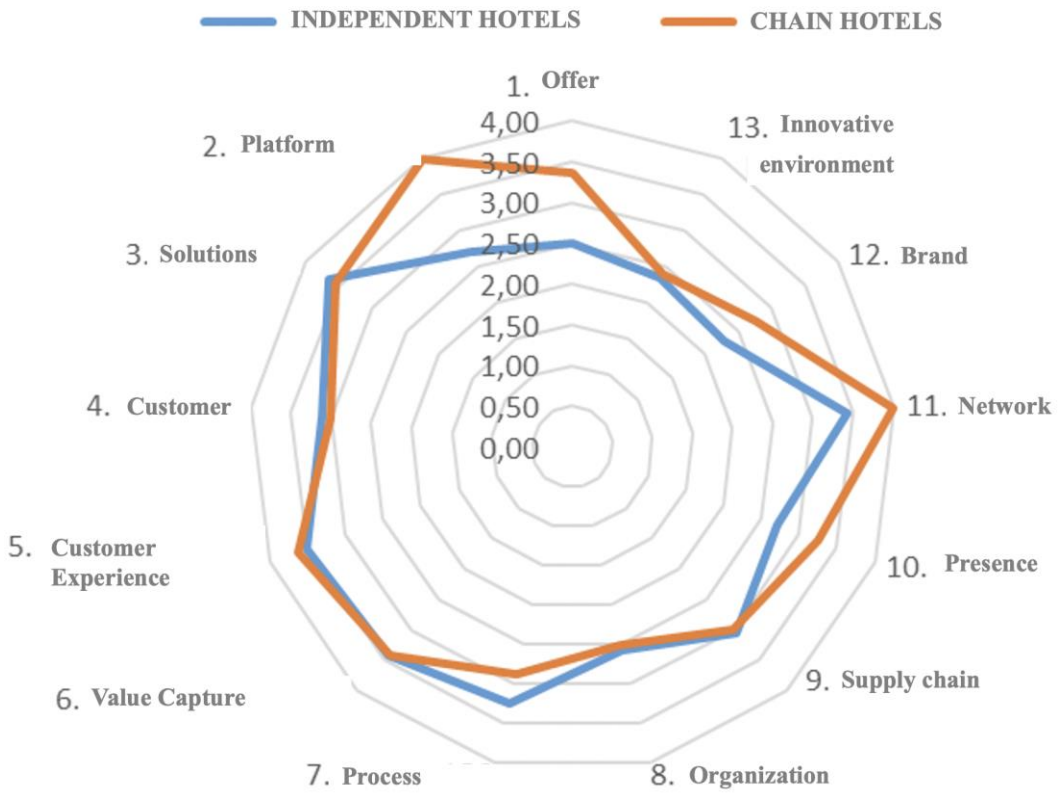
Analyzing the data in light of Figueiredo et al.'s (2010) scale, which classifies hotels according to the degree of innovation, the Total ID of 3.03 indicates that the hotel industry in Fortaleza, represented in the studied sample, is at the Intermediate Innovative stage, very close to the Basic Innovative stage. This means that hotels have invested in projects aimed at environmental sustainability and waste treatment, offering specialized services, organizing different events and entertainment services, and working on projects with universities, innovation institutions, among others.

However, to evolve to the Advanced Innovative stage, hotels need to address the most critical dimensions: Organization (8), Brand (12), and Innovative Ambience (13), i.e., make changes in organizational activity to generate innovative ideas, establish new partnerships with local trade, seek new business opportunities, and expand the brand, including to other domains.

Considering that 58% (7) of the sample consists of independently managed hotels, evidence was sought in the data to support the proposition by Hjalager (2010) that a family-managed company would decrease innovation potential. The General Innovation Degree of independent/family hotels is 2.96, while the ID of chain hotels is 3.21. As seen in the HIR represented below, there are no significant disparities in the dimensions when analyzed comparatively.

Thus, the results found in this study oppose the characteristics outlined by Duarte and Silva (2015), as family-managed hotels can be as innovative as chain hotels, as explicitly shown in Figure 4.

Figure 4: HIR - Comparative Innovation Radar between independent/family hotels and chain hotels.



Source: Authors' elaboration (2023).

However, it is essential to note that the respondents, whose businesses belong to a hotel chain, stated that being part of a chain would be a hindrance to innovation from the hotel itself, but unanimously stated that the chain keeps them constantly updated on the market. MH10 reported that the chain to which it belongs recently authorized some differentiations in the offered services, taking into account the profile of the guests they serve.

The dimension that showed the lowest degree of innovation was Innovative Ambience. Few hotels use consulting, and the investment in training, although mentioned by all respondents, is aimed at improving service quality and not at the effective participation of employees in the creative process of innovation, with little or no expressiveness in formal systems to collect employee suggestions and forms of recognition. The Manager of MH11 reported that the Human Resources department exclusively handles personnel hiring and considers the company too small to invest in training and staff development.

Respondents from MH1, MH2, and MH8, whose innovation degrees are recorded in Table 2, reported having a structure to promote the generation of new ideas and encourage innovation, such as regular meetings with employees, hiring corporate education companies, encouraging shared knowledge, and holding cultural contests. Still, they agreed that the entire innovative process occurs at the managerial level.

After applying the HIR, it is evident that the analyzed sample of Fortaleza's hotel industry is innovative, and the process of identifying and analyzing new market demands fundamentally arises from customer feedback and technological surveillance aligned with hotels' strategic objectives, primarily conducted at the managerial level.

Respondents reported openness to employee participation in this innovative process, but only MH1, MH2, and MH6 have consolidated structures for this idea generation process, including awards, incentives, and regular meetings. MH5 reported that employees did not participate in the innovation process.

The main tools used to capture new market demands mentioned by respondents are: a guest feedback compilation platform (Trustyou), satisfaction forms (virtual or printed), market surveys conducted by specialists, sales team visits to other establishments, surveys on competitors' websites, analysis of competitors' complaints on various platforms (TripAdvisor and Booking.com), and the development of internal programs to monitor guest satisfaction.

The analysis of competitors' innovations occurs either corporately (when belonging to a chain) or focused on the sales management or even under the responsibility of the manager, in the case of privately managed hotels. MH1, the hotel with the highest degree of innovation, positions itself as "always at the forefront of innovations."

MH3 highlighted the importance of ABIH in the "technological leveling" of registered hotels. MH8 reports that the goal of monitoring the competition is to improve the service and states that it does so sporadically to analyze specific demands that need to be reformulated. All hotels unanimously acknowledged that innovations are essential for the company to remain in the market.

In agreement with Barras' (1986) model on the reverse cycle of the product, the innovative process in Fortaleza's hotels initially involves incremental changes to the product or service offered, such as package improvements, increased quality of breakfast products, selection of new suppliers and partners, always with the aim of meeting customer demands and improving the quality of the offered product, ending, in the end, with a completely differentiated product to be offered to the market.

According to respondents, the strategic changes in the last three years consisted of changes to adapt to the competition or to stand out in the market. Only MH1 and MH8 reported seeking innovation to be pioneers in the market. The innovations recorded during the interviews during the Radar application and in the semi-structured part were classified according to the model of Gallouj and Weinstein (1997). Thus, about 42% are technological innovations, 25% are structural, 25% are management-oriented, and 8% are focused on creating a new product.

Innovation in the hotel industry (according to the studied sample) has shown significant changes in technology, management, and environmental sustainability. It can be observed, according to the information recorded in the graphs and the respondents' answers, that there is a high incidence of technological innovations, possibly encouraged by the COVID-19 pandemic, which forced a reduction in personal contact and the search for technological strategies to meet customer demands. This information confirms what was proposed by Orfila-Sintes and Mattsson (2009), that innovation strategy in the hotel industry is mostly applied at the technological level.

Although already suggested by Fleury and Oliveira (2002), the importance of knowledge and people management in the innovative process, innovations in management are still timid compared to the broad range of possibilities that investing in people can provide to the hotel service. An issue not mentioned by any manager was the inclusion process in the hotel industry.

Regarding environmental sustainability reflected in the offer of ecologically correct products and services, there were little expressive changes in the majority of the analyzed sample. Currently, being

sustainable is a market and consumer requirement, with actions to improve quality, the company's image, and costs. The innovations recorded by managers demonstrate the beginning of a significant challenge, which will be to maintain a sustainable enterprise and meet the new behavioral profile of Brazilian tourists already recorded in Booking.com reports.

Managers reported high costs as the biggest obstacle to innovation. Torchia et al. (2016) reinforce that funding is a fundamental factor for innovating in service, and most of the time, smaller companies (as is the case with many hotels in the sample) do not have the financial support to carry out innovative projects and, for this reason, encounter many difficulties, a fact that does not occur with larger companies.

In addition to the high cost, other obstacles were listed, such as bureaucracy to obtain resources (related to bank financing); the mindset of partners/internal resistance (as it is a hotel with more conservative investors); the involved risk (financial risk), and the difficulty of accessing information (to decide where to innovate). Only MH5 could not inform the obstacles to innovation in its enterprise.

The interviews conducted, with the dual data collection, promoted a greater understanding of the theme in a qualitative way, identifying the reality of the enterprises, identifying new trends, clarifying specific topics about management, technology, and environmental sustainability, complementing the qualitative information from the Hotel Innovation Radar.

V. Conclusion

This study aimed to understand innovation in the hotel industry in Fortaleza and positively contributed to the creation of a new methodological process for measuring innovation in this context. It incorporated the dimension of Innovative Ambiance, as proposed by Valença (2017), and a recent study by Silva et al. (2023). This expansion of the Hotel Innovation Radar (HIR) provided a more comprehensive and robust perspective to identify innovative practices.

By adding the 13th dimension of Bachmann and Destefani (2008), we extended the scope of the Tourism Innovation Radar (TIR), allowing for a more complete analysis of innovative practices in the lodging establishments studied. During the research, we assessed 13 dimensions in the HIR, creating a more comprehensive instrument to measure innovation in the hotel industry.

The results obtained through the Hotel Innovation Radar, interviews, and literature review indicate that the analyzed hotels demonstrate innovative practices. Dimensions such as Solutions, Customer Experience, and Networks stood out, highlighting practices focused on customer satisfaction and loyalty.

However, areas like Organization, Brand, and Innovative Ambiance proved critical, suggesting the need for changes in organizational activities, strategic partnerships, and a greater focus on environmental innovation aspects. Technology was a prominent investment, possibly influenced by the pandemic, driving strategies to maintain secure services and strengthen the bond between the company and the customer. Following this, innovations in environmental sustainability stood out, even though they are not yet widely considered, being a differential in customer choice. However, some hotel units did not mention efforts in this direction. Finally, innovations in management, especially in people management, were underexplored, despite the fundamentally human nature of the tourism sector. This suggests the need for more structured strategies to promote innovations in this area.

The main barriers to innovation in the hotel industry include high costs and difficulty in obtaining external financing. The low number of respondents highlighted a possible lack of interest in innovation and research, emphasizing the importance of a cultural change in this regard. Thus, to advance research on innovation in the hotel industry, a longitudinal follow-up of innovative practices is recommended, along with statistical analyses to better understand the relationships between HIR variables. Expanding the study to all lodging establishments in Fortaleza may provide additional data on the innovative process in the city.

The results of this study offer significant theoretical, practical, and social contributions to understanding the innovative profile in Fortaleza's hotel industry. The data present important details about the composition of the sample of 12 lodging establishments, highlighting the predominance of large enterprises (75%) and an average of 62 employees per establishment, affected by the pandemic-related reduction. Furthermore, they reveal that the sample is, on average, in the intermediate stage of innovation, close to the basic stage, according to an adapted scale from Figueiredo, Gomes, and Farias (2010). The analysis of the Innovation Degree of the hotels highlighted that innovation is concentrated especially in solutions to customer problems, customer experience, and networks, showing that innovations are directed towards customer satisfaction and loyalty.

When comparing independent/family-owned hotels with chain hotels, the results challenge the notion that family management would decrease innovative potential, showing that these types of hotels can be as innovative as chain hotels. However, while independent/family-owned hotels have a slightly lower General Innovation Degree, the study highlights that belonging to a hotel chain keeps hotels up-to-date with the market.

The study also reveals that, although most respondents have a background in tourism/hotel administration/hotel management, the education of managers is not a determining factor in innovative actions. The results indicate that the analyzed hotels invest in technological and structural innovations but still need to strengthen critical dimensions such as organization, brand, and innovative ambiance to advance in the innovation stage.

The importance of customer feedback and technological surveillance to drive innovations, especially technological ones, which became more relevant in response to the COVID-19 pandemic, is emphasized. However, innovations in management are still timid, and there is room to invest in knowledge and inclusion processes in the hotel industry.

Obstacles to innovation include high costs, bureaucracy to obtain financial resources, internal resistance, and a lack of access to information. The study concludes that innovations occur primarily with incremental changes in services or products offered, with the aim of meeting customer demands and improving quality.

The tools used to capture new market requirements, such as feedback platforms, market research, and competitor analysis, highlight the importance of monitoring customer demands and competition to drive innovation in the hotel industry.

A more detailed study on Innovative Ambiance is crucial, as this dimension has shown less development, highlighting the importance of an organizational culture that promotes creativity and innovation. In summary, innovation is essential for the competitiveness of companies, positively impacting efficiency, products, market positioning, and financial return, although it is a challenging process that encompasses various social, environmental, technological, and economic spheres.

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