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Digital Innovation and Customer Satisfaction in the Hotel Industry

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Introduction

Nowadays the whole business environment is affected by technological progress and it is going through the digital transformation. The hospitality industry is no different and is subject to change in the digital era. With transforming of the ways of operations in hotels customers' preferences are shifting as well. Today the professional hoteliers are trying to turn the hotel not just into a place to stay for tourists, but into a whole experiment involving the sophisticated technologies at various stages of the stay: pre-arrival, stay, post-stay. Specifically, this factor is explaining the relevance of the research. In addition, the competition in the market and striving for customer loyalty are the main motivations for hotels and they are speeding up the process of developing the technology within a property.

For the study it has been chosen one of the most difficult regulated markets where businesses are mostly oriented on traditions rather than on updating infrastructure and implementing digital experience. Nevertheless, hotels in Venice are continuing to monitor their reputation and position across the competitors. The 5-star hotel Venetian market has been selected to explore how digital innovations influence guests' satisfaction in terms of over-tourism which is faced by many cities in Italy.

The research area is customer satisfaction within hotels in the digital era on the example of Venetian market. The research focus implies JW Marriott Venice Resort & Spa and specific digital innovations. Practical significance is explained by the author's professional experience in the hotel industry in Venice. This has ensured the access to valuable insights concerning hotels' operations and digital technologies within them.

The objective of the study is the development of the suggestions regarding digital innovations that can be implemented in the specific luxury resort. Therefore, the main question of the research would be how recommended innovations would impact customer satisfaction. Based on the defined objective there have been formulated the following tasks:

1. Review the literature related to the topic of customer satisfaction including different theories, models and instruments of measuring.
2. Explore digital innovations and their specifics for the hotel industry.
3. Analyze the Venetian market, competition and dynamics.
4. Conduct a thorough study of the operations of JW Marriott Venice Resort & Spa.

5. Evaluate the current level of guest satisfaction and identify critical pain points.
6. Develop recommendations and analyze the possible effect of the implemented technologies.

The structure of the thesis includes four interconnected chapters. The first chapter is dedicated to the theoretical basis of customer satisfaction with the revealing of different concepts concerning the topic. The constituent elements are considered by the author as well as various approaches of scientists to its definition and the relationship of this concept with customer loyalty. One of the main sections is defining the key metrics using for measuring the satisfaction.

The second chapter examines modern technologies that improve the digital path of customers. This section provides information about the concept of digital innovation, degrees and classification. Moreover, the concept of Industry 4.0 is considered and the technologies used by various companies, and in particular by the hotel business, are presented.

The third chapter is a solid foundation for the further research. This section is devoted to the study of a specific case of the Venetian hotel. The features of a hotel located on a separate island, its position among competitors and market conditions are considered here. Most importantly, the third chapter presents a digital audit of the company in order to further develop recommendations. On the basis of the third chapter the suggestions for the implementation of the technologies presented in the fourth section. Moreover, in addition to the recommendations themselves, the effect and long-term perspectives for the business are considered.

Ultimately, will technology become a competitive advantage of the JW Marriott Venice Resort & Spa, or will it simply be one of the bridges for survival in a city that is gradually sinking under water? Will technology be able to make the hotel belong to the category of extra luxury? Will the guests be more satisfied staying on the island of the Venetian lagoon?

1. Theoretical framework of customer satisfaction

1.1 Key definitions of customer satisfaction

In highly competitive market conditions, companies must constantly monitor their market position and make timely adjustments to their strategic decisions. However, to ensure sustainable development, it is no longer enough to focus solely on financial performance metrics. It is quite important to analyze preferences of customers and study their expectations because the needs and demands are changing over time due to social, economic and technological progress (Kotler, 2012, p.74).

With all the changes in the market, emerges of new brands and product consumer behavior is transforming (Yadav et al., 2024). Digital solutions make customers to reconsider their habits and preferences regarding quality of goods and services, price and whole customer journey (Ranjan & Gurjar, 2020).

Consequently, companies that are unable to track and interpret these changes risk losing their competitive advantages.

Therefore, the systematic study of customer perception and behavior is becoming an essential component of strategic management. By integrating customer-centered analysis with traditional financial metrics, organizations can respond more effectively to market dynamics and build long-term relationships with their target audience (Hill, 2007).

Nowadays orientation on a customer is a basic necessity for businesses. It influences directly profitability, sales and financial performance overall. Companies are able to improve their positioning, develop new categories of products and create value that will enable to obtain strong competitive advantage. At the end, by operating customer-oriented approach, organizations can achieve short-term objectives as well as long-term sustainability. (Zairi, 2000)

Customer satisfaction is a key element of consumer purchasing behavior and the development of long-term loyalty toward a brand. It represents an individual assessment that arises from personal perceptions, emotions, and cognitive evaluations rather than from objective criteria alone. This evaluation is formed under the influence of multiple elements, including perceived product quality, prior and current experiences, and the level to which expectations are fulfilled in a given context. (Giese & Cote, 2002; Yüksel & Yüksel, 2001; Rahman et al., 2017).

Below are definitions of satisfaction as presented in various academic sources, reflecting the fact that different authors conceptualize and interpret this construct in distinct ways.

Kotler (2000) defined satisfaction as: “a person’s feelings of pleasure or disappointment resulting from comparing a product’s perceived performance (or outcome) in relation to his or her expectations”. According to Hansemark and Albinsson (2004), “satisfaction is an overall customer attitude towards a service provider, or an emotional reaction to the difference between what customers anticipate and what they receive, regarding the fulfillment of some need, goal or desire”. "Satisfaction is the consumer's fulfillment response. It is a judgment that a product or service feature, or the product of service itself, provided (or is providing) a pleasurable level of consumption-related fulfillment, including levels of under- or over-fulfillment..." (Oliver, 1997). Oliver’s definition of customer satisfaction is significant for the business context because the focus is on the consumer rather than on the customer. Conventional researches point out that it is essential to distinguish a person who actually consume a product or service (consumer) and an individual who is responsible for the purchase (customer). This method would increase satisfaction by analyzing usage experience and moment of purchase separately.

Looking at these concepts, it is possible to notice that with the evolution of social sciences more and more emphasis is placed on consumer emotions rather than just on the fact of meeting their needs. The necessity to provide various definitions is conditioned by the lack of a standardized concept and, consequently, its versatility. In this research, customer satisfaction will be considered both from the point of view of sufficient features of the service to meet the need, and from the point of view of improving the emotional state during interaction with the company.

Customers are typically considered the most important external stakeholders for companies. (Majava et al. 2013) Customers, also known as clients, purchasers, and buyers, are organizations or parts of it, either business-to-business (B2B) customers or end-user consumers, which may benefit from the products or services a company provides (Christ, 2009; Peppers and Rogers, 2011). Customers can be current or potential, and all others with problems and needs who seek solutions. Among these stakeholders there are clients of company’s competitors, former customers, related or look-alike audiences

(Griffin, 2005). From a manufacturer's point of view, customers include distributors, retailers, and persons who buy products from the retailers (Caplan, 2001).

So, according definitions mentioned it is essential to realize that the concept of customer satisfaction is about consumer satisfaction (that is, user satisfaction), rather than about buyer satisfaction (which may include non-users).

The idea of consumer satisfaction is closely related to several terms, which are sometimes used interchangeably in research and management discussions. These concepts often overlap, as they are all regarded to consumers' emotional and perceptual responses to products or services. As a result, the differences between satisfaction, loyalty, perceived value, and customer experience can become hidden, despite each concept reflecting different aspects of consumer attitudes and behaviors (Kusumawati & Rahayu, 2020). Therefore, clarifying these differences is essential to ensure accuracy in both research and practical context.

Customer-perceived value (CPV) is the difference between the prospective customer's evaluation of all the benefits and all the costs of an offering and the perceived alternatives. Customer benefit represents the perceived financial worth of the collective economic, practical, and psychological advantages a customer expects from a market offering, encompassing the product itself, accompanying services, human interaction, and brand perception. Customer cost, on the other hand, is the perceived aggregate of monetary, time, energy, and psychological expenditures a customer anticipates throughout the evaluation, acquisition, usage, and disposal phases of that offering. Therefore, customer-perceived value is fundamentally the disparity between the benefits received and the costs assumed for various alternatives. A marketer can elevate the customer offering's value by either augmenting its economic, functional, or emotional benefits, or by diminishing one or more of its associated costs. When comparing two value offerings, V1 and V2, a customer will lean towards V1 if the V1:V2 ratio is greater than one, favor V2 if it's less than one, and remain neutral if the ratio is exactly one (Kotler & Keller, 2012, p.125).

Oliver (1997, p. 392) proceeds to describe the consumer who "fervently desires to rebuy a product or service and will have no other." He further suggests a consumer driven to achieve this goal no matter the obstacles or expense. Such unwavering commitment signifies the ultimate loyalty.

An inquiry into the relevant literature shows that the satisfaction–loyalty relation is not well defined. Six of the many and diverse possible associations of satisfaction and loyalty are shown as panels in Figure 1 (Oliver, 1999).

Panel 1 posits that satisfaction and loyalty are simply different expressions of the same underlying idea, similar to how early proponents of total quality management viewed quality and satisfaction as interchangeable goals.

Panel 2 implies that satisfaction is a key element to create loyalty, and satisfaction is the core.

Panel 3 offers a less central role for satisfaction, considering it as one of components contributing to loyalty.

Panel 4 introduces the idea of "ultimate loyalty" where satisfaction and loyalty are constituent parts.

Panel 5 aligns with the notion that loyalty includes satisfaction as a part of it but not as defining characteristic.

Lastly, Panel 6 suggests that satisfaction initiates a process of change that ultimately leads to a distinct state of loyalty. This implies that loyalty could eventually become independent of satisfaction, meaning negative satisfaction experiences (dissatisfaction) would not impact the loyalty state.

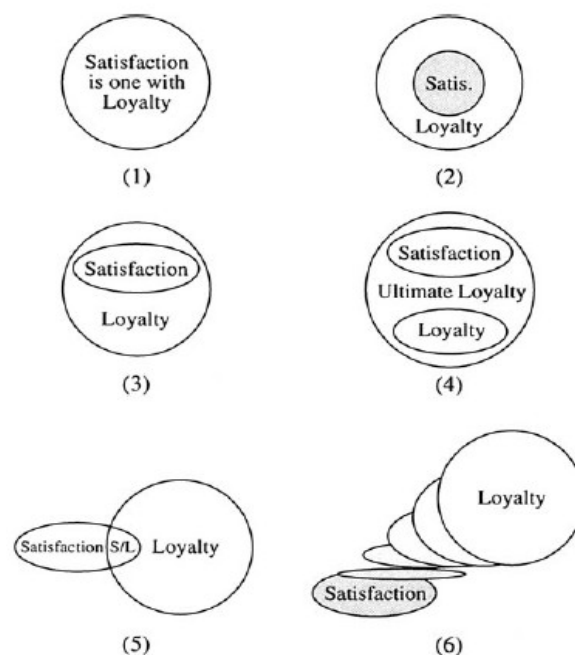


Figure 1. Six Representations of Satisfaction and Loyalty by Richard L. Oliver (1999)

The concepts of what customers believe they gain versus what they give up, how pleased they are with an experience, and their commitment to a brand are three interconnected but distinct ideas crucial to marketing and understanding consumer actions. Understanding these distinctions is important to explain customers' choices and relationships between consumers and businesses (Hill, 2007).

Customer-perceived value shows how customers evaluate usefulness of a good or service, based on what they receive and what they expend. It is a balance between what they believe they obtain (quality, performance, or emotional/social benefits) and what they believe they pay (including money, time, effort, and potential risks). It varies among individuals due to differences in perception and can be formed both before and after using a product or service. This idea forms a customer's desire to buy and their initial selection (Kotler & Keller, 2012).

In contrast, customer satisfaction is an assessment made after usage of a product or service. It indicates how well the actual performance corresponds with what was expected. When performance does not meet expectations, dissatisfaction emerges in this case. When it meets or exceeds them, customers are satisfied. Therefore, customer satisfaction is based on experience and usually connected to specific purchases or interactions. While satisfaction can increase due to repeated purchases, it is generally considered as a short-term, cumulative evaluation of a customer's experience (Kotler & Keller, 2012).

Customer loyalty implies strong connection between a customer and a company. It refers to a customer's willing and actions to continue buying from the same supplier and to a refusal to switch to another brands. Loyalty includes (Kotler & Keller, 2012) visible actions, like repeat purchases, and internal feelings, such as emotional connection and dedication (Khan, 2013). Unlike satisfaction, loyalty implies a consistent preference and not just dependence on individual experience (Oliver, 1999).

It is possible to find a progression in the interplay between these concepts. The value a customer perceives has an impact on their satisfaction. A higher perceived value makes it more probable that their expectations will be met or exceeded. At the same time customer satisfaction contributes to the development of customer loyalty. However, satisfaction does not guarantee loyalty separately (Oliver, 1999). Even satisfied customers might switch their preferences towards competitors if they perceive better value.

Therefore, sustainable customer loyalty is more likely to develop when high customer satisfaction is consistently reinforced by superior customer-perceived value over time (Callarisa Fiol, 2009).

1.2 Theoretical models and determinants of customer satisfaction

Typically, the paradigm that describes the consumer's satisfaction as a comparative process whose result (the satisfaction/dissatisfaction) derives from three distinct elements: expectations (standards), performance, and disconfirmation (Schiebler et al., 2025).

Expectations derive from the degree of knowledge of an individual and, broadly speaking, can be described as "the anticipated outcome of a probabilistic situation" (Reber, 1985, p. 257).

Predictive expectations detail what individuals foresee occurring, drawing upon available data and prioritizing accurate foresight. In contrast, normative expectations express what individuals believe ought to occur, reflecting principles, conventions, or aspirations. Thus, predictive expectations are descriptive, while normative ones are prescriptive (Meirovich et al., 2020).

Individuals thus develop evaluative criteria that are anchored to such values, according to which they interpret and assess reality (Rosenberg, 1960).

As a consequence, expectations and these other standards (e.g., ideal performances, social rules, needs, wants, desires), although usually go hand in hand, are qualified as distinct constructs, separately elaborated by individuals according to circumstances (see Wirtz and Mattila, 2001).

The product's performance offers another point of comparison within the existing paradigm for measuring consumer satisfaction, a satisfaction ultimately determined by the product/service's results. (Oliver, 1997).

"Adequate performance" determine a standard which is based on the implicit connection between an individual's investment expenses and expected returns. In practice it is the result a consumer should have obtained for perceived expenditures. "Ideal performance" has origins from optimal preference and purchase choice criteria. It is the consumer's desired result. "Predicted performance" outlines the outcome which is the most probable. It serves as comparison on pre-purchase stage and is used in satisfaction research, reflected in predictive expectations (Kanning & Bergmann, 2009).

The disconfirmation is the comparison between the consumer's expectations and the perceived performance, that is, the result obtained once the product has been purchased and used. This phenomenon was described by Oliver (1980) in the very well-known Expectancy confirmation theory. Customer satisfaction or dissatisfaction arises when the actual service performance doesn't align with what the customer anticipated. Originating from consumer research and social psychology, the Expectation Confirmation Theory (ECT) was first used in marketing to explore consumer satisfaction and decision-making (Oliver, 1980). Expectation disconfirmation theory (EDT) (Oliver, 1993) is an alternate version of ECT, which replaces confirmation with disconfirmation. Consumers compare the product performance with prepurchase expectations in the post-purchase stage, creating disconfirmation perceptions. In his research Oliver utilized the Howard and Sheth (Haines, Howard & Sheth, 1970) model of consumer satisfaction to propose that disconfirmation stems from the comparison between anticipated satisfaction and received satisfaction.

Regarding the conceptualization of disconfirmation, it is important to note that positive disconfirmation (perceived performance exceeding expectations), and negative disconfirmation (perceived performance falling short of expectations), have sometimes been argued to represent qualitatively different phenomena that could be associated with different psychological processes (Homburg et al., 2006; Oliver, 2010; Santos & Boote, 2003).

Perceived product performance > expectations = positive disconfirmation

Perceived product performance < expectation = negative disconfirmation

Perceived product performance = expectation = simple confirmation

Since its inception, the marketing literature has consistently highlighted the critical role of consumer satisfaction, which further affects repurchases, consumer loyalty, and consumer retention (Rust & Zahorik, 1993; Churchill & Surprenant, 1982).

Consumers have basic requirements and particular expectations concerning products that is considered to satisfy their needs. In case if these goods do not meet expectations, consumers formulate negative attitude (disconfirmation) and perception towards the products and companies (Yang, Lu & Chau, 2013). This idea of disconfirmation does not correlate with cognitive dissonance theory, which consider that individuals deal with

internal psychological tension when their actions differ from their values and thoughts. (Harmon-Jones & Mills, 2019).

Standardized model shown in Figure 2. This model has been foundational to a significant portion of the customer satisfaction research conducted in the last ten years. Note the following:

1. Perceived performance often does not match its actual or technical performance, particularly when the offering is complicated, intangible, or unfamiliar to the user.

2. Comparison standards originate from a variety of sources, which can differ greatly depending on the individual, the context, and the type of product or service involved.

3. Perceived disconfirmation refers to how consumers assess the perceived performance. They compare it against one or several benchmarks. This disconfirmation can be positive (indicating satisfaction), negative (indicating dissatisfaction), or neutral.

4. Satisfaction feeling is a mental state or attitude of a consumer. The concept of "mixed feelings" is relevant, as a person might have experience which varies degrees of satisfaction across different criteria of purchased product or service.

5. Outcomes of satisfaction feelings can include intentions to buy again, sharing opinions with others (word-of-mouth communication expressing approval or disapproval), and lodging complaints. These effects are influenced by additional factors; for instance, even strong dissatisfaction may not lead to complaints if the consumer feels that complaining would be pointless.

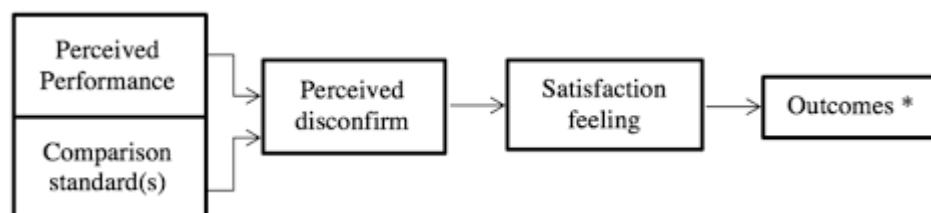


Figure 2. Traditional Macro-Model of Customer Satisfaction
(adapted from Woodruff & Gardial, 1996)

*includes intent to purchase, word-of-mouth, loyalty, and complaints

In a similar way, Comparison Level Theory (Thibaut & Kelley, 2017) connects satisfaction to expectations, which are formed from three key origins: (i) *customer prior experiences with similar products* that, in the case of accommodation, exemplified by a customer's history with a hotel chain or a previous stay at a different hotel in the same

area; (ii) *promotional efforts*, such as marketing campaigns; (iii) *experience of other customers* who serve as a reference group (online reputation).

Finally, another popular theory is the one which describes satisfaction as the result of a perceived input-output gain. Equity theory (Oliver & Swan, 1989) posits that customers assess the fairness of their exchange during evaluation. Every acquisition, involving various costs (including foregone alternatives), is weighed against the value received. This framework proposes that individuals contrast their perceived contributions (such as expenditures and exertion) and gains (like advantages and service caliber) with those of the provider to establish a sense of equity, which subsequently influences their contentment.

Below is a table created by the author based on a comparative analysis of the models described above.

Table 1. Main theoretical theories of customer satisfaction

Theory / Model	Key Authors	Core Assumption	Main' Comparison Mechanism	Concept of Satisfaction	Key Outcomes / Implications
Expectation Confirmation Theory (ECT)	Oliver (1980)	Comparison between expectations and perceived performance	Pre-purchase vs. Post-purchase perceived performance	Confirmation or disconfirmation of expectations	Repurchase intention, loyalty, and post-purchase evaluation.
Expectation Disconfirmation Theory (EDT)	Oliver (1993)	Satisfaction is determined by the degree and direction of disconfirmation between expectations and	Perceived performance compared to expectations, producing positive, negative, or zero disformation	Satisfaction increases with positive disconfirmation negative disconfirmation	Influences favorable or unfavorable attitudes toward products and services after consumption.
Traditional Macro-Model of Customer Satisfaction	Woodruff & Gardial (1996) (adapted)	Multidimensional attitude formed through perceived performance, expectations, and disconfirmation	Multiple comparison standards (past experience, norms, expectations)	Satisfaction increases with positive disconfirmation and decreases with negative disconfirmation	Leads to behavioral outcomes such as repurchase intention, word-of-mouth, loyalty, complaints (moderated by other variables).
Comparison Level Theory	Thibaut & Kelley (2017)	Satisfaction is a multidimensional attitude form through perceived performance; expectations, and disconfirmation	Multiple comparison standards (past experience, norms, expectations)	Satisfaction is a psychological state that may involve mixed feelings across service attributes	Leads to behavioral outcome such as repurchase intention word-of-mouth, loyalty, complaints (moderated by other variables).
Comparison Level Theory	Thibaut & Kelley (2017)	Satisfaction depends on how outcomes compare to a reference level	Outcomes compared against a "comparison level" formed by prior experience.	Satisfaction reflects the extent to which outcomes meet or exceed the comparison level.	Social influence, online reviews, and prior experiences.
Equity Theory	Oliver & Swan (1989)	Satisfaction results from perceived fairness in the exchange between customer and provider.	Comparison of customer inputs (costs, effort) and outputs (benefits) relative to the firm's inputs and out-	Satisfaction arises when the exchange is perceived as equitable; dissatisfaction from perceived inequity.	Fairness, value perception, and justice as drivers of Satisfaction and loyalty.

Source: Author's own elaboration.

The theories outlined in the table collectively suggest that customer satisfaction is largely driven by comparative evaluations. This involves comparing expectations with actual performance, referencing past experiences, or considering perceived fairness. Most

models, despite their varied emphases, define satisfaction as a psychological and evaluative outcome of these comparisons, thereby highlighting its strong emotional underpinnings. The reviewed theories consistently point to satisfaction's impact on repeat purchases, loyalty, and post-consumption sentiments, while also demonstrating its complex, multi-faceted nature.

1.3 Quantitative and qualitative approaches to measuring satisfaction

Why measure customer satisfaction?

In today's "new economy," knowledge is both a valuable input and an increasingly significant output (Hsu et al., 2006). As physical products become globally uniform and effective methods spread rapidly, businesses differentiate themselves through continuous invention, precise customer focus, and enhanced service offerings. However, these approaches are not appropriate for transactional customer interactions. The more attention is paid to innovation and service, the greater the role the customer plays in the company's overall performance (Mahmoud, 2017).

Customer relationship is an important asset, deserving careful attention as usual tangible assets. Frameworks assessing intellectual capital admit the importance of customer capital with sales figures, customer contentment, and brand standing. These methodologies classify customers into following groups: key clients (representing reputation), new or trial customers (new sales), and repeat customers (signifying satisfaction and ongoing sales) (Kumar & Ciddikie, 2023). In addition to measuring intellectual capital, marketing research offers a variety of industry models for tracking customer satisfaction.

Therefore, it is clear that academic and practical researchers in management and marketing agree on the vital role of customer relationships in achieving business success (Kotler & Keller, 2012). To move beyond simple statements, it is essential to implement customer relationship management that allow for systematic monitoring and control. Although everyone understands this necessity, there are some arguments about the phenomenon of customer relationships. Management theorists offer different perspectives, shaped by the formed by contradictory assumptions of various theoretical schools.

It is essential to stress that the process of measuring customer satisfaction is not a observation but an active intervention. The aim is not simply to assess past performance

but to actively shape future outcomes (McColl-Kennedy & Schneider, 2000). Since interactions with customers during surveys inevitably influence them, it is necessary to guide proactively this influence in alignment with the strategic vision and business objectives (Hill & Brieley, 2003).

Since the "customer service revolution" began nearly two decades ago, a significant amount of business research has been dedicated to understanding customer satisfaction and the characteristics of customer-centric organizations (Zemke et al. 1989, p. 31). Every study on customer satisfaction operates on a single core tenet: evaluating a company's products or services by how customers experience them. It is crucial to remember that customer viewpoints, whether they align with reality, are behind the times, or are spot-on, hold significant weight. Indeed, comprehending these perspectives offers vital insight into future customer actions (Yuksel, A. & Yuksel, F., 2001).

Regardless of the methods used to assess intellectual capital, the marketing literature offers a variety of specialized models for different industries designed to track customer satisfaction. Assessing customer satisfaction goes far beyond simply creating satisfied consumers. It is directly related to making a profit and gaining competitive advantages. To ensure long-term success in the market, companies are required to monitor customer satisfaction signals regarding products, services, and relationships with them. Measuring satisfaction provides a comprehensive understanding of consumer behavior before and after a purchase. Without this approach, it is impossible to deeply comprehend, improve and enhance customer service. Therefore, business consultants, corporations and other specialists strive to identify the features of organizations that consistently delight their customers, create tools for monitoring satisfaction, and implement continuous quality improvement systems that respond to customer feedback (Hill, 2007).

Companies use different metrics to:

- 1) assess the effectiveness of business processes;
- 2) identify areas that require changes to improve performance;
- 3) evaluate the impact of changes on results.

Understanding the perception and attitudes of customers towards the organization's activities allows firms expand the possibilities for making more efficient management decisions. Such organizations will be aware of the needs and expectations of their

customers and will be able to determine whether their products and services meet these demands (Hayes et al., 1992).

Smart organizations prioritize regular measurement of customer satisfaction, as it is a fundamental driver of customer loyalty (Allen, 2024). A customer who is thoroughly satisfied is likely to be a long-term patron, a more frequent purchaser of new and enhanced items, a positive referrer, less influenced by competing offers and price points, a source of innovation, and less expensive to service due to predictable interactions. Moreover, a strong link exists between high customer satisfaction and increased profitability and decreased investment risk (Yeung & Ennew, 2000).

Prior to any measurement, it is crucial to define the subject and purpose of the assessment. A robust measurement framework necessitates addressing fundamental inquiries: who, what, when, where, how, and why, as these are all indispensable for achieving desired outcomes (McColl-Kennedy & Schneider, 2000).

- 1) Who will conduct the assessment? All personnel within the organization.
- 2) What aspects require evaluation? Every element and factor impacting the customer experience.
- 3) When should these evaluations occur? On an ongoing basis.
- 4) Where should these evaluations be performed? Across the entire organizational structure and within every process that influences customer contentment and product/service excellence.
- 5) How should these evaluations be carried out? Through the establishment of performance benchmarks and measurable criteria, enabling the assessment of performance via empirical data and numerical findings.
- 6) Why is this assessment imperative? To gain insights for enhancing quality and elevating customer satisfaction levels.

To effectively manage and achieve corporate objectives regarding customer satisfaction, leaders need access to relevant data and insights. This information enables them to monitor their progress against established goals and to strategically adjust their efforts when key milestones are not reached (McColl-Kennedy & Schneider, 2000).

Customer contentment is assessed throughout the entire product lifecycle. This includes evaluations at the moment of purchase, the quality of the sales interaction, the efficiency of administrative processes, after-sales service and the continuous support. For

each of these four stages, customers assess various specific characteristics such as company's performance and the personal significance of each characteristic. (Zairi, 2000)

The methodology's initial important phase involves evaluating a combination of criteria that reflect various aspects of customer satisfaction (Mihelis et al. 2001). This evaluation typically unfolds through a detailed, interactive process involving the analyst and the company's decision-makers. Regardless of the specific approach, it's essential to validate the reliability of these chosen criteria and sub-criteria showed on the Figure 3, by testing them with a small, representative sample of customers.

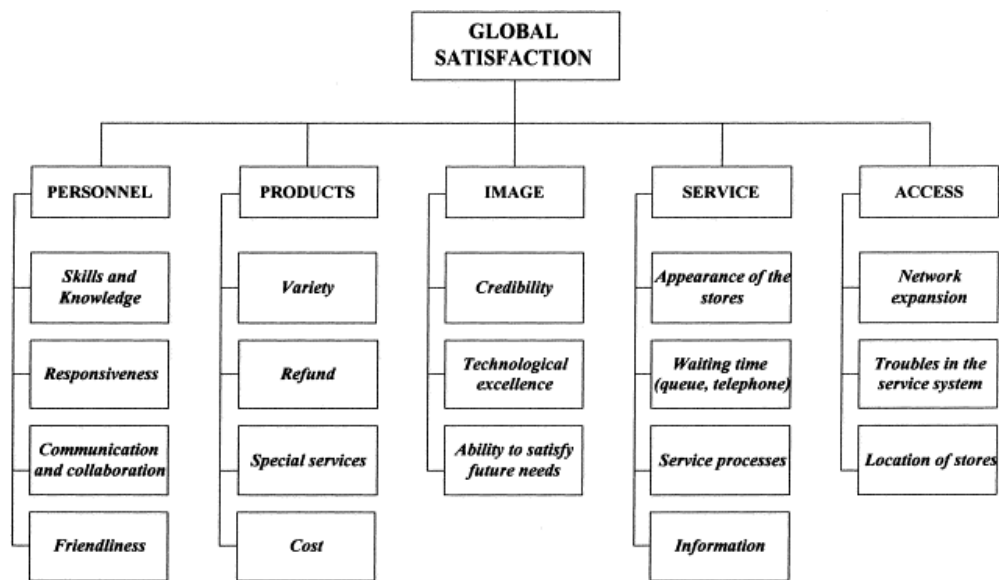


Figure 3. Criteria for studying customer satisfaction by G. Mihelis, E. Grigoroudis, Y. Siskos, Y. Politis, Y. Malandrakis, 2001

Key Metrics for Measuring Customer Loyalty and Satisfaction

In the realms of marketing research and customer relationship management, a range of quantitative measures are frequently employed to gauge customer contentment, allegiance, and general sentiment towards an organization or its offerings. Prominent among these are the Net Promoter Score (NPS), Customer Satisfaction Index (CSI), Customer Effort Score (CES), and various behavioral loyalty metrics. Each of these distinct indicators illuminates a particular facet of the customer journey, furnishing crucial understanding into how customers perceive and act (Kuzmin, 2020).

Net Promoter Score (NPS)

The Net Promoter Score (NPS) is a widely used and easy-to-understand method for assessing customer satisfaction. It assesses how likely customers are to suggest a brand, product, or service to others. Due to its straightforwardness and clear results, NPS is often mentioned in marketing resources and materials for business education.

This metric is calculated based on customer responses to a simple question: ***“How likely are you to recommend our company (product/service) to friends or colleagues?”*** The scale of responses includes eleven points ranging from 0 (not at all likely) to 10 (extremely likely). Based on the answers, the classification of respondents is created. Customers who give scores from 0 to 6 are considered *detractors*, showing dissatisfaction or negative attitudes toward the brand. Scores of 7 and 8 represent *passives*, who are generally satisfied but not enthusiastic and may easily switch to competitors. Customers who assign scores of 9 or 10 are referred to as *promoters*, representing the most valuable segment. They are the ones who are willing to actively recommend the brand and generate positive word-of-mouth.

The NPS value is calculated by subtracting the percentage of detractors from the percentage of promoters. The resulting score can range from -100 to +100. Negative values indicate a predominance of dissatisfied customers, while positive values suggest strong customer advocacy. A score close to zero is considered neutral and often signals the need to strengthen competitive advantages (Weinstein, 2024).

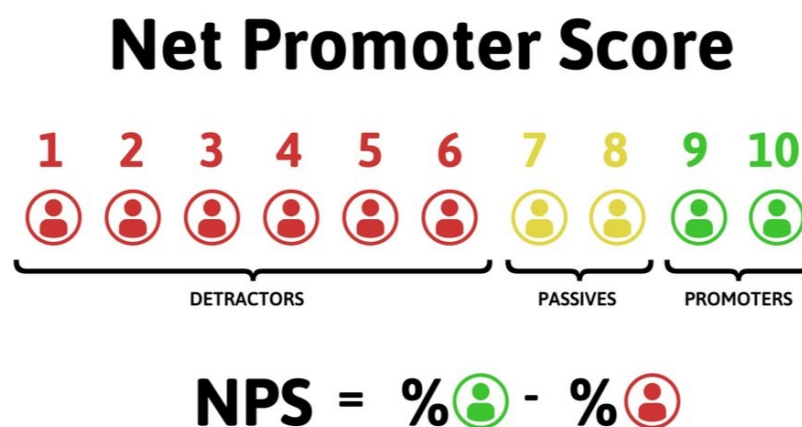


Figure 4. Structure and calculation of the Net Promoter Score

CSAT Score

The CSAT score represents an advancement over prior measurement methods. It's calculated by determining the percentage of customers who expressed a satisfactory level of contentment, out of all the surveys collected.

Consequently, a clear threshold is required to define what qualifies as "valid satisfaction." This metric effectively transforms individual scores into a binary classification: exceeding the defined threshold results in a "satisfied" designation (represented as a 1 for calculation), while falling below it leads to a "dissatisfied" designation (represented as a 0). The metric will be presented as the percentage of customers who are satisfied.

$$CSat\ score = \frac{\text{Count of surveys scored above } x}{\text{Count of surveys received}}$$

Figure 5. Customer Satisfaction (CSAT) score calculation

A satisfaction level exceeding 70% is generally regarded as a positive outcome across most industries, indicating that the majority of customers are satisfied with the company's products or services (Testograf, 2023).

Satisfaction scores ranging between 50% and 70% reflect a moderate level of customer satisfaction. While such results cannot be considered unfavorable, they suggest that there is room for improvement in enhancing the overall customer experience.

Satisfaction levels below 50% indicate significant issues in how customers perceive the product or service. Results in this range require immediate managerial attention and a thorough analysis of the underlying factors contributing to low customer satisfaction.

Customer Satisfaction Index (CSI)

The Customer Satisfaction Index (CSI) is a more detailed measure of customer satisfaction that evaluates how well a product or service meets customer expectations across multiple attributes. Unlike NPS, which focuses on overall loyalty, CSI aims to capture customers' satisfaction with specific factors that are important in the purchase and consumption process.

The calculation of CSI can vary depending on the chosen methodology. In its comprehensive form, CSI requires advanced analytical techniques, including weighting factors and matrix-based calculations. Such approaches are typically used by large

corporations. However, simplified variations of CSI are often applied by small and medium-sized enterprises. These companies implement principles which are similar to those used in NPS calculations.

A company should identify key attributes of the brand that are relevant to customers to compute CSI correctly. These attributes are often derived from the marketing mix (Product, Price, Place, Promotion, and People). In any case it is necessary to adapt to the specific business context. Customers are asked to evaluate the importance of these attributes and their level of satisfaction with each one. To calculate Customer Satisfaction Index firms usually use a five- or ten-point scale. Based on the responses, customers are again categorized into detractors, passives, and promoters, and an overall satisfaction index is calculated.

CSI is particularly valuable because it reflects customer satisfaction with aspects that genuinely matter to customers, rather than abstract characteristics. This makes it a reliable tool for identifying areas requiring improvement (Eklof & Westlund, 1998).

Customer Effort Score (CES)

The Customer Effort Score (CES) measures the amount of effort a customer must expend to purchase a product or receive a service. This metric is mostly appropriate for business-to-consumer (B2C) contexts, but it can also be applied in business-to-business (B2B) environments (Clark & Bryan, 2013).

The CES score is usually calculated by a survey of customers who determine the ease or difficulty of completing a purchase or solving problems. For this metric a scale from 0 to 10 is used. High scores (9-10) indicate low efficiency and positive experience, while low scores (0-6) indicate significant difficulty. As the NPS, the CES is computed by subtracting the percentage of customers who had positive experience from the percentage who dealt with problems.

In practice, CES is most effective when combined with follow-up interviews or surveys. This allows companies to identify specific obstacles in the customer journey, such as technical issues, payment problems, or unfulfilled service promises (Norouzi, 2024).

Behavioral Loyalty Indicators

In addition to attitudinal measures based on survey responses, customer satisfaction can also be assessed through actual behavior, particularly repeat purchase rates. This

approach assumes that customer actions provide a more objective assessment of loyalty than initial stated intentions.

To measure behavioral loyalty, companies use customer databases, loyalty cards and customer relationship management (CRM) systems. The basic indicator is the Customer Loyalty Index (CLI), which extends the NPS by adding questions related to repurchase intention and cross-buying behavior. However, this method is used less frequently due to the increased risk of response bias.

Another commonly applied indicator is the loyalty rate, which represents the percentage of customers who continue to purchase from a company over a defined period. This metric is particularly suitable for businesses with frequent customer interactions, such as online services or subscription-based models (Aksoy, 2013).

1.4 Instruments for capturing customer feedback

An accurate assessment of customer satisfaction largely depends on the reliability of the data collected (Hill, 2007). Many customers are reluctant to complete surveys unless they receive incentives. That is why businesses often provide discounts, loyalty rewards, or early access to new products in return for feedback (Kotler et al., 2022). Well-designed surveys should include precise and straightforward questions and should avoid general or abstract wording, because ambiguity may cause varied interpretations and distort the results. Additionally, grouping respondents by customer category or purchasing patterns helps increase both the precision and practical value of the insights obtained (Hill, 2007).

Periodic conducted surveys allow companies to directly monitor customer satisfaction and include supplementary questions that assess repeat purchase intentions as well as the customer's readiness to recommend the brand or company to others. Pulte Homes, one of the largest and most diversified residential construction firms in the United States, consistently outperforms competitors in J.D. Power's annual rankings by continuously evaluating customer experience and maintaining long-term tracking of client feedback. The company collects responses immediately after a home purchase and repeats the survey several years later to confirm that customer satisfaction remains high over time (Kotler & Keller, 2012).

Many organizations argue that a single, carefully constructed question can be sufficient for evaluating overall customer satisfaction. In addition to measuring their own

performance, companies must also keep a close watch on competitors. This can be done by analyzing customer churn and contacting former customers or those who have changed service providers to understand the reasons for their decisions (Hill & Brierley, 2003).

Another effective approach involves employing mystery shoppers who act as prospective customers and document strengths and weaknesses appeared during purchasing. Managers may also personally engage in sales interactions with their own firm and competitors under anonymity to verify service quality firsthand, or they may contact their own customer service departments with inquiries or complaints to assess how staff respond (Blessing & Natter, 2019).

The precision of a Customer Satisfaction Measurement (CSM) investigation based on two primary elements. Firstly, it is crucial to formulate right questions, which is the essence of exploratory research. Secondly, these questions must be addressed to an appropriate audience, to a customer group that truly represents your overall clientele. The reliability of this customer group is established by three criteria: it must be a true reflection of the whole, its selection must be unbiased, and its size must be sufficient (Hill & Brierley, 2004).

With assurance that the questions are relevant and directed at the correct individuals, it is possible to finalize the survey instrument and launch the primary data collection. The initial step in this phase involves deciding on the survey's delivery method. Options include conducting interviews or distributing self-administered questionnaires, which can take various forms such as mail, in-person at the point of purchase, or digital (Oishi, 2003).

- Exploratory research

Exploratory research represents a methodological framework for investigating research questions that have not been studied yet (Hill et al. 2007). While often qualitative and primary in its data collection, exploratory studies can also incorporate quantitative elements, particularly when involving a large sample size. Its adaptable and emergent characteristics have resulted in its association with interpretive research or a grounded theory methodology.

- Qualitative research

Research commonly begins with an exploratory stage, which is widely recognized as an appropriate initial approach. This phase is primarily qualitative and involves collecting

detailed information from a relatively small number of participants. At this stage, the focus is not on the size of the sample, but on gaining a deep understanding of customer relevance and perceptions. Such understanding is essential for the accurate development of questions used in the main survey (Hill & Brierley, 2003).

Exploratory research aims to identify respondents' experiences, attitudes, and, especially in consumer markets, their emotional responses. By encouraging participants to share their feedback in detail, this method allows to gain insights about customer needs and expectations. As a result, a substantial amount of valuable information is obtained from each respondent (Kotler & Keller, 2012).

However, due to the limited sample size, exploratory research is not designed to produce quantitative results or support statistical generalizations. This limitation does not reduce its value, as the main aim of exploratory research is to obtain information for the development of the main survey tool. The subsequent core survey, conducted with a larger and quantitatively representative sample, makes it possible to measure customer satisfaction and to assess relative importance of different factors with statistical reliability.

In addition, the inclusion of a limited quantitative component at preliminary stage, before finalizing the main questionnaire or conducting a control study, can further improve the overall research plan (Mason et al., 2010).

- Depth interview

According to Johnson and Gustafsson (2005), depth interviews are most often conducted in a face-to-face format and involve individual participants rather than groups. The length of such interviews typically varies between 30 and 90 minutes, depending on the complexity of the customer–company relationship under examination. This method is particularly prevalent in business-to-business research contexts.

Given the qualitative orientation of exploratory research and the relatively limited variation in customer needs at this stage, large sample sizes are not required. To obtain valuable insights in the context of customer satisfaction measurement (CSM) exploratory studies it is adequate to conduct approximately 12 in-depth interviews. In cases where the customer base is small, even lower number of interviews may be enough.

In contrast, companies with a large or heterogeneous customer database may require a greater number of interviews to provide sufficient representation. This includes ensuring

diversity in key consumer characteristics, such as different levels of value, different industries, distribution channels (for example, manufacturers and distributors), geographical regions, different positions in the decision-making process.

- Focus group

For some companies focus groups as a qualitative research method is preferred because interaction between participants often helps identify a wider range of customer needs than individual interviews. Group discussions also make it possible to understand how customers think, the language they use, and how they describe their experiences. This insight is important for designing a main survey questionnaire that is relevant and clear to respondents, as it reflects the terms customers naturally use when expressing their needs and expectations. In customer satisfaction measurement (CSM) exploratory studies, it is common to conduct between four and eight focus groups, each consisting of approximately eight participants. However, in cases where the customer base is large or highly diverse, a greater number of groups may be required to allow for effective segmentation (Marcus, 1998).

- Quantitative survey

In studies of customer satisfaction, quantitative survey methods play a central role in gathering standardized numerical data from customer samples in order to assess satisfaction and associated variables. This approach allows researchers to quantify satisfaction levels, empirically examine theoretical connections (such as the relationship between service quality and satisfaction), and draw generalizable conclusions using statistical techniques. As a result, quantitative surveys complement exploratory and qualitative approaches by offering empirical support for hypothesis testing and validation of conceptual models (Hill, 2007).

Primary Methods of Data Collection

Once the initial research phase and sampling strategy are finalized, the focus shifts to the execution of the primary survey. The immediate priority is selecting the most effective data collection channel (Hill & Brierley, 2003). Generally, researchers choose between four fundamental approaches:

1. Personal interviews

Direct, in-person engagement remains a powerful tool for gathering data. This method excels because it builds a sense of trust and rapport between the researcher and the

participant. It allows organizations to immediately clarify confusing points and use visual aids to help the respondent. In addition to simple numbers, face-to-face communication often leads to deeper quality "pearls" because people tend to be more visual when they communicate in person. However, these benefits require a high price. Hiring and training professional interviewers is expensive, and the logistics of meeting participants especially in a B2B context where people are geographically separated can be a significant expense on time and budget. There is also the risk of "social desirability bias," where participants soften their criticisms to avoid offending the interviewer (Hill, 2007).

2. Telephone-based research

Telephone surveys serve as a robust quantitative instrument for capturing public opinion and consumer habits. By contacting a statistically relevant sample within a specific region, organizations can efficiently gather data from 50 to 1,000+ individuals. While faster than in-person visits, this method has limitations. It is less effective for exploring complex emotional responses or deep-seated attitudes, where a focus group might be better suited. Furthermore, certain demographics are becoming increasingly difficult to reach via traditional phone lines, which can skew the representativeness of the final data (Schmich & Jentsch, 2011).

3. Postal surveys

Postal surveys involve sending physical, standardized questionnaires that respondents complete independently. Although an increase in usage of digital tools the "paper" methods still remain as one of efficient way to found out social views. There are some reasons that should be considered choosing between online and postal surveys:

- A part of society lacks the access to the internet and modern networks.
- Researchers may not have sufficient database of email addresses.

Mail-in surveys are often used as a "fallback" or secondary method to reach groups that have ignored email or phone invitations (Menold, 2016).

4. Electronic surveys

Current academic and commercial literature highlights a strong preference for electronic surveys, primarily driven by the need for budget efficiency. Scholars like Bachmann et al. (1996) and Weible and Wallace (1998) have long argued that digital platforms offer a massive financial advantage over traditional physical mail. By removing

the costs of printing, postage, and manual data entry, electronic methods allow for rapid data collection on a scale that was previously impossible for most researchers.

One major difficulty in measuring customer satisfaction is that it depends heavily on the specific industry. It is a mistake to treat all satisfaction scores the same way, as what customers expect varies depending on the market. For instance, in highly competitive areas like retail, there are many choices and it is very easy for a customer to switch to a rival. Because of this, shoppers in retail naturally expect a much higher level of service. Sometimes a score that represents "excellent" result for a local utility company might be considered "average" or even poor in the retail sector and other industries. Therefore, businesses must analyze their data considering the context of their own field standards (Testograf, 2023).

Furthermore, it is not enough to look at customer satisfaction as a separate and static indicator. The real value emerges from studying how these parameters change over time. Through a single survey it is possible to obtain only a short review of the current customers' mood. However, tracking these scores regularly enables companies discover important trends in customers feeling. Whether the scores are slowly rising due to better service or gradually dropping because of "brand fatigue," these shifts offer vital clues for the future. By watching these patterns, organizations can fix problems before they get worse and build stronger, long-term relationships with their clients (Boyer et al., 2002).

1.5 Specifics of customer satisfaction in hotel industry

In today's highly competitive hospitality market, customer reactions play a crucial role in determining a hotel's success or failure. Emotional responses of clients have a significant impact on further bookings and reputation of a hotel. If a guest is satisfied or their needs are at least met they are more likely to return to a property. In another case, dissatisfied guests are unlikely to recommend the hotel to friends or family. Moreover, they may leave negative feedback online and lately destroy brand's reputation and make the number of guests decrease (Li et al., 2020). As the studies have shown one negative review may bring about 30 guests lost (Oliver, 2010). It is also pointed out that financial risks connected to unpleasant customer experience are quite high.

Hospitality organizations should to focus on making guests happy with their journey as well as on eliminating dissatisfaction. To attain these results, it is essential to develop

different management strategies. Research shows that the factors that delight customers are not necessarily the same as those that lead to dissatisfaction or frustration (Albayrak and Caber, 2013; Alegre and Garau, 2011; Füller and Matzler, 2008). As an example, a clean towel in a hotel room is considered as a standard and not as an extra factor increasing satisfaction. However, if the same towel is dirty it would make a customer highly disappointed. Considering another situation, complimentary welcome gift or another small gesture will cause displeasure or complaints even if it is absent.

Examples mentioned above prove that hotel attributes may influence guests' satisfaction in an asymmetric way. Some actions on the part of a hotel may cause increase in satisfaction while others lead to equally strong dissatisfaction (Albayrak and Caber, 2015). Basically, the relationship between hotels' attributes and customer satisfaction is not always balanced. It means that positive improvements may have a disproportionately large effect, while negative impacts may outweigh the benefits of other aspects. These data indicate that customers react differently to positive and negative performance depending on the type of attribute involved.

The three-factor theory provides a theoretical explanation for this phenomenon of asymmetry, proposing that not all hotel attributes has the same contribution to overall satisfaction. According to Kano et al. (1984), service attributes can be categorized as basic, performance, or excitement factors. Basic factors primarily cause dissatisfaction when absent or poorly delivered. Excitement factors increase customer delight when present. Performance factors affect satisfaction and dissatisfaction in a more linear and balanced manner, depending on how well they are executed.

Building on this framework, the current study aims to examine whether the classification of hotel attributes as basic, excitement, or performance factors differs across hotel star categories and customer groups. Since star ratings indicate a hotel's quality in terms of pricing, facilities, and service standards (Cser and Ohuchi, 2008), it is reasonable to assume that guests staying in higher-rated hotels have higher expectations than those in lower-rated ones. Moreover, customer background may influence satisfaction. Domestic and international guests may consider service differently which leads to variations among market segments.

Previous studies that have applied three-factor theory to tourism and the hospitality industry show that the characteristics of a hotel and destination affect customer

satisfaction in different ways. Albayrak and Caber (2013) found that information availability is considered as a basic factor, health and hygiene, accommodation, and shopping are performance factors, and local transportation functions as an excitement factor. Later, Albayrak and Caber (2015) identified cleanliness, food and beverage services, staff performance, entertainment, and child amenities as basic factors, while beach access and room technology were performance factors. Similarly, Matzler et al. (2006) reported that reception services, employee friendliness, and hotel rooms are basic factors, wellness facilities are performance factors, and restaurant and breakfast services serve as excitement factors. Lai and Hitchcock (2016, 2017) argued that the classification of hotel attributes depends on hotel type and guests' prior experience. Recent research by Albayrak (2019) reinforces this contextual view, with core service elements as basic factors, hotel ambiance as an excitement factor, and room design as a performance factor.

A large body of research recognizes hotel attributes as central to customer satisfaction. Parasuraman et al. (1988) proposed that satisfaction arises from how well individual service components meet guest expectations. Later studies have organized hotel attributes into multiple dimensions reflecting different aspects of hospitality services (Rhee and Yang, 2015). Most of this research relies on empirical data drawn from guests' reported experiences.

Researchers analyze hotel customer satisfaction from multiple perspectives, using diverse methods and data to determine the most influential factors. Based on surveys of Qu et al. (2000) there have been proposed six broad attribute categories that cover over thirty hotel services. Choi and Chu (2001), using surveys of international visitors to Hong Kong, identified seven key attributes, including staff service quality, room features, and perceived value as the most important. Other researchers emphasize a multidimensional approach. Kim and Perdue (2013) found that customer choices are influenced by cognitive factors like brand, price, and service quality, affective factors related to comfort and enjoyment, and sensory attributes such as atmosphere and room quality. Studies in China suggest that service quality is particularly critical in budget hotels for shaping guest perceptions (Hua et al., 2009).

Research has shown that determinants of hotel customer satisfaction can be identified through online reviews in comparison with structured surveys (Jang et al., 2018; Mellinas et al., 2019; Padma and Ahn, 2020; Tian et al., 2016). For example, Li et al. (2013)

examined Chinese hotel reviews and found that food and beverage management, transportation convenience, value for money, and proximity to tourist sites are key satisfaction drivers. The quality of beds, interaction at reception and room size and decoration are also important, although guests tend to be less satisfied with these characteristics. Jang et al. (2018) analyzed online reviews for 149 Chicago hotels and identified 30 key attributes. The most important one is quality of staff. It influences customer satisfaction the most. Kim et al. (2016) compared satisfied and dissatisfied customers in New York City hotels. He confirmed that staff and their attitude are critical for guest satisfaction.

Nowadays, posting reviews on major booking platforms is a common way for guests to express their opinion. These reviews are often compiled into a single rating score, which provides a customer satisfaction rating. Besides offering insights to hotel management, these scores help potential guests to make a decision and influence the hotel's reputation. Detailed information about hotel features including price and location, amenities, activities, pet policies, and languages spoken by staff has become widely accessible.

The HOTREC association represents hotels, restaurants, and cafés across Europe. This organization created the Hotelstars Union classification system. It includes 21 categories with 270 criteria, some mandatory for a star rating and others optional ones. The focus is on quality management, wellness, and rooms conditions. However, not all countries follow this system. Due to cultural and national differences, some continue use private rating schemes as they prefer to prevent a single global standard. Therefore, star ratings do not always truly represent hotel quality, and their impact on customer satisfaction cannot be universally determined. This situation has prompted researchers to investigate which factors affect guest satisfaction.

Wuest, Tas, and Emenheiser (1996) emphasized the importance of hotel facilities and characteristics for customer satisfaction. Studies identify key attributes such as cleanliness, price, location, security, personalized service, appearance, opportunities for relaxation, service standards, image, and reputation (Ananth et al., 1992; Atkinson, 1988; Barsky & Labagh, 1992; Cadotte & Turgeon, 1988; Knutson, 1988; McCleary et al., 1993; Rivers et al., 1991; Wilensky & Buttle, 1988). Saleh and Ryan (1992) highlighted that besides physical features (i.e. restaurants or parking), the hotel's interior and exterior

aesthetics are very important. They also noted that guests staying longer or having more experience place more value on the interaction with personnel.

Empirical research further confirms the impact of various factors on guest satisfaction. Gu and Ryan (2008) found that the external environment, hotel reputation, and room cleanliness are key elements. Choi and Chu (2001) identified staff quality, room quality, and value for money as most important. Chaves, Gomes, and Pedron (2012) report that guests frequently evaluate hotels based on rooms, staff, and location. Mattila and O'Neill (2003) emphasize that price significantly shapes guests' perceptions of value and quality, as higher prices typically create expectations of higher service standards (Matzler et al., 2006).

2. Digital transformation and innovation landscape

2.1 Theoretical foundations of digital innovation

Business environment allows firms switch attention from achieving sales figures in favor of developing emotional connection with their audience (Kotler, 2000). Making customers' needs as a core is not optional nowadays. It is an essential requirement. The relationship between a service provider and its consumer base is defined by the fulfillment with customer-company interaction and the emotional loyalty (Pansari & Kumar, 2017).

In the digital realm, success depends on integrating all touch points into a singular, cohesive experience. Remaining consistent, a brand can foster deeper satisfaction and strengthen reputation. It is emphasized that clarity and an continuous flow of content are the benchmarks of superior customer communication (Berman, 2012).

In today's world, information technology (IT) solutions play a crucial role in supporting various industries and enhancing individual experience (Ciriello et al., 2018). Many entrepreneurs are trying to attract customers in an extremely competitive market. Effectively identifying and addressing customer demands is one of the strategies that gains effective results for drawing their attention (Yu et al., 2014). However, understanding clients' needs can be quite challenging due to the complexity and variability of human emotions and perceptions. As a result, customer satisfaction surveys have emerged as an excellent tool in marketing to find out and reflect these needs. This type of analysis is widely utilized across different sectors to evaluate product quality. Recently, there has been a strong link established between customer satisfaction and the quality of service provided (Kotler & Keller, 2012).

The globalisation of international markets has had a significant effect on companies in the last decades. Rather than being static, internationalisation represents a dynamic evolution where a firm moves its domestic origins to compete on a global stage. This expansion is further accelerated by the rapid implementation of digital technologies. These technologies drive entering new markets (Kotler, 2000). Engaging in cross-border trade enables businesses to increase revenue. Moreover, it serves as a laboratory for acquiring specialized skills and competencies that fuel corporate innovation. Enterprises that have roots from emerging economies apply external knowledge as the key for strengthening their efforts. Consequently, contemporary research focuses on optimising

business models to balance technological risk against the pursuit of sustainable, frugal innovations that remain viable in the long term (Escudero-Cipriani et al., 2024).

What exactly is "digital innovation," and how does it differ from traditional forms of innovation? There are three fundamental characteristics of it that transform the nature of innovations:

1. Digitized information can be stored, modified, transmitted, and tracked by any digital device, regardless of its type (Yoo et al. 2010).
2. This digital information can be changed through reprogramming that allows digital solutions to adapt post-deployment through interactions with other systems (Kallinikos et al. 2013).
3. Digital technology is inherently self-referential. It is essential for the creation of further digital technologies (de Reuver et al. 2018; Yoo et al. 2010). This means that digital technology serves both as an outcome and a foundation for new digital innovations, resulting in high scalability, low barriers to entry, and fostering widespread participation and democratized innovation (Yoo et al. 2010).

The concept of digital technologies includes the combination of intelligent and innovative technologies, such as big data analytics, IoT, and cloud computing. All of this enable businesses to stay linked, converse effortlessly, and operate autonomously (Ciriello et al., 2018). Integrating digital tools allows a company to change outdated models for smarter, more intuitive ones. By putting data at the heart of their strategy, these organizations can respond more effectively to market pressures and outpace their rivals (Marcon et al., 2022).

In addition, the COVID-19 pandemic dramatically had a significant effect on global behavior in 2020. It forced the advancement of several sophisticated digital technologies in information and communication (Wallengren Lynch et al., 2023). This swift evolution has impacted various sectors and industries. Technologies such as artificial intelligence, the Internet of Things (IoT), blockchain, and the fifth-generation wireless networks (5G) have strengthened a dynamic ecosystem. Exactly this ecosystem helps businesses and industries identify and leverage new opportunities around the business environment (Nleya et al., 2025).

Digital innovation is never an isolated phenomenon. Many people view it as a formal strategic project managed strictly by IT departments. However, the broader organizational landscape serves as a vital foundation and sometimes it is unpredictable. A company's established culture and routines, and strategic vision are actively shaped by these technological shifts (Kohli & Melville, 2019).

Consider the friction that occurs when new systems clash with old habits. As Pentland and Feldman (2008) illustrated, a conference management tool failed to meet its goals for two business units because the software's rigid logic contradicted the internal culture of the team and daily workflows. This highlights that digital progress is about the environment. Furthermore, successful innovations can fundamentally reconstruct the organization, paving the way for entirely new business models (Fichman et al., 2014).

The term AI, or artificial intelligence, means systems or applications that are created to replicate human thought processes and behaviors, such as learning, decision-making, and problem-solving. In the modern environment, customers increasingly expect services that are secure, swift, and user-friendly. As a result, digital transformation has become an essential priority (Amarna et al., 2025).

2.2 Degrees of innovation: incremental, breakthrough and radical

Nowadays a lot of people of different professions and interests are participating in discussions about new technologies. These discussions are encouraged by innovations that influence the people's everyday lives (smartphones, automobiles, household appliances etc.). However, it is essential to admit that innovation is a complex concept applied in different fields. In the academic literature there are no standardized systems to classify the degrees of this phenomenon (Kotler & Keller, 2012). Booz-Allen and Hamilton consultants have developed the model involving six levels of innovations. These levels vary from simple to radical, defining the invention market. This classification was later refined by Keith Goffin and Rick Mitchell into a more concise three-level one.

1. Incremental Innovation

By catering to a firm's primary audience, these adjustments drive growth primarily through increased market share. These opportunities are frequently uncovered by conducting direct feedback surveys regarding consumer pain points and desires. Practical applications of this strategy include the development of energy-efficient appliances, such

as water-saving washers, or the integration of mobile functionality into traditional banking platforms.

2. Breakthrough Innovation

Breakthrough innovations happen when a company introduces a product or service that fundamentally changes the value proposition. It is often powered by cutting-edge technology or by solving problems that consumers did not even realize they had. These offerings essentially make entirely new market categories emerge. However, pioneers in this space must be cautious: conventional R&D and standard market surveys are often ineffective at predicting the success of such transformative products. Because these concepts are so novel, the public usually requires some time to find out the benefits. Finally, these innovations allow a business to transfer from its primary niche into adjacent markets, fueling long-term expansion.

3. Radical (Transformational) Innovation

The most significant changes occur through radical or transformational innovations. These events are quite rare but at the same time they possess the power to destroy existing markets, set up entirely new business, and fundamentally alter the competitive landscape. The boundary between "radical" and "incremental" is often subjective. What one expert considers a total transformation, another might see as a logical progression. Academics always argue on these frameworks, pursuing a single, universal meaning is often a secondary concern. In a practical business sense, the real value of categorizing innovation lies in helping organizations identify covered opportunities and areas with the highest growth potential.

Table 2. Degrees of innovation

Degree of innovation	Explanation	Investment
1 Incremental innovation	• Improvements to existing products, services and processes, such as line extensions. • New products or services that address the same existing markets. • Easy to develop based on customer needs. • Growth only possible through taking market share.	70%
2 Breakthrough innovation	• New products or services with unique features that provide real benefit to customers. • Difficult to develop as they require deep customer insights. • Generate growth through opening new, adjacent markets. • May take time to generate sales.	20%
3 Radical innovation	• Develops products and services for markets that do not yet exist. • New business models that transform markets. • Rare and difficult to develop.	10%

Source: Goffin, K., & Mitchell, R. (2016). Innovation management

2.3 Classification of digital innovation

In academic literature and managerial practice, there are a lot of approaches to classifying types of innovation, ranging from traditional distinctions between product and process innovation to more complex, multi-layered models that incorporate business models, organizational structures, and customer interaction (Oke, 2007). This diversity reflects the multifaceted nature of innovation. It represents that innovation pursues different purposes among which there are analytical ones.

An innovative product is a significant improvement of a product or service that has been successfully presented to consumers. Moreover, it shows a clear difference from the company's previous offerings. Business process innovation occurs when a firm applies new methods to transform its core function. The modification of processes changes the traditional way of operation and is aiming at increasing efficiency or effectiveness (Kanagal, 2015).

This work is based on the conceptual framework "Ten types of innovation" that is proposed by the consulting firm Deloitte. The model is developed for conducting analytical research. It is ideal for this study because it provides a comprehensive view on simple product upgrades as well as more sophisticated ones. The model provides three levels of innovation such as configuration (how the company structures and monetizes its

activities), offering (what the company provides) and experience (how customers interact with the brand). This characteristic allows to analyze innovations as a combination of different factors and interrelated elements.

Such a strategic approach influence customers' satisfaction directly. The transformation of inner processes, ways of interactions with partners, communication channels and pricing model define how the consumers perceive company's value and which experience they gain. This framework allows to explore how different categories of innovations contribute to meeting customer expectations, strengthening customer loyalty, and increasing customer satisfaction. The popularity of the model in modern business confirms its relevance, as it correlates the theoretical foundations with current management practices in the field of value generation and building a customer-oriented strategy.

Ten Types of innovation model, presented on the Figure 6, can be used to increase the efficiency of efforts in many ways. This can serve as a diagnostic tool to understand the perception of innovation internally, help to understand the competitive environment, and identify gaps along with opportunities for non-standard actions that can turn the market around.



Figure 6. "Ten Types of Innovation" by Deloitte

The Configuration category of innovation focuses on changing ways a company operate internally and how it builds its business model in order to create value proposition. The *profit model* is a key element. It implies finding new sources of revenue but not only relying on traditional pricing and sales. Companies are able to obtain new financial possibilities and competitive advantage by changing monetization models and a reassessment of customer willingness to pay.

Network innovation is another important element. It is based on cooperation with external partners. Instead of operating independently, companies are making collaborations with other organizations to combine technologies, expertise, and other

brand advantages. Partnerships allow companies to share risks, reduce expenses, and pay more attention on their core competencies, while still expanding their capabilities.

Structure innovation relates to how a company organizes its people and raw resources. This may involve changes in structure of a team, talent management, or the use of equipment and infrastructure. The main objective is to increase productivity and not wasting resources. When a company's structure is well-designed, it reduces costs. Moreover, it creates an environment encouraging innovations and motivating staff.

Process innovation means the improvements of the way that a company use to run its core activities. This includes developing new methods, technologies, or workflows. Changing these factors allows to make operations more flexible and more efficient. Over time, such improved processes can become a competitive edge of the company, helping it maintain an advantage in the market and making it more difficult for competitors to imitate its success.

The Offering type of innovation focuses on an enterprise's primary goods and services. A critical component is **product performance**, which aims at the development of unique features, functionality, and high overall quality. This often involves launching entirely new products or high-value line extensions and firms must admit that relying only on performance attributes is a strategic risk. In many spheres, functional adjustments (i.e. ergonomic or power improvements) can be copied by competitors. Long-term market leadership through performance alone is almost impossible. That is why, it must be viewed as just one element of an overall strategy.

To create a long-term advantage that is harder for other companies to break, businesses turn toward **product systems** innovations. This approach moves away from single products and focuses on their connection. By using modular designs and making sure systems cooperate with each other, a firm can transform separate items into one powerful rate. When a business combines its various offers into a single system, it creates a much better experience for the customer. Because everything works together so well, customers find it difficult to switch to another company, giving the firm a strong market position.

The Experience category focuses on the customer-oriented parts of a business that directly impact them. **Service** innovation is a central component. It regards not only the company's main product but also the customers' journey at all stages. It is possible to make clients repeat their purchases by facilitating the interaction and eliminating their

pains. **Channel** innovation supports the service one. This element refers to the ways a company delivers offerings. Huge firms generally use offline markets as well as digital platforms. This strategy aims to make the buying process as smooth as possible, removing obstacles so customers can get what they need with minimal effort.

Moreover, **brand** innovation ensures that a company's offering is recognizable and memorable for customers. It is not just about a logo. It is a corporate identity built through every touchpoint that transforms a basic product into something with unique value. **Customer engagement** innovation bring everything together, meeting the needs of the target audience and revealing their hidden dreams. Nowadays businesses are trying to create something bigger than simple relation between buyer and seller. They are looking for greater customers' satisfaction and increased loyalty.

More and more companies are examining clients' perception of technologies used. Digital tools define how customers feel and accept value of a product or service. Digitalization represents a significant shift from selling just products to focusing on services. This change has dramatically improved how companies interact with their customers, moving them away from traditional mass marketing toward a personalized approach that focuses on the specific needs of each individual (Muther, 2002; Matzner & Büttgen, 2018).

2.4 Digital tools in business operations

The implementation of modern digital technology within business environments started several decades ago. The main objective is automatization of routine tasks required a lot of labor resources. That is why, technologies mostly focus on mechanization of payroll, accounting, logistics and other duties. Businesses use different systems such as ERP (enterprise resource planning) and CRM (customer relationship management) to manage departmental workflows and operations effectively (Itälä, 2015). Accordingly, the usage of mentioned technologies has created a shift and a new driver for market expansion and competitive differentiation. It is common for companies to rely on digital solutions to cut costs when the economy takes a hit, but there is a limit to how much can be saved. This is due to the principle of diminishing marginal utility (Carlsson, 2004).

Nowadays there is a powerful trend of companies transforming their digital strategies. Instead of simply using technologies to cut expenses, they are using it as a main source

of revenue. This shift involves developing new products and services that are often created based on innovative business model (Teece, 2010).

The whole process of transforming is characterized by emerge of the Industry 4.0. It has the main features such as:

- There is a strong connection between products and services due to the internet and other network applications, for example a block chain.
- Constant digital connectivity allows for an environment where goods are produced and delivered via self-optimizing processes. These smart production systems use data-driven insights to adjust themselves quickly, effectively removing the need for human intervention. This shift moves control away from a central hub and into the hands of the system elements themselves. As a result, factories and transport units act as independent agents, making their own decisions based on the immediate needs of the network (Hofmann and Rüsch 2017).

The term Industry 4.0 is defined in different ways by authors in different contexts. The widespread interpretation of this concept refers to new technologies, digitization, and robotization. Scholars like Lu (2017) highlight several principles of this transformation, including the Internet of Things (IoT), cyber-physical systems (CPS), and integrated enterprise architectures. Industry 4.0 reshapes the entire value chain, developing innovation in organizational human resources, labor structures, and business modeling (Pereira and Romero 2017; Erol et al. 2016).

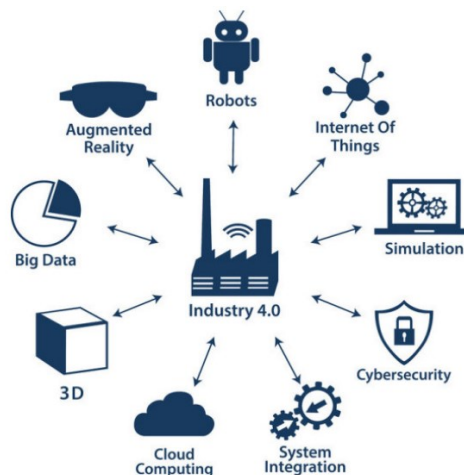


Figure 7. The Industry 4.0 ecosystem and its key technological pillars

Source: Machała, Chamier-Gliszczyński & Królikowski, 2022

Each element of Industry 4.0 has its own unique application in business processes and it is important to study the specifics and the benefits they provide. By analyzing the key technologies, the selection of the most suitable ones for a company and industry is more efficient for gaining maximum impact (Mohamed, 2018).

The Internet of Things (IoT)

The Internet of Things (IoT) functions as a sophisticated ecosystem that interconnects physical devices within a digital network, enabling the autonomous collection, processing, and exchange of data through integrated software and hardware components (Magomedov et al., 2020). This infrastructure relies on a seamless blend of physical sensors, computational logic, and diverse communication protocols, operating across both wired and wireless environments. An IoT architecture typically bridges the gap between end-user "smart" appliances and centralized cloud platforms. Data is first captured at the edge before being transmitted to the cloud for deeper analysis (Ghosh & Grolinger, 2021). The proliferation of IoT across sectors such as logistics, healthcare, and manufacturing are a primary driver of the current shift toward total automation in both public and private spaces (Attaran and Gunasekaran, 2019). As illustrated in Table 3, the key IoT functions that contribute to improved customer satisfaction are outlined based on the research conducted by Anurag A.S., Swathi A., and Johnpaul M.

Table 3. Enhancing Customer Satisfaction with IoT Technology

Streamlining processes	IoT systems can automate tasks like billing, shopping and order handling, reducing errors and saving time.
Personalising experiences	IoT devices collect and analyse customer data to offer tailored services, such as personalised shopping recommendations and customised hospitality experiences. This helps businesses align services more closely with individual preferences.
Real-time issue detection and updates	IoT enhances service reliability by detecting potential problems in advance and providing real-time notifications.
Enhancing safety and convenience	In industries like hospitality, IoT integrates safety measures with user-friendly features. Systems like IoT-enabled smart hotel management enhance guest security and make services accessible via centralised platforms.
Improving operational efficiency	IoT solutions optimise processes in logistics and resource management, reducing delays and enhancing service quality with technologies such as smart logistics systems and automated order handling.
Targeted marketing and retention	IoT-driven analytics allow businesses to deliver customised advertisements and promotional offers, boosting customer retention.

Source: Understanding the Role of IoT Technology in Enhancing Customer Satisfaction Anurag A.S., Swathi A., and Johnpaul M.

Recent research uncovers the role of IoT in specific service fields. Lubota et al. (2024) highlight the potential of AI-enhanced IoT billing systems to revolutionize small-scale workshops in developing nations. Their research demonstrates that by automating bill collection and offering customers detailed insight into their spending, firms can simultaneously reduce operational errors and elevate the service experience. The same way the hospitality industry is benefiting from integrated IoT solutions (Sudhakar, 2024). Their work introduces a comprehensive framework that prioritizes guest safety. Hotel managers aim at meeting guests' needs such as food orders, taxi bookings and room management keeping all information within one portal. By replacing multi-functional environments with a single, secure system authorization, this innovation will significantly improve guest convenience and operational efficiency.

IoT's capacity for real-time data integration is fundamentally reshaping service-delivery standards. In the research of Wang et al. (2020) it is stressed how an integrated dispatching architecture including linking customers, autonomous picking robots, and cloud systems outperforms conventional logistics by prioritizing agility and precision. This shift toward intelligent automation significantly lowers the probability of service delays and enhances the overall value delivered to the end-user. In a similar vein, Sultana et al. (2024) identify that the dining sector in developing nations stands to gain significant operational advantages by transitioning to IoT-based automated systems. Eliminating the manual mistakes of traditional order handling is achieved by the fact that modern systems create a more responsive and error-free dining experience. These findings collectively reinforce the argument that IoT is not merely a tool for data collection, but a strategic asset for organizations aiming to achieve a sustainable, high-efficiency, and customer-oriented service environment.

Augmented Reality (AR)

Augmented Reality (AR) is the digital augmentation of the physical world, where virtual elements are dynamically mapped onto reality via mobile device cameras. The advancement of real-time AR services has unlocked significant potential for industrial innovation. It allows firms to deploy hybrid systems that merge physical and digital workflows. As these technologies mature, they are increasingly used to design interactive environments that blur the distinction between traditional computing and tangible human experience (Machala et al., 2022).

Due to the fact that AR and VR technologies make customer journey more interactive they contribute to enhancing customer engagement. This type of innovation foster personalization of services provided and have a positive impact on brand reputation (Smink et al., 2019). AR facilitates the moment of purchasing allowing customers to visualize goods in their own environment. Customer are able to perceive value and make decisions easier. Fully immersive environments are offered by VR technologies. So that consumers have an opportunity to explore products and stores online. It leads to increase in emotional and psychological engagement (Huang & Liu, 2020). Another benefit is stimulating customer-company relations and customer loyalty due to personalization of experience. (Scholz & Duffy, 2018). Moreover, these advancements provide valuable data for businesses to reconsider their strategies.

Cloud platforms

Cloud technology is “an information technology service model where computing services are delivered on-demand to customers over a network in a self-service fashion, independent of device and location. The resources which are essential to provide the required level of service quality are shared, dynamically scalable, quickly allocated, virtualized and released with minimal service provider interaction” (Marston et al., 2011; p. 177). This innovation includes hardware part as well as software one.

Cloud innovations are the representors of technological progress and offerings aimed at increasing service component. The first wave of cloud computing emerged due to innovations such as virtualization, high-performance networks, and data center automation. (Armbrust et al., 2010; Boss, Malladi, Quan, Legregni, & Hall, 2007; Venters & Whitley, 2012). The second wave is conditioned by an increase in importance of service-based perspectives for sellers (Etro, 2009; Vouk, 2008; Venters and Whitley, 2012).

Cloud services can be distinguished by the ability to pay-as-you-use. This type of digital innovation consists of Infrastructure-as-a-Service (IaaS), Platform-as-a-Service (PaaS), and Software-as-a-Service (SaaS). However, the businesses focus mostly on SaaS, which provides application functionality and related services over the Internet (Sultan, 2010; Low et al., 2011).

Cloud infrastructure utilize edge computing and content delivery networks (CDNs). Specifically, this makes data and applications closer to the consumer and decrease the

delay of their output. Moreover, one of the main advantages of cloud-based AI is the ability to process demands and questions and provide automated, immediate support at any time of the day without interruption (Yathiraju, 2022).

The massive storage space and computational power can be provided by cloud platforms. This allows companies to analyze large datasets about customers in real time and these analyses contribute to creation of hyper-personalized experiences. Among examples of this phenomenon there are product recommendations or proactive problem solving, which are key elements of satisfaction and loyalty (Sandhu, 2022).

Chatbots

A Chatbot is another AI application. It has been developed to facilitate and speed up human conversation via text or voice interactions. Chatbots have automated customer support and are able to resolve common issues, provide an assistance and participate in dialogues in natural way (Azmi et al., 2023).

Researchers pointed out main types of chatbots' operations:

1. *Rule-based Chatbots* follow rules and patterns that have been provided in advance and their aim is to respond to user inputs.
2. *AI-powered Chatbots* operate machine learning algorithms. These innovations are used to understand better customers' requirements and to generate outputs based on huge training datasets (Kurniawan et al., 2024).

During the interactions with chatbots users can obtain valuable information and personalized suggestions to develop decision-making processes. Chatbots are created in the way to better understand user preferences, patterns, and behaviors. Moreover, these innovations facilitate and automate other business functions as creating reports, planning advancements and trainings, analyzing Key Performance Indicators (KPIs) (Banu, 2018).

Recent years have seen key technologies emerge as the primary drivers of digitalization. Digitalization remains vital for creating business value (Sommarberg and Mäkinen 2019; Ribeiro-Navarrete et al. 2021). Businesses must implement digital tools to gain an advantage to survive in today's competition. This transition is particularly significant in the service and manufacturing sectors, where success increasingly depends on knowledge-intensive operations (Martínez-Caro et al. 2020). Despite growing evidence that digital transformation improves firm performance (Truant et al. 2021;

Chatterjee et al. 2023), the specific impact of digital tool adoption within the context of the COVID-19 era remains under-researched.

The research conducted by Dave Abood and Aidan Quilligan reveals the implementation of five technologies. Among them there are autonomous transportation, augmented reality, big data, machine learning, and mobile computing. These innovations allow companies to achieve average savings of over \$85,000 per employee. Meanwhile, the use of a different set of tools, including autonomous robotics, mobility solutions, driverless vehicles, 3D printing, and machine learning, leads to an average market capitalization increase of over \$6 billion.

Types of technologies used depend on the industry and change with the progress. However, the combination of them brings the potential to optimize the costs. By uniting 3D printing, blockchain, AI, big data, and autonomous robotics it is possible to save over \$43,000 per staff member (Abood and Quilligan, 2017). In a different application, Oil & Gas organizations could unlock over \$16 billion in market valuation by strategically deploying virtual reality, big data, and AI.

Abood and Quilligan introduce Industry X.0 which follows Industry 4.0. It represents the fundamental digital transformation of the industrial environment. Organizations operating under this paradigm do not just react to technological changes; they actively capitalize on them. In the modern terms companies try to rely not only one digital tool or SMAC (social, mobile, analytics, cloud) architectures. They create integration of tools to increase revenue expansion as well as operational profitability. Industry 4.0 has brought the simple digitalization due to technological progress but shift to Industry X.0 allows firms to go beyond. It makes possible to apply technologies for higher personalization and decrease in the difference between business-to-consumer (B2C) and business-to-business (B2B) models.

Due to AI companies received availability to conduct predictive analytics to discover patterns of consumer behavior and to learn about their preferences. Operating the strategic examination of massive datasets, organizations are empowered to refine customer engagement, personalize product suggestions, and improve the efficiency of their marketing efforts. Research conducted by Verhoef (2021) and Chen and Pu (2020) underscores the transformative potential of AI-enhanced predictive analytics. They have found that these data-driven approaches affect customers' satisfaction and loyalty that are

important for company's expansion. Implementation of AI not only has benefits but also brings up ethical issues. Analyzing large datasets, the problem of information privacy appears. That is why, it is essential to apply security tools to mitigate risks and maintain customers' trust (Mittelstadt & Floridi, 2022). Additionally, Jobin (2019) argues that organizations must prioritize transparency and actively counteract algorithmic bias to prevent adverse social impacts and ensure their AI strategies remain ethically grounded.

Using AI creates ability to generate hyper-personalized offerings is a cornerstone of modern retention strategies. As evidenced by Schmidt et al. (2020), AI-guided interactions frequently elevate satisfaction levels by providing users with sophisticated, bespoke information. However, this technology can be described as ambiguous. As Castillo et al. (2020) point out, mechanical or unresponsive AI interfaces can trigger user frustration and prove entirely counterproductive. Developers must prioritize an "experience-first" design philosophy, ensuring that customer perceptions are not sidelined in favor of technical automation.

However, implementing digital innovations in business operation is not that simple as it may be seen by some entrepreneurs. The main challenge is expensiveness of implementation of digital platforms. Moreover, it requires a vast database of consumers and high awareness of a brand. Businesses must find enough service providers to apply essential tools in efficient way. Providers of digital platforms have to be appropriate for a specific company and a specific sphere of business. Finally, sometimes it may be difficult to define a manager responsible for developing standards and maintaining the processes (Enholm et al., 2019).

2.5 Strategic implementation of digital innovations in the global hospitality sector

Traditional management models still remain relevant, the Ten Types of Innovation framework reveals that the modern hospitality sector is now defined by its technological evolution. Today, digital integration is no longer a secondary advantage. It has become the primary engine behind hotel management and a fundamental driver of guest satisfaction (Chaudhary et al., 2025). The tourism has also changed. Modern travelers no longer consider advanced technological amenities as "extra" luxuries. Instead of it, they view seamless tech integration as a necessary requirement that directly define their loyalty and decision to return to a property (Kucukusta, 2017). The presence of high-tech features

such as automated check-ins and smart room controls is often the decisive factor in a guest's initial intention to visit a hotel (Yang et al., 2021).

This technological necessity is refining how the hospitality addresses its unique industry challenges. While hotels still provide a complex mix of dining, leisure, and accommodation, these traditional elements are now viewed through a digital perspective. Even core satisfaction drivers such as room cleanliness and staff professionalism are increasingly managed through specialized software to ensure consistency (Pizam, Shapoval, & Ellis, 2016). Modern researchers should admit that staying ahead of the technological progress is not just about "offering more". It means surviving in a market where guests expect the latest digital innovations as a basic part of their stay (Chen, 2015). Hotel managers place technology at the heart of their operations to bridge the gap between basic service quality and the high-performance expectations of the modern, tech-lovers traveler (Li et al., 2013; Schuckert, Liu, & Law, 2015).

The hospitality sphere operates in a dynamic and increasingly demanding market. In this market maintaining constant levels of customer satisfaction represents a strategic objective as well as a complex managerial task. From the perspective of the Resource-Based View (RBV), customer satisfaction can be considered a valuable organizational resource that creates to long-term competitive advantage. When hotels successfully reach high levels of satisfaction, they are more likely to strengthen customer loyalty and improve overall business performance (Barney, 1991; Shahzad et al., 2021). There has been developed the Technological-Organizational-Environmental (TOE) framework that allows companies to undercover patterns of customers' behavior (Tornatzky & Fleischer, 1990). This framework provides a comprehensive structure to analyze how the combination of technological capabilities, internal processes, and external factors influence the guest experience.

Operational parameters of hotel management, particularly service efficiency, are defined by the organizational and environmental dimensions of the TOE framework. Waiting time has been identified as a fundamental indicator of quality. Delays during check-in procedures, service requests, or other interactions can make guests dissatisfied and frustrated (Lee & Cheng, 2018; Pitakaso et al., 2025). In addition, safety and security measures affect guests' perceptions of reliability and trust. Technologies such as electronic access systems, infrastructure, and digital monitoring solutions are considered

as essential components of modern hospitality services (Nunkoo et al., 2017). Another important environmental factor is room quality. Elements including temperature control, sound insulation, spatial comfort, and general room conditions directly affect how guests evaluate the quality of their stay (Shu et al., 2023).

Besides the functional features, the emotional dimension of hospitality also contributes significantly to customer satisfaction. Guests evaluate their experience with a hotel not only on the basis of physical facilities or operational efficiency. Another important factor is the atmosphere and the quality of service. To create a memorable experience, hotels pay a special attention to welcoming environment, attentive staff, and personalization. (Tsaur & Lo, 2020). This emotional engagement is quite important because it encourages repeat visits and strengthens long-term customer relationships (Anis et al., 2023). Properties combine technological, operational, and experiential elements with the TOE framework that offers an understanding of how hospitality organizations can improve performance. They are trying to meet the expectations of digitally oriented travelers.

The timeline represents the evolution of digital innovations with the "Industry 4.0" paradigm, offering timely perspectives for both academic inquiry and operational practice within the hospitality sector. To better understand how digital advancements improve hotel performance, in International Journal of Hospitality Management there has been conducted analysis highlighting several core digital pillars currently reshaping the sector. Among them there are social media platforms, mobile applications, big data and artificial intelligence, self-service interfaces, robotic systems, virtual reality, e-commerce, and advanced information and smart-system infrastructures. Detailed definitions for these categories are consolidated in Table 4.

Table 4. Description of the emerging digital technologies in the hotel sector.

Digital Technology	Description
Social Media	Social media tools are digital platforms designed to increase customer engagement, allowing the collaborative creation and share of information Hansen (2010, p. 12). These tools are necessary to transform the traditional brand-to-consumer monologue into a two-way dialogue. As mentioned by Leung

and Baloglu (2015), this category includes a wide spectrum of Web 2.0 technologies: interactive forums, blogs, chat rooms, social networking sites like Facebook and Twitter.

Mobile Apps

Mobile apps are specialized software systems created for smartphones and other digital environments (Jeong, 2016). In practice, applications developed for hotel brands operate as a comprehensive guest interface. According to Lee (2018), they carry out critical functions such as initial booking process and information research, more technical roles like digital door access and concierge service automation.

**Big Data
Analytics and
Artificial
Intelligence**

The term "big data" means large volumes of organized and unorganized information available for real-time access (Maroufkhani et al., 2022, p. 3). To uncover valuable patterns from complex corporate datasets, organizations employ big data analytics. It means a sophisticated methodological approach designed for deeper evaluation (Maroufkhani et al., 2022). Moreover, artificial intelligence serves as a powerful analytical tool that mirrors human cognitive processes within a computational framework (Noriega, 2020). In the hospitality sector specifically, the combination of AI and big data analytics allows hotels to find out actionable insights from massive information pools (Chen et al., 2019).

**Self Service
Technologies and
Robots**

According to Kucukusta et al. (2014, p. 55), self-service technology represents any digital interface that enables guests to fulfill their needs independently, without the requirement for face-to-face staff interaction. Hospitality companies use different forms, including automated check-in and check-out, digital ordering systems, and robotics. Robots represent a special type of these innovations designed to engage with hotel personnel while providing services that deliver human-based behavior and assistance (Xu, 2020).

Virtual Reality

Virtual reality is defined as a synthetic 3D space that allows to engage the user into real-time interaction (Leung et al., 2020). In the hotel industry, VR gives the availability to facilitate the "pre-stay" experiences. By using these technologies guests are able to explore properties in advance. It is similar to a physical visit that is aiding in the decision-making process.

E-Commerce and Social Commerce	E-commerce is defined by the use of digital platforms to manage transactions along a firm's value chain (Theodosiou and Katsikea, 2012). Digital environments have transformed and social commerce has emerged as an integrated derivative of this model. It combines standard e-commerce practices and the social connectivity of Web 2.0 (Halawani et al., 2020a).
Information Systems	Chevers and Spencer (2017) described information systems as computer-driven architectures that manage the entire lifecycle of data which includes input at the beginning and storage to transmission. Such systems differ from integrated solutions like Enterprise Resource Planning (ERP) to relationship-focused tools like Customer Relationship Management (CRM). Information systems extends to include Supply Chain Management (SCM) and Knowledge Management Systems (KMS), which provide the technical support necessary for managing complex business data flows.
Smart Systems	Smartness means the integration of smart features that automate and facilitate daily business processes (Leung, 2019, p. 52).
Front Desk Technologies	Front desk technologies provide information that allows employees to deliver services in effective customized way and on time (Shin et al., 2019).

Apart from specific technological innovations mentioned above in International Journal of Hospitality Management it has been mention the importance of the Internet of Things (IoT). Its integration allows hospitality organizations define accurate occupancy and optimize services provided (Jiang, 2022). Specifically, IoT combine most elements of digital development within a company into united system.

By providing accurate information IoT make the hotel operations highly efficient and more personalized to the guests. In the Figure 8 there are some sectors where IoT has already been implemented and has shown increase in efficiency. Particularly, in the hospitality industry IoT makes it possible to clients to take under control some room features, such as lighting, temperature, and entertainment component. They can use their smartphones or voice commands. Enhanced comfort make loyalty increase (Car et al., 2019).

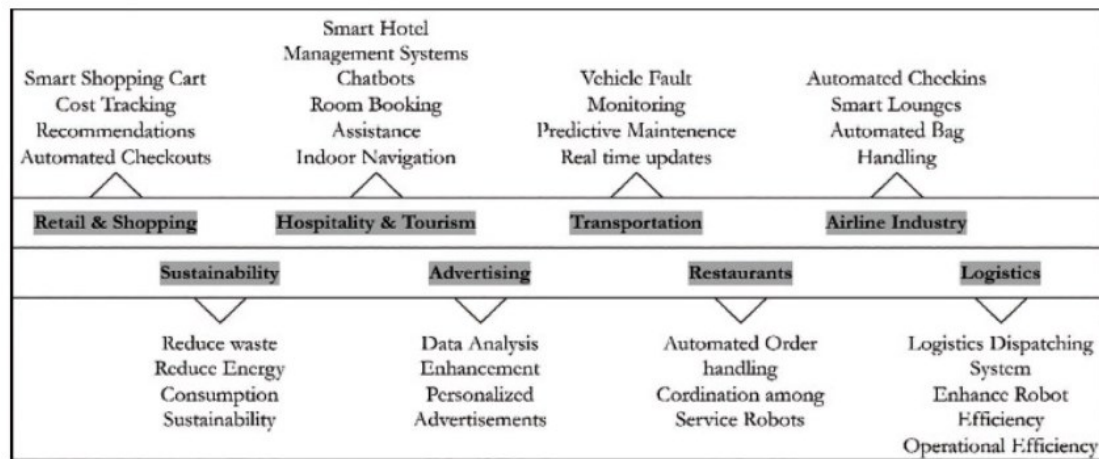


Figure 8. Fields of IoT usage (Magomedov et al.,2020)

Technologies are quite important in a quickly developing market. Modern hotels apply them to improve customer journey. Artificial intelligence is significant innovation un this case. It is used for customer service as well as for revenue management. The most important features that play a crucial role in hospitality are chatbots and virtual assistants, predictive analytics, robotic process automation that facilitate routine tasks (housekeeping or guest requests), personalized recommendations (suggest activities, dining options, and special offers) (Khatun, 2024).

Everyday hotels collect vast amounts of clients' data including their behavior, preferences, previous requests etc. Main sources of these data are loyalty programs, past bookings, feedback review and their activity in social media. The main challenge is to connect all insights between them. In this case it may appear lack of communication between different departments (Goel, 2026). As examples front office may not receive information from housekeeping department about noted guests' preferences about the room or bartenders might not know about some discounts in the bar introduced by marketing unit as a special event. One united system is able to resolve problems mentioned before. It creates profile of every guest to collect all information from different departments updated in real time.

In a meantime AI-chatbots can gather relevant insights even before customers arrive in hotel. For instance, virtual concierge can analyze guests' preferences to prepare some advice for their dining or leisure experiences. The survey conducted by Oracle Hospitality

in 2025 has shown that 77% of respondents are interested in using virtual assistants before and during their stay. The results are represented in the Figure 9.

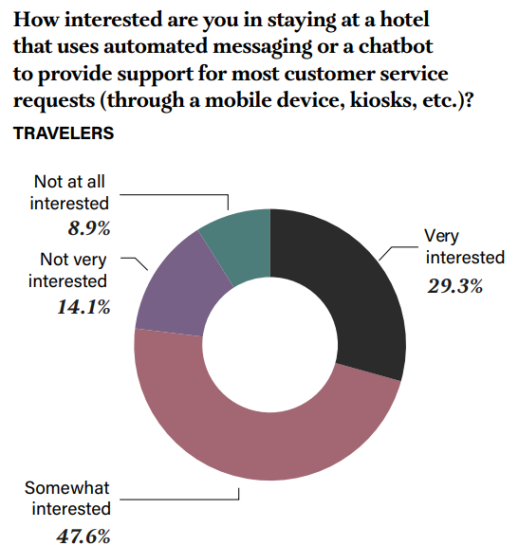


Figure 9. Guests' interest in using chatbots.

Source: Oracle Hospitality, 2025

The same instrument can be used to create personalized messages using AI. It may reference upcoming stay, confirm some important information and increase the number of touchpoints.

The AI analyzes the guest's behavior in real time, including room requests in the app, detecting signs of dissatisfaction at an early stage. Using predictive analytics, the system captures markers such as complaints about Wi-Fi or missed breakfasts, and notifies staff. This allows the administration to intervene in time (for example, to offer a bonus or fix a problem), preventing the appearance of negative reviews (Manoharan & Ashtikar, 2025).

It is quite difficult to list all the specific technologies used in the hotel industry, as there are a large number of them and the technological process is moving forward every day. Nevertheless, below is another survey conducted by Oracle Hospitality, which shows which innovations customers are most interested in. The most sought-after is development of entertainment system, voice control devices, access to rooms with guests' own devices etc.

Which of the following technologies would be a must-have for you in the future to create a more amazing hotel stay?

TRAVELERS

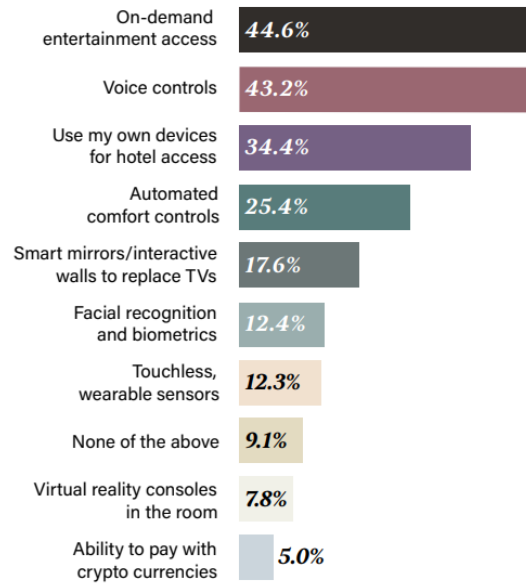


Figure 10. Technological preferences of travelers to improve the quality of hotel service in the future.

Source: Oracle Hospitality, 2025

In conclusion, the implementation of different digital technologies allows hotels to optimize core business processes and make them more efficient. These processes include demand management and customer relation as well as resource management and interaction with third parties. Moreover, this improves financial performance, and increases competitiveness through flexibility and an innovative approach to service (Cho et al., 2012; Ivanov et al., 2020; Lenuwat and Boonitt, 2021).

3. Case study analysis: digital tools and customer satisfaction at JW Marriott Venice Resort & Spa

3.1 Market context and technological environment

3.1.1 Statistics and dynamics of Venetian hotel market

According to the data presented on TTG Travel Experience conference¹ during 2025 tourism in Italy surpassed the figures of previous years. The country has been visited by more than 481 million tourists which is up 3,3% from 2024. It is explained by increased number of foreign tourists of whom there were around 265 million overnight stays.

At the same time Italian travel agencies point out the changes in travelers' behavior (Rostami, 2023). Stays are becoming shorter due to high inflation, difficult economic situation in the world, limitations introduced by authorities (i.e. city tax paid for each night) and definitely lifestyle changes. Nowadays, representatives of Gen Z and millennials prefer to see as much places as possible in a shorter period of time and sometimes their aim is creating content or visiting specific events rather than exploring culture of historical places (Liu et al., 2023). According to Banca d'Italia² the average stay has been reduce from 6.8 to 6.6 nights during 2023 although before that year it was notice after-pandemic growth. However, according to Istat data³, in the fourth quarter of 2025 customers spend 2.82 nights on average in accommodation compared with 3.13 nights for foreigners and 2.50 ones for Italians in 2024. The first indicator shows the duration of the stay in Italy as whole while Istat provides data on an amount of nights spent at one location.

Venice is probably one of these historical points in Italy that every passionate tourist would like to visit at least once. That is why the number of visitors is increasing every year (De Marchi, 2025).

Based on the statistic provided by Elaborations of the Statistics Office of the Veneto Region on Istat data (Regione del Veneto) it is possible to notice the upward trend which

¹ Press Release n. 4 of 01/10/2025, "Growing Tourism and Hotels at the Centre: 2025 Marks a Turning Point for Hospitality," [TTG Travel Experience], 2025.

² Banca d'Italia. (2025). Survey on International Tourism. https://www.bancaditalia.it/pubblicazioni/indagine-turismo-internazionale/2025-indagine-turismo-internazionale/en_statistiche_ITI_30062025.pdf?language_id=1

³ Istat. (2026). Flussi turistici: IV trimestre 2025 <https://www.istat.it/comunicato-stampa/flussi-turistici-iv-trimestre-2025/>

is returning to normal after being hit hard by the pandemic. The graphs illustrated on the Figure 11 represents the amount of arrivals including the data from hotels and alternative accommodation that consists of private residences, agritourism and camping.

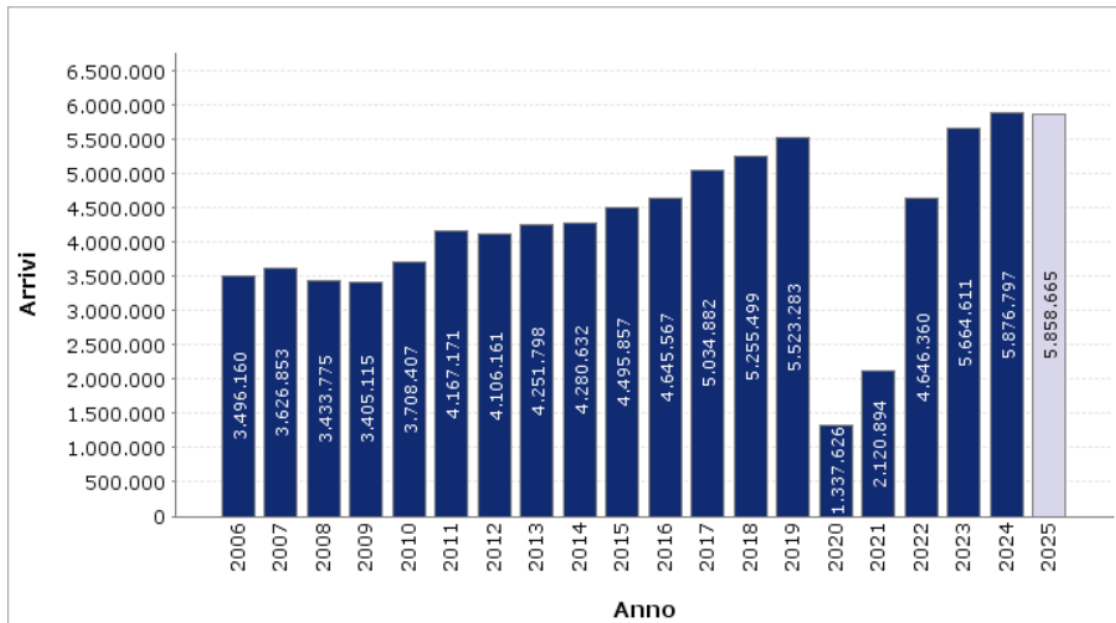


Figure 11. Arrivals in Venice (2006-2025).

Source: Statistics Office of the Veneto Region based on Istat data (2025),

<https://statistica.regione.veneto.it/jsp/venezia.jsp?comune=Venezia&periodo=202512&B1=Visualizza+il+report>

Although Venice is considered as one of the most beautiful places it faces a lot of problems and challenges in the modern realm. With all unique features and specific experience different scientists emphasize the decrease of population, overtourism and extreme ecological problems (Somma, 2024; Visentin, Bertocchi, 2019). All of this represent complexity for locals as well for tourists and is affected by different factors such as huge events in the city, weather conditions, legislative frameworks etc.

That is why, it is possible to notice that the city is undergoing a process of crisis a transformation from historical destination to a point of modern place that combines traditions and sophisticated innovations of digital era. Specifically, this phenomenon makes Venice a complex business environment (Pignocchi et al., 2024).

Moreover, the city possesses a huge potential of natural and cultural resources and ideas that are essential for transformation mentioned above. Since 2000s it has been

discussed the possibility of creating a metropolitan zone uniting Venice with Padua and Treviso. These places together would create a functional area which could be able to compete in the global market and make Venice a smart destination (Bussetto, 2014).

So, Venice should be not only about the past but also about the future and regain the position of one of the most developed cities in Europe as it was in a period between XIII and XVI centuries (D'Amico, 2017).

To the disappointment of many scientists, the fact that the city has being considered just as a museum and an object of admiration, the technological progress was not a primary goal and its development was suspended. Venice has become a point of attraction of mass tourism. Moreover, bureaucracy and a lack of strategic vision held back innovation (De Marchi, 2025).

That is why, nowadays many young scientists and enthusiasts are working on the revival of innovation. Their aim is to male Venice a smart city where traditions and technologies complement each other. Some things have been implemented in the direction of digital transformation, such as the DIME online counter of the Municipality of Venice and the VEGA Science and Technology Park of Venice, but it is necessary to continue working on the development of technologically advanced activities and the adaptation of digital services for residents and tourists (VeneziaToday, 2024).

In 2024, there was created an ambitious idea of "casa dell'innovazione partecipata", which aims to develop the application of some new technologies (3D printing, robotics, laser cutting) in a number of areas of production and the third sector.

For Leonidas Paterakis, technical director of Fablab, this center responds to the need to "create a more interesting, livable and open city: thanks to the sensitivity of partners and administrations, we want to create an innovation center where cooperation between traditional and digital industries is promoted." Another important goal is to build an environment conducive to the employment and professional growth of new graduates: "we regret that young people are going abroad: it is necessary to attract funding and research and retain the young people this laboratory needs."

Considering economic aspect, Venice has become one of the most expensive cities so it is becoming more difficult to find an accommodation at fair price in the center (Rudiferia, 2025). Local entrepreneurs emphasize that the city is suffering from one-day tourism that not contributes local economy. This factor together with non-appropriate

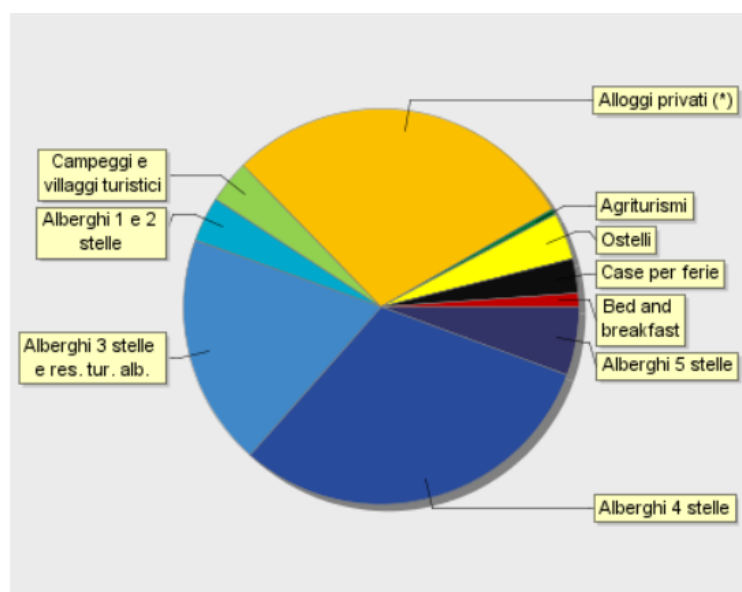
behavior of visitors cause protests and negative attitude among locals (Nolan & Séraphin, 2019).

Nevertheless, as it has already been mentioned number of tourists is increasing and Venice has to maintain the adequate number of bed-places of a level represented city's development. The types of accommodation include different categories of hotels (1-star, 2-star, 3-star, 4-star, 5-star), hostels, guest houses, camping, private accommodations. According to data provided by Statista, in 2024 the city had 1,262 hotels with 98,720 beds. Moreover, in Venice there are around 80 hotel chains and more than 8,000 Airbnb options.

Comparing with other European cities hotel market in Venice represents a significant increase after the pandemic. As a consequence of this increase average rates of rooms in hotels have grown that influence Revenue Per Available Room (RevPAR). RevPAR shows the efficiency in the hotel business, reflecting the average income from each available room for a certain period (Pignocchi et al., 2024). The development of the hotel market is also represented by huge investments that reached €1.4 billion in capital in the first quarter of 2025. This amount to an 80% year-on-year increase. This size of investments is also explained by stabilized inflation regarding the 2023 year. Hotels remain the most attractive asset in the due to stable fundamentals, competitive profitability and great interest in the possibilities of location change (Colliers, 2025).

3.1.2 Competitive benchmarking of properties

In this study the context of 5-star hotels and ones of luxury category is considered to provide relevant frameworks for the case study. It is necessary to study the external environment in order to assess the current position of the resort in the market and determine the feasibility of introducing innovations. In addition, this analysis makes it possible to identify and assess the risks associated with competitive activity in the region. According to Elaborations of the Statistics Office of the Veneto Region on Istat data (Regione del Veneto) the proportion of 5-stars hotel is 6% for the Venice city (Figure 12).



Legenda:

- Alberghi 5 stelle: 6% (326.986)
- Alberghi 4 stelle: 31% (1.813.713)
- Alberghi 3 stelle e res. tur. alb.: 19% (1.112.498)
- Alberghi 1 e 2 stelle: 4% (215.637)
- Campeggi e villaggi turistici: 4% (205.477)
- Alloggi privati (*): 29% (1.699.743)
- Agriturismi: 1% (29.847)
- Ostelli: 4% (223.929)
- Case per ferie: 3% (166.772)
- Bed and breakfast: 1% (64.063)

Figure 12. Distribution of tourism accommodation capacity in Venice by category (2025).
Source: Statistics Office of the Veneto Region based on Istat data

According to Istat data, there are 36 5-star hotels in Venice for 2024. Including new ones to be opened in 2025-2026 the size of luxury segment will reach around 43-45 5-star hotels. In the Figure 13 the new hotel pipelines are mentioned (Pignocchi et al., 2024).

Hotel	Rooms	Projected Opening
Hampton by Hilton Venice	324	Q2 2024
B&B Hotel Venezia Tronchetto	406	Q3 2024
Hotel Gabrielli, Starhotels Collezione	68	Q1 2025
Hotel Danieli, Venezia, A Four Seasons Hotel	204	Q2 2025
Les Airelles Venice	51	Q2 2025
Orient Express Venice	45	Q4 2025
NUMA Residenza Grünwald Venice	19	Q1 2026
Only You Palazzo Bonvecchiati	168	Q1 2026
The Langham Venice	138	Q3 2026
Rosewood Hotel Bauer	110	N/A

Figure 13. Hotel pipelines and rebranding.
Source: HVS Venice Market Pulse: A Slow-Moving Market (May 2024).

Luxury hotels in Venice have some significant features. First of all, a lot of them are located in ancient *palazzo* that creates a unique atmosphere of staying in the city and enjoying its rich culture. As examples, *Orient Express* in Palazzo Donà Giovannelli previously owned by families of Doges and Venetian elite; *Aman* with its, one of the eight monumental palazzos on the Grand Canal, Palazzo Papadopoli; *Hotel Danieli* located in Palazzo Dandolo built exclusively for Doge's family etc.

In addition, looking at the map of Venice it is clear that now 5-star hotel are not tend to locate in the city center near San Marco Squire where there is a major flow of tourists. More and more luxury accommodations are opening in quiet and remote areas to provide privacy and more personalized service to their guests. So that the object of this study, JW Marriott, and San Clemente hotels have their own private islands. Orient Express is based in Cannaregio, zone which is full of history and local bars. Hotel Excelsior Venice is settled down on the island of Cinema Festival, Lido.

Shiji ReviewPro, one of the main software in hospitality industry that helps companies to explore guests' satisfaction and gather their feedback, has provided data relevant for 5-star hotels located in Venetian lagoon. According to them for the 2024 year these hotels reached 91,2% Global Review Index score that shows the hotel reputation based on guests' reviews. Moreover, more than 77% of visitors of Venice have shared positive feedback about their stay in luxury accommodations. This research represents the high level of luxury hotels and customers' satisfaction over Europe.

3.2 Comprehensive overview of JW Marriott Venice Resort & Spa

3.2.1 Infrastructure and core property standards

The object of this research is JW Marriott Venice Resort & Spa, one of the most beautiful 5-star hotel in Venetian lagoon. It is located on a 40-acre private island which is called Isola delle Rose (Rose Island) and can be reached in 15 minutes with a boat from St. Mark's Square. This island is full of gardens, olive trees, flowers and hotel amenities.

The hotel was opened in March, 2015 with two different types of accommodation experience: JW and JW Retreats. The first one offers 100 rooms of different categories including suites which are located in the main building⁴. Another 166 suites are scattered around the island and represent luxury suites with own gardens and some of them with outside pool. Moreover, JW Retreats offers extraordinary service by providing check-in on a dedicated desk.

Apart from different types of accommodation JW Marriott Venice possesses 2 restaurants: Sagra Rooftop and Agli Amici Dopolavoro. The latter was awarded a Michelin star for the cuisine and service of high quality. The rooftop restaurant specialises in Venetian cuisine (i.e. cicchetti). In addition, on the island a guest can find also 3 bars with various menus. For those who would be more interested in Italian cuisine, the hotel provides special experience of Saponi Cooking Academy.

Outside pools, lagoon-view spa, family activities are all the features proving that JW Marriott Venice is not only 5-star hotel but also an accommodation suitable for different-size families.

However, the hotel is a bit more than just stay on vacation. This paradise on a private island offers exclusive venue for different kinds of meetings: weddings, business conferences, exhibitions, meeting etc. For these purposes there are 14 meeting rooms and halls and one non-religious church.

In May 2025 KSL Capital Partners, private investments company, has acquired JW Marriott Venice Resort & Spa that was an asset of German Aareal Bank Group. "Private island rentals and excellent operational characteristics," explained Martin Edsinger, partner at Ksl, "combined with the timeless appeal Venice provides to luxury travelers, make JW Marriott Venice exactly the iconic and irreplaceable asset we want to invest in. Thus, our strategy will be to further enhance the value of this wonderful resort through targeted investments and improvement activities that enrich the guest experience and strengthen the hotel's position as a benchmark for the international high-end market."

⁴ Appendix 1. The structure of JW Marriott Venice Resort & Spa

To satisfy customers' need better each company should consider who is its target audience. So, for JW Marriott Venice it is possible to distinguish guests into several categories:

- wealthy travelers who appreciate luxury service, mostly American couples at the age of 30-50;
- families who value comfort and entertainment for children (usually families with 2 kids);
- event planners and couples arranging weddings on the island;
- spa connoisseurs in most cases represented by couples or women between the ages of 30 and 40, more often locals, staying for 1 night (i.e. in honor of a birthday or anniversary);
- tourists traveling on a cruise starting or finishing in Venice, American couples aged 50-70.

3.2.2 Competitive landscape

As mentioned above, the Venice hotel market can be described as a highly competitive market. JW Marriott Venice Resort & Spa is a 5-star hotel, which is popular among connoisseurs of luxury experiences. Its competitors can be divided into several categories.

1. Island hotels:

San Clemente Palace: real palace of 196 rooms with 12th century historical church and blossoming gardens located on a private island. The hotel has three bars, three restaurants with unique cuisine, a spa and well-designed suites. Moreover, there is a swimming pool and a lagoon-view terrace. San Clemente Palace provides a service of a complimentary shuttle boat connecting the island and St. Mark's square.

Hotel Cipriani: settled down on Giudecca Island romantic place with 67 rooms and luxury suites. Among the advantages there is Michelin-starred restaurant, professional staff and the unique swimming pool inspired by Olympic games. Wellness center is surrounded by beautiful gardens.

Hilton Molino Stucky: fully restored flour mill located on Giudecca Island of Venice. The hotel can be reached with private shuttle from St. Mark's Square. Hilton with 379 rooms and suites offers excellent service in restaurants, rooftop bar, spa and swimming pools and represents the history reserved through the centuries.

Hotel Excelsior Venice Lido: its unique beachfront location on Lido Venice, near the Adriatic Sea makes the hotel attractive to the guests. It was built in 1908 with 196 rooms and special suites and now it has couple of restaurants serving Mediterranean dishes, romantic summer terrace, cocktail bar.

2. SPA hotels:

Palladio Hotel & Spa: the perfect location on Giudecca island of 79 rooms. The hotel's bar represents the ideal place for aperitif or cocktail, offers selection of wines and signature drinks. The hotel spa provides menu of rejuvenating massages, hot tub, Turkish steam bath and a treatment room.

Aman: an ultra-luxury 5-star hotel offers 24 elegant rooms and suites with Grand Canal views and private gardens. A 16th-century palace has been renovated keeping all valuable features of the history. Dining includes Italian cuisine and dishes cooked with local ingredients. Hotel spa has treatment rooms offering a different massages and treatments, inspired by both Asian healing philosophies and the Italian spa tradition.

Nolinski: hotel consists of 43 rooms including 13 suites and each has unique design. Nolinski offers a menu combining Mediterranean cuisine with the French culinary techniques. The treatment room and the gold mosaic pool overlooking the Venetian rooftops offer visitors an unforgettable experience. One room is for beauty treatments and another is for meditative relaxation.

3. Family-friendly hotels:

Splendid Venice: a special place just a few minutes from St Mark's Square with 165 rooms offers a real Venetian experience. A restaurant, a lounge bar and one of the most beautiful rooftops in Venice provide not only a spectacular view on Venice but also a menu of unique dishes as well as kids menu. Due to Family Program, the hotel makes traveling with children easier as there is no need to pay for 2 children under 16.

The St. Regis Venice: Venetian paradise of 124 guestrooms and 39 suites, some have even a private terrace. Ginori Terrace, Gio's Restaurant, The St. Regis Bar and Arts Bar are not just places to eat but create real luxury experience. Reserving 2 rooms at The St. Regis Venice allows to get 50 percent off the second room for children aged 16 or under. Tailored service makes the stay there exceptional.

The Gritti Palace: the hotel features 82 luxurious guestrooms and suites. On the property it is possible to enjoy the Club del Doge restaurant, Bar Longhi, and the Gritti

SPA. The palace located on the Grand Canal provides family-friendly amenities (i.e. cribs and babysitting) cooking classes at the Epicurean School.

Ca' di Dio: settled down in the Castello area near the Arsenale. There are 66 rooms 57 of them are suites. The main advantage is combining 5-star service with family-oriented home atmosphere. Among dining options there is Alchemia bar, Essentia's inner courtyard, the VERO restaurant.

4. Extra-luxury hotels:

Orient Express: A 15th-century Venetian palace with 47 suites has been reopened after 8 years of renovation. The hotel's restaurants offer cuisine where dishes follow Venetian traditions with contemporary character. Special signature cocktails and Venetian cicchetti are offered at the bar. Gardens and courtyards extend the experience and make guests' experience outstanding.

Hotel Danieli: place that combines art, culture and craftsmanship. According to the hotel plans there will be 176 rooms by 2027. The Danieli has been fully restored and just a few steps from St. Mark's Square the 5-star luxury hotel offer special dining options, the rooftop terrace and spa.

Baglioni Hotel Luna: the closest hotel to St. Mark's Square includes art gallery where guests can travel into the past. Baglioni consists of 91 rooms and signature suites with lagoon views. It offers one of the best Italian seafood dining and special Canova Bar for aperitivo or an original cocktail.

Rosewood Hotel Bauer: the hotel which is going to be open in 2026 includes just over 110 rooms and half of them are unique luxury. Hotel Bauer will also have various restaurants, wine bar and beautiful rooftop inspired by traditions. The premises will provide guests with modern wellness center, outside pool and spectacular views of Venice and lush gardens.

3.2.3 Digital audit of the resort

Exploring JW Marriott Venice Resort & Spa and the topic of this study it is necessary to make a technological audit of the company. That is why, the most important digital innovations will be considered.

The guest's experience begins from the pre-stay stage with information search and booking. The hotel's website is well developed. That is why, the guest can find absolutely

all the details about accommodation, dining, experiences and book the preferable room in a few minutes.

The hotel receives all the information through the reservation department and then systemizes everything in the Opera PMS (Property Management System), including personal data (name and surname), check-in dates, previous bookings, loyalty program status, preferences, and special occasions of travelling. Opera PMS has been developed by the Oracle Company and provides personalized experience for guests as well as for hotels' personnel. It can be implemented in companies of different size: in a boutique hotel and a global hotel chain. Moreover, Opera PMS allows organizations to conduct analysis and prepare advanced reports. It is used to monitor the efficiency of operations and to facilitate reservation processing, check-in and check-out, room allocation, inventory management and performing accounting and billing functions.

Upon guest's arrival, the reception staff already have all the information about the reservation. One of the important stages of check-in is the verification and processing of documents. This step is necessary for the safety of both the guest and the entire hotel. JW Marriott Venice uses NP technology to optimize and speed up the process. NP means "No Paper Solutions" and this innovation is advanced in the hospitality industry. Among main advantages there is the reduction of paper dependency, increased sustainability, digitalization of processes, optimization of guests' experience. Moreover, the data of customers are protected by sophisticated encryption and high-quality security systems. It means that the risk of breach of privacy is significantly reduced. NP technology scans ID documents with a small tablet, gather all essential details and facilitates the process of digital signing and managing privacy policy.

After all the necessary procedures, the guest can finally enjoy all the comforts of the room. And even here they can find objects of the digital era. The first one is a mobile key that enables to open the room without physical key but just using a smartphone. Smart Energy Management means the system turns off the lights when there are no guests, reduces the power of the air conditioners, or puts the building into energy-saving mode when needed. In addition, in each room of JW Marriott Venice it is possible to find the QR code that redirects to the Guest Iris platform. This platform is unified digital service portal where the guest can order a room service, find out the shuttle schedule or program of activities, book a table in a restaurant and so on.

Special attention should be paid to the Marriott Bonvoy mobile app. It is this application that allows guests to use a mobile key. Moreover, if the room is not ready during the check-in procedure, the application can be used to monitor its status. The Marriott Bonvoy chat allows send any requests or make questions without contacting the staff personally. Loyalty program participants can track their status, manage their points, and have access to exclusive offers.

Considering the technological aspect of operations, it is essential to point out one of the partners of JW Marriott Venice. The 3P Technologies company has developed audio and video solutions that have a positive impact on guests' comfort. The partner has created a project of implementing these technologies into unique hotel's design and guaranteed high-quality and functionality of embedded systems. 3P Technologies has also developed light-sound integration in the wellness area paying special attention to guests' experience.

The whole system represents a network of independent elements, where each component of the hotel operates independently. All this is managed by a single digital MAYA platform from the same partner. It automatically monitors the schedule, monitors the operation of the equipment and instantly notifies of any problems. The main feature of the system is the possibility of remote access which is clear advantage for the hotel located on a separated island.

Moreover, 3P Technologies allows to optimize the organization of event on the property as it provides special equipment for meeting, conferences and other occasions. After a thorough assessment of the premises and the environment, and the development of ideas on how they can be used by individual customers, the choice was made in favor of a "basic" stationary infrastructure based on a high-quality audio system and video solutions capable of meeting everyday needs. The significant importance has been given to flexibility by developing a widespread cable infrastructure capable of supporting any type of event and by facilitating the use of different technologies required for different installations.

Reception desk, lounges, breakfast room, restaurants, outdoor gardens and pools - every setting has been designed considering all details. This is essential for providing the experience of a luxury hotel that has guests' comfort as the main objective.

3.3 Critical assessment of guest satisfaction factors and constraints

3.3.1 The methodology behind the survey

Since the objective of this study is elaborating suggestions regarding digital innovation to increase customer satisfaction, it is necessary to explore the current guests' attitude. This is essential to find a gap between customers' expectations and present hotel's operations. JW Marriott Venice Resort & Spa cannot just implement technologies used in the sphere by the competitors, it should find digital solution to a specific problem. Moreover, the analysis of customers' satisfaction would allow the hotel to substantiate the economic viability.

The first method of gathering valuable data used in this research is *web scraping*. This is one of the techniques that ensure conversion of unstructured information from the websites into structured ones. After this process the data can be analyzed and systemize into one database. Among the advantages of web scraping is a possibility to collect a huge amount of data in a short amount of time (Khder, 2021). In this study manual web scraping is used to gather the guests' feedback from the largest aggregator platforms like Booking.com, TripAdvisor, Expedia. For the research and exploring reviews of JW Marriott Venice Resort & Spa there have been chosen such aggregators as Booking, TripAdvisor, Expedia since these companies represent the industry standards, are used by the majority of travelers and provide reliable data for empirical study. In addition, these sources ensure access to a huge sample of customers.

The information represents the online reviews of the guests for a selected period including the division into the criteria influenced customers' satisfaction and assessment of the connotation. To assess level of guests' satisfaction and to uncover strengths and weaknesses the reviews for the period from March 2025 to April 2026 have been analyzed. This timeframe has been chosen to provide relevant data and author's elaborations gained during the internship as a Front Office Agent at the resort. Primarily, aggregate ratings from Booking, TripAdvisor, Expedia and official hotel's website have been collected to demonstrate overall satisfaction. All points have been normalized to a unified 10-point scale.

There have been analyzed 200 reviews to ensure validity of the research. In particular, the sample includes reviews containing descriptive feedback, intentionally excluding reviews that provide only a quantitative assessment without accompanying comments.

The reason for this sampling is a necessity to provide a full context for deeper analysis, uncover the problems of negative ratings and examine the experience behind the reviews.

Therefore, the generated dataset of 200 normalized and verified text reviews provides a solid empirical foundation. These prepared data guarantee the reliability and objectivity of descriptive analysis and allow for an accurate transition to identifying weaknesses of the resort.

This method has been chosen for several reasons among which there is the absence of bias that can occur during the interview with a client. In addition, it is possible to monitor guests' feedback during different periods of the years and discover some seasonal problems. An equally important factor is that web scraping provides an access to a huge sample of respondents without necessity of financial resources and field research. Moreover, manual web scraping implemented by the author allowed to make data cleaning and eliminate reviews that have features of automated generation (bots) or biased ones (abnormal frequency of publications, similar syntactic constructions, etc.)

In order to make the data objective and multidimensional, it has been conducted *in-depth interview* with the Director of rooms at JW Marriott Venice Resort & Spa. The interview was semi-structured and was aimed at assigning weighted coefficients for each category identified during the descriptive analysis. The questions were in regard to the categories of problems that are more often than others mentioned in guests' complaints over the last season. In addition, the Director of rooms has been asked about some subtleties that are not usually featured in customers' reviews but can significantly spoil the overall impression about the property. Ultimately, the interview allowed to study the problems, found during the process of web scraping, from the inside of the hotel, prioritize them and severity of each issue.

The information received by data gathering methods such as web scraping and in-depth interview has been analyzed by using *descriptive analysis*. Qualitative or quantitative data have been systemized and reviews from aggregators have been compared with data received from management. Finally, it has been formed a comprehensive overview of the current state of services in the hotel under study. The pains of the clients and the patterns of behavior of the guests were revealed.

In order to bring qualitative to quantitative indicators, this study provides a calculation of such an indicator as the *customer satisfaction index*. The aim of the methodology

provided is extracting insights of current level of customer satisfaction using qualitative and quantitative data. The received results will ensure a strong base for identifying critical problems.

3.3.2 The descriptive analysis of the results

Based on the data collected by the author from the official website of the hotel and aggregators such as Booking, TripAdvisor, Expedia, a comparative table was prepared to analyze customer satisfaction criteria. The following criteria were selected: location, including the location of the hotel, logistics and accessibility of transport, street areas. Cleanliness including cleanliness of rooms as well as of common areas, restaurants and dishes in them. Staff and service implies any interaction between a guest and the staff, the quality of service provided in a restaurant, bar, SPA, gym. Value for money shows how much the hotel corresponds to the cost of staying in the opinion of the guests and means that the guest receives the desired quality of service at an acceptable cost. Facilities include a technical reference to any part of a building or hotel, from the actual structure to the parking lot or guest rooms. These are designated spaces and utilities designed to facilitate activities (dining facilities, spa, gym, conference center, swimming pool, etc.). And finally, Amenities mean something that creates a wow moment for the guest, i.e. additional facilities that contribute to a comfortable stay (a set of cosmetics and hygiene products, welcome gift or courtesy souvenir).

Table 4. Comparison analysis of customer satisfaction criteria

Criteria Source	Location	Cleanliness	Staff & service	Value for money	Facilities	Amenities
Hotel's website	9,2	9,4	8,8	8,0	-	9,0
Booking	9,2	9,2	9,3	8,2	9,1	-
TripAdvisor	9,2	9,4	9,0	8,2	-	-
Expedia	9,0	9,4	9,2	-	9,2	9,0
Average	9,15	9,35	9,08	8,13	9,15	9,0

Source: Author's own elaboration

Exploring the customers' satisfaction at JW Marriott Venice Resort & Spa, the main topic of this research, it is necessary to point out that the hotel holds a strong position on all aggregators and can worthily be considered one of the best in the Venice 5-star hotel market.

Thus, the guests often stressed friendly staff, location, particularly, the private island and possibility to obtain unique experience of travelling in Venice. Among the positive comments there are such phrases as “the staff there was incredible”, “a wonderful breakfast experience”, “attentiveness, friendliness and genuine care”, “perfect place to escape”. Moreover, despite some differences of opinion a significant share of families staying at JW Marriott Venice emphasize that the hotel is “child-friendly” due to availability of kids’ club, a varied program of activities, a separate children's pool, kids menu options and spacious rooms.

Especially, it can be highlighted the free shuttle service to St. Mark's Square and the guests confirm that the schedule is clearly followed and the route is quite comfortable. Looking at the comments on the sources listed above, the author revealed that the hotel is a popular place among guests who want to celebrate a special event on the island (anniversary, birthday or wedding). They emphasize the responsiveness of the staff during the event, the amenity and the incredible attention to detail. In addition, the gym satisfies guests who lead a healthy lifestyle or those who want to diversify their stay on the island with physical activity.

However, there are also the negative comments and reviews. Almost all of them specified the poor housekeeping service as guests found dirty rooms (carpets, curtains, bed sheets etc.), broken furniture, opened vanity kit. In a period from May to September, guests complain about not working air conditioners and the fact that the rooms become unbearably hot.

To analyze the results there have been determined the weights of each of the parameters based on the expert opinion of the Director of rooms and the specifics of the hotel. Since the JW Marriott Venice Resort & Spa is a family-friendly hotel, cleanliness comes first, as the child's health is considered the main criterion for choosing accommodation. Moreover, facilities such as a kids' club and a family pool help ensure that guests decide to stay longer, as there is something to keep the child occupied. In addition, the nature and the gardens on the island are an attractive factor for adults as well for children. Equally important is the staff and service parameter because despite the family specifics, the JW Marriott Venice remains a 5-star luxury hotel. The remaining criteria were assigned equal weights.

Table 5. The weights of customer satisfaction factors

Criterion	Weight
Location	0,1
Cleanliness	0,3
Staff & service	0,2
Value for money	0,1
Facilities	0,2
Amenities	0,1

Source: Author's own elaboration

Summarizing the analysis, it can be concluded that the main problem areas are the room stock, the breakfast area, dining options and, in some cases, interaction with the staff. Further this paper will address the root causes of such negative comments and develop proposals to increase customer satisfaction through digital innovation.

3.3.3 Quantitative computation of the Customer Satisfaction Index

As it was mentioned in the methodology section, the data obtained through the web scrapping, in-depth interview and insights gained from the descriptive analysis are transformed into quantitative metric for better visualization and understanding. Using these elaborations, it is possible to count customer satisfaction index (CSI). According to the methodology mentioned in the Chapter 1, the formula for the CSI is the following:

$$\text{CSI} = \sum(f_i * w_i), \text{ where}$$

f_i means each parameter of customer satisfaction,

w_i is the weight of each factor.

Based on the average scores of each satisfaction criterion and weights for them found in the section 3.3.2 it is possible to calculate the CSI for JW Marriott Venice Resort & Spa:

$$\text{CSI} = (9,15 * 0,1) + (9,35 * 0,3) + (9,08 * 0,2) + (8,13 * 0,1) + (9,15 * 0,2) + (9,0 * 0,1) = 9,079$$

Despite the fact that the CSI is quite high and shows the guests' overall satisfaction with the hotel, using it is possible to find the areas for involvement and some problem zones. Particularly these issues may carry risks for the hotel. That is why, is essential to compare the obtained customer satisfaction index with each average satisfaction criterion. If the average criterion score is less than the CSI this would represent the potential danger for the business and the innovations may be useful to mitigate these risks.

Using the Table 4 it is possible to discover that such criteria as “Staff & Service”, “Value for money” and “Amenities” with the average scores of 9,08, 8,13 and 9,0 correspondingly have the numeric value is less than or equal to the CSI (with the value of 9,079). Thus, these are the areas that will be considered fundamental and require immediate operational adjustment to maintain and later increase the guests’ satisfaction

Moreover, to justify the necessity for the follow-up suggestions of technology implementation the author provides the computation of the CSI for the main competitors. This would represent the base for the benchmarking. Based on the section 3.2.2 and such characteristics as geographical proximity, similar hotel’s specific there have been chosen The St. Regis Venice, San Clemente Palace and Hotel Cipriani as the main competitors for benchmarking. For these hotels the customer satisfaction index is calculated according to the identical scheme: the available data has been taken from the aggregators, the average score was computed and the same weights determined by the Director of rooms of JW Marriott Venice Resort & Spa were used. The results of the calculation are presented in the Table 6.

Table 6. Evaluation of Competitors' Customer Satisfaction Index

Criterion Hotel	Location	Cleanliness	Staff & Service	Value for money	Facilities	Amenities	CSI
The St. Regis Venice	9,83	9,6	9,35	8,5	9,7	9,4	8,707
San Clemente Palace	9,43	9,57	9,07	8,2	9,4	-	9,463
Hotel Cipriani	9,80	9,87	9,73	8,6	9,80	-	7,388

Source: Author’s own elaborations

For clarity, this indicator has been converted to a percentage value for each hotel, getting 90,79%, 87,07%, 94,63% and 73,88% for JW Marriott Venice Resort & Spa, The St. Regis Venice, San Clemente Palace and Hotel Cipriani accordingly. These values of CSI are quite high and close to each other. This represents the high competition in among

these hotels. Around 90% for JW Marriott Venice is a good indicator but it shows that there is still a risk to lose clients. That is why, it is necessary to take measures. JW Marriott Venice has a Quality Manager position who responds promptly to negative guest reviews, participates in the development of actions that contribute to increasing CSI.

3.4 Determinants and root causes of the identified problems and weaknesses

Exploring guests reviews and level of their satisfaction with JW Marriott Venice Resort & Spa it is necessary to find the root causes. Regarding the criterion “Staff & Service” mentioned in the section 3.3.3 one of the reasons of weakness is poor communication between different departments. Thus, one of the most common situations is misunderstanding between Front Office and Housekeeping teams. The team responsible for cleanliness of rooms does not always receive information about the time of the guest's arrival and the client is forced to wait for the cleaning to end. Moreover, when changing the assignment of rooms at the reception, housekeeping does not obtain details about what needs to be rescheduled and additional verification is carried out. Another difficulty is the interaction with the Maintenance department, since without an established stable connection with them, guests complain several times about the non-working air conditioners in the rooms or the cut out of electricity.

Outdated software in the form of an old version of Opera PMS and failures in NP Technology contribute to slowing down the process of checking-in or checking-out. According to the standards, the check-in should last 5 minutes, but due to the hanging of the programs, the lack of their connection to each other, this procedure can take 10-15 minutes. In addition, at the end of the working day, the reception staff must do a double duty, adding information about the guest's documents into the Opera PMS, since this process is not automated.

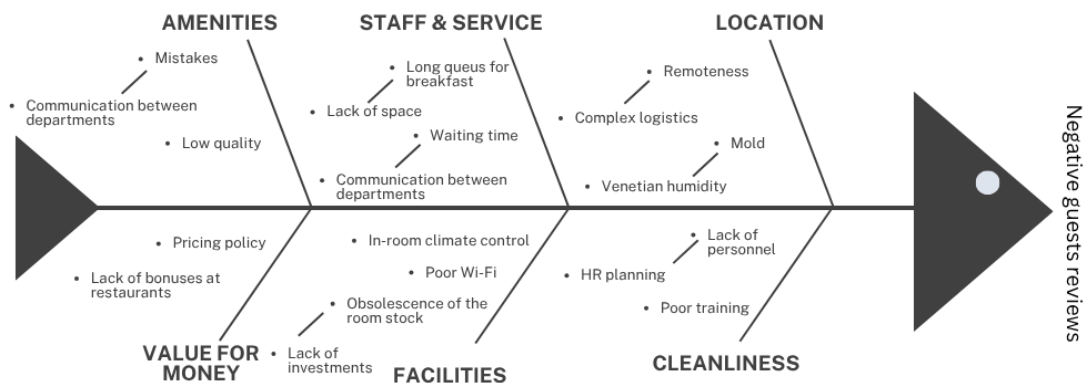
Considering the digital infrastructure of JW Marriott Venice, it can be noted that although it is stated that there is a mobile check-in option, in fact, the guest cannot check into the room without passing by the reception desk, as there is no alternative option to provide documents and make a deposit.

One difficulty that should be mentioned is worn out room capacity. Thus, employees of the hotel are not able to clean carpets, curtains, floor and fixed sofas. In the rooms guests can face slow Wi-Fi, lack of climate control, non-functioning system of scanning QR-code system with all necessary details about the hotel.

Finally, complaints about huge queues for breakfast are featured quite often by the guests. Among the root determinants of this problems there may be operational inefficiency in the kitchen of the restaurant and management of the flows of the customers and lack of personnel. Moreover, the customers' behavioral habits affected this situation since there is a high demand for premium or limited food positions.

For better understanding, visualization and analyzing it has been created the Ishikawa diagram (Figure 14). As the main problem it has been highlighted the fact of negative guests' reviews. The factors are the same as for studying satisfaction: Location, Cleanliness, Staff & Service, Facilities, Amenities and Value for money.

Figure 14. Ishikawa diagram



Source: Author's own elaborations

Using this instrument, it is possible to conclude that negative reviews do not caused by only reason. This gap is explained by combination of various factors. Main problems requiring immediate solutions are obsolescence of the rooms and poor technologies inside, ways to provide service at breakfast and restaurants as whole and internal processes such as communications between departments. In addition, the combination of all issues within a property may make the guests feel the lack of personalization.

4. Strategic suggestions for improving customer satisfaction through technology

4.1 Proposed digital innovations

In Chapter 3, the feedback of the guests who had an opportunity to stay on the island of the Venetian lagoon were examined in detail. In this section the focus is shifting from the problems to the particular solutions. Some digital technologies are proposed for each guests' issue that currently poses risks to the hotel. These risks imply causing potential customers' dissatisfaction and loss of future customers, weakening its market position among other luxury hotels in Venice. Thus, the main question of this section is *if the existing infrastructure and facilities are sufficient for holding out the competition and retaining guests or digitalization is a necessity for maintaining and increasing their satisfaction.*

4.1.1 Implementation of Oracle Opera Cloud Infrastructure

On the basis of the analysis conducted in this research it has been proved that the guests' satisfaction in the hospitality industry depends directly on the technological development within a property. The Oracle research provided in the section 2.5 and customers' complaints on the aggregators and during the interactions with the staff studied in the chapter 3 it is essential to mention that the digital innovations are also a necessity for the Venetian hotels. It has been discovered that the main weaknesses and problems of JW Marriott Venice Resort & Spa are connected with obsolete software used by various departments, long waiting time (especially in dining outlets), weak maintenance of the rooms and relatively poor automation of services for customers compared to competitor hotels.

Considering modern tendencies (see Figure 10), customers' preferences and Venetian market of the hotels (see Section 3.1), one of the main goals of JW Marriott Venice Resort & Spa is becoming a smart destination. It means that the hotel should develop smart technologies such as online applications, social media platforms, and advanced systems (Gretzel et al., 2015; Huang et al., 2017). This improves the quality of interactions, personalization and creates memorable experience. It is explained by the fact that smart JW Marriott Venice as a smart destination would meet even the sometimes-hidden desires of guests and satisfy their preferences due to technologies such as AI and the Internet of

Things. The hotel would be able to provide immersive, seamless, and sustainable experience.

Several technological innovations have been proposed to achieve the goal mentioned above. The first one is connected with the main weakness of JW Marriott Venice. In the Section 3.4 it is mentioned that difficulties with communication between various hotel's departments cause some risks influence guests' impressions. To resolve this, it is suggested to update the software. Opera Cloud Infrastructure is able to replace the outdated system of Opera PMS. There are several advantages of online infrastructure including the access from any kind of device. It allows the staff to receive details in real time without the necessity to stay at desktop computer. Using smartphones and tablets would facilitate the exchange of information and speed up the whole process of providing services. First of all, it would influence interactions between Front Office and Housekeeping departments as Opera Cloud is able to consolidate all details about guests' arrivals and their status, cleanliness of rooms and amenities requirements.

Unlike the old system, which is not yet able to transmit complete information about the client's profile, Opera Cloud automatically updates data for all departments regarding information about guests, their preferences, allergies, etc.

Main differences between Opera PMS and Opera Cloud are represented in the Table 7. This Table justifies the necessity to imply new software in terms of becoming smart tourism destination which requires completely different and sophisticated digital infrastructure. The data provides in the Table represent that Opera Cloud is more flexible and possesses mobility which is essential for faster response, problem solving and more efficient operating.

Table 7. Differences between Opera PMS and Opera Cloud

Criteria \ Software	Opera PMS	Opera Cloud
Access	Physical computer-based server	Cloud infrastructure available on any device including smartphones
Architecture	Outdated monolithic client-server architecture	API architecture, availability of integration with external software
Updating	Manually by IT department	Automatic

Storage of information	Only on the local server	Oracle Secure Data Centers (Cloud)
Staff training rate	Complex interface and UX requiring memorization of transaction codes and shortcuts	Modern and intuitive interface allowing fast learning for the staff
Data availability	Long-term report generation and only when syncing with the network	Availability of offline mode for basic functions

Source: Author's elaborations based on Oracle Hospitality

Thus, it is possible to conclude that implementing the Opera Cloud Infrastructure would create integrating system within the property, combining all elements, including departments, teams, facilities and rooms, of JW Marriott Venice and updating information on time.

4.1.2 Mobile check-in as a competitive advantage

As it was discovered by the analysis of operations through the official website of JW Marriott Venice Resort & Spa the mobile check-in is declared as one of the digital features of the hotel. In practice it is impossible to do check-in without face-to-face interaction with front office staff. That is why, integrating technologies to control the guests' documents and make room keys using only mobile device would be a digital advantage for the company. Based on the Oracle Hospitality research (see Figure 10) mobile check-in is a must have feature for more than 34% of travelers.

However, in Italy the process of guests' authorization is strictly regulated. According to the Articolo 109 Testo Unico Leggi Pubblica Sicurezza ⁵, the proprietors of any kind of accommodation are obligated to verify the guest's personality with an identity card or other document suitable to certify their identity in accordance with the regulations in force. Moreover, these data must be provided within 24 hours to the territorially competent police headquarters in accordance with the procedures specified. Considering all legislative requirements, it is important carefully study the technologies that could be used in the hotel.

⁵ Ministero dell'Interno (2001). Articolo 109 Testo Unico Leggi Pubblica Sicurezza https://www1.interno.gov.it/mininterno/site/it/sezioni/servizi/old_servizi/legislazione/sicurezza/legislazione_656.html

Nowadays business environment offers different digital solutions among which such application as Chekin. It enables control the ID documents, gather information about them and send necessary details to Italian police. Chekin program meets all legislative requirement, allows hotels to have all-in-one system including availability for guests to pay city tax in different currencies. Another application is Cyberneid which is more secure as the first one due to more complex system and reliable data protection complying with standards. Both technologies provide guests with the opportunity to scan the document using also face matching technique. This automates the process of uploading the documents.

However, these two startups are quite elementary and, despite all the advantages, are not reliable enough for such a large network as Marriott. Management needs more sophisticated and reliable systems, because the hotel often hosts VIP guests who will not entrust their data to the left application. Moreover, JW Marriott Venice is trying to make the check-in experience smooth despite all the difficulties of Italian laws. Therefore, the best solution would be to integrate technologies inside Marriott Bonvoy application, thus the guest will not have to download additional applications to his device. As examples there are such software as Facephi and Sumsb. They not only allow hotels to gather personal information, but also minimize scanning errors, have enhanced legal verification and protection. Such technologies ensure that the data does not fall into the hands of fraudsters, as the details remain on the guest's device or on Marriott's servers, but only for the time required for the client to register.

Conducting the analysis and research of the competitors mentioned in the Section 3.2.2 the author has found that 5-star hotels belonging to the luxury category do not possess the availability of mobile check-in which implies eliminating face-to-face communication with the staff.

Thus, to solve the problem of the lack of mobile check-in, there are many technological solutions, the choice of one of them will depend on the technical, financial capabilities and goals set by the management. However, if JW Marriott Venice

4.1.3 Digitalization of breakfast experience

Another difficulty that JW Marriott Venice faces is huge queues for the breakfast. A lot of negative comments include the note about waiting time in the morning. During the

analysis of the data obtained through web scraping the author has discovered that among 200 reviews explored there are around 15 ones that involve the following comments:

- “Breakfast was very basic, with limited options and not up to the usual JW Marriott standard” (Booking.com, 2025);
- “The food and services at breakfast are below expectations” (TripAdvisor, 2025);
- “The breakfast service and food were not good” (TripAdvisor, 2025);
- “Some days the breakfast area was packed with Viking cruise people (they are there a lot)” (JW Marriott Venice Resort & Spa, 2025);
- “The breakfast is very expansive (and a bit hectic)” (JW Marriott Venice Resort & Spa, 2025).

That is why, digital innovation should be introduced also to overcome this problem. The key element here is the Internet of Things. It is suggested to combine the following components into one system: reservation system in the restaurant, Opera Cloud Infrastructure and AI monitoring of the occupancy. By unifying all of these, the guests would be able to control in the Marriott Bonvoy application fullness of the dining space and plan their time appropriately. Moreover, it would be useful to implement table release notifications and availability for the guests to put them into the virtual queue. Such digital solution may reduce dissatisfaction, minimize the waiting time and make the restaurant operations more efficient.

4.1.4 IoT integration: smart climate control systems

The last one but still not the least problem is not properly working air-conditioning. During the period from May 2025 to September 2025 around 20% of negative reviews mentioned this issue (see Section 3.3.2). The root cause is worn out equipment but it requires a huge amount of investments as the hotel includes 266 rooms and each of them has a necessity of changing AC system. According to Director of rooms information about an inoperable air conditioner is received only when the guest has already felt discomfort and complained. In the terms of an island resort and the specific climate of Venice, the load on climate control systems is at its peak. He also has confirmed that 20% is a critical value and represents a high risk for the reputation.

However, there are also some digital technologies that are able to provide temporary solutions and increase customer satisfaction. First of all, Opera Cloud will improve communication between departments, specifically with the technical department, and

monitor guests' preferences and complaints about temperature in the room. As an example, as soon as a guest completes mobile check-in or inform hotel personnel about their arrival Opera Cloud Infrastructure prompts maintenance to activate air conditioner in the room. Moreover, it is suggested to implement a function into the Marriott Bonvoy application that enable guests to choose the desired temperature and air conditioner operating time.

In conclusion, the business environment offers a lot of digital solutions for any kind of problems. It is essential to take into account the specifics of JW Marriott Venice Resort & Spa to select the appropriate technology. Implementing modern infrastructure as Opera Cloud would be an efficient way to overcome obstacles in communication between personnel, as well as introduce sophisticated technologies to personalize the service and making guests' experience smoother.

4.2 Predicted impact and efficiency of new strategic solutions

The main goal of implementing the technologies mentioned above is increasing the guest's satisfaction by resolving the problems that now are causing most complaints. Particularly the customer satisfaction with the hotel impacts their desire to come back to the property, strengthens hotel's reputation, allows to attract new guests and therefore increase revenue. Moreover, raising satisfaction is one of the key drivers of decreasing negative reviews, growth of operational efficiency and saving resources.

Due to the fact that there is no possibility to put into practice all suggestions and measure the effect, the conclusions regarding predicted efficiency will be made on the basis of the researches conducted by leading hospitality experts.

First of all, implementing of Opera Cloud Infrastructure would affect all operations of JW Marriott Venice Resort & Spa. As it was mentioned in the Section 3.4 the combination of all the difficulties that customers face may give the impression that the staff of JW Marriott Venice is not interested in providing the personalized service. Since the system stores and transmits all customer data, personalization increases, as well as decrease the possibility of errors. Before the check-in procedure, the room is prepared more efficiently, taking into account all preferences of a guests. Even before arrival the Front Office department has an access to the information about their previous stays across the Marriott chain, their activities within a property, complaints, preferred room location etc. Using the same Opera Cloud system, the hotel would have an opportunity to provide a guest

with special dining options, congratulations on special occasions on the TV in the room. Thus, JW Marriott Venice would be able to anticipate the wishes of the guests. Moreover, as the hotel is the family resort (see the Section 3.2.1), Opera Cloud would obtain specific information about the presence of the children before the stay and particular preferences of the little guests. This is another touchpoint that Front Office can apply.

In addition, by deployment of synergy of Opera Cloud and Artificial Intelligence (AI) it would be possible to achieve even better results. To scale personalization just gathering data about guests is not enough. AI would ensure the ability to analyze large amount of information, discover hidden patterns in guests' behavior (movement routes around the resort, the frequency of visits to various activity areas, dining preferences, frequent requests etc.) and therefore transfer all of these into personal experience and touchpoint. It is also should be highlighted that AI is able to reduce costs of making the service more personalized. There would not be the necessity of huge team of concierge to analyze the guests' preferences regarding amusement in Venice and to find solutions to some unexpected questions.

Opera Cloud Infrastructure would be a strong base to introduce mobile check-in within JW Marriott Venice. On the one hand, it would become another point of personalization. If a guest would like to complete check-in procedure without interacting with the staff, they would have this opportunity. Moreover, mobile check-in would become a solution for the problem of huge lines in front of the desks in lobby. As the hotel's shuttle arrives always in the same time and quite often full of guests, sometimes waiting time can reach 25-30 minutes. JW Marriott Venice can reduce the waiting time by ensuring that when there are long queues, available staff can help customers complete checking-in right in the lobby either via guests' device or via Opera Cloud, which can be used on a tablet. According to a survey that has been conducted by the American Hotel and Lodging Association (AHLA), the share of guests that would prefer the hotels with the option of mobile check-in is 70%. Reducing check-in waiting time increases guest satisfaction, improves hotel ratings, and encourages repeat visits. (Zaplox, 2024)

Mobile check-in implies usage of mobile key providing unsurpassed convenience. According to the survey conducted by Oracle and Skift in 2025 hotel managers as well as customers have agreed on the fact that sophisticated technologies are very important on a property. Over 60% of hoteliers in the global market expect that within three years the

industry will switch to a contactless format of work. It is about the complete digitalization of the main stages of a guest's stay, including obtaining keys and going through registration procedures. Moreover, around 34% of clients highlighted that using their own devices to open a room is essential to increase the quality of their stay. (Zaplox, 2024)

Implementing innovations that would improve breakfast experience, JW Marriott Venice would be able to pay attention to each guest even without direct interaction. The technology that can show the occupancy at the restaurant would be able to help personnel to distribute flows of the guests correctly, thereby reducing the likelihood of negative impression from the dining service. Breakfast is an important aspect at the 5-star family resort and by introducing the possibility to manage time calmly and offering various experience options it emphasizes the luxury. Thus, managing this process and reducing waiting time will increase guests' satisfaction. According to Breffni M. Noone and Sheryl E. Kimes customer's experience may be totally broken by huge lines to get the place in the restaurant. Moreover, decreasing seating delay at least for 5 minutes would be able to improve satisfaction by 10-15%. Research conducted by the TrustYou company partnering with Pennsylvania State University ⁶ has shown that queues and long waiting time usually decrease the overall satisfaction with a hotel by 0.5 - 0.8 points on TripAdvisor and Booking.com aggregators.

The next innovation suggested is smart climate control in the room. It would definitely contribute to strengthening the personalization of a stay. As JW Marriott Venice is first of all a family resort, it is extremely important for guests that the room temperature is comfortable and safe enough for children, without the risk of getting sick. In addition, by implementing sustainable technologies that would control energy consumption, the hotel is able to reinforce the image of the sustainable property among the guests, both past and potential. According to the statistics, 85% of travelers appreciate sustainable traveling and declare that the green factor is important or very important to them. Older generation demonstrate a greater commitment to specific, more sustainable behaviors than their younger counterparts (Booking.com, 2026).

⁶ TrustYou. (2022). The power of guest reviews: How hotel ratings impact revenue and performance. <https://www.trustyou.com/blog/insights/how-guest-reviews-impact-hotel-performance>

Despite the fact that improving customer satisfaction is a key objective of this research, it is essential to point out potential financial benefits of innovation. In the industry literature implementing technologies and their impact on a company's profits are discussed quite often. Hotels may have availability to reduce their operating costs by using innovations for optimization of routine duties. (Ivanov et al., 2020) JW Marriott Venice would be able to make transmit of guests' documents to the police more effective. In addition, such innovations as AI, Internet of Things and applications for mobile check-in would allow Venetian hotel to reduce the number of personnel and optimize the work of the remaining employees. This would cut some labor costs. Decreasing labor costs would be a profitable strategy as the labor force in Venice costs more than in some other Italian cities due to local legislation and specific features of Venice. Moreover, JW Marriott Venice, locating on the private island, has to provide transportation to the staff and for most of them accommodation. According to Federazione delle Associazioni Italiane Alberghi ⁷ e Turismo in Venetian hotels, staff costs range from 35% to 45% of the total turnover and these costs are continuing to increase.

Revenue management is also affected by sophisticated technology. AI and Opera Cloud Infrastructure may be used to make forecasts of occupancy, booking rates, prices at the competitor hotels etc. Thus, management of JW Marriott Venice would be able to adjust the supply and prices on different aggregators. Digital innovations would improve pricing strategy and make use of resources more efficient (PwC & Urban Land Institute, 2026).

However, the strategy of implementing innovations should be developed with a careful attention due to the importance of personalized service, interaction, and emotion in the luxury hotel industry (Ivanov et al., 2020). Therefore, JW Marriott Venice would be able to reduce labor costs and some operating expenses, increase work efficiency and develop sustainability aspect, but managers should always take into account the specifics of the hotel, its property age, financial capabilities, and goals set by higher management.

Moreover, apart from the obvious increase in guest satisfaction, with the introduction of innovations, JW Marriott Venice would have the opportunity to attract more and more Baby Boomers and Millennials. These are two generations that are currently using AI to

⁷ Federalberghi, Decimo rapporto sul sistema alberghiero e turistico ricettivo in Italia, Roma, Federalberghi, 2024, <https://www.federalberghi.it/rapporti/x-rapporto-sul-sistema-alberghiero-e-turistico-ricettivo-in-italia-sintesi.aspx>

plan trips and select hotels (Deloitte, 2026). If the market trends continue, the Venetian hotel would be able to gain a foothold in the market as a smart distance resort.

4.3 Long-term perspectives

It is essential to point out that business environment in Venice and all over the world is changing faster and faster. This phenomenon impacts customers because their preferences are becoming different. That is why, customer satisfaction should be studied in long-term perspective. Digital transformation is a necessity for luxury hospitality nowadays.

JW Marriott Venice Resort & Spa is interested in strengthening its position in the market and making guests loyal to the brand. General Manager of the property has specified the main global goals for the next years ⁸. Among them there is intention to transform Isola delle Rose into a full-fledged travel destination in its own right. General Manager highlights that the strategy implies not being just a place to stay in or near Venice. Another goal is strengthening resort's position in the market. In Venice more and more hotels of 5-star category are opening. Therefore, it is necessary to think about the competitive advantage and consider possible ways to strengthen and overcome the competition. Based on the long-term goals set for the management, the need to introduce digital innovation justifies all possible financial and time costs.

Implementing Opera Cloud Infrastructure, mobile check-in, climate control technology and AI would create the foundation for the future digital ecosystem. Therefore, it would allow JW Marriott Venice to become a smart destination. This is one of the strategic business advantages. Moreover, these innovations would impact Guest Lifetime Value (GLV) so that the hotel is able to retain the guests and make them repeat their stay. GLV would increase not only the overall profit but which is more important customer loyalty as all of the innovations would create a “wow”-effect.

Another long-term perspective is sticking to sustainability. For the hotel located in Venetian lagoon it is one of the conditions for survival since this city is under threat of being flooded and destroyed. Smart climate control system would minimize carbon footprint and reduce energy consumption. All technologies in combination are able to reduce costs, avoid penalties in the future for harming the environment, and get more

⁸ JW Marriott Venice Resort & Spa. (2025). JW Marriott Venice 10 years: Interviews with Cristiano and Irene [Video]. YouTube. <https://youtu.be/9sLd2AYT2JQ>

funding from companies interested in following the ESG targets. As mentioned in the previous section, guests are increasingly paying attention to green technologies, thus sustainability plays an important role in customer satisfaction.

In addition, key point is the availability to resist crisis situations without any influence on the guests. Cloud technologies and access to a room without any physical cards would allow not only to cope some operational disruptions but also mitigate larger risks such as labor shortages, cybersecurity threats, climate-induced emergencies etc.

Long-term viability of the technologies suggested is supported by Marriott's intention to transform the entire network. In 2026 Marriott International invested more than 1 billion dollars into company's development more than a third of which will be devoted to digital transformation and technology adjustments. Anthony Capuano, CEO of Marriott International, has declared that there had been identified three main directions for innovating: property management, reservation infrastructure and loyalty program ⁹. Artificial intelligence is considered as long-term opportunity that is able to change the methods of attracting, retaining and servicing guests. However, according to Anthony Capuano, the digital progress is still at an early stage of its practical implementation.

To conclude, digital innovations that may be implemented at JW Marriott Venice Resort & Spa are able to harmonize Italian traditions and modernity of business environment. Through the company's large investments, the Venetian resort would be able to strengthen its position in the market and obtain a competitive advantage in one of the most challenging markets.

⁹ Stone, D. (2026). Marriott Advances Technology Migration as AI Strategy Moves Into Deployment. Hotel Technology News. <https://hoteltechnologynews.com/2026/02/marriott-advances-technology-migration-as-ai-strategy-moves-into-deployment/>

Conclusions

In conclusion, the research has been focused on exploring customers' attitude towards the hotels in terms of technological progress and overtourism specifically in Venice and the area of its lagoon. Another factor taken into account in this study is high competition which is increasing rapidly in digital era and influencing the properties (De Marchi, 2025). Moreover, the author considered customers' preferences changing over time due to transferred needs (Hill et al., 2017). It has been found out that, generally, hotels are obliged to adjust the way of their operations implementing sophisticated technologies. These focuses have been chosen given the objective of this research: to propose ideas of digital innovations that can be implemented at JW Marriott Venice Resort & Spa.

To analyze all the aspects of these questions the industry literature including collections of scientific papers, journals, articles, conference materials, business cases and statutory acts has been explored. To supplement the theoretical base with up-to-date data, statistics have been collected from platforms such as Istat and the U.O. Sistema Statistico Regionale of the Veneto Region. In addition, in the research there has been presented in-depth review of modern digital innovations. The author has studied theoretical foundations related to service innovations, their various typologies, and their direct impact on the provision of services and guest experiences. This comprehensive review provided a good foundation for further consideration of practical applications.

After researching the theoretical aspects there have been examined the Venetian hospitality market and its features. In this paper work the author has explored tendencies and dynamics in this market specifically 5-star properties. There have been studied customers' behavior habits and preferences. Moreover, it was important to consider the technological potential of the Veneto region and to propose developments that are within the capabilities.

The practical part of the study was based on a detailed audit of guest reviews collected from leading open platforms and aggregators. Based on this information, a comprehensive assessment of customer satisfaction was carried out, combining both quantitative analysis and qualitative content analysis of feedback. This made it possible not only to record the current ratings of the resort, but also to identify hidden pains of dissatisfaction and systemic operational failures in the process of providing the service. Specifically, this part provided the possibility to identify the technologies that could be implemented at JW

Marriott Venice. The innovations proposed by the author have been designed considering their relation to the strategy of the JW Marriott in Venice and the goals of the entire rate. As mentioned in the Section 4.3, the chain's strategy is aimed at introducing changes in the relevant area of this research.

Turning to the specific results of this study, it has been found out that nowadays in Venice there are presented around 1300 hotel accommodations and this number is increasing all the time as well as number of tourists (see Section 3.1.1). This means that the object of the paper work, JW Marriott Venice Resort & Spa is facing strong competition in the market and has to pay special attention to the customer satisfaction. Current Customer Satisfaction Index is 90,79% which is quite high but still requires some advancement. Among its main competitors (another Venetian properties such as The St. Regis Venice, San Clemente Palace and Hotel Cipriani) JW Marriott Venice occupies a moderate position, and its CSI closely matches the industry average among its major luxury competitors.

Analyzing the pains of the guests the main directions where innovations should be implemented to increase customers' satisfaction have been identified. There have been highlighted such points of dissatisfaction as the lack of a mobile check-in, long queues for breakfast, non-functioning air conditioners, as well as some misunderstandings with staff, which leads to decreased personalization. However, personalization is one of the main features of a 5-star hotel.

Thereby, the author has suggested to apply the sophisticated technologies such as the following:

- Oracle Opera Cloud Infrastructure instead of the outdated software;
- Technologies allowing monitoring the guests' documents and introduction of mobile check-in;
- Application adjustments ensuring digitalization of breakfast experience;
- Smart climate control systems.

During the conduction of the research some limitations that complicated the study of the selected topic have occurred. Among these difficulties there is inability to conduct a large-scale survey within the guests of JW Marriott Venice that is why the availability of data was limited by the public open information. Moreover, the technologies recommended by the author are relevant only at the time of the study and will need to be

adjusted over time due to the development of technologies and the progress. Another issue was the language barrier since some reviews on the open resources are left in foreign languages (i.e. German, Chinese, French etc.). That is why, they cannot be examined with the precise accuracy and full understanding of guests' attitude. In addition, all the comments are extremely subjective in the luxury segment. It is important to emphasize that consumers in this segment have exceptionally high expectations. Consequently, their satisfaction is highly sensitive to seemingly insignificant details that would be considered insignificant in budget hotels. Therefore, this study has required the large analytical process to eliminate this emotional clutter.

After making suggestions regarding the innovations the practical significance has been considered. In the short-term perspective the hotel would be able to enhance the efficiency, optimize routine operations, develop touchpoints and emotional connection with its customers and reduce the current operational expenditures. Finally, these factors would lead to the decrease of negative feedback left by the guests and, therefore, increased satisfaction. Furthermore, in the long-term perspective the huge investments would allow to meet company's strategic goals. Among the hotel's long-term objectives there is strengthening position in the market, increasing guest lifetime value. Moreover, integrating sustainability with smart climate control systems may become competitive advantage as well as essential factor for survival in the city of bridges and canals. Additionally, JW Marriott Venice would be able to obtain the position of the smart destination and become a unique place attracting guests from all over the world.

Thereby, in this research it has been demonstrated that digital technologies actually affect the guests' satisfaction and their experience of staying at the hotel in all the phases. A lot of academic paper works exist regarding implementation of sophisticated technologies in the hotel industry. However, this study introduces new research applying theoretical aspects developed earlier into the specific context. Tourists visiting Venice have particular needs and requirements towards accommodations. This factor makes the research of their satisfaction more difficult. Moreover, the paper work contributes to the academic dialogue considering highly sensitive guests' expectations in the luxury hospitality.

However, there are some questions left. Will sophisticated innovations be able to replace humans in some aspects and provide luxury services, or will they remain only

auxiliary tools? How will the hospitality industry change over time and technological progress? These are the issues for further research and observations.

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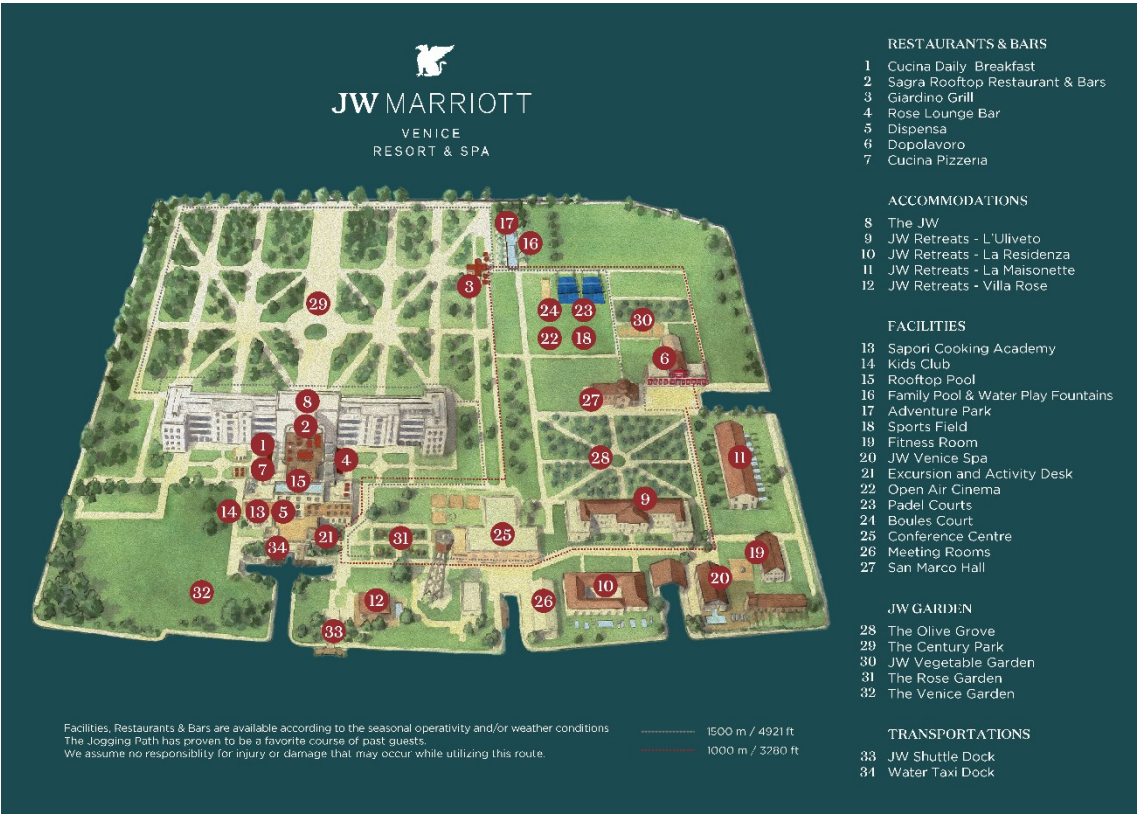
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Appendix 1

Figure 1.1 The structure of JW Marriott Venice Resort & Spa

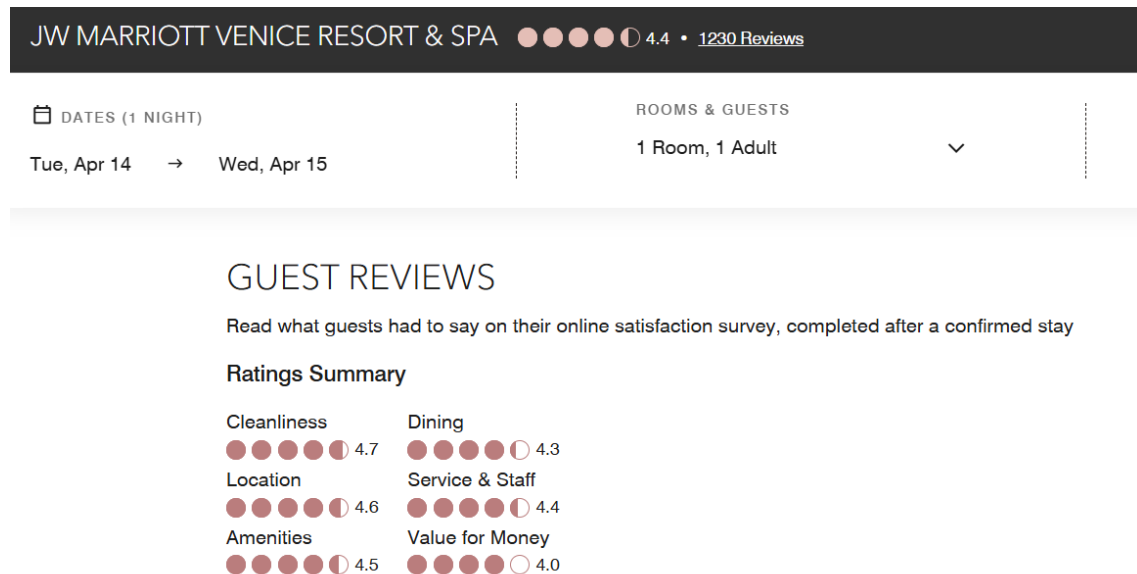


Source: JW Marriott Venice Resort & Spa Official Website

Appendix 2

Guests' satisfaction with JW Marriott Venice Resort & Spa

Figure 2.1. Hotel's website



Source: <https://www.marriott.com/en-us/hotels/vcejw-jw-marriott-venice-resort-and-spa/reviews/>
(14.04.2026)

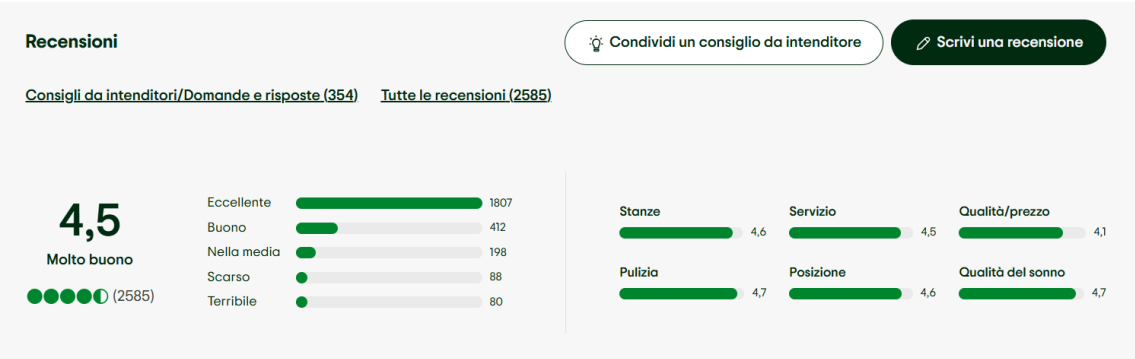
Figure 2.2. Booking.com



Source: https://www.booking.com/hotel/it/jw-marriott-venice-resort-amp-spa.en-gb.html?aid=356980&label=gog235jc-10CA0ocUIhanetbWFycmlvdHQtdmVuaWNILXJlc29ydC1hbXAte3BhSBRYA2hxiAEBmAEzuAEXyAEM2AED6AEB-AEBiAIBqAIBuALHj_nOBsACAdICJDI0NmYxOTk2LTJhYzQtNDNINy05ZDBhLWFjMDU5YzM3Z

[TRiZtgCAeACAQ&came_from_hotel_review=1&keep_landing=1&sid=11db8b3898b6b0e4a2ba980ede4fa4da](https://www.tripadvisor.it/Hotel_Review-g187870-d7179516-Reviews-JW_Marriott_Venice_Resort_Spa-Venice_Veneto.html) (14.04.2026)

Figure 2.3. TripAdvisor



Source: https://www.tripadvisor.it/Hotel_Review-g187870-d7179516-Reviews-JW_Marriott_Venice_Resort_Spa-Venice_Veneto.html (14.04.2026)

Figure 2.4. Expedia



Source: <https://www.expedia.it/Venice-Hotel-JW-Marriott-Venice-Resort-Spa.h8841989.Informazioni-Hotel> (14.04.2026)