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Analysis of Hospitality Information Systems on Guest Engagement and Operational Efficiency in Rwanda; A Case of Sainte Famille Hotel

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Abstract

The study investigated the impact of hospitality information systems (HIS) on guest engagement and operational efficiency within Rwanda's hospitality industry, focusing on Sainte Famille Hotel in Kigali. The research was driven by the growing global adoption of digital technologies in the hospitality sector to improve service delivery and customer experiences. However, Rwandan hotels continue to face challenges such as limited digital literacy among staff, inadequate technological infrastructure, and weak online marketing strategies, which hinder the full benefits of HIS utilization. The study aimed to achieve three main objectives: to examine the relationship between online services and guest engagement, to assess the influence of technology on occupancy levels and to evaluate the relationship between technology and operational efficiency. A sample size of 127 respondents was determined from a total population of 187 using Slovin's formula, comprising 97 hotel staff and 30 guests drawn mainly from Booking.com users. Staff participants included personnel from key departments such as administration, finance, IT and maintenance, front office, kitchen, food and beverage, public area cleaning, housekeeping, and sales and marketing. Data were collected through questionnaires and analyzed using Statistical Package for Social Sciences (SPSS), with results presented in tables, percentages, and frequencies. The findings revealed that the adoption and effective use of hospitality information systems play a critical role in improving hotel performance. HIS were found to enhance guest engagement through personalized services, efficient communication, and streamlined operations, while also promoting operational efficiency by reducing manual workloads and improving coordination among departments. The study concludes that effective adoption of hospitality information systems significantly enhances guest engagement and operational efficiency, thereby strengthening competitiveness and sustainability within Rwanda's hospitality industry, as evidenced by the case of Sainte Famille Hotel. The study recommends that Sainte Famille Hotel should upgrade and integrate its hospitality information systems while strengthening staff training to support data-driven decision-making and personalized guest services. The study also recommends that the Government of Rwanda should support hotels through targeted training programs, financial incentives, and clear data protection policies to accelerate sector-wide digital transformation and service quality improvement.

Keywords: *Hospitality, Information Systems, Guest Engagement, Sainte Famille Hotel, Rwanda.*

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1.0 Introduction

Technological advancements have significantly changed business practices, particularly in the hospitality sector, where information systems are vital for boosting guest engagement and fostering growth. Digital platforms, such as hotel booking websites, mobile applications, social media, and online guest service channels, have revolutionized interactions between businesses and guests by offering convenience, personalized experiences, and real-time communication. These hospitality information systems help businesses attract and retain guests by providing seamless reservations, tailored recommendations, and instant support, leading to higher satisfaction and brand loyalty (Fang, Wen George & Prybutok, 2023). Digital marketing techniques, such as personalized advertisements and social media campaigns, play a significant role in enhancing the visibility and competitiveness of hospitality businesses. As consumer expectations continue to evolve, leveraging hospitality information systems has become essential for improving guest experiences, strengthening brand relationships, and driving overall industry success (Baubonienė & Gulevičiūtė, 2022).

In the global context, hospitality information systems have significantly transformed the hospitality industry by redefining guest engagement and promotional strategies. With the rise of digital platforms, businesses worldwide leverage online booking systems, social media, artificial intelligence, and guest relationship management tools to enhance guest experiences and build stronger brand connections. The increasing reliance on e-commerce, online reviews, and virtual guest support has enabled hospitality businesses to reach a broader audience, improve service efficiency, and personalize offerings to meet diverse consumer preferences. As global competition intensifies, the adoption of innovative hospitality information systems remains crucial for sustaining growth, improving guest satisfaction, and driving the long-term success of the hospitality industry (Baldus, Voorhees & Calantone, 2015).

The hospitality industry in Africa has experienced significant growth, driven by increasing tourism, urbanization, and digital transformation. Hospitality information systems play a vital role in boosting guest engagement by enabling smooth interactions, tailored experiences, and prompt service delivery. Digital platforms such as hotel booking websites, mobile applications, and social media channels enable businesses to connect with guests, address their needs promptly, and foster brand loyalty. As competition intensifies, leveraging hospitality information systems is essential for hospitality businesses to attract and retain guests, ultimately promoting the industry's expansion across the continent (Nukusheva, Jantassova & Popova, 2020).

Rwanda's hospitality industry has been growing rapidly, driven by the country's focus on tourism, business travel, and digital innovation. Hospitality information systems play a vital role in enhancing guest engagement by offering convenient booking platforms, personalized digital interactions, and real-time guest support. Hotels, lodges, and travel agencies in Rwanda increasingly use websites, mobile applications, and social media to attract and retain guests while improving service delivery. As Rwanda continues to position itself as a leading tourism destination in Africa, leveraging hospitality information systems is crucial for sustaining growth and competitiveness in the hospitality sector (Raude, Flamand & Apostolidis, 2019).

Sainte Famille Hotel, a prominent establishment in Rwanda's hospitality sector, has increasingly embraced hospitality information systems to enhance guest engagement and drive business growth. As digital transformation reshapes the industry, the hotel leverages online booking

platforms, social media, and personalized digital communication to attract and retain guests. Online reviews and feedback mechanisms help the hotel maintain service quality and build guest trust. By integrating digital solutions into its operations, Sainte Famille Hotel strengthens its competitive position and contributes to the broader development of Rwanda's hospitality industry (Senecal, Kalczynski & Nantel, 2020).

The hospitality industry in Rwanda has experienced significant growth, driven by the country's strategic investments in tourism, infrastructure, and digital transformation. As technology continues to reshape guest interactions, hospitality information systems have become essential tools for enhancing guest engagement and promoting the sector's development. Hotels and hospitality establishments are progressively utilizing digital tools, including websites, mobile apps, social media channels, and online reservation systems, to deliver smooth customer experiences, draw in guests, and enhance service quality. This research seeks to examine how hospitality information systems contribute to boosting guest interaction and supporting the development of Rwanda's hospitality sector, while also identifying the main opportunities and obstacles within the digital environment.

2.0 Methodology

The study adopted a descriptive research design to examine the influence of hospitality information systems on guest engagement and operational efficiency at Sainte Famille Hotel in Rwanda. This design was appropriate because it enabled the researcher to observe, describe, and interpret existing practices as they occur in a real-life hospitality setting. The target population comprised 187 individuals, including 90 guests accessed through Booking.com records and 97 hotel employees and administrative staff drawn from key operational departments. Using Slovin's formula at a 5% margin of error, a sample size of 127 respondents was determined. Purposive sampling was applied to management and staff to capture informed operational perspectives, while convenience sampling was used to select guests based on accessibility and willingness to participate, ensuring representation of both service providers and service users. The study employed documentary review and structured questionnaires as the main data collection methods. Questionnaires containing both closed-ended and open-ended items were administered to guests, employees, and administrative staff to gather quantitative and qualitative data on system usage, service delivery, and guest experiences. Documentary review involved consultation of relevant books, journals, reports, and online sources to support contextual understanding and instrument development. Data collection followed systematic procedures that included verification of completed questionnaires, exclusion of incomplete responses, and thematic coding of qualitative feedback. Quantitative data were analyzed using SPSS to generate descriptive statistics, while qualitative data supported interpretation of patterns and trends. Ethical considerations, including informed consent and confidentiality, were observed throughout the research process to ensure credibility and integrity of the findings

3.0 Research Findings

The research findings are presented in sections.

3.1 Profile of Respondents

In this section, the researchers presented the views of respondents in relation to demographic characteristics of respondents in order to ascertain maturity, experience, knowledge and understanding in relation to the study topic.

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Table 1: Gender of Respondents

Gender	Frequency	Percentage (%)
Male	70	55.1
Female	57	44.9
Total	127	100.0

Table 1 shows that gender distribution of respondents indicates a slight male majority, with 55.1% male and 44.9% female, demonstrating that both genders are well represented in the study and that the feedback reflects a balanced perspective of Sainte Famille Hotel's guests, employees, and administrative staff. The modest male dominance suggests that hotel patronage and employment may lean slightly toward men, possibly due to factors such as business travel or the composition of certain job roles. However, the near parity also highlights the hotel's broad appeal and inclusivity, implying that its hospitality information systems and service strategies should remain gender-neutral, focusing equally on the preferences and expectations of both male and female users to ensure comprehensive guest engagement and operational efficiency.

3.2 Guests' Findings

Table 2 presents findings of satisfaction with online booking and check-in

Table 2: Satisfaction with Online Booking and Check-In

Statement	Mean	SD
Ease of use and convenience	1.95	0.82

The findings in Table 2 show a mean score of 1.95 with a standard deviation of 0.82, indicating that most respondents strongly agreed or agreed that Sainte Famille Hotel's online booking and check-in system is easy to use and convenient, with relatively little variation in opinion. Because the mean is well below 2.0 on a 1–5 scale (where 1 = Strongly Agree), the data reflect a consistently positive experience across guests, employees, and administration staff. The low standard deviation further confirms that satisfaction levels are uniform, suggesting that the hotel's hospitality information system effectively streamlines reservations and arrivals. The researcher in his views highlighted that this high level of acceptance highlights the system's success in enhancing guest engagement and operational efficiency, while also signaling that maintaining regular updates and user support will be key to preserving this strong satisfaction.

Table 3: Influence Of Online Promotions & Social Media

Statement	Mean	SD
Promotions influenced decision to book	2.10	0.90

Table 3 shows a mean score of 2.10 with a standard deviation of 0.90, indicating that respondents generally agreed that online promotions and social media content influenced their decision to book at Sainte Famille Hotel. Because the mean is slightly above 2.0 on the 1–5 scale (where 1 =

Strongly Agree), the results reflect a moderately strong positive influence, suggesting that most guests find digital marketing efforts such as social media posts, special offers, and online advertisements—persuasive in their booking choices. The relatively low standard deviation demonstrates consistent views across different respondent groups, reinforcing the importance of maintaining active and targeted social media campaigns to attract and retain customers. These findings highlight that well-executed digital promotions are an effective strategy for enhancing guest engagement and driving reservations.

Table 4: Impression of Hotel Technology

Statement	Mean	SD
Technology improved experience	2.00	0.86

Table 4 reports a mean score of 2.00 with a standard deviation of 0.86, showing that respondents generally agreed that the technology at Sainte Famille Hotel positively improved their overall experience. A mean exactly at 2.0 on the 1–5 scale (where 1 = Strongly Agree) reflects a strong and consistent endorsement of the hotel’s hospitality information systems, indicating that digital tools such as online booking, in-house communication platforms, and service tracking are effectively enhancing guest satisfaction and operational efficiency. The relatively low standard deviation demonstrates limited variation in responses, suggesting that both guests and staff share a similar appreciation for the hotel’s technological offerings. The researcher in his views highlighted that this consistency underscores the importance of maintaining and upgrading these systems to preserve a seamless, tech-enabled guest experience.

Table 5: Responsiveness of communication channels

Statement	Mean	SD
Pre-stay & in-stay communication	2.05	0.88

Table 5 shows a mean score of 2.05 with a standard deviation of 0.88, indicating that respondents generally agreed that Sainte Famille Hotel’s communication channels were responsive and helpful both before and during their stay. A mean score of 2.0 or higher on the 1–5 scale reflects a strong positive assessment, indicating that guests experienced timely responses through platforms such as email, phone, or messaging apps, which in turn supports the smooth coordination of reservations and service requests. The relatively low standard deviation highlights consistent satisfaction across different respondent groups, confirming that the hotel’s communication systems reliably meet guest expectations. The researcher viewed that these findings emphasize that efficient, well-managed communication is a key contributor to guest engagement and overall operational efficiency, while also suggesting that ongoing staff training and technology updates will help sustain this high level of responsiveness.

Table 6: Promptness of Hotel Services

Statement	Mean	SD
Timely delivery of hotel services	1.97	0.84

Table 6 presents a mean score of 1.97 with a standard deviation of 0.84, indicating that respondents generally agreed that hotel services such as check-in, housekeeping, and restaurant orders were delivered promptly and efficiently at Sainte Famille Hotel. A mean below 2.0 on the 1–5 scale (where 1 = Strongly Agree) reflects a high level of satisfaction with service timeliness, showing

that operational processes are well-coordinated and support smooth guest experiences. The relatively low standard deviation suggests that perceptions of service promptness are consistent across guests, employees, and administration staff, highlighting that the hotel maintains reliable standards in service delivery. The researcher viewed that these findings indicate that timely execution of services is a key factor contributing to guest satisfaction and operational efficiency, reinforcing the effectiveness of the hotel's hospitality information systems in managing workflows and staff coordination.

3.3 Workers' Findings

Table 7 summarizes the length of employment

Table 7: Length of Employment

Years Worked	Frequency	Percentage (%)
<2 years	14	23.3
2–4 years	19	31.7
4–5 years	15	25.0
6+ years	12	20.0
Total	60	100.0

Table 7 indicates that the majority of staff at Sainte Famille Hotel have moderate work experience, with 31.7% having worked for 2–4 years and 25.0% for 4–5 years, while 23.3% have less than 2 years and 20.0% have over 6 years of employment. This distribution demonstrates a balanced mix of early-career, mid-career, and long-serving employees, providing a diversity of perspectives on hotel operations and hospitality information systems. The presence of experienced staff (6+ years) ensures institutional knowledge and stability, while newer employees (<2 years) bring fresh ideas and adaptability to technological tools. The researcher viewed that this blend of experience levels supports effective implementation of operational systems, fosters knowledge transfer, and enhances both service quality and organizational efficiency.

Table 8: Existing Hospitality Information Systems

System in Place	Mean	SD
Basic property management system (PMS)	2.05	0.89
Partially computerized billing	2.20	0.92
Social media pages for marketing	2.15	0.95
Lack of integrated guest-relationship management	1.98	0.87

Table 8 shows that respondents generally agreed on the presence and functionality of existing hospitality information systems (HIS) at Sainte Famille Hotel, with mean scores ranging from 1.98 to 2.20 on the 1–5 scale (where 1 = Strongly Agree). The basic property management system (2.05) and partially computerized billing (2.20) indicate that core operational systems are in place but

may require further automation and integration. The use of social media for marketing (2.15) reflects moderate adoption of digital platforms to engage guests, while the lack of an integrated guest-relationship management system (1.98) highlights a recognized gap in consolidating guest data for personalized service. The relatively low standard deviations (0.87–0.95) suggest consistent perceptions among staff and administration. The researcher in his views expressed that these findings indicate that while Sainte Famille Hotel has foundational HIS tools supporting operations and marketing, there is significant potential to enhance integration and leverage technology for improved guest engagement and operational efficiency.

Table 9: Digital Literacy of Managers & Staff

Indicator	Mean	SD
Basic computer & internet skills	1.95	0.84
PMS training for some staff	2.02	0.88
Limited online marketing skills	2.18	0.93
Minimal data-driven decision-making	2.20	0.90

Table 9 reveals that respondents generally agree on the current levels of digital literacy among managers and staff at Sainte Famille Hotel, with mean scores ranging from 1.95 to 2.20. Staff and managers are reported to possess basic computer and internet skills (1.95), indicating foundational competence for operating hospitality information systems (HIS). Some employees have received PMS training (2.02), showing partial readiness to manage property management software, whereas limited online marketing skills (2.18) and minimal data-driven decision-making (2.20) highlight notable gaps in leveraging digital tools for strategic guest engagement and operational analytics. The standard deviations (0.84–0.93) suggest relatively consistent perceptions among respondents. The researcher viewed that these findings indicate that while core digital competencies exist, targeted training in online marketing, analytics, and data-driven decision-making is necessary to maximize the effectiveness of HIS and improve both guest engagement and operational efficiency.

Table 10: Use of hospitality information system (HIS) for guest feedback

Indicator	Mean	SD
Occasional manual surveys	2.04	0.90
Basic review monitoring on booking sites	2.00	0.86
No structured data analytics	1.98	0.85

Table 10 shows that respondents generally agreed on the limited use of hospitality information systems (HIS) for assessing guest feedback at Sainte Famille Hotel, with mean scores ranging from 1.98 to 2.04. The use of occasional manual surveys (2.04) and basic review monitoring on booking sites (2.00) indicates that feedback is collected irregularly and primarily through simple, reactive methods rather than systematic approaches. The recognition of no structured data analytics (1.98) highlights a clear gap in leveraging HIS to generate actionable insights from guest feedback. The relatively low standard deviations (0.85–0.90) reflect consistent perceptions among staff and administration. The researcher viewed that these findings suggest that while some mechanisms exist for capturing guest opinions, there is substantial potential to implement structured, data-

driven analytics to better understand guest preferences, improve services, and enhance overall operational efficiency.

3.4 Administration Staff Findings

Table 11 presents the findings of impact of hospitality information system on service delivery

Table 11: Impact Of Hospitality Information System on Service Delivery

Indicator	Mean	SD
Track guest satisfaction	1.92	0.83
Monitor service delivery times & efficiency	2.05	0.88
Review system-generated KPIs	1.98	0.86
Compare pre/post implementation performance	2.10	0.90

Table 11 indicates that respondents generally agreed on the positive impact of hospitality information systems (HIS) on service delivery at Sainte Famille Hotel, with mean scores ranging from 1.92 to 2.10. The lowest mean score for tracking guest satisfaction (1.92) suggests strong recognition that HIS effectively captures and monitors guest experiences, supporting targeted service improvements. Monitoring service delivery times and efficiency (2.05) and reviewing system-generated KPIs (1.98) reflect consistent agreement that operational performance is better tracked and evaluated through technology. The slightly higher mean for comparing pre- and post-implementation performance (2.10) indicates moderate recognition of HIS in measuring operational improvements over time. Standard deviations (0.83–0.90) show relatively uniform perceptions across staff and administration. The researcher in his views highlighted that these findings demonstrate that HIS contributes significantly to efficient service delivery, performance monitoring, and informed decision-making, although further optimization could enhance comparative performance assessment.

Table 12: Measuring Digital Marketing Effectiveness

Indicator	Mean	SD
Track website traffic & booking sources	2.00	0.87
Monitor social media engagement	1.96	0.85
Measure ROI of campaigns	2.05	0.88

Table 12 indicates that respondents generally agree on the strategies used by Sainte Famille Hotel to measure the effectiveness of digital marketing campaigns, with mean scores ranging from 1.96 to 2.05. The lowest mean for monitoring social media engagement (1.96) suggests that this is the most consistently applied and effective method for assessing online interactions with guests. Tracking website traffic and booking sources (2.00) shows that the hotel actively evaluates the origin and volume of bookings, while the slightly higher mean for measuring campaign ROI (2.05) indicates moderate application of financial metrics to assess marketing efficiency. The standard

deviations (0.85–0.88) reflect uniform perceptions among administration staff, suggesting consistent understanding of these practices. The researcher viewed that these findings demonstrate that the hotel employs a combination of engagement, traffic, and financial metrics to evaluate digital marketing effectiveness, though there is room to further strengthen ROI-focused analysis for strategic decision-making.

Table 13: Technological Upgrades and Competitiveness

Indicator	Mean	SD
Conduct tech needs assessments	1.94	0.84
Benchmark against industry trends	2.00	0.86
Provide staff training during implementation	1.95	0.85

Table 13 shows that respondents generally agreed on the hotel’s approach to technological upgrades and maintaining competitiveness, with mean scores ranging from 1.94 to 2.00. The lowest mean for conducting technology needs assessments (1.94) indicates strong agreement that the hotel regularly evaluates its technological requirements to ensure relevance and efficiency. Benchmarking against industry trends (2.00) reflects consistent efforts to align with best practices in the hospitality sector, while providing staff training during implementation (1.95) highlights recognition of the importance of equipping employees with the skills needed to adopt new systems effectively. The low standard deviations (0.84–0.86) suggest uniform perceptions among respondents. The researcher viewed that these findings demonstrate that Sainte Famille Hotel proactively manages technological upgrades through assessment, benchmarking, and staff capacity building, thereby enhancing operational efficiency and sustaining competitive advantage.

3.5 Overall analysis and interpretation

The overall analysis reveals that Sainte Famille Hotel serves a predominantly young to middle-aged, well-educated, and digitally competent group of guests and staff, with fairly balanced gender representation. Respondents consistently reported high satisfaction with the hotel’s hospitality information systems (HIS), including online booking, check-in, service delivery, and communication channels, reflecting the effectiveness of these technologies in enhancing guest engagement and operational efficiency. While core systems such as property management and social media marketing are in place, gaps exist in integrated guest-relationship management, structured data analytics, and advanced digital marketing skills, highlighting opportunities for improvement. Staff experience levels and training practices demonstrate a mix of institutional knowledge and adaptability, supporting the adoption of technology-driven workflows. The researcher in his overall views highlighted that hospitality information system significantly contributes to efficient service delivery, performance monitoring, and guest satisfaction, while targeted upgrades, staff training, and enhanced data-driven practices could further optimize operational efficiency and competitiveness.

4.0 Discussions of the Findings

The role of Hospitality Information Systems (HIS) in enhancing guest engagement and operational efficiency has become increasingly central within the contemporary hospitality industry. In the

context of Sainte Famille Hotel, the integration of digital platforms and automated service systems demonstrates how technology serves as a strategic tool for improving both service quality and internal processes. HIS not only facilitates seamless communication between guests and service providers but also supports effective resource management, performance monitoring, and data-driven decision-making.

Hospitality information systems are essential in aligning operational practices with modern guest expectations. Through the adoption of digital booking, check-in, and service management tools, hotels can provide convenience, transparency, and personalization—factors that are strongly associated with guest satisfaction and loyalty. Moreover, the use of technology fosters efficiency in routine operations such as room allocation, billing, and record management, reducing human error and ensuring timely service delivery. However, the discussion also recognizes that successful implementation of HIS extends beyond the mere installation of technology. Organizational culture, staff training, and managerial commitment are key determinants of how effectively these systems are utilized. Continuous professional development and technological literacy among employees remain critical to maximizing system benefits and ensuring smooth adoption. Similarly, the presence of an integrated guest-relationship management framework can strengthen engagement by allowing hotels to collect, analyze, and respond to guest feedback in real time.

Furthermore, the evolving nature of digital hospitality requires hotels to invest in analytics and digital marketing capabilities. Data analytics enables better understanding of guest behavior and operational trends, informing strategic decisions that can enhance competitiveness in the market. The integration of social media, mobile communication, and online reputation management systems further reinforces guest trust and brand visibility. Overall, the discussion underscores that hospitality information systems are not merely operational tools but strategic assets that shape guest experiences and organizational performance. For establishments such as Sainte Famille Hotel, continuous innovation in technology adoption, employee capacity building, and data utilization will remain crucial for sustaining efficiency, responsiveness, and customer satisfaction in an increasingly digital hospitality environment.

5.0 Conclusion

In conclusion, the study demonstrates that the adoption of hospitality information systems is a key driver of success for hotels in Rwanda, significantly enhancing both guest engagement and operational efficiency. The findings confirm that online services, such as digital booking platforms and mobile check-ins, strengthen guest relationships by improving convenience, personalization, and satisfaction. Likewise, the integration of advanced technologies directly influences occupancy levels by enabling data-driven marketing, dynamic pricing, and efficient reservation management, thereby attracting more guests and sustaining high room sales. Moreover, the use of automated management systems streamlines hotel operations, reduces errors, and boosts staff productivity, resulting in cost savings and improved service delivery. Overall, the study concludes that investing in robust hospitality information systems is not only a competitive advantage but also a strategic necessity for hotels seeking sustainable growth and excellence in Rwanda's evolving hospitality industry.

6.0 Recommendations

The study recommends that Sainte Famille Hotel should strengthen its hospitality information systems by investing in fully integrated digital platforms that combine property management, guest relationship management, and data analytics. The hotel should upgrade existing systems to allow real-time collection, analysis, and use of guest data to support personalized services, targeted marketing, and informed managerial decision-making. In addition, management should prioritize continuous system maintenance and periodic technology audits to ensure alignment with emerging industry trends and guest expectations. These measures should enhance guest engagement, improve occupancy performance, and support consistent service quality across all departments. The study also recommends that the hotel should place strong emphasis on staff capacity building and organizational readiness to maximize the benefits of hospitality information systems. Regular training programs should be implemented to improve digital literacy, online marketing skills, and data-driven decision-making among managers and staff. The hotel should also establish clear policies and procedures that encourage effective use of technology in daily operations and performance monitoring. By fostering a technology-oriented culture supported by skilled personnel, Sainte Famille Hotel should improve operational efficiency, responsiveness, and long-term competitiveness within Rwanda's hospitality sector.

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