
Volume 9 | Issue 2

May 2024

Tech-Savvy Hospitality: A Strategic Approach to Overcoming Labor Shortages

Donna Haywood
Metropolitan State University of Denver

Smita Singh Dr.
Metropolitan State University of Denver

Follow this and additional works at: https://via.library.depaul.edu/ichrie_rr



Part of the [Hospitality Administration and Management Commons](#)

Recommended Citation

Haywood, Donna and Singh, Smita Dr. (2024) "Tech-Savvy Hospitality: A Strategic Approach to Overcoming Labor Shortages," *ICHRIE Research Reports*: Vol. 9: Iss. 2, Article 2.
Available at: https://via.library.depaul.edu/ichrie_rr/vol9/iss2/2

This article is brought to you for free and open access by the International Council on Hotel, Restaurant, and Institutional Education (ICHRIE). It has been accepted for inclusion in *ICHRIE Research Reports* by an authorized editor of DePaul University School of Hospitality Leadership. For more information, please contact rr@depaul.edu. The compilation of the journal issue is copyrighted by ICHRIE, but authors retain the copyright for their article.

Tech-Savvy Hospitality: A Strategic Approach to Overcoming Labor Shortages

Donna Haywood¹ | Smita Singh¹

¹ Metropolitan State University of Denver

Executive Summary: The hospitality industry faces an unprecedented labor shortage, prompting a surge in technological solutions. This reflection paper explores how innovations such as robotics, artificial intelligence, and digital applications are being deployed to bridge these staffing gaps. By analyzing the role of technology in areas like housekeeping, guest services, event, and culinary operations, implications for service quality and industry standards are also assessed. While technology offers potential alleviation for labor challenges, it's crucial to consider its impact on the inherent human-centric nature of hospitality.

KEYWORDS: *technology, labor shortage, hospitality staffing, hospitality trends, technology innovations*

Introduction

The COVID-19 pandemic wrought havoc on the hospitality industry globally. Travel restrictions, lockdowns, and health concerns led to plummeting occupancy rates, canceled reservations, and significant revenue losses. Many establishments, from renowned hotels to local eateries, faced closures or drastic operational changes. Industry grappled with layoffs and furloughs, affecting millions of workers. According to the American Hotel and Lodging Association's State of the Hotel Industry 2021 report, "More than 670,000 hotel

industry operation jobs and nearly 4 million hospitality jobs were lost in 2020 due to the pandemic." (Lardieri, 2021, para. 2). With the pandemic behind us, dining and travel businesses have returned, and the hospitality industry has grown rapidly. However, staffing has continued to be a challenge.

The labor shortage has caused leaders in the hospitality industry to consider technological solutions to address this problem. Examples include automated check-in and check-out systems, contactless payment options, and service robots for room service,

cleaning, and even concierge services. The application of technology is not new, but its development has lagged compared to other sectors of the economy due to the industry's reliance on human interaction and expenses linked to utilizing and implementing technologies in various sectors. Writer Lyle Worthington writes in Hospitality Net, "Hotels don't spend enough money on technology. We remain at the bottom of the 'spend as a percentage of revenue' benchmark, and a low earning potential combined with a high threshold to enter is not a very attractive proposition for a technology company" (Bleeker, 2019, para. 5). Thus, in addressing the hospitality sector's labor crisis, technology integration presents both a promising solution and a complex ethical quandary, reshaping industry norms and challenging traditional service paradigms.

Integrating technology in the hospitality sector to mitigate the labor crisis implies a transformative approach to service delivery and workforce management. Automation and artificial intelligence (AI) solutions can enhance efficiency and guest experiences but also spark concerns over job displacement, data privacy, and the potential dilution of personal human interactions. The study reflects the authors' assessment and reflection on the current labor shortage issues, solutions, and technological efforts to

overcome the labor shortage crisis in the hospitality industry.

Reasons for Labor Shortages in the Hospitality Industry

Labor shortages in the hospitality industry in the United States can be attributed to a combination of external and internal factors. These factors can vary in importance and impact over time. Here are some key external and internal factors contributing to labor shortages in the hospitality industry:

External Factors

Economic Conditions

During periods of economic expansion, firms seek to hire skilled labor to meet new and growing market demands, which can exacerbate labor shortages (Dawson et al., 2020). In addition to this, inflationary trends can result in mounting expenditures, often prompting price hikes in the hospitality industry. As consumer expenses escalate, the necessity for increased salaries to match inflation becomes apparent. Moreover, reduced discretionary spending directly affects the dining, travel, and tourism sectors, compelling cuts in labor budgets (What, 2023). This reduced budget limits the ability of organizations within the service sector to hire adequate staff or to compensate staff for the number of hours necessary to meet quality service standards.

Demographic Trends

Demographic trends play a crucial role in shaping labor shortages within

the hospitality industry. The convergence of declining birth rates, a growing proportion of an older population, and the hospitality industry's historical preference for younger employees has compounded the staffing shortage issue. The decline in birth rates has notably dampened the flow of new entrants into the job market, exacerbating the global talent shortage (Committee, 2023). This trend has particularly impacted the hospitality industry, which previously relied on a plentiful supply of young adult workers who are now notably scarce due to the persistent decline in birth rates.

Furthermore, the hospitality sector traditionally leaned heavily on a younger workforce, with pre-2020 statistics indicating that over 60% of employees were under the age of 35 (Soto, 2022). This younger demographic was often more adaptable to the industry's demanding work environment, lower pay scales, and less favorable work schedules. However, deeper investigation unveils the underlying reasons behind the scarcity of older workers within the hospitality sector (Huang et al., 2021).

Immigration Policies

The impact of immigration policies on labor shortages in the US hospitality industry is a complex and multifaceted issue. Immigration policies can influence the availability of labor in the hospitality industry, potentially affecting labor shortages. It is estimated that 11 million

people are living in the US without legal status (Undocumented Immigrants, n.d). They are vital contributors, “playing integral roles in agriculture, construction, hospitality, and other industries that are essential to the U.S. economy” (Undocumented Immigrants, n.d, para.1). As reported by NBC News, 21% of individuals who are foreign-born are employed in the service industry, a notably higher percentage compared to only 14% of the native-born population (Chinni, 2022). Well-designed immigration policy and free movement of workers may play an important role in labor adjustment during times of economic shocks, potentially impacting labor shortages in the hospitality industry (Kahanec & Guzi, 2017). Moreover, the impact of integration and anti-discrimination policies, social expenditure, and labor market regulation on the labor market performance of immigrants in Europe highlights the potential influence of policy contexts on immigrant labor, which may have implications for the US hospitality industry (Platt et al., 2021).

Pandemic and Health Concerns

The pandemic has created a complex set of challenges for the hospitality industry, including workforce management, retention, and performance, all of which have contributed to labor shortages. Workforce challenges, including supply chain shortages and communication disruptions, have been reported as

significant impacts of the pandemic on construction projects, which may also extend to the hospitality industry (Bernardo, 2022). Moreover, the pandemic has led to a spike in employees quitting for personal reasons, such as childcare duties, which has likely contributed to labor shortages in the hospitality industry (Isley, n.d.). Additionally, the unpredictability of staff performance due to the pandemic's lingering effects has further strained the available workforce in the hospitality sector (Morosan & Bowen, 2022). The increase in job satisfaction has been identified as a potential factor in mitigating employee turnover, which could be crucial for addressing labor shortages in the hospitality industry (Stamolampros et al., 2019).

Competition for Talent

The competition for skilled workers is intensifying in the labor market. The hospitality industry is vying for talent against other sectors that may seem more attractive on occasion (Ek Styven et al., 2022) due to higher wages, better benefits, or improved working conditions that may attract potential employees away from hospitality jobs. Additionally, industry segments have pursued candidates from the same talent pool (Hiring Trends in Hospitality, 2022). Thus, securing skilled personnel poses a challenge, with numerous industries grappling with a shortage in the labor pool (Spiess et al., 2022).

Internal Factors

Wages and Benefits

Low wages and limited benefits in the hospitality industry can make it challenging to attract and retain qualified employees. According to a recent study conducted by BCG, New York University's Jonathan M. Tisch Center of Hospitality, and the American Hotel and Lodging Association, which surveyed 1,200 workers encompassing current, former, and prospective employees in the hospitality industry, it was revealed that 22% of former employees cited compensation and benefits as their main reasons for exiting the hotel sector (Bogicevic, 2022). Ensuring a livable wage is essential for workers, as inadequate pay can result in heightened stress levels and the necessity for supplementary employment. This, in turn, can adversely affect their job performance and increase absences due to illness. Therefore, offering a livable wage proves advantageous not only for the well-being of workers but also for the overall success of businesses (Ton, 2023).

Workplace Conditions

Employment within the hospitality sector can pose significant physical and mental challenges owing to demanding working conditions. Occupations in restaurants, hotels, bars, entertainment venues, and airlines frequently entail repetitive movements that may lead to physiological distress (Zhang et al., 2020). As per a recent Forbes article,

employees in customer-facing positions have been grappling with challenges such as unruly customers, supply chain issues, and staffing shortages in the aftermath of the COVID-19 pandemic. In an effort to mitigate the risk of burnout, numerous companies are now providing mental health days, allowing employees a day off to unwind and decompress (Morgan, 2022). Consequently, the hospitality sector experiences elevated employee turnover and struggles to attract interest from job seekers due to subpar working conditions. These unfavorable conditions substantially impact the industry, posing challenges in retaining existing employees and enticing new ones.

Seasonal Nature of the Industry

Seasonal employment provides a temporary alternative that may attract job seekers seeking diverse experiences and opportunities. It presents the opportunity to explore various jobs and locations, possibly leading to permanent employment. Nevertheless, a drawback is its temporary nature, necessitating workers to secure another job once the season concludes. Furthermore, the requirement for seasonal work in distant locations from their homes can pose a challenge for workers (Hcareers, 2022). Certain seasonal recreation stakeholders are redefining the seasonal employment model to attract staff while adhering to budget constraints, positioning it as experiential opportunities. Specifically targeting

adults aged 18 to 29, employers are emphasizing a positive emotional environment, fostering relationships, and providing chances to make meaningful contributions (Povilaitis, 2022).

Role of Artificial Intelligence and Technology in the Hospitality Industry

The significance of artificial intelligence in addressing staffing challenges within the Hospitality Industry cannot be overstated. It is widely acknowledged that a transformation of the industry is essential to address its poor image and to effectively attract and retain talent. Leaders and experts unanimously recognize the need for enhancements in work-life balance through optimized work schedules, increased employee appreciation, a positive work culture, expanded opportunities for career advancement, and improved compensation. Integrating artificial intelligence and technology emerges as a crucial facilitator in achieving these objectives.

AI for Scheduling, Recognition, and Appreciation

Creating work schedules involves comprehensively considering factors such as available staff, skill sets, budget, regulatory compliance, and service requirements. As these factors are dynamic and subject to change, schedule revisions may become necessary. Utilizing AI scheduling tools, managers can leverage algorithms to

assess service needs and monitor employee qualifications, certifications, overtime, work hours, and shift patterns. This data-driven approach enables managers to enhance the scheduling process, making it more efficient. Staff members can access their schedules in real time, provide feedback, and make requests, fostering greater transparency and engagement (Planday, n.d.).

During the 2020 pandemic, many hospitality workers faced layoffs for financial or health reasons. Their return was low post-pandemic, mainly due to a perceived lack of recognition. A Nectar survey of 800 workers found that 77.9% believed increased recognition would boost productivity (Noori, n.d.). Recognizing the importance of acknowledging employees, tech company Abundantly developed the Amplify tool, which utilizes artificial intelligence to gather information on individual work performance over time and generate personalized commendations. It integrates with platforms like Workday, LinkedIn, and Slack, making it easier for managers to express appreciation and foster a positive work culture (Feffer, 2023).

AI Tools for Effective Leadership

Artificial intelligence provides managerial support by optimizing schedules, enabling managers to allocate time to review employee behavior trends and patterns and gain a deeper understanding of their team's

needs. Through algorithmic data collection, managers can gauge team productivity, identify areas of struggle, and assess collaboration with other teams (Modi, 2019). In this context, Peoplelogic, an IT company, has pioneered a suite of AI tools designed to evaluate organizational well-being through comprehensive data collection and analysis. These tools go beyond mere data processing, offering actionable insights and recommendations. Leaders can leverage these insights to enhance employee relationships, streamline workflows, and boost operational efficiency (Schmidt, n.d.).

AI to Improve Staff Efficiency

Effective communication is fundamental to all customer service positions, necessitating regular interactions within the team and with customers. Inefficiencies in this aspect can contribute to employee burnout and suboptimal service quality. Fortunately, tools are accessible for streamlining and automating communication processes to enhance efficiency. Facing challenges due to limited staffing and high business volume, front desk agents can find relief through solutions that involve routing calls to messaging services. This enables efficient handling of common questions, and guests can receive maps, travel instructions, and local information instantly with the press of a button (Where Technology and Humanity

Meet, 2024). Digital check-in/out processes, particularly beneficial in times of limited staff, enhance guest services and streamline the check-in/out process. For instance, a digital guidebook provides essential information about arrival, parking, Wi-Fi, amenities, and the local area (Operto Papers the Technology Operations Playbook Chapter 6, n.d.). Another example is Smart Rooms, which offer advantages to both staff and guests by streamlining communication and enhancing the guest experience through convenient features (Barton, 2024).

Robotics and Conversational Bots

Robotics has seamlessly integrated into the hospitality industry, demonstrated by the world's pioneering fully staffed robot hotel, Henn-na Hotel in Nagasaki, Japan. This innovative establishment employs robots in various roles, including front desk staff, luggage handlers, and concierge. Guests navigate the check-in process through touchscreens, and a porter robot transports their luggage to the room. Room access is facilitated through fingerprint and facial recognition, while an automated concierge provides assistance. Guests can access information via in-room touchscreens (Barton, 2024). The integration of robots in the restaurant industry is notable, with some robots delivering meals, beverages, and even preparing food. Commercial food processing facilities benefit from robots performing

tasks like sorting, cutting, packaging, and storing food, contributing to increased productivity and handling repetitive tasks (Kazarian, 2022). In a recent development, Sweetgreen has introduced a robotic restaurant in Naperville, Illinois, aiming to address the high labor costs associated with food assembly. Customers place orders through kiosks, and a conveyor belt facilitates ingredient dispensing into bowls, which are then delivered to customers (Wolf, 2023).

In the hospitality sector, chatbots stand out as one of the earliest and extensively utilized AI tools, aiming to deliver a conversational and human-like experience. They engage users through voice or chat, probing their needs with questions and providing relevant answers. Snatch-bot, a travel booking-focused chatbot template, collects essential information, including desired time, date, location, and price point. After user selection, Snatch-bot seamlessly transitions to the reservation process, requesting payment access. This 24/7 platform can potentially replace human reservation agents, offering continuous service efficiency (Barton, 2024).

Major Concerns in Using AI Technology in the Hospitality Industry

Job Displacement

The shift towards automation is reshaping job demands, particularly affecting roles with routine tasks that are susceptible to automation (Djankov

& Saliola, 2018). AI technology in the hospitality industry can lead to job displacement by automating routine tasks, from check-ins to customer service. Self-service kiosks, AI-driven chatbots, and virtual assistants diminish the need for human staff in various roles. Predictive analytics optimize staffing levels, potentially reducing employment during off-peak periods. Robotic automation, from cleaning to food preparation, replaces some traditional job functions. Data analysis and revenue management AI streamline operations but may reduce staffing requirements. Facial recognition and security systems can replace certain security roles. While AI enhances efficiency, businesses must carefully manage workforce transitions and consider upskilling initiatives to mitigate job displacement. While automation and intelligent robots are becoming more prevalent, viewing them as tools that necessitate effective management is essential. Radauskas (2023) highlights the importance of proper infrastructure investment for fully harnessing technology's potential in the hospitality sector.

Data Privacy Concerns

The incorporation of technological advancements and artificial intelligence (AI) in the hospitality sector has the potential to significantly improve operational services. Customer analytics tools enable the delivery of personalized services through continuous data

collection and analysis, which may encompass personal details like names, addresses, financial information, medical records, and social security numbers. Nevertheless, concerns about collecting, processing, usage, and accessing such data have been raised (ET Online, 2023). Establishing trust with customers is paramount for the industry, necessitating the safeguarding of their personal data. To achieve this, implementing transparent data collection policies, offering options for deletion or correction options, and ensuring compliance with data protection regulations are crucial (Patel, 2023).

Reliability and Technical Issues

Integrating new technologies in the hospitality industry involves considering not only the initial cost of equipment but also expenses related to installation, maintenance, and staff training. A thorough approach to these factors is crucial for prolonging the lifespan of the equipment. Professional consultation is essential to assess how the existing infrastructure can support new technologies, considering factors like wattage, internet speed, and space for control mechanisms. Changes in wattage, internet speed, and space must be carefully evaluated. The maintenance cost is vital, with recent studies indicating that the hospitality sector allocates less than 2.5% of net room revenue to technology, in contrast

to the 4.2% average spending in other industries (Unifocus, 2023).

The expenses for new technology equipment and upgrades vary, encompassing service contracts with costs that depend on equipment type and whether they are purchased or leased. Programs like RobotLAB's Raas (Robot-as-a-Service) start at \$1,215 per month, covering shipping, installation, training, and ongoing support (Vaudel, n.d). For self-service ordering systems in restaurants, units can be purchased for less than \$1000 each, but additional costs for regular maintenance, software updates, and technical support need to be factored in (Guinn, n.d.).

Acquiring new equipment necessitates staff receptiveness to new cleaning and maintenance processes, especially in environments where food is prepared and sold. While hotel and restaurant chains with larger budgets are well-positioned for technical upgrades, smaller establishments such as individual restaurants, bed and breakfasts, and roadside inns may face affordability challenges, making such enhancements potentially less cost-effective for them.

Positive Outcomes of Deploying Artificial Intelligence Technologies in the Hospitality Industry

Contemporary literature offers valuable insights into the adoption of cutting-edge technologies in the hospitality industry (Gonzales et al., 2021). It gravitates towards the

argument that embracing innovative business models has the potential to enhance industry structures and provide businesses with opportunities to effectively navigate significant crises (Alonso-Almeida et al., 2015). In response to the labor shortage crisis in the hospitality sector, a practical remedy involves the implementation of advanced information technology (IT) within innovative IT-based business models. This approach aims to deliver service volumes and levels comparable to those before the crisis. Moreover, there is progress in the talent management literature, acknowledging the imperative for innovative strategies in staff management (Hughes & Christensen, 2021).

Enhanced and Personalized Guest Experiences

AI-enabled robots and technologies have been employed to personalize and improve guests' stay experiences, revolutionizing guest satisfaction and increasing loyalty. AI technologies, such as chatbots and robot assistants, have been used to improve on-site hotel experiences for guests, contributing to breakthrough excellence for hotels and enhancing the industry beyond imagination (Gupta et al., 2022). Additionally, AI has been utilized to foster touchless travel during the pandemic, emphasizing the potential of AI and robotics in addressing health crises and hospitality management (Gaur et al., 2021).

Chatbots and AI-enabled robots can efficiently manage routine inquiries, check-ins, and requests, delivering prompt responses. One of the articles also quoted, “AI has emerged as a way for restaurants to mitigate shortages while improving employee and customer experiences. For example, some restaurants with high volume of phone orders, like pizza restaurants have begun implementing AI-powered phone bots to handle orders placed over the phone via text message” (Kulkarni, 2022, para. 7). This lessens the burden on human staff and enhances customer service by ensuring quick and efficient assistance.

Utilizing AI technologies facilitates personalized recommendations, empowering hotels to customize services and offerings according to individual preferences. Chatbots and virtual assistants contribute to instant and precise responses to customer inquiries, elevating customer satisfaction and engagement (Leeway Hertz, 2023). More and more, restaurants leverage AI to gain insights into individual preferences, offering personalized recommendations rooted in customers' past behavior and ordering history. For instance, if a customer frequently opts for vegetarian meals, AI can suggest other plant-based items tailored to their taste. Additionally, AI tools streamline customer interactions by swiftly responding to inquiries, emails, and

social media comments. This automation not only saves time but also contributes to key metrics such as heightened consumer satisfaction, loyalty, engagement, and increased sales (Damaren, 2023).

Efficiency and Automation

AI technologies in the hospitality industry have gained significant attention due to their potential to automate various tasks. AI solutions can automate processes and engage cognitively to improve service delivery and mitigate the impact of challenges such as COVID-19 (Gaur et al., 2021). The growing data from industry reports indicates that using advanced systems like AI enables more effective handling of sophisticated tasks, such as overseeing multiple properties or attending to customer service functions. Due to its self-learning nature, AI can form the core of business models that operate without constant human input, leading to heightened efficiency, intricate decision-making, and ultimately, sustainable profitability and enhanced value for guests (Morosan & Bowen, 2022). An illustration of this is seen in AI-enhanced chatbots, a messaging interface that seamlessly comprehends and engages with guests. The deployment of AI-enabled robots has been found to facilitate automation, information gathering, personalization, and seamless service in the hospitality industry, particularly in smart cities (Gupta et al., 2022). Furthermore, the

use of robots, artificial intelligence, and service automation (RAISA) technologies is widespread in the global tourism and hospitality industry, indicating the increasing reliance on these technologies (Yassin et al., 2022).

Data-driven Decision Making and Forecasting

AI is employed by well-known brands such as Domino's, Panera, IHOP, Hilton Hotels, Marriott, and The Cosmopolitan of Las Vegas to navigate vast and intricate datasets (Escobar, 2023). AI can support humans in making better decisions by analyzing large datasets and producing forecasts and predictions, highlighting the potential for cooperation between humans and AI (Kong et al., 2021). This, in turn, facilitates more informed decision-making, leading to enhanced strategies in staffing, scheduling, purchasing, and other operational aspects. The outcome is not only cost savings but also the optimization of resources and a reduction in waste for these brands.

In addition to it, AI extends its impact to areas like inventory management in hotels, leveraging its ability to forecast demand and dynamically adjust room prices based on demand and availability. This strategic approach allows brands to capitalize on peak periods by increasing prices and, conversely, reduce inventory during off-peak times by adjusting rates. This intelligent utilization of AI not only maximizes revenue potential but also

ensures efficient resource allocation for enhanced operational efficiency in the hospitality industry. AI tools play a crucial role in minimizing food waste and associated costs by precisely forecasting demand, optimizing inventory, and efficiently managing expiration dates. This results in a streamlined and cost-effective approach to food management in various sectors.

Implications and Conclusion

In conclusion, the integration of Artificial Intelligence (AI) in the hospitality industry has ushered in a transformative era, redefining how businesses cater to guest needs and manage operations. The advantages are manifold, from optimizing resource allocation through demand forecasting and dynamic pricing to enhancing guest experiences with personalized services. The use of AI not only streamlines routine tasks but also allows for data-driven decision-making, leading to improved efficiency and cost savings. For hospitality managers, this technological shift demands a strategic mindset and adaptability. Embracing AI means harnessing its potential to stay competitive, providing tailored experiences that resonate with modern consumers. Hospitality managers must navigate the evolving landscape, ensuring that AI implementation aligns with the brand's identity and guest expectations. It involves fostering a culture of innovation and upskilling the workforce to collaborate effectively

with AI tools. While AI offers unprecedented insights and efficiencies, human touch remains irreplaceable in the hospitality sector. Managers need to strike a balance, leveraging AI to augment human capabilities rather than supplant them. In this digital transformation era, hospitality managers who embrace AI stand to unlock new possibilities, elevate guest satisfaction, and position their establishments for sustained success in a dynamic and competitive industry.

References

- Alonso-Almeida, M. del, Bremser, K., & Llach, J. (2015). Proactive and reactive strategies deployed by restaurants in times of crisis. *International Journal of Contemporary Hospitality Management*, 27(7), 1641–1661.
- Barton, M. (2024, January 4). 8 Examples of Robots Being Used in the Hospitality Industry. *RevFine Optimizing Revenue*. Retrieved from <https://www.revfine.com/robots-hospitality-industry/>
- Bernardo, E. L. (2022). Impact of the pandemic on the construction projects of dpwh nueva ecija 2nd district engineering office. *Engineering and Technology Journal*, 07(06).
- Bleeker, F. (2019, May 22). *Is Hotel Technology Lagging Behind Other Industries?* Hospitalitynet. Retrieved from <https://www.hospitalitynet.org/viewpoint/125000007.html>
- Bogicevic, V., Bonke, O., Eeckels, B., Goldberg, A., Graf, N., Guggenheim, J., Laitamaki, J., & McCaleb, T. (2022, June 10). *Overcoming the Talent Shortage in the US Hotel Industry*. BCG. Retrieved from <https://www.bcg.com/publications/2022/overcoming-the-talent-shortage-in-the-us-hotel-industry>
- Chinni, D. (2022, January 9). Slowing Immigration Worsens Job Shortages. NBC News. Retrieved from <https://www.nbcnews.com/politics/meet-the-press/slowing-immigration-worsens-job-shortages-n1287219>
- Committee of 200. (2023, August 29). *Navigating The Perfect Storm: Removing Chaos During the Talent Shortage Crisis*. Forbes. Retrieved from <https://www.forbes.com/sites/committeeof200/2023/08/29/navigating-the-perfect-storm-removing-chaos-during-the-talent-shortage-crisis/?sh=3fde135a486f>
- Damaren, P. (2023, October 23). 10 ways restaurants are actually using AI to improve operations. RizePoint. Retrieved from <https://rizepoint.com/10-ways-restaurants-are-actually-using-ai-to-improve-operations/>
- Dawson, N., Rizoio, M., Johnston, B., & Williams, M. (2020). Predicting skill

- shortages in labor markets: a machine learning approach.
- ET Online. (2023). *Ai and privacy: The privacy concerns surrounding AI, its potential impact on personal data*. The Economic Times. <https://economictimes.indiatimes.com/news/how-to/ai-and-privacy-the-privacy-concerns-surrounding-ai-its-potential-impact-on-personal-data/articleshow/99738234.cms?from=mdr>
- Gaur, L., Afaq, A., Singh, G., & Dwivedi, Y. K. (2021). Role of artificial intelligence and robotics to foster the touchless travel during a pandemic: a review and research agenda. *International Journal of Contemporary Hospitality Management, 33(11)*, 4079-4098.
- Gonzalez, R., Gasco, J., & Llopis, J. (2022). Information and communication technologies in food services and restaurants: A systematic review. *International Journal of Contemporary Hospitality Management, 34(4)*, 1423–1447.
- Guinn, J. (n.d.). How to weigh the costs and benefits of self order ... Toast. <https://pos.toasttab.com/blog/on-the-line/restaurant-self-order-kiosks>
- Gupta, S., Modgil, S., Lee, C., Cho, M., & Park, Y. (2022). Artificial intelligence enabled robots for stay experience in the hospitality industry in a smart city. *Industrial Management & Data Systems, 122(10)*, 2331-2350.
- Ek Styvén, M., Näppä, A., Mariani, M., & Natarajan, R. (2022). Employee perceptions of employers' creativity and innovation: Implications for employer attractiveness and branding in tourism and hospitality. *Journal of Business Research, 141*, 290–298.
- Escobar, M. C. (2023, November 13). 9 ways ai is a game-changer for the hospitality industry. Hospitality Technology. <https://hospitalitytech.com/9-ways-ai-game-changer-hospitality-industry>
- Feffer, M. (2023, May 4). Abundantly Launches AI Content Generator Within Employee Recognition Software. *HCM Technology Report*. Retrieved from <https://www.hcmtechnologyreport.com/abundantly-launches-ai-content-generator-within-employee-recognition-software/>
- Gaur, L., Afaq, A., Singh, G., & Dwivedi, Y. K. (2021). Role of artificial intelligence and robotics to foster the touchless travel during a pandemic: a review and research agenda. *International Journal of Contemporary Hospitality Management, 33(11)*, 4079-4098.
- Gupta, S., Modgil, S., Lee, C., Cho, M., & Park, Y. (2022). Artificial intelligence enabled robots for stay experience in the hospitality industry in a smart city. *Industrial Management & Data Systems, 122(10)*, 2331-2350.
- Hcareers. (2022). *The Pros And Cons Of Seasonal Hospitality Work*. <https://www.hcareers.com/article/career-advice/8491>

- Hiring trends in the hospitality industry. (2022, September 1). *Food & Beverage News, NA*. Retrieved from https://link-gale-com.aurarialibrary.idm.oclc.org/apps/doc/A718937131/ITOF?u=auraria_main&sid=summon&xid=2217f23f
- Huang, A., Velasco, E. d. I. M., Marsh, J., & Workman, H. (2021). Covid-19 and the future of work in the hospitality industry. *International Journal of Hospitality Management, 97*, 102986.
- Hughes, J. C., & Christensen, J. D. (2021). Talent management innovation in a time of unprecedented disruption: Implications for practice and Research. *Talent Management Innovations in the International Hospitality Industry, 153–179*.
- Isley, C. Two essays on food manufacturer resilience: regional factors and workforce challenges. <https://doi.org/10.32469/10355/91512>
- Kahanec, M. and Guzi, M. (2017). How immigrants helped eu labor markets to adjust during the great recession. *International Journal of Manpower, 38(7)*, 996-1015.
- Kazerian, K. (2022, April 18). Robots Reach for Food Processing. *Food Engineering*. Retrieved from <https://www.foodengineeringmag.com/articles/100208-robots-reach-for-food-processing>
- Kipsu. (n.d.). We build relationships. https://www.kipsu.com/?utm_medium=cpc&utm_source=google&utm_campaign=13901865590&utm_term=hotel+communication&_gl=1%2A_zfb3n%2A_up%2AMQ..&gclid=Cj0KCQjA2KitBhCIARIsAPPMEhJFLaRUv03eoe4k6TBamkMmFy9PiwMBXLnRXhE_zxqmocGUMROfNXwaArKsEALw_wcB
- Kong, H., Yuan, Y., Baruch, Y., Bu, N., Jiang, X., & Wang, K. (2021). Influences of artificial intelligence (ai) awareness on career competency and job burnout. *International Journal of Contemporary Hospitality Management, 33(2)*, 717-734.
- Lardieri, A. (2021, January 27). Coronavirus Pandemic Sets Hotel Industry Back 10 Years, Report Finds. *US News and World Reports*. Retrieved from <https://www.usnews.com/news/national-news/articles/2021-01-27/coronavirus-pandemic-sets-hotel-industry-back-10-years-report-finds#:~:text=The%20hotel%20association%20estimates%20that,of%20only%208.5%25%20from%202020>.
- LeewayHertz. (2023, September 22). *Enhancing guest experiences: Ai's role in the hospitality industry*. Medium. Retrieved from <https://medium.com/predict/enhancing-guest-experiences-ais-role-in-the-hospitality-industry-cd964f80771e>
- Modi, A. (2019, May 7). *Will AI Save You From Bad Managers In The Future Of Work?* Forbes. Retrieved from <https://www.forbes.com/sites/ankurmodi/2019/05/07/will-ai-save-you>

- from-bad-managers-in-the-future-of-work/?sh=d3a9b456cea8
- Morgan, B. (2022, February 2). *Customer-Facing Employees Are Burned Out: Here's What To Do About It*. Forbes. Retrieved from <https://www.forbes.com/sites/blakemorgan/2022/02/02/customer-facing-employees-are-burned-out-heres-what-to-do-about-it/?sh=69099dbf48e8>
- Morosan, C. and Bowen, J. T. (2022). Labor shortage solution: redefining hospitality through digitization. *International Journal of Contemporary Hospitality Management*, 34(12), 4674-4685.
- Noori, R. (n.d.). *EMPLOYEE RECOGNITION: AI In Employee Recognition: Can Robots Ever Play a Part in Crafting Genuine, Authentic Feedback?* Nectar. Retrieved from <https://nectarhr.com/blog/ai-in-employee-recognition>
- Operto. (2023, November 14). *Overcoming Hotel staffing shortage using technology*. Operto Guest Technologies. <https://operto.com/hotel-staffing-shortage-and-technology/>
- Patel, P. (2023, August 4). Using AI in the hospitality industry - privacy protection - united states. Using AI In The Hospitality Industry - Privacy Protection - United States. <https://www.mondaq.com/unitedstates/privacy-protection/1351208/using-ai-in-the-hospitality-industry>
- Kulkarni, N. P. (2022, November 15). Tech talk: How ai is serving the restaurant industry. Spiceworks. Retrieved from <https://www.spiceworks.com/tech/artificial-intelligence/interviews/tech-talk-how-ai-is-serving-the-restaurant-industry/>
- Planday. (n.d.). The role of artificial intelligence. <https://www.planday.com/articles/the-role-of-artificial-intelligence-in-employee-scheduling-and-workforce-management/>
- Platt, L., Polavieja, J. G., & Radl, J. (2021). Which integration policies work? the heterogeneous impact of national institutions on immigrants' labor market attainment in europe. *International Migration Review*, 56(2), 344-375.
- Povilaitis, V., & Sibthorp, J. (2022). *Developmental Experiences in Seasonal Employment: A National Mixed-Methods Study of Camp Staff*. *Journal of Park and Recreation Administration*, 40(4), 99+. Retrieved from https://link-gale-com.aurarialibrary.idm.oclc.org/apps/doc/A726042465/AONE?u=auraria_main&sid=summon&xid=fe1362ac
- Radauskas, G. (2023). AI enters hotels and restaurants: where will all the workers go? Cybernews. Retrieved from <https://cybernews.com/editorial/ai->

- hotels-restaurants-hospitality-employment/
- Schmidt, M. (n.d.). *Enhancing People Management with Artificial Intelligence*. Peoplelogic. Retrieved from <https://peoplelogic.ai/blog/enhancing-people-management-with-artificial-intelligence>
- Soto, I. (2022, March 17). *The Leisure and Hospitality Industry: Short-Term Growth, Long-Term Challenges*. United States Congress Joint Economic Committee. Retrieved from <https://www.jec.senate.gov/public/index.cfm/republicans/2022/3/the-leisure-and-hospitality-industry-short-term-growth-long-term-challenges>
- Spiess, T., Nickel, V., Faißt, R., & Zehrer, A. (2022). Employer attractiveness of family businesses in the IT-industry: The effect of personality traits and the moderating role of ownership communication. *Journal of Human Resource Management – HR Advances and Developments*, 2022(1), 1–13.
- Stamolampros, P., Korfiatis, N., Chalvatzis, K., & Buhalis, D. (2019). Job satisfaction and employee turnover determinants in high contact services: insights from employees' online reviews. *Tourism Management*, 75, 130-147.
- Ton, Z. (2023, June 8). *Good Jobs are Good Business*. Retrieved from <https://time.com/6285516/good-jobs-good-business/>
- Undocumented Immigrants. (n.d.). *New American Economy*. Retrieved from <https://www.newamericaneconomy.org/issues/undocumented-immigrants/>
- Unifocus. (2023, February 22). *Hoteliers Are Increasing Technology Budgets in 2023*. Retrieved from <https://www.unifocus.com/blog/all-what-you-need-to-know-inflation-in-the-hotel-industry/>
- NewGen Advisory. Retrieved from <https://newgenadv.com/2023/01/what-you-need-to-know-inflation-in-the-hotel-industry/>
- Wolf, M. (2023, May 15). Two Years After Buying Spyce, Sweetgreen Launches Infinite Kitchen Robotic Restaurant. *The Spoon*. Retrieved from <https://thespoon.tech/two-years-after-buying-spyce-sweetgreen-launches-infinite-kitchen-robotic-restaurant/>
- Vaudel, C. (n.d.). *Bellabot for Delivery Robots. RobotLAB Group - Robotics Solution Integrator*. Retrieved from <https://robotlab.com/delivery-robots/store/bellabot#Yes-BellaBot-is-available-for-rent-at-RobotLAB-The-Robot-as-a-Service-RaaS-program-starts-at-11-per-month-and-it-includes-shipping-onsite-installation-training-and-unlimited-ongoing-support>
- Yassin, E., Gharieb, A., Saad, H., & Qura, O. (2022). Robots, artificial intelligence,

and service automation (raisa) technologies in the Egyptian hotel sector: a current situation assessment. *International Journal of Heritage, Tourism and Hospitality*, 16(1), 51-60.

Zhang, T. C., Torres, E., & Jahromi, M. F. (2020). Well on the way: An exploratory study on occupational health in hospitality. *International Journal of Hospitality Management*, 87(102382).