STREAMLINING RESTAURANT STAFF MANAGEMENT WITH CLOUD-BASED SCHEDULING TOOLS

Akash Gill

Abstract

This paper aims to find out how cloud-based scheduling technology has affected restaurant staff. As mentioned earlier, conventional approaches to scheduling in the restaurant business create problems like overstaffing or understaffing and mistakes arising from manual working. These inefficiencies contribute positively to labor costs, lead to demoralization of employees, and degrading of services. These challenges are overcome by cloud-based scheduling tools, which use automation, real-time updates, and predictive analytics. Some of the options, like a mobile application module, integration with a payroll system, or secure performance of all data, provide practicality and efficiency in managing staff with the additional benefit of communication enhancement and flexibility. The integration with AWS Lambda is used to increase the level of automation, which means that changes to work schedules can be made in real-time without necessarily requiring the control of a human hand. Numerous advantages have been reported from real scenarios, such as the elimination of time inconvenience, cost of employee time, and boosting of morale among employees. This paper provides a summary of the technical specifications and the solutions for the adoption of the instruments, with a highlighted emphasis on customization and training for usage. Continued trends, including the application of predictive analytics and integration with restaurant management systems, are clear indicators of technology as a driver of future advancements in the concept of workforce optimization. This study established that deploying cloud-based scheduling systems is instrumental in keeping operations afloat, a key to boosting employee engagement and calamity-proofing restaurants. This creates a competitive advantage and helps restaurants operate profitably.

Keywords: *Cloud-based scheduling, Restaurant management, Staff efficiency, Predictive analytics, Real-time scheduling, Employee satisfaction, AWS Lambda, Labor cost reduction, Workforce optimization, Hospitality technology.*

Introduction

One of the most pressing issues in hospitality management is developing an efficient way to manage restaurant staff. Conventional approaches towards scheduling involve the use of such tools and methods that inherit notational constraints inherent with conventional approaches providing low productivity. Many of these inefficiencies are evidenced by scheduling problems, inadequate staffing and overstaffing, and input errors because the systems are usually manual. These are some of the challenges faced by managers in that they fail to manage the times when employees are unavailable and at other times when there is a flood of customers. One of them is that such issues not only cut down operational effectiveness but also limit new employee appraisals and deteriorate customer service levels. Overcoming these challenges is something that a restaurant owner must do in order to sustain a competitive advantage within a highly innovative industry. To address these perennial challenges, newer forms of cloud-based scheduling tools are some of the revolutionary technologies. These tools utilize the support of cloud computing to give real-time scheduling mechanisms, consistent communication, and predictive analysis. Compared to conventional approaches, cloud-based systems have flexible and adaptable scheduling that will coincide with the operations. Such systems help the restaurant's manager in staffing and snowboarding, as well as help employees view their schedules through a mobile or web application. The features created by the use

of these tools eliminate human interface errors, improve performance, and create a harmonized working culture. The importance of efficiency marks preliminary performance evaluation in the restaurant business as an imperative to constantly achieve profits and serve clients with exceptional quality at reasonable prices. People management, especially relating to employees, is one of the most significant line items on a restaurant's operating expense, and therefore, effective scheduling is critical for economic viability. Overmanning is excluded to ensure that maximum human resource is not utilized during off-peak business hours, while adequate staffing during business peak is available to ensure service quality is maintained. Further, efficient staff management enhances the morale of the employees and determines the rate of staff turnover. Cloud scheduling tools make restaurants operational since they help eliminate redundancies and deliver the workforce in the best ways.
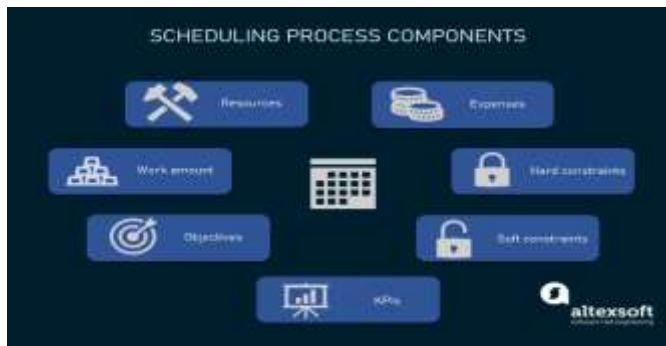

Figure 1: Schedule Optimization Approaches and Use Cases

One of the technologies that has been incorporated into the implementation of cloud-based scheduling tools is automation technology, which AWS Lambda is advancing. AWS Lambda is a compute service that enables running code without requiring the manual configuration of servers with avoidance or. Reserve instance management. In the case of restaurant scheduling, it enables managers to change the labor schedule on a real-time basis, and unsurprisingly, the changes are replicated across the different platforms. For example, if an employee wants to trade shifts or a sudden rush arrives at a facility, AWS Lambda allows for adjustment on its own. At this level, reductions in managerial and clerical loads are achieved, increased precision in scheduling processes, and adaptability of the schedules to changing operating requirements are witnessed. Moreover, these tools are compatible with payroll and many other management systems, so they make restaurant operations smooth.

Challenges in Traditional Staff Scheduling

Manual Scheduling and Common Errors
This paper aims to compare the effectiveness of the traditional approach of staff scheduling in restaurants with the automated method. Either of these methods typically involves the use of spreadsheets or manual documentation, and this often results in shift mis-scheduling and time distortion. Employee mistakes that include having two people on duty at the same time or having no staff during busy hours are typical and lead to inefficiencies. However, manual scheduling cannot accommodate the necessary changes that are required due to unexpected events such as staff emergencies. This rigidity can result in a restaurant failing to maintain the best quality of service delivery to the customers and demoralized employees. Secondly, manual scheduling also needs to consider the preferences or availability of employees, and hence, workers are not happy with the work schedules (Ernst et al, 2004). Promoting staff self-organization also makes the

staff unhappy because their satisfaction is ignored, thus increasing the turnover rate. For restaurant managers, this presents a vicious cycle of having to source for and train new employees continually. The labor-intensiveness of manual scheduling also employs much managerial time that could be more profitably utilized in other activities or even enhancing restaurant operations (Nyati, 2018).
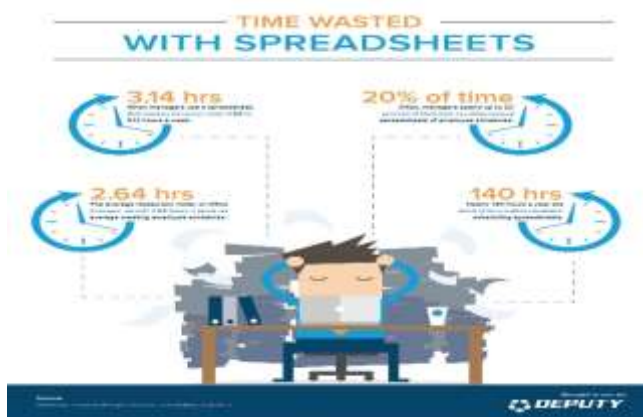

Figure 2: Why Restaurants Should Use Scheduling Software

Difficulty in Managing Dynamic Staff Needs
The restaurant industry's staffing is volatile because staffing demand changes with time because of factors like seasonality, occasion, and unscheduled high traffic in the restaurant. These variables do not work well with traditional scheduling techniques. For example, during a business feast or discounted sale, a large number of customers flood the restaurant, hence the need for more waiters. When there is no effective and adaptive scheduling system in place, managers have to make changes that are disruptive to staff and lead to operational confusion. In addition, traditional scheduling does not include the flexibility of real-time adjustment in emergent situations. When an employee is sick or wants to swap shifts, managers have to move things around by hand, and this can result in errors or shifts needing to be filled. This lack of flexibility leads to over-staffing or understaffing, both of which have cost implications as well as productivity implications. Hiring too many workers leads to high costs, while few workers pose a threat to the company's ability to deliver quality services to its customers (Nyati, 2018).

High Labor Cost due to Inefficiencies
Scheduling problems play a significant role in high labor costs in restaurants to some extent. This is because schedules that have yet to be accurately developed end up having more employees than are required to meet the customer traffic. This also raises payroll costs because the employees may need more work to do during their shifts. On the other hand, when an organization hires few employees to attend to many customers, the few employees available get overstressed and, therefore, less effective. In addition, manual scheduling does not incorporate the use of predictive or historical information to determine the best way to allocate labor (Shobrys & White, 2002). Restaurants that do not look at trends include peak times for dining or low times and may need to be more accurate in their workforce. Lack of ability to match people with the organizational requirements leads to operational losses and poor revenue returns. Since labor costs are always a significant component of a restaurant's cost structure, restaurant owners need to tackle scheduling inefficiencies and competitiveness in the long run.

Copyrights @ Roman Science Publications Ins. **Vol. 2 No.1, June, 2020**
International Journal of Applied Engineering & Technology

100

Case Study: Successful Leadership Approaches for Reduced Restaurant Management Stressors Based on Newer Cloud Applications

For instance, a mid-sized restaurant that is still stuck with manual methods of staff scheduling will have many problems (Lawson, 2015). Workers in the restaurant complained of shift conflicts or overlapping shifts and changes in schedules at the very last minute, and these badly affected service delivery at the restaurant. For instance, when there was a mad rush during the weekend due to a special event, the manager made the mistake of hiring a small number of servers. This mattered a lot because it resulted in long waiting times for the patrons and complaints of poor service delivery. Furthermore, the manual scheduling process took a lot of the manager's time each week, as well. Nevertheless, mistakes were made, and the manager needed to achieve a proper distribution of shifts among workers. Certain staff members got far less than what they wanted, whereas others got more than they wanted – both situations created tension and lowered morale among the staff. The separation of the performance management system from other operational systems like payroll, timekeeping, and others made it even more difficult to ensure timely payment and increased the administrative load. Failure by the restaurant management to change quickly, especially in situations that called for the formulation of new strategies, compounded these problems. For instance, when an employee reported sick, the manager had to call other employees to try and get a replacement personally, and the latter was only sometimes forthcoming. This made the workflow reactive and put much pressure on the rest of the team. In the long run, these challenges continued to reduce the confidence of employees, which finally led to higher turnover and higher recruitment costs.

Benefits of Cloud-Based Scheduling Tools

Cloud-based scheduling is also implemented at restaurants to increase the accuracy, efficiency, and flexibility of workforce management. These tools solve the significant problems associated with conventional staff scheduling techniques and have significant advantages that appeal to restaurant managers and employees. This section delves into five primary advantages of cloud-based scheduling tools: improved accuracy and speed, cost savings, scalability, better communication, and information analysis. Real-life examples and success stories add more weight to such advantages.

Figure 3: What Is a Cloud Based System and How does it Work?

Accuracy and Efficiency

Electronic scheduling systems enhance the efficiency of the schedules with accuracy by reducing the chances of human error and offering updated schedules. In the course of scheduling using traditional approaches, many errors are made through manual input, such as shift overlapping and wrong availability

inputs. Such mistakes can lead to industrial relations problems, low morale, and even loss-making. On the other hand, some cloud-based solutions can automatically schedule many tasks, hence minimizing human errors. For instance, they can be used to scan the availability of the workers, their proficiency, and the legislated working hours for the employees. Another characteristic of these tools is that they provide real-time updates and allow managers to make changes to the schedules in real time (Ramamritham & Stankovic, 1994). For instance, when an employee calls in sick, the system can alert other employees on duty and respond from the schedule optimally. This feature enables its operation to run continuously and does not have the inconvenience of rescheduling the change. Workforce management technologies have been discussed in research to show the relevance of real-time functional aspects in labor-management (Kumar, 2019).

Cost Reduction

Among the most attractive advantages of cloud-based scheduling tools is the extent to which they can minimize the amount of money spent on labor. Lack of effective scheduling leads to overstaffing or understaffing, and these are costly factors in any organization. Meanwhile, overstaffing leads to high labor costs that are avoidable, while understaffing leads to customer dissatisfaction, and consequently, the company loses business. Cloud-based tools solve such problems because they rely on predictive analysis to estimate staffing based on past and current trends and business requirements. The application of big data and predictive analytics in workforce management has been established to improve business intelligence as well as optimize operations (Ajah & Nweke, 2019). Hence, restaurant managers can use the above insights to properly distribute human resources so that the labor expenses are commensurate with the level of business activity. For instance, during busy hours, the system may call extra servers to address the high demand for customers' services, while during low busy hours, a few staff may be required. Such an approach to scheduling not only saves labor expenses but also improves organizational coordination and productivity.

Flexibility

One of the most significant benefits of cloud-based scheduling tools is their ability to be adaptive, especially in the ever-changing restaurant industry. Employees' availability and organizational requirements may be dynamic, and therefore, the scheduling must be dynamic as well. Cloud-based tools do well in this respect, with features like shift swapping, access to schedules anytime, and real-time notification. For the employees, this flexibility then means increased self-managed work and, therefore, better work-life balance (Seppälä, 2019). Employees can check their schedules, apply for a vacation, or exchange their shifts with their counterparts through mobile apps, all with just a few clicks. Managers, on the other hand, can approve or deny requests immediately because the operations requirements do not have to be delayed. Such flexibility is beneficial for creating a better team and happy employees, which are crucial for keeping up high performance and employee turnover rates.

Enhanced Communication

Most staff management requires constant communication, and cloud-based scheduling allows for efficient communication between managers and workers. It is typical to schedule a meeting using physical reminders or emails, which may cause confusion in the end. Cloud-based tools consolidate the data related to scheduling within one system, which enables all stakeholders to work with the most recent and accurate data only (Wu et al, 2013). For example, when a shift change is made, the system notifies the particular employees automatically and thus minimizes misunderstandings. Also, most cloud applications have incorporated messaging options that allow managers and staff to converse within the application. This does away with the need to use external communication links in scheduling the various activities. The

Copyrights @ Roman Science Publications Ins.   Vol. 2 No.1, June, 2020
International Journal of Applied Engineering & Technology

102

incorporation of other advanced communication features has been considered a significant aspect of improving staff cooperation and productivity (Gill, 2018).

Data Insights
The scheduling data from cloud-based tools is crucial to restaurant managers in order to improve their workforce management. These tools utilize various data, including employee performance, attendance trends, and labor cost, and they present information that is useful in decision-making. For instance, managers can notice that many employees are often absent from work or that many employees are leaving the company often. The combination of predictive analytics and data-driven decision-making in cloud tools is in line with a general trend in business intelligence (Tuli et al, 2018). These insights could be useful for restaurants in making better staffing decisions, increasing employee efficiency, and increasing customer satisfaction. In addition, charts and dashboards help managers analyze the data and make changes as needed because of their complexity.

Examples and Success Stories
The advantages of using cloud-based scheduling tools are well illustrated by the cases of restaurant owners and managers who implemented these solutions. For example, a small restaurant chain claimed that in six months of using a cloud-based scheduling platform, it was able to cut labor costs by 20%. The tool offered the chain the ability to forecast demand and, therefore, not overstaff or understaff its restaurants. Another example is a local restaurant business owned by a family that has experienced many employee turnover problems because of scheduling. This paper also shows that by using a cloud-based scheduling tool, the restaurant was able to increase the level of engagement with its employees and, therefore, increase the level of employee satisfaction and retention. The option of viewing and modifying schedules using portable technologies was especially valued by the workers, who, in turn, experienced increased ownership of the schedules (Spreitzer et al, 2017). Additional proof of these tools' effectiveness comes from restaurant owners' feedback. Another manager said, "Since understanding the value of cloud-based scheduling solution, it is evident that we have zeroed in on greater schedule accuracy as well as staff satisfaction." The real-time and data capabilities have been key assets to our business."

Figure 4: The 4-day work week schedule - An Implementation Guide

Key Features of Effective Cloud-Based Scheduling Tools
Web/Cloud-based scheduling solutions are the new trends in restaurant workforce management. They provide a variety of new features that can be combined in a sophisticated way to meet staff scheduling

Copyrights @ Roman Science Publications Ins.   **Vol. 2 No.1, June, 2020**
International Journal of Applied Engineering & Technology

103

requirements. In the next section, we provide detailed descriptions of these tools and explain why they are essential.

User-Friendly Interfaces: Intuitive Dashboards for Managers and Employees
One of the most significant features of a suitable cloud-based scheduling solution is that it is easy to use. These tools have simple interfaces with graphical consoles that make it easy even for the manager and the employees to use them. For managers, the dashboard gives a quick insight into staffing needs, availability, and shift work schedule and thus saves time that could be spent on other activities. Employees are able to see their schedules and, therefore, can quickly check their working schedule, request a change, or swap with another employee. Such self-service feature hinders communications and promotes individualism or more self-service, thereby enhancing satisfaction. However, what is essential is that customization is a vital component of these interfaces. Managers can choose which aspects of the business they want to view on the dashboard, guaranteeing they only get the necessary information they need to run the business effectively (Laursen & Thorlund, 2016). These interfaces are simple and functional: they improve work efficiency and minimize annoyance, which is crucial in the restaurant business.

Figure 5: Designing User-Friendly Dashboards: A Guide to UI Excellence

Integration Capabilities: Integration with Payroll and Time Keeping Software
The other significant characteristic worth discussing is the fact that cloud-based calendar tools are usually compatible with other crucial systems. These tools are intended to integrate with payroll software and time management systems, as some of the processes are usually done manually. This integration aims to consolidate data such as worked hours, overtime, and time off in the payroll systems as an automatic way of determining the same. The end of this is a more precise and faster payroll system that would minimize mistakes and delays in remunerating the employees. For restaurants where individual product margins are always slim, this feature is beneficial. Besides saving time, it means that proper records make it easier to follow the legal requirements of labor laws and regulations. At the same time, integration makes it easy to control labor costs in real-time in order to achieve optimal results and limit expenses (Kaplan & Cooper, 1998). Integrated with scheduling, payroll, and time tracking tools fill the gap between scheduling and financial processes, which makes them valuable for the restaurant business.

Real-Time Updates: Immediate Changes Reflected in Schedules
Expectations in a restaurant setting are ever-changing. For instance, if the restaurant is short-staffed or experiences a sudden influx of customers, an employee may just be called out at the last minute. Real-time updates are another area where cloud-based scheduling tools perform well, particularly in relation to making

Copyrights @ Roman Science Publications Ins.   **Vol. 2 No.1, June, 2020**
International Journal of Applied Engineering & Technology

104

changes to schedules. Managers can, therefore, easily add a shift, change staff distribution, or respond to fluctuations in demand without fear of confusion. To employees, real-time updates benefit them in that they are always working with the latest schedule (Cowling & Johansson, 2002). Notifications inform them about changes so there is no misunderstanding within the team. This feature does not only increase operational effectiveness but also increases employee satisfaction as uncertainty is minimized. Moreover, the flexibility of schedules to be changed in real terms is particularly useful during periods of high traffic in businesses to ensure that the right resources are deployed to deliver quality services.
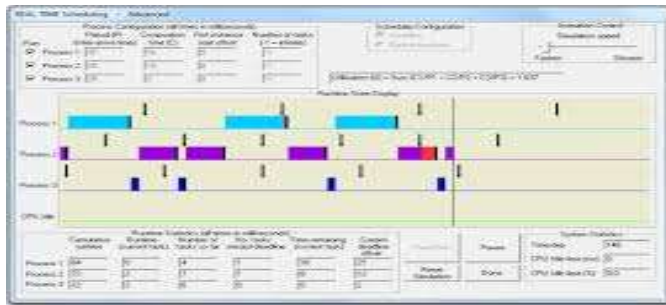

Figure 6: Real Time Scheduling - an overview

Mobile Accessibility: Managing Schedules on the Go
The ability to access the scheduling tools on a mobile platform is one of the most significant breakthroughs of cloud-based applications (Christensen, 2009). Many of these tools are available as mobile applications or optimized for mobile web use to enable managers and employees to access the schedule at any time on their mobile devices. For managers, this means that they are able to monitor staffing, perform changes, or handle problems even if they are not at the restaurant. Mobile access is convenient for employees since they can view their shifts, request time off, or even communicate with management from their mobile devices. It helps more when it comes to a fast-growing business such as the restaurant business because flexibility and responsiveness are vital. Mobile accessibility also means that there is no need to use paper schedules or even static spreadsheets to manage your business's scheduling function. It also brings a culture of openness and 'inclusion' to the workplace since employees can interact with the progress of the scheduling process in a way they prefer.

Data Security: Ensuring Sensitive Staff Data is Protected
Given that most of the organization's tools have gone digital, it becomes important that staff data is well secured. Scheduling applications are also hosted in the cloud and have strong security features, including data encryption, secure access, and regular security audits. These safeguards help protect information unique to every employee, including company contacts, employee salary, and employment history. To restaurants, the protection of this data is not only about compliance with privacy laws but also about establishing confidence with the employees. An adequate system minimizes data loss and guarantees that employees will have their data safe in the organization (Culnan & Williams, 2009). Furthermore, the use of the tools in cloud computing provides for regular backup of data so that in case of technical hitches, data is not lost. In this way, offering security tools helps to free the employer and the employee from additional concerns so that they can concentrate on the job.

Highlight of AWS Lambda for Automation

Copyrights @ Roman Science Publications Ins. **Vol. 2 No.1, June, 2020**
International Journal of Applied Engineering & Technology

105

One of the defining characteristics of many of the most innovative cloud-based scheduling platforms is the presence of automation technologies such as AWS Lambda. This serverless computing service can be used to schedule systems where repetitive tasks are performed on behalf of the scheduling systems, such as updating schedules, generating shift patterns, or notifying employees whenever there are changes. AWS Lambda automates these tasks without requiring human intervention, cutting time and costs. For instance, when an employee asks for a shift interchange, AWS Lambda can initiate a series of preset actions, such as notifying staff, adjusting shift requirements, and synchronizing the changes according to the payroll (Wilkins, 2019). This level of automation makes the scheduling process efficient and, at the same time, practical. In such a setting as a restaurant, where time is of the essence, it becomes beneficial to be able to perform some tasks automatically. AWS Lambda helps to improve the efficiency of scheduling applications in the cloud since they become more effective and stable.
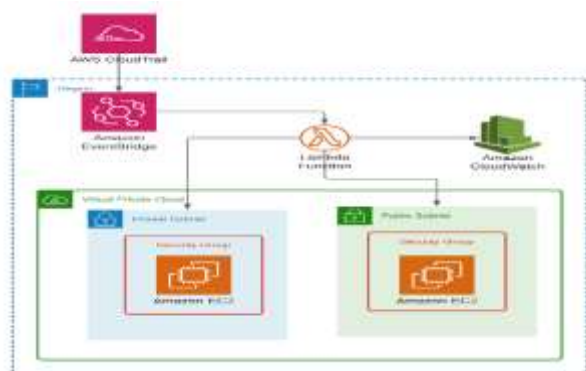
Figure 7: Automating Instance Security: Enhancing AWS Workflows with Lambda Functions

Implementation of Cloud-Based Scheduling Tools in Restaurants
The use of cloud-based scheduling tools in restaurants can dramatically improve the overall system of staff organization (Cavusoglu, 2019). However, there is a need for a well-planned approach toward the realization of this goal in order to maximize its use and achieve a good structure that will enable easy transformation. This article includes a breakdown of the process of integrating these tools and the features of implementation, critical technical requirements, general considerations concerning staff training, possible solutions to possible resistance, the use of AWS Lambda for real-time updating, and case studies of successful implementation.

Copyrights @ Roman Science Publications Ins.   **Vol. 2 No.1, June, 2020**
International Journal of Applied Engineering & Technology

106

Figure 8: Best Cloud Based Restaurant Management Software for Your Business

Step-by-Step Guide to Integrating These Tools.

1. **Assess Your Current System and Needs:** First of all, you should assess the existing state of scheduling. However, it is eroded by weaknesses like manual errors, lack of flexibility, or even inefficiency. Create specific goals for integrating cloud tools, such as decreasing labor expenditures or increasing schedule precision.
2. **Select the Right Scheduling Tool:** Always choose the platform that best suits your restaurant's needs. Nothing is more critical here than ease of use, platform compatibility, real-time feed, and the ability to interface with other systems such as payroll and time tracking.
3. **Prepare Data for Migration:** Collect data templates, including basic employee information, roles, availability, and previously published schedules. This will enhance flexibility in the implementation phase so that there is no disruption.
4. **Develop an Implementation Plan:** Timelines and an overview of significant activities in the employees' integration process into enterprises should also be developed. Divide roles among all the team members and the tasks to be accomplished so that one knows the progress made so far. Various stakeholders, such as management and staff, should be involved in the planning process, including the formulation and implementation.
5. **Customize the System:** Customize it to fit your restaurant, depending on what you want the tool to do. These contain options to let users choose when they would like to work, legal and regulatory measures (like labor laws), and frequencies. This step helps to make the tool specific to your operations because of the numerous encounters with change.
6. **Pilot the System:** Use the scheduling tool on a limited scale; for instance, the organization can adopt the tool to only one site for some time before using it in all its operational areas. This means you get an opportunity to address specific problems with the objective of altering them without affecting the workforce.
7. **Full Deployment:** After the pilot system's success, implement it in all centers. The last step is to disseminate the timeline to staff to ensure that they are all ready for change.
8. **Monitor and Optimize:** After the tool has been deployed, it is important to check its effectiveness. Ask for comments from the employees, review data in analytics, and improve the usage of scheduling to reap more rewards from the tool.
   Overview of Technical Requirements and Training Needed

Copyrights @ Roman Science Publications Ins.   **Vol. 2 No.1, June, 2020**
International Journal of Applied Engineering & Technology

107

The effectiveness of cloud-based scheduling tools involves five critical areas related to your restaurant's technical and training needs.

1. **Technical Requirements:** Stable Internet Connection: The realization of cloud-based tools depends on an internet connection since it is the key to enabling
2. **Compatible Devices:** Make certain that the current system can be comfortably operated on hardware familiar to the restaurant, including smartphones, tablets, or even computers.
3. **System Integration:** Make sure it incorporates the restaurant's payroll systems, POS, and, whenever possible, timekeeping software.
4. **Data Security Protocols:** The first firm should select a specific platform for comprehensible data protection so that the employees' data remains secure.
5. **Management Training:** Educate the managers on how to work with the different features of the tool, including creating a schedule, dealing with change, and analyzing (Hrebiniak, 2013). This is to ensure that the staff becomes accustomed to using the application as a tool for accessing their working timetable, posting changes, and using the messenger.
6. **Support Resources:** To help users use the product, offer user guides, tomes, lessons, and customer service to resolve problems.

Overcoming Initial Resistance from Staff
There are always likely to be rejections from employees while implementing new systems. If this is done effectively, then the transition to such a system will be all the easier.

Figure 9: Overcoming Resistance to Change

1. **Communicate Benefits:** Further, explain to the readers how the new system will benefit them; some ways are that it will provide real-time access to schedules, fewer mistakes, and a good work-life balance.
2. **Involve Staff Early:** Empower employees and involve them in planning processes and decisions. This creates ownership and causes resistance to change.
3. **Provide Hands-On Training:** A senior staff can demonstrate how the tool works by presenting practical and familiar training sessions. Stress how it is easy to use in order to develop confidence in the same.
4. **Offer Support:** This should help establish a communication line where any staff member who has grievances or feels overwhelmed can share. Addressing their feedback immediately will instill confidence in the system.

Copyrights @ Roman Science Publications Ins.   **Vol. 2 No.1, June, 2020**
International Journal of Applied Engineering & Technology

108

5. **Demonstrate Success:** It is necessary to explain to critics the initial improvements to problems, such as faster scheduling or fewer conflicts (Davis & Burns, 2011).

Leveraging Lambda AWS for Real-Time Updates

In this case, AWS Lambda is most valuable when it comes to allowing real-time updating of cloud systems such as scheduling. This is one of the serverless computing services that enable RDS for AWS to run some processes without human interference to have instant updates on the platform. For instance, if an employee changes his/her schedule or a manager makes changes to a shift, AWS Lambda takes that information and changes schedules in real time. This makes it easier to work, reduces the miscarriages that used to occur before, and avoids the charming of managers in unnecessary work. Moreover, scalability is one of AWS Lambda's strengths; therefore, a restaurant's increased traffic during lunch or over the weekend or holidays is catered for.

Examples of Successful Integrations

a) **Case Study: Mid-Sized Restaurant Chain.** For the experiment, a regional restaurant chain located in the south introduced a self-service-based cloud scheduling tool that linked to payroll. Therefore, using AWS Lambda, the tool was able to update schedules on the go and effectively communicate with the staff. In the next two and a half months, the number of scheduling errors was cut down to 40%, and the labor cost came down to 15%.

b) **Case Study: Family-Owned Diner.** An independently owned diner used Clercx as a user-friendly cloud-based scheduling solution in response to unreliable shift schedule alterations. After giving the staff, the training and the pilot phase, the system enhanced the level of flexibility and the number of clashes in all the scheduling. The satisfaction ratings given by employees improved greatly owing to the effective means of communication and openness (Sy et al, 2006).

c) **Case Study: Large Fast Food Eatery Chain.** A multi-unit fast food chain employs cloud solutions for a massive staff. Connection with POS resulted in information on the busiest hours and proper staffing. Now, by triggering AWS Lambda to provide real-time updates, handling such changes was made more accessible. This helped to enhance the operation and customer satisfaction.

Any attempt to implement cloud-based scheduling tools in restaurants calls for strategizing, solid technological support, and ensuring staff efficiency. When concerns are addressed with a structure, Orange SaaS Restaurants can attain integration, functionality, and considerable performance gains with the utilization of AWS Lambda.
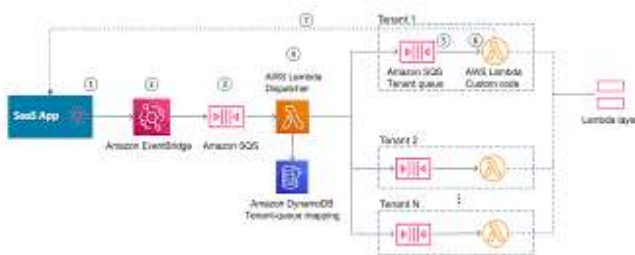

Figure 10: Extending your SaaS platform with AWS Lambda

Case Studies: Real-World Applications

The adoption of cloud-based scheduling has enhanced the way restaurant owners work with their employees. Lived examples are undertaken to describe the benefits that such technologies hold for a society. The following case studies will demonstrate how business owners have found positive effects on staff morale, ways of applying efficiency, and actual savings in money spent on wages. Further, we correlate the obtained data to show the effectiveness of the defined scheduling tools that have been implemented.

Improved Staff Satisfaction

Another clear benefit of setting up cloud-based calendars is the improvement of the morale of staff in a Healthcare organization. Many staff members have cited changes to their scheduling at the last minute, a clearer understanding of which shifts they would be working, and problems with being able to find or trade shifts. These challenges resulted in a situation of dissatisfaction and a high turnover, which remains a perennial issue in the restaurant business. For example, if we consider a mid-sized family restaurant in Chicago. Prior to the implementation of the cloud-based tool, scheduling was done way with the use of papers, and thus, many times, it came with wrong information (Mourtzis & Vlachou, 2018). Several employees filed complaints of not knowing their schedules and could come to work or be laid off, while others showed up when the company did not need them. Once the restaurant installed an 'in the cloud-based scheduling tool, people could log into a computer or smartphone, see their schedules, request shifts to be switched, or address issues/mishaps with supervisors. In the end, the organization was able to realize a forty percent improvement in staff satisfaction ratings, which was undertaken through anonymous staff surveys, six months after implementation. Another time, a fast-casual restaurant chain in New York needed help to address how its workers wanted to work. By employing an aspect of shift bidding where the employees were able to select their preferred working shifts, the chain was forced to adopt a tool that supported their choice, thus getting the best of both worlds. This also helped to cut last-minute absenteeism by 25% and clearly added to morale.

Figure 11: Fast Casual vs Fast Food

Increased Operations Efficiency

Copyrights @ Roman Science Publications Ins.   **Vol. 2 No.1, June, 2020**
International Journal of Applied Engineering & Technology

110

Stakeholder Management is critical in the restaurant business, where margins for profitability are very slim (Smudde & Courtright, 2011). Manual scheduling practices took a lot of time and could have been more accurate. Any good restaurant manager knows that it is valuable time that could be spent on a lot of other things, such as attending to customers or training employees. The days of creating a schedule, writing it on board, and having to adjust it for the next week or the next day have been replaced by cloud-based scheduling tools. A hypothetic seafood restaurant located in Seattle, Illustration. The manager devoted an average of 10 working hours per week to construct the schedules and to adapt them to shifts and unpredicted modifications. By using the new tool, the process was brought down to below two hours per week. This is because the system incorporated features such as staff availability and projected sales data in order to determine staffing levels, coupled with knowledge of labor laws. These were achieved with a consequent impact on the overall satisfaction of the restaurant's customers, as the scores rose by 15% within six months, focusing only on the improvement of the dining experience. Likewise, a premium steakhouse restaurant based in Texas is working on a scheduling tool in collaboration with the POS system. Based on daily and weekly sales volume and hours of high traffic, the tool had information about personnel requirements. It also limited cases where organizations hired many employees during off-peak hours and few employees during peak hours. A 20% increase in the steakhouse's labor-to-sales ratio was achieved within 3 months, thus reflecting the improvement of operations efficiency by effective scheduling.

Measurable Reductions in Labor Costs
People's costs have always been among the principal cost drivers when it comes to managing a restaurant. Poor scheduling results in extra time, making additional shifts that are expensive and unproductive, or hiring too few people or too many, which is costly. It is not a secret that one of the key strategies for lowering expenditures has been the use of scheduling software, which helps cut the costs of labor by efficiently distributing the personnel and avoiding mistakes. For instance, an overpopulated café in Los Angeles had a problem with excess employees during working days and a lack of employees during the weekends (Wilson, 2017). Instead of using actual data, most of the time, the manager just relied on guesswork on the employees' schedules, which led to many wasted labor hours within the agency and employees' stress. Subsequent to implementing a cloud-based tool, the café was able to utilize real-time data regarding steering of employee working hours for enhanced correlation with customer flow. The cafe has been able to manage to cut down on labor costs by 18% within 1 and a few months while maintaining high standards of service.

Another example can be regarded as the case of a pizzeria chain in Florida that experienced some problems with overtime expenses owing to ineffective staffing. Multisite managers were sometimes unable to tally the total number of hours logged in by their employees. Heating up to a new cloud-based environment that tracked time and signaled possible overtime, the chain declined overtime costs by 30%. Also, the tool is connected to the payroll system to calculate wages and minimize the burden of overhead work.

Comparative Data: Before and After Using Scheduling Tools
Unfortunately, direct measures of the effectiveness of cloud-based scheduling tools cannot be easily calculated, and it is more helpful to look at the differences in such indicators in restaurants that switched from pen-and-paper to cloud-based tools. Below are aggregated insights based on feedback from various establishments:

   a. **Scheduling Time:**
      Before: Managers reported that they spend between 8-10 hours per week in the scheduling and rescheduling of their staff.

Copyrights @ Roman Science Publications Ins.   **Vol. 2 No.1, June, 2020**
International Journal of Applied Engineering & Technology

111

After: Using cloud tools, this time was cut to less than 2 hours per week, which is 4 times improvement in efficiency.

b. Employee Turnover Rates:
Before: This led to high turnover rates. For instance, restaurant turnover averaged 60% per year, mainly because of discontentment with the severances in scheduling.
After: These results of making rules flexible and improving communication revealed a turnover rate that was 20-30% lower.

c. Shift Coverage:
Before: Restaurants were experiencing 3-5 missed shift months due to miscommunication or at the last minute in their operations.
After: Notifications and the ability to open the application allowed for a significant decrease in missed shifts to nearly nonexistent.

d. Labor Costs:
Before: Pre-tax operating profit margin was commonly below 5%; overall labor costs, at about 35% of revenues, were exacerbated by specters of excessive staffing and unauthorized overtime.
After: Efficient work schedules and effective overtime regimes eliminated the significant problem of the company's skyrocketing labor expenses, which raged from 35% to an average of 28-30% of gross receipts.

Future of Restaurant Staff Management

The food services sector is still experiencing significant changes because of innovations that focus on increasing productivity. Speaking of staff management, it is worth mentioning that the future does seem very promising, as new technologies are expected to reshape the way restaurants manage their employees. Below are the trends and future developments of restaurant staff.

Innovations on the Horizon

Another notable feature of implementing artificial intelligence in staff management is the option of intelligent staff scheduling. Unpredictive and unstructured scheduling is gradually losing its conventional appeal because of artificial intelligence (AI) in scheduling work schedules. Some factors that AI systems capture include the availability and capability of employees, the busiest business periods, and records that help in determining staff requirements. For instance, during weekends or events, the AI algorithms can be used to increase staffing personnel while reducing costs (Tambe et al, 2019). In addition, AI can learn patterns over time and can become more innovative and wiser in scheduling, not compromising its accuracy. The other emerging strategy is advanced predictive analytics for staff because it uses current and past data to have accurate projected staffing needs. Some of the advantages of using predictive analytics include: one, it is able to predict existing trends within customers' behavior and seasons, and two, it is able to predict deficiencies within employees. For instance, if results show an increase in customers during holiday periods, then the recommendation from predictive tools should be to recruit seasonal workers in anticipation of the peak periods. They assist restaurants in performing well in negotiations and keep service quality high while avoiding extra labor expenses.

Copyrights @ Roman Science Publications Ins.   **Vol. 2 No.1, June, 2020**
International Journal of Applied Engineering & Technology

112

Figure 12: The Three Horizons of Growth Model For Successful Innovation Strategy

Integration with other Restaurant Systems

The future of restaurant staff management will also involve even more extensive connections with other systems that are used in restaurants. Other interconnection possibilities that restaurants must implement include linking staff scheduling systems with inventory management software, CRM, and POS, among others. As an indication, the application of technology requires the scheduling software to feed inventories when stock and menus are available to meet staff demand (Jagtap & Rahimifard, 2019). For instance, if inventory information reveals low stock for a particular menu likely to attract many customers, then the system can readily reassign the workforce to optimize other available foods. In the same manner, integration with instantiation with the CRM systems aids in maximizing the opportunity to ensure that the appropriate personalities are scheduled to fit the customers' requirements. For example, if a client is usually a frequent consumer of the services in the evening, the system can guarantee that the forever server is employed at that time. They argue that this level of coordination serves the needs of customers and engages employees due to scheduled work that is consistent with their goals.

Figure 13: The Full Guide to Restaurant Automation

Trends in Restaurant Tech

This indicates that restaurant staff management in the future depends on other trends in restaurant technologies. For example, going mobile is now a standard trend into its preeminence. Deluxe puts mobile first, allowing managers and staff to view and update schedules with the help of mobile applications and communicate in real-time. These tools increase flexibility and decrease demand for managerial time and resources, thus allowing them to work on essential activities. Another emerging trend is the use of wearable devices to improve staff performance (Chan et al, 2012). This electronic device, like smartwatches and

other wearables, informs orders, tables, or shift changes in real-time. Moreover, wearable devices can monitor many indicators of employee performance, such as the number of steps or time devoted to particular work tasks, which contributes to improvement and fine-tuning. When organizations embrace the restaurant industry, the almighty cloud-based platforms will remain ubiquitous technology in the future. These platforms are flexible, offer secure storage and access to information, and are thus suitable for restaurants at all levels of operation. Cloud applications also ease remote control; if the owners and managers are away from the building, they can still monitor its operations.

Figure 14: 2019 foodtech trends review

Conclusion

Online scheduling has considerably brought changes to the management system, embodying better performance and reliability in restaurant staff scheduling (Hannan et al, 2018). These tools rid the scheduling of mistakes in the timing and productivity of conventional manual scheduling and offer restaurant managers a process that is suited to the volatile nature of their industries. With the features of real-time updates, expanded communication ways, and data analysis, the use of cloud tools helps restaurant owners make better decisions, thus controlling labor costs and increasing employee satisfaction. This, therefore, calls for the adoption of cloud-based scheduling tools, which are of uttermost significance. In a place like hospitality, where hiring and firing rates are high, it is essential that employees have an efficient way of managing their schedules. Not only do these tools help in better management of person-hours, but they also help in maintaining communication when everyone is on the same page. Moreover, recent enhancements like AWS Lambda bring such scheduling even deeper and free valuable time and resources while enhancing general precision in labor management.

In an ever-growing competitive market, restaurants that do not adopt this technology stand to be put out of business. Today, customer demands are much richer, expecting personalized and integrated service, which makes it even more important to involve the right staff at the right time. Scheduling tools on the cloud help restaurant businesses accomplish this goal effectively and keep them relevant as they scramble to meet consumers' needs. These tools also signal to the employees that the organization has their best interest at heart by providing them with an honest and fair means to schedule their work and ensure they balance their productivity rates with their obligations. To optimize their service delivery amidst successive competitive challenges, restaurant owners and managers can only afford to do so with the latest scheduling system based on the cloud (Morabito, 2015). Some of these tools are useful in solving current problems, but they are also helpful in anticipating future developments in restaurant management. New possibilities include using artificial intelligence to automate scheduling and predictive analytics as a part of the system; realizing these potential benefits requires a foundation set by developing cloud-based systems.

Copyrights @ Roman Science Publications Ins.   **Vol. 2 No.1, June, 2020**
International Journal of Applied Engineering & Technology

114

Altogether, cloud-based scheduling tools are the promising path to improving restaurants' human resource management. As a result, restaurants are able to work more efficiently simply by implementing tools that make processes less costly in terms of time, money, and employees. This means that by adopting this technology, organizations are in a suitable stand to produce outputs that will enable them to adapt to new industry standards that arise from time to time and, hence, stay relevant in the market. Therefore, it becomes imperative for eateries to act now, embrace cloud-based scheduling solutions, and unlock the opportunities they present (Jasonos & McCormick, 2017).

References;
1. Ajah, I. A., & Nweke, H. F. (2019). Big data and business analytics: Trends, platforms, success factors and applications. Big data and cognitive computing, 3(2), 32.
2. Cavusoglu, M. (2019). An analysis of technology applications in the restaurant industry. Journal of Hospitality and Tourism Technology, 10(1), 45-72.
3. Chan, M., Estève, D., Fourniols, J. Y., Escriba, C., & Campo, E. (2012). Smart wearable systems: Current status and future challenges. Artificial intelligence in medicine, 56(3), 137-156.
4. Christensen, J. H. (2009, October). Using RESTful web-services and cloud computing to create next generation mobile applications. In Proceedings of the 24th ACM SIGPLAN conference companion on Object oriented programming systems languages and applications (pp. 627-634).
5. Cowling, P., & Johansson, M. (2002). Using real time information for effective dynamic scheduling. European journal of operational research, 139(2), 230-244.
6. Culnan, M. J., & Williams, C. C. (2009). How ethics can enhance organizational privacy: lessons from the choicepoint and TJX data breaches. MIS quarterly, 673-687.
7. Davis, R. I., & Burns, A. (2011). A survey of hard real-time scheduling for multiprocessor systems. ACM computing surveys (CSUR), 43(4), 1-44.
8. Ernst, A. T., Jiang, H., Krishnamoorthy, M., & Sier, D. (2004). Staff scheduling and rostering: A review of applications, methods and models. European journal of operational research, 153(1), 3-27.
9. Gill, A. (2018). Developing a real-time electronic funds transfer system for credit unions. International Journal of Advanced Research in Engineering and Technology (IJARET), 9(1), 162–184. https://iaeme.com/Home/issue/IJARET?Volume=9&Issue=1
10. Hannan, M. A., Faisal, M., Ker, P. J., Mun, L. H., Parvin, K., Mahlia, T. M. I., & Blaabjerg, F. (2018). A review of internet of energy based building energy management systems: Issues and recommendations. IEEE access, 6, 38997-39014.
11. Hrebiniak, L. G. (2013). Making strategy work: Leading effective execution and change. Ft Press.
12. Jagtap, S., & Rahimifard, S. (2019). The digitisation of food manufacturing to reduce waste–Case study of a ready meal factory. Waste management, 87, 387-397.
13. Jasonos, M., & McCormick, R. (2017). Technology integration for restaurants & hospitality industry in the year 2025.
14. Kaplan, R. S., & Cooper, R. (1998). Cost & effect: using integrated cost systems to drive profitability and performance. Harvard Business Press.
15. Kumar, A. (2019). The convergence of predictive analytics in driving business intelligence and enhancing DevOps efficiency. International Journal of Computational Engineering and Management, 6(6), 118–142. https://ijcem.in/wp-content/uploads/THE-CONVERGENCE-OF-PREDICTIVE-ANALYTICS-IN-DRIVING-BUSINESS-INTELLIGENCE-AND-ENHANCING-DEVOPS-EFFICIENCY.pdf
16. Laursen, G. H., & Thorlund, J. (2016). Business analytics for managers: Taking business intelligence beyond reporting. John Wiley & Sons.

Copyrights @ Roman Science Publications Ins.   **Vol. 2 No.1, June, 2020**
International Journal of Applied Engineering & Technology

115

17. Lawson, F. (2015). Restaurants and foodservice facilities. In Metric Handbook (pp. 587-614). Routledge.

18. Morabito, V. (2015). Big data and analytics. Strategic and organisational impacts.

19. Mourtzis, D., & Vlachou, E. (2018). A cloud-based cyber-physical system for adaptive shop-floor scheduling and condition-based maintenance. Journal of manufacturing systems, 47, 179-198.

20. Nyati, S. (2018). Revolutionizing LTL carrier operations: A comprehensive analysis of an algorithm-driven pickup and delivery dispatching solution. International Journal of Science and Research (IJSR), 7(2), 1659–1666. https://www.ijsr.net/getabstract.php?paperid=SR24203183637

21. Nyati, S. (2018). Transforming telematics in fleet management: Innovations in asset tracking, efficiency, and communication. International Journal of Science and Research (IJSR), 7(10), 1804–1810. https://www.ijsr.net/getabstract.php?paperid=SR24203184230

22. Ramamritham, K., & Stankovic, J. A. (1994). Scheduling algorithms and operating systems support for real-time systems. Proceedings of the IEEE, 82(1), 55-67.

23. Seppälä, A. (2019). Flexible work and self-management: employee and employer expectations in a changing work environment.

24. Shobrys, D. E., & White, D. C. (2002). Planning, scheduling and control systems: why cannot they work together. Computers & chemical engineering, 26(2), 149-160.

25. Smudde, P. M., & Courtright, J. L. (2011). A holistic approach to stakeholder management: A rhetorical foundation. Public Relations Review, 37(2), 137-144.

26. Spreitzer, G. M., Cameron, L., & Garrett, L. (2017). Alternative work arrangements: Two images of the new world of work. Annual Review of Organizational Psychology and Organizational Behavior, 4(1), 473-499.

27. Sy, T., Tram, S., & O'hara, L. A. (2006). Relation of employee and manager emotional intelligence to job satisfaction and performance. Journal of vocational behavior, 68(3), 461-473.

28. Tambe, P., Cappelli, P., & Yakubovich, V. (2019). Artificial intelligence in human resources management: Challenges and a path forward. California Management Review, 61(4), 15-42.

29. Tuli, F. A., Varghese, A., & Ande, J. R. P. K. (2018). Data-Driven Decision Making: A Framework for Integrating Workforce Analytics and Predictive HR Metrics in Digitalized Environments. Global Disclosure of Economics and Business, 7(2), 109-122.

30. Wilkins, M. (2019). Learning Amazon Web Services (AWS): A hands-on guide to the fundamentals of AWS Cloud. Addison-Wesley Professional.

31. Wilson, E. R. Y. (2017). Serving across the divide: Race, class, and the production of restaurant service in Los Angeles. University of California, Los Angeles.

32. Wu, D., Thames, J. L., Rosen, D. W., & Schaefer, D. (2013). Enhancing the product realization process with cloud-based design and manufacturing systems. Journal of Computing and Information Science in Engineering, 13(4), 041004