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SwiftStaff: A Proposed Architectural Design of a Mobile-Based Manpower Pooling and On-Call Staffing Platform for Hotels in Western Pangasinan

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ABSTRACT

The hospitality industry in Western Pangasinan faces persistent workforce challenges caused by fluctuating tourist demand across destinations such as Hundred Islands, Patar Beach, the caves of Anda, and the surfing coves of Dasol and Burgos. Hotels rely heavily on informal recruitment channels, including social media, personal contacts, and word-of-mouth, which frequently lead to no-shows, skill mismatches, and inefficient part-time deployment. This study aims to design the architecture of SwiftStaff, a mobile-based manpower pooling and on-call staffing platform that connects local hotels with Hospitality Management students of Pangasinan State University – Alaminos City Campus. A combined descriptive and developmental research design was used. Observations, surveys, and structured interviews characterized the existing on-call hiring process, while development followed an adapted seven-phase Agile Software Development Life Cycle using Android Studio, PHP, MySQL, Firebase, and Figma. Purposive sampling identified 100 target respondents for the acceptability test. The resulting platform follows a three-tier architecture comprising a Presentation Tier (web and mobile interfaces), an Application/Logic Tier (five core processing modules), and a Data Tier (MySQL and Firebase). SwiftStaff centralizes staffing requests, enables real-time job postings, and allows students to receive push notifications and accept or decline offers based on skills and availability. Internal alpha testing of the prototype is complete, while beta testing and the weighted-mean acceptability evaluation are scheduled for the deployment phase. The prototype indicates that a locally adapted, mobile-first workforce solution built on a three-tier architecture is technically feasible and can reduce the inefficiencies of informal recruitment, thereby addressing the staffing gap in the region's hospitality sector. Ultimately, the study contributes a replicable architectural model for smart workforce pooling that may be extended to other tourism-dependent localities in the Philippines.

Keywords: Manpower pooling, On-call staffing, Mobile application, Hospitality, Western Pangasinan

INTRODUCTION

The 21st-century workforce is increasingly defined by mobility, flexibility, and reliance on digital technology. According to Akter et al. (2024), digital technologies are reshaping workforce management, and organizations need digital capabilities that match workforce needs. Jain (2024) notes that technology-enabled platforms have facilitated the rise of gig work, driven in part by technological advances and workers' desire for flexibility. Sandhu et al. (2025) found that online platforms make job searching more convenient and shorten the time job seekers spend searching.

The hospitality industry depends heavily on flexible human resources. Hotels need housekeeping, front-desk, food-and-beverage, and guest-service staff to keep customers satisfied, yet occupancy shifts with seasons, holidays, and special events. According to Ćorluka and Landvogt (2022), this hotel seasonality calls for flexible workforce strategies. In the Philippines, the Philippine Statistics Authority (2025) reported that tourism contributed approximately 8.9% of GDP in 2024 and that tourism industries employed an estimated

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6.75 million people. Even so, traditional recruitment is slow and inefficient, which makes it hard for hotels to respond to sudden surges in occupancy. Petitta and Ghezzi (2025) also observe that the growing preference for flexible work arrangements brings both benefits and drawbacks for individuals and organizations.

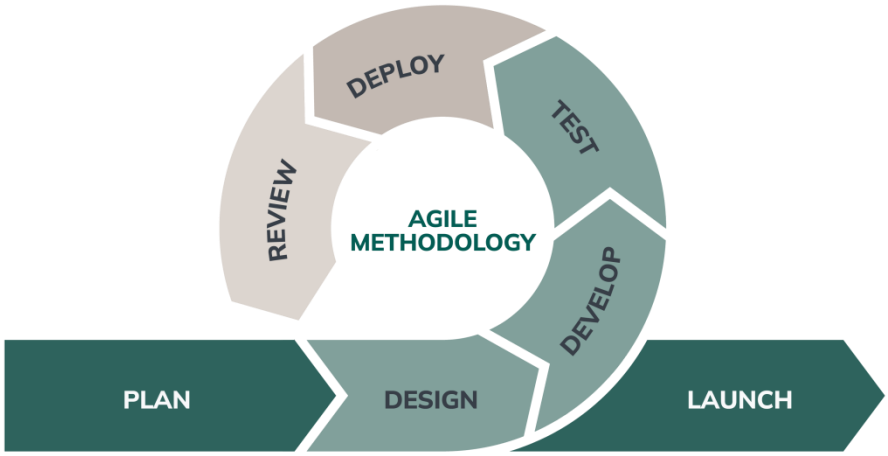
These challenges are evident in Western Pangasinan, which includes Alaminos, Bolinao, Anda, Bani, Burgos, Dasol, Infanta, and Agno. According to the interview with the Alaminos City Tourism Office, the area attracts more than 500,000 local and international tourists annually, and Alaminos City alone receives approximately 103,068 visitors, largely because of the Hundred Islands National Park. Based on interviews with hotel managers, establishments such as Proxy by The Oriental Pangasinan, Island Tropic Hotel, Empress Hotel, and Rustic Crown Hotel report 20%–30% occupancy in off-peak months and sharp increases during the "ber" months (September to December). To cope, they rely on student part-timers and on-call workers found through social media or personal contacts, often on very short notice and with problems such as cancellations and no-shows. Hospitality Management (HM) students at Pangasinan State University (PSU) Alaminos City Campus, in turn, seek part-time work for income, skill development, and practicum-related experience, but they depend on word of mouth and unverified social media posts. No organized mechanism connects hotels with these students.

To address this gap, this study presents SwiftStaff, a mobile platform for manpower pooling and on-call staffing. The system centralizes staffing requests so that hotels can post immediate needs and connect with registered student workers based on skills, experience, and availability. Specifically, the study aims to (1) identify the existing process of hiring on-call staff in selected hotels in Western Pangasinan; (2) determine the difficulties encountered by hotel managers and students in this process; (3) identify the features to be integrated into the proposed system and design its architecture; and (4) assess the acceptance level of the developed platform.

METHODOLOGY

This study combined descriptive and developmental research approaches. Descriptive techniques—including observations, surveys, and structured interviews—characterized the existing on-call hiring processes of Western Pangasinan hotels, while the developmental component was guided by an adapted seven-phase Agile Software Development Life Cycle (SDLC), as illustrated in Figure 1. The architectural design of the platform was structured around a Three-Tier System Architecture to ensure a clear separation of concerns across the presentation, logic, and data tiers.

Figure 1. Agile Methodology



The Agile SDLC proceeded through seven interrelated phases. In the Requirements phase, structured interviews were conducted with hotel managers across Western Pangasinan and with HM students of PSU Alaminos City Campus to surface existing hiring practices, pain points, and desired system features. The Design phase translated these needs into wireframes, ERDs, use-case diagrams, and Figma prototypes

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validated by selected stakeholders. During Development, the system was built using Android Studio, PHP, MySQL, Firebase, and Figma, with the five core modules—authentication and account management, shift posting and matching, push notifications, rating and feedback, and reports and analytics—constructed incrementally. The Testing phase executed test cases for each module; internal alpha testing is complete, and beta testing with hotel managers and student respondents is scheduled for the deployment phase. The Deployment phase covers onboarding of participating hotels and students and initial performance monitoring. The Review phase systematically gathers user feedback to document strengths, weaknesses, and improvement opportunities for the next iteration. Finally, the Launch phase completes final testing, environment configuration, and release documentation before SwiftStaff is made available to end users, with user guides and support resources prepared to assist during the transition.

Population and Locale

The study is being conducted in Western Pangasinan, specifically engaging the Provincial Tourism Office and registered hotels in the area. Separately, the Alaminos City Tourism Office was interviewed to obtain local visitor statistics for the Introduction; it is distinct from the Provincial Tourism Office, whose staff are counted among the respondents. A purposive sampling technique was used to identify respondents with relevant knowledge and experience in hospitality and information systems. A total of 100 target respondents have been identified for the acceptability test, distributed as shown in Table I.

Table I. Respondents of the Study

Respondents	**Number of Respondents**
Provincial Tourism Office Staff	1
Hotel Managers / Owners / Staff	5
IT Experts	3
ICTMO Coordinator	1
Hospitality Management Students (PSU ACC)	90
Total	**100**

Limitation of the Study

Although SwiftStaff offers a promising solution for manpower pooling, several limitations must be acknowledged. The system is being tested with selected hotels in Western Pangasinan, primarily those in Alaminos City and partner establishments in nearby coastal municipalities, so findings may not be immediately generalizable to all hotels in the region. The platform is exclusively intended for Hospitality Management students of PSU Alaminos City Campus and does not accommodate other students or external job seekers. SwiftStaff is not a full human-resources system; it does not handle contracts, payroll, or legal employment processes, and all hiring decisions and payments are settled directly between the hotel and the student. At the present stage, no formal acceptability findings have yet been collected.

RESULTS AND DISCUSSION

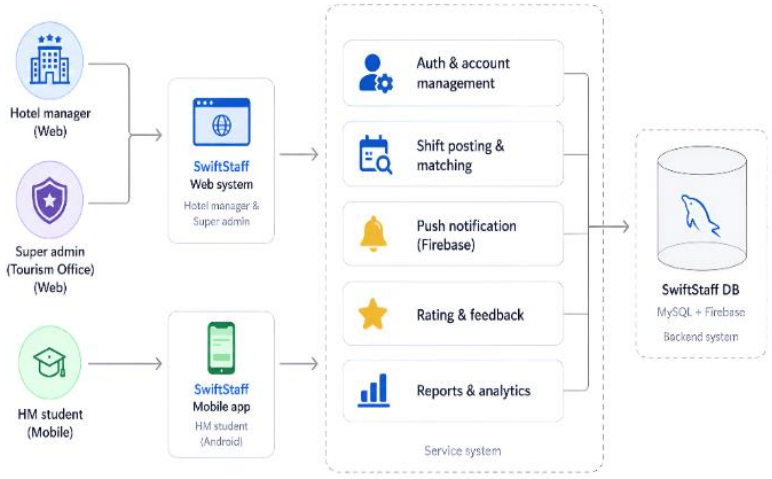
This section addresses the first three objectives of the study: the existing on-call hiring process, the difficulties encountered, and the features and architecture of the proposed system. The fourth objective, the acceptability assessment, is scheduled for the deployment phase. SwiftStaff was designed to improve the way hotels in Western Pangasinan source and deploy on-call staff during peak occupancy periods. The existing process is largely informal, relying on social-media posts, group chats, and personal referrals—channels that frequently produce unreliable response times, last-minute cancellations, and mismatched skills. Structured interviews with hotel managers and Provincial Tourism Office staff confirmed that these

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inefficiencies become particularly pronounced during summer months, the "ber" months, holidays, and major local festivals, when occupancy surges of 70% or more strain the capacity of regular staff.

To address these challenges, the team developed a mobile platform that centralizes manpower pooling and automates the matching of hotels with qualified Hospitality Management students. The proposed system architecture is presented in Figure 2.

Figure 2. SwiftStaff System Architecture Framework Model



As shown in Figure 2, the system architecture of SwiftStaff is built on a Three-Tier structure that organizes all platform functions across three distinct tiers: the Presentation Tier, the Application/Logic Tier, and the Data Tier. The system begins with the user—either a Hotel Manager, an HM Student, or the Super Admin—who accesses the platform through their respective interface. Hotel Managers and the Super Admin interact through the SwiftStaff Web System via a browser-based dashboard, while HM Students access the SwiftStaff Mobile Application on their Android devices.

When a hotel manager posts a shift request, the Presentation Tier forwards it to the Application/Logic Tier, where five core service modules process the transaction. The Auth and Account Management module verifies user identity and role-based access, ensuring that only approved accounts can operate within the system. The Shift Posting and Matching module then filters the student manpower pool based on skill tags, availability, and profile criteria, returning ranked candidates to the manager. Once a student is selected, the Push Notification Module—powered by Firebase Cloud Messaging—dispatches a real-time alert to the student's mobile device, who may then accept or decline the offer directly within the application. Following shift completion, the Rating and Feedback Module prompts both parties to evaluate one another, while the Reports and Analytics Module aggregates all platform activity into performance summaries accessible to the Super Admin.

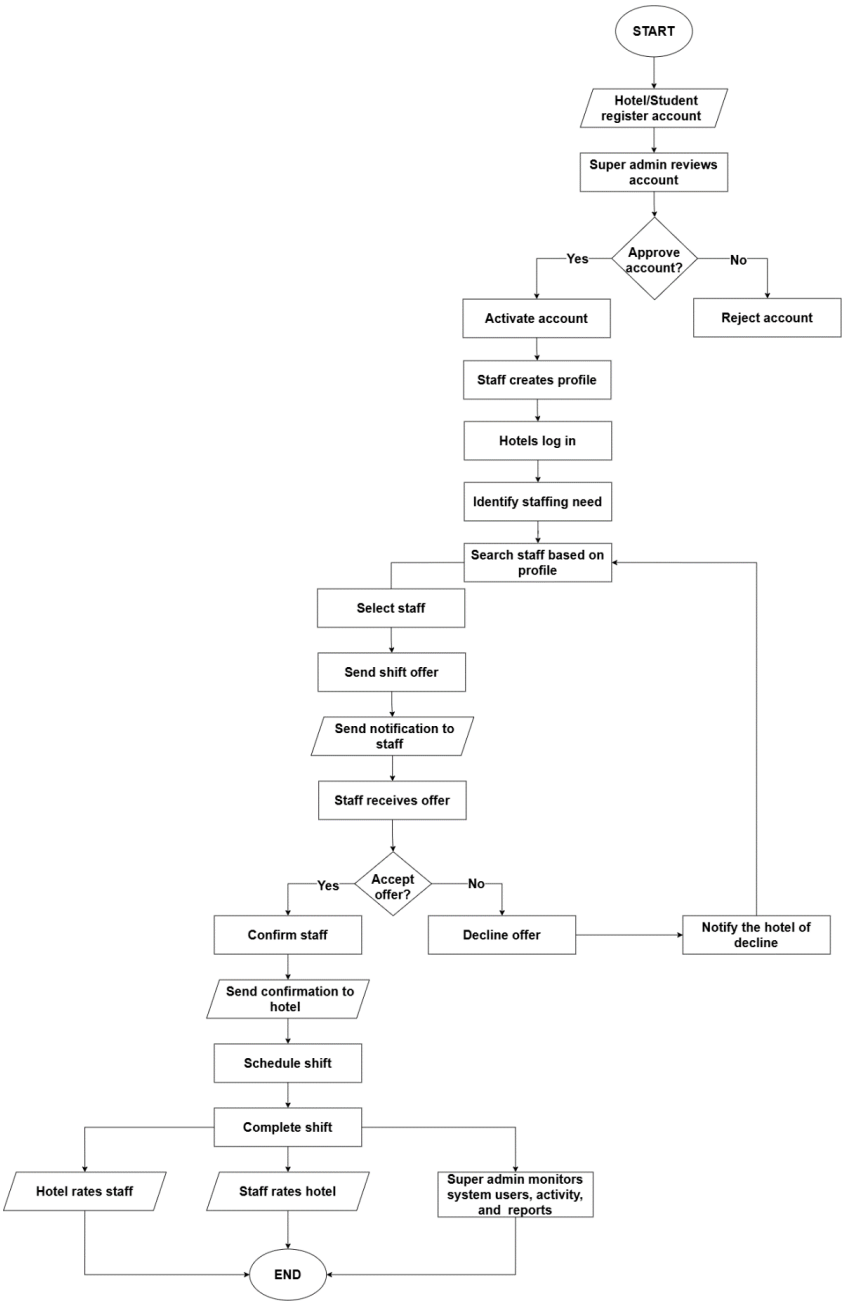
All transactions, user records, shift histories, and ratings are persisted in the Data Tier through a hybrid database composed of MySQL and Firebase. MySQL handles structured relational data such as accounts, hotel profiles, and shift records, while Firebase manages real-time session states and notification queues. The development of this architecture enables the staffing process to be efficient, reliable, and transparent. By automating shift matching and notifications, it is expected to reduce the inefficiencies of informal recruitment and to speed up the deployment of on-call staff during peak occupancy periods. Additionally, it enhances data security and traceability by storing all transactions, shift records, and ratings in a centralized cloud-based database accessible to authorized users across the platform.

In addition to the system architecture, the flowchart shown in Figure 3 illustrates the staffing process as a sequential operation, covering critical steps such as account verification, shift posting, student matching,

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offer acceptance, and the mutual rating process upon shift completion. This flowchart makes it possible to track the overall system workflow and ensure that each stage of the staffing cycle operates as intended.

Figure 3. SwiftStaff Staffing Request Process Flow



As shown in Figure 3, the workflow begins when hotels or students register an account, which the Super Admin reviews and either approves or rejects. Approved accounts are activated, after which students and hotels complete their profiles, and the hotel logs in to identify a staffing need, searches for matching staff, and sends a shift offer. The selected student receives a push notification and may accept or decline. Acceptance confirms the shift; declination prompts the hotel to search for alternative staff. Upon shift completion, the hotel rates the student and the student rates the hotel, supporting service quality and platform reliability.

Prototype Development

The prototype implements the architecture and workflow described above. The following screens illustrate its main interfaces. As shown in Figure 4, the login screen authenticates users via email and password through Firebase Authentication and routes them to the appropriate role-based dashboard.

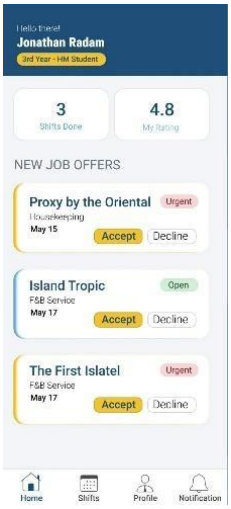
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Figure 4. Authentication and Login Interface



As shown in Figure 5, students view available shifts, filter offers by hotel, date, or role, and receive real-time notifications of new opportunities.

Figure 5. Student Dashboard and Job Offers



As shown in Figure 6, both hotels and students can review upcoming shifts, completed engagements, and overall performance history within a unified interface.

Figure 6. Shift Management and History



As shown in Figure 7, managers can create shift requests, monitor confirmed bookings, and review a curated pool of qualified student staff drawn from the verified registry.

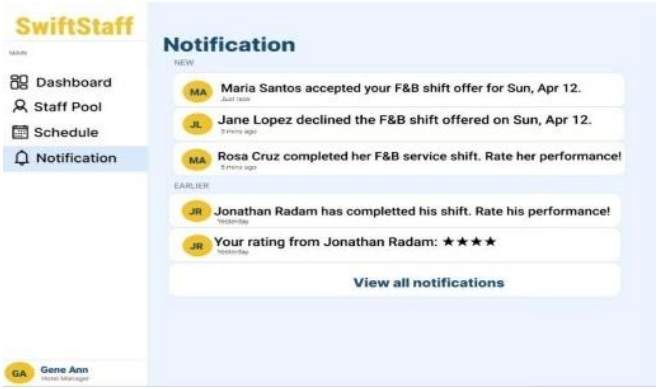
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Figure 7. Hotel Manager Dashboard



As shown in Figure 8, push notifications inform users of new job postings, acceptances, cancellations, and reminders for upcoming shifts, ensuring that critical updates reach both parties without dependence on third-party messaging apps.

Figure 8. Notification and Alert System



CONCLUSION

This study designed and prototyped SwiftStaff, a mobile-based platform for manpower pooling and on-call staffing for hotels in Western Pangasinan, built on a Three-Tier System Architecture. The proposed architecture and its embedded features are designed to address the current workforce deployment inefficiencies of the region's hospitality sector. The platform provides fast, real-time delivery of shift offers to qualified students through push notifications, which is intended to reduce dependence on informal social-media channels as well as no-shows and last-minute cancellations. Skill-based matching is intended to ensure that the right HM students are deployed to each role, minimizing mismatches that affect hotel service quality. Role-specific dashboards enable systematic monitoring of shift fulfillment and completion status, keeping management informed of manpower availability at all times. A mutual rating and feedback mechanism maintains accountability for both hotels and students, improving the reliability and professionalism of the manpower pool over successive staffing cycles. The reports and analytics module further supports the Provincial Tourism Office in analyzing staffing trends, monitoring platform performance, and informing workforce planning and curriculum alignment for PSU Alaminos City Campus.

The completed prototype indicates that a locally adapted, mobile-first workforce solution structured on a three-tier architecture is technically feasible and can meaningfully reduce the inefficiencies associated with informal recruitment, strengthen the link between the university and the hospitality industry, and contribute to the broader digital transformation of tourism services in Western Pangasinan. The formal acceptability evaluation involving the Provincial Tourism Office, hotel representatives, IT experts, the ICTMO coordinator, and Hospitality Management students is scheduled for the deployment phase, and the corresponding weighted-mean results will be reported in a follow-up publication. Future enhancements may

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include expanded coverage to other Pangasinan municipalities and dedicated analytics dashboards for the local government and university to inform workforce planning and curriculum development.

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