Mobile Application Based on Geolocation for the Recruitment of General Services in Trujillo, La Libertad

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***Abstract*—Currently, there is no technological solution that efficiently facilitates the offering of general services by independent workers in the city of Trujillo. This limitation reduces job opportunities, as workers secure fewer contracts due to reliance on client recommendations, a method that is often inefficient due to long response times and low accessibility. Leveraging the versatility of mobile applications. This study contributes to computer science by demonstrating how cloud-based data management, real-time communication, and location-based service matching using Google APIs optimize service efficiency and user experience. The study follows an applied research approach with a quantitative methodology, employing a pre-experimental explanatory design and a sample of 22 workers selected through non-probabilistic convenience sampling. The development was carried out using the Flutter framework and the Dart programming language, with an SQL database hosted on Microsoft Azure cloud services. The Mobile-D agile methodology guided the development process. After implementing the application, the results showed an 86.79% reduction in the average hiring process time, a 50% increase in the number of contracts completed, and a 51.27% improvement in workers' average satisfaction. These findings highlight the effectiveness of mobile and cloud computing technologies, along with ranking algorithms and geolocation services, in streamlining labor market interactions and improving user experience.**

Keywords*—Mobile application; recruitment; geolocation; general services

I. Introduction

We live in an era defined by technological advances, where virtually any activity, from education and business to finance and entertainment, can be completed through mobile devices [1]. The widespread penetration of these devices is evident in statistics showing that 45% of people in 40 countries use non-smartphones, while 43% opt for smartphones [2]. This context of mobile connectivity has led to the emergence of apps as the main communication channel in modern society, standing out for their versatility and efficiency in accessing important and reliable information at any time of the day [3].

The influence of the digital age extends even to the workplace, where the conventional job search has been replaced by digital platforms, which have proven successful in connecting professional candidates with potential employers [4]. Globally, unemployment rates are higher in wealthy countries than in poorer ones, especially among less-educated workers who face greater difficulties adapting to a labor market driven by technological progress that primarily benefits the highly skilled [5]. The deindustrialization of the manufacturing sector has led to a significant decline in "blue-collar" jobs, reflecting a polarization of employment that particularly affects intermediate-skilled occupations. While unemployment among more educated workers remains stable, less educated workers experience rising unemployment rates as GDP per capita increases. This indicates that skill-biased economic development contributes to higher unemployment rates among less-skilled workers, who often must abandon self-employment to seek salaried jobs in an increasingly competitive and precarious labor environment [6].

However, many workers offering services such as electricians, plumbers, builders, tailors, carpenters, among others, lack access to a technological tool with similar characteristics to those available in other sectors, which would facilitate finding job opportunities [7]. This situation forces them to rely heavily on word-of-mouth recommendations from previous clients to secure jobs [8]. On the other hand, for clients, finding trustworthy personnel without the help of the internet can be an arduous and tedious task, as the waiting time to contact a worker is often lengthy [9].

According to study [10], digitalization is transforming the labor market by facilitating job searches and recruitment via the internet, fostering labor mobility, increasing efficiency, and reducing structural unemployment, thereby improving the flow of workers between employers. Social media enables workers to promote themselves to employers outside their local markets, and a significant portion of European freelancers find employment through these platforms. Digital technologies are also driving new forms of employment, such as temporary work distributed through task-based service platforms. These changes have positioned private digital intermediaries as central players in labor market operations, creating new considerations for policymakers.

In the context of the COVID-19 pandemic, the International Labor Organization (ILO) assessed its impact on the labor market and the rapidly evolving situation. It analyzed employment and unemployment rates, as well as global working hours in the European Union. Results showed a 5.4% decline in the first quarter of 2020 and a 14% decline in the second quarter compared to the fourth quarter of 2019. Notably, these declines were less pronounced in Europe and Central Asia, with decreases of 3.4% and 13.9%, respectively [11].

In Trujillo, La Libertad, the absence of a digital platform to connect independent workers with clients limits job

opportunities and service quality. To address this challenge, this research aims to develop a mobile application to facilitate the hiring of general services, optimizing the process and benefiting both providers and consumers. Thus, the following question was formulated: How can the implementation of a mobile application improve the hiring of general services in Trujillo, La Libertad, in 2024? The specific questions were as follows: How does the implementation of a mobile application based on geolocation reduce the hiring process times for general services in Trujillo, La Libertad, in 2024? How does the implementation of a mobile application based on geolocation improve the number of contracts in the hiring process for general services in Trujillo, La Libertad, in 2024? How does the implementation of a mobile application based on geolocation improve satisfaction in the hiring process for general services in Trujillo, La Libertad, in 2024?

II. State of the Art

The authors in study [9] addressed the stagnation problem of manual labor startups in their early stages by proposing a geolocated mobile job portal. This portal acts as an intermediary, connecting workers with users based on geographical proximity, thereby improving job prospects and the number of hires for these workers. The methodology employed was an Incremental model, allowing for continuous evaluation and improvement of the software after each development cycle. The application consists of three main modules: login, service requests by users, and request acceptance by providers. This modular approach enhances usability and maintenance while enabling advanced features such as suggesting additional services based on the nearest available personnel. The research concluded successfully, potentially contributing to reducing unemployment in Nigeria by improving connections between employers and workers.

Similarly, aiming to improve the acquisition of local repair services in Metro Manila, [12] developed "Handy Fix," a mobile application designed to optimize the experience of contracted technicians. Using a mixed-methods approach and a sample of 414 households, the challenges faced by technicians in terms of localization, communication, and payment were assessed. The results showed a significant improvement in technician satisfaction, with 89.17% of respondents affirming that the application addressed the key challenge of verifying skills and credentials. Additionally, 85% highlighted that the lack of adequate tools and safety equipment was effectively addressed through the application's integrated ratings and review system.

In another study, [13] developed an Android application that utilizes location-based services to improve the search and management of services such as plumbing, pipefitting, and electrical work. The goal was to increase the efficiency of service management for users. Using an Agile prototyping approach and tools like Android Studio and MySQL, rapid iterations were conducted based on feedback. The methodology included planning, analysis, design, and implementation phases, resulting in a system that surpassed most functional tests. Workers found the application significantly improved profile management, accounts, services, and appointments, though areas for improvement were identified, such as text appearance and ratings functionality.

Furthermore, the authors in study [14], researched and developed an Android application for domestic services, leveraging on-demand application technology to optimize the hiring of home professionals. Through a methodology combining qualitative and quantitative techniques, such as interviews, literature reviews, and case analyses of existing applications, user needs and market trends were identified. The result was an application with three modules: administrator, workers, and clients. The administrator can modify the website after logging in, while clients can describe required services, manage payments, rate services, and initiate a refund process in cases of dissatisfaction. The application significantly improved the service hiring experience, with recommendations provided for its successful market implementation.

The study by [15] examined the evolution and impact of on-demand home service platforms. Using a qualitative and quantitative exploratory-descriptive design, market data, growth trends, and user satisfaction surveys were analyzed. The results highlight the importance of mobile applications in efficiently connecting workers and clients, improving work organization and management, and optimizing service quality and customer satisfaction. However, challenges related to security and trust in mobile technology persist.

The authors in study [16] analyzed the on-demand home service industry and proposed improvements to applications to offer a smoother and more user-friendly experience. Using a descriptive methodology based on literature reviews, market analyses, and user experience evaluations, the study emphasizes the need to enhance service quality, labor rights, and sustainability. The results suggest that applications like Urban Company and TaskRabbit could benefit workers by implementing training programs, quality control measures, and labor policies that ensure fair pay and job security. Moreover, integrating technologies such as artificial intelligence and machine learning is proposed to optimize service allocation and personalize recommendations, enhancing efficiency and job satisfaction while reducing instability and inequality in the workplace.

According to the study by [17], a technological solution was presented to optimize the work of technicians in the home appliance repair sector. The goal is to facilitate connections between technicians and users requiring home repairs through an online platform and mobile applications. Using a quantitative approach and technological development design, the methodology employed tools like Python, Django, Geopy, and the Fast2SMS API to create an accessible and efficient interface. This platform allows technicians to receive service requests in a more organized manner, improving their access to the job market and optimizing their time by reducing unnecessary travel. The results show a significant improvement in service efficiency and satisfaction for both users and providers, though no specific statistical data is provided.

Finally, the study in [18] developed an application for domestic services using the Extreme Programming (XP) methodology, integrating APIsPERU to verify user information through SUNAT and RENIEC data, enhancing security in the hiring process. The application enables real-time worker localization and optimizes logistics through its integration with

Google Maps, achieving an average response time of two seconds. Validation tests confirmed its effectiveness and integration capability with external services.

III. Objectives

A. General Objective

To determine how the implementation of a geolocation-based mobile application improves the hiring process for general services in Trujillo, La Libertad.

B. Specific Objective

- To determine how the implementation of a geolocation-based mobile application reduces the time required for the hiring process of general services in Trujillo, La Libertad.
- To determine how the implementation of a geolocation-based mobile application increases the number of hirings in the general services contracting process in Trujillo, La Libertad.
- To determine how the implementation of a geolocation-based mobile application improves satisfaction in the hiring process for general services in Trujillo, La Libertad.

IV. Materials and Methods

The methodology used for the development of the application is Mobile-D, which, according to study [19], emerges from the combination of other well-known solutions, all adhering to agile principles. It is characterized by prioritizing software functionality over extensive documentation, client participation over rigid contractual negotiation, and flexibility in the face of changes rather than strict adherence to a predefined plan. It consists of five phases: exploration, initialization, production, stabilization, and system testing.

This study employed a pre-experimental single-group design with pretest and posttest. According to study [20], this type of design allows the evaluation of the effects of an intervention or treatment on a specific sample. It is characterized by two aspects: the use of a single group of participants and a linear order requiring measurement of the dependent variable before and after the intervention or treatment is implemented.

This research was classified as applied and adopted a quantitative approach, with an explanatory level and a pre-experimental design. The study population was selected using non-probabilistic convenience sampling, comprising 22 workers, considering the time and resource constraints for the research. Therefore, the size is the same as the population.

To measure the key indicators of the study, carefully selected techniques and instruments were employed. The "Average hiring time for personnel" and the "Number of hirings" were analyzed using the ratio technique, with an observation sheet that enabled the collection of accurate and quantifiable data on these aspects. Meanwhile, the "Satisfaction level with services" was assessed using a Likert scale, through a structured questionnaire designed to capture users' perceptions and satisfaction regarding the service. These instruments were validated and approved by experts to ensure alignment with the study objectives, guaranteeing the reliability and validity of the data collected. Table I shows indicators, techniques and instruments.

TABLE I. Indicators, Techniques and Instruments

Indicator	Technique	Instrument
Average hiring time for personnel	Ratio	Observation sheet
Number of hirings	Ratio	Observation sheet
Satisfaction level with services	Likert Scale	Questionnaire

V. Methodology

The development of the mobile application was conducted using the Mobile-D methodology, which comprises the following phases: (A) Exploration, (B) Initialization, (C) Production, (D) Stabilization, and (E) System Testing.

A. Exploration

During this phase, stakeholders were identified, and the project foundations were presented, considering its objectives and requirements. Additionally, the project scope was established to ensure all aspects aligned with stakeholders' expectations. The functional requirements are detailed in Table II below:

TABLE II. Functional and No-Functional Requirements

Code	Description
RF-001	Users must be able to log in according to their type (Customer or Tasker).
RF-002	Users must be able to view their service history.
RF-003	Users must be able to view their current hired services.
RF-004	Users must be able to access their active chats.
RF-005	Users must be able to update their profiles.
RF-006	The system must allow users to rate a service after its completion.
RF-007	Users must be able to search for a service by category.
RF-008	The system must provide users with nearby services or clients based on geolocation.
RF-009	The system must allow users to cancel a service request.
RF-010	The system must enable Taskers to schedule a service for a specific date and time.

B. Initialization

Fig. 1 illustrates the development environment, utilizing Visual Studio Code for the frontend and Spring Tool Suite 4 for the backend, along with the installation of JDK 1.8 (Java 8 SE). The database will be managed using SQL Server Management Studio 20. Additionally, the development team employed the Flutter framework and the Dart programming language. Communication with clients will be facilitated through email and phone calls.

Solution Architecture

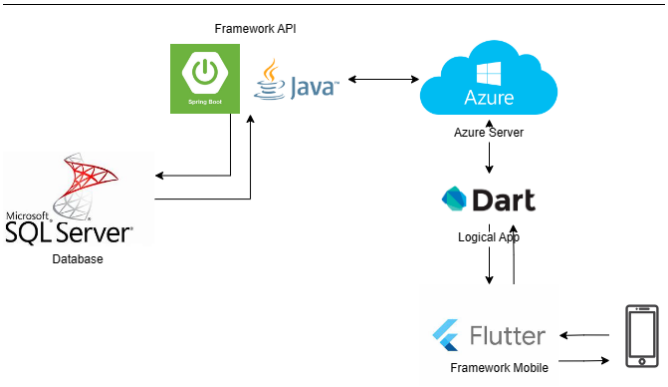

Fig. 1. Software architecture diagram.

C. Production

Planning Day (see Table III)

TABLE III. ITERATION PLANNING BY PHASE

Fase	Iterations	Description
Exploration	Iteration 0	Establishment of stakeholders, functional and non-functional requirements, scope definition, and selection of development technologies.
Initialization	Iteration 0	Creation of the mobile application architecture, requirements analysis, and interface design
Production	Iteration 1	Verification of selected tools. Development of the mobile app interfaces and database implementation and connection to Azure. Creation of the GitHub repository.
	Iteration 2	Implementation of user registration and login functionality: Tasker and Customer, using Firebase OTP service. Visualization of service categories (Service table).
	Iteration 3	User data modification through the app. Implementation of geolocation for users to search for nearby services using Google Places.
	Iteration 4	Implementation of chat between users using Firebase. Request logging implementation.
	Iteration 5	Implementation of user reviews. View of pending and completed request history.

Workday

Iteration 1. The selected tools for development were verified, and the project setup was completed, including project compilation, library downloads, credential creation for services, and proper connection to the SQL Server database. This database was uploaded to Microsoft Azure to enable simultaneous use and faster performance for the development team. For the design of interfaces, they were developed following the functional requirements outlined in the first phase, emphasizing the application's usability. Finally, the backend and frontend projects were uploaded to a GitHub repository for version control. Additionally, a web application was created on the Microsoft Azure platform, linking it to the backend project via GitHub.

Iteration 2. Using stored procedures in SQL Server and APIs in the backend project, the user registration and login functionality were developed through Firebase's OTP service. As shown in Fig. 2, users can authenticate using their phone number, receiving a unique code to be entered in the application interface. Based on stored procedure verifications of user existence in the database and the selected user type (Tasker or Customer), they are redirected to the Registration interface (as shown in Fig. 3 and Fig. 4) or the Login page. The Customer is presented with the Home screen, listing Services and Top Taskers, along with quick access to their chats. The Tasker, in turn, sees the Home screen with unopened requests and direct access to their chats. Fig. 5 show customer main menu and service search by category.

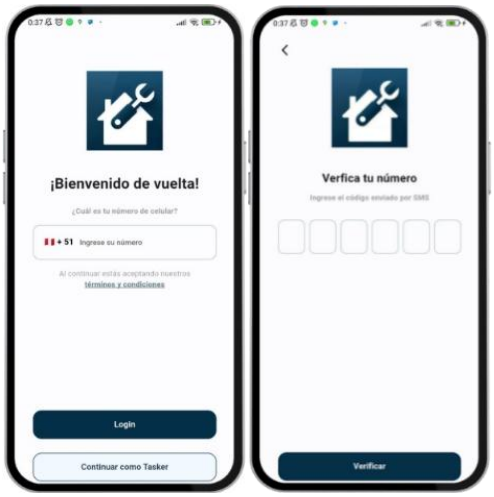

Fig. 2. OTP registration.

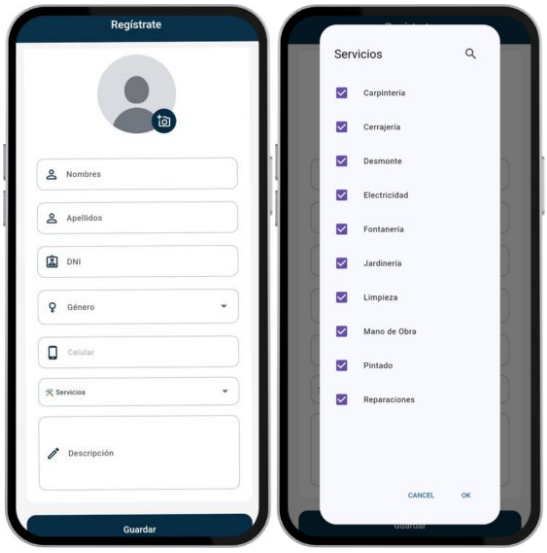

Fig. 3. Tasker registration.

Iteration 3. From the user perspective, they can now access their profile to modify their data using stored procedures. Additionally, the Google Places API will be implemented and utilized on the front end. When a user has location services enabled, their latitude and longitude data will be automatically captured and sent to the backend, allowing them to be mapped and enabling the Customer to see the closest Tasker in their area, as shown in Fig. 6 and Fig. 7.

Fig. 4. Customer registration.

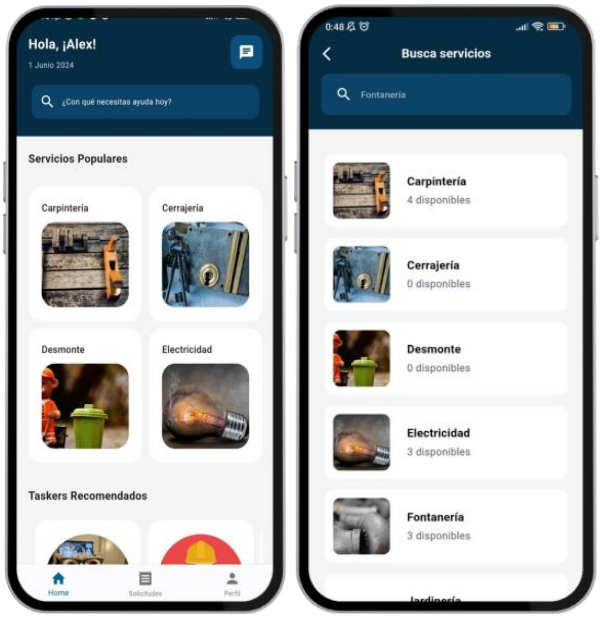

Fig. 5. Customer main menu and service search by category.

Iteration 4. During this iteration, Firebase libraries were integrated to enable chat and notification services within the application. Requests are managed with four different statuses: deleted, accepted, completed, and pending. In the Tasker view, as shown in Fig. 8 and Fig. 9, a redirection to a request registration modal was implemented, where the necessary details specified by the client are entered to confirm the request.

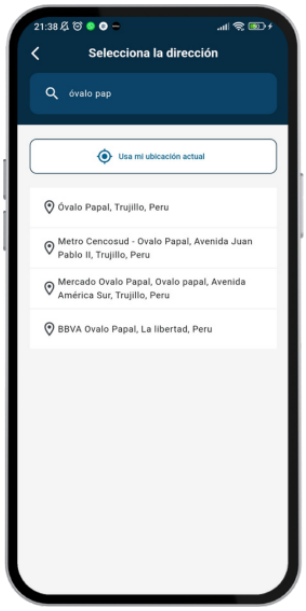

Fig. 6. Location selection via geolocation or search.

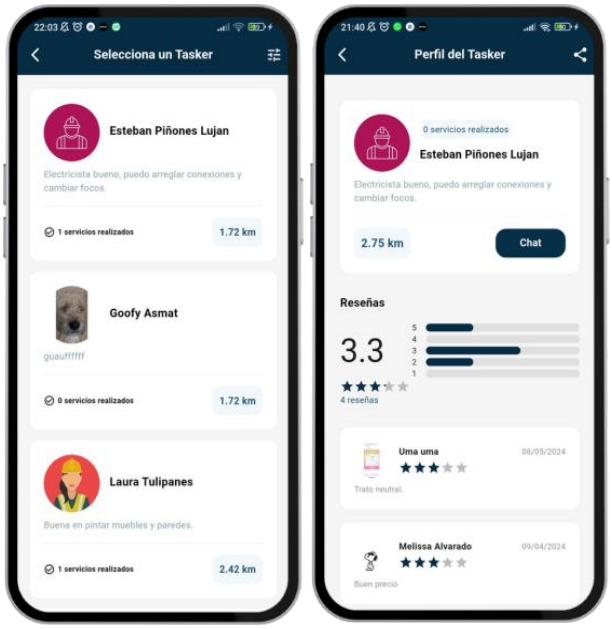

Fig. 7. Selection and profile of tasker near current location.

Iteration 5. In this iteration, as illustrated in Fig. 10, the ability to view the history of pending and completed requests was implemented, providing users with a comprehensive overview of their past interactions in the application. Additionally, a review feature was added, allowing users to leave comments and ratings on the services received once completed, as shown on Fig. 11. Consequently, Customers now see recommendations for Taskers with the highest average ratings on their home screen, while Taskers can view the ratings of the Customers requesting their services.

Fig. 8. Chat history.

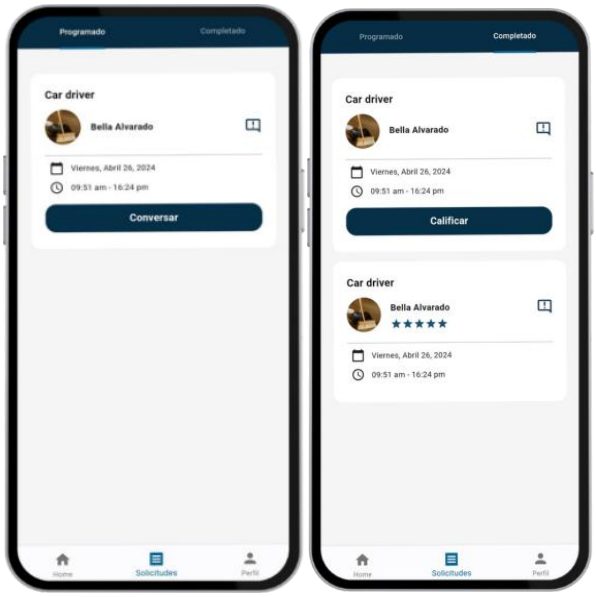

Fig. 10. History of scheduled and completed requests.

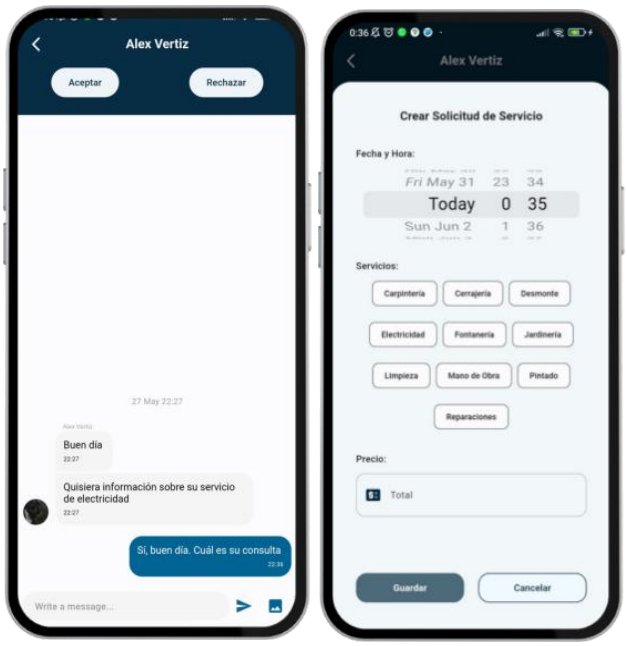

Fig. 9. Chat and service request creation.

Fig. 11. Service rating.

D. Stabilization

In this phase, a modular structure was implemented, allowing for clearer organization in both the application's architecture and interface. A bottom navigation bar was added, making it easier to access features. This improvement enhances the user experience by providing smoother interaction.

Algorithm 1: MenuTasker Navigation

```
Initialize
    Create MenuTasker as a stateful widget
    Create NavigationControllerTasker as a navigation

Compute
    Initialize controller with NavigationControllerTasker
While (the application is running) do
    Build the user interface
    For (each region of the interface) do
        Display BottomNavigationBar with three options:
            - Home
            - Requests
            - Profile
        Show the corresponding screen based on selectedIndex
    Update
        Observe changes in selectedIndex
        Update and analyze
            If (selectedIndex changes) then
                Search for the corresponding screen in the screens list
    End                 End
    End
```

E. System Testing

During this phase, unit tests were conducted to review the code and ensure that the developed and implemented product operated correctly according to the specified functionalities. Additionally, time was allocated to identify and fix any errors detected during the process.

TABLE IV. UNIT TEST

Test Scenario	Expected Outcome		Obtained result	
			RT	OK
User	Verificar Signup Tasker Service ()	searchTasker	332ms	X
		searchTaskerByUid testing	441ms	X
		saveTasker testing	285ms	X
		updateTasker testing	278ms	X
		updateProfileTasker testing	299ms	X
User	Verificar SearchCustomer Service ()	searchCustomer testing	285ms	X
		searchCustomerByUid testing	281ms	X
		updateCustomer testing	281ms	X

As shown in Table IV, the results demonstrate that the code is effective and adequately fulfills the expected functionality.

VI. RESULTS

The results presented in Table V demonstrate a high reliability of the measurement instruments used in the research. The obtained coefficients exceeded the 0.70 threshold, indicating adequate consistency in the measurements.

TABLE V. RELIABILITY

Instrument	Method	Indicator	Coefficient
Pre- and Post-Observation Sheet	Test - retest	General services contracting time	.910
Pre- and Post-Observation Sheet	Test - retest	Number of Contracts	0.843
Pre and post Questionnaire	Cronbach's Alpha	Satisfaction Level	.853

Data elaborated based on SPSS.

A. Descriptive Analysis

Indicator 1 General services contracting time

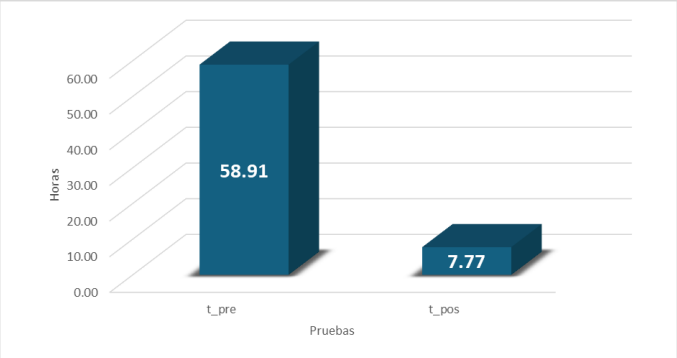

Fig. 12. Average service contracting time before and after.

According to Fig. 12, the average time to contract general services before the solution's implementation was 59 hours, and the post-implementation time was eight hours. The significant reduction in the average time after implementation suggests that the application had a positive and considerable impact on the contracting process, improving the efficiency of worker selection.

Indicator 2 Number of Contracts

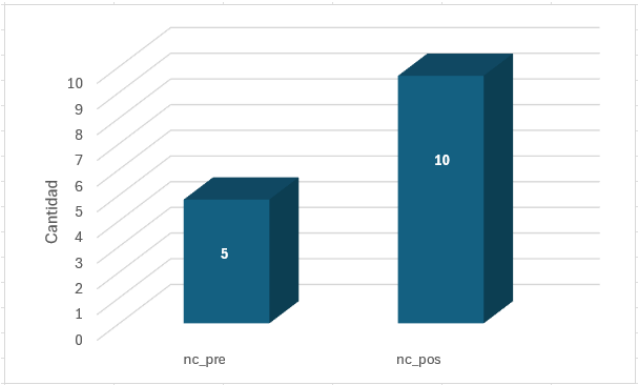

Fig. 13. Average number of contracts before and after.

According to Fig. 13, the average number of general service contracts before the implementation of the solution was 5, while after the implementation, 10 contracts were recorded. This notable increase in the number of requests demonstrates the positive impact of the solution's implementation, doubling the number of contracts and significantly improving the efficiency of the process.

Indicator 3 Satisfaction with the Contracting Process

TABLE VI. LEVEL OF SATISFACTION BEFORE IMPLEMENTATION

Category	Frequency	Percentage
Strongly disagree	7	31.82%
Disagree	13	59.09%
Neither agree nor disagree	2	9.09%
Agree	0	0%
Strongly agree	0	0%
Total	22	100%

Data elaborated from SPSS

TABLE VII. LEVEL OF SATISFACTION AFTER IMPLEMENTATION

Category	Frequency	Percentage
Strongly disagree	0	0%
Disagree	0	0%
Neither agree nor disagree	0	0%
Agree	11	50%
Strongly agree	11	50%
Total	22	100%

Data elaborated from SPSS

According to Tables VI and VII, the predominant perception of 22 workers regarding satisfaction before the implementation of the mobile application in the general service hiring process was: totally disagree 7 (31.82%), disagree 13 (59.09%), and neither agree nor disagree 2 (9.09%). However, after the implementation of the mobile application, a considerable positive impact on satisfaction was observed, with a notable increase in perception: agree 11 (50%) and totally agree 11 (50%).

B. Inferential Analysis

1) Normality test: Based on the results from Tables VIII, IX, X and XI, obtained from a sample of 22 data points, it is observed that most indicators show an asymptotic significance lower than 0.05, which suggests a non-normal distribution of the data. Therefore, the non-parametric Wilcoxon test for paired samples is used for each indicator.

TABLE VIII. SHAPIRO-WILK TEST FOR AVERAGE TIME OF THE GENERAL SERVICE HIRING PROCESS

	Statistic	*gl.*	*Sig.*
t_pre	*.887*	*22*	*.017*
t_pos	*.782*	*22*	*<.001*

Data elaborated from SPSS

TABLE IX. SHAPIRO-WILK TEST FOR AVERAGE NUMBER OF CONTRACTS IN THE GENERAL SERVICE HIRING PROCESS

	Statistic	gl.	Sig.
t_pre	.875	22	.010
t_pos	.854	22	.004

Data elaborated from SPSS

TABLE X. SHAPIRO-WILK TEST FOR AVERAGE SATISFACTION WITH THE CONTRACTING PROCESS FOR GENERAL SERVICES

	Statistic	gl.	Sig.
s_pre	.912	22	.052
s_pos	.920	22	.076

Data elaborated from SPSS

2) Hypothesis formulation

a) Alternative hypothesis: The implementation of a mobile application based on geolocation significantly improves the time, satisfaction, and number of contracts in the general service hiring process in Trujillo, La Libertad.

b) Null hypothesis: The implementation of a mobile application based on geolocation does not significantly improve the time, satisfaction, or number of contracts in the general service hiring process in Trujillo, La Libertad.

3) Hypothesis testing: Indicator 1 Contracting Process Time

TABLE XI. WILCOXON TEST FOR AVERAGE CONTRACTING PROCESS TIME FOR GENERAL SERVICES

Null Hypothesis	Test	Sig.	Decision
The median difference between t_pre and t_post is equal to 0	Wilcoxon signed-rank test for related samples	.000	Reject the null hypothesis

Data elaborated from SPSS

Since the p-value is equal to 0, which is less than 0.05, we reject the null hypothesis and accept the alternative hypothesis. This means that the implementation of a mobile application based on geolocation significantly improves the contracting process time for general services hiring process in Trujillo, La Libertad.

Indicator 2 Number of Contracts

TABLE XII. WILCOXON TEST FOR AVERAGE CONTRACTING PROCESS TIME FOR GENERAL SERVICES

Null Hypothesis	Test	Sig.	Decision
The median difference between nc_pre and nc_post is equal to 0	Wilcoxon signed-rank test for related samples	.000	Reject the null hypothesis

Data elaborated from SPSS

Since the p-value is equal to 0, which is less than 0.05, we reject the null hypothesis and accept the alternative hypothesis. This means that the implementation of a mobile application based on geolocation significantly improves the number of contracts in the general services hiring process in Trujillo, La Libertad (see Table XII and XIII).

Indicator 3 Satisfaction with the Contracting Process

TABLE XIII. WILCOXON TEST FOR AVERAGE SATISFACTION WITH THE CONTRACTING PROCESS FOR GENERAL SERVICES

Null Hypothesis	Test	Sig.	Decision
The median difference between s_pre and s_post is equal to 0	Wilcoxon signed-rank test for related samples	.000	Reject the null hypothesis

Data elaborated from SPSS

Since the p-value is equal to 0, which is less than 0.05, we reject the null hypothesis and accept the alternative hypothesis. This means that the implementation of a mobile application based on geolocation significantly improves satisfaction in the contracting process for general services in Trujillo, La Libertad.

VII. DISCUSSION

According to the results obtained, the times, satisfaction, and number of contracts in the hiring process were analyzed and compared before (pre) and after (post) the implementation of the mobile application. This app was developed using a hybrid framework to ensure cross-platform compatibility and efficient performance. The objective was to improve the efficiency of the general service hiring process through the implementation of a mobile application based on geolocation in Trujillo, La Libertad.

The results of the study reveal a significant reduction of 51.14 hours in the average time of the general service hiring process after the implementation of the mobile application. This substantial decrease demonstrates the effectiveness of mobile technology in optimizing organizational processes. The findings align with previous research [8], [13], which highlighted the potential of geolocation-based mobile applications to streamline operations and improve efficiency. Furthermore, the integration of Google Places API allowed users to easily find the nearest available taskers, further enhancing the speed and accessibility of the hiring process. These results corroborate the research proposed by study [20] regarding the importance of time as a key performance indicator in various functional areas.

After the implementation of the mobile application, a notable 50% increase in the number of contracts was observed, rising from an initial average of 5 to 10 contracts. This increase clearly reflects the ease and effectiveness the application offers in accelerating the general service hiring process. These results are consistent with those reported in study [17], where it was demonstrated that mobile applications not only optimize process organization but also significantly expand access to the job market. Similarly, the results reinforce the argument made by [9], which suggests that the development of a location-based job portal has a positive impact on increasing the number of contracts.

Regarding satisfaction levels, an increase in the satisfaction average from 55% to 83.2% was observed after the mobile application implementation, indicating that employees are more satisfied with the hiring process for their services after adopting this tool. These findings coincide with those reported in study [12], where it was determined that the implementation of a location-based mobile application significantly improved technician satisfaction by 89.17% by providing a more organized environment. Similarly, the study in [13] highlighted that the development of a location-based mobile application for facilitating service search increased satisfaction in the hiring process management. These results also reinforce the claims of [18], who argues that satisfaction is achieved through the standardization and optimization of processes, which enhances quality and, consequently, overall satisfaction.

VIII. CONCLUSION

The implementation of a mobile application based on geolocation has proven to be effective in improving the efficiency of the general service hiring process in Trujillo, La Libertad, by significantly reducing the average process time and increasing the satisfaction level and number of worker contracts.

The average time of the hiring process was reduced from 58.91 hours before implementation to 7.77 hours after, representing an 86.79% decrease. This result was confirmed by the Wilcoxon test, which showed a significant level lower than 5%, confirming the acceptance of the alternative hypothesis.

Similarly, the average number of worker contracts in the hiring process increased from 5 to 10 after the implementation of the mobile application, which equals a 50% increase. This increase was also validated by the Wilcoxon test, with a significance level lower than 5%, reaffirming the effectiveness of the technological intervention.

Additionally, the average worker satisfaction in the hiring process increased from 55% to 83.2% after the mobile application implementation, which represents a 51.27% increase. This increase was also validated by the Wilcoxon test, with a significance level lower than 5%, reaffirming the effectiveness of the technological intervention.

Finally, this study contributes to computing by demonstrating how cloud-based data management, real-time communication, and location-based service matching using Google APIs optimize service efficiency and user experience. Additionally, the platform implemented a ranking algorithm that sorts service providers based on their ratings, ensuring that users can easily find the highest-rated professionals, leading to a more reliable and efficient hiring experience

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