

Developing a Mobile Application for Project Bidding and Service Matching

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Abstract

The rise of the gig economy and the increasing demand for flexible, remote work have transformed the freelancing landscape. This paper presents the development of a mobile application designed to streamline the process of project bidding, user management, and service matching for freelancers. Built using Java and Android Studio, the application employs Agile development methodologies to ensure robust performance and a seamless user experience. Key features include user registration and verification, a secure project-bidding platform, and efficient database management with SQLite. The app also utilises the Glide library for optimised image handling, ensuring smooth interaction for freelancers and clients alike. Initial results indicate that the platform effectively connects clients with freelancers by providing an intuitive, reliable, and secure service-matching environment. This paper explores the technical design, challenges, and future directions of the application, emphasising its potential to improve freelancing workflows and address key issues such as decision fatigue and trust in digital platforms.

Keywords: freelancing, economy, mobile application, service matching, Java, Android development.

JEL Classification: O32; L86; C88.

Introduction

The increasing demand for flexible, remote work has significantly transformed the landscape of global employment, with independent contractors, or freelancers, becoming a prominent part of the workforce. Freelancers now offer their expertise across a wide range of industries, from creative fields to technical services, tapping into a global market that values autonomy, flexibility, and specialized skills. This rise in freelancing is closely linked to the rapid expansion of digital platforms, which facilitate seamless communication, collaboration, and service delivery between freelancers and clients. These platforms have simplified the process of finding, hiring, and working with freelancers, making it easier for both clients and contractors to engage in mutually beneficial relationships.

However, despite these advancements, freelancers still face several challenges, such as managing projects efficiently, ensuring secure transactions, and navigating the complexities of contract bidding and service matching. While various freelance platforms exist, many fail to provide a unified solution that effectively addresses these issues. In this context, the development of a dedicated mobile application tailored to the specific needs of independent contractors is crucial. This application aims to expedite processes like project bidding, secure payment handling, job organization, and contract management, thereby enhancing the freelancing experience for both freelancers and their clients.

The primary goal of this paper is to design and build a mobile application that is not only functional but also intuitive and user-friendly, enhancing productivity and the overall user experience. The application will enable freelancers to easily register, authenticate their identities, and place bids on projects listed by clients, offering a streamlined solution to service matching. The app will help mitigate common issues such as decision fatigue, trust concerns, and time management challenges faced by freelancers.

1. Literature Review

Over the past decade, the freelance market has undergone significant transformations, driven by shifts in work preferences and advancements in digital technologies. This section of the paper explores key concepts in the gig economy, characteristics of freelancing platforms, and the technologies and methodologies involved in the development of mobile applications for freelancers.

The "gig economy" is a term used to describe a labour market characterized by short-term, flexible, and freelance employment arrangements, as opposed to traditional, permanent employment. This paradigm shift has been largely facilitated by digital platforms that connect freelancers with clients, enabling individuals to work remotely and flexibly across various fields. Katz & Krueger (2019) highlight that the gig economy has seen significant growth, with an increasing number of individuals opting for freelance work due to its flexibility, independence, and the potential for a more balanced work-life dynamic. According to Manyika et al. (2016), freelancers now represent an increasingly vital segment of the labour force in many economies, driving innovation, economic diversification, and the expansion of digital services. Also, Johnes (2019) highlights these dynamics, providing a wide analysis of the gig economy in the UK from a regional perspective, emphasizing the varying impacts across different areas and the need for tailored policy responses.

The growth of the gig economy has been spurred by technological innovations, such as the widespread adoption of smartphones, digital payment systems, and communication tools, all of which have made it easier for independent contractors to find clients and for clients to locate qualified freelancers. With the rise of these technologies, the nature of work has fundamentally changed, allowing for more flexible, decentralized, and specialized job structures. As more people embrace freelance work, the gig economy is reshaping labour markets globally, influencing sectors ranging from creative industries to IT, healthcare, and finance.

The proliferation of freelance marketplaces, such as Upwork, Fiverr, and Freelancer, has contributed to the growth of the gig economy by creating virtual platforms where clients and freelancers can connect, negotiate, and collaborate. These platforms enable freelancers to showcase their skills and expertise, bid on jobs, and secure projects from clients across the globe. According to a 2019 report by Upwork and Freelancers Union, the demand for flexible work arrangements has surged, with millions of freelancers participating in these digital platforms.

Upwork as one of the largest and most widely used freelance marketplaces, offers a diverse range of services across various industries, including writing, design, programming, and marketing. The platform operates on a bidding system, where freelancers submit proposals for jobs posted by clients. Key features include time tracking, milestone management, payment processing, and a comprehensive feedback and rating system that enhances transparency and trust (Upwork, 2020). Fiverr takes a different approach by allowing freelancers to list pre-packaged services, known as "gigs," at fixed prices. This model simplifies the process for clients by providing them with a clear understanding of service offerings and prices upfront. However, it can limit the scope for negotiation and customization, particularly for more complex or tailored projects (Fiverr, 2020). Freelancer combines elements of both Upwork and Fiverr offering a marketplace where freelancers can bid on jobs or participate in competitions to complete specific tasks. This platform also supports a wide range of service categories and features such as client contests, which encourage creativity and competition among freelancers (Freelancer, 2020).

Despite the advantages of freelance platforms, they face several challenges that can affect both freelancers and clients. One of the most pressing issues is the verification of user identities. As freelancers work remotely, ensuring their legitimacy and qualifications is vital to maintain trust within the platform. Robust identity verification mechanisms are necessary to prevent fraud and enhance the security of the transaction process. Yang et al. (2020) emphasises the importance of identity verification to protect users from scams, ensuring the platform maintains integrity and reliability.

Another significant challenge faced by freelancing platforms is the security of financial transactions. As digital platforms handle a growing volume of payments, the risk of cyberattacks and data breaches increases. The

cybersecurity landscape is evolving rapidly, with cybercriminals targeting digital payment systems and sensitive user data. Cybersecurity Ventures (2020) estimates that by 2025, the annual cost of cybercrime will reach \$10.5 trillion, highlighting the critical need for secure transaction mechanisms in freelance platforms. To address this, platforms must implement advanced encryption methods, secure payment gateways, and robust fraud detection systems to protect both freelancers and clients.

The development of mobile applications for freelance platforms requires the integration of various technologies to ensure a seamless, efficient, and user-friendly experience. These technologies enable the functionality necessary for freelancers and clients to interact, manage projects, and complete transactions securely, as follows:

- Android Studio is the preferred integrated development environment (IDE) for developing Android applications, offering a comprehensive set of tools for building, testing, and debugging apps. Google (2020) notes that Android Studio provides a user-friendly interface and robust features, such as real-time collaboration and compatibility with the Android operating system, making it ideal for mobile app development.
- Java remains one of the most widely used programming languages for Android app development due to its stability, scalability, and extensive support within the Android ecosystem. According to Oracle (2020), Java's interoperability with the Android platform and its extensive library support makes it an optimal choice for developing complex mobile applications like freelance platforms.
- SQLite is a lightweight, portable database management system widely used for mobile application data storage and retrieval. Due to its simplicity and efficiency, SQLite is ideal for mobile applications that require local storage, such as freelance platforms that manage user profiles, project data, and transaction histories (Gaffney et al., 2022).
- Glide is a popular Android library used for efficient image loading and caching. It is particularly useful in freelance applications where user profiles, project portfolios, and visual content must be displayed quickly and smoothly. Glide (BumpTech, 2020) helps ensure that images are loaded efficiently, contributing to an improved user experience.
- Firebase, a platform developed by Google, offers a wide range of tools for real-time database management, user authentication, and analytics. Firebase excels in handling real-time data synchronization and managing user authentication, which are crucial for maintaining seamless communication between clients and freelancers (Firebase, 2020). It also provides cloud-based services for securely storing and managing user data.

The Agile development methodology has become increasingly popular in the field of software development due to its iterative and flexible approach. According to Beck et al. (2009), Agile divides the development process into smaller units called sprints, allowing for continuous feedback and rapid adaptation to changing requirements. This iterative approach helps developers stay responsive to client needs, ensuring that the final product meets user expectations. Agile practices such as daily stand-ups, sprint reviews, and retrospectives foster collaboration, transparency, and timely problem resolution, making it an ideal methodology for building dynamic and user-centered freelance platforms. Alsaqqa, Sawalha, & Abdel-Nabi (2020) emphasize that agile software development encompasses various methodologies, each with distinct advantages and disadvantages. They argue that there is no universally optimal methodology for all projects, as the selection must account for the specific characteristics, requirements, and constraints of each project. For example, agile methodologies are better suited for smaller organizations with fewer employees and lower budgets, whereas traditional methods may be more effective for large-scale organizations, extensive teams, and projects with critical or substantial budgets. This careful selection process ensures the methodology aligns with the project's unique needs and organizational context.

User experience (UX) design is important in the success of mobile applications, particularly those used for freelancing. Nielsen (2012) argues that a well-designed user interface can significantly enhance user engagement,

satisfaction, and retention. Freelance platforms must offer intuitive, responsive, and aesthetically appealing interfaces to ensure that users can easily navigate the app and access essential features. Good UX design focuses on simplifying complex processes, improving usability, and ensuring a seamless experience across multiple devices. For freelance applications, UX design is integral in ensuring that both clients and freelancers can easily register, place bids, communicate, and manage projects efficiently.

2. Research Methodology

This study employed a systematic, iterative, and user-focused methodology to design and develop a mobile application for independent contractors. The Agile development framework served as the backbone of the development process, enabling adaptive responses to stakeholder feedback while ensuring that the final product aligned with user requirements and expectations. Android Studio was utilized as the primary Integrated Development Environment (IDE), and Java was chosen as the core programming language for its robustness and compatibility with Android platforms. To ensure efficient local data management, SQLite was adopted as the database management system, while the Glide library was integrated to optimize image handling and caching, further enhancing the app's functionality and user experience.

The Agile methodology was selected due to its iterative and incremental approach, which is particularly effective in dynamic projects with constantly evolving requirements. Agile fosters flexibility, adaptability, and collaboration, making it well-suited for software development projects. Agile facilitated the timely delivery of functional software increments while enabling ongoing improvements based on feedback, structuring the development process into iterative cycles. Agile emphasizes four core values and twelve guiding principles, as articulated in the Agile Manifesto:

- Agile prioritizes collaboration and open communication among team members, fostering an adaptive and cooperative environment.
- The methodology focuses on delivering functional software as a tangible outcome, rather than extensive documentation that may not directly impact user satisfaction.
- Agile involves clients and stakeholders throughout the development process to ensure alignment with their evolving needs and expectations.
- Agile's flexibility allows it to accommodate changes in requirements or priorities, even in the later stages of development.

The Agile methodology incorporates principles such as continuous delivery of valuable software, welcoming changing requirements, maintaining a sustainable development pace, and fostering effective communication among team members and stakeholders. Agile teams are typically self-organizing and prioritize simplicity, maximizing the amount of work not done while ensuring timely delivery of functional software. The development process was divided into a series of sprints, each representing a time-boxed iteration during which specific features and functionalities were developed. Each sprint was structured into the following phases:

- *Planning:* During the planning phase, stakeholders and the development team collaborated to define sprint goals, scope, and priorities. The Product Owner reviewed and prioritized the Product Backlog, while the development team selected items for the Sprint Backlog. A detailed plan was created, including the definition of a sprint goal and the allocation of tasks.
- *Execution:* The development team worked on implementing the selected features and enhancements during the execution phase. Daily stand-up meetings were held to track progress, address challenges, and maintain alignment with sprint goals. These meetings facilitated effective communication and ensured that any obstacles were promptly resolved.
- *Review:* At the end of each sprint, a Sprint Review meeting was conducted to showcase the completed product increment to stakeholders. Feedback was collected and used to refine the Product Backlog, ensuring that future sprints addressed user requirements and expectations effectively.

- **Retrospective:** Following the Sprint Review, the team conducted a Sprint Retrospective to evaluate the sprint process. The retrospective provided an opportunity to identify successes, challenges, and areas for improvement. Concrete action items were developed to optimize workflows and enhance productivity in subsequent sprints.

Figure 1: Agile methodology frameworks



A variety of tools and technologies were employed to ensure the successful development of the mobile application, with each tool chosen for its specific features, compatibility, and contribution to the overall project goals.

Android Studio, as the official Integrated Development Environment (IDE) for Android development, provided a robust platform with a comprehensive suite of tools for designing, debugging, and testing. Its advanced layout editor enabled the creation of intuitive, responsive, and visually appealing user interfaces, while features such as code completion, debugging tools, and performance profilers ensured efficient development workflows. Java was selected as the primary programming language due to its reliability, scalability, and extensive support for Android development. Its object-oriented nature and compatibility with Android's runtime environment made it an ideal choice for building secure and efficient applications. For local data storage and offline functionality.

Morales, Botella, Rusu, & Quiñones (2019) highlight the challenges faced by programmers and software developers when using Integrated Development Environments (IDEs), noting that these tools are often complex and not user-friendly for novice programmers. They emphasize that the learning curve for IDEs can span several weeks, with usability and user satisfaction frequently falling short of expectations. As a specific aspect of User Experience (UX), the Programmer eXperience (PX) is influenced by the usability of IDEs and associated tools. Through a survey, their study evaluates the usability of various IDEs, shedding light on programmers' behaviors and proposing improvements to enhance their experience.

SQLite, a lightweight relational database management system, was used. Its efficiency, portability, and minimal configuration requirements made it an excellent option for managing user and project data within the application. Git, a distributed version control system, played a crucial role in facilitating effective collaboration among developers by tracking changes to the source code and enabling concurrent contributions. Features such as branching, merging, and version history helped ensure a streamlined development process.

Additionally, Glide, an open-source image loading and caching library, was integrated to optimize the retrieval and display of images within the application. This was particularly beneficial for features such as user profiles and project portfolios, where efficient image handling significantly enhanced the user experience.

The choice of Agile as the development framework was driven by the need for flexibility, adaptability, and stakeholder engagement. The iterative nature of Agile ensured that the application evolved in response to user feedback, resulting in a product that met functional and usability requirements. The tools and technologies selected were based on their compatibility with Android platforms, their ability to enhance development efficiency, and their contribution to the overall functionality and performance of the application. Combining the Agile methodology with state-of-the-art development tools, this project achieved a balance between user-centric design and technical excellence. The iterative process allowed for continuous improvement, ensuring that the final application was both robust and responsive to user needs.

3. Application Functionality

To ensure a seamless and intuitive user experience, significant effort has been dedicated to the design of the "Service Matching" mobile application. This design prioritizes user accessibility and simplicity, with particular attention given to the registration, authentication, and dashboard pages, which are crucial for user onboarding and platform interaction. These interfaces have been carefully crafted to optimize functionality and ease of use for different users, including clients, freelancers, and administrators.

The registration page is designed to efficiently collect necessary information for user account creation. The page features a clear and logical layout, with the application logo positioned at the top. Key components include fields for full name, email address, and password, along with an account type dropdown (customer, freelancer, or administrator). A "Register" button initiates the account creation process, while a text link directs users with existing accounts to the login page.

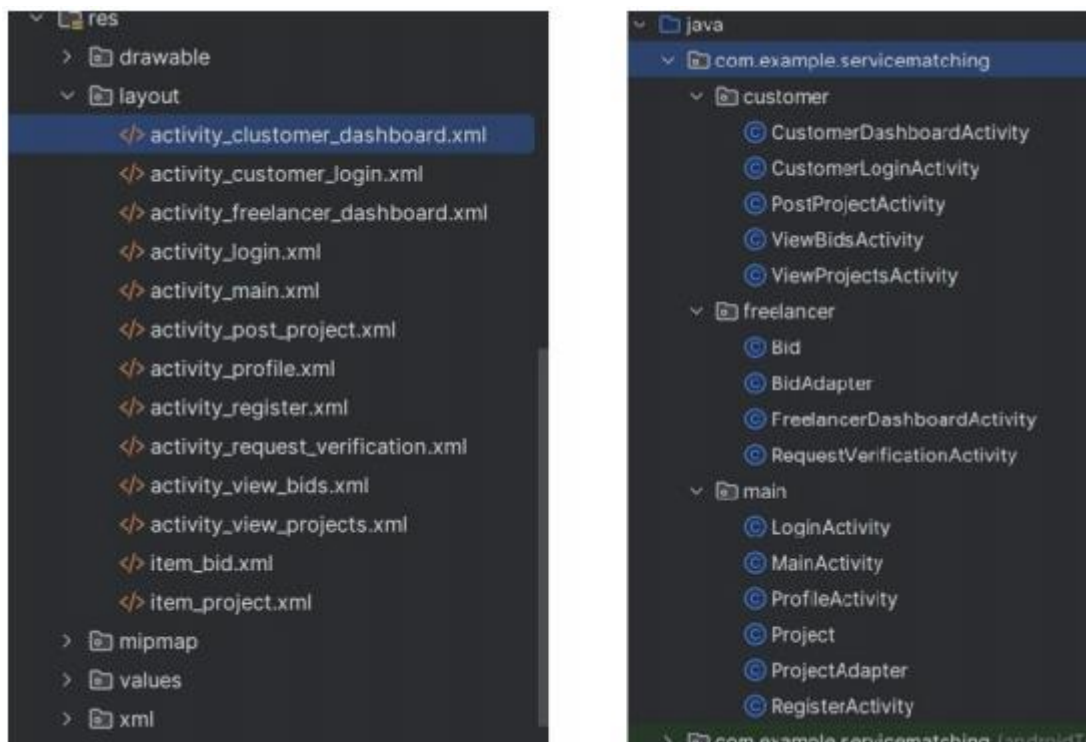
For user authentication, the application mirrors the design of the registration page, ensuring a consistent and cohesive experience. The authentication page includes fields for email and password input, a "Sign In" button, and additional links for password recovery and account registration. The overall layout maintains visual continuity with the registration page, reinforcing the brand identity through consistent logo placement.

The customer dashboard is designed to provide easy access to key features of the platform, such as project posting, profile management, and project browsing. The interface is straightforward, with large, clearly labelled buttons for posting projects, viewing existing projects, managing the user profile, and logging out. The design focuses on simplicity and consistency, with uniform button styles and legible fonts to ensure accessibility for all users. The dashboard also features a responsive design, adapting seamlessly to various screen sizes and orientations.

In addition to the core dashboard functionalities, the platform includes specialized pages such as the Post Project layout, which allows clients to submit new projects for freelancers, and the Update Profile layout, where freelancers can update their personal and professional information. The Request Verification layout enables users to submit verification details, essential for maintaining platform security. For administrators, a dedicated dashboard page provides access to account management and verification approval tasks.

The XML layout files in left side, and in the right-side Java classes responsible for implementing the application's functionalities (Figure 2). Classes are grouped into packages called main, freelancer, and customer. Each package has supporting classes and activities that manage the logic and functions of the program.

Figure 2: App Service Matching: Layout and Java Classes



A robust and scalable database underpins the "Service Matching" application, with SQLite chosen for its reliability in mobile environments. The database schema is structured to support the application's primary use cases, including user registration, project bidding, account management, and verification requests. The database design ensures the integrity, security, and performance of these core functionalities, facilitating a seamless user experience while maintaining high standards of data protection.

Key use case scenarios include user registration and verification, project posting and bidding, user account management, and collaborative project management. These scenarios are supported by the database schema, which addresses the necessary relationships between users, projects, bids, and verification requests. To enhance the platform's capabilities and user experience, several key areas for further development have been identified. These improvements aim to address user needs, scalability, and functionality, ensuring the application's long-term relevance and success.

One significant development is the implementation of an advanced user verification system. This could include biometric authentication methods, such as facial recognition or fingerprint scans, alongside AI-powered document verification to streamline and secure the onboarding process. Additionally, a dynamic, tiered verification system could build trust by adapting to user engagement and behaviour over time.

Improving customer and freelancer interaction is another critical focus area. Features like real-time messaging and video conferencing can facilitate seamless communication, while embedded collaboration tools such as shared workspaces or project boards can enhance task management and project tracking. These improvements would foster better relationships and increase productivity between users.

The integration of AI and machine learning can significantly elevate the platform's intelligence and efficiency. Developing a smart matching algorithm could provide tailored freelancer recommendations based on user preferences and historical data. Furthermore, machine learning models could be used to suggest dynamic pricing for freelancers by analysing market trends and project parameters, while sentiment analysis tools can help interpret user feedback for continuous improvement.

Expanding administrative tools is essential for maintaining platform efficiency. A comprehensive analytics dashboard would empower administrators with insights into user activity, project trends, and overall performance. Automated moderation, powered by AI, could enhance platform security by identifying and addressing inappropriate behaviour or policy violations. Customizable reporting tools would further support data-driven decision-making. From a business perspective, monetization opportunities can diversify revenue streams. Subscription plans with tiered benefits, targeted in-app advertising, and refined transaction fee structures can generate sustainable income while maintaining fairness and value for users.

Scalability and internationalization are crucial for accommodating a growing user base. Localization features, including multilingual support and regional customizations, can make the platform accessible to global audiences. Transitioning to cloud-based database solutions like Firebase or Amazon RDS would ensure the system can handle increased user loads, while the addition of desktop and web versions would extend accessibility across devices.

Integrating third-party services could further enhance functionality. Popular payment gateways like PayPal and Stripe can streamline transactions, while linking professional portfolios from platforms such as LinkedIn, GitHub, or Behance would bolster freelancer credibility. Cloud storage integration would simplify project file sharing, making the platform more user-friendly.

To improve user engagement and retention, strategies such as gamification, loyalty programs, and personalized recommendations could be employed. Badges, rewards, and leader boards would foster healthy competition, while curated project suggestions could encourage continued use of the platform. Legal and compliance enhancements are important for maintaining trust and credibility. Ensuring adherence to data privacy standards like GDPR and CCPA would protect user information, while implementing a robust dispute resolution mechanism would provide transparency and fairness. Regularly updating terms of service would also help the platform stay aligned with evolving legal requirements.

Finally, the platform could explore future technologies to maintain a competitive edge. Blockchain technology could enable secure, immutable smart contracts for project agreements, while AR/VR tools could support virtual collaboration in creative or technical projects. Additionally, integrating Internet of Things (IoT) technologies could open new possibilities for industries requiring physical services.

Conclusion

This paper has explored the development and potential impact of a mobile application designed to streamline the project bidding and service matching process. By leveraging mobile technology, the application addresses key inefficiencies in the current market, enabling both service providers and clients to connect quickly, securely, and effectively. Through the integration of user-friendly interfaces and robust back-end functionality, the application simplifies the traditionally complex bidding process, fostering a more transparent and competitive environment.

One of the significant achievements of this project is the development of a smooth, intuitive, and easy-to-use user interface. By adhering to best practices in UI/UX design, the application ensures that users can navigate and utilize its features with ease, which is critical for maintaining user engagement and satisfaction. This ease of use is vital to the platform's success, as it enhances the overall user experience and encourages continued use.

Security has been a top priority throughout the development process. Strong authentication and verification procedures have been implemented to protect user data, and only verified freelancers can offer their services. This focus on security fosters user trust, which is essential for the platform's legitimacy and long-term sustainability. The scalable design of the application allows it to effectively handle an increasing number of users and transactions, ensuring its ability to expand and serve a growing audience over time. Performance optimization has been a key area of focus, ensuring the application's reliability and responsiveness under varying conditions, which contributes to its overall success.

However, the project did encounter some challenges and limitations. The initial set of functionalities was constrained by technical limitations, and some advanced features had to be postponed for later iterations. Maintaining peak performance under high load scenarios remains a continual challenge that requires ongoing improvements. Additionally, user experience is a dynamic field, necessitating regular feedback and adaptations to meet the evolving demands of administrators, clients, and freelancers. Ongoing monitoring of security and privacy issues is also critical to ensure compliance with changing data protection laws.

In conclusion, the Service Matching mobile application has successfully addressed significant needs in the freelancing market, laying a strong foundation for future growth. Despite the challenges faced, the application's achievements highlight its potential to offer substantial value to freelancers, clients, and administrators alike. Moving forward, continuous innovation and development will be necessary to keep the platform relevant and effective. By focusing on performance, user experience, and security, while exploring new technologies and features, the application is poised to continue delivering significant benefits to its users. The identified research directions and potential developments will serve as a roadmap for future improvements, ensuring that the platform adapts to the changing needs of its diverse user base.

Credit Authorship Contribution Statement:

Popîrlan, C.I., provided overall supervision and guidance throughout the project, contributed to the revision and refinement of the manuscript, ensuring the clarity, accuracy, and quality of the work. T.D was responsible for the conceptualization of the research, designing the methodology, and performing the formal analysis of the data.

Conflict of Interest Statement

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest. Additionally, it is noted that Phd. Popîrlan, C.I. one of the co-authors, serves as the EIC of the journal. However, this role did not influence the reviewing process or the manuscript evaluation.

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