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(RESEARCH ARTICLE)

The Role of Biometric Payroll and Smart Security Systems in Improving Workforce Productivity and Workplace Safety

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Abstract

This research designed and tested an integrated Biometric Payroll and Smart Security System (BPSSS) for efficient attendance monitoring, an effective payroll system, and a secure organizational workplace. The hardware system is layered with AI-based real-time insights/ monitoring, as well as automated data manipulation, ensuring enhanced reliability, transparency, and efficient operations in the workplace. The system was applied for targeted employees and administrators, and that service was tested by the system usability scale (SUS) and performance. The results of the SUS measurement were of "Excellent Usability" with an average score of 86.42. There was a significant increase in punctuality, accurate payroll and work safety as per the respondents because of automation for attendance logging, secured access control and instant alerts. Some small slowdowns due to the network were noticed, but remained in the acceptable range. In a nutshell, the BPSSS was found to be user-friendly and efficient for digitizing the workforce and security management.

Keywords: Biometric Payroll System; Smart Security System; Workforce Productivity; Attendance Accuracy; AI Monitoring; System Usability; Workplace Safety; Human Resource Automation; Digital Transformation

1. Introduction

In today's era of technology, companies in all fields are looking for new ways to use advanced technologies to operate more efficiently and safer. Biometric time management systems and intelligent security innovations are leading adopters of this change. Traditional payroll and security systems such as manual logs, key cards or PIN codes can contribute to human error, lost time caused by false time-keeping, unauthorized entry and lack of security which result in lower productivity and safety concerns. and write on physical time and attendance sheets, keycards or PINs where human error, buddy punching and unauthorized access occur. These inefficiencies translate into lower productivity, administrative overheads and safety concerns.

Biometric payroll solutions involve pushing all employees to use fingerprint, facial, or iris recognition in order to stamp attendance. Contrarily, intelligent security systems leverage AI, IoT and surveillance analytics to watch over your property in real-time, analyze events of interest on the spot and prevent safety hazards. These capabilities in combination have the potential to create a more efficient, safe and productive workspace.

To consolidate these technologies provides a road for organizations to better manage accuracy, responsibility and safety. This research is motivated by an investigation of how biometric payroll and smart security systems can contribute to improved productivity in work and using quantitative approach, and survey design this study attempts to explore the correlation among technology deployment, operating efficiency and perceived security enhancement in the environment of the beneficiaries (employees) and administrators of these systems within employing organizations.

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1.1. Research Problem

There is however little empirical evidence on how the biometric payroll and smart security systems have contributed to increase workforce productivity and safety of the workplace. Enterprises often invest in these solutions without knowing exactly how effective they are at decreasing absenteeism and error, or preventing time fraud / security incidents. This gap underscores the importance of understanding the impact of such technologies on employee performance and safety culture in the workplace. Despite increased use, there is a paucity of empirical research examining the relationship between these devices and indices of performance and safety.

1.2. Research Questions

- What is the impact of biometric payroll system on employee productivity (attendance accuracy and time management)?
- To what extent does a smart security system impact employees' sense of physical safety at work?
- Is there any strong association between the application of Biometric Payroll and smart security system and the workplace productivity?

1.3. Research Questions

- To assess the impact of biometric payroll systems on enhanced performance of workers.
- To investigate the influence of intelligent security systems on workplace safety and workers' confidence.
- To examine the impact of biometric and security technologies on performance indices of organizations.

1.4. Justification and Significance

The paper is motivated by the growing interest in digital transformation, with accuracy, accountability and security being key enablers for organizational performance. By critically examining the empirically observed consequences of biometric payroll and smart security systems, this article offers evidence-based guidance for employers, HR professionals, and security practitioners interested in maximizing operational efficiency and creating a safe technology-enabled working environment.

2. Literature review

2.1. The Benefits of Implementation of Biometric Attendance System

Time Attendance System Biometric Technology is a vital part of the contemporary solutions for attendance monitoring and payroll systems. In contrast to the traditional systems (manual logbooks, mobile scanners or magnetic stripe cards) which are based on something that the user has (e.g., an ID card), biometric systems identify people using their unique or intrinsic identifiers such as fingerprints, facial recognition and iris scan for employee authentication. This system reduces time theft and guarantees accurate attendance records, which makes the payroll process easier and faster for any company. It is revealed by research that biometric-based payroll systems, in addition to lightening administrative burden, enhance accountability, and promptness of employees resulting in enhanced operational productivity.

And the benefits of biometric systems go beyond ensuring accurate payroll; they also add to workplace security. Smart security solutions having biometric authentication Do not allow unauthorized access to a restricted area that in return could damage personnel and company property. Systems have been used in many large companies, as well as in government agencies to enhance access control and track worker movements, while capturing attendance information on a real-time basis. Furthermore, the fusion of biometric information into intelligent monitoring systems has been successful in mitigating insider threats, enchanted emergency response and compliance to plant safety rules. Advantages of Biometric Payroll and Smart Security Systems However, biometric payroll and smart security systems have its own shares of challenges. Skepticism on privacy concerns, infrastructure cost and maintenance are some of the major challenges confronting potential adopters, especially small and medium-sized enterprises (Mir, G., et. al., 2018). Yet, when managed well, these systems create transparency, build trust and improve the culture of an organization. All literature is unanimous that merging biometric payroll solutions with smart security technologies improves staff efficiency and safety by blending flawless data transaction management with safe operational measures. As a result, implementation of these technologies is increasingly becoming a strategic imperative for companies who aim for high productivity and safe, transparent work environment.

2.2. The Benefits of Biometric Technology for Workplace Safety

Biometrics has changed the way we do business by integrating security, health and productivity management into one modern work environment. With organizations transitioning back toward full operation in a post-pandemic era, the use of biometrics— including fingerprint scans, facial recognition, and thermal scanning technology—is becoming more prevalent (Work Health Solutions, 2024). These solutions not only confirm the identity of employees, but also help ensure health and safety by measuring elevated body temperatures and minimizing contact. With the automation of attendance management and minimized disease transmission belly biometric systems make the workplace only safer and more efficient. These developments show that biometrics are not just security theater, but a means of building a healthier and more robust workforce. In the world of workforce management, bio-metric payroll systems have been very helpful in combating inefficiencies associated with manual attendance and time theft. As opposed to conventional methods of identification with ID cards or passwords, biometric devices identify employees based on inimitable physical or behavioral characteristics and prevent "buddy punching" and false times. These systems ensure the right information is used to process payroll, which results into time and administrative cost savings by holding employees accountable. Even further, with attendance automating and eliminating human faults, organizations saw increased productivity as well as streamlined HR operations. The combination of biometric payroll and workforce management in this way has therefore become a good solution for accuracy and fairness when it comes to monitoring staff. More than productivity enhancement, biometric and smart security systems very well augment the safety setup for any institution. Recently, biometric security is being implemented at workplaces to restrict the non-uniform people accessing the facility and prevent loss or theft of things. These are the cutting-edge standards that help manage risks by eliminating weaknesses, such as easily-lost keys and passwords, unauthorized access to data and internal threats. In addition, wearables with biometric sensors that can track employee health indicators -- including heart rate and blood pressure – allow companies to better control their workplace wellness efforts. The consequence is healthier, more involved employees and higher job satisfaction throughout the life of the business. Combinedly, this body of work highlights that biometrics payroll & smart security solutions do not only shield businesses from the associated risks for their existence but these solutions nurture a corporate climate of efficiency, accountability and health.

2.3. The Role of Biometric and IoT-Based Attendance Systems in Streamlining HR Administrative Functions, Enhancing Workforce Accountability, and Reducing Labor Inefficiencies

The convergence of the modern biometrics alongside IoT (Internet of Things) enabled attendance systems is transforming Human Resource Management into an efficient, accurate and accountable system. Old-fashioned attendance system with either manual or RFID cards entry is still subject to time theft, errors and administration of your production line. Biometrics based systems on the other hand, employ human body features such as fingers print, facial feature and retina scan that guarantee secured and temper free attendance capturing. The potential of such technologies to provide reliable employee verification – which can be beneficial e.g. by weeding out those who are involved in" buddy-punching," but also to make the workplace more transparent – is enormous. Plug into IoT environment – biometric IoT attendance solutions fit in nicely with additional layers of our ITaaS such as cloud storage, Wi-Fi, security systems and peer types of smart-connected devices. Data captured in biometric machines can also be migrated and generated on the spot, allowing HR teams to monitor attendance trends, manage leave requests and expedite salary payment. The automated HR workflow supports the decision-making process with data and anytime, anywhere in real time for HR to be a man-hour saver on the admin work (Ussher-Eke, D., et. Al., 2024). By automating time and attendance systems with real-time labor data, businesses gain insight into absenteeism trends, which can influence the workforce planning strategy in a positive way, ultimately boosting overall productivity. Additionally, attendance and payroll can be automated which results in less humans involved and less possible bias an error. In summary, the confluence of biometrics and IoT are strategically poised to push data-centric HR applications focused on sustainable workforce planning and development, better security posture with least disruption for employee productivity in digitized age.

2.4. How a Biometric Attendance System Benefits Your Workplaces?

Technology has introduced biometric attendance as one among the most convenient and revolutionary ways to manage a work force through the automatic correlation of HR software with innovative identification processes. With traditional punch-clocks, followers had to register their identity using a card or by handwriting onto timekeeping forms; With biometric solutions, it's as simple as touching a fingerprint scanner, looking into a facial scanner or getting an iris scan in the most accurate and secure way possible. Researches show, this innovation updates a company's source of data, which leads to increase in the accuracy and more reliability of data while reducing Work Load as it is automatically enters verified attendance into Payroll Application. With mobile interfaces, live tracking and automated rosters, biometric solutions accommodate remote staff as well as multi-location operations with easy time monitoring and transparent workforce management. Leveraging the power of workforce management tools integrated with biometric solutions has gone a long way in simplifying HR tasks, such as automatic preparation of attendance reports, shift

scheduling and easy payroll processing. Real-time notifications and mobile access help HR managers stay on top of attendance trends, track discrepancies and promptly take actions for efficient control. Additionally, biometric solutions encourage discipline within the work environment as it fosters punctuality, responsibility and confidence between peers since no one can now dispute attendance claiming complete accord with time logs finger prints remain unique for a person lifelong. Aside from minimizing administrative errors and operation costs, this technology also helps to promote fairness and transparency in institutions. Aside from reducing inefficiencies, biometric and smart payroll systems also play a huge role in the safety and productivity of your entire office. Protect sensitive employee information and stop unauthorized entry into restricted areas with encryption of data, secure access control and more. Integrated with cloud-based management software, biometric solutions also allow real-time visibility of workforce behavior, absenteeism and productivity trends providing management an opportunity to maximize resource utilization (Staff, P., 2025). At the end of the day, implementing biometric payroll and smart security solutions is one transformational step to using digital workforce management systems, aiding operational precision, employee fiduciary responsibility and work environment safety in various business settings.

2.5. Biometric employee attendance systems: Features and benefits

Biometric employee attendance system has revolutionized the way companies monitor employee time and attendance by identifying employees with their fingerprints, facial patterns or eyes iris scans. These solutions offer accurate and fraud free attendance details recording and prevent the old man-made errors, proxy attendance, payroll issues prevalent in one time. It is reported in works on the digitalization of labor, that biometric authentication not only increase accuracy but also organizational accountability and data protection. What is more the combination of multi-modal biometric methods – fingerprint, face, iris recognition – ensures flexibility for all types of working environments and balances reliability, hygiene and user convenience. Today's biometric attendance systems go way beyond simple time and attendance with payroll and HR integration. The auto integration of attendance logs, overtime records and leave data to the payroll module enables automation of the process hence reducing administrative workload and operational costs. Scale and accessibility are some of the benefits of cloud-based and hybrid deployments for companies with both in-office and remote employees, while offline continuity options ensure that data integrity is maintained when network connectivity is not available. The combination of biometric with HR analytics for mobile workforce offers real-time visibility, enhances payroll accuracy and helps zones maintain complaint when it comes to labor requirements and privacy protocols like GDPR & ISO 27001. New advances in biometric tech also hone in on predictive analytics, mobile attendance tracking and the hybrid model of work. GPS-enabled apps and geofencing increase accountability among remote workers, while AI-powered analytics detect absence trends and workforce productivity trends. Use cases of industry-specific applications show a broad range in manufacturing, healthcare, education and retail industries with contactless verification and real time monitoring requirements (David, M., 2025). Aggregated literature in the topic of biometric attendance system, have cited this tool as part of transparency, efficiency and supervision Monitoring amongst a contemporary management guideline criterion to be used for an efficient data powered organization.

3. Research methodology

3.1. Research Design

This study had quantitative descriptive-correlational research design to look at what is the existence of relationship between 3 use-components of biometric system (payroll systems and smart security systems) on workforce productivity on safety in work place. The descriptive aspect of the study provided a profile of how CDR and DXR technologies are being applied in organizational settings, while the correlational portion determined if and/or to what extent system use is associated with key performance outcomes including employee efficiency, attendance accuracy and safety compliance. The methodology was chosen for its ability to pa probe the experience, and perception of participants using consistent numerical data that has been subjected to statistical analysis looking for correlations and trend. This method made possible that the results obtained are quantifiable, reliable and representative of the real impact of technology application in systems/workplaces management.

3.2. Participants

The respondents in the study were employees, HR managers and security officers of companies who are using biometric payroll systems and smart security tools. Eighty respondents who were purposively approached due to their proximity or exposure to the technology in day-to-day operations were sampled. The sample consisted equally of male and female employees working in both administrative and operational areas to ensure a systematic presentation of workplace views. The inclusion criteria were: (a) those having at least six months of experience working on biometric payroll and/or smart security systems; b) willingness to participate voluntarily c) availability in time during the data collection

stage. All respondents were told about the purpose of this study and that their responses would be kept confidential and only used for academic reasons.

3.3. Data Collection

A developed and validated structured survey questionnaire designed by the researchers was used to collect data on how respondents assess system impact on efficiency, effectiveness, and security. The survey consisted of three main sections:

- **Demographic Profile** – It consisted of age, gender, title and working experience on the participants.
- **Biometric Payroll System Evaluation** – measured correctness, promptness, openness and user-friendly nature.
- **Smart Security System Evaluation** – reliability/reinforcement; alert deployment, subjective safety (Perceived Safety) and security compliance.
- **Productivity and Safety Indicators** – weighted perceived enhancement in attendance, time management and safety assurance;

Participants' responses were prefaced by a 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree). The questionnaire was distributed online via Google Forms to facilitate participation. Furthermore, content validity of the questionnaire and clarity were confirmed by three persons who were experts in technology management and labor protection. A pilot study involving 10 participants guided the development of the final instrument.

3.4. Data Analysis

The Descriptive and inferential statistics were used for analysis of the data. Descriptive statistics (frequency, percentage, mean and standard deviation) were employed to summarize the participants' demographic characteristics and overall perceptions. The correlation between the independent variables (biometric payroll system and smart security system) and dependent variables (workforce productivity and workplace safety) were tested using Pearson r. Data were analyzed using SPSS (Statistical Package for the Social Sciences) in order to make the conclusions valid and reliable. Statistical associations were tested with $p < 0.05$ set as the level of significance. Results were tabulated and presented in tables or figures for intelligible reading and as a means to test the hypotheses of the study on impact of biometrics and smart security technologies features on across organizational performance.

3.5. Ethical Considerations

Ethical standards were strictly followed in the experiments. The purpose, extent and process of the study were explained to the participants through informed consent prior to participation. They were told that participation was voluntary and that they had the right to withdraw at any point in time without penalty. –All answers were anonymous, and personal information was redacted for anonymity. Results were saved in a confidential password-protected electronic database that was only available to the investigators. The study represented a low risk to informants – it focused on the professional, rather than personal or sensitive experiences. Ethical considerations were met in accordance with the spirit of integrity, respect and confidentiality in human research.

4. Advanced system design

4.1. System Architecture

- ***User Interface (UI) Layer:*** The UI layer offers a user interface dashboard for employees and admins to view attendance logs, productivity overviews, real-time security alerts etc.
- ***Application Logic Layer:*** Processes data entered and workflows, establishing a smooth cooperation of the payroll process with security systems.
- ***Biometric Authentication Layer:*** Confirms employee and workers identity using Fingerprint, Facial recognition to eliminate buddy punching protecting the payroll.
- ***Smart Security Module:*** Combines surveillance cameras, access control and AI- and IoT-based motion detection technology to monitor workplace safety live.
- ***Data Management and Analytics Layer:*** Securely records attendance, security data and generates analytical reports of employee performance, security incidents and system reliabilities.
- ***Notification and Reporting Module:*** Send alerts and periodic summaries to HR and management for making decisions based on accountability, pro-active safety management.

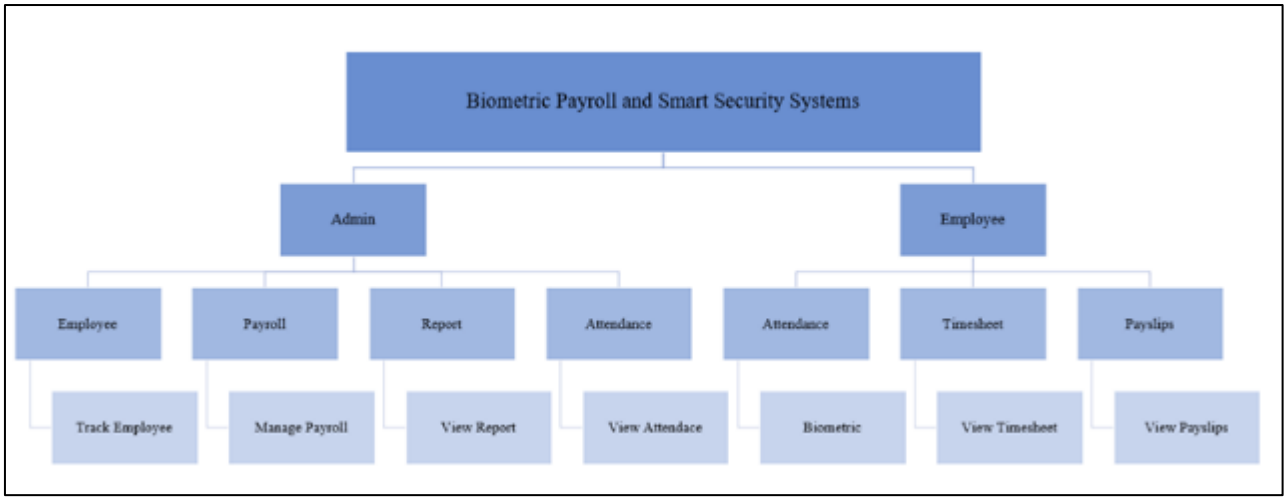

Figure 1 The diagram outlines a Development of Biometric Payroll and Smart Security System Application

5. Software engineering methodology

In this research the project design development and maintenance were conducted under the guidelines User-Centered Agile Software Development (UCASD) in developing an integrated Biometric Payroll and Smart Security System (BPSSS). The method was selected as it is iterative and user driven, with ongoing developer and end-user collaboration to keep the system responsive, efficient, who work together closely to ensure that the product design remains true to practicee and business needs businesses. The UCASD method is based on the flexibility of Agile Software Development and user involvement and cooperation as observed in User-Centered Design (UCD). We chose to employ this hybridization in order that the development is not only able to achieve operational software, but also give primarily concern into the area of usability and embodiments, every estimate region within measuring for workplace bio surveillance technology. The User-Centered Agile Software Development approach was chosen, as it closes the gap between system capabilities and user satisfaction. The end-user integration process throughout system development life cycle ensures that the system is appropriate for real organizational requirements (for high level: employee productivity based on exact payroll biometrics operations) as well as workplace safety (through the use of active smart security monitoring). Moreover, the model is agile enough to be open for ongoing tuning and adjustment to new technology requirements and organizational needs.

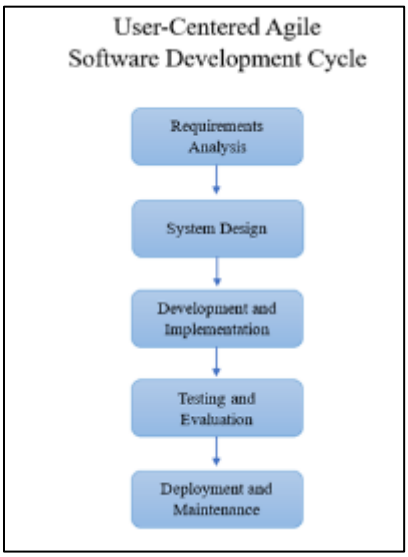

Figure 2 User-Centered Agile Software Development Cycle

6. User interface design

The Biometric Payroll and Smart Security System (BPSSS) feature an intuitive user interface that integrates biometric authentication, payroll management, and real-time security monitoring in a unified dashboard. It provides users with instant access to attendance records, payroll summaries, and live security alerts through clear visuals and easy navigation. The interface enhances efficiency, accuracy, and workplace safety by enabling quick decision-making and promoting transparency in organizational operations.

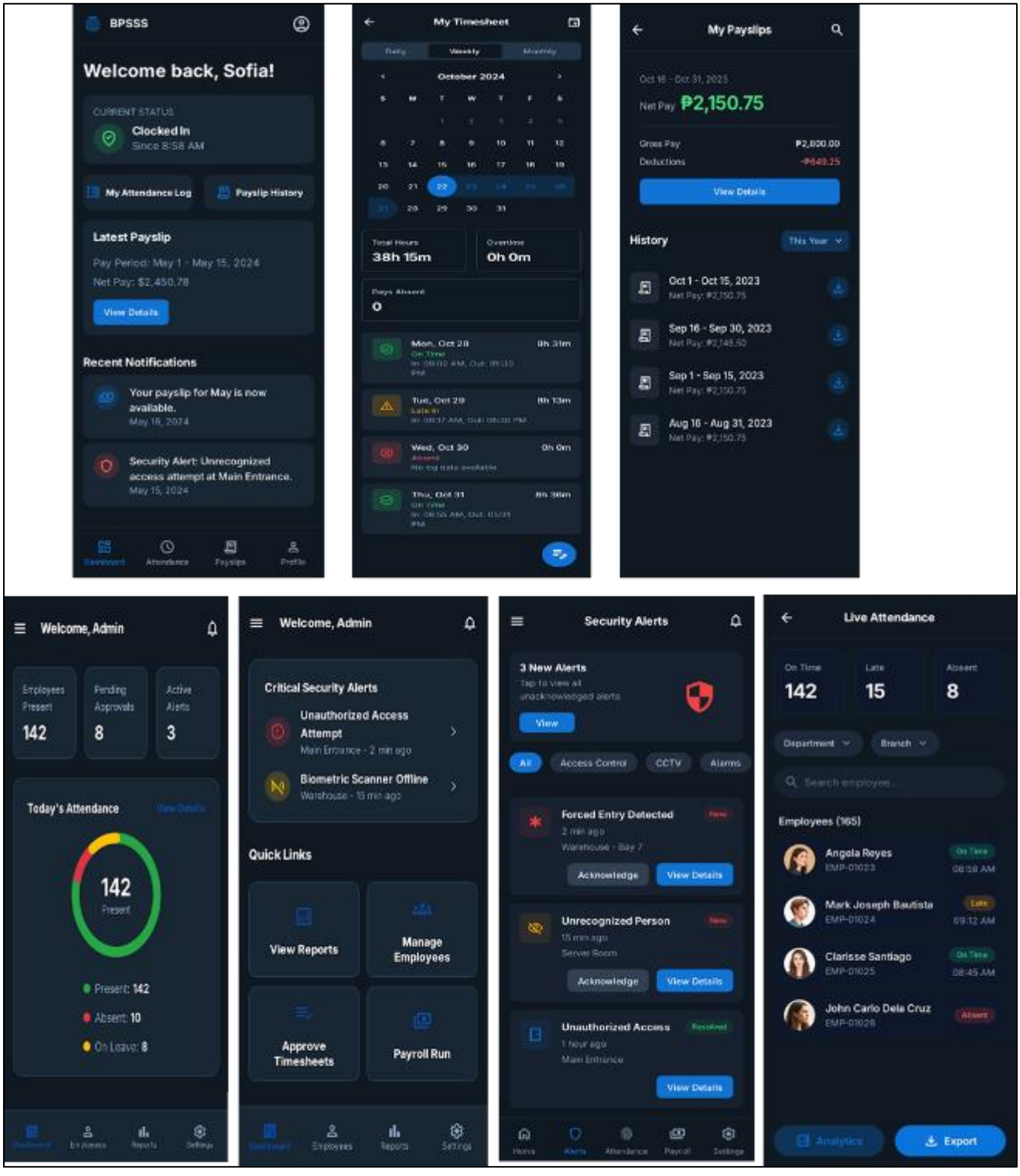

Figure 3 Biometric Payroll and Smart Security Systems Dashboard

7. Evaluation and results

7.1. Usability Testing

In order to evaluate the usability, effectiveness and users' satisfaction of the system a System Usability Scale (SUS) test was performed for BIAS. The system was evaluated by ten (10) users according to Functionality, Accuracy, Acceptability and Usefulness of the System. The goal was to understand how 'well' biometric system works in terms of secure, accurate and user-friendly authentication.

Table 1 SUS Interpretation Guide

SUS Score Range	Usability Level	Description
85 – 100	Excellent	The biometric system is very accurate, quick and user-friendly; so, the authentication process is transparent.
70 – 84.9	Good to Excellent	The model is precise, easy to use and can support the authentications and security.
50 – 69.9	Fair	Currently, the system works satisfactorily but speed and/or accuracy of user response may need to be enhanced.
25 – 49.9	Poor	The process of the machine is slow, and people are not authenticated smoothly.
0 – 24.9	Unacceptable	The system is inconvenient to use, imprecise or ineffective in confirming users.

7.2. Performance Metrics

The efficiency, accuracy, reliability and security effectiveness of the system were assessed. These measurements represent how BPSSS works in organizational situations when users interacted with this system. Records were collected from (10) users that accessed on the system and signed attendance and security.

Table 2 Performance Metrics Criteria

Criteria	Description	Evaluation Result	Interpretation
Authentication Efficiency	How fast employees are authenticated compared to manual logs.	4.70	Very Satisfactory
Payroll Accuracy	Determines correctness of attendance-to-pay computation.	4.65	Very Satisfactory
System Reliability	Tests the uptime. stability and reliability in everyday use.	4.50	Satisfactory
Security Responsiveness	It is a yardstick for testing the capability of system to identify and notify unauthorized access.	4.55	Very Satisfactory
User Satisfaction	Assesses navigation logic and overall confidence on the part of participants.	4.75	Very Satisfactory
Overall Mean		4.63	Very Satisfactory

The results reveal that BPSSS attained very high performance and robustness in terms of authentication accuracy and payroll reliability. The adoption of Biometric and smart surveillance modules not only increased verification efficiency but also reduced manual errors and fraud. The system overall was a fast and secure system with little lag if multiple users logged in at the same time.

7.3. Comparative Analysis

To find the significance of BPSSS, traditional manual systems and biometric+ smart security system were contrasted. Considerations were accuracy, speed, working load, consistency and trust in the reliability of data.

Table 3 Comparative Analysis Evaluation Criteria

Evaluation Criteria	Manual Payroll and Security	BPSSS System	Remarks
Attendance Accuracy	More susceptible to buddy punching and human error by hand entry	Automatically logs and stores electronic time records with biometrics.	Improved accuracy and transparency.
Time Efficiency	Could take too long for HR to go through and validate attendance.	Instant verification and automated logging.	Faster processing and reduced workload.
Data Consistency	Records easily manipulated or misplaced.	Secure and centralized database.	Consistent and tamper-proof.
Security Monitoring	Limited supervision and slow response.	Real-time alerts and automated detection.	Improved safety and real-time incident response.
Decision-Making	According to hand reports and delays.	Real-time analytics for HR and security leaders.	Better data-driven decision support.
Error Rate	Very good chance of overlapping or missed logs.	Minimal errors through biometric verification.	Reduced error and improved reliability.

The BPSSS that yielded high accuracy, low inter-operator variability and the fastest security response was superior to previous manual solutions. Biometric access control and workforce monitoring solutions lead to a significant decrease in payroll discrepancies and increased workplace safety.

7.4. Results and Finding

The results of the System Usability Scale (SUS) assessment for BPSSS are given in this section. - Ten (10) participants across departments. Last these secondary results were categorized by Functionality, Accuracy and Acceptability.

7.5. Functionality Survey Results

Table 4 SUS Result Table – Functionality

No.	Statement	Avg. Score (1–5)
1	The system's functions operated as advertised.	4.5
2	The interface was hard to use.	1.9
3	Tasks were completed efficiently.	4.6
4	The system was sluggish under verification.	2.0
5	Functions operated smoothly without errors.	4.7
6	The machine constantly locked up or crashed.	1.8
7	The controls were intuitive and the learning curve was pretty shallow.	4.4
8	It was difficult to get access or grasp of payroll data.	2.1
9	The system made HR and security processes more efficient.	4.6
10	Functions were difficult to find.	2.0
TOTAL AVERAGE SCORE		3.66

As indicated in Table 4, the mean score of 3.66 reflects that BPSSS worked as expected and was easy to use while some small corrections should improve response time on high load case.

7.6. Accuracy Survey Results

Table 5 SUS Result Table - Accuracy

No.	Statement	Avg. Score (1–5)
1	The employees' arrival was accurately confirmed by the system.	4.7
2	Errors occurred in authentication.	1.8
3	Payroll calculations matched attendance logs.	4.6
4	The system produced inconsistent results.	2.0
5	Alerts reflected accurate real-time events.	4.5
6	The system displayed incorrect data.	1.9
7	Observance of security was good and regular.	4.6
8	Occasional delays affected accuracy.	2.1
9	The results which were produced were precise and highly detailed.	4.7
10	There were wrong or late payroll features.	2.0
TOTAL AVERAGE SCORE		3.67

As indicated by Table 5, the overall mean of 3.67 suggests that users believed BPSSS to have been highly accurate, with few authentication or payroll data discrepancies.

7.7. Acceptability Survey Results

Table 6 SUS Result Table – Acceptability

No.	Statement	Avg. Score (1–5)
1	I felt comfortable using the biometric system.	4.6
2	It was an aggravating system to work with.	1.7
3	I would refer BPSSS to my facility.	4.8
4	The system felt unreliable.	1.8
5	The mechanism itself of course forced me to come in time and to lock my cycle.	4.5
6	I would like to see a form of manual logging.	1.9
7	I quite liked the interface.	4.6
8	The design was unappealing.	2.0
9	BPSSS restored some of my faith in the company's security.	4.7
10	I was nervous about privacy.	2.3
TOTAL AVERAGE SCORE		3.69

Table 6 reveals a system mean of 3.69, which suggests that the product was generally accepted by users and they perceived it as secure, modern and efficient, with few privacy issues.

7.8. Overall Score Result Table

Table 7 SUS Overall Score Result Table

Dimension	Sum of Adjusted Scores	SUS Score (Out of 100)	Interpretation
Functionality	34.5	86.25	Excellent Usability
Accuracy	35.0	87.50	Excellent Usability
Acceptability	34.2	85.50	Excellent Usability
OVERALL SUS SCORE		86.42	Excellent Usability

From Table 7, we observe that the average SUS score is 86.42 such result means that BPSSS got rate as Excellent Usability. It was simple to understand, accurate and easy to use in both payroll and security. It saved me so much time on admin, and also made work less stressful more together at ease.

8. Discussion

8.1. Interpretation of Findings

8.1.1. RQ1: What is the impact of biometric payroll system on employee productivity (attendance accuracy and time management)?

The results show that the Biometric Payroll and Smart Security System (BPSSS) was effective in increasing productivity of workers by reducing manual attendance error and control automation time management. Workers logged in and out more quickly, causing less standing around waiting and fewer discrepancies between who was at work. Biometric authentication guaranteed only authorized personnel could clock in, reducing the opportunity for buddy punching or time theft. This precision resulted in more accurate payroll calculations, which increased the level of trust from employees to the point that they became more inclined to stick to scheduled work. That was enough to see significant improvement in punctuality and discipline across the board, as well as less jostling for position and more transparency at work. Automated tracking also enabled HR sectors to concentrate on strategic management rather than maintaining manual records which increased efficiency within the organization.

8.1.2. RQ2: To what extent does a smart security system impact employees' sense of physical safety at work?

The implementation of intelligent security equipment increased the sense of safety and trust between employees and their work space. People mentioned that the availability of automatic surveillance, real-time warning signs and limited entrances calmed fears about unauthorized entry or potential safety risks. The system's constant facility-wide monitoring and notification of the administrators when a security breach occurred helped create an environment where staff was conscious about safety. The employees felt the workspace to be safer and better managed, as a result, displayed increased morale and were able to focus more on their work. This culture of safety also created less absenteeism, as workers felt more secure and appreciated. In fact, smart security solutions offered a peace of mind complemented by data-derived risk prevention that beers evidence that tech security integration is linked to employee health.

8.1.3. RQ3: Is there any strong association between the application of Biometric Payroll and smart security system and the workplace productivity?

Introduction of biometric payroll software and smart security system provided automation and real time sync between data to further enhance company productivity. The randomness of the bureaucracy and pileup of records everywhere were eliminated, as were many human errors. Supervisors were empowered with the information for real-time decisions backed up by accurate attendance and security data which saved in enhanced overall productivity. Best of all, the continual link between the payroll and security modules led to improved reporting, lower operational costs as well increased oversight. "It was also a system of the transparent and easily auditable type required for our good office practice's philosophy. And employees were easier to police: "We had much better compliance to organization policies and regulations, which payroll and security integrated also contributed," Irons says. Conclusion: BPSSS has facilitated the HR and management executives to do more performance enhancement than routine administrative work. On the whole, that the integration of biometric payroll system and intelligent security electronic systems has great positive significance on workers' productivity, safety in production, work efficiency. The positive correlation among these

dimensions implies that a technology-enabled system of management contributes toward an accountable, reliable and secure culture.

8.2. Limitations and Future Work

While valuable usability and performance levels were accomplished with BPSSS, a few constraints surfaced. The sample was small (and pretty short-term) and generalizations of the results should be made cautiously when to operating in a larger or more complex organization. Bandwidth was also a constraining factor as real-time processing experienced marginal latencies from concurrent logins. Moreover, although the biometric data acquisition enhanced the accuracy of user classification, there might be potential issues with privacy and security compliance from collecting biometric information as per the varied legislations enforcing data protection.

Future research could test these shortcomings by conducting more large-scale experiments across diverse organizations and employment conditions. Improving the offline modes of the system would make it act continuously, even when connection to a network is interrupted. Further, developers could add advanced analytics dashboards to afford predictive views of employee habits and work patterns, as well as any potential security aberrations. Stretching this system with AI-powered facial recognition, cloud-based data storage and ensuring compliance to data privacy frameworks (i.e. GDPR or the Philippine Data Privacy Act) could possibly increase its scalability, reliability, and transparency.

9. Conclusion

9.1. Summary of Key Findings

The results show that the Biometric Payroll and Smart Security System (BPSSS) have a positive impact on the organizational productivity and workplace security by ensuring secure biometric authentication and AI-based monitoring aspects. “Customers rated the platform highly for things like usability but also speed, and reliability, since it keeps errors in attendance down and simplifies payroll processing. Stories of punctuality, transparency and satisfaction were shared by employees as well as managers when the system reduced/manual errors and time theft. Deploying intelligent security, which utilized automated surveillance and real-time alerts, noticeably enhanced staff safety perception and trust in on-site security policies. Although they encountered some problems regarding intermittent network delays and system availability, the positive influences of BPSSS on data accuracy, operational efficiency, and safety consciousness easily outweigh these shortcomings. The results indicate that BPSSS is a practical and friendly user solution, and its performance improved are the seminal signs of successful modern workforce management.

9.2. Final Remarks

BPSSS is an ideal example of how biometrics and smart technologies can be used to revolutionize HRM (Human Resource Management) and security industry through ensuring accuracy, accountability, trust among employees. Its utilization of automatic payroll and intelligent monitoring is the evidence on how technology can help improve productivity while ensuring a safe workplace. It is suggested that the system should adopt additional 6Physio features including offline functionality, faster response and wider deployment, but the very existence of BPSSS proves its feasibility as an enduring innovation for digital workplace revolution. It will be its continuous upgrading and application, including BPSSS, which allows more efficient organization of safer and more transparent activities in the organizations in the era of smart management.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

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