

“A Study on Benefits of Biometrics Attendance System: A Technological based Human Resource Management Practice”

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ABSTRACT

Biometric technology that involves the identification and verification of individuals by analyzing the human body characteristics has been widely used in various aspect of life for different purposes, most importantly in regard to employee’s attendance; this paper is all about the same. Despite the numerous advantages of the biometric system and its impact to various work sectors across the globe, most biometric technology users face the issue of defining the right and accurate biometric technology system that will be cost effective in solving particular problems in specific environment. This paper is a study of determining the biometricattendance identifier that can be used to enhance their traditional staff attendance system which presently affects the productivity of the organization. The study was conducted using a qualitative (exploratory) approach, it is pure exploring study, where detailed knowledge of Biometrics, Biometrics Attendance System and it’s usage in HR practices is been shared. However the study shows that biometric identifier is effective and economic for the employee attendance management system of the organization as a part of HR practices and therefore implies that the attention should be paid to several factors before recommending biometrictechnology as a means of improvingthe productivity of an organization business processes.

Keywords:

Biometric, Employee Attendance, Verification, Productivity, Human Resource Management

1. INTRODUCTION

The term “biometrics” is derived from the Greek words “bio” (life) and “metrics” (to measure). Automated biometric systems have only become available over the last few decades, due to significant advances in the field of computer processing. Many of these new automated techniques, however, are based on ideas that were originally conceived hundreds, even thousands of years ago.

One of the oldest and most basic examples of a characteristic that is used for recognition by humans is the face. Since the beginning of civilization, humans have used faces to identify known (familiar) and unknown (unfamiliar) individuals. The concept of human to human recognition is also seen in behavioral predominant biometrics such as speaking and walking recognition of human. Individuals use these characteristics, somewhat unconsciously, to recognize known individuals on a day to day basis.

Other characteristics have also been used throughout the history of civilization as a more formal means of recognition. Some examples are –

- In a cave, estimated to be at least 31,000 years old. The walls are adorned with paintings believed to be created by prehistoric men who lived there. Surrounding these paintings are numerous handprints that are felt to “have acted as an unforgettable signature” of its originators.
- There is also evidence that fingerprints were used as a person’s mark as early as 500 B.C. “Babylonian business transactions are recorded in clay tablets that include fingerprints.”
- Joao de Barros, a Spanish explorer and writer, wrote that early Chinese Merchants used fingerprints to settle business transactions. Chinese parents also used fingerprints and footprints to differentiate children from one another.
- In early Egyptian history, traders were identified by their physical descriptors to differentiate between trusted traders of known reputation and previous successful transactions, and those new to the market.

1.1 Timeline of Biometrics History

1858 – First systematic capture of hand images for identification purposes was recorded
1936 – Concept of using the iris pattern for identification was proposed
1960 – Face recognition becomes semi-automated
1965 – Automated signature recognition research begins
1974 – First commercial hand geometry systems become available
1992 – Biometric Consortium is established within US Government

2002 – ISO/IEC standards committee on biometrics is established
2010 – U.S. national security apparatus utilizes biometrics for terrorist identification
2013 – Apple includes fingerprint scanners into consumer target smartphones

Source – National Science and Technology Council (NSTC) Report

Biometrics have offered a scalable solution to business owners who are now empowered to circumvent issues like undocumented access, ID swapping, manual symbol checks, credential replacements and more.

There have been many developments in the field of biometrics, which means things are getting more reliable and costs are becoming down. Biometrics offer high level identification management security operations that have several advantages over traditional means and now they are available at lower costs. Many business owners are adopting biometric identification management systems to save money, time, and resources and increase security.

1.2 Benefits of Biometrics

While traditional security systems are reliant on passwords, personal identification numbers (PINs) or smart cards, biometrics can help to achieve a high level of accuracy. If set up of the system is correct, biological characteristics like fingerprints and iris scans, can offer unique and accurate identification methods. These features cannot be easily duplicated, which means only the authorized person gets access and get high level of security to the organization.

Biometric logins means a person can be directly connected to a particular action or an event. In other words, biometrics creates a clear, definable audit trail of transactions or activities. This is especially handy in case of security breaches because to know exactly who is responsible for it. As a result true and complete accountability which cannot be duplicated will be there.

The good thing about using biometrics for identification is that modern systems are built and designed to be easy and safe to use. Biometrics technology gives accurate results with minimal invasiveness as a simple scan or a photograph which is usually all that is required for it. Moreover the software and hardware can be easily used and can have them installed without the need of excessive training.

Biometric identification is extremely quick, which is another advantage it has over other traditional security methods. A person can be identified or rejected in a matter of seconds. For those business owners

that understand the value of time management the use of this technology can only be beneficial for office revenue by increasing productivity and reducing costs by eliminating fraud and waste people.

Biometrics systems installed easily and after that, doesits job quickly, reliably and uniformly. It will need only a minimum amount of training to get the system operational and there is no need for expensive password administrators. If using high quality systems, it will also mean maintenance costs are reduced to minimize the expenses of maintaining an ongoing system.

Another advantage these systems have is that they can’t be guessed or stolen; hence they will be a long term security solution for your company. So, the problem with efficient password systems is that there is often a sequence of numbers, letters, and symbols, which makes them difficult to remember on a regular basis. The problem with tokens is that they can be easily stolen or lost – both these traditional methods involve the risk of things being shared. As a result it can’t ever be really sure as to who the real user is. However that won’t be the case with biometric characteristics, and it won’t have to deal with the problem of sharing, duplication, or fraud.

It’s considered to be a convenient security solution because you don’t have to remember passwords, or carry extra badges, documents, or ID cards. It definitely saved the hassle of having to remember passwords frequently or changing cards and badges. People forget passwords and ID cards are lost, which can be a huge nuisance with traditional security methods.

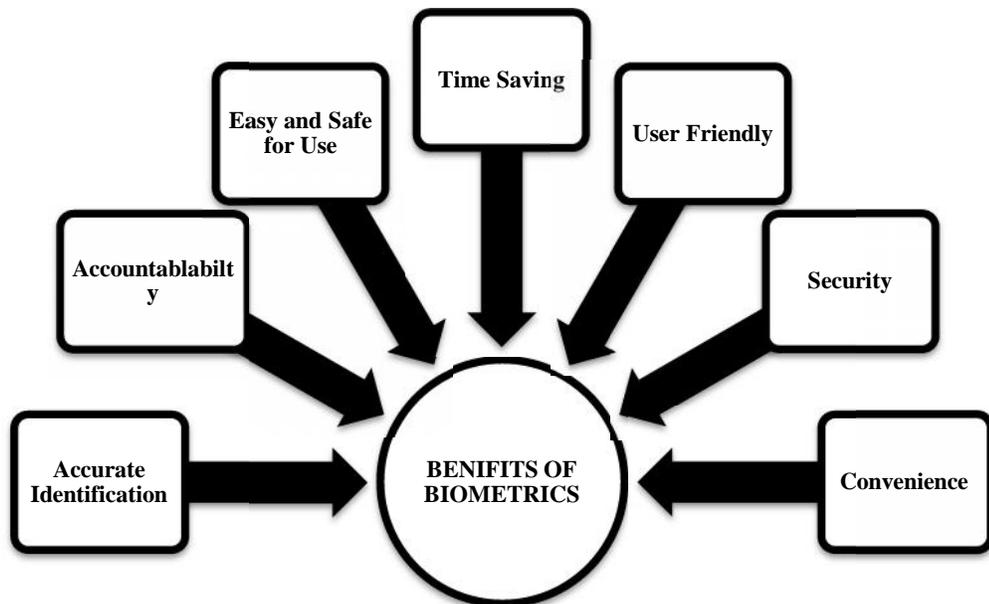


Figure 1
– Benefits of Biometrics

Source - own source

Biometrics definitely can avoid fraud including "buddy punching," besides which lowering payroll costs, accurate calculation of work hours, and reduced management time. While the security is improved which can also easily apply consistent policies and procedures at the same time and it is all about the initial cost of the biometric system. Benefits of biometrics systems are of great extent and do away with the need to remember passwords and combinations. Rather than remembering the password for a computer system or a combination to a safe, a unique biometrics information can get access automatically from which, job will be done quickly, accurately, with a fast implementation schedule and minimal training.

1.3 Biometrics and Attendance

The benefits of a time and attendance system are numerous. Managing your workforce and processing payroll accurately and quickly begins with reliable data. In addition to reduce overtime and payroll costs and get control over labor costs, automated time registration and collection reduces errors and improves efficiency. Time and attendance systems are also invaluable for ensuring compliance with labor regulations regarding proof of attendance. A time and attendance system that meets organization's needs and integrates with HR and payroll systems can lead to a strong return on employee investment and a positive effect on overall business results.

Employees are empowered when they have access to their own information through technology like employee self-service. That empowerment is a level of shared control between the employer and employee and makes for a better relationship with a positive effect as a company's culture. The benefits of engaged employees are numerous. Engaged employees are enthusiastic, contribute ideas, are optimistic about the company and its future, are rarely absent from work, typically stay with the organization longer, and are ambassadors for the organization. Plus, a highly valued company culture is a major contributor to attracting and retaining top talent employees.

With a manual process, human resource management means keeping massive amounts of paper based employment and timesheet data files on each of your employees. Maintaining these types of records can be both time consuming and inefficient and becomes especially cumbersome when key employment information is requested by managers or payroll personnel. The HR person managing the files of all the active and nonactive employees in the organization becomes a bottleneck to other departments' access to information, which should be able to securely share across the organization. Employee self-service (ESS) functionality is now a standard feature of most time and attendance and HR solutions, and ESS not only allows employees access to their own timekeeping and employment data but also encourages them to actively participate in the upkeep of this information, reducing bottlenecks in processes and empowering employees to take ownership of their data. No more is the HR or payroll department running around to

collect paper time cards at the end of a pay period. Employees are entering their own time worked as they work it.

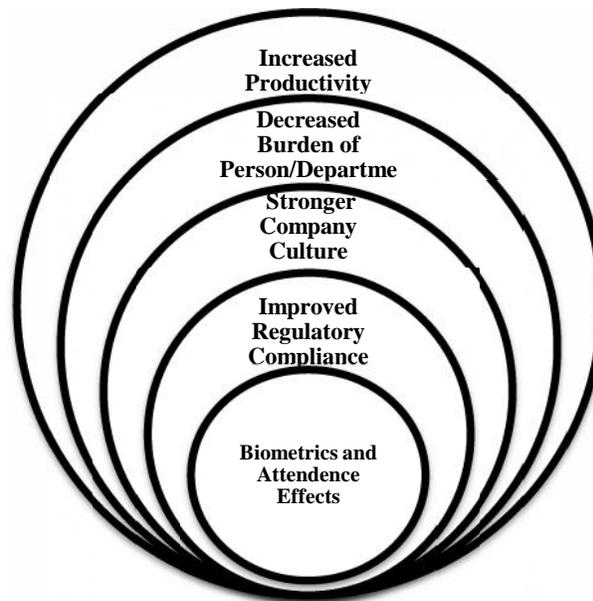


Figure 2 – Biometrics and Attendance Effects

Source – own source

When it's time to run payroll at the end of a pay period, if using a manual process, the collection of time cards, re - entry of data into your payroll solution, and time necessary to process payroll for the entire organization can be tedious and laborious. It is not uncommon for organizations with a manual timekeeping and payroll process to spend upward of five hours or more running payroll at the end of each pay period. Even if it is the responsibility of one person, five hours per pay period adds up to a lot of productivity hours with a direct expense (the person's hourly pay), the point is the amount of time it takes to utilize time and attendance data to run payroll can be drastically reduced to a matter of minutes with an automated time and attendance system. Saved productivity hours and the related personnel wages can be reallocated elsewhere once you eliminate some of the manual processes. Automating the collection of time through data collection devices ensures time records are in an electronic format, this allows the transfer of that data to be automatically sent to your payroll solution for payroll processing. Automated time registration and collecting reduces or can eliminate the need for any manual re - entry of timekeeping data into a payroll system when the two are integrated. The result is accurate payroll processing that can take as little as 20 minutes per pay period. Reducing the time it takes to run payroll while also increasing the data accuracy by automating the transfer of timekeeping information can lead to increases in both productivity and cost savings.

2. RESEARCH OBJECTIVE

The main objective of this research is to critically analyze various forms of biometric technology systems and how they have been used in the past till the present time, especially on the issue of staff attendance system in various organizations. Also, the study highlights work productivity factor of employees that are there as a result when implementing a biometric system in the organization.

3. BIOMETRICS ATTENDANCE SYSTEM FOR HUMAN RESOURCE MANAGEMENT PRACTICES

The various forms of biometric technology have been in existence for several centuries for the purpose of identification. One of the oldest forms of biometrics is the recognition of the human face because facial characteristics are matched within our memory. Civilization became larger and other methods arose, such as documenting images in portraiture, for example, in 1434 the Arnolfini marriage was painted by Jan Van Eyck for the purpose of marriage certificate as said by Tuller, M., Dhawan, A., Simon, B., Lee, K., and Ward, D. in the year 2006 (1). According to NSTCS, 2006(2), in the mid 1960s, the face recognition system as a relatively new concept was developed. An administrator was required to point out certain body features like eyes, ears, nose and mouth on photographs before the distance and ratio are calculated to a common reference point which is then compared to a reference data NSTCS, 2006(2) further stated that the lip thickness and hair were used as specific subjective markers by Goldstein and Lesk in the 1970s to automate recognition. The problem that time was, the solution faced was that measurements and locations which were manually computed. Biometric technologies include fingerprint, iris, hand geometry, handwriting signatory, voice recognition, facial scan, palm print, keystroke and gait recognition.

3.1 Review of Existing Biometric Technology and Its Usefulness in various Sectors

The origin of biometric technology system has been started in the public sector; however biometrics is also used for the identification and verification of criminals as said by Jiexun L., Wang .A. and Chen H in the year 2011(3). Other sectors where biometrics has also thrived are the Banking, Education and Health sectors. For example, emerging application markets include biometrically enabled transactional payment solutions and biometrically enabled wireless for business use. Some European banks use the 3D facial recognition of employees into bank buildings, thereby eliminating the issue of keys been lost, stolen or misused, as suggested by Capoor S. in 2006 (4). Furthermore, biometric application has been useful in various other sectors which include the government using it for the purpose of stopping terrorist attacks

and fighting crimes. After the 9/11 incident, the Yeager Airport in Charleston introduced the biometrics system, which is used to secure access to its control tower as explained by Dubin, C. in 2011(5). Also, the biometrics system has been very useful in the Education sector where it has assisted students in the borrowing and returning of books out and into the library respectively. The positive impact of biometrics to the health sector cannot be left out which has helped in stopping fraud in some healthcare bill for services they never performed. A palm scanner which reads patient's unique vein pattern was implemented in Sharp Healthcare in San Diego for the purpose of stopping patient identity theft, the system was known to be very secure and performed efficiently well for its purpose is been explained by Kreimer, .S. in the year 2010 (6). Furthermore, biometrics can be integrated with other systems for it to carry out its purpose of identification. Whereas Zalud, B. in 2010 emphasis various homeland security databases require to use a card access system integrated with a biometric technology to gain access (7).

3.2 Attendance Management System

According to Bevan, S and Hayday, S. in 1998 attendance management is the act of managing attendance or presence in a work setting to minimize loss due to employee downtime. Attendance control has traditionally been approached using time clocks and timesheets, but attendance management goes beyond this to provide a working environment which maximizes and motivates employee attendance (8).

Attendance management is a major part of today's human resource systems; take organization towards better human resource practice, systems and excellence, hence regular attendance and punctuality are expected of all employees or candidates in a work setting. Unsatisfactory attendance caused by unscheduled absences and tardiness because a disruption in work, affects productivity, and creates morale problems when workloads are shifted to other employees as rightly explained by McKeehan, D.A. in 2002 (9).

3.2.1 Types of Attendance Management System

Attendance Management falls into two categories namely; Conventional and Automated methods. Conventional methods include time sheet, attendance register and time clock. Time sheets are documents, electronic or otherwise that record what time was spent by the employee on what tasks. Attendance register is an official list of people who are present at an institution or organization. Time clock which is a mechanical (or electronic) time piece used to assist in tracking the hour worked by an employee of a company.

Automated methods include Barcode attendance system, Magnetic Stripe attendance system, Radio Frequency Identification (RFID) and the Biometric attendance system as explained by Ononiwu, G. C and Okorafor G. N in 2012 (10). The barcode attendance system requires that every employee is issued a badge/card in which there is a barcode. In order to check into or out of the company, the badge/card is swapped on the time clock, and the data is captured by the clock. In the magnetic stripe attendance system, data is encoded in the magnetic stripe of the employee card. When the card, is swiped through the employee time clock, the information in the card's magnetic stripe is recorded by the time clock. This system reads one card at a time and also requires contact with the reader. Radio-frequency identification (RFID) is a technology that uses radio waves to transfer data from an electronic tag, called RFID tag or label, attached to an object, through a reader for the purpose of identifying and tracking the object. The ID cards of the employees is embedded with RFID tag which is read by a reader. This RFID system is interfaced to a database through a computer. Each employee uses an RFID card and the reader records the data when the employee enters or exits. In biometric attendance system, there is attendance software that is paired with a time clock for employees which uses biometric technology for authentication purposes. When these systems are in use, the employees can use their biometric data such as finger prints for clocking in and clocking out. This method has the great benefit that the entire process is easy as well as quick. Other advantages include elimination of the cost previously incurred in getting the employees cards.

4. SCOPE OF THE STUDY

This research covers the biometric technology system which is been used for the purpose of staff attendance in different organization. The biometric technology system included in this study are having the fingerprint, hand geometry, iris recognition, voice recognition, facesrecognition and signature verification meters. The employees of the company who use the traditional way of recording employee attendance has always faced trouble in many manner like – incorrect attendance, affected pay etc.

In this paper biometrics has been defined effectively in a manner, where more than a decade for time and attendance and workforce management is been explained in detail. Despite widespread use, confusion and misconceptions about the technology and its capabilities persist. These concerns are easily dispelled when the facts about biometrics are established, which are also been explained in this paper. The following are the scope of study –

- **Firstly, the study shows that** biometrics attendance system offers unparalleled ability to quickly and accurately captures real-time, labor data and provides a non-repudiated audit trail.
- **Secondly, the study shows that** biometrics attendance system has intense scrutiny and the results are in - when properly deployed, biometrics work well and are safe, secure, and accurate.
- **Thirdly, the study shows that** biometrics offers organizations a broader range of direct and indirect time, cost, and operational benefits than alternative time and attendance methods.
- **Fourthly, the study shows that in** today's scenario thousands of organizations are relying on easy clocking time & attendance systems to automate their employee attendance and as a result they are seeing a significant reduction in direct and indirect labor costs.

5. LIMITATION OF THE STUDY

A fingerprint scanner system has two basic jobs. First it needs to get an image of your finger, and it needs to determine whether the pattern of ridges and valleys in this image matches the pattern of ridges and valleys in pre-scanned images.

. Reality of Barcode in Biometrics

Only specific characteristics, which are unique to every fingerprint, are filtered and saved as an encrypted biometric key or mathematical representation. No image of a fingerprint is ever saved, only a series of numbers (a binary code), which is used for verification. The algorithm cannot be reconverted to an image, so no one can duplicate your fingerprints.

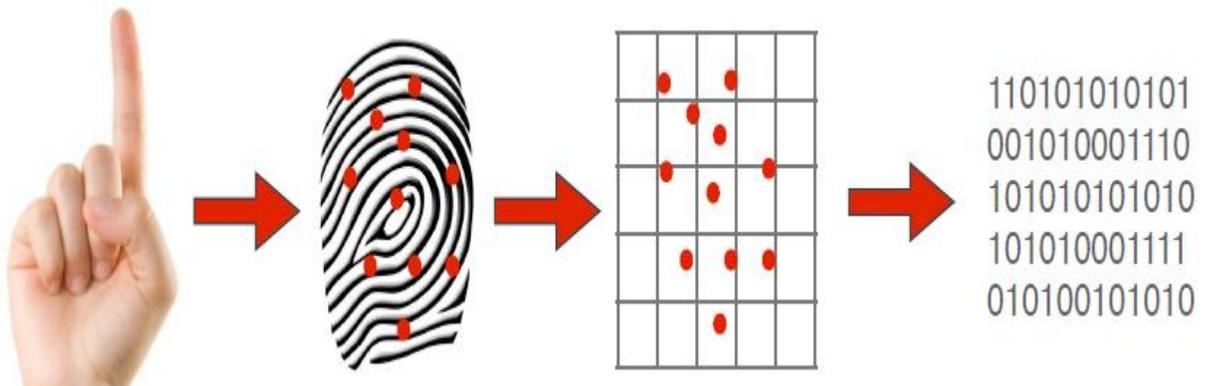


Figure 3 – Diagrammatic Presentation of Biometrics and Attendance System

Source – own source

. Employees Privacy and Cleanliness Concerns

It is important to note that Easy Clocking's biometric time clocks do not actually collect and store fingerprints. Instead, it saves a mathematical representation of the employee's biometric data. When the biometric time clock scans a hand or finger during a supervised enrollment process, only an encrypted mathematical representation of the fingerprint is stored. As a result, it's virtually impossible to duplicate the original image from that mathematical representation. Additionally, if employees question cleanliness, this concern should not be dismissed. Instead, you should assure employees that the time clock's finger zone is not a hot zone for germs. In fact, it will be touched far less frequently than restroom door handles and water cooler spigots etc.

6. CONCLUSION AND RECOMMENDATION

Since biometric technology will involve the employees of the organization using the physiological part of their body for identification and verification, this however satisfies the fact that the system will be sustainable. Hence, biometric technology is surely a global ICT strategy that can be used to enhance staff attendance. Therefore, this study has come to a conclusion that biometric technology system is the best system that can sustainably solve the lingering problem of staff attendance in the organizations. This will eliminate buddy punching and increase staff productivity. It is therefore, recommended that attention should be paid to workforce productivity factors before recommending biometric technology as a means of improving the productivity of an organization business processes.

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