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## Computer Engineering and Software Applications in Human Resource Management of Micro, Small and Medium Enterprises

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### ABSTRACT

Micro, Small and Medium Enterprises (MSMEs) play a pivotal role in economic development and employment generation, particularly in developing economies where they contribute significantly to inclusive growth and entrepreneurship. Despite their importance, most MSMEs operate with limited financial, technical, and human resources, which makes the adoption of complex and expensive Human Resource Management Systems (HRMS) largely impractical. As a result, HR functions in MSMEs are often managed through informal and manual practices. This article explores how basic computer engineering tools and commonly used software applications—such as WhatsApp, mobile payment applications, and Microsoft Office tools including Word, Excel, and PowerPoint—are effectively utilized to support Human Resource Management (HRM) activities in MSMEs. The study also examines the role of data saving and transfer tools such as pendrives, email, and cloud storage platforms in managing employee information and HR documentation. Through a descriptive and analytical approach, the paper highlights how these simple digital tools enable MSMEs to perform essential HR functions such as communication, payroll processing, record maintenance, and employee training. The findings reveal that the use of familiar technologies offers several benefits, including cost-effectiveness, ease of adoption, faster HR processes, and improved



accessibility. At the same time, the article identifies key challenges related to data security, privacy, lack of standardization, and scalability. The study argues that, with appropriate data protection measures and gradual digital upskilling, simple and accessible technologies can effectively bridge the technological gap in MSME HR practices and contribute to sustainable organizational growth in the digital era.

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## 1. Introduction

Micro, Small and Medium Enterprises (MSMEs) form the backbone of many national economies by generating large-scale employment, promoting inclusive growth, and fostering local entrepreneurship. In developing countries like India, MSMEs play a vital role in reducing regional economic disparities and supporting grassroots innovation. Despite their economic significance, MSMEs often operate under severe constraints such as limited financial resources, absence of dedicated Human Resource (HR) departments, lack of trained technical personnel, and inadequate access to advanced technological infrastructure. Consequently, the adoption of formal and integrated Human Resource Management Systems (HRMS) remains limited in these enterprises.

Traditional HRM practices in MSMEs are largely informal and manual, relying on paper-based records or verbal communication. Such practices often result in inefficiencies, poor documentation, and difficulties in tracking employee-related data such as attendance, payroll, performance, and compliance with labor regulations. The high cost, complexity, and maintenance requirements of sophisticated HR software further discourage MSMEs from investing in advanced digital HR solutions.

In recent years, basic computer engineering tools and widely available software applications have emerged as practical and affordable alternatives for managing HR activities in MSMEs. The widespread availability of smartphones, low-cost computers, and internet connectivity has enabled enterprises to adopt everyday digital tools such as WhatsApp, mobile payment applications, Microsoft Office (Word, Excel, PowerPoint), email services, and cloud storage platforms. These tools, though not originally designed for HRM, are increasingly repurposed to perform essential HR functions including employee communication, attendance monitoring, salary disbursement, record keeping, and training.

The use of such simple technologies offers several advantages, including ease of adoption, minimal training requirements, and cost-effectiveness, making them particularly suitable for resource-constrained MSMEs. However, their informal nature also raises concerns related to data security,



privacy, standardization, and long-term scalability. Understanding how MSMEs balance these benefits and challenges is essential for developing sustainable and secure HR practices.

This article explores the role of basic computer engineering tools and commonly used software applications in Human Resource Management within MSMEs. It examines the specific HR tasks supported by these technologies, evaluates their benefits and limitations, and highlights the importance of adopting appropriate data management and security measures. By doing so, the study emphasizes how simple digital tools can bridge the technological gap in MSME HR practices and contribute to organizational efficiency and growth.

## **2. Role of Simple Computer Software in HR Tasks**

### **2.1 WhatsApp for HR Communication**

WhatsApp has emerged as one of the most widely used digital communication tools in Micro, Small and Medium Enterprises due to its accessibility, low cost, and ease of use. In MSMEs, HR-related communication such as daily work schedules, attendance updates, holiday announcements, policy changes, and emergency notifications are commonly shared through WhatsApp groups or individual messages. The platform enables real-time interaction between employers and employees, thereby reducing communication delays and improving operational efficiency.

The informal and user-friendly nature of WhatsApp makes it particularly effective for workers who have limited access to computers or lack advanced digital skills. Features such as group chats, broadcast messages, voice notes, document sharing, and read receipts support quick information dissemination and confirmation. As a result, WhatsApp enhances employee engagement, promotes transparency, and ensures that critical HR information reaches employees promptly. However, the absence of formal documentation and security controls highlights the need for cautious usage in handling sensitive HR data.

### **2.2 Mobile Payment Applications for Salary Processing**

Mobile payment applications such as Google Pay, PhonePe, Paytm, and bank-based Unified Payments Interface (UPI) apps have significantly transformed salary processing in MSMEs. These applications are increasingly used for salary disbursement, overtime payments, and reimbursement of employee expenses. The shift towards digital payments has reduced reliance on cash transactions, minimized errors, and ensured timely payment to employees.



Mobile payment platforms generate automatic digital transaction records, which can be used for payroll verification, financial audits, and dispute resolution. This digital trail enhances accountability and transparency in HR and financial management. Moreover, the simplicity and widespread adoption of mobile payment apps enable MSMEs to manage payroll efficiently without investing in complex payroll software. Despite these benefits, issues such as transaction failures, data privacy concerns, and dependency on internet connectivity remain challenges that require attention.

### **2.3 MS Office for Employee Data Management**

Microsoft Office applications play a crucial role in HR documentation and data management within MSMEs. Due to their versatility and widespread familiarity, these tools are extensively used to support routine HR functions.

MS Word is commonly used for drafting appointment letters, offer letters, employment contracts, policy manuals, circulars, and official notices. It enables professional documentation with standardized formats and easy editing.

MS Excel is one of the most important tools for HR data management in MSMEs. It is used to maintain employee databases, attendance registers, salary and wage calculations, leave records, performance evaluation sheets, and compliance-related data. Built-in formulas and functions support basic automation and reduce manual errors.

MS PowerPoint is primarily used for employee training programs, orientation sessions, safety briefings, and internal presentations. Visual aids improve comprehension and make training sessions more engaging and effective.

Overall, MS Office tools provide flexibility, affordability, and ease of use, making them highly suitable for small organizations that lack dedicated HR software. However, the manual nature of data entry and limited security features necessitate careful handling and regular backups of HR data.

## **3. Data Saving and Transfer Tools in MSME HR Practices**

### **3.1 Pendrives (USB Drives)**

Pendrives, also known as USB drives, are widely used in MSMEs for storing and transferring Human Resource documents such as employee personal records, payroll sheets, attendance reports, and



training materials. Their portability, affordability, and ease of use make them a convenient solution for offline data movement, particularly in workplaces with limited internet connectivity.

Pendrives allow HR personnel to quickly transfer files between computers, share documents during meetings, and maintain backup copies of important records. They are especially useful in small enterprises where centralized digital storage systems may not be available. However, pendrives also present significant risks. Since they are small and easily portable, they can be lost, stolen, or damaged, leading to potential data loss or unauthorized access to confidential employee information. Additionally, pendrives may introduce malware or viruses when used across multiple devices without proper security measures. Therefore, MSMEs must adopt safe handling practices, including encryption, regular backups, and antivirus protection.

### **3.2 Internet and Email**

Email serves as one of the primary communication and data transfer tools for HR management in MSMEs. It is extensively used for sending and receiving resumes, scheduling interviews, issuing appointment letters, distributing salary slips, and maintaining formal communication with employees and job applicants. Email communication provides a structured and traceable record of correspondence, which improves administrative transparency and accountability.

The internet enables instant sharing of HR-related documents and allows organizations to maintain digital records without relying on physical paperwork. Email attachments support the transfer of various file formats, including documents, spreadsheets, and presentations. Furthermore, email systems often include archiving and search features that help HR personnel retrieve historical records efficiently. Despite these advantages, email systems may be vulnerable to cyber threats such as phishing attacks, unauthorized access, and data breaches. MSMEs must therefore implement strong password protection, spam filtering, and secure communication protocols to safeguard sensitive HR data.

### **3.3 Cloud Storage Platforms**

Cloud storage platforms such as Google Drive, Dropbox, and Microsoft OneDrive have become increasingly important for HR data management in MSMEs. These platforms allow organizations to store employee information, payroll records, policy documents, and training materials in centralized digital repositories that can be accessed from multiple devices and locations.



Cloud storage supports collaborative work by enabling HR personnel and management to view, edit, and share documents simultaneously. Features such as automatic backup, version control, and file synchronization improve data reliability and reduce the risk of accidental data loss. Additionally, cloud-based storage allows remote access, which is particularly beneficial for organizations with multiple branches or flexible work arrangements.

However, the use of cloud storage requires careful management of data security and privacy. Improper access control, weak passwords, or unauthorized sharing of documents may expose confidential employee information. To minimize these risks, MSMEs must implement secure login credentials, role-based access control, and regular monitoring of data access activities.

#### **4. Benefits of Using Simple Technology in MSME Human Resource Management**

The adoption of basic computer engineering tools and simple software applications offers several significant advantages for Human Resource Management in Micro, Small and Medium Enterprises. These benefits make such technologies particularly suitable for organizations operating with limited financial and technical resources.

##### **Cost-effectiveness:**

MSMEs can leverage existing infrastructure such as smartphones, personal computers, and internet connectivity to manage HR functions. The use of free or low-cost applications like WhatsApp, MS Office, and cloud storage eliminates the need for expensive HR management systems, reducing operational costs while maintaining functional efficiency.

##### **Ease of adoption:**

Most employees are already familiar with commonly used digital tools such as messaging applications and spreadsheets. This familiarity minimizes the learning curve and reduces the need for extensive technical training. As a result, MSMEs can implement digital HR practices quickly and with minimal disruption to daily operations.

##### **Faster HR processes:**

Digital communication platforms and spreadsheet-based automation significantly speed up HR activities such as attendance tracking, salary calculations, leave management, and information dissemination. Instant messaging and online data sharing enable quicker decision-making and improve overall administrative efficiency.



### **Improved accessibility and flexibility:**

Cloud-based tools allow HR data to be accessed anytime and from any location, supporting remote work and flexible work arrangements. This accessibility enhances coordination between management and employees and ensures continuity of HR operations even during disruptions.

## **5. Challenges and Limitations**

Despite their advantages, the use of informal and basic digital tools for HR management also presents several challenges that MSMEs must address to ensure sustainable and secure HR practices.

### **Data security risks:**

Sensitive employee information such as personal details, salary data, and performance records may be exposed due to weak passwords, unsecured devices, unencrypted files, or unauthorized sharing. The absence of advanced security features increases the risk of data breaches and privacy violations.

### **Lack of standardization:**

Informal digital tools often result in inconsistent documentation formats and data entry practices. Variations in file naming, record structure, and data storage methods may lead to errors, duplication, and difficulties in retrieving accurate information.

### **Limited scalability:**

While simple technologies are effective for small-scale operations, they may become inadequate as MSMEs expand their workforce and HR requirements. Managing large volumes of data and complex HR processes using spreadsheets and messaging apps can reduce efficiency and increase the likelihood of errors.

### **Compliance and regulatory issues:**

Informal HR practices may not fully comply with labor laws, data protection regulations, and statutory reporting requirements. Lack of proper documentation and secure data handling may expose MSMEs to legal and regulatory risks.



## 6. Conclusion

Simple computer engineering tools and commonly used software applications play a pivotal role in enhancing Human Resource Management practices in Micro, Small and Medium Enterprises. Although MSMEs often lack the financial capacity, technical expertise, and organizational readiness required for implementing advanced Human Resource Management Systems, the strategic use of accessible digital tools such as WhatsApp, mobile payment applications, Microsoft Office, email services, and cloud storage platforms effectively bridges this technological gap.

The study demonstrates that these tools support core HR functions including communication, payroll management, documentation, data storage, and employee training in a cost-effective and user-friendly manner. Their familiarity among employees encourages quick adoption, improves operational efficiency, and enhances transparency in HR processes. Moreover, cloud-based technologies provide flexibility and remote accessibility, which are increasingly important in contemporary work environments.

However, the reliance on informal digital tools also presents challenges related to data security, standardization, scalability, and legal compliance. Without adequate safeguards, sensitive employee information may be exposed to risks such as data loss, unauthorized access, and privacy violations. Therefore, MSMEs must adopt basic cybersecurity practices, including password protection, access control, regular data backups, and employee awareness programs.

Looking ahead, future efforts should focus on structured digital training for MSME owners and employees to enhance digital literacy and responsible technology usage. Gradual integration of affordable, modular HR software solutions can further strengthen HR practices as organizations expand. Policymakers and industry bodies can also play a crucial role by providing digital infrastructure support, awareness programs, and guidelines tailored to the unique needs of MSMEs. By combining simple technologies with informed management practices, MSMEs can achieve sustainable growth, improved employee satisfaction, and enhanced organizational resilience in the digital era.

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