International Labour Organization | Global Centre on Digital Wages for Decent Work

Scaling up digital wages

Lessons and challenges from India's enabling environment

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Abbreviation

AEBAS	Aadhaar Enabled Biometric Attendance System
AePS	Aadhaar-enabled Payment Systems
APBS	Aadhaar Payment Bridge System
DBT	Direct Benefit Transfer
IMPS	Immediate Payment Service
MGNREGS	Mahatma Gandhi National Rural Employment Guarantee Scheme
MoRD	Ministry of Rural Development
NACH	National Automated Clearing House
NCIIPC	National Critical Information Infrastructure Protection Centre
NDLM	National Digital Literacy Mission
NEFT	National Electronic Fund Transfer
NPCI	National Payments Corporation of India
PPI	Prepaid Payment Instruments
PMJDY	Pradhan Mantri Jan Dhan Yojana
RBI	Reserve Bank of India
RTGS	Real-Time Gross Settlement
TRAI	Telecom Regulatory Authority of India
UIDAI	Unique Identification Authority of India
UPI	Unified Payments Interface

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Introduction

India's adoption of digital wage payments has accelerated over the past decade, especially in formal enterprises in the private sector, and in the public sector. According to the Findex Database, 43 per cent of wage recipients received wages in cash in 2021, a substantive drop from 79 per cent in 2014. This movement is consistent with results from the Reserve Bank of India's Financial Inclusion Index, which had reached 64.2 points in 2024, against 43.4 in 2017.

The government's drive toward a digital economy, along with financial inclusion initiatives and the rapid expansion of digital infrastructure, has been a key catalyst for this transformation. The scale and speed of digitization in the Indian economy over the past few years have positioned the country at the centre stage in the world of digital transformation. One notable benefit of this process is the rise of digital wage payments, which have become more accessible, efficient, and transparent.

The current report presents some of the key lessons from India's journey towards the adoption of digital wage payments at scale. Over the past decades, government institutions and the private sector in India have collaborated in a series of measures that facilitated the financial and digital inclusion of a greater portion of workers. Nine of these measures have been identified as critical drivers for the scaling up of digital wage payments:

- Conducive **labour and financial regulatory frameworks**, in particular the updating of the Code on Wages and the regulations on cyber security, data and consumer protection;
- Integrated **digital public infrastructure**, notably India Stack and the digital payment services enabled by its infrastructure;
- Foundational **universal biometric digital ID**, known as Aadhaar, a central component of India's digital public infrastructure;
- Universal **access to bank accounts**, through the Pradhan Mantri Jan Dhan Yojana (PMJDY) scheme, that allows every unbanked citizen to open a basic savings account in a financial institution;
- **Direct benefit transfer** (DBT), a scheme to facilitate the digital payment of government subsidies and social transfers into Aadhaar-linked bank accounts;
- Low-cost, real-time, **interoperable payment systems**, comprising of different solutions suitable for retail and bulk payments, such as wage disbursements;
- Robust physical **banking and financial infrastructure**, relying on the expansion of agent banking networks, the creation of payment banks, and increased usage of digital payments by merchants;
- Cost-effective **connectivity**, with improved access to mobile devices, networks and the internet.
- Measures to **address the gender gap**, considering the greater impact of the digitization of wages to women workers.

Despite the overall success, challenges to onboard the totality of Indian workers remain and are likely to present a greater obstacle to workers in the informal sector, employed by smaller enterprises, living in regions where connectivity is still an issue and/or vulnerable groups, particularly women workers, more prone to be digitally and financially illiterate. It is important to have these challenges in mind as we delve into India's journey towards digital wage payments, since they are likely to provide important insights to devise strategies for the "last mile" of wage digitization.

Lessons

Ensuring conducive regulatory frameworks

Regulatory frameworks have significantly impacted the digitization of wage payments in India. They have been responsible for driving the adoption of digital payment methods and transforming the landscape of wage disbursements. Indian labour and financial regulations have evolved along with the changing payments' industry and have been a supportive element to ensure a responsible transition to digital wage payments.

Regulations on wage payments

The evolution of the Indian Wage Code from 1936 to 2022 highlights the shift from traditional payment methods to modern, digitized processes, reflecting broader economic, technological, and regulatory changes in India over the decades.

India's Payment of Wages Act was first enacted in 1936, primarily targeting industrial workers, to eliminate malpractices by defining the time and mode of wage payments. It specified that wages should be paid in current coin, currency notes, or into bank accounts (with the written authorization of the employed person). Wages were predominantly paid in cash, which often led to issues such as delayed payments, , difficulties in maintaining accurate records, and in some cases wage theft. This Act mandated the timely payment of wages and sought to prevent unauthorized deductions and delays. In 2017, an amendment removed the requirement to obtain written authorization to pay wages by cheque or bank transfer.

In 2019, India approved a new Code on Wages, which consolidates and simplifies the country's labour laws related to wages, including the Payment of Wages Act, Minimum Wages Act, Payment of Bonus Act, and Equal Remuneration Act. This comprehensive legislation establishes a uniform minimum wage across all sectors, ensures the timely and complete payment of wages, and promotes digital wage payments. It also includes provisions for equal remuneration for men and women and enhances transparency in wage determination. By modernizing and unifying wage-related regulations, the Code aims to improve compliance, reduce litigation, and foster a more equitable and efficient labour market in India.

Section 15 of the Code on Wages regulates wage and bonus payments for all employees and mandates electronic wage payments. The Code specifies that wage payments should be made by cheque or by crediting wages directly to bank accounts, unless an appropriate government specifies otherwise for particular industrial or other establishments. This provision requires employers to adopt digital payment methods for wage disbursements, reducing reliance on cash payments and promoting financial inclusion.

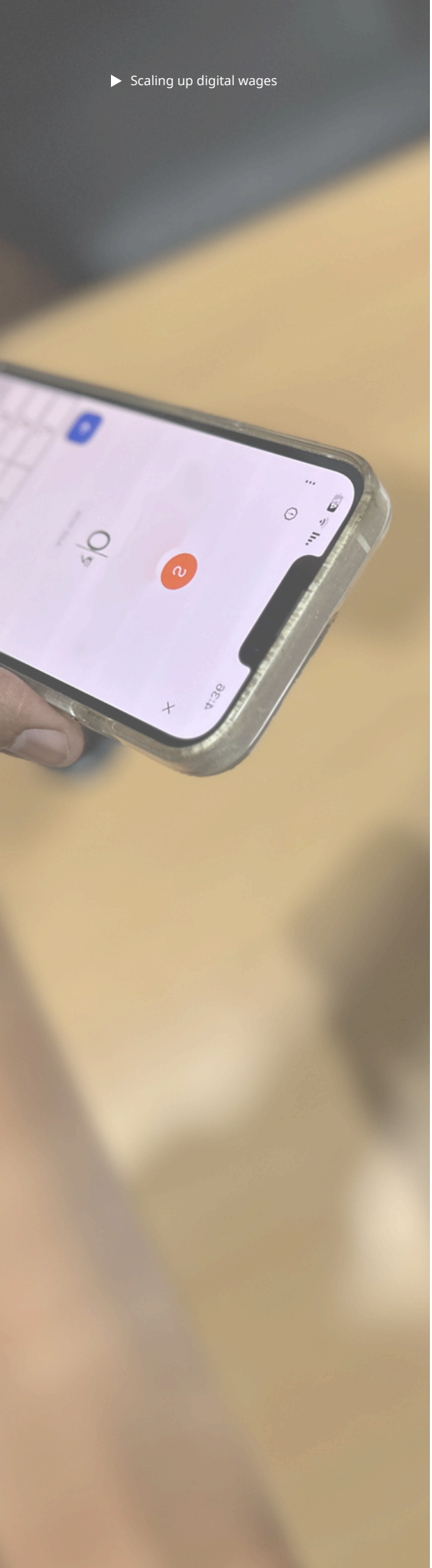
According to a senior high court lawyer interviewed for the study, the new Code on Wages recognizes that "electronic payment methods facilitate the generation of digital records, enabling employers to track and document wage payments more effectively. It also reduces cash transactions in wage payments, which can be prone to pilferage, leakage, and corruption."

> The Code of Wages of 2019 enhanced transparency and accountability in wage payments by requiring employers to maintain accurate records of wages disbursed and deductions made.
>
> Senior High Court Lawyer

The new Code on Wages is part of a broader effort to rationalize labour regulations in India. Since 2019, the government approved four labour codes, which have replaced 29 central labour and industrial laws: the Code on Social Security 2020, the Occupational Safety, Health and Working Conditions Code 2020, the Industrial Relations Code 2020, and the Code on Wages 2019. This reformulation aligns with the government's Digital India campaign, which aims to promote the adoption of digital technologies and services across various sectors, including finance and payments, but is yet to be fully implemented, given protest from trade unions.

Table 1: Evolution of regulations on wage payments

Act/ Amendment	Payments of Wages Act, 1936 (Section 6)	Payment of Wages (Amendment), 2017	Code on Wages, 2019 (Section 15)
Original text of the Act/ Amendment	All wages shall be paid in current coin or currency notes or in both: Provided that the employer may, after obtaining the written authorisation of the employed person, pay the wages either by cheque or by crediting the wages in his bank account.	All wages shall be paid in: (i) in coin or currency notes; or (ii) by cheque; or (iii) by crediting them into the workers' bank account. Relevant central or state government may specify certain industrial or other establishments where the employer should pay their employees only by: (i) cheque; or (ii) crediting the wages in their bank account	All wages shall be paid in: (i) current coin or currency notes or; (ii) by cheque; or (iii) by crediting the wages in the bank account of the employee or by the electronic mode: The appropriate government may, by notification, designate specific industrial or other establishments where employers are required to pay wages to all employees exclusively through cheque or by direct deposit into their bank accounts.
Interpretation	Enables the employer to pay wages solely in coins or currency. However, if the employer chooses, they may pay the salaries via cheque or by depositing the amount in the employees' bank accounts—but only after getting the necessary consent from them.	Wages to be paid in current coin or currency notes or by cheque or crediting in bank account. The Bill removes the requirement of obtaining written authorisation for payment of wages by cheque or through a bank account.	Wages to be paid by cheque or crediting in bank account or by electronic mode (bank transfers). The code empowers the appropriate government to issue a notification that requires certain employers to pay wages through non-cash methods (cheque or bank transfer), only. This is aimed at ensuring transparency, accountability, and security in wage payments.



Regulations on cyber security, data privacy and consumer protection

With the increasing digitization of financial transactions and the proliferation of digital payment systems, it is imperative to establish frameworks to regulate cybersecurity, data privacy, and consumer protection. These are key criteria to ensure that digital wage payments are conducted responsibly and have a substantial impact on fostering the usage of digital financial services and building trust between workers, employers, and financial service providers.

The Government of India has implemented relevant policies and regulations in these areas, with the involvement of several bodies. Long-standing financial sector regulatory frameworks, such as the Banking Regulation Act of 1949 and the Public Financial Institutions (Obligation as to Fidelity and Secrecy) Act of 1983, already provided guidelines on privacy and the disclosure of customers' data and information. However, with the emergence of digital technologies and their increasing application in the financial sector, these regulatory frameworks required modernization.

Broader regulations on data protection and cybersecurity have been enacted by the Parliament of India, such as the Information Technology Act of 2000 and, more recently, the Digital Personal Data Protection Act of 2023. The National Cyber Security Policy of 2013, issued by the Department of Electronics and Information Technology, outlines the vision, mission, and objectives for securing India's cyberspace. It is supported by institutions such as the National

Critical Information Infrastructure Protection Centre (NCIIPC) and the Indian Computer Emergency Response Team (CERT-In). In the financial sector, banks have established dedicated Security Operations Centres (SOCs) and the National Payments Corporation of India (NPCI), responsible for managing India's retail payment systems, has implemented several security measures to protect digital payment platforms and their users.

For matters related to payment systems and financial service providers, the Reserve Bank of India has led the elaboration, implementation, and supervision of measures. It was designated by the Payment and Settlement Systems Act of 2007 as the main authority for matters related to payment systems, including issues on cyber security, data protection and consumer rights. Since then, the Reserve Bank has developed some measures, such as a Charter of Consumer Rights in 2014, a Complaint Management System (CMS) in 2019, and an integrated ombudsman scheme for banks, non-banking institutions and digital transactions.

India's regulatory framework is evolving to address the complex challenges of a rapidly digitizing financial sector. Through dedicated institutions, comprehensive regulations, and continuous capacity building, India aims to secure its banking ecosystem and protect the interests of customers. Ongoing efforts to enhance cybersecurity measures, coupled with robust regulatory oversight and enhanced regulations around financial consumer protection, will be crucial in sustaining and advancing these initiatives.

▶ Table 2: Relevant regulatory frameworks on cyber security, data privacy and consumer protection

Regulation	Topics covered	Responsible institution	Details
Information Technology Act, 2000	Cyber security Data protection and privacy	Enacted by the Parliament of India	Provides legal recognition for electronic transactions, prescribes penalties for cyber crimes and guidelines for the secure handling of electronic records and digital signatures. Amendments to the IT Act, particularly the IT (Amendment) Act, 2008, have introduced stricter provisions for data protection and cybersecurity.
Payment and Settlement Systems Act, 2007	Cyber security Consumer protection Data protection and privacy	Enacted by the Parliament of India Empowers the Reserve Bank of India	Provides the legal framework for the regulation and oversight of payment systems in India. Empowers RBI to set standards for the security and efficiency of payment systems, ensuring the safe conduct of digital transactions. Prohibits financial institutions from sharing consumer data with any third-party service provider unless it is required by law or the consumer's consent was received beforehand.
National Cyber Security Policy, 2013	Cyber security	Department of Electronics and Information Technology	Emphasizes the need for a secure and resilient cyberspace, encourages private-public partnerships, and promotes cybersecurity research and development. The policy also advocates for capacity building and the creation of a skilled cybersecurity workforce.
Charter of Customer Rights, 2014	Consumer protection	Reserve Bank of India	Enunciates five basic rights of financial service consumers in India: a. Fair treatment b. Transparency, fair and honest dealing c. Suitability d. Privacy e. Grievance redress and compensation

Table 2: Relevant regulatory frameworks on cyber security, data privacy and consumer protection

Regulation	Topics covered	Responsible institution	Details
Cyber Security Framework in Banks, 2016	Cyber security	Reserve Bank of India	Mandates banks to have a board-approved cybersecurity policy, establishes a robust cybersecurity governance structure, and implements measures like security operation centres (SOCs), cyber incident reporting, and periodic vulnerability assessments.
Know Your Customer (KYC) master direction, 2016	Data protection and privacy	Reserve Bank of India	Disposes about the secrecy obligations and sharing of information from customers of financial service providers.
Strengthening of grievance redress mechanism in banks, 2021	Consumer protection	Reserve Bank of India	Comprises three main areas to be strengthened in grievance redress mechanisms: a. Enhanced disclosure of complaints b. Recovery of costs of redress of complaints from banks c. Intensive review of grievance redress mechanism
Digital Personal Data Protection Act, 2023	Data protection and privacy	Enacted by the Parliament of India	Regulates the processing of personal data by entities engaged in commercial activities, including those in the payment sector. Financial service providers are required to obtain explicit consent from customers before collecting or processing their data. Customers have the right to access, correct, or delete their personal data and exercise control over its usage by payment service providers. The Act also establishes the Data Protection Board, a new regulatory authority established to ensure compliance, handle grievances, and impose penalties.

Developing an integrated digital public infrastructure

India's Digital Public Infrastructure is spread across a range of sectors – including, but not limited to – healthcare, finance, logistics, e-commerce, governance, taxation, skilling, agriculture, and data. India Stack is a part of the country's digital public infrastructure.

India Stack is non-rivalrous (allowing shared use without preventing others from using them) and non-excludable (any citizen cannot be denied its use without just and equitable reason). It is crucial in ensuring the efficiency, security, and inclusivity of digital payment ecosystems. It is a set of Application Programming Interfaces (APIs) that allows governments, businesses, start-ups, and developers to utilise unique digital infrastructure. It consists of three layers of APIs: identity, payments, and data. Together, they enable online, paperless, cashless, and privacy-respecting digital access to public and private services. [1]

Its development is guided by a foundational building blocks approach and a focus on supporting innovation across the ecosystem. The building block approach involves unbundling the solution's components to problems and identifying a minimal common core. The Government played a catalytic role, acting as an anchor client and establishing institutions to ensure continuity in India Stack's operations. [2]

Figure 1 presents some of the main components of India Stack, many of which played a crucial role in the scale up of digital wage payments and are further discussed as important lessons in this report.

Figure 1: Evolution of India Stack

[1] Oriel, A. (2023, April 25). India's digital journey highlights lessons for other countries: IMF Paper. https://www.fortuneindia.com/macro/indias-digital-journey-highlights-lessons-for-other-countries-imf-paper/112400#:~:text=India%20Stack%20is%20the%20collective,(DigiLocker%20and%20Account%20Aggregator).
[2] Zhabska, C. A. B. H. P. U. (2023, March 31). Stacking up the Benefits: Lessons from India's Digital Journey. IMF. https://www.imf.org/en/Publications/WP/Issues/2023/03/31/Stacking-up-the-Benefits-Lessons-from-Indias-Digital-Journey-531692

While the India Stack has many layers, these have the most significant impact on digital wages:

- **Aadhaar Integration:** Aadhaar, a central component of India Stack, is a foundational identity verification tool. Aadhaar integration enables employers to authenticate employees' identities (especially in attendance and payments for MGNREGS, India's employment guarantee program for rural workers) using biometric authentication, ensuring that wage payments are disbursed to legitimate beneficiaries securely and efficiently. This note elaborates on Aadhaar in the next section. Further, in 2014-15, Central Government of India has mandated all the government organizations to adhere to Aadhaar Enabled Biometric Attendance System (AEBAS) for their employees.

- **Digital Signatures:** India Stack facilitates using digital signatures for authentication and authorisation purposes, enabling employers to digitally sign and approve wage payments. Digital signatures ensure the integrity and authenticity of wage transactions, eliminating the need for physical paperwork and manual signatures.

- **Unified Payments Interface:** UPI, another critical component of India Stack, has revolutionised digital payments in India by providing a seamless and interoperable platform for instant fund transfers between bank accounts. Employers have leveraged UPI to transfer wages directly into employees' bank accounts in real-time, simplifying the wage payment process and reducing transaction costs.

Overall, India Stack is a robust digital infrastructure that also helps enable wage digitization, offering tools and services that streamline and secure the wage payment process. India Stack has fostered innovation and competition (especially in the finance sector), expanded markets (using digital payments has expanded smaller merchants' customer base), closed financial inclusion gaps, and improved public expenditure efficiency. [3]

▶ Box 1: Demonetization and digital payments

On 8 November 2016, the Government of India announced that all INR 500 and INR 1,000 banknotes of the Mahatma Gandhi Series would be withdrawn from circulation, affecting more than 86.4 per cent of the banknotes in India. The government's stated objectives for this measure were to combat counterfeit currency, terrorism financing, corruption, and the illegal economy.

In addition to these immediate goals, authorities also hoped that the shift towards a cashless economy would encourage formalization, particularly benefiting the poor. Evidence suggests that demonetization significantly boosted the adoption of digital payments, leading to a substantial decline in ATM withdrawals and an increase in the use of POS and mobile banking.

However, demonetization also highlights the risks of an accelerated digital transition that does not allow sufficient time for adaptation to economic contexts and social norms. The policy has been widely criticized for its unequal effects, with a notable impact on women and informal sector workers.

Source: Cyril Fouillet, Isabelle Guérin, Jean-Michel Servet (2021). Demonetization and digitalization: The Indian government's hidden agenda (2021). Telecommunications Policy, Volume 45, Issue 2.

[4] Zhabska, C. A. B. H. P. U. (2023, March 31). Stacking up the Benefits: Lessons from India's Digital Journey. IMF. https://www.imf.org/en/Publications/WP/Issues/2023/03/31/Stacking-up-the-Benefits-Lessons-from-Indias-Digital-Journey-531692

Establishing universal biometric digital IDs

In Hindi language, the word 'Aadhaar', means foundation or base. Aadhaar is also the name of India's biometric identity system, which has played a foundational role in facilitating digital wage payments, enhancing security, and promoting financial inclusion. Launched in August 2009, Aadhaar is a 12-digit individual identification number which serves as proof of identity and address for India's residents.

Aadhaar coverage among the adult population continues to be nearly universal. The saturation level among all age groups has climbed to 94.8 per cent, as per April 2023, as stated by the Ministry of Electronics & IT [5]:

> Aadhaar holders executed 1.96 billion authentication transactions in April 2023, a jump of more than 19.3 per cent over April 2022, indicating the growth of the digital economy and usage of Aadhaar in India.
>
> Ministry of Electronics & IT

The creation of Aadhaar costed the government over USD 1 billion, since it required physical biometric enrolments for more than a billion residents. However, at about USD 1 per enrolment, Aadhaar is still one of the cheapest identity projects in the world due to its use of open-source software, open-source hardware, and minimal design. [6] Data of all Aadhaar number holders is stored at the Central Identities Data Repository (CIDR) of the Unique Identification Authority of India (UIDAI). The enrolment data is collected on the client application provided by the UIDAI, which is encrypted at the source, and the packet is transmitted securely.

Aadhaar has made a transformative impact on the adoption of digital wage payments in the following ways:

- **Secure biometric authentication:** Aadhaar provides a safe and reliable mechanism for biometric authentication, enabling individuals to verify their identity using fingerprint or iris scans. This biometric authentication ensures that wage payments and social security benefits are made to genuine beneficiaries, reducing the risk of identity theft, fraud, and duplication. This has also helped employers by removing ghost employees from the payroll and ghosts' beneficiaries getting social benefits.

- **Aadhaar-linked bank accounts:** Aadhaar has played a pivotal role in promoting financial inclusion by providing millions of individuals with a unique identity and facilitating the opening of bank accounts. Aadhaar-linked bank accounts (under PMJDY, see next section) are a gateway to formal banking services and digital payment platforms, empowering individuals to access financial services and participate in the formal economy.

- **Incorporation into payment systems:** Aadhaar has been seamlessly integrated into various digital payment systems, including Aadhaar-enabled Payment Systems (AePS) and bank account linkages. This integration allows beneficiaries to receive their wages directly into their Aadhaar-linked bank accounts, streamlining the payment process and enhancing efficiency.

[5] Aadhaar authentication clocks 1.96 billion transactions in April, 19% more than same month last fiscal. (n.d.). https://www.pib.gov.in/PressReleasePage.aspx?PRID=1926374
[6] Atick, Joseph J. 2016. Digital Identity: The Essential Guide. ID4Africa Identity Forum. https://www.id4africa.com/2016/files/Digital_Identity_The_Essential_Guide.pdf.

- **Efficiency and cost savings:** Aadhaar authentication streamlines the verification process for wage payments, reducing paperwork, administrative overheads, and manual interventions. This improves the efficiency of wage disbursements, lowers transaction costs, and minimises the burden on employers and government agencies. It is estimated that the Government has saved INR 2,250,000 million just by removing ghost beneficiaries from Direct Benefit Transfer programs' lists, thanks to Aadhaar [7].

- **Innovation and digital ecosystem development:** Aadhaar has spurred innovation within the digital ecosystem, leading to new payment solutions, fintech applications, and services. Aadhaar-enabled technologies, such as biometric point of sales (POS) terminals and micro-ATMs [8], have expanded the range of digital payment options available to individuals, further driving the adoption of digital wage payments. In April 2023, more than 200.6 million last-mile banking transactions were made possible through the Aadhaar-enabled Payment System and the network of micro-ATMs. [9]

- **Enhanced transparency and accountability:** Aadhaar authentication creates a digital trail of transactions, improving transparency and accountability in wage payments. Employers and government agencies can easily track and verify payments, ensuring compliance with regulations and minimizing the risk of fraud or misappropriation, especially in government schemes.

[7] English rendering of PM's address at Digital India Week 2022 in Gandhinagar, Gujarat. (n.d.). https://pib.gov.in/PressReleasePage.aspx?PRID=1839230
[8] Micro ATMs are handheld card swipe terminal used to conduct basic transactions like deposit, withdrawal, fund transfer and balance enquiry; in locations where bank ATMs cannot reach. It is used by banking agents in India.
[9] Aadhaar authentication clocks 1.96 billion transactions in April, 19% more than same month last fiscal. (n.d.). https://www.pib.gov.in/PressReleasePage.aspx?PRID=1926374

Promoting universal access to bank accounts

In August 2014, India launched the Pradhan Mantri Jan Dhan Yojana (PMJDY), a scheme that aimed to provide universal access to banking facilities, including savings and deposit accounts, remittances, credit, insurance, and pension, to all households in India. PMJDY addressed financial inclusion challenges and transformed the banking landscape. According to the Ministry of Finance, until August 2024, over 530 million people were brought into the formal banking system by opening PMJDY accounts. Nearly 67 per cent of accounts are opened in rural and semi-urban areas with total deposits at over USD 25 billion, or INR 2,290 billion. [10]

PMJDY are basic savings accounts, free of charge and with no minimum balance requirements. They are integrated with various digital payment platforms, including mobile money apps, Aadhaar Enabled Payment System (AePS), and Unified Payments Interface (UPI) [11]. It enables beneficiaries to receive digital wage payments directly into their accounts, reducing the need for physical cash transactions.

From the perspective of digital wage payments, PMJDY has had several noteworthy impacts:

- **Expansion of banking infrastructure:** PMJDY led to a substantial expansion of India's banking infrastructure, particularly in underserved areas.
- **Encouraging digital transactions:** PMJDY promotes digital transactions by providing RuPay debit card (see **Box 2**) to account holders. These cards enable payments at point-of-sale (POS) terminals, cash withdraws and online transactions. By encouraging digital payment instruments, PMJDY contributes to reducing dependence on cash and easing workers' acceptance of digital wages.
- **Financial and digital literacy:** PMJDY includes financial literacy and awareness initiatives to beneficiaries [12]. Governments, banks, and NGOs conduct financial literacy camps, workshops, and campaigns to empower individuals to effectively access and utilise digital financial services.

Box 2: Facilitating digital payments through Rupay

RuPay, a blend of "Rupee" and "Payment," is an Indian multinational financial services and payment system developed by the National Payment Corporation of India (NPCI) in 2012. It supports electronic payments across all Indian banks and financial institutions. RuPay offers debit cards, credit cards, prepaid cards and government scheme cards.

Through partnerships with Discover Financial and JCB, RuPay cards are accepted internationally. As of January 1, 2020, all merchant discount rate (MDR) charges were waived for RuPay transactions. Additionally, Indian companies with an annual turnover exceeding USD 6.0 million, approximately INR 500 million, are mandated to provide RuPay payment options to their customers. As per the Ministry of Finance, until 2023, around 340 million RuPay debit cards have been issued to PMJDY account holders.

Source: Ministry of Finance, Government of India. (2023, August)

[10] Ministry of Finance, Government of India. Pradhan Mantri Jan-Dhan Yojana (PMJDY), 07 August 2024. Retrieved August 19, 2024, from https://pmjdy.gov.in/account
[11] AePS - Aadhaar Enabled Payment System (AePS) allows the merchant to accept payment from a customer of any bank, by authenticating the customer's biometrics. More on AePS and UPI in the following sections.
[12] Pradhan Mantri Jan-Dhan Yojana | Department of Financial Services | Ministry of Finance. (n.d.). https://pmjdy.gov.in/literacy

Paying government subsidies and benefits digitally

The Direct Benefit Transfer (DBT) programme in India has played a crucial role in transforming the landscape of welfare distribution and financial transactions. Introduced in 2013, the DBT provides a standardized payment framework to streamline the delivery of subsidies, benefits, and services directly into the bank accounts of beneficiaries, reducing leakage, fraud, and delays. As of November 2023, 1016 government subsidies and benefits schemes had already been onboarded for Direct Benefit Transfer payments. It has facilitated 1679.4 million transactions (INR 2,140,000 million (equivalent to ~USD 25,604.48 million) for 1040.2 million beneficiaries [13].

This initiative has significantly boosted trust in digital systems across various sectors in India, particularly in the context of financial transactions and wage payments. DBT has ensured that subsidies and benefits reach the intended recipients without intermediaries. The direct transfer of funds into beneficiaries' bank accounts has made the process transparent and traceable. Beneficiaries receive real-time notifications and updates about their transactions. The transparency provided by DBT has also made it easier for the government to audit and monitor the flow of funds, ensuring accountability at every step.

Transparency and traceability have been possible largely due to the interaction of Aadhaar as an enabler for the DBT programme. Government subsidies, welfare payments, and wages of the Rural Employment Guarantee Scheme (MGNREGS) – see **Box 3** – are directly transferred to beneficiaries' bank accounts linked with Aadhaar.

DBT has been instrumental in promoting financial inclusion since it encourages every beneficiary to have a bank account. Initiatives like the PMJDY have complemented DBT by providing access to banking services to previously unbanked individuals. As beneficiaries experience the ease and security of receiving funds digitally, their trust in the banking system and digital transactions has grown. This financial empowerment has encouraged more people to engage with digital financial services beyond receiving benefits, such as saving, investing, and making digital payments.

The widespread implementation of DBT has also called for the improvement of digital literacy among beneficiaries. Various government programmes have been launched to support beneficiaries on using digital banking services, understanding transaction details, and addressing issues. As people become more familiar with and confident in using digital systems, their trust in these systems also increases.

DBT's success has demonstrated the scalability and reach of digital systems in India. The ability to transfer benefits digitally to millions of people across diverse geographic and socio-economic backgrounds has showcased the robustness of India's digital infrastructure. This capability has not only bolstered trust among the recipients but also among policymakers and other stakeholders, encouraging further digital initiatives.

[13] Ministry of Finance Year Ender 2023: Department of Expenditure. (n.d.). https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1990746

▶ Box 3: Digital wage payments in the Mahatma Gandhi National Rural Employment Guarantee Scheme

Launched in 2005 by the Ministry of Rural Development (MoRD), the Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS) is a social welfare initiative that guarantees 100 days of annual employment for adult members of rural households willing to perform unskilled manual work on public projects. In the fiscal year 2021-22, MGNREGS employed 113.7 million households, generating a total of 2.89 billion person-days of employment, according to MoRD data.

India has recently taken steps to digitize MGNREGS processes, including payments, attendance, and worker verification systems. In January 2024, MoRD mandated the use of the **Aadhaar Payment Bridge System (APBS)** for wage payments to MGNREGS workers. Created by the National Payment Corporation of India (NPCI), APBS uses Aadhaar numbers to verify transactions, eliminating duplicate or ghost accounts and reducing payment delays. For workers to receive payments via APBS, their Aadhaar numbers must be seeded into their MGNREGS job cards, and their bank accounts must be linked to the same Aadhaar number. However, MoRD data indicates that as of December 2023, 34.8% of job card holders were still ineligible for this payment mode.

While digitization promises benefits such as accurate wage calculation via digital attendance, transparency, timely payments, and reduced unauthorized access, challenges remain. Civil society organizations have raised concerns over technical issues, including app malfunctions and limited network connectivity, which impact attendance systems and consequently delay payments. Additionally, many workers have not completed the Aadhaar seeding process, preventing them from transitioning to ABPS. There are also concerns about increased vulnerability to cyber fraud among workers.

Responding to criticism from Congress members, who argued that the Aadhaar-based system could deny benefits to vulnerable groups, exemptions were established for MGNREGS workers from strict Aadhaar-linked payments.

Source: Team, B. W. (2022, December 30). 113 million households got employment under MGNREGS in 2022.

Creating interoperable payment systems

India's payment and settlement systems are regulated by the Reserve Bank of India (RBI) and the Board for Regulation and Supervision of Payment and Settlement Systems. Over the past decade, the Indian payment landscape has evolved significantly, influencing both the digital wage payment solutions available and the use of digital payment systems by workers.

Since the early 2000s, systems developed by the RBI, such as the Real-Time Gross Settlement (RTGS) and the National Electronic Fund Transfer (NEFT), have enabled the transfer of wage payments from employers to workers. NEFT has also been largely used for daily payments, such as bills and online purchases.

More recently, payment and settlement systems developed by the National Payments Corporation of India (NPCI) have expanded the options for employers and workers, significantly driving the uptake of digital transactions. Services such as the Immediate Payment Service (IMPS), the National Automated Clearing House (NACH), RuPay, and the Unified Payments Interface UPI, see **Box 4**) have focused on enhancing interoperability, substantially reducing the cost of digital transactions, and investing in user-friendly applications.

The integration of payment systems with the digital ID, Aadhaar, has also been an important driver of financial inclusion and usage of digital payment services. NPCI's Aadhaar-enabled Payment System (AePS) allows for secure online transactions through bank agents and is especially important for banking services in remote areas. The Aadhaar Payment Bridge System (APBS), which integrates Aadhaar verification technology into NACH, has largely contributed to greater security, efficiency and compliance in the disbursement of government benefits.

These advancements have positively impacted the adoption of digital payments by employers for wage disbursements and by workers for daily expenditures. **Table 3** elaborates on some of these payment systems.

Box 4: Unified Payments Interface (UPI)

UPI is revolutionising how transactions are conducted in India and enhancing financial inclusion. Launched by the National Payment Corporation of India (NPCI) in April 2016, UPI enables seamless and instant fund transfers between bank accounts using a single identifier.

It is used for purposes such as bill payments and purchases (both online and offline). There is zero charge for UPI transactions for consumers (P2P and P2M transactions). An interchange fee of 1.1 per cent on UPI transactions exceeding INR 2,000 (equivalent to USD 23.93) was established from April 1st 2023. This rule applies to transactions made via prepaid payment instruments (PPI).

According to RBI data, in June 2024, UPI enabled over 13 billion transactions, worth INR 20,070 billion (equivalent to USD 239.18 billion). It represents a 500% increase in volume and a 370% increase in value compared to June 2021. The increase in transactions translates the growing number of UPI QR codes in India, which has reached 340 million in June 2024.

Part of UPI success is explained by NPCI's efforts to make it more inclusive:

- **123PAY** facilitates access through basic phones. It uses interactive voice response, app functionality in feature phones, missed call-based approach or proximity sound-based payments. (2022)
- **UPI Lite X** allows users to send and receive money while being completely offline. (2022)
- **Hello! UPI** facilitates conversational payments in Indian regional languages. It is accessible on smartphones, feature phones and IoT devices (2023)
- **Credit line on UPI** provides individuals and small businesses with access to pre-approved credit lines from banks, available for immediate use in transactions via UPI (2023)

Source: Reserve Bank of India, Payment System Indicators, June 2024 and historic series

Table 3: Payment and settlement systems typically used for paying wages

	National Electronic Fund Transfer (NEFT)	Immediate Payment Service (IMPS)	National Automated Clearing House (NACH)
Year of creation	2005	2010	2016
Responsible institution	Reserve Bank of India	National Payment Corporation of India	National Payment Corporation of India
Cost per transaction	Maximum mandated fees: INR 2.50 (USD 0.03) to INR 25 (USD 0.30)	Maximum mandated fees: INR 2.50 (USD 0.03) to INR 15 (USD 0.18)	Varies according to volume and type of mandate.
Limit	No limit.	Maximum amount: INR 5,00,000 (USD 5,950)	Maximum amount: INR 10,00,000 (USD 12,000) to INR 1,00,00,000 (USD 120,000)
Details and use cases	Electronic payment system that enables individuals, companies, and organisations to transfer funds from one bank account to another. NEFT transactions are processed in batches and settled in half-hour intervals. Widely used for various purposes, such as wage payments, bill payments, and online purchases.	Real-time inter-bank payment service. Accessible on multiple channels such as mobile, internet, ATM, and SMS. It is integrated to other digital payment systems, providing interoperability and outreach across different platforms and channels. Used for money transfers to remote locations, remittances, and instant payments. Typically used by enterprises for wage payments.	Web-based clearing service focused on high volume, repetitive, periodic, electronic transfer between banks. Costumers can create mandates for automatic periodic payments. Used by larger enterprises for wage payments. NACH integrates the **Aadhaar Payment Bridge System (APBS),** widely used for the disbursement of DBTs, including to MGNREGS beneficiaries.

Strengthening usage of digital financial services

Scaling digital wage payments in India required a robust and well-coordinated infrastructure across physical, digital, financial and communication dimensions. This section elaborates on the developments of the physical banking and merchant payment infrastructure in India.

Banking Infrastructure

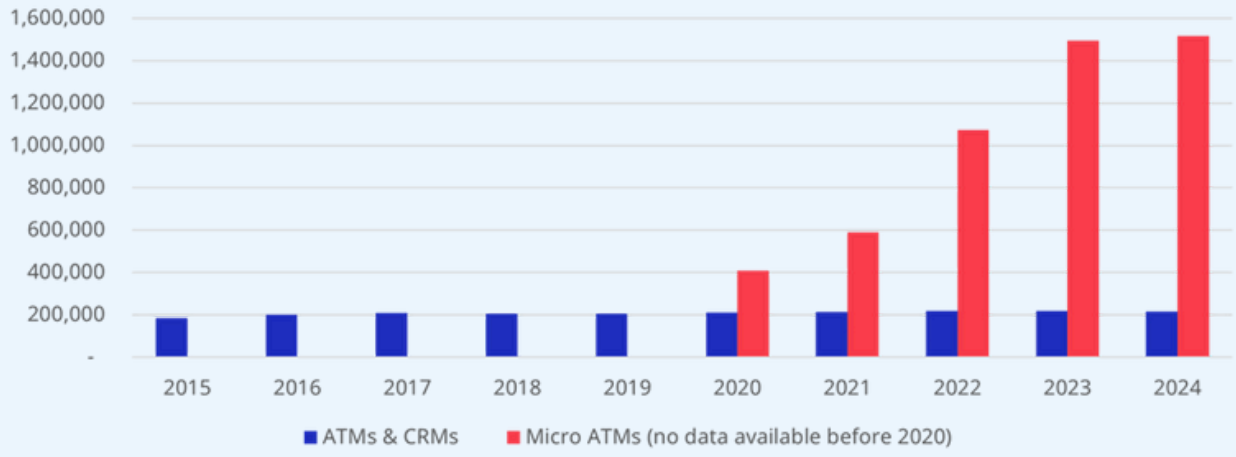
Strengthening the physical presence of banks, especially in rural areas, ensures that individuals can access banking services and have improved access to their digital wage payments. The government of India has put in place a series of measures to further the presence of financial service providers in remote areas and ensure access to and usage of financial services.

As mentioned, initiatives such as PMJDY incentivised banking agents to open accounts for individuals, even those without proper documentation or a minimum balance requirement. As a result, millions of previously unbanked individuals gained access to formal banking services. On the same lines, the creation of Payment Banks, in 2014, aimed at strengthening the presence of financial service providers in remote areas.

Payment banks are a new type of financial institution, subject to more restrictive regulations, which rely on mobile channels and on a network of agents and ATMs to accept deposits and offer remittance services, mobile payments and purchases, debit cards, and other basic banking services.

The expansion of banking networks has also allowed individuals in remote areas to access basic banking services, including digital payments, through authorised banking agents. Since 2017, the RBI mandates that 25 per cent of new banking outlets opened by commercial banks must be in unbanked rural locations. [14] In addition, NPCI has extended the National Financial Switch, an ATM network of more than 1,300 I'members. As a result, over the past decade, the number of ATMs has experienced steady increases, strengthened by the growing presence of emerging solutions, such as micro-ATMs (see **Graph 1**).

Graph 1: Number of ATMs and Micro -ATMs in India



[14] Chamberlin, Kellison, Klugman, & Zimmerman. (2019, June). Enhancing Women's Economic Empowerment Through Digital Cash Transfers. Retrieved March 7, 2024, from https://www.findevgateway.org/sites/default/files/publications/files/_bmgf_d3_criteria_june_1_2019.pdf

Merchant payments

Encouraging businesses to accept digital payments enhances the use cases of digital wages and strengthens financial inclusion by allowing workers to keep a larger portion of their salaries in the accounts, thus supporting further use of financial services. In India, government incentives for businesses to adopt digital payment methods have driven acceptance, including reimbursing merchant discount rates for payments done through UPI or RuPay cards [15].

The infrastructure for **face-to-face payments**, POS and QR payments have seen significant growth in metropolitan regions, as well as in smaller towns and peri-urban areas. The year-over-year growth of POS machines and QR codes is nearly 10 per cent and 24 per cent, respectively, for the period from June 2023 to June 2024. For credit cards, year-over-year growth for the same period is 17 per cent. Innovations in this space, such as tap-to-pay [16] and soundbox, have also promoted digital payments by enhancing the user experience while making payments [17].

Digital literacy

Such a fast-paced, transformational journey warrants that citizens are up-to-date with the changes. A structured approach to digital literacy programmes has been taken in India. One major initiative is the **National Digital Literacy Mission** (NDLM) Scheme, launched in 2017 under the Digital India campaign. This scheme aims to digitally literate 60 million rural households by providing access to digital devices, internet connectivity, and digital literacy training. Further, the Government and the RBI, in November 2014, launched a Consumer Education and Protection Department (CEPD), which will run various awareness programmes throughout the year to educate end consumers. Such initiatives help users understand and utilise digital payment platforms, reducing barriers to adoption.

▶ Box 5: Challenges to digital wage payments in the tea sector

India is the second largest tea producer of the world, which employs about over one million workers (out of which about 95 per cent are field workers). The tea plantations are highly concentrated in the hilly regions of the country.

Almost all the workers have a bank account which were opened under PMJDY. However, due to lack of adequate banking infrastructure, manpower and poor network connectivity, the sector has not been able to completely digitize the wages.

Workers must travel to a bank branch/ ATMs (located far from their work/ residence or banking infrastructure is inadequate to deal with several accounts) to withdraw some amount. This leads to loss in working hours or absentees. Because of these issues, wages of a large section of workers need to be paid in cash.

Efforts are being made by the various stakeholders (government, bank, Indian Tea Association) to address these challenges and expedite digital wage payments in the sector.

Source: ILO (2020). Wages and working conditions in the tea sector.

[15] Incentive scheme for digital payments in Interim Budget 2024 (2024, March). PriceWaterhouseCoopers Private Limited. https://www.pwc.in/assets/pdfs/incentive-scheme-for-digital-payments-in-interim-budget-2024.pdf
[16] Tap to Pay: It is a technology that allows users to make payments by tapping or hovering their NFC-enabled device or contactless card over a payment terminal (POS).
[17] The Indian payments handbook – 2022–2027. (2023, May). PriceWaterhouseCoopers Private Limited. https://www.pwc.in/assets/pdfs/the-indian-payments-handbook-2022-2027.pdf

Improving access to mobile devices and the internet

Access to mobile phones and the internet has been an important driver of financial inclusion in India. Through extended **mobile network coverage** and **internet connectivity** across urban and rural areas, along with increased **ownership of mobile phones**, individuals now have unprecedented access to digital payment platforms and banking services, transforming how digital wage payments can be distributed and accessed.

The Telecom Regulatory Authority of India (TRAI) reports that India's teledensity stood at 85.9 per cent in June 2024, with 898.2 million broadband mobile device users registered, a substantial increase from pre-pandemic levels. Differences between urban and rural areas remain, with teledensity in rural areas at 57.7% in June 2024. [18].

Initiatives like BharatNet [19] aim to improve internet penetration, especially in rural areas. As of January 2024, 210,190 villages were connected through the BharatNet project, and 678,148 kilometres of optical fibre cable (OFC) had been laid [20].

Budget-friendly smartphones and feature phones have also allowed individuals from diverse socioeconomic backgrounds to use digital payments and receive wages digitally. According to the International Data Corporation's (IDC) Worldwide Quarterly Mobile Phone Tracker, India's smartphone market shipped 146 million smartphones in 2023. The entry-level (sub-USD100) segment grew by 12 per cent year-over-year [21]. To further increase penetration, the Union Budget of 2024-25 reduced Basic Customs Duty (BCD) taxes on mobile phone and associated devices.

Extending digital infrastructure and mobile phone ownership is critical for scaling up digital wage payments. It enables individuals to access digital financial solutions, allowing them to securely manage banking information and use financial services. The accessibility reduces the need for physical bank branches or ATMs. Mobile phones facilitate real-time transaction monitoring, instantly informing individuals about wage payments credited to their accounts. The transparency empowers them with greater financial control and better informed financial decisions.

Box 6: Offline financial services

IGiven the challenges to ensure seamless internet access and connectivity across remote areas in India, offline payment mechanisms have also played an important role in the adoption of digital payments and its various use cases for low-income and rural segments. Offline payment transactions are performed using technologies such as SMS and GSM. They are shared with banks once the connection is restored.

One of these mechanisms is NPCI's ***99#**, a USSD mobile banking service that enables offline mobile and UPI payments on feature phones, connecting over 117 financial service providers. Users can send money, check their account balance and last five transactions.

*Source: PriceWaterhouseCoopers Private Limited (2021). Emerging solutions and use cases in offline digital payments. National Payment Corporation of India. Product overview, *99#.*

[18] Press Release No.54/2024, Telecom Regulatory Authority of India (TRAI). Retrieved August 20, 2024 from https://trai.gov.in/sites/default/files/PR_No.54of2024_0.pdf
[19] BharatNet, one of the biggest rural telecom projects in the world, implemented in a phased manner to all Gram Panchayats (approximately 250,000) in the country for providing non-discriminatory access to broadband connectivity to all the telecom service providers. https://usof.gov.in/en/bharatnet-project
[20] Telecom, E. (2024, February 20). BSNL rolls out Rs 65,000 crore tender for BharatNet phase-3 project. ETTelecom.com. https://telecom.economictimes.indiatimes.com/news/industry/bsnl-rolls-out-rs-65000-crore-tender-for-bharatnet-phase-3-project/107837848
[21] India's Smartphone Market Grew by 1% YoY in 2023 to 146 Million Units, says IDC. (n.d.). IDC: The Premier Global Market Intelligence Company. https://www.idc.com/getdoc.jsp?containerId=prAP51865624

Addressing the gender gap

Digital wage payments have had a profound impact on bridging the gender gap in India. A 2019 report found that greater control over earned income can increase women's household bargaining power [22]. According to the study, women who received MGNREGS wages directly into their own accounts (and not through the account of a male household member) were more likely to find employment than those paid in cash; they also stayed longer in the labour force.

An evaluation by Microsave Consulting in 2022 on the impact of DBT on women beneficiaries and their experience in accessing, withdrawing, and utilising DBT funds in India found that it increased women's disposable income and financial decision-making [23]. Additionally, a large-scale experiment conducted in collaboration with government partners in rural areas of India found that women who received digital wage deposits worked more outside their homes, indicating higher financial autonomy [24].

[22] Erica M. Field, et al., On Her Own Account: How Strengthening Women's Financial Control Affects Labor Supply and Gender Norms National Bureau of Economic Research, September 2019.
[23] MicroSave Consulting, September 2022. DBT Diagnostic Study: Female Beneficiaries' Experience of Receiving DBT.
[24] India, I. F. (n.d.). Empowering women through direct digital wage payments. Ideas for India. https://www.ideasforindia.in/topics/social-identity/empowering-women-through-direct-digital-wage-payments.html

▶ Box 7: Wage digitization and the gender divide in the garment sector

The garment and textile industry in India is the second largest employer in the country, providing direct employment to 45 million people (60 per cent of whom are women) and 100 million people in related industries. Workers in large and/or brand facing factories have been paid into bank accounts since 2017.

Research has shown that digital wage payments have increased women's labour force participation and helped shift gender norms by strengthening their control over their finances. Despite the enablers and benefits of wage digitization and digital financial inclusion, there are many barriers which limits women from embracing digital financial inclusion such as limiting gender norms, limited access to mobile devices (particularly smartphones), low levels of digital literacy and limited financial literacy.

Women workers often face difficulty in accessing their accounts and gaining the confidence to use them because of barriers listed above. This result in workers withdrawing their entire salary in cash, or even handing over control of their accounts to others (e.g. male members of the family in case of women workers).

However, research shows that when garment workers are provided with access to digital wages and other digital financial services, along with capacity building support, it builds their confidence to use the financial services (especially in women). Further, it addresses social norms around financial decision-making, which leads to increased economic empowerment and financial resilience for women.

It must be noted that although the garment sector is in the forefront of wage digitization in the country, such digitization is happening mostly for workers who are directly employed by the factories or the brand. The sector provides employment to millions of contractual or casual workers who are hired by a third party. Wages of these workers may not be paid digitally. Such workers are often paid lower wages, lack job security, and social security.

Source: BSR Her Project (2019). Financial Behavior of Female Garment Workers in India: a quantitative enquiry.

Remaining challenges

Remaining challenges

India's digitization success has been pivotal in enabling and propelling the adoption of digital wage payments at scale. Government initiatives, particularly the Digital India campaign, have established a robust digital infrastructure that supports this shift. India has significantly enhanced financial inclusion by promoting Aadhaar-linked bank accounts, UPI, and mobile banking. The widespread availability of affordable internet and mobile devices has further facilitated this transition, ensuring that digital wage payments become an accessible reality for a large segment of the population.

However, the journey towards comprehensive digital wage payment adoption is not without its challenges. The **digital divide** remains a significant barrier, particularly in remote and mountainous areas with sparse internet connectivity and low digital literacy. These regions often lack the necessary infrastructure to support seamless digital transactions, hindering the uptake of digital wage payments. Older workers, who may not be as tech-savvy, face difficulties adapting to digital tools, creating a gap in digital financial inclusion. Moreover, women, especially in rural areas, often have limited access to digital devices and the internet, further exacerbating this divide.

Micro and small businesses, which form the backbone of India's economy, have also been slower in adopting digital wage payments. This reluctance can be attributed to several factors, including weak institutional capacities and this sector's high level of informality.

Many small businesses operate outside the formal banking system, making the transition to digital payments more complex. Additionally, the cost of digital infrastructure and the perceived complexity of digital tools deter small business owners from embracing digital wage payments.

Government initiatives have successfully aimed at MSMEs' adoption of digital tools. According to a 2021 survey, 72 per cent of the MSME payments were made online (through cards, UPI, net banking, etc.) compared with 28 per cent cash transactions [25]. However, no clear data exists on the extent of digitization of wages of MSMEs. Expert interviews suggested that most of the MSME wage payments might not be happening digitally.

> Large organisations and employers are rapidly adopting digital wage payments, while adoption among MSMEs is still lagging.
>
> **Vivek Kumar** / Bhartiya Mazdoor Sangh

The functionality and reliability of digital tools and apps also present challenges. Instances of technical glitches, cybersecurity concerns, and user interface issues can deter users from fully trusting and adopting digital wage payment methods. For many, especially in rural and less digitally literate demographics, even minor technical issues can become significant obstacles, leading to a preference for traditional cash transactions.

[25] India Brand Equity Foundation (May 2024). https://www.ibef.org/download/1720513075_MSME_May_2024.pdf

Despite these challenges, the benefits of digital wage payments are undeniable. They offer greater transparency, reduce the risk of theft and corruption, and ensure timely and accurate payment of wages. Continuous government efforts to improve digital literacy, expand internet connectivity, and provide incentives for digital transactions are crucial steps in overcoming the existing barriers.

In conclusion, while India's digitization success has laid a strong foundation for the widespread adoption of digital wage payments, addressing the digital divide, enhancing support for micro and small businesses, and ensuring the reliability of digital tools are essential for achieving universal digital financial inclusion. Bridging these gaps will require sustained effort, collaboration between public and private sectors, and tailored solutions to meet the diverse needs of India's population. As these challenges are progressively addressed, India can look forward to a more inclusive and efficient digital payment ecosystem, benefiting women and men workers and businesses alike.

The Global Centre on Digital Wages for Decent Work addresses the challenges of cash wages and promotes the transition to responsible digital wage payments for the benefit of workers, employers and governments in every country and economic sector.

The Global Centre is a one-stop-shop for promoting evidence-based strategies and interventions, highlighting progress and sharing knowledge and tools for the transition to responsible digital wage payments. It is an initiative of the ILO's Social Finance Programme.

For information and additional resources on digital wage payments: **www.digitalwages.org**

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