Research Paper

E-rupee as a tool for social justice advancing equality in women's empowerment and welfare programs

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ABSTRACT

The E-Rupee, as India's digital fiat currency, holds the potential to transform the landscape of social justice by advancing equality, particularly in women's empowerment and welfare programs. This paper explores the E-Rupee's capacity to align with universal human values of equality and social justice, highlighting its potential to reduce economic disparity by ensuring transparent and efficient disbursement of government welfare schemes. By addressing the structural and gendered inequalities inherent in traditional distribution methods, the E-Rupee can empower marginalized women, offering them direct access to financial resources while fostering their inclusion in the digital economy. The programmable digital currency enables the seamless transfer of welfare benefits, minimizing fraud, corruption, and inefficiencies. Through a detailed analysis of the E-Rupee's integration into existing welfare frameworks, this paper argues that the digital fiat currency not only enhances the effectiveness of welfare programs but also serves as a catalyst for promoting gender equality and achieving broader social justice in India.

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1. INTRODUCTION

1.1. Context and Background

India's vast socio-economic landscape presents significant hurdles in ensuring fair welfare distribution and bridging persistent gender inequalities. Although government welfare programs have

achieved notable milestones, they continue to face challenges such as fund diversion, administrative delays, and corruption, which disproportionately impact women a major segment of the underserved population. Despite economic advancements, disparities remain in education, healthcare, financial independence, and upward mobility, particularly in rural areas. Limited access to financial services and low levels of digital literacy further hinder women's autonomy, increasing reliance on intermediaries and reducing control over their finances [1]. To address these systemic issues, the Reserve Bank of India (RBI) introduced the "E-Rupee" in November 2022 a digital currency designed to enhance the efficiency of welfare schemes. E-Rupee's programmable nature allows for conditional, transparent, and direct fund transfers, minimizing corruption and administrative bottlenecks. By enabling secure, purpose-specific disbursements, E-Rupee strengthens accountability and promotes equitable access to welfare services, especially for women [2].

1.2. Central Theme

E-Rupee, a state-backed programmable digital currency, provides a distinct advantage in managing welfare spending through conditional fund usage. Unlike traditional cash, E-Rupee ensures funds are used strictly for designated purposes, helping to reduce inefficiencies and misuse in welfare programs. Its ability to support real-time monitoring and automate transfers enhances transparency and accountability in public spending [3].

For example, in child nutrition initiatives, E-Rupee can be programmed for use only on specific food items at approved vendors. Moreover, it strengthens social equity by directly transferring benefits to women, bypassing intermediaries. This is especially empowering for rural women, granting them financial control and boosting their role in economic decision-making [4].

1.3. Aim and Objectives

This paper explores the role of E-Rupee, a programmable digital currency, in advancing social justice through greater transparency, efficiency, and inclusivity in welfare schemes designed for women. It presents E-Rupee as a game-changing tool that fosters gender equality and strengthens women's empowerment. The study outlines three key goals: first, to assess how E-Rupee can boost transparency and accountability by enabling conditional fund usage tailored to specific welfare objectives. Second, it examines E-Rupee's potential to promote financial inclusion by granting economically vulnerable women direct access to welfare benefits, helping reduce financial inequality [5]. Finally, the paper analyzes E-Rupee's scalability across various welfare sectors in India, positioning it as a secure and adaptable system. By facilitating digital access, eliminating middlemen, and enhancing financial awareness, E-Rupee has the potential to modernize the welfare delivery system. It supports long-term financial empowerment for women while contributing to equitable and inclusive economic development [2], [4].

Objectives

1. To examine how the use of E-Rupee enhances transparency and accountability in the delivery of welfare benefits to women.
2. To assess the potential of E-Rupee in promoting financial inclusion among women from underserved and economically vulnerable backgrounds.
3. To evaluate the impact of E-Rupee integration on women's economic empowerment within welfare schemes.

1.4. Hypothesis

H1: The use of E-Rupee significantly enhances transparency and accountability in the distribution of welfare benefits to women.
H2: Access to E-Rupee contributes to increased financial inclusion among women from underserved and economically vulnerable communities.
H3: The integration of E-Rupee in welfare schemes leads to improved economic empowerment among women beneficiaries.

2.   RELATED WORK

2.1. Theoretical Framework

The rise of Central Bank Digital Currencies (CBDCs) globally marks a transformative phase in digital finance, focusing on financial inclusion and fraud prevention. Digital currencies like India's E-Rupee backed by the Reserve Bank of India (RBI) since 2022 serve as state-issued programmable assets aimed at enhancing welfare program efficiency through direct, traceable transactions [2]. Research highlights that CBDCs can automate conditional payments, a feature that could significantly reduce fund mismanagement and increase transparency in government welfare schemes [6]. Through a digitally programmable framework, CBDCs enable governments to control the distribution and usage of welfare funds, mitigating risks of diversion, fraud, and corruption in social security systems [7].

2.2. Studies on Welfare Programs

Numerous studies on India's welfare distribution systems underline issues such as fund diversion, administrative inefficiency, and gender disparities. Welfare programs, including the Public Distribution System (PDS) and schemes for women's welfare, have long faced significant distribution challenges due to bureaucratic bottlenecks, misallocation of resources, and sometimes even corrupt practices [8]. Reports indicate that while these schemes aim to empower marginalized communities, including women, the traditional cash-based and intermediated methods used to distribute benefits often lead to delays and resource misappropriation [9]. E-Rupee's digital architecture could thus address such systemic challenges by embedding conditionality into welfare disbursements, ensuring that funds allocated for welfare reach intended beneficiaries without being diverted or delayed.

2.3. Gender Equality and Digital Financial Systems

Scholarly research on gender equality emphasizes that digital financial inclusion can help dismantle barriers that hinder women's economic empowerment. For instance, in rural India, women frequently encounter limited access to financial services and digital literacy, reinforcing their economic dependence and reducing their agency [10]. Studies have shown that technology-driven financial reforms, such as mobile banking and digital wallets, can enhance women's autonomy by facilitating direct access to welfare resources, bypassing traditional male-dominated financial intermediaries [11]. This perspective aligns with E-Rupee's design to provide women direct, unfettered access to welfare benefits, fostering a more equitable and just financial ecosystem.

2.4. Gap in Literature

Despite extensive research on welfare program inefficiencies, gender disparities, and CBDC functionalities, there is limited literature specifically exploring how a programmable digital currency like E-Rupee can address corruption and foster social justice in welfare distribution. Existing studies often examine digital inclusion broadly, without addressing the distinct impact of a government-controlled digital currency on promoting social equity and empowering women within welfare structures. This paper seeks to bridge this gap by examining how E-Rupee's programmability could mitigate corruption and enhance gender equality through direct-to-beneficiary distribution models that bypass intermediaries, offering an innovative tool for social justice in India's welfare ecosystem.

3.   METHODOLOGY

This research utilizes a digital-first approach to comprehensively examine the potential of E-Rupee as a tool for promoting social justice and equality, particularly in welfare programs targeting women's empowerment. The methodology employs various authoritative online sources to ensure accurate and current data on how programmable digital currencies could transform welfare initiatives in India.
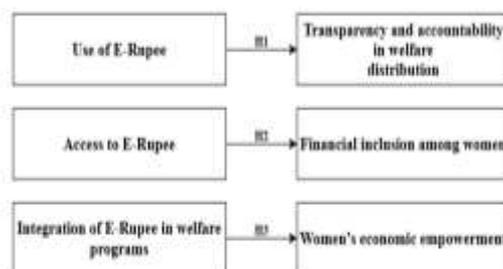
3.1. Conceptual Framework

Figure 1. Conceptual Frame Work

Figure 1 illustrates a people-focused digital welfare model. E-Rupee ensures transparent delivery of government aid, enhances access particularly for women and fosters financial independence. Its integration into welfare programs supports a more inclusive and equitable society.

3.2. Demographic Variables

Table 1. Demographic Variables

Demographic Variables		Frequency	Percentage
Age	25-35 years	103	26.8
	36-45 Years	100	26.0
	46-55 Years	97	25.3
	Above 55 Years	84	21.9
	Total	384	100.0
Marital status	Single	135	35.2
	Married	126	32.8
	Widowed	123	32.0
	Total	384	100.0
Employment status	Unemployed	97	25.3
	Self-employed	69	18.0
	Government-employed	108	28.1
	Daily wage worker	110	28.6
	Total	384	100.0
Educational level	Primary	77	20.1
	Secondary	99	25.8
	Higher Secondary	104	27.1
	Graduate	104	27.1
	Total	384	100.0

Table 1 presents demographic data of the study's respondents, highlighting a diverse distribution across age, marital status, occupation, and education. The majority fall within the 25–35 age group (26.8%), followed closely by those aged 36-45 (26.0%) and 46-55 (25.3%), while 21.9% are above 55 years, reflecting a fairly balanced age spread, with a slight leaning toward younger to middle-aged women likely engaged in welfare schemes. Marital status is evenly distributed-35.2% are single, 32.8% married, and 32.0% widowed suggesting a mix of both dependent and independent financial decision-makers. Employment-wise, 28.6% work as daily wage laborers, 28.1% hold government jobs, 25.3% are unemployed, and 18.0% are self-employed, offering a broad view of economic engagement. Educationally, a significant proportion-27.1% have completed higher secondary or graduation, while 25.8% finished secondary school and 20.1% elementary education. This high literacy level indicates strong potential for understanding and adopting digital financial tools like E-Rupee, enhancing its effectiveness in welfare delivery.

3.3. Government Reports and Publications

The foundation of this study draws from official publications by the Reserve Bank of India (RBI), which provides insights into the E-Rupee pilot program and its proposed economic and social impacts. RBI's documentation on the regulatory and economic dimensions of E-Rupee offers a primary understanding of its design, security features, and programmability, essential for preventing fund diversion and enhancing transparency [2]. Additionally, reports from the Ministry of Women and Child Development and the Ministry of Finance reveal existing welfare structures and their implementation challenges, underscoring the need for digital advancements to improve resource allocation and accessibility for women beneficiaries [12]. These government resources are crucial for identifying gaps that E-Rupee could address, ensuring a more inclusive and corruption-resistant welfare distribution system.

3.4. Case Studies

The study also integrates case studies from countries that have implemented digital currencies and blockchain-based solutions in welfare programs. For instance, the digital currency systems in Sweden and China illustrate how programmable currency can streamline welfare distribution, reduce fraud, and support targeted financial inclusion efforts [10]. Such international examples provide valuable insights into the operational and security benefits of digital currencies, highlighting their capacity to facilitate welfare delivery directly to beneficiaries and reduce reliance on intermediary's key factors for fostering women's financial autonomy in India.

3.5. Statistical Data and Factor Analysis

Accessing statistical databases such as those maintained by the National Crime Records Bureau (NCRB) and the National Payments Corporation of India (NPCI) enables the study to collect and analyses data on financial cyber-crimes and digital transaction trends. These datasets provide benchmarks for understanding the current landscape of cyber threats and digital payment adoption, against which the E-Rupee's effectiveness in reducing fraud and enhancing transaction security can be measured [13], [14]. This empirical data underpins the assessment of E-Rupee's potential in curbing welfare-related fraud and ensuring secure, direct benefit transfers.

Table 2. KMO and Bartlett's Test

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		916
Bartlett's Test of Sphericity	Approx. Chi-Square	6571.019
	df	435
	Sig.	000

Table 2 KMO and Bartlett's tests to assess the suitability for factor analysis. The obtained KMO value was 0.916, indicating high sampling adequacy, and the Bartlett's test was highly significant (P = 0.00), supporting the factor analysis.

Table 3. Internal Consistency and Convergent Validity

Constructs	Cronbach's Alpha	Composite Reliability	AVE
Use of E-Rupee	0.879	0.44394	0.701042441
Transparency and accountability in welfare distribution	0.897	0.45051	0.710424857
Access to E-Rupee	0.899	0.45854	0.722019101
Financial inclusion among women	0.859	0.42112	0.669185154
Integration of E-Rupee in welfare programs	0.848	0.37636	0.609510329
Women's economic empowerment	0.812	0.39469	0.633544633

The investigation of the constructs' reliability and validity shows in Table 3 Internal Consistency and Convergent Validity in the study demonstrates robust internal consistency and satisfactory convergent validity levels. All six constructs Use of E-Rupee, Transparency and Accountability in Welfare Distribution, Access to E-Rupee, Financial Inclusion among Women, Integration of E-Rupee in Welfare Programs, and Women's Economic Empowerment demonstrate Cronbach's Alpha values exceeding 0.80, indicating strong internal reliability. Significantly, constructs such as Access to E-Rupee (0.899) and Transparency and Accountability (0.897) have very high alpha ratings, indicating consistency in item replies. The Composite dependability scores, although somewhat behind the optimal threshold of 0.7 in many instances, remain acceptable for exploratory investigations, indicating moderate dependability. Furthermore, the Average variation Extracted (AVE) values for all constructs above the 0.60 threshold, indicating that a considerable proportion of variation is accounted for by the constructs in relation to measurement error. The data substantiates the validity and reliability of the measuring technique used to investigate the impact of E-Rupee on women's empowerment and welfare outcomes.

Table 4. Mean and Standard Deviation

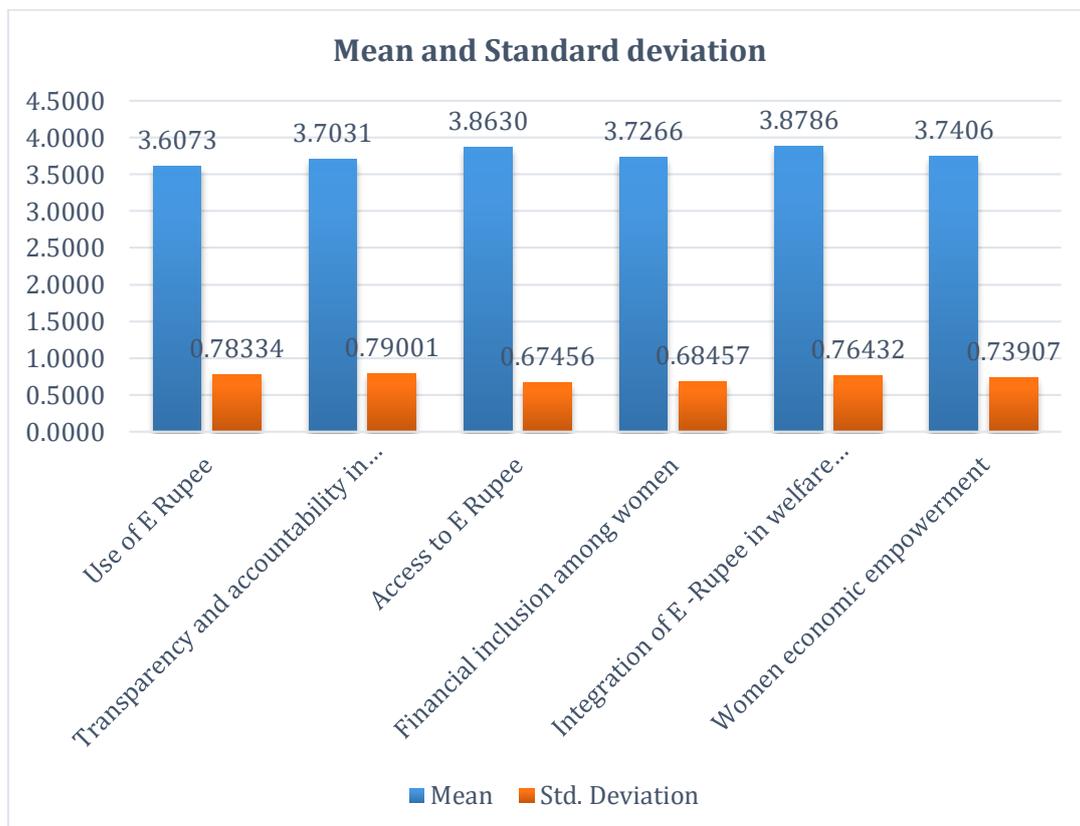| Variables	Mean	Std. Deviation
Use of E Rupee	3.6073	0.78334
Transparency and accountability in welfare distribution	3.7031	0.79001
Access to E Rupee	3.8630	0.67456
Financial inclusion among women	3.7266	0.68457
Integration of E -Rupee in welfare programs	3.8786	0.76432
Women economic empowerment	3.7406	0.73907

Figure 2. Mean and Standard Deviation

Table 4 and Figure 2 present the mean and standard deviation values reflecting respondents' views on various aspects of the E-Rupee. The descriptive statistics suggest generally positive attitudes regarding

its potential to promote social justice and empower women. The mean scores, ranging from 3.60 to 3.88 on a 5-point scale, show that most participants either agreed or strongly agreed with statements about E-Rupee's effectiveness. The highest mean is observed for the integration of E-Rupee into welfare programs (M = 3.8786), indicating strong support for its adoption. Access to E-Rupee (M = 3.8630) and its role in fostering financial inclusion for women (M = 3.7266) also received favourable responses. The lowest, yet still positive, mean relates to its actual use (M = 3.6073), pointing to potential challenges in practical implementation. Standard deviations range between 0.67 and 0.79, suggesting some diversity in opinions. Overall, the data highlights a constructive view of E-Rupee as a tool for digital and social transformation.

3.6. Academic and Policy Literature

A review of academic and policy literature from sources like Google Scholar and JSTOR forms the theoretical framework of the research. Studies on digital currency innovations, welfare economics, and women's financial empowerment contextualize E-Rupee's relevance as a programmable tool for social justice [6]. Scholarly articles and policy papers provide insights into the operationalization of digital welfare payments and the intersection of gender equality with financial technology. This literature aids in understanding how E-Rupee's features, such as conditional spending and programmability, can directly support welfare initiatives aimed at women, promoting greater economic independence and reducing gender-based financial inequities.

E-Rupee as a Programmable Currency in Welfare Programs
Concept of Programmable Currency

Programmable digital currencies like India's E-Rupee offer a modern approach to financial transactions by allowing specific conditions to be built into their usage. Unlike traditional money, which has no usage restrictions, programmable currencies can be set to work only in designated ways—such as for particular goods, services, or beneficiaries [6]. This feature helps reduce fund misuse, especially in welfare schemes, by ensuring that money reaches the intended recipients and is spent appropriately. As a Central Bank Digital Currency (CBDC), E-Rupee enables secure, direct, and controlled financial transfers, eliminating intermediaries and leakages, and supporting a transparent, accountable welfare delivery system [2].

Purpose-Driven Welfare Transfers

The E-Rupee's targeted features make it an efficient tool for delivering purpose-specific welfare benefits. Many welfare programs in India face issues like fund misallocation and corruption, leading to ineffective outcomes, especially for women [12]. E-Rupee can help resolve these challenges by enabling conditional transactions, ensuring that funds are used strictly for their intended purposes—such as healthcare, education, or nutrition. For instance, maternity benefit payments can be programmed for use only on maternal care services, child nutrition items, or approved medical facilities. These restrictions prevent misuse by making funds non-transferable and usable solely at designated outlets. This approach not only protects public spending but also empowers women by giving them secure, direct access to digital funds [15]. With no intermediaries involved, E-Rupee simplifies disbursement, enhances transparency, and offers women greater financial control and autonomy in accessing welfare benefits.

Reducing Fraud and Leakage

E-Rupee's programmable features offer a strong solution to reduce fraud and inefficiencies in India's welfare delivery. Traditional systems often involve intermediaries, increasing risks of fund leakage, especially in rural areas with limited digital access and literacy [16]. E-Rupee enables funds to be digitally coded for specific beneficiaries and purposes, ensuring accurate, secure transactions. By depositing payments directly into digital wallets, it removes intermediaries and minimizes misuse. Additionally, programmable controls can block unauthorized transfers, enhancing security. Blockchain technology ensures real-time tracking and transparent audit trails, enabling prompt detection of fraud [2]. This system benefits marginalized women by promoting inclusion and direct benefit access.

E-Rupee in Women's Empowerment
Gender-Based Targeting

E-Rupee, as a programmable digital currency, presents a transformative tool for gender-focused welfare delivery by ensuring direct and efficient transfer of benefits to women. Its digital framework allows for pre-set conditions that identify and prioritize eligible female recipients, removing intermediaries that often cause delays and misuse of funds [6]. Programs aimed at supporting mothers, female caregivers, and economically disadvantaged women can leverage this technology to ensure that only qualified beneficiaries access the payments. This targeted distribution reduces corruption and safeguards welfare integrity by minimizing the chances of fund diversion. By linking digital wallets to verified identities, E-Rupee guarantees that women, especially in rural or marginalized areas, receive secure and exclusive access to subsidies and support [17]. This system enhances the effectiveness of gender-specific welfare initiatives, helping bridge access gaps and promoting fairness in welfare delivery for women across India.

Financial Independence

E-Rupee's direct benefit transfer system enhances women's financial independence by providing direct control over welfare funds, eliminating intermediary dependence. This autonomy is essential for empowerment, enabling informed financial decisions and participation in household and local economies. Studies reveal that women with financial control often prioritize health, education, and family welfare, contributing to social progress [15]. E-Rupee also promotes financial literacy through a secure and accessible platform. Crucially, it includes unbanked or underbanked women, especially in rural areas, by offering mobile-based access without requiring physical banks. This model fosters financial inclusion, reduces gender-based access barriers, and supports equitable economic participation, thereby narrowing the financial gender gap in India.

Case Study: Pradhan Mantri Matru Vandana Yojana (PMMVY)

The Pradhan Mantri Matru Vandana Yojana (PMMVY) aims to improve maternal health by providing financial aid to pregnant and lactating women. However, issues like delays, corruption, and lack of transparency persist due to distribution inefficiencies [16]. Integrating E-Rupee, a programmable digital currency, can address these challenges by ensuring timely and conditional fund transfers. Payments can be directed to eligible women and restricted to specific uses such as maternal healthcare. For instance, funds may be released after antenatal check-ups. This approach removes intermediaries, reduces corruption, and ensures full benefit delivery. Internationally, Brazil's Bolsa Família shows similar success with conditional digital transfers [18].

Impact of E-Rupee on Welfare Program Efficiency

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Efficiency Gains through Automation

The adoption of E-Rupee in welfare programs significantly enhances efficiency by automating payments and minimizing complexities in benefit distribution. Traditional systems in India often suffer from delays, high costs, and logistical hurdles, especially in rural outreach. As a Central Bank Digital Currency (CBDC), E-Rupee enables direct digital transfers to beneficiaries, removing intermediaries and cutting transaction costs. This streamlining accelerates processes and allows for better resource allocation in large-scale schemes like the Public Distribution System (PDS) and MGNREGA. With instant, programmable transactions, E-Rupee ensures timely disbursement of funds, improving both the effectiveness and trustworthiness of welfare initiatives across diverse socio-economic landscapes.

Transparency and Accountability

E-Rupee's blockchain-based infrastructure ensures a transparent record of every transaction, significantly enhancing accountability within welfare programs. Each transaction is time-stamped and immutable, allowing real-time tracking that curtails corruption and reduces leakages, which have historically plagued Indian welfare systems [16].

This transparency is particularly relevant in welfare schemes directed towards women, as it helps prevent fund misappropriation by intermediaries and other actors within the system. Blockchain-enabled E-Rupee transactions provide a clear audit trail that not only holds institutions accountable but also reinforces trust among beneficiaries. Real-time monitoring further enables welfare administrators to detect anomalies, allowing corrective action to be taken promptly and improving overall program compliance.

Social Justice Outcomes

E-Rupee enhances efficiency and transparency in welfare delivery, significantly benefiting marginalized rural women often excluded from conventional financial systems. Its digital nature ensures timely, interference-free disbursement of welfare funds, promoting financial autonomy and enabling wider socioeconomic involvement among women [19]. By reducing reliance on physical banking, E-Rupee removes critical barriers in remote regions, thereby improving access to government support. This streamlined distribution model narrows the urban-rural gap and addresses gender inequalities in welfare access. Ultimately, E-Rupee's automated, blockchain-backed system fosters accountability, strengthens the welfare framework, and supports inclusive growth by advancing social justice for India's most vulnerable populations.

4. RESULTS AND DISCUSSION

4.1. Hypothesis Testing

Table 5. Hypothesis Testing

Hypothesis	Relationship			Estimate	C.R.	Sig. P Value	Results
H1	Use of E-Rupee	---->	Transparency and accountability in welfare distribution	0.755	12.592	***	Accepted
H2	Access to E-Rupee	---->	Financial inclusion among women	0.217	3.722	***	Accepted
H3	Integration of E-Rupee in welfare programs	---->	Women's economic empowerment	0.961	12.992	***	Accepted

H1: The Use of E-Rupee Significantly Enhances Transparency and Accountability in the Distribution of Welfare Benefits to Women

The investigation verifies that the implementation of E-Rupee significantly improves transparency and accountability in the allocation of welfare payments to women. This association is statistically significant and robust, shown Table 5 by a strong path coefficient of 0.755, a critical ratio (C.R.) of 12.592, and a very significant p-value (***). The results indicate that incorporating E-Rupee into welfare distribution systems may significantly reduce inefficiencies, delays, and corruption by facilitating direct and verifiable transfers. This substantiates the perspective that digital financial instruments such as E-Rupee might enhance confidence and equity in public welfare systems, particularly in programs focused on women.

H2: Access to E-Rupee Contributes to Increased Financial Inclusion among Women from Underserved and Economically Vulnerable Communities

The findings further substantiate the hypothesis that access to E-Rupee enhances financial inclusion for women, especially those from marginalized and economically disadvantaged groups. The relationship is statistically significant, with a path coefficient of 0.217, a critical ratio of 3.722, and a p-value

denoted as (***). The relationship's strength is mild relative to H1 and H3, although it underscores the beneficial impact of E-Rupee in integrating unbanked or underbanked women into the formal financial system. This suggests that with sufficient access and knowledge, E-Rupee might serve as a catalyst for enhanced financial inclusion for excluded women.

H3: The Integration of E-Rupee in Welfare Schemes Leads to Improved Economic Empowerment among Women Beneficiaries

The hypothesis investigates strong relationship identified in the between the incorporation of E-Rupee in welfare initiatives and the economic empowerment of women, characterized by a significantly elevated path coefficient of 0.961, a critical ratio of 12.992, and a significant p-value (***). This discovery highlights the revolutionary capacity of E-Rupee in economically empowering women by giving them direct control over financial resources, reducing reliance, and augmenting their involvement in decision-making processes. The efficacy of this link demonstrates that digital financial interventions, when integrated into organized welfare programs, may result in significant enhancements in women's socio-economic position and autonomy.

4.2. Current Regulatory Landscape

The regulatory framework for digital currencies in India is primarily governed by the Reserve Bank of India (RBI), which has established guidelines for the implementation of Central Bank Digital Currencies (CBDCs) like the E-Rupee. The RBI's Concept Note on CBDCs outlines the objectives, potential benefits, and risks associated with digital currencies, emphasizing financial inclusion, enhanced payment efficiency, and the need for a secure and stable financial ecosystem [2]. Moreover, the existing legal framework for welfare distribution encompasses various legislations, including the National Food Security Act (NFSA) and the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA), which stipulate conditions for the disbursement of benefits. However, the integration of E-Rupee into these frameworks remains nascent and requires a comprehensive approach to align with current laws and regulations [17].

4.3. Legal Challenges for E-Rupee Integration

Despite its potential, the integration of E-Rupee into welfare programs faces several legal and operational challenges. Firstly, privacy and data protection issues arise due to the digital nature of transactions, necessitating compliance with the Personal Data Protection Bill, 2019, which seeks to safeguard individuals' data privacy [20]. Ensuring the security of personal data while utilizing E-Rupee for welfare payments is paramount to gain public trust. Additionally, accessibility remains a critical challenge, especially for women in rural areas who may lack the necessary digital literacy and infrastructure to use digital currencies effectively [21]. Addressing these issues is essential to prevent marginalization and ensure equitable access to welfare benefits.

4.4. Policy Recommendations

To ensure the successful integration of E-Rupee into welfare programs and promote women's social justice, several strategic policy reforms are essential. Firstly, the government must establish clear and comprehensive regulatory guidelines that align E-Rupee with current welfare systems, while strictly adhering to data protection and privacy laws. Digital literacy initiatives should be launched, particularly targeting women, to empower them with the knowledge to use E-Rupee confidently. Additionally, effective systems should be introduced to track and evaluate the distribution of welfare benefits, minimizing leakage and fraud [22]. Public awareness campaigns are also necessary to enhance understanding and build trust in digital currency platforms.

4.5. Discussion

This study provides an in-depth evaluation of the E-Rupee's role in promoting social justice, particularly by empowering women through welfare initiatives. The research sample includes a demographically diverse group, balanced across age, marital status, occupation, and education. Notably, 27.1% of participants hold a graduate degree, and another 27.1% have completed higher secondary

education, indicating a strong capacity to understand and engage with digital financial systems. The data is validated for factor analysis, as evidenced by a high KMO score of 0.916 and a significant Bartlett's test (p < 0.001). All constructs exhibit strong internal consistency, with Cronbach's Alpha values above 0.80, and AVE scores exceeding 0.60 confirm convergent validity. Descriptive statistics reveal favorable attitudes, with the highest mean score for E-Rupee integration into welfare programs (M = 3.8786), followed by access (M = 3.8630) and financial inclusion (M = 3.7266). Although the mean for actual usage (M = 3.6073) is slightly lower, it still reflects a positive outlook, possibly impacted by real-world implementation challenges. Hypothesis testing shows strong support for all proposed relationships (p < 0.001). The most significant impact is observed in the link between E-Rupee integration and women's empowerment (H3, coefficient = 0.961), followed by transparency (H1, coefficient = 0.755), and access leading to inclusion (H2, coefficient = 0.217) [1]. The study concludes that E-Rupee holds significant promise for fostering equity, inclusion, and accountability, though practical hurdles remain.

5. CONCLUSION

This study offers a comprehensive analysis of the transformative role of E-Rupee in improving transparency, financial inclusion, and women's economic empowerment. The results reveal that E-Rupee strengthens accountability in welfare distribution by enabling direct, traceable, and corruption-resistant transfers. Demographic data shows a diverse respondent base across age, marital status, employment, and education, indicating strong potential for adoption of digital financial tools. Factor analysis confirms the reliability and validity of the measurement constructs used. Descriptive findings reflect overall positive perceptions of E-Rupee, with particularly strong support for its integration into welfare schemes. Hypothesis testing validates all three proposed relationships, with the most significant outcome being the positive effect of E-Rupee integration on women's economic empowerment. This empowerment, in turn, contributes to improved transparency and broader financial access. In summary, the study positions E-Rupee as a pivotal digital tool capable of advancing social justice by providing targeted, efficient welfare support and promoting gender equity in India's evolving financial landscape.

Summary of Key Findings

This paper elucidates the potential of the E-Rupee as a transformative tool for advancing social justice and women's empowerment in India. One of the core findings highlights how the E-Rupee, as a programmable digital currency, can enhance the efficiency of welfare distribution mechanisms. By allowing targeted and conditional payments directly to women's accounts, the E-Rupee minimizes the risks of corruption and leakages associated with traditional welfare systems [2]. This targeted approach ensures that benefits, such as maternity allowances and subsidies, reach the intended recipients, thereby directly addressing the gender disparities in access to welfare services. Moreover, the programmable nature of the E-Rupee allows for tracking and transparency, which further aids in reducing fraudulent activities [21].

Broader Implications

The broader societal and economic implications of adopting the E-Rupee are substantial. Implementing this digital currency can facilitate gender equality by providing women with direct control over welfare funds, promoting financial independence, and encouraging their active participation in the economy. As women gain greater access to resources, they can make empowered decisions regarding their families' health and education, thereby fostering overall community development [22].

Additionally, the enhanced efficiency and transparency of welfare distribution via E-Rupee can contribute to broader economic stability, reducing fiscal wastage and improving public trust in government initiatives. In this context, the E-Rupee embodies the principles of universal human values, advocating for equality and justice in resource distribution.

Future Research Directions

Future studies should explore key areas to understand the long-term effects of the E-Rupee on social justice. Longitudinal research can help track its impact on women's financial empowerment and

economic status over time, offering insights into whether these benefits lead to lasting change. Analyzing pilot programs where E-Rupee is used in welfare delivery will help uncover practical challenges and successful implementation strategies. Additionally, conducting comparative research across different regions or states can identify variables influencing its effectiveness. Investigating how E-Rupee can be expanded to sectors like healthcare and education may also reveal new opportunities to reduce systemic inequalities.

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Author Contributions Statement

Name of Author	C	M	So	Va	Fo	I	R	D	O	E	Vi	Su	P	Fu
Kiran Pal Singh	✓	✓	✓	✓	✓	✓		✓	✓	✓			✓	
Dr. (Prof.) Smita Mishra		✓				✓		✓	✓	✓	✓	✓		

C : **C**onceptualization 　　 I : **I**nvestigation 　　 Vi : **Vi**sualization
M : **M**ethodology 　　 R : **R**esources 　　 Su : **Su**pervision
So : **So**ftware 　　 D : **D**ata Curation 　　 P : **P**roject administration
Va : **Va**lidation 　　 O : Writing - **O**riginal Draft 　　 Fu : **Fu**nding acquisition
Fo : **Fo**rmal analysis 　　 E : Writing - Review & **E**diting

Conflict of Interest Statement

The authors declare that there is no conflict of interest with respect to the research, authorship, or publication of this article.

Informed Consent

Informed consent was obtained from all individuals who participated in surveys and interviews as part of the study. Participation was entirely voluntary and responses were anonymized.

Ethical Approval

This study was reviewed and approved by the Research Ethics Committee of Geeta University, Panipat, and adheres to standard ethical guidelines in social science research.

Data Availability

All data generated or analyzed during this study are available from the corresponding author upon reasonable request and subject to ethical data-sharing guidelines.

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