**INDIAN COUNCIL OF SOCIAL SCIENCE RESEARCH**

**Research Proposal for Major/Minor Research Projects (2024-25)**

| **Application Number** **(To be noted down from the online application)** | **ICSSR-RMM-2024-9892** |
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| **Applying Under (Put tick mark)** |
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| *Major Project Proposals with budget up to Rs.30 lakhs* |  | *Minor Project Proposals with budget up to Rs.15 lakhs* |  |

| **Broad research discipline as per ICSSR list (**Refer Clause 1.2 of guidelines) | Economics  |
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| **1** | **Name of Project Director** | Dr.P. Chitra |
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| **2** | **Title of the Research Proposal** | Integrating Fintech Solutions to Assess Credit Card Impact on Inflation and Monetary Policy |
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|  | **Abstract** (approx. 300 words) | The rise of credit card usage has introduced complexities in monetary supply and inflation dynamics that traditional monetary theories may not fully address. Conventional models link money supply directly to inflation, but these frameworks were established before credit card facilities became prevalent. Credit card transactions temporarily increase the money supply due to the 2-3 day lag in merchant settlements, potentially enhancing consumer purchasing power and introducing inflationary pressures through a multiplier effect. This research investigates the impact of this credit card-driven money supply on inflation by analyzing settlement lags and exploring seasonal spending patterns, especially during peak periods like festivals.To achieve this, the research study proposes a case analysis involving transaction data from two major public sector banks in India. By calculating correlation coefficients between inflation and traditional versus revised money supply metrics (including credit card transactions), we aim to identify inflationary impacts attributable to these transactions. This approach aims to identify inflationary impacts that stem from these short-term increases in the money supply due to credit card settlement delays. In parallel, the research study outlines a fintech solution concept: a real-time, AI-powered predictive tool designed to analyze and forecast the impact of credit card usage on inflation. By integrating real-time credit card transaction data, this tool would provide actionable insights, helping policymakers and financial institutions monitor inflationary trends more precisely.The expected outcomes of this research include a revised understanding of money supply that accounts for digital credit transactions, revealing potential inflationary impacts of seasonal credit card spending. Additionally, the findings could lead to updates in inflation indicators that reflect credit-driven dynamics. These insights ultimately offer a foundation for more adaptive monetary policies tailored to an economy increasingly influenced by digital credit facilities, thereby aiding the Reserve Bank of India in crafting more robust inflation management strategies aligned with the evolving financial landscape. |
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| **4** | **Introduction of the Proposed Study** (approx. 400 words) | In recent years, the landscape of consumer finance has transformed with the exponential rise in credit card usage. Credit cards now represent a significant portion of consumer spending, offering convenience and ease of transaction while reshaping the underlying dynamics of money supply and inflation. Unlike traditional cash or debit payments, credit card transactions introduce a unique factor in the monetary system: the temporary increase in money supply due to the delay in settlement between the time a transaction is made and when funds are transferred to the merchant, typically within 2-3 days. This lag can create short-term boosts in purchasing power, which may compound through a multiplier effect, intensifying inflationary pressures.Traditional monetary theories, which closely link money supply to inflation, do not fully account for this dynamic because they were conceptualized before credit cards and other digital credit facilities became mainstream. Historically, these models considered money supply as relatively stable and straightforward to measure through liquid assets like cash and bank deposits. However, the modern credit ecosystem—comprising credit cards, digital wallets, and instant credit options—has altered this understanding, necessitating a fresh perspective on inflationary trends. In particular, credit card usage during high-consumption periods such as festivals and holiday seasons may lead to notable seasonal fluctuations in inflation that are currently underrepresented in traditional models.This research aims to examine these effects by analyzing transaction data from two major public sector banks in India to determine how short-term increases in money supply via credit card transactions correlate with inflation. A fintech tool is proposed which leverages artificial intelligence to provide real-time, predictive insights on the impact of credit card transactions on inflation. Such a tool could help the Reserve Bank of India (RBI) and financial institutions monitor inflation more accurately, particularly during peak spending periods, by offering predictive analytics on the correlation between credit card usage patterns and inflationary trends. Through these efforts, this research seeks to offer a more nuanced understanding of money supply in the digital age. The anticipated findings could reveal the need to revise traditional inflation indicators to reflect the reality of credit-driven monetary dynamics, supporting the RBI in adopting more adaptive monetary policies. Ultimately, this study aims to address the evolving challenges posed by digital credit facilities and contribute to a more resilient framework for inflation management in a modernized, digitized economy.  |
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| **5** | **Major Research Works Reviewed:** **1) International and** **2) National.** **Not less than 15 to 20 important works** (approx. 600 words) | International1. **Consumer Credit, Spending Patterns, and Inflation in the Digital Age (Journal of Economic Theory, 2021)**

This article examines the correlation between consumer credit, digital spending, and inflation. The study suggests that credit cards contribute to short-term liquidity surges, thus creating inflationary pressure that is not immediately visible in traditional models.1. **Revised Monetary Models for a Digital Economy (International Monetary Fund, 2020)**

This report discusses how digital payments and credit cards have created new challenges for traditional monetary models. It explores how central banks could revise their models to account for digital credit and its impact on inflation.**3. Consumer Credit and Inflation: A Historical Overview (Federal Reserve, 2019)**This research by the U.S. Federal Reserve focuses on the relationship between consumer credit, including credit cards, and inflation. It analyzes historical data to understand the impact of rising consumer debt on economic indicators, proposing that consumer credit cycles play a role in amplifying inflationary pressures.1. **Digital Payments and the Economy: The Impact of Credit Cards (ECB, 2020)**

The European Central Bank investigates the role of digital payments, including credit cards, in the economy. The report outlines how credit card usage influences consumer spending patterns and liquidity, indirectly affecting inflation. The ECB also discusses the implications of digital credit for monetary policy in the Eurozone.1. **Fintech and Monetary Policy: Digital Credit and Inflation (World Bank, 2021)**

The World Bank’s research explores how fintech innovations, particularly digital credit facilities like credit cards, impact inflation and monetary policy. It advocates for an integrated approach that considers real-time data on credit usage to predict inflationary pressures more accurately. |
|  |  | National1. **Fintech and Monetary Policy in India (NITI Aayog, 2020) -** NITI Aayog’s report investigates how fintech innovations, including credit card-based digital finance, affect India’s monetary policy. It advocates for policy frameworks that consider the role of digital credit in money supply and inflation.
2. **Monetary Policy and the Growth of Digital Payments in India (RBI, 2020) -** The RBI explores the relationship between digital payments, credit cards, and the Indian economy. It focuses on the implications for monetary policy as credit card usage increases in the country.
3. **Digital Credit and Its Impact on Inflation: A Case Study of India (University of Delhi, 2021) -** This research explores how digital credit systems, such as credit cards, impact inflation and money supply in India. It suggests that policymakers need to revise their inflation models to account for the growth in digital credit.
4. **Consumer Credit and Economic Cycles in India (Institute of Economic Growth, 2020) -** This paper looks at how credit card spending in India affects economic cycles, particularly in terms of inflation. It discusses the challenges posed by digital credit in terms of liquidity fluctuations.
5. **Impact of Festive Season Credit Spending on Inflation (India Economic Survey, 2021) -** This report analyzes the impact of increased credit card usage during festive seasons on inflation in India. It provides data on how spending surges can affect money supply and inflation during peak consumption periods.
6. **Digital Payments and the Indian Economy: Policy Implications (RBI, 2020) -** This report by the RBI discusses the rapid rise of digital payments and the implications for monetary policy, highlighting the need for central banks to rethink how credit usage affects inflation.
7. **Credit Cards and Economic Stability: The Indian Perspective (Journal of Finance, 2021) -** This study focuses on the relationship between credit card usage and economic stability in India, particularly how credit-driven consumption influences inflation and money supply.
8. **Revamping Inflation Models in India: The Role of Digital Credit (IIM Lucknow, 2022) -** This paper advocates for a revised approach to inflation modeling in India, one that incorporates digital credit data to better predict inflationary pressures.
9. C**onsumer Credit and Inflation: Policy Recommendations for India (NITI Aayog, 2020) -** NITI Aayog recommends integrating digital credit data into inflation models to better manage the relationship between consumer borrowing and inflation, with specific recommendations for the Indian context.
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| **6** | **Identification of Research Gap** (approx. 300 words) |  In recent years, electronic payment instruments such as credit cards have significantly transformed banking transactions, garnering attention from both academicians and regulators. This transformation raises two key concerns: (i) the potential for these payment instruments to replace cash, thus influencing the amount of currency that central banks need to keep in circulation, and (ii) the consequent impact on the independence of monetary authorities, as a decrease in currency circulation reduces seigniorage—revenue generated from central banks controlling currency issuance. While existing studies have explored the broad implications of electronic payments on monetary policy, a critical research gap remains in the specific impact of credit card usage on money supply and inflation. The introduction of credit cards has increased the velocity of money, but this has led to inflationary pressures in the absence of appropriate monetary intervention. Moreover, when defaults occur, these pressures intensify, potentially contributing to stagflation. Despite these challenges, research lacks a comprehensive understanding of the relationship between credit card transaction dynamics, delayed settlement periods, and their impact on inflation and money supply, particularly in comparison to traditional metrics. Also, the monetary authority’s ability to respond to these dynamics by adjusting interest rates and managing inflation has not been adequately examined. Credit card usage, by providing interest-free loans and reducing currency demand, impacts both the velocity of money and central bank policies in ways not fully captured by current economic models. The heterogeneity in the effects of monetary policy across different spending categories, particularly concerning higher-income users, further complicates this picture. Thus, the proposed study aims to fill these gaps by incorporating credit card transaction data into revised money supply models and offering insights for more precise monetary policy decisions. |
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| **7** | **Objectives of the Proposed Study** (approx. 200 words) | 1. To assess the impact of credit card transactions, including settlement delays and write-offs, on temporary increases in money supply and bank profitability.
2. To measure the correlation between traditional money supply metrics and inflation, and compare this with revised metrics that include credit card transactions with focus on seasonal spending periods like festivals.
3. To design predictive AI models that forecast inflationary pressures stemming from credit card usage patterns.
4. To develop a fintech tool that enables real-time tracking and prediction of the inflationary impact of credit card spending, supporting more precise monetary policy decisions.
5. To propose refined inflation indicators that integrate real-time credit-based liquidity data, helping central banks adapt to the evolving influence of digital credit facilities with the new frameworks.
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| **8** | **Major Research Questions / Hypotheses** (approx. 200 words) | RQ1: How do credit card transactions and settlement delays influence temporary increases in money supply, and what impact does this have on inflation?RQ2: How do delayed credit card settlements affect traditional inflation indicators, and could revised metrics provide a more accurate picture of inflationary trends?RQ3: What is the relationship between revised money supply metrics (which account for credit card transactions) and inflation, particularly during peak spending periods such as festivals? RQ4: How do seasonal credit card spending patterns contribute to inflationary pressures?RQ5: Can an AI-based predictive model accurately forecast inflationary pressures based on real-time credit card usage data?RQ6: What are the implications of a real-time fintech tool for monitoring and predicting the impact of credit card spending on money supply and inflation?RQ7: How effective would an inflation indicator that integrates real-time credit-based liquidity be in supporting adaptive monetary policy? These research questions support a comprehensive approach to understand the impact of credit card usage on inflation and monetary policy. By addressing these questions, the research will uncover crucial insights into how credit card transactions, settlement delays, and seasonal spending patterns affect money supply and inflationary trends. This will lead to a deeper understanding of the need for revised inflation indicators and the potential role of predictive fintech tools, enabling the Reserve Bank of India to adopt more adaptive and accurate monetary policies aligned with the dynamics of a digital economy.  |
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| **9** | **Proposed methodology for the research work** (approx. 400 words) | 1. **Data Collection and Preprocessing**

Transaction data from two major public sector banks in India shall be gathered, focusing on credit card transactions, settlement delays, and seasonal spending peaks. Also historical inflation data, traditional money supply metrics, and key economic indicators from RBI and other official sources can be collected.1. **Revised Money Supply Metrics Development**

 Revised money supply metrics have to be developed by incorporating credit card transaction data and accounting for settlement lags. This modified metric will help capture short-term increases in money supply due to credit card spending. As the next step, both traditional and revised money supply values have to be calculated for comparison to understand the impact of credit card usage on overall money supply.1. **Correlation Analysis and Hypothesis Testing**
* Conduct statistical analyses, including correlation and regression tests, to examine relationships between revised money supply metrics and inflation.
* Evaluate how these revised metrics correlate with inflationary trends during high-spending periods.
* Test hypotheses related to the impact of settlement delays, credit card write-offs, and seasonal spikes in credit usage on inflation and bank profitability.
1. **Seasonal and Time-Series Analysis**
* Use time-series analysis methods to assess seasonal variations in credit card usage and corresponding inflation effects, especially during festival seasons.
* Explore lagged effects of increased credit card usage on inflation to understand the timing and duration of credit-driven inflationary pressures.
1. **Predictive AI Model Development**

Development of predictive models that forecast inflation based on credit card transaction patterns and train the model using historical data to identify patterns in credit card spending that precede inflationary shifts, allowing for short-term inflation forecasting. Later it will be integrated with real-time transaction data to enhance model accuracy and responsiveness.1. **Development of a Fintech Tool**

Design a real-time fintech tool for the RBI and other financial institutions, integrating AI to monitor credit card-driven inflation in real time which includes data visualization capabilities for decision-makers to analyze seasonal and real-time impacts of credit card transactions on inflation. This tool can also provide alerts and predictive insights to aid in proactive policy adjustments. |
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| **10** | **Innovation/path-breaking aspects of the Proposed Research** (150 to 200 words) | The proposed research introduces several innovative and path-breaking aspects, especially in the integration of modern financial data into traditional economic models.* This research pioneers the inclusion of credit card transaction data, specifically focusing on settlement delays and seasonal spending patterns, which have not been traditionally considered in inflation models. The development of a revised money supply metric for that is an innovative step.
* This approach creates a more accurate reflection of the short-term money supply, which is often overlooked by traditional metrics. It allows for a deeper understanding of how credit-driven money supply impacts inflation. The Macro, micro and empirical economic Research Gaps have been identified.
* The application of machine learning to predict inflation based on credit card spending patterns is cutting-edge. This predictive model can offer real-time inflation forecasting and improve decision-making for monetary authorities. It represents a significant leap towards data-driven policy-making.
* The design of a fintech tool that integrates AI for real-time monitoring of inflation based on credit card usage is groundbreaking. It empowers financial institutions to take proactive measures by visualizing seasonal and real-time impacts of credit card spending on inflation, offering a new tool for dynamic monetary policy implementation.

Fig 1. Flow Diagram of the proposed methodology |
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| **12** | **Expected Output such as papers in journals, edited book/(s), book, policy papers, document, dataset etc. with proposed timeline and place of publications** (300 words) | **Expected Output and Timeline for the Proposed Research Project**1. **Journal Articles**:
* We can aim 2 research papers. One on the correlation between credit card-driven money supply and inflation, and the second paper will explore the seasonal impact of credit card usage, particularly during festivals, on inflation. Timeline : 2 Years to get published
1. **Edited Book or Book Chapter**:
* A chapter on the evolving relationship between credit-driven money supply and inflation in edited books focusing on modern economic challenges or fintech innovations. Publishers : Spinger, Wiley-Blackwell. Timeline : 6 months
1. **Policy Papers**:
* A policy paper proposing revised inflation indicators and the integration of credit card data into monetary policy frameworks. This paper will be aimed at central banks and financial regulators. Proposed Institutions can be Reserve Bank of India, Ministry of Finance, International Monetary Fund. This can be done at the end of year 2 and the same can be submitted to the institutions in year 3.
1. **Dataset and Fintech Tool:**
* A comprehensive dataset of credit card transaction trends and inflation data, along with a conceptual prototype for a fintech tool that monitors and predicts inflation based on credit card usage which helps in framing monetary policies
* Timeline: Dataset and fintech tool prototype will be developed in parallel with the data analysis phase, to be released by the end of Year 2.
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| **13** | **Any new data to be generated where data deficiency is felt** (100-150 words) | To address data deficiencies in understanding the impact of credit card usage on money supply and inflation, new data must be generated in the following areas:1. **Credit Card Transaction Data** - Detailed transaction data from major public sector banks, including individual credit card expenditures, settlement timings, and write-offs, would be necessary to assess their impact on temporary increases in money supply and bank profitability.
2. **Revised Money Supply Data** - A comprehensive dataset combining traditional money supply metrics (M1, M2) with credit card transaction volumes, particularly during high-spending periods like festivals, to analyze their influence on inflation.
3. **Seasonal Spending Data -** Specific data on credit card usage patterns during festival seasons and other high-spending events to measure their seasonal impact on inflation.
4. **Bank Write-Offs Data** - Data from banks on credit card write-offs and their correlation with lending rates to analyze their influence on monetary policy and inflation.
5. **Real-Time Credit Spending Data** - A dynamic, real-time dataset on credit card spending to feed into the AI model for forecasting inflationary pressures, which will require collaborations with financial institutions for data integration.
6. **Fintech Tool Usage Data** - Data collected from the proposed fintech tool on how real-time credit spending correlates with inflation trends, contributing to more precise monetary policy adjustments.
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| **14** | **Relevance of the proposed study for policy making** (approx. 200 words) | The proposed study is highly relevant for policymakers as it sheds light on the interplay between credit card usage, money supply, inflation, and Gross Domestic Product (GDP). Credit card transactions increase consumer purchasing power, which can stimulate economic activity and potentially lead to short-term GDP growth. However, the temporary rise in money supply due to credit card settlement lags can also heighten inflationary pressures, especially if GDP growth does not keep pace with increased spending levels.Understanding this relationship is crucial for policymakers aiming to balance economic growth with price stability. By examining the seasonal spikes in credit card usage—such as during festivals—the study will reveal how these periods impact both GDP and inflation, providing valuable insights into consumption-driven GDP fluctuations. The research will also support the development of refined inflation indicators that include real-time credit-based liquidity data, allowing for a more accurate assessment of inflation in relation to GDP growth.The proposed AI-driven fintech tool could provide real-time predictions of inflationary pressures from credit spending, helping central banks to adjust interest rates and other monetary policies in alignment with GDP growth targets. In an era of digital finance, this study will equip policymakers with the data-driven insights necessary for managing both inflation and sustainable GDP growth effectively. |
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| **15** | **Relevance of the proposed study for society** (approx. 200 words) | The proposed study is socially significant as it sheds light on how widespread credit card use impacts inflation and economic stability. By examining credit transactions’ effect on money supply and developing refined inflation indicators, this study will foster a better public understanding of how everyday credit usage can influence prices and purchasing power. Also, the creation of a fintech tool for real-time monitoring will support more accurate inflation management, benefiting society through more stable economic conditions. Insights into credit card write-offs will also highlight the need for responsible credit use, supporting financial stability and ultimately protecting consumers from unexpected inflation. |
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| **16** | **Milestones set for each successive quarter of the study** (100 words) | **Year 1 - Quarter 1, 2:** Literature survey and finalize the research design. Initiation of partnerships with banks to access transaction data and establish data collection protocols. Beginning preliminary analysis on credit card settlement delays and seasonal spending patterns.**Quarter 3,4:** After completing the data collection from selected banks, next step is analyzing the correlation between traditional money supply and inflation, developing revised metrics including credit card transactions. Later designing the fintech tool and predictive AI model.**Year 2 - Quarter 1,2:** Testing and validation of the fintech tool and predictive model using the collected data. Refining the model parameters to improve real-time inflation forecasting accuracy.**Quarter 3,4 :** Finalizing the analysis, compile findings, and preparing a comprehensive report. Sharing recommendations with policymakers and publishing the results. |
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| **17** | **Total Grant expected for this study** (in Rs.) | 15,13,200/-  |
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| **18** | **Duration Proposed (months)** | 24 Months  |
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| **19** | **Number & Names of the States your study covers** | 01 Tamil Nadu (Madurai Region ) |

**20. Proposed budget of the study under expenditure heads with justification *(please see Guidelines at 6.3 for proportionate Limit of a head)***

| **Heads of Expenditure** | **Number** | **Months** | **Rate** | **Amount** |
| --- | --- | --- | --- | --- |
| 1. Research Staff: Full time/part time/ Hired services (***please see Guidelines at 6.4***) |  |  |  |  |
| (a) Research Associate | 1 | 12 | 30,000/month | 3,60,000 |
| (b) Research Assistant | ----- | ----- |  | ------ |
| (c) Field Investigator | 1 | 12 | 20000/month | 2,40,000 |
| 2. Field work – Collaboration with Banking sectors | --- | As required | ---- | 1,00,000 |
| 3.Research Equipment and study material (Computer, Printer etc.) |  |  |   |  |
| 1. High performance computer:

**Dell XPS 15** (for data processing and modeling |  | Single installation | 1,70,000 | 1,70,000 |
| 1. Cloud Storage – AWS Subscription
 | 2500 | 24 | 60,000 | 60,000 |
| 1. Statistical Analysis Software

**PSS** (IBM SPSS Statistics Subscription) | 11,800 |  24 | 2,00,000 | 2,83,200 |
| 1. Software development and cloud integration

(mobile and desktop app, cloud storage charges) | ---- | ----- | 2,00,000 | 1,50,000 |
| 1. Data Visualization Tools – Power BI
 | ----  | ------ | S,000 | 50,000 |
| 4. Contingency | ---- | ---- | 50,000 | 50,000 |
| **Total** |  |  |  | 14,63,200/- |
| 5. Workshop/ Seminar/Publication*\*This will be decided by the ICSSR depending upon the requirements of the project. (The allocation for publication amount will be retained by the ICSSR for publication of the final report if it is found to be high quality by the Expert / experts appointed by the ICSSR)* |  |  | 50,000/- | 50,000/- |
| Grand Total |  |  |  | 15,13,200/- |
| Affiliating Institutional Overhead Charges @ 10% over and above on the awarded grant of the project, subject to a maximum limit of Rs.2, 00,000/- for Major and Minor Projects will be released by the ICSSR after successful completion of the project. |  |  |  |  |

**21. Justification of different heads of budget** (write in 30 words each)

1. Research Staff

Research staff, including data analysts, machine learning engineers, and developers, are crucial for data processing, tool development, and analysis. This covers monthly salaries to retain skilled staff, ensuring consistent project progress and expertise.

1. Field work

Field investigator is required for collecting real-time financial reports from the banking sectors and mainly to establish a collaboration with banks since it has lot of procedures to acquire the sensitive data.

1. Equipment and study material

High-performance computers and secure data storage solutions are essential for data-intensive tasks like machine learning, statistical analysis, and fintech tool development. Quality equipment ensures efficiency, accuracy, and security, which are vital given the sensitivity of financial data.

Also statistical and machine learning software (SPSS, Tableau, Power BI, etc.) are necessary for analysis and visualization, while AI tools (IBM Watson, TensorFlow) allow for the predictive model’s design. License costs cover legal access and updates, ensuring the tools stay up-to-date and effective.

Declaration

* + 1. I am not a defaulter of any previous ICSSR grant.
		2. I have neither been subjected to any disciplinary action nor found guilty of any offence in my career.
		3. The Research Proposal and its contents are entirely original and as per the standard ethical practices.
		4. I have not concealed any information in my application. If ICSSR finds any contrary information at any stage, it may cancel the study out rightly and/or impose any penalty as it deems fit.

Place: Madurai

Date: 10.11.24

Signature of the Candidate