

# Visvesvaraya Technological University

(State University of Government of Karnataka Established as per the VTU Act, 1994)

"Juana Sangama", Belagavi-590 018, Karnataka State, India

Prof. A. S. Deshpande B.E., M.Tech., Ph.D.

Phone : (0831) 2498100

Fax : (0831) 2405467

REGISTRAR

Ref: VTU/BGM/Aca/A-12/ VTU RGS/DIS -ME/2021-22/5862/5

Date 8 FEB 2022

To,

The Principal,

Dr.Ambedkar Institute of Technology, Bengaluru .

Sub: Grants for Research Proposal for the year 2021-22

Ref.: 1. VTU/Aca./2021-22/ PS/2019-20/9707, dated 18-03-2020.

2. Hon'ble Vice-Chancellor's approval dt: 11-02-2022

At the outset please accept our congratulations and greetings.

We are pleased to inform you that, the grant of Rs. 6.00 Lakhs (Rupees Six Lakh only) is sanctioned to the research proposal entitled as "Designing and building a solar-based autonomous robot for intra-row weed elimination to aid small and mid-sized farmers." submitted by Dr.T N Raju (PI), Dr.Indumathi S K (CoI-1) and Dr. Manjunath Rao L (CoI-2) under VTU Research Grants Scheme -2021.

The expenditure of the sanctioned amount needs to be planned as under.

Expenditure Particulars		First Year (Rs. in Lakhs)	Second Year (Rs. in Lakhs)	Total (Rs. in Lakhs)
Non - Recurring	Fellowship for Research Scholar	1.20	1.20	2.40
	Equipments/Software/Instruments (Purchase of Desktops/Laptops are not permitted)	3.00	0.00	3.00
Recurring	Consumables (Glass wares/Chemicals)	0.20	0.20	0.40
	Others (Expenditure towards/ testing / consultancy / publications of research work in terms IPR Registrations (not for paper publications in journals) / TA - DA to present a paper in conferences or workshop or symposia in India .	0.10	0.10	0.20
Total (Rs. in Lakhs)		4.50	1.50	6.00
VTU Contribution (75% of the Sanctioned Amount) This amount will be released after receiving the acceptance letter and compliance of Point Number 10,11 & 12 mentioned in "Terms and Conditions"		3.375	1.125	4.50
Institute Contribution (25% of the Sanctioned Amount) Please Refer Point Number 10,11 & 12 in the "Terms and Conditions" and comply accordingly		1.125	0.375	1.50

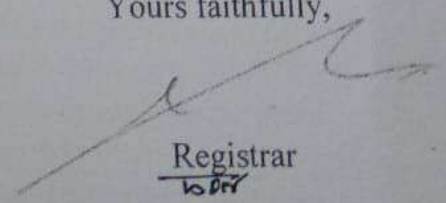
MCA  
mf

*Applicable Terms and Conditions:*

1. The grant will be released in the name of the Principal of the Institute and Principal Investigator of the project.
2. The grant shall be utilized for the purpose for which it has been sanctioned.
3. The research activities of the sanctioned projects will be evaluated at the end of each year by committee constituted by VTU. Also, the LIC team of VTU may review the progress.
4. Change in heads of expenditure mentioned in the table on the previous page is not permitted.
5. The grantee institute has to abide by the guidelines of VTU Research Grant Scheme.
6. VTU reserves all the rights to change/modify rules/guidelines in this regard.
7. The Principal of the institute shall submit year wise Utilization Certificate (UC) and in the prescribed format and Audit Report (Duly signed by CA) to the undersigned. The subsequent grant will be released only after submission of UC for the grant released earlier along with details of expenditure and satisfactory work progress report.
8. The project will last for two years from the day that the Grantee Institute receives the amount of first Installment.
9. Any correspondence by the Investigators to the Registrar of VTU shall be routed through the Principal of the Grantee Institute.
10. VTU shall release the amount of first installment, after an exclusive Joint Bank Account for the sanctioned project is opened and remitted the Institute share of 25% of the First Year Installment as mentioned in the above table and same shall be intimated to VTU by submitting copy of account statement.
11. The exclusive Bank Account must be Join Account in the name of Principal of the Institute and Principal Investigator with the title of the project mentioned as purpose.
12. Grantee Institute shall submit account details in the *mandate form (enclosed)* along with duly signed *acceptance letter (Format Enclosed)*. These are required for issuing the sanction order and release of fund from our end.

Thanking you,

Yours faithfully,

  
Registrar  
W.D.P.

Encl:

- 1) Format of Mandate Form
- 2) Format of Acceptance letter



# Dr. AMBEDKAR INSTITUTE OF TECHNOLOGY

BENGALURU-560 056.

Research and Development Cell

Dr.AIT/R&D/2021-22/70 } 21.22

Date:18-01-2022

To  
Dr.M.H.Leela  
Assistant Professor  
Department of ~~Chemistry~~ <sup>MBA</sup>  
Dr. Ambedkar Institute of Technology  
Bengaluru-560 056

## Administrative Approval

**Subject:** Financial Assistance under Dr.AIT R & D Grant Scheme for the research project entitled "A Study on Agriculture transformation in the adoption of Industry 4.0 Technologies: Issues and Challenges (with special reference to Bengaluru rural districts of Karnataka)" submitted by Dr.M.H.Leela , Principal Investigator-Reg.

Ref No: Dr.AIT/PVPWT/2021-22/1391

Dated: 04/01/2022

Sir/Madam,

With reference to the above subject, the project proposal entitled "A Study on Agriculture transformation in the adoption of Industry 4.0 Technologies: Issues and Challenges (with special reference to Bengaluru rural districts of Karnataka)" submitted by Dr.M.H.Leela, Principal Investigator, Department of MBA of Dr. Ambedkar Institute of Technology(Dr. AIT), Bengaluru-560056 is sanctioned with a grant of **Rs 45,000/- (Rupees Forty Five Thousands only)** for a period of **24** months.

The details of the grant for which the total allocation of Rs. 45,000/-are as follows

Expenditure details	12 Months	12 Months	Total
Equipment:			
Consumables	Rs 20,000.00-	Rs 25,000.00--	Rs 45,000.00-
Contingency	-	-	-
Total	Rs 20,000.00	Rs 25,000.00	Rs 45,000.00

The sanction of the grant is subject to the following conditions:

- 1) The grant will be released in the name of the Principal Investigator of the concerned department.
- 2) The research activities will be evaluated by the evaluation committee constituted by the Chairman/Vice Chairman/Dean (R&D) of the Research and Development Monitoring Committee twice in a year (January/July) after commencement of the project apart from periodic review.
- 3) The grant shall be utilized for the purpose for which it has been sanctioned. Mixing of heads of expenditure mentioned in the table is not allowed.



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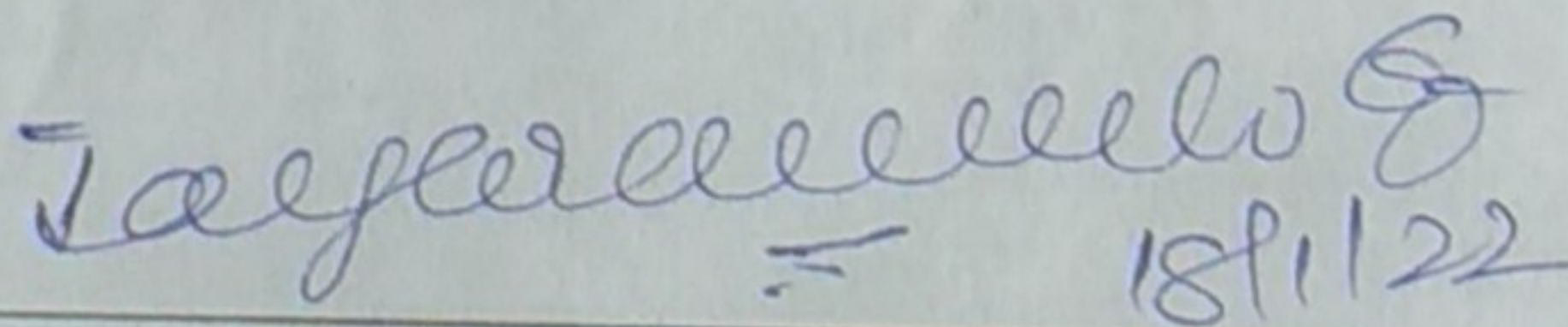
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- 4) Funds for subsequent years shall be released on satisfactory progress and submission of half yearly progress report by the Principal Investigator. Audited statement of accounts and utilization certificate duly certified by the financial authority of the Institute for each financial year is required to submit through Head of the Department of the Institution to the undersigned. **Excess expenditure, beyond sanctioned grants will not be considered.**
- 5) The date of the receipt of the first instalment of the grant would be reckoned as the date of commencement of the project.
- 6) Any correspondence by the investigators to the Dean (R&D)/Principal of Dr. AIT shall be routed through HOD of the grantee department.
- 7) The grantee department shall abide by the rules and regulations of Dr. A. research grant scheme.

You are requested to send the letter of acceptance of the grant immediately.

Signature

  
18/1/22

Dr. G. V. Jayaramaiah

Dean (R & D)

Dean (R&D)

Dr. Ambedkar Institute of Technology

Near Jnanabharathi Campus

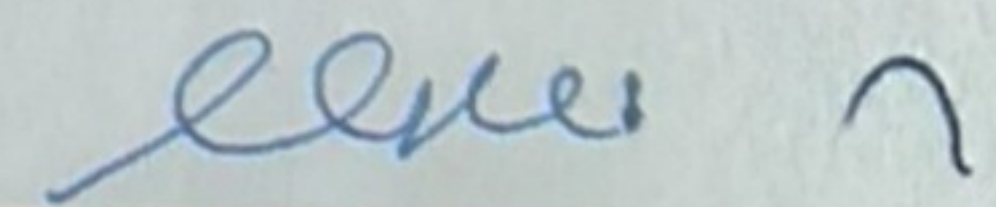
BDA Outer Ring Road, Mallathahalli,

Bengaluru-560 056

Copy with compliments to:

1. Hon'ble Secretary, PVPWT, for kind information
2. Vice Principal for information
3. Head, Account Section, for information
4. Registrar/AAO, for information
5. Dean (R&D) for file.

Signature



Dr. M. Meenakshi

Principal

PRINCIPAL

Dr. Ambedkar Institute of Technology

Bengaluru-560 056



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**APPLICATION FOR AWARD OF GRANT FOR THE FACULTY UNDER**  
**FACULTY RESEARCH PROMOTION SCHEME (FRPS)**

(To be filled by the Applicant in BLOCK letters only)

**Part A**

Name of the Applicant: **Dr. Leela M H**

Designation: **Assistant Professor**

Name of the Department: **MBA**



1. **Project Title** : A Study on Agriculture Transformation in the Adoption of Industry 4.0 Technologies: Issues and Challenges (with special reference to Bengaluru rural districts of Karnataka)

2. **Subject(s)** : Management

3. **Research Issues (100 Words)** :

In contemporary era, agriculture has been evolved into smarter than ever. The proposed study involves and tries to address the favourable applications of emerging technologies to optimize the crop yield. The emerging technologies include Internet-of-Things, Drones, Wireless sensors, Unmanned Aerial Vehicles and Robots have brought a revolutionary change in the existing agriculture practices. The



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proposed study is to determine whether industry 4.0 technologies have been enhanced the agricultural process, production and return on investment. The proposed study initiates to highlight issues and challenges in the integration of industry 4.0 technologies with the conventional agricultural practices among the farmers of Bengaluru Rural District.

**4. Details of Principal Investigator(s) and Co-Principal Investigator(s)**

<b>Particulars</b>	<b>PI 1</b>	<b>Co-investigator</b>
Name	Dr.Leela.M.H	Dr.S.Baskaran
Designation	Asst. Prof	Associate Professor
Department	MBA	MBA
Gender	Female	Male
Date of Birth	09.06.1980	20.5.1983
SC/ST/OBC/GM/PH	SC	OBC
Contacts		
Mobile NO	9632640620	8095634499
Whats`up Mobile NO	9632640620	8095634499
Email ID	<a href="mailto:mhleela.mba@drait.edu.in">mhleela.mba@drait.edu.in</a>	rsbkaran.mba@drait.edu.in



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**5. Address for Correspondence (Principal Investigator only):**

Name: Dr.Leela.M.H

Department of MBA, Dr. Ambedkar Institute of Technology, Outer Ring Road, Mallathalli, Bengaluru

Pin: 560056

Email ID: mhleela.mba@drait.edu.in

**6. Permanent Address (Principal Investigator only):**

Name: Dr.Leela.M.H

#1214, 7<sup>th</sup> B Main 1<sup>st</sup> C cross, Hampinagar, Bengaluru

Pin: 560104

Email ID: mhleela.mba@drait.edu.in

**7. Experience:**

a) Research: 6 years (Part Time)

b) Teaching: 10 years

**Co-Investigator Experience**

a) Research: 8 years (Part Time)

b) Teaching: 17 years

**8. Field of Specialization: Finance and Human Resource**



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9. **Any other study/research done for the proposed topic in India or abroad other than own university/college:** No
10. No of papers published
- a) In Scopus Journals: 01
  - b) In Web of Science indexed Journals: Nil
  - c) No of books/reports/Chapters/General articles if any: 1 Book Chapter (Commerce and Management, ISBN – 978-93-90781-07-2, ESN publications, First Edition 2021
  - d) No of papers /books under publication, if any: Nil
  - e) No of patents if any: 03
  - f) No of patents under process, if any: Nil

**Details of the Journal Publications (2017-2020)**

Entry	Author Name	Name of the journal	Title of the paper	Year	Volume	Issue	Page No	Citations
1.	Dr.Leela.M.H	Asia Pacific Journal of Research	A Conceptual Study on Growth and Challenges of Insurers	2017	1	IV	217-219	-
2.	Dr.Leela.M.H	International Journal of Creative Research Thoughts (IJCRT)	An Assessment on Key Performance Indicators for Top Cities (with special reference to top cities in Karnataka)	2018	6	2	484-493	-





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3.	Dr.Leela.M.H	International Journal of Management and Social Sciences (IJMSS),	“Investor’s Investment Decision on Equity Shares in Secondary Market	2019	8	2.5	95-99	-
4.	Dr.Leela.M.H	International Journal of Recent Scientific Research (IJRSR)	Branding of Paprika Oleoresin in Chilli – Challenges and Opportunities”	2020	11	02	37381-37383	-
5.	Dr.Leela.M.H	International Journal of Creative Research Thoughts (IJCRT)	Efficient Market Hypothesis On Selected Healthcare Stocks Using Run Test”	2020	8	8	3651-3667	-
6.	Dr.Leela.M.H	Shanlax International Journal of Education	Digital Pedagogy for Sustainable Learning	2021	9	3	179 – 185	-
7.	Dr.Leela.M.H	International Journal of Research Publication and Reviews	Sustainability of HUL and ITC Using RSI and ROC - A Technical Analysis	2021	2	8	246-256	-
Link to journal papers			Entry 1 - <a href="http://doi.one/10.1729/Journal.24365">http://doi.one/10.1729/Journal.24365</a>					
			Entry 2 - <a href="http://dx.doi.org/10.24327/ijrsr.2020.1102.5096">http://dx.doi.org/10.24327/ijrsr.2020.1102.5096</a>					
			Entry 3 - <a href="https://www.ijrpr.com/uploads/V2ISSUE8/IJRPR942.pdf">https://www.ijrpr.com/uploads/V2ISSUE8/IJRPR942.pdf</a>					
Link to UGC journal webpage			Entry 1 - <a href="https://journals.foundationsspeak.com/index.php/ijmss/article/view/845">https://journals.foundationsspeak.com/index.php/ijmss/article/view/845</a>					

\*-based on clarivate analytics

**Dr. S.BASKARAN**

Sl. No	Title of the Article	Name of the Journal	ISSN	Month and Year
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1	A Study on Paytm: Opportunities and Challenges in e-Commerce	Asia Pacific Journal of Research	ISSN: 2320-5504, E-ISSN-2347-4793 (IF = 6.58)	August 2017
2	Impact of GST on Banks – Issues and Challenges	International Journal of Pure and Applied Mathematics	ISSN: 1311-8080 E-ISSN 1314-3395	Feb 2018
3	An Empirical Analysis on asset & liability Management in Tumkur Grain Merchant Co-operative Bank, Tumkur	Shanlax International Journal of Management	ISSN : 23214643	April 2018
4	A Study on Relationships Between Risk and Return Analysis of Selected Stocks Listed in NSE	Asia Pacific Journal of Research	ISSN: 2320-5504, E-ISSN-2347-4793 (IF = 6.58)	April 2018
5	A Study on Customer Satisfaction towards Modern Banking System	Asia Pacific Journal of Research	ISSN: 2320-5504, E-ISSN-2347-4793	April 2018
6	Economic Value Added: A General Perspective	International Journal of Scientific Research and Review	ISSN: 2279-543X (IF = 6.946)	May 2018
7	A Study On Customer's Perception On Airtel Payment Banks With Special Reference To Bangalore City	International Journal of Business and Administration Research Review	E- ISSN -2347-856X ISSN -2348-0653 Vol.6, Issue.2, Impact Factor: 5.494	April-June 2019. Pp 26-36
8	CAPM Model Analysis for Performance of Stock Market in Automobile, IT, and Banking Companies	Research Directions: An International Refereed Peer- Reviewed Multi-disciplinary Monthly Research Journal	ISSN 2321-5488 Vol: 6, Issue: 15	June 2019. Pp 94-99
9	Risk and Return Analysis of Pharmaceutical Industry	International Journal for Research in Engineering Application and Management	ISSN No – 2454 9150 Vol. 8 Issue: 7	July 2019. Pp 121-130



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			Impact factor: 5.6	
10	An Empirical Study on Conceptual framework of building Capacity & the role of Micro Finance on Poverty reduction: Evidence from Chickmagalore District	International Journal of Research in Social Sciences	ISSN: 2249-2496 Vol. 9 Issue 7 Impact Factor: 7.081	July 2019. 452-462
11	A study on the effectiveness of fund management at Bangalore District & Bangalore Rural District Co-operative Bank	Strad Research – An UGC- CARE Approved Group – 2 Journal	Volume 7, Issue 7	July 2020 Pp 70-75
12	A Study on “Optimal Portfolio Construction” Through Sharpe Framework With Specific Reference to Constituents Stocks Of S&P BSE Sensex	International Journal of Mechanical and Production Engineering Research and Development (IJMPERD) (SCOPUS & UGC)	ISSN (P): 2249–6890; ISSN (E): 2249–8001 Vol. 10, Issue 3, Jun 2020, 11029-11038 Impact factor = 8.8746	Sep 04, 2020
13	Corporate Social Responsibility in India: A Road Map for Corporate Entities to Pay Back to the Society	African Journal of Business and Economic Research (UGC- CARE Approved)	ISSN: 1750-4554/E- ISSN: 1750-4562 Volume 15 Issue 3 Number 12	Dec. 2020
14	Digital Pedagogy for Sustainable Learning	Shanlax International Journal of Education	P-ISSN: 2320-2653 Vol. 9 Issue 3	June 2021

**Part B**

1. **Name of the Department where the proposed project under is to be under taken:** Master of Business Administration



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2. **Details of the Proposed Project:** The proposed study aims to determine the demographic profile of the farmers who have adopted agtech. The emerging technologies include Internet-of-Things, Drones, Wireless sensors, Unmanned Aerial Vehicles and Robots have brought a revolutionary change in the existing agriculture practices. The proposed study is to determine whether industry 4.0 technologies have been enhanced the agricultural process, production and return on investment. The proposed study initiates to highlight issues and challenges in the integration of industry 4.0 technologies with the conventional agricultural practices among the farmers of Bengaluru Rural District.
  
3. **Title of the Project (BLOCK LETTERS ONLY):** A STUDY ON AGRICULTURE TRANSFORMATION IN THE ADOPTION OF INDUSTRY 4.0 TECHNOLOGIES: ISSUES AND CHALLENGES (WITH SPECIAL REFERENCE TO BENGALURU RURAL DISTRICTS OF KARNATAKA)

**Project Abstract (Maximum 500 Words):** Evolution in agriculture, changes in irrigation and productivity witnessing the rapid change in agriculture. The proposed study involves and tries to address the favorable applications of emerging technologies to optimize the crop yield. The emerging technologies include Internet-of-Things, Drones, Wireless sensors, Unmanned Aerial Vehicles and Robots have brought a revolutionary change in the existing agriculture practices. The study is to determine whether industry 4.0 technologies have been enhanced the agricultural process, production and gain return on investment. The proposed study initiates and highlights the expected issues and challenges in the integration of these technologies with the conventional agricultural practices. Consequently, the study analyses how these technologies supports the farmer through the crop stages from sowing to harvesting and respective distribution as well as in the creation of new opportunities. The study aims to understand the awareness level among the rural population on agricultural technologies, to determine the pre and post technology in agriculture development, to examine smart farming in the



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utilization of resources and generation of yield using latest agriculture technology, to analyze various factors influence in the implementation of advanced agricultural technology, to evaluate the overall performance of agriculture after implementation of advanced agricultural technology. The proposed study adopts primary research for collection of data using structured questionnaire, and census sampling technique. The collected data has been analyzed using statistical tools viz., ANOVA, Chi-square test and Post hoc test using Statistical Package for Social Science and develop a framework using Structural Equation Modeling.

**3.1 Statement of the Problem with full justification for taking up the proposed project:** The proposed study is a need of an hour to bring awareness on new age farming and to identify the prospects and potential challenges of farmers in their related agricultural activities. The advanced automated system has been enhanced the human intervention in farming and helping farmer to manage more farmland and improve their production. However, there are fewer studies done in Karnataka. The proposed study attempts to conducted depth study on farmers, farmland and the Industry 4.0 technologies on agriculture.

**3.2 Aim and Objective of the Project (Maximum 200 words):**

1. To identify the demographic profile of the farmers adopted Industry 4.0 technologies
2. To understand the awareness level of latest agricultural technologies for farming
3. To analyze various factors influencing in the choice of agricultural technology
4. To examine various financial support availed by the farmer to adopt agricultural technologies
5. To determine the challenges on pre and post implementation of technology in agriculture
6. To analyse major issues confronted by the farmers using agricultural technology
7. To find the most efficient and effective agricultural technology.



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8. To evaluate the overall performance of agriculture in adaptation of advanced agricultural technology.
9. To determine the updation and improvement among the existing agricultural technology
10. To develop a framework to define the gap between the technology and the agricultural efficiency

**3.2 Hypothesis:**

- There is a statistically significant difference between awareness of the technology and farmer
- There is a statistically significant difference between pre and post implementation of technology in agriculture
- There is a statistically significant association between demographic profile of the farmer and decision on availing technology for agriculture
- There is a statistically significant association between factors influence in selection of technology and growth in agricultural performance
- There is a statistically significant relationship between support by financial institution and avail agricultural technology by the farmer
- There is a statistically significant relationship between issues confronted by the farmers and industry 4.0 agricultural technology
- There is a statistically significant difference between effectiveness of technology and overall performance

**3.3 Conceptual frame work: -**



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**Industry 4.0:** Industry 4.0 is the digital transformation of manufacturing/production and related industries and value creation processes. Industry 4.0 takes the emphasis on digital technology from recent decades to a whole new level with the help of interconnectivity through the Internet of Things (IoT), access to real-time data, and the introduction of cyber-physical systems.

Industry 4.0, also sometimes referred to as IIoT or smart manufacturing, marries physical production and operations with smart digital technology, machine learning, and big data to create a more holistic and better connected ecosystem for companies that focus on manufacturing and supply chain management.

**Food and Agtech includes**

Unmanned spraying helicopters,

Agricultural drones,

Robotic Intelligence Implements,

Robotics Strawberry harvesting,

Autonomous Tractors,

Autonomous agricultural small robots,

Mobile dairy farm robotics,

Static Milking Robots.



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Agricultural robots are specialized articles of technology that are capable of assisting farmers with a wide range of operations. They have the capability to analyze, contemplate, and carry out a multitude of functions, and they can be programmed to grow and evolve to match the needs of various tasks. **Agricultural technology** is an application of techniques to control the growth and harvesting of animal and vegetable products. Various processes require equipments for Soil preparation, Tilling, rod weeders, Fertilizing and conditioning the soil, Determining nutrient needs, Farm manure, Green manuring, liming materials.

**3.4 Theoretical frame work:** - Agricultural technology or agrotechnology is the use of technology in agriculture, horticulture, and aquaculture with the aim of improving yield, efficiency, and profitability. Agricultural technology can be products, services or applications derived from agriculture that improve various input/output processes. It is developed to increase production, resolve chemo-physical, biological, and socioeconomic constraints related to crop production systems.

To prepare structured questionnaire scale to be used such as Normal, Ordinal, Likert scale, and Garrett ranking.

**Statistical tools & techniques for the proposed study shown below,**

**a) Descriptive analysis:** This is termed as study on one variable distribution. In the present research, it extracts the mean and standard deviation score on demographic profile of the customers, and different factors etc.

**b) Correlation analysis:** It is termed as the combined difference of 2 or more variables to determine the sum of correlation. The research study has been applied correlation (Charles Spearman's and Pearson's). Pearson's correlation (simple), is a technique to measure the level of relationship among 2 factors. Charles Spearman's correlation (or rank), is a method to determine the level of correlation among 2 variables with the ordinal statistics.





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c) **Chi-square:** The whole of each squared distinction between the watched and expected frequencies separated its normal recurrence.

$$\chi^2 = \sum_{i=1}^N \frac{(O_i - E_i)^2}{E_i}$$

d) **Regression:** It is also called as “Causal analysis”. It involves with the investigation of how 1 or more variables influence transform in other variable and it determines the statistical relationship between one or more variables.

e) **Independent sample t test:** It is to resolve the considerable disparity in scores between groups. It is applied when the population mean and standard deviation are unknown, and two separate groups are being compared”.

f) **Factor analysis:** it is a measurable system used to consider over the dimensionality of an arrangement of variables. In this analysis, idle variables speak to surreptitiously builds and are alluded to as elements or measurements. Confirmatory Factor Analysis (CFA) model place a limitations on factor loadings, differences, residual variances and covariances.

g) **Reliability test:** Cronbach alpha is the most regularly utilized measure of dependability i.e., inner consistency. It was initially inferred by Kuder & Richardson (1937) for dichotomously scored information (0 or 1) and later summed up by Cronbach (1951) to represent any scoring strategy.



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$$\text{Cronbach basic equation for alpha, } \alpha = \frac{n}{n-1} \left[ 1 - \frac{\sum V_i}{V_{\text{test}}} \right]$$

Where

n = number of questions

V<sub>i</sub> = variance of scores on each question

V<sub>test</sub> = total variance of overall scores (not percentage) on the entire test

**h) One way Analysis of Variance (ANOVA):** One way ANOVA tests whether the methods for 2 or more independent groups are equivalent by breaking down correlations of change evaluations. The ANOVA F test assesses whether the group means on the dependent variable vary altogether from one another. The study performs F test on information contained in any 2 or more variables or in one variable filed by a second or grouping variable. The F-ratio is utilized to focus measurable importance. The tests are non-directional in that the null theory indicates that all means are equivalent and the alternate speculation basically expresses that no less than one mean is distinctive.

$$F = \frac{MS_{\text{Between}}}{MS_{\text{Within}}}$$

Where,

MS means Mean Square,

Between means between group variation whereas Within means within group variation.



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**i) *Two-way ANOVA (Univariate and Multivariate):*** Two-way ANOVA is a suitable investigation method for a study with a quantitative result and 2 or more straight out illustrative variables. The normal application of assumptions of Normality, Independent errors and equivalent variance, One regular naming tradition for a model consolidating a k level clear cut illustrative variable and a m-level all out logical variable is "k by m ANOVA" or "k x m ANOVA". ANOVA with more than two logical variables are frequently called multiway ANOVA. The table represents to SS section speaks to the aggregate of squared deviations for each of a few distinct methods for picking which deviations to take a gander at, and these are marked Source (of Variation). Each SS has a relating Df (degrees of freedom) which is a measure of the quantity of independent bits of data present in the deviations that are utilized to register the comparing SS. Furthermore, every MS is the SS separated by the Df for that line. Every MS is a fluctuation evaluation or a difference like amount, and as being what is indicated its units are the squares of the result units. Every F-measurement is the proportion of two MS values. Each of these lines exhibits  $MS=SS/df$ . For the principle impacts and association, there are F values (which square with that line's MS value partitioned by the error MS value) and consequent p values.

**j) *Kruskal Wallis test:*** The Kruskal Wallis one way ANOVA by positions is a strategy for contrasting different tests with compute whether there is a measurably critical distinction between the evaluations of those qualities. The system depends on the positions of the scored qualities and the method for those positions, instead of inspecting the method for the information. The Kruskal-Wallis test is a nonparametric substitute for the restricted ANOVA when the suspicion of typicality is not legitimate. For this situation 5 percent level of significance (95% confidence level) has been utilized, The Kruskal-Wallis test to choose if any properties are measurably unique in relation to the others with the predefined level of noteworthiness. This test depends on a dissemination that is approximated by a chi-squared appropriation with degrees of freedom k-1, or the quantity of properties being analyzed minus one.



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Then,

Ho: all attribute populations are identical

Ha: all attribute populations are not identical

The formula for the Kruskal-Wallis test is

$$H = \frac{12}{N(N+1)} \sum_{i=1}^k \frac{R_i^2}{n_i} - 3(N+1)$$

Where,  $R_i$  is the sum of the ranks of the  $i^{\text{th}}$  group

**k) Bonferroni Method:** It is an expandable post hoc method to make post hoc association so as to guarantee a family wise type II error rate not larger than  $\alpha$ .



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Let  $m$  = the number of post hoc comparisons that will be made. There are up to ' $m = {}_kC_2$ ' possible comparisons that we can make, where  $k$  = the number of groups being considered. For example, in comparing 4 groups, ' $m = {}_4C_2 = 6$ '.

In order to ensure that family wise-type I error rate is not greater than  $\alpha$ , each of the  $m$  tests is performed at the ' $\alpha / m$ ' level of significance. For example, to maintain  $\alpha = 0.05$  in making 6 comparisons, use an alpha ( $\alpha$ ) level of ' $0.05 / 6 = 0.0083$ '. An equivalent way to accomplish Bonferroni adjustment is to simply multiply the  $P$ -value derived by the LSD test by  $m$ :

$$P_{\text{Bonf}} = P_{\text{LSD}} \times m$$

**1) Structural Equation Models (SEMs):** SEMs report findings in three special ways by accepting the method on statistical significance report needs to understand various model terminologies and display of graphical representation to create by utilizing model arrows & boxes. Shapes or Boxes represents the practical data whereas arrows represent implicit causation. However, inside the model the factors or variables receives one way directional control by any other variable called as "endogenous", or "dependent". The variables do not accept a directional control from different variable called as "exogenous" or "independent".

In addition, coefficients of regression & correlation, it also test the overall model fit. The narrative analysis utilizes three actions to fit the model to establish the overall quality towards fit of the model. Thus, when the significance values have met to test entire associations within the



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model are significant, and it is then their relative strengths take decision if there is a relationship or not. Moreover testing for fitness of the model, it also provides an assessment of multi-collinearity. Consequently among few cases, the model fits the data well, although dependent variables does not affected even when the independent variables are significant statistically.

Statistical Package for Social Sciences i.e., SPSS and IBM SPSS Amos will be used to analyze and develop the framework using SEM on the collected data and to retrieve outputs on the statistical techniques and tools, to generate tabulated reports, charts and plots for the distributions and to develop a hypothetical model.

**3.5 Funding:** - Dr. Ambedkar Institute of Technology, PVP Welfare Trust, Bengaluru-56

**3.6 Proposed Start date and End date:** Jan 2022 to Dec 2023

- 3. Introduction of Proposal (Maximum 2 Pages):** The proposed proposal is a survey-based research to be carried to assess the efficiency of the industry 4.0 technology in agriculture. The effort of the farmer in the implementation of agtech, consequently followed by the major issues and challenges in the agriculture. The proposal aims to determine various factors influencing to avail and adopt in agriculture, to examine the effectiveness and efficiency of the technologies performance in terms farmers gain. The study mainly concentrate on the varied segment of farmers (demographic profile), expectation, need, performance, utility, service quality, affordability, satisfaction level and technology efficiency. The proposal is very much necessity in the trend to carry forward to focus on know-how technological requirements for future agricultural benefit. The proposal is a need of an hour to identify the pros and cons of the agricultural technology and bringing in various research ideas to propose for future advancement in agricultural field.



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4. Review of Status of Research and Developments in the Proposed work (Maximum 2 pages)

4.1 **International Status :**

- **Dr. Wu Yin**, revealed the ambition of IOT implementation in china agricultural industry. The researcher found IOT is one of the most promising technology for propelling agriculture, farming, fishing and poultry industry, to reduce cost and enhance rural labour efficiency significantly. Realtime Surveillance, Information Analysis, Fault Farming Analysis, Remote devices control, Decision and Policy Support. The study could retrieved the improvement on green house live rate and product volume significantly.
- **Maria Zomeni et al**, “Historical analysis of landscape change using remote sensing techniques: An explanatory tool for agricultural transformation in Greek rural areas” The role of agricultural change in transforming Greek rural landscapes is analysed within the broader context and theory of agricultural transition from traditional to productivist and post-productivist regimes. Understanding the process of agricultural change could enhance the role of agricultural policy as a tool for landscape management and regional planning.
- **DazhuanGe**, “Effects of rural–urban migration on agricultural transformation: A case of Yucheng City, China”, in the study agricultural transformation in china’s traditional farming areas has been analysed. In promoting rural transformation to create and enhance more employment opportunities based on local conditions.



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**National status:**

- KH Anantha et al, seeking sustainable pathways for fostering agricultural transformation in peninsular India, Natural Resource Management (NRM) interventions offer an important path to sustainable agricultural practices through increasing resource use efficiency, but true efficacy will only be achievable if these initiatives can be scaled up.

**5. Comprehensive work plan:**

5.1 Research Design and Methodology\Experimental design (Maximum of 5 pages)

The study aims to understand the scenario in different types of agriculture and perspective of various technologies in the transformation of the agriculture.

The present study is descriptive and empirical in nature. The study involves both primary and secondary data. Census sampling technique has been adopted on selected districts of Karnataka. The collected data has been analyzed using statistical tools viz., ANOVA, Chi-square test and Post hoc test using Statistical Package for Social Science and develop a framework using Structural Equation Modeling.

**Sampling Technique:** Census Probability Sampling Technique. The proposed study includes agricultural Crops grown in Bengaluru Rural Karnataka include rice, maize, pulses, oil seeds, Sugarcane, chillies, coarse cereals, silk, Vegetables, and Fruits





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**Sample:** Bengaluru Rural District

<b>State</b>	<b>Bengaluru Rural District (Taluks)</b>
Karnataka	Nelamangala, Doddaballapur, Devanahalli, Hosakote

**Sample Frame:** Agriculture and Farming

**Source for data collection:** Department of Agriculture (KSDA). Government of Karnataka, Department of Agriculture & Farmers Welfare, Farmer's Portal (<https://farmer.gov.in/>), Seednet India portal (<https://www.seednet.gov.in/smis/loginform.aspx>), Horticulture Department and personal visit to the district/taluk/village panchayat.

5.2 Major work elements and time line(Year-wise plan of work and target to be achieved) of activities (Maximum of 1 page)

<b>Plan of The Proposed Project</b>	<b>Duration Of The Project</b>
Preparation of detailed plan for study	3 months
Preparation of research instrument	2 months
Identification of respondents	3 months
Pilot study	2 month
Analyse the pilot survey to refine research instrument	1 month



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Primary data collection	6 months
Analysis & Interpretation	3 months
Report Writing	3 months
Submission of Final Report	1 month
<b>Total Duration Required to complete the project</b>	<b>24 months</b>

5.3 **Details of collaboration, if any intended:** Nil

5.4 **Details of the tools, etc., required for the project:** Nil

5.5 **Academic significance of the project:** The gap between the efficiency of agriculture and the technology inventions will be determined. The survey findings could bring in ideation for new projects and new technological developments. The extensive data collection and its analysis will probe the students to rethink on the existing technology and act as an input through this research for budding entrepreneurs. The proposed study shall be a booster for the upcoming technologies for agriculture.

5.6 **Relevance to present day problems:** With implementation of new technology based irrigation and cultivation in farming is being a challenge to many farmers. The relevance of skills in handling the techno-based irrigation and its productivity. The chance of withdraw the technology due to high cost and maintenance, Lack of financial support, Lack of Planning and Productivity, Lack of Marketing strategy for sales.



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- 5.7 **Relevance to society/Country:** Upliftment and encouraging rural people, Educating about the technology, collecting the major requirements on technology for the purpose of irrigation from farmers of Bengaluru Rural Districts of Karnataka.
- 5.8 **It's likely contribution to the Knowledge:** Yes, as Industry 4.0 and its advancement probing the agriculture transformation. The proposed study has been testing on the feasibility of the Industry 4.0 technologies.
- 5.9 **Are you aware of work being done on identical projects in any other institution in India/abroad?** If so, attach a note in this regard, giving present status of such work as well as the proposed measures, you would like to adopt to cover any gap, if untouched.
- 5.10 Please indicate whether you have already submitted or availed of any other project financial assistance from the Dr AIT or from any other agency: If yes, give the following details:

Year	Amount Received	Date of Completion
Nil	Nil	Nil

**5.11 Research outcome expected from the project and its potential application / utilization (Maximum of ½ page)**

The proposed proposal is potential enough to retrieve outcome such as capacity and capability of the agricultural technology to cater the need of the farmer. It is a reality check on the optimum utility of the technology influencing the agricultural transformation, helps in research idea generation on product innovation and business incubation ideation. However, the outcomes also enhance the knowledge on



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latest technology, its developments and its cost models for the purpose of agriculture. It creates a demand and interest for upcoming/budding rural entrepreneurs to adopt and develop in the field of agriculture. The findings of the study will rejuvenate the existing technology and provide newer technical ideas.

**5.12 Environmental/Societal impact assessment and risk analysis (Maximum of ½ page)**

The proposed study is interestingly contributing to increase the awareness level of latest and existing technology that supporting agricultural need and emphasis on individual, village, taluk, district and nation development in the field of agriculture. The study assesses the risk, time, and money contributed by the farmer in his way of achievement and to differentiate the livelihood of those individuals on pre and post implementation of industry 4.0 technologies. This kind of study in and around Bengaluru rural district is highly fewer. The scope of the study is to gain knowledge on the phases of issues and challenges absorbed by the farmer. The study also triggers the solution to resolve their issues and motivates the aspirants in the field of agriculture.

**5.13 Any other information of academic/technical nature about this project that you would like to provide in support of the application: Nil**

**6. Expertise available with the investigators in executing the project (Minimum of 1 page):**

**(Professional expertise existing with each of investigators to execute every component of the proposal should be highlighted)**

Investigators are having a good knowledge on survey-based research, ability to develop questionnaire to collect data and process data. The investigator could handle required data analysis on the research with the help of Statistical Package for Social Science (SPSS) and IBM AMOS for data analysis and good at report preparation. The Co-investigator is a recognized supervisor in VTU and guiding six Ph.D Scholars.



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7. **Recommended Reviewers(Maximum of 4 with complete address, Mobile No, Email ID, What's up Mobile No etc):** Nil
8. **Preliminary results obtained related to the proposal (Maximum of 1 page) :** Nil
9. **Summary of roles / responsibilities of all Investigators (Maximum of 1 page):** Designing the questionnaire, Pilot Study, Survey, Data collection, Data sorting and editing, Data Analysis and Report preparation
10. **References:** Nil
11. **List of facilities available with the Institution/Department for the project implementation**
  - 11.1 **Infrastructure facilities:** Nil
  - 11.2 **Equipment available with the Department/Institution/other Department/other Institution for the project implementation:**  
Nil
12. **Budget details:**

	Item	Budget			In Rupees Total
		1 <sup>st</sup> Year	2 <sup>nd</sup> Year	3 <sup>rd</sup> Year	
A.	Non-Recurring(Equipment)	-	-	-	-
B.	Recurring				
	1. Fellowships/Salaries	-	-	-	-
	2. Consumables	25,000	20,000	-	45000
	3. Travel	40,000	20,000	-	60000
	4. Other Costs contingency, etc.,	10,000	10,000	-	20000
C.	Overhead cost	20,000	20,000	-	40,000
D.	Grand Total(A+B+C)	95,000	70,000	-	1,65,000



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- Financial year: April to March
- Count six months from submission of the proposal to arrive at expected time point for commence of the project.: April 2022
- Please indicate brief justifications for each head of expenditure (100 words for each)  
Consumables amount of Rs. 20000 for the support of the documentation.

**BUDGET FOR CONSUMABLES**

Items	Budget in Rupees			
	I Year	II Year	III Year	Total
Stationeries	25,000	20,000	-	45,000

**BUDGET FOR OTHER COSTS**

Items	Budget in Rupees			
	I Year	II Year	III Year	Total
Contingencies	10,000	10,000		20,000
Others	20,000	10,000		30,000
Total	30,000	20,000		50,000

**BUDGET FOR PERMANENT EQUIPMENT**

Sl.NO	Name of the Equipment	Estimated Cost in Rupees
1.	Nil	Nil
Total	Nil	Nil

**Please give justification for each equipment: Nil**



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12.1 Justification for budget components:

- (a) Planned break-up of the utilization of the grant:
- (b) Consumables: To purchase required stationeries
- (c) Travel: Travel cost of Rs. 60,000 to conduct survey to collect data from the respondents.
- (d) Contingency: Additional expenses on article publications.

13. Minimum 3 names and address of subject experts interested in the Project proposal/Outcome of the Project:

**Quantitative Outcome:**

Expected & estimated revenues

Production capacities

Applications, unit sales & estimated consumption

Reality checks & adjustments

Market forecasts

Segmented by application

Segmented by income and educational level

**Qualitative Outcomes**

Technology identification, description & latest developments

Drivers, trends, needs & analysis

Existing & emerging performance targets & needs

Application roadmaps & timelines

Cost models & estimates for implementation

14. Brief Bio-data of the Project Investigator(s)

14.1 General Information: Having knowledge on data analysis.



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14.2 List of Projects submitted to various funding agencies:

**2018: DST:** A Study On Challenges and Opportunities of Innovative Technologies For Poly And Net Houses Cultivation An Agricultural Transformation In Karnataka

**2020: AICTE:** An Exploratory Study on the Transformation of Elected Women Representatives in Panchayati Raj Institutions (With special reference to Panchayat Raj & Women Empowerment in the Districts of Karnataka, India)

14.3 List of On-going projects: - Nil

14.4 Details of projects completed during last 5 years: - Nil

14.5 Any other details related to the project: - Nil

14.6 Any other information (Maximum of 500 Words): - Nil





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Research and Development Cell

UNDERTAKING

I, Dr. Leela.M.H possess a Doctorate of Philosophy (Ph.D.) and am now working as a permanent faculty at Department of MBA

Since 2016

I/We certify that general facilities such as furniture, study space, and library facilities are available accessible to me for this project in the Dr. Ambedkar Institute of Technology (Dr. AIT).

The same project proposal has not been submitted elsewhere for financial support.

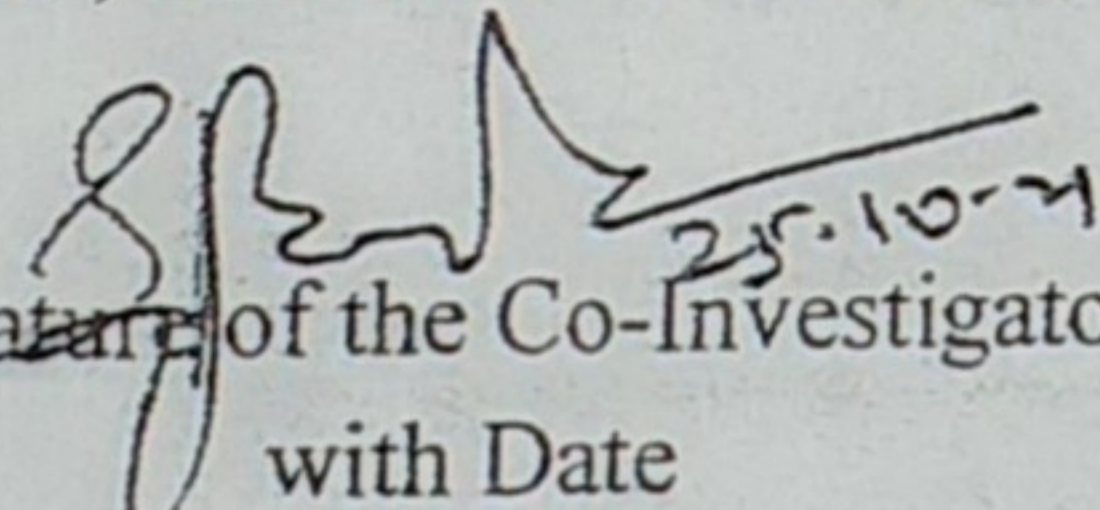
I/We undertake that spare time on equipment procured in the project will be made available to other users.

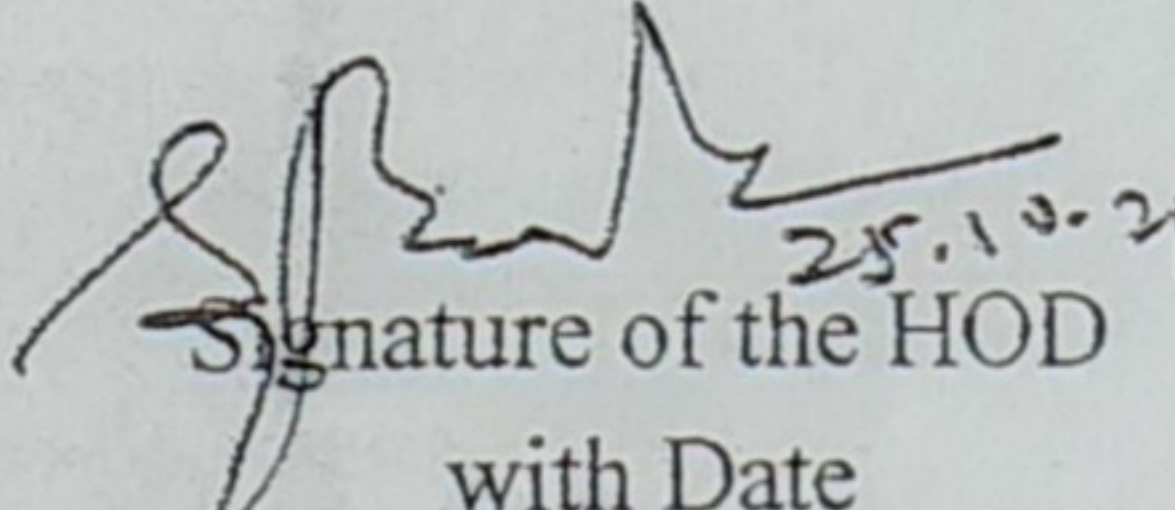
The research work proposed in the scheme/project does not in any way duplicate the work already done or being carried out elsewhere on the subject.

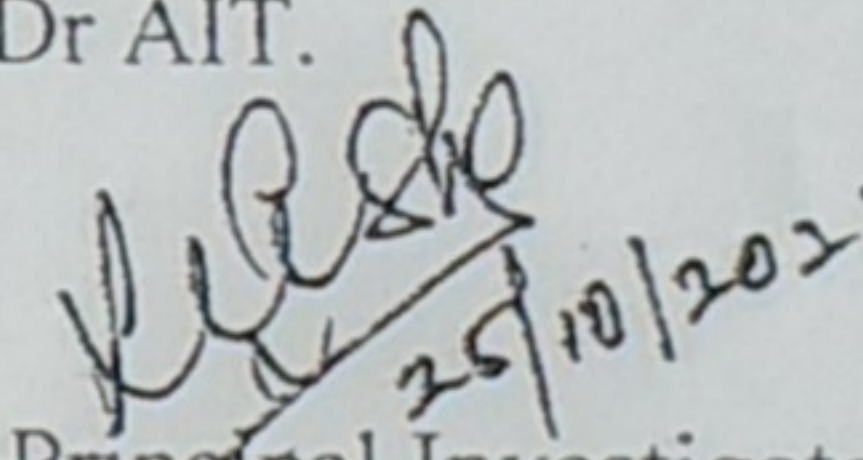
I/We shall complete the proposed project within the stipulated period mentioned by me/Research Monitoring Committee(RMC) committee recommended period, and if fail do so, or in case progress of research work is found unsatisfactory, the RMC committee may terminate the project immediately and the grant paid by the RMC committee will be refunded by me to Dr AIT.


In case I/We make any wrong declaration of facts or conceal anything, I shall be liable for any deterrent action, as RMC committee deems necessary.

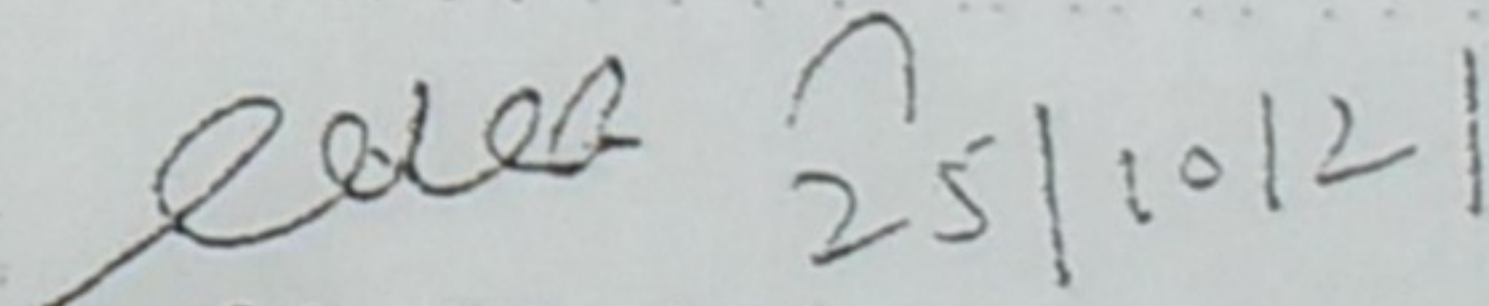
I/we shall abide by the terms, conditions and rules and regulations governing the scheme as constituted by the Dr AIT.

  
Signature of the Co-Investigator  
with Date

  
Signature of the HOD  
with Date

  
Signature of the Principal Investigator with Date

  
Signature of the Dean(R & D)  
with Date

  
Signature of the Principal  
with Date



# Karnataka State Council for Science and Technology

(An autonomous organisation under the Dept. of Science & Technology, Govt. of Karnataka)

Indian Institute of Science Campus, Bengaluru – 560 012

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Email: office.kscst@iisc.ac.in, office@kscst.org.in ♦ Website: www.kscst.iisc.ernet.in, www.kscst.org.in

**Mr. H. Hemanth Kumar**

Executive Secretary

11th May, 2022

Ref: 7.1.01/SPP/91

The Principal,  
Dr. Ambedkar Institute of Technology Campus,  
BDA Outer Ring Road,  
Bengaluru - 560 056.

Dear Sir/Madam,

Sub : Sanction of Student Project - 45th Series: Year 2021-2022

**Project Proposal Reference No. : 45S\_BE\_3815**

Ref : Project Proposal entitled **IOT BASED REMOTE ELECTRONIC VOTING SYSTEM USING AADHAR AND DUAL BIOMETRIC AUTHENTICATION**

We are pleased to inform that your student project proposal referred above, has been approved by the Council under "Student Project Programme - 45th Series". The project details are as below:

<b>Student(s)</b>	Mr. SURAJ H P	<b>Department</b>	ELECTRONICS AND COMMUNICATION ENGINEERING
	Mr. SKANDA G		
	Mr. SHOBITH G BHARAMSHETTY		
	Mr. SRIKANTH P S		
<b>Guide(s)</b>	Dr. RANGASWAMY Y	<b>Sanctioned Amount (in Rs.)</b>	6,000.00

### Instructions:

- The project should be performed based on the objectives of the proposal submitted.
- Any changes in the project title, objectives or students team is liable for rejection of the project and your institution shall return the sanctioned funds to KSCST.
- Please quote your project reference number printed above in all your future correspondences.
- After completing the project, 2 to 3 page write-up (synopsis) needs to be uploaded on to the following Google Forms link <https://forms.gle/YMn9K7XETu96i8KbA>. The synopsis should include following:
  - Project Reference Number
  - Title of the project
  - Name of the College & Department
  - Name of the students & Guide(s)
  - Keywords
  - Introduction / background (with specific reference to the project, work done earlier, etc) - about 20 lines
  - Objectives (about 10 lines)