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TECHNOLOGY ACCEPTANCE: A STUDY ON PROFESSIONAL STUDENTS READINESS FOR AI INTEGRATION SPECIAL REFERENCE TO THE STATE OF KERALA

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ABSTRACT

The rapid integration of Artificial Intelligence (AI) into diverse professional sectors necessitates an assessment of the readiness of emerging professionals, particularly students, to embrace this technological shift. This study investigates the readiness of professional students in Kerala to integrate AI into their future careers, focusing on their acceptance and adaptability. Guided by the Technology Acceptance Model (TAM), the research emphasizes the roles of Perceived Ease of Use (PEU) and Perceived Usefulness (PU) in shaping AI readiness. Moderating variables such as academic discipline, institutional type (government or private), and geographic location (village, municipality, corporation) are also considered. A descriptive and exploratory research design was adopted, employing quantitative methods and data collected from a stratified random sample of 530 professional female students across selected districts in Kerala. The TAM instrument developed by Fred D. Davis was adapted for contextual relevance. Principal Component Analysis (PCA) and Multiple Regression Analysis (MRA) confirmed the robustness of the model, with an R^2 value exceeding 80%, indicating strong predictive validity. The study found that institutional type and academic stream significantly influenced AI readiness, while location showed moderate interaction effects. The findings highlight the importance of targeted educational policies and curriculum enhancements to prepare students for a technology-driven workforce. The study concludes with strategic recommendations for educators, policymakers, and institutions to foster a digitally empowered, future-ready student population.

Keywords: *AI Readiness, young female students, Technology Acceptance Model (TAM), Digital Empowerment and AI Adoption*

I. INTRODUCTION

Having been designed by a very rapid evolution over the duration, Artificial Intelligence (AI) is instilling a transformation in world employment markets and education allowing the whole personality to get accustomed rapidly as cited by Spector [48]. According to Brynjolfsson & McAfee [28] and the World Economic Forum [128], AI also changes work and decision-making; therefore, it is essential to evaluate readiness for such change across demographic segments. Gender, geography, and technology access converge in India, making inclusive digital transformation more complex, according to Singh [95] [37]. AI's influence spans sectors such as healthcare, business, and law, making its inclusion in professional education essential. For students preparing for AI-disrupted careers, adopting such technologies is vital for academic and professional growth as cited by Spector [48]. Yet, the presence of AI tools alone does not ensure effective usage; student acceptance—driven by perceived usefulness and ease of use—is key. The Technology Acceptance Model (TAM), developed by Davis [33], offers a well-established framework for studying technology adoption. TAM has been widely validated in education, as cited by Venkatesh & Davis [124] and Teo [112] and applied in Indian studies to understand digital learning adoption. As cited by Zawacki-Richter et al [73] and Luckin [91] study global research highlights the benefits of AI in skill development and engagement, but also notes disparities in infrastructure, digital literacy, and user confidence . In India, as cited by Sharma & Singh [69] these issues are compounded by uneven access, limited training, and questions about AI's relevance to specific fields. This study uses TAM to examine student readiness and acceptance of AI tools in Indian higher education. By exploring student perceptions, it aims to inform educators and policymakers on effective strategies for integrating AI in learning environments.

Kerala is a unique location to examine the terrain of AI adoption by young female students because it has historically been a highly literate and human-developed location. However, as per NITI Aayog [72], imbalances in digital infrastructure, income, and employment hinder preparedness. With the advent of quicker business assimilation of AI, as cited by Brynjolfsson and McAfee [28]: World Economic Forum [127] [128], it is crucial to gauge the preparedness of these women to facilitate an inclusive workplace and digital equity. With this view the government of India, introduced National Education Policy 2020, which promotes technology-enabled learning under Ministry of Education [63]. However, successful integration depends on students' perceptions and engagement with these tools.

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II. BACKGROUND OF THE STUDY

Recent reports of McKinsey Global Institute [62] included Gupta et. Al, [7], [41] & [87] studies, showing that AI is in more and more Professions, but much more in India, where fascination with gender is included. Kerala provides a distinct reference to check for AI readiness among young female students, with its high literacy rate and progressive development indicators. The Emeritus Global Workplace Skills Study [32] cited that 87% of female workers in India are taking training in professional technology, and as cited by Chakrabarti, [78]. Female researchers have raised genes by 29.6%, whereas male researchers have done it by 19.1%. Further, women make up only 29.6% of genuine learners. In India, 90% of women consider learning AI is important for career development, yet only 35% feel sufficiently prepared, citing obstacles such as limited awareness, equipment access, institutional support, and fear of investigation reported by Business Standard.[21]&[108] cited that women who are understood, particularly lower digital literacy and many domestic responsibilities, are also marginalised. The trivial revelation came from the citations of Beig and Qasim [67] and Raman et al. (2024) they found that male students showed upper hand over opposite gender over favorable attitudes toward AI. As per citation of Raman et al. [123] differences in academic backgrounds like Students from engineering, business, and science streams were more influence by AI tools than other non-science streams. During COVID period, the citations of Prasad and Nair [52], Varghese and Kumar [19] and Joseph and Mathew [8] reported that engineering students in Kerala quickly adopted AI tools, mean there is a divide among academic streams in adoption. Despite those insights, most studies lack local recognition and do no longer cope with Kerala's specific socio-financial and geographical references to Deloite,[25]; Kerala State Planning Board [53]. There is a lack of localised, empirical and version-based research that implements a sturdy as cited by Dais (1989) shape such as the technology acceptance model (TAM), which focuses on perceived software (PU) and perceived ease of use (PEU). In addition, the modern studies do not often investigate how the district types (urban/rural), professional course, income level, or location they are studying. AI readiness are elements, nor do they deal with how the identity identifies women's engagement with AI

III. THEORETICAL BACKGROUND

The technology acceptance model (TAM) was cited in his paper by Davis [33] to provide a theoretical framework to understand the use of technology, using alleged utility (PU) and ease (PEU) as two main constructs. Further, as cited by Davis [33] PU represents the opinion that technology increases performance, while PEU is the ease of using technology. In terms of Kerala, PU young female students may be related to the alleged ability of women to increase productivity and career success, while PEU may vary with digital literacy and access to socio-economic groups. While TAM creates the main outline for this study, insight from complementary principles makes its scope wider. The principle of planned behavior cited by Ajzen, [40] shows the effect of approach, subjective norms, and perceived behavior control, stating that social expectations and confidence in someone's abilities affect how to adopt AI. The proliferation theory of innovations (Rogers et. al [29] & [30] combines a population-level approach, emphasising adopting factors such as relative advantage, compatibility, and complexity, which parallel to PU and PEU of parallel TAM. This broad lens helps refer to how community norms in Kerala can affect AI adoption trends. The social cognitive principle citd by Bandura [1] & [2] enriches analysis by emphasising self-efficacy – faith in the ability to do a task. High self-efficacy among women can increase both perceived ease and utility, encouraging adoption. SCT on environment and individual factors emphasizes the cognitive perceptions of TAM. Despite the value added by these frameworks, the strength of the TAM lies in its clarity and individual-level focus. Unlike the socio-normal orientation of TPB, the disability of macro level spread, or SCT behavior of DOI, focuses on psychological perceptions of TAM technology as cited by Davis, [33]. This makes it particularly well suited to examine the behavior of individual adoption of young female students in Kerala. Although this study attracts wide theoretical insights, Tam remains central due to the alignment of research on its future power and individual readiness for AI integration.

Gaps identified

Research into technology-based empowerment strategies is limited: Literature coming out about cutting-edge technologies needs to be more specific on aspects relating to empowering backward classes in education, employment, and financial inclusion. Hence, it elaborates on barriers rather than on good actionable solutions. No Models of Technology Adoption Based on Caste: Most of the research focuses on the issues that concern either rural-urban division or gender disparities as cited by Sharma & Kapoor [70], [82] & [106], but very few are interested in exploring the role of caste-based social structures in determining the processes of technology adoption and how a targeted intervention can be used to alleviate such a situation Fernandez [59]. Public and Community-driven Solutions Deficiency: Although public programs like Digital India and PMGDISHA have developed and continue to create an effort to reduce the digital divide, the literature tends to leave aside any mention of private sector innovativeness, startups, and community-based digital literacy initiatives that could raise backward classes as cited by Gupta et al. [7] & [41] and Moitra et al. [13]. AI and Modern Technologies for Inclusion: Studies highlight India's AI leadership, as reported by Time [114] & [115], but they do not emphasis how AI-driven tools, automation, and smart technologies create equivalent opportunity spaces for the marginalised populations. Impediments to the Adoption and Effectiveness of Policy: Most of the literature criticises government policies about digital inclusion as cited by Mukherjee [92] & [104] and UNESCO [117] & [118], but few studies engage in a more critical evaluation of the effect of such policies in real time on backward classes, especially regarding employment and entrepreneurship.

IV OBJECTIVES OF THE STUDY

1. To assess the impact of technology adoption on the socio-economic mobility of backward classes.
2. To identify barriers to technology adoption and propose effective policy interventions.

V. SCOPE AND DELIMITATIONS OF THE STUDY

The present study among young female students in Kerala, India, analyses AI adoption readiness among them in their day today life by utilising the TAM. In this study, we are looking at the impact of PEU and PU as cited by Davis [33]. concerning their readiness measured by a series of moderating variables – professional course they are in, geographic location from they are hailing, location where they are studying and Economic circumstances. Primary data was gathered through a structured TAM-based questionnaire as cited by Davis [33]. This study is limited to a cross-sectional perspective, providing contextually relevant data on a contemporary phenomenon while avoiding the difficulties that may arise from longitudinal and organizational emphases. The study is geographically constrained to Kerala, a state that has high levels of literacy and digital penetration. The findings are applicable in context but not readily generalisable to other Indian states. The study focuses only on young female students excluding and other gendered, meaning comparative gender work is constrained. The study also employs only the TAM framework, meaning that it does not assess other frameworks to determine broader differences – frameworks like UTAUT or Diffusion of Innovation may shed additional light on this area. The study did not include others like family education background, digital literacy, family responsibilities, or culture, as the study needed to maintain a specific focus. From a methodological perspective, a quantitative, cross-sectional survey design facilitated the collection of broad-based data – no longitudinal or qualitative approaches were attempted, limiting depth. Finally, although the questionnaire contained adapted language from Davis's [33] original TAM scale, the survey items' application to the socio-cultural context of Kerala might introduce bias should the constructs not resonate with local perception.

VI. STATEMENT OF PROBLEM

Despite the growing body of literature on adopting technology in India, there is a notable difference in research that checks the readiness of AI adoption of young female students, especially in Kerala, focusing on both individual and relevant factors.

"How prepared are young female students in Kerala to adopt AI technologies in their day today life and what factors influence this readiness?"

VII. RESEARCH QUESTIONS

- To assess the readiness of young female students AI adoption in Kerala, focus on the role of PU and PEU in their preparations to integrate AI technologies
- To examine the moderating effects of socio-economic, occupational and geographical factors on the readiness of AI adoption of young female students in Kerala,
- To include factors such as alleged utility (PU), ease of use (PEU) and moderating variables to develop a forecast model for the readiness of AI adoption among young female students in Kerala.

VIII. HYPOTHESIS

1. **Ho:** PU and PEU have no significant difference in impact on the AI adoption readiness of young female students in Kerala.
2. **Ho:** Socioeconomic factors (income level), profession (type) and location of origin (e.g., urban vs. rural areas) have no significant difference in moderation effect over the relationship between PU and PEU with AI adoption readiness among young female students in Kerala.

IX. METHODOLOGY

This study adopts a quantitative, descriptive and explanatory design, which enables objective analysis through empirical measurement and statistical testing. Founded on the technology acceptance model (TAM), it examines

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the readiness of AI adoption among young female students in Kerala. The researcher use stratified random sampling. The samples were taken from the various economic categories of each district and are based on the size of the population of the districts, and the sample size was calculated statistically to be 530 - which included a buffer, justified by Slovene Formula with 95% confidence required round to 400. The data is collected through a questionnaire, which Davis [33] adapted to the TAM Questionnaire (Cronbach alpha 0.97, reliability 0.91) with adaptation, distributed online and offline to ensure inclusion. Ethical standards such as informed consent, oblivion and voluntary participation are strictly followed. The analysis includes principal component analysis and multiple regression analysis (with or without moderators) to validate factors, factor variables, moderating variables' effects and the predictive model.

X. ANALYSIS AND DISCUSSION

A. PCA: Principle component analysis

As cited in Minitab [130], the statistical test principal components analysis (PCA) helps us to understand the covariance structure in the original variables. Further, it is cited in Minitab [130], it helps to create a smaller number of variables using this structure. Followed by the multiple regression analysis to validate the predictive power and develop a model equation. Further to that, it also validates the moderating effect of categorical variables.

The PCA analysis, in the current article context, is to identify that there are 2 identifiable factors in line with TAM theory. Reference to analysis: with an Eigenvalue cut of “>=1”, the analysis reveals there are 2 distinct factors that contribute 75.80% of total covariance (Fig. I). Though the percentage is not closer to the ideal, one of the reasons is the outliers, which account for 5%. This analysis gives a clear hint that there are two factors, as described under TAM are valid. That means PU and PEU are the two critical factors that we can derive from this test (Fig. II). Since the tool was invented in 1989, we should expect slight variation in the findings from the original, which explains one of the causes of variation. Further, the scale is developed for Western work environments. In the Principal Component Analysis, items under the Perceived Usefulness (PU) construct - It would be easy for me to become skillful at using AI tools.- exhibited a weak factor loading, falling way below the acceptable threshold. This finding may be attributed to several contextual and interpretive factors in addition to the points discussed above. Firstly, perceived ease of use is strongly linked to actual exposure and contextual relevance. Given that many respondents, particularly in certain districts (especially backward districts which are close to the national average of precipitation) or professions, may not have had direct experience using AI tools, their ability to assess the usefulness of such tools in their specific profession contexts could be limited or speculative. Secondly, the generic phrasing of the item might have led to vagueness or inconsistency in interpretation. Despite the low statistical loading, the item retains conceptual and theoretical importance within TAM and was therefore retained for discussion.

Particulars	Factor 1	Factor 2	Factor 3	Factor 4
Eigenvalue (>1)	7.5526	**1.5383**	0.4324	0.3804
Proportion	62.90%	12.80%	3.60%	3.20%
Cumulative	62.90%	**75.80%**	79.40%	82.50%

Fig.I Eigen analysis of the Correlation Matrix results cited from Minitab (2023)

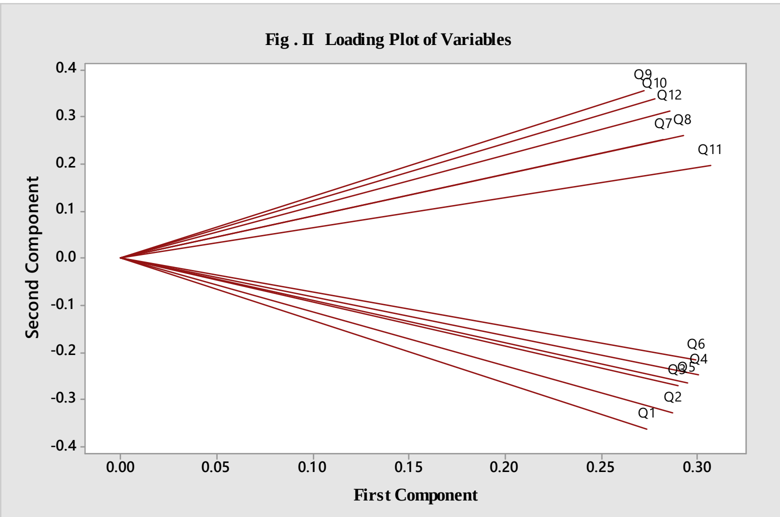

Fig II loading plot of variables shows the variable loadings in two factors.

B. Multiple regression analysis without Moderators

Research is testing the significance of factors with a 5% alpha. Using this step, research validates that around 83% of the variation of dependent variables can be explained through PU and PEU. The R-squared and R-squared adjusted reported are 83.60 % and 83.54 % (Fig. III). Further, the R^2 predicted is 83.43 %, which signifies the model does not appear to be over fit and has adequate predictive ability as cited in Minitab [130] help. The 'P' value of '0.00' is significant (at 5% alpha); hence, the factors are significant. The 'VIF' values less than cutoff 3, indicate that there is no collinearity. The model equation derived without categorical variable is as given under.

Model Equation:

Readiness = 0.7152 + 0.4164 PU + 0.3999 PEU

Fig III. Regression Analysis: Readiness versus PU and PEU

Source	DF	Adj SS	Adj MS	F-Value	P-Value
Regression	2	356.21	178.103	1343.22	0.000
PU	1	65.16	65.160	491.42	0.000
PEU	1	54.27	54.268	409.28	0.000
Error	527	69.88	0.133		
Lack-of-Fit	253	56.31	0.223	4.50	0.000
Pure Error	274	13.56	0.050		
Total	529	426.08			

Model Summary

S	R-sq	R-sq(adj)	R-sq(pred)
0.364134	83.60%	83.54%	83.43%

C. Multiple regression analysis without Moderators

The focus here is to check whether the model is influenced by the professional course they are in. The tests reveal that, 'P' values - 0.000 - are less than 0.05, which indicates profession is a significant variable (Fig. IV). However, the 'R' values are not significantly improved with this addition. Up on drilling down to each profession, we found that the non-science differs from the science group; outliers is Engineering that with 'P' close to cutoff.

The districts are classified using percapita income report published by Kerala State government. Which are clubbed into three distinct segments under quartile one (Districts: Pathanamthitta, Wayanad, and Malappuram), quartile two (Districts: Kannur, Kozhikode, Palakkad, and Kasaragod), quartile three (Kottayam, Thrissur, Idukki, and Thiruvananthapuram), and quartile four (Ernakulam, Alappuzha, and Kollam). It is worth mentioning that it is above the national average of Rs.175,000/- as cited by Khokhar[36]. The focus here is to check whether the model is influenced by the economic factor of the location they are hailing from. The tests reveal that the 'P' value is greater than 0.05, which indicates the moderator is not significant. Similar, the researcher checks whether the moderators - location from they are coming (city, municipality and village) and location they are undergoing studies - are significant or not The tests reveal that, 'P' values are greater than 0.05, which indicates the moderator are not significant.

Fig. IV Regression analysis of model with Moderating Variables

Analysis of Variance

Source	DF	Adj SS	Adj MS	F-Value	P-Value
Regression	12	360.319	30.0266	236.05	0.000
PU	1	64.087	64.0868	503.82	0.000
PEU	1	54.106	54.1056	425.35	0.000
Professional Courses	8	3.733	0.4666	3.67	0.000
location type	2	0.388	0.1940	1.53	0.219
Error	517	65.764	0.1272		
Lack-of-Fit	458	64.347	0.1405	5.85	0.000
Pure Error	59	1.417	0.0240		
Total	529	426.083			

Model Summary

S	R-sq	R-sq(adj)	R-sq(pred)
0.356654	84.57%	84.21%	83.86%

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Interaction effect of moderators:

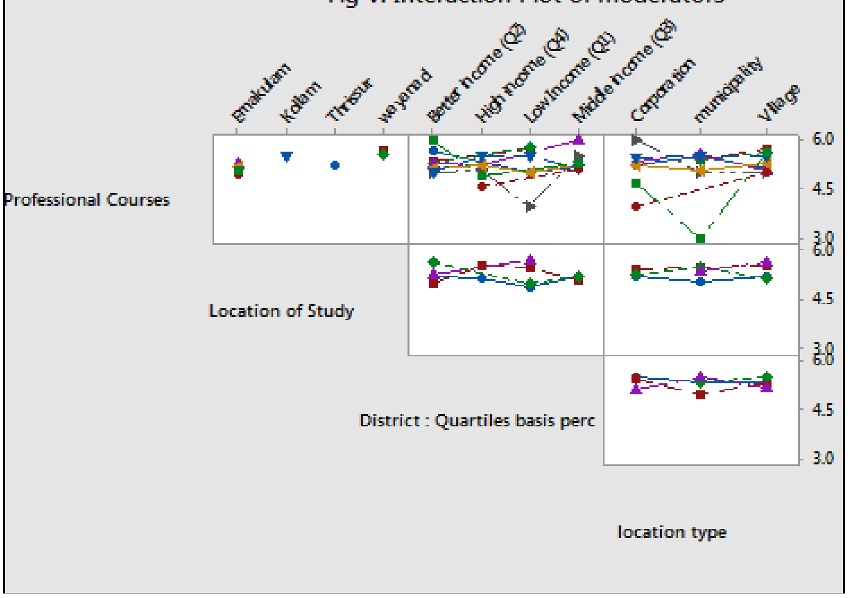
The interaction plot (Fig. V) shows significant divergence in AI adoption readiness of young female students in Kerala, based on academic background, district economic level, and geographic locality (associated with per capita income). Women in the sciences branches, excluding computer science, have consistently higher readiness levels than in the educational, commercial, and humanities branches. This illustrates the effect of academic background on readiness. Further it interact with Low income background and location type (Corporation and Municipality).

AI adoption readiness varies depending on district quartile; while it follows consistent lines of reasoning, the quartiles III and IV (likely economically wealthy) have higher mean readiness levels than quartiles I, further it interact with academic background and influence. The contributing reasons for differences in readiness could be due to underlying local policy and/or factors resulting from being engaged digitally.

Worthy of note, readiness increased with urbanisation associated with geographic location, with both women in cities reporting the highest levels of readiness and women in villages reporting the lowest levels of readiness. Looking at the way the interaction lines intersect suggests that influencing one definite factor (i.e., academic background) is a factor of uncertainty and subject to the other factors based on where the women are located (that is, what economic tier they represent).

The conclusion here was the complexity of the AI adoption readiness for young female students is both influenced and shaped by a confluence of dimensions that relate to academic background and economic level (interaction effect). Therefore, any effort on a regional or contextual level to uptick, to improve, the AI adoption readiness of millennial women should focus on devising strategies that are context-sensitive and do not perpetuate inequitable integrations of AI.

Fig V. Interaction Plot of moderators



XI. CONCLUSION

The core structure proposed by Davis [33] through his Technology Acceptance Model (TAM), still retain high predictive power in current research context. The Current research proved that the TAM factors are credible enough to explaining readiness for AI adoption. The PCA and MRA analysis performed in current research substantiate this argument. However the research is not concluding that only this theory can explain all in one go there are other theories too which future researchers should consider to explain the behavioral intention in heterogeneous settings like Kerala. Differences in responses across different professions and income levels indicate that the model needs to be contextualised to the various contexts. The observations seem to indicate that participants with science-related work lives and participants primarily residing in higher-income districts are better versed in readiness than non-science participants and participants residing in economically disadvantaged districts. These findings underscore the significance that economic and professional context has on one's perception and behavioral intention with new AI tools. So, an effective intervention to promote AI adoption cannot rely solely on general assumptions in TAM and must include diverse, localized and profession-based interventions that are economically positioned. This will be particularly important in places like Kerala, which has high literacy levels but huge intra-state variations in professional exposure, access to technology, and economic opportunities.

XII. RECOMMENDATIONS

In the promotion of AI use among female students in Kerala, a combined effort of the various stakeholders is required. The government and policymakers should establish programs for the digitisation, focusing particularly in rural or underperforming districts. Further they should give financial assistance to the families and or scholarships to females through direct incentives or through subsidies. AI literacy can be improved through public-private partnered initiatives in education and training fields is a necessary. Further, they should be using structures such as community hubs or women's self-help groups for this upliftment of target segment. Educators and training should focus on tailored training models with digital modules for profession-specific training programs and focused on future career-path. Father they should enable technology to delivered remotely in rural locales and in flexible hybrid delivery modes that address access challenges. Finally, the collaboration between Industry and educational institutions is a must to develop next generation work focus through customised learning approaches/strategies focusing on informed deployment use and long-term AI learning.

-END-

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