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Factors Influencing Behavioural Intention to Use Mobile Banking in Champawat District of Uttrakhand

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Abstract: ***India has more mobile connections compared to banking accounts, therefore GoI in Economic Survey 2014-15, proposed JAM (Jan-Dhan Yojana, Aadhar Number and Mobile Number) trinity to use ICT for more efficient and effective spread of formal banking even to the hilly areas where brick and mortar banks are challenging to build and sustain. Also, financial inclusion cannot happen without economic activity, and Mahatma Gandhi National Rural Employment Act (MGNREGA) is a policy which significantly helped to enhance the economic activity of rural India. Because of penetration of mobile technology and involvement of the same in financial inclusion, this research will contribute to understanding the constructs of mobile banking adoption in hilly rural area of Champawat District, Uttrakhand w.r.t population registered with MGNREGA. The authors found research is scarce for mobile banking adoption in hilly rural areas of India. (Mehta et, al 2019) may be the only study for Champawat district of Uttrakhand, using technology acceptance model (TAM) and total interpretive structural modelling (TISM) to develop a model. This paper takes model from Mehta et al. 2019 and examines the relationship between the constructs using structured equation modelling (SEM).***

Keywords: Financial Inclusion, Mobile Banking, Technology Acceptance Model (TAM), Intention Behavior, Hilly Rural India, Total Interpretive Structural Modeling (TISM), Structured Equation Modeling(SEM)

I. INTRODUCTION

Due to increased competition in the banking sector, banks were encouraged to adopt new technologies (Alalwan et al., 2017; Koksal, 2016). The new digital distribution platform is mobile banking. As the Internet has developed into a mobile phone, mobile phones are used to carry out banking transactions (Koenig-Lewis et al. 2010). With the advent of mobile banking, banks have become more effective in reducing operating cost and time, while offering customers considerable convenience and enabling them to conduct banking. Based on the variables contained in the literature study by (Mehta et al. 2019) and the outcome of which the model was based on the TAM and TISM, the author intends to broaden the below-shown model and add to the literature on influencers for mobile banking use in hilly area of Champawat district, Uttrakhand.

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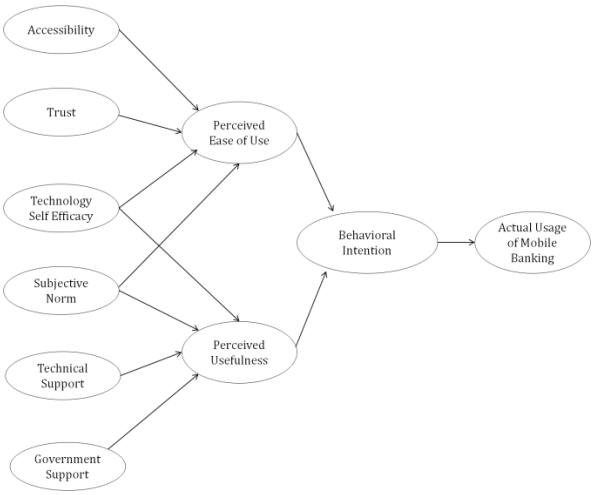

Figure 1: Conceptual Model

As shown in Figure 1, (Mehta et al. 2019) suggested the conceptual model using TISM by taking extended TAM as a base model. This study will test the same model by using SEM

II. FORMULATION OF HYPOTHESIS

From the conceptual model, two hypotheses and these were tested using Structured Equation Modeling

H1 - There is no relationship between Perceived Ease of Use and Behavioral Intention towards the usage of Mobile Banking in hilly rural India

H2 – There is no relationship between Perceived Usefulness and Behavioral Intention towards the usage of Mobile Banking in hilly rural India

III. DATA MINING

The data collected from 425 respondents from various villages under the district of Champawat. The degree of response checked after collecting data from the field to figure out the efficiency of the questionnaire design and method of collecting data. Twenty-two entries showed irregularities, and therefore, 403 considered out of 425 entries for data analysis. Out of these 22 entries, 13 entries were from respondents who were not able to show the MNREGA job card and, other respondents from the other nine entries marked all extremes. These twenty-two entries were random across the blocks. The summary of the removed entries has shown in Figure 2 below.

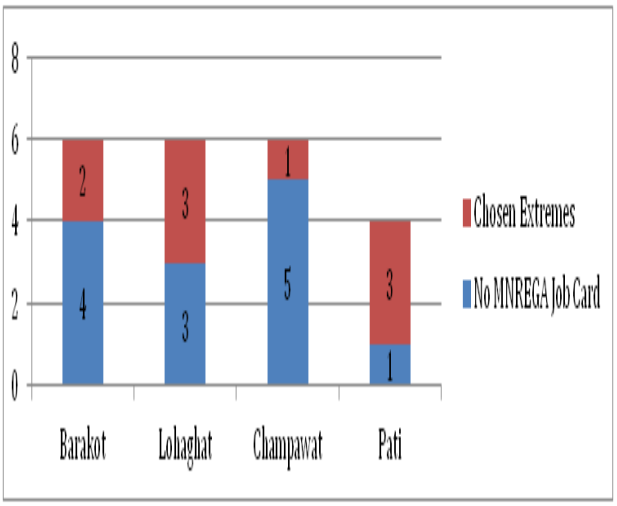

Figure 2: Removed Entries

A careful administration for non-response bias is required while dealing with questionnaires and, this carefulness increases when the circulation of questionnaires is in a rural setup. This paper caters the non-bias response for the four demographic variables, namely; age, level of education, monthly income and occupation. The comparison between the two groups of respondents was made using ANOVA. The first group was of 40 respondents who filled genuine entries and 40 respondents whose missing entries filled manually. Table 1 shows the response bias analysis:

Table 1 – Response Bias Analysis

Demographic Entry	Results of ANOVA (First 40 vs. Last 40)	
	F Value	Level of Significance
Age	0.786	0.576
Level of Education	0.846	0.505
Monthly Income	1.134	0.457
Occupation	0.576	0.698

This analysis indicates that there is no response bias and also the entries that entered instead of missing entries were done carefully.

Paper manages missing data and also applies the Malhanobis test. This test reveals a maximum of 0.8% of data was missing for each construct item, and randomness of missing entries was also insignificant, as shown in Table 2:

Table 2 – Chi-Square Test

$\chi 2$	Degrees of Freedom	Sig.
849.338	878	0.75

The missing data values will be replaced using the two-step procedure of "Regression Imputation" (Allison, 2003; Frane, 1976).

IV. DEMOGRAPHIC SUMMARY OF RESPONDENT'S CHARACTERISTICS

It is also important to understand the distribution of nominal and categorical data, which, will help to explain the dynamics of respondents. There was an equal distribution of questionnaires across 70 villages out of 662 inhabited villages in 4 blocks of Champawat. A total of 717 villages are under the district. The respondents were using mobile banking under MGNREGA.

The ratio of male to female respondents was 3 to 2, i.e., 65% male and 35% female, which is the same as MGNREGA policy which mentions 1/3rd of the employment should be given to female population.

The distribution of the age of the respondents clearly shows that the respondents enrolled for MGNREGA are either between 18-38 years of age (74.4%) or above 58 years of age (15.4%). Table 3 below shows the distribution.

Table 3 – Age-wise distribution of respondents

S.No	Age Group	Total Entries
1.	18-28	202
2.	28-38	98
3.	38-48	17
4.	48-58	24
5.	Above 58 years	62

The data also shows that the majority of respondents were divided among illiterate or functional literate, while very few were graduates. Table 4 shows the respondent data:

Table 4 – Education-wise distribution of respondents

S.No	Education	Total Entries
1.	Illiterate	103
2.	Functional Literate	154
3.	Primary	44
4.	Upper Primary	34
5.	High School	30
6.	Intermediate	29
7.	Graduate	13

The results show that 75% of the respondents were between 18-38 years of age. Hence, the younger generation uses mobile banking, and also literacy rate doesn't affect the use of mobile banking.

V. EXPLORATORY FACTOR ANALYSIS (EFA)

EFA will be used to find relationships between Perceived Ease of Use, Perceived Usefulness, Behavior Intention, and usage of mobile banking in hilly rural India. This research paper uses principal component analysis (PCA) and utilises the orthogonal framework with a varimax rotation technique to perform factor analysis.

The EFA results checked and verified using confirmatory factor analysis (CFA) using structural equation modelling (SEM). The first step is to check the acceptance of sample adequacy in the research, for this Kaiser-Meyer-Olkin (KMO) and Bartlett's test of sphericity was employed. The test clearly showed that factor analysis could be done using sample data. KMO measure of sampling came out to be 0.913. Also, Bartlett's test revealed approx chi-square was 11456.62, Degrees of Freedom was 832 and Sig. (p-value) < 0.001. Next is to check the communalities for the variables, and if the communality is less than 50%, it leads to the exclusion of the variable from the analysis. The analysis revealed that communalities of all the variables loaded on EFA varied from 0.630 to 0.904 with average communality of 0.808, which makes the model highly acceptable model. The method of extraction was Principal Component Analysis. EFA, based on the common factor model, was used to understand the relationship between a large set of variables.

Table 5 below shows the total number of factors extracted and total variance explained in EFA model.

Table 5 – EFA Model – Factors Extracted and Total Variance

Items	Initial Eigen Value			Extraction Sums of Square Loading			Rotation Sums of Squared Loadings		
	Cumulative %	% of Variance	Total	Cumulative %	% of Variance	Total	Cumulative %	% of Variance	Total
AU	38.308	38.308	14.17	38.308	38.308	14.17	17.022	17.022	6.3
BI	48.16	9.852	3.645	48.16	9.852	3.645	30.094	13.071	4.84
PU	54.634	6.475	2.396	54.634	6.475	2.396	41.034	10.94	4.05
PEoU	61.02	6.386	2.363	61.02	6.386	2.363	51.416	10.382	3.84
SN	66.185	5.165	1.911	66.185	5.165	1.911	61.773	10.357	3.83
TR	70.466	4.28	1.584	70.466	4.28	1.584	66.595	4.822	1.78
TSE	74.29	3.824	1.415	74.29	3.824	1.415	71.399	4.804	1.78
AC	78.089	3.799	1.406	78.089	3.799	1.406	76.176	4.776	1.77
GS	80.899	2.81	1.04	80.899	2.81	1.04	80.899	4.724	1.75
TS	82.278	1.379	0.51						

Table 6 shows the data of the rotated component matrix, which corresponds to the loading of measured items on latent factors. Here Principal Component Analysis has been used as an extraction method, Varimax with Kaiser Normalization was used for rotation method with rotation converged in 6 iterations. All nine latest factors contribute to the actual usage of mobile banking. It was observed that 0.30 is the minimum criteria between the constructs and therefore justified the factor loading.

Table 6 – Rotated Component Matrix

Components	1	2	3	4	5	6	7	8	9
Accessibility	0.123	0.842	0.132	0.127	0.136	0.113	0.136	0.035	0.035
Clear	0.102	0.874	0.072	0.112	0.082	0.09	0.051	0.005	0.025
Comfort in reference manual	0.224	0.153	0.106	0.212	0.78	0.052	0.113	0.082	0.022
Comfort in using first time	0.165	0.213	0.194	0.162	0.767	0.062	0.043	0.092	0.092
Comfort learning from peers	0.165	0.079	0.134	0.167	0.827	0.082	0.016	0.103	0.045
Comfort learning on my own	0.235	0.045	0.112	0.023	0.846	0.113	0.098	0.067	0.043
Consistency	0.242	0.172	0.249	0.806	0.115	0.036	0.098	0.023	0.082
Consistency	0.164	0.136	0.125	0.124	0.183	0.167	0.034	0.864	-0.03
Continuity	0.234	0.195	0.297	0.758	0.149	0.103	0.067	0.087	0.086
Ease and Variety of Access	0.152	0.176	0.124	0.083	0.066	0.547	0.043	0.004	0.904
Easier Transaction	0.241	0.039	0.775	0.245	0.135	0.045	0.049	0.124	0.092
Easy to learn	0.09	0.814	0.173	0.145	0.183	0.074	0.046	0.12	0.095
Flexibility	0.065	0.789	-0.029	0.164	0.083	0.048	-0.066	-0.009	0.034
Fraud Free	0.121	0.035	0.032	0.126	0.136	-0.021	0.914	0.054	0.053
Future Use	0.225	0.226	0.241	0.746	0.219	0.141	0.134	0.045	0.036
Government Facilitation	0.134	0.152	0.114	0.147	0.072	0.887	-0.004	0.152	0.073
Improved Effectiveness	0.242	0.106	0.834	0.136	0.112	0.075	0.04	0.043	0.021
Improved Productivity	0.236	0.102	0.816	0.202	0.172	0.036	0.07	0.025	0.123
Influence of Family	0.765	0.114	0.215	0.114	0.049	-0.006	-0.021	0.197	0.135
Influence of friends	0.843	0.103	0.112	0.101	0.187	0.132	0.033	0.07	0.037
Influence of Media	0.787	0.123	0.189	0.2	0.156	0.032	0.024	0.024	0.035
Often and Diverse Use	0.269	0.224	0.236	0.782	0.235	0.112	0.042	0.041	0.074
Overall Comfort in usage	0.164	0.203	0.157	0.124	0.809	0.032	0.103	0.103	0.034
Overall Rating	0.143	0.834	0.104	0.148	0.162	0.053	0.102	0.136	0.136
Overall rating	0.824	0.111	0.146	0.185	0.112	0.145	0.083	0.012	0.071
Peer Influence	0.782	0.023	0.183	0.175	0.178	0.03	0.068	0.012	0.087
Quick	0.169	0.116	0.11	0.101	0.168	0.115	0.013	0.888	-0.035
Quick Transaction	0.293	0.118	0.786	0.236	0.184	0.074	0.096	0.064	-0.012
Recommendations to Peers	0.236	0.236	0.234	0.813	0.123	0.096	0.078	0.103	0.016
Saves Time	0.248	0.054	0.811	0.206	0.136	0.052	0.063	0.087	0.118
Security of Money	0.076	0.126	0.121	0.08	0.154	0.003	0.872	0.021	0.66
Sharing Experience	0.836	0.084	0.134	0.112	0.165	0.102	0.031	0.042	0.061
Skill Improvement	0.152	0.825	0.083	0.186	0.152	0.14	0.036	0.041	0.054
Societal Influence	0.772	0.134	0.198	0.136	0.121	0.025	0.054	0.126	0.09
Teaching others	0.811	0.078	0.176	0.198	0.135	0.05	0.07	0.035	0.065
Technology Promotion	0.131	0.185	0.142	0.151	0.132	0.873	-0.021	0.13	0.034
Unrestricted Access	0.162	0.146	0.113	0.036	0.067	0.025	0.056	-0.043	0.914

EFA provided nine latent factors, which were the result of the sum of rating scores of all loaded items on each factor. The reliability and cross reliability of each variable and each question respectively were checked to develop a strong framework. Table 7 shows reliability statistics, and Table 8 shows total statistics. Total statistics of each construct revealed that if any item as shown in Table 8 of any of the construct will be deleted, then the Cronbach's Alpha of the corresponding construct can't be increased.

Table 7 - Reliability Statistics of the nine constructs:

S.No	Construct	Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	No. of Items
1.	PU	0.937	0.937	5
2.	PEoU	0.923	0.923	6
3.	SN	0.937	0.937	8
4.	TSE	0.915	0.916	5
5.	AC	0.864	0.864	2
6.	TR	0.871	0.871	2
7.	GS	0.892	0.892	2
8.	TSE	0.888	0.889	2
9.	BI	0.944	0.944	5

The results from Table 7 and Table 8 signifies that variables can derive the latent factors, and also reliability of the variables points out that basic TAM variables Perceived usefulness, Perceived Ease of Use and Behavioral Intention could be used to study mobile banking usage.

Table 8 - Total Statistics of constructs

Constructs	Items	Cronbach Alpha of item deleted	Squared multiple correlation	Corrected Inter-item correlation	Scale variance if item delted	Scale Mean if item deleted
PU	Easier Transaction	0.915	0.697	0.842	45.403	18.68
	Improved Effectiveness	0.931	0.736	0.862	24.883	18.82
	Improved Productivity	0.913	0.643	0.821	45.092	18.69
	Saves time	0.922	0.714	0.827	46.115	18.87
	Quick Transaction	0.924	0.725	0.841	44.784	18.85
PEoU	Skill Improvement	0.911	0.765	0.812	66.711	23.8
	Clear	0.915	0.645	0.813	65.545	23.76
	Flexible	0.939	0.465	0.696	69.032	24.13
	Easy to Learn	0.922	0.723	0.823	66.523	23.76
	Accessibility	0.919	0.745	0.865	66.923	23.83
	Overall Rating	0.915	0.721	0.864	65.765	23.86
SN	Teaching others	0.942	0.715	0.864	124.834	32.82
	Influence of friends	0.945	0.724	0.813	125.834	32.7
	Societal Influence	0.956	0.665	0.834	128.556	32.62
	Influence of family	0.923	0.656	0.745	128.122	32.65
	Sharing Experience	0.951	0.716	0.813	125.452	32.76
	Peer Influence	0.955	0.683	0.834	128.603	32.76
	Influence of Media	0.946	0.715	0.832	125.932	32.79
	Overall Rating	0.943	0.734	0.845	126.363	32.75
TSE	Comfort learning on my own	0.897	0.628	0.78	39.537	19.16
	Comfort Learning from Peers	0.896	0.623	0.784	38.531	19.18
	Comfort in using first time	0.904	0.573	0.747	39.29	19.05
	Comfort with reference manual	0.894	0.643	0.797	37.926	19.08
	Overall comfort in usage	0.891	0.662	0.81	38.558	19.19
AC	Ease and variety of access	.(a)	0.58	0.761	3.963	4.62
	Unrestricted access	.(a)	0.58	0.761	3.845	4.55
TR	Security of money	.(a)	0.596	0.772	3.68	4.62
	Fraud Free	.(a)	0.596	0.772	3.779	4.69
GS	Technology Promotion	.(a)	0.647	0.805	3.825	4.42
	Government Facilitation	.(a)	0.647	0.805	3.625	4.47
TSE	Network Availability	.(a)	0.64	0.8	3.675	4.7
	Customer Care	.(a)	0.64	0.8	3.307	4.76
BI	Recommendation to Peers	0.927	0.732	0.871	45.373	19.43
	Continuity	0.934	0.732	0.864	44.703	19.63
	Often and Diverge Usage	0.932	0.751	0.862	44.532	19.74
	Future Usage	0.927	0.711	0.824	45.894	19.71
	Consistency	0.932	0.742	0.852	43.799	19.85

The next aim is to derive the latent factors and relationship between the variables which would be useful for taking care of transitivity. The Bivariate Pearson's correlation significant at 0.01 levels (**2-tailed) has been used to check the linearity of the test in the data. Table 9 shows that government support and technical support shows a negative correlation.

Table 9 - Pearsons' Bivariate Correlations between latent constructs

	PU	PEoU	SN	TSE	AC	TR	GS	TS	BI
PU	1	.311(**)	.543(**)						
PEoU		1	.312(**)						
SN			1						
TSE	.421(**)	.383(**)	.481(**)	1					.473(**)
AC	.285(**)	.303(**)	323(**)	.211(**)	1	.189(**)	.162(**)	0.06	.240(**)
TR	.253(**)	.242(**)	.243(**)	.311(**)		1	0.04		.279(**)
GS	.292(**)	.328(**)	.301(**)	.268(**)			1		.384(**)
TS	.318(**)	.281(**)	.332(**)	.373(**)		.175(**)	.375(**)	1	.338(**)
BI	.603(**)	.462(**)	.545(**)						1

Mahalanobis distance (D2) test and boxplots are used to test multivariate and univariate outliers, respectively. As shown in Table 10, the maximum value of D2 (23.112) is lower than the minimum cutoff limit of 27.653 and shows that there are no outliers in final set of 9 variables from total of 403 entries.

Table 10 – Residuals Statistics

	Std. Dev	Mean	Min.	Max
Predicted Value	38.68	177	70.46	304.26
Std. Predicted Value	1	0	-2.754	3.29
Standard Error of Predicted Value	4.713	15.4	6.26	25.058
Adjusted Predicted Value	38.864	176.2	67.55	308.26
Residual	94.441	0	-204.26	223.08
Std. Residual	0.987	0	-2.135	2.332
Stud. Residual	1.002	0.004	-2.154	2.405
Deleted Residual	97.341	0.805	-207.95	237.24
Stud. Deleted Residual	1.004	0.004	-2.166	2.422
Mahal. Distance	5.806	8.975	0.51	23.15
Cook's Distance	0.005	0.003	0	0.037
Centered Leverage	0.016	0.025	0.001	0.066

The normality of data was tested using the Shapiro-Wilk test and the Kolmogorov-Smirnov test. Table 11 signifies that the data was normal.

Table 11 – Test of Normality

	Shapiro-Wilk			Kolmogorov-Smirnov(a)		
	Sig.	Df	Statistics	Sig.	Df	Statistics
PU	0	403	0.848	0	403	0.219
PEoU	0	403	0.855	0	403	0.212
SN	0	403	0.821	0	403	0.226
TSE	0	403	0.856	0	403	0.202
AC	0	403	0.869	0	403	0.221
TR	0	403	0.858	0	403	0.255
GS	0	403	0.887	0	403	0.199
TS	0	403	0.868	0	403	0.237
BI	0	403	0.821	0	403	0.239

The Levene's test indicates the homogeneity in all constructs except Perceived Ease of Use. Table 12 shows the test of homogeneity of variance.

Table 12 – Test of Homogeneity of Variance

Constructs		Levene's Statistics	Df1	Df2	Sig.
PU	BIM	0.004	1	401	0.95
	BoM	0.045	1	401	0.83
	BoM(df)	0.045	1	401	0.83
	BTM	0.031	1	401	0.86
PEoU	BIM	4.737	1	401	0.03
	BoM	1.124	1	401	0.29
	BoM(df)	1.124	1	444.2	0.29
	BTM	2.157	1	401	0.04
SN	BIM	1.033	1	401	0.31
	BoM	0.538	1	401	0.46
	BoM(df)	0.538	1	401	0.46
	BTM	1.101	1	401	0.3
TSE	BIM	0	1	401	0.99
	BoM	0.014	1	401	0.91
	BoM(df)	0.014	1	398.8	0.91
	BTM	0	1	401	0.99
AC	BIM	0.084	1	401	0.77
	BoM	0.278	1	401	0.6
	BoM(df)	0.278	1	401	0.6
	BTM	0.132	1	401	0.72
TR	BIM	1.063	1	401	0.3
	BoM	0.29	1	401	0.59
	BoM(df)	0.29	1	400.3	0.59
	BTM	0.867	1	401	0.35
GS	BIM	0.043	1	401	0.84
	BoM	0.236	1	401	0.63
	BoM(df)	0.236	1	396	0.63
	BTM	0.074	1	401	0.79
TS	BIM	0.194	1	401	0.66
	BoM	0.184	1	401	0.67
	BoM(df)	0.184	1	399.8	0.67
	BTM	0.245	1	401	0.62
BI	BIM	0.742	1	401	0.39
	BoM	0.296	1	401	0.59
	BoM(df)	0.296	1	401	0.59
	BTM	0.686	1	401	0.41

The results from the above table clarify that data is ready to apply in Structured Equation Modeling to test the hypothesis and verify the framework.

VI. STRUCTURAL EQUATION MODELING (SEM) ANALYSIS

The relationship between constructs was tested using two-step SEM, and a framework was developed. Confirmatory Factor Analysis (CFA) was used to validate the relationship between the measurement items using AMOS, and a structured model was used to study the relationship between the constructs.

Confirmatory factor analysis was conducted, which confirms the validity and reliability of the measurement model. The first step is to check the goodness of fit (GOF). The GOF indices used parsimonious fit indices, incremental fit indices, and absolute fit indices to prove the fitness of constructs in the final framework. Table 13 shows a summary of the results derived from the initial CFA.

Note: $\chi 2$ = Chi-square; df = degree of freedom; GFI = Goodness of fit index; RMSEA = Root mean square error of approximation; NFI = Normated fit index; CFI = Comparative fit index; AGFI – Adjusted goodness of fit index

Note: Based in Mean – BIM; Based on Median – BoM; Based on Median and with adjusted df – BoM(df); Based on trimmed mean – BTM

Table 13 - Goodness of fit statistics for the Initial CFA

			Parsimony Fit Indices	Incremental Fit Indices		Absolute Fit Indices		
	χ2	Df	AGFI	NFI	CFI	χ2/df	GFI	F
Criteria			≥0.90	≥0.90	≥0.90	1< X2/df<3	≥0.90	<0.05
Obtained	939.31	462	0.899	0.94	0.948	2.272	0.9	0.051

Chi-square statistics indicates that data to the model was not significant and therefore model to be rejected, and it is, therefore, important to switch the analysis to other fit indices like **NFI** = Normated fit index **; CFI** = Comparative fit index; **RMSEA** = Root mean square error of approximation**, GFI** = Goodness of fit index; **AGFI** – Adjusted goodness of fit index**.** The Chi-square test is mainly dependent on sample size, and it applies to data that doesn't follow the normality.

Results from Table 11 and Table 13 depict that the numbers are not in sync with each other, and therefore the model needs to be refined.

The cutoff value for squared multiple correlations and factor loading is 0.5 and 0.7, respectively (Byrne, 2001). The standard residual value shall lie between -2.58 to 2.58 (Hair et al. 2006). (Hair et al., 2006) opined that limit of modification indices which represents high value of covariance and regression weight also needs to be checked. When the results from data are tested and validated against the output of the CFA applied to the older model. It was observed that factor loading was passed for all the measurement items but "Flexible," "Comfort learning from peers," "Continuity" and "Influence of Media" got high degree of residual variance and therefore they were dropped from the list. Once these items were removed from the list, according to (Hair et al., 2006; Kline, 2005) CFA was re-run.

Table 14 clearly shows the goodness of fit indices, concerning every criterion, improved from the revised model

Table 14 – Goodness of Fit Statistics of revised CFA Model

			Parsimony Fit Indices	Incremental Fit Indices		Absolute Fit Indices		
	χ2	Df	AGFI	NFI	CFI	χ2/df	GFI	F
Criteria			≥0.90	≥0.90	≥0.90	1< X2/df<3	≥0.90	<0.05
Obtained	821.15	546	0.925	0.923	0.987	1.834	0.91	0.015

Once the goodness of fit indices was done, the discriminant, nomological and convergent validity was done to make sure, new constructs are valid to be used to form a model.

Table 15 shows the results of convergent validity, which points out that the revised CFA model clears of the minimum cut off, and it is better than the previous one.

Table 15 – Convergent Validity

Construct	Item	Average Variance Extracted	Critical Ratio (T-value)	Standardized Factor Loading
PU	Easier Transaction	0.772	21.423	0.875
	Improved Effectiveness		22.463	0.869
	Improved Productivity		…….	0.845
	Saves time		22.391	0.813
	Quick Transaction		21.946	0.869
PEoU	Skill Improvement	0.763	25.712	0.863
	Clear		24.839	0.801
	Easy to Learn		23.145	0.823
	Accessibility		21.429	0.893
	Overall Rating		_____	0.914
SN	Teaching others	0.726	19.518	0.821
	Influence of friends		20.732	0.862
	Societal Influence		_____	0.812
	Influence of family		21.312	0.845
	Sharing Experience		20.874	0.832
	Peer Influence		20.563	0.841
	Overall Rating		20.295	0.892
TSE	Comfort learning on my own	0.665	17.873	0.792
	Comfort with reference manual		19.151	0.854
	Comfort in using first time		18.238	0.813
	Overall Comfort in Usage		_____	0.819
AC	Ease and variety of access	0.751	_____	0.894
	Unrestricted access		10.263	0.832
Trust	Security of Money		9.652	0.883
	Fraud Free	0.789	_____	0.873
GS	Technology Promotion	0.878	13.547	0.903
	Government Facilitation		____	0.893
TSE	Network Availability	0.901	13.672	0.911
	Customer Care		_____	0.934
BI	Recommendation to Peers	0.725	24.873	0.873
	Often and Diverge Usage		_____*	0.893
	Future Usage		23.174	0.899
	Consistency		23.834	0.903

*Regression Weight 1

Tables 16 and 17 shows strong and significant discriminant validity for the constructs

Table 16 – Inter Construct Correlations

	PU	PEoU	SN	TSE	AC	TR	GS	TS	BI
PU	1								0.63
PEoU	0.34	1							0.42
SN	0.58	0.342	1	0.28	0.32	0.24	0.29	0.36	0.56
TSE	0.44	0.431		1					0.51
AC	0.3	0.314		0.21	1			0.06	0.25
TR	0.28	0.298		0.35	0.21	1		0.11	0.29
GS	0.3	0.351		0.29	0.16	0.07	1	0.41	0.4
TS	0.57	0.325		0.39				1	0.37
BI									1

Table 17 – Discriminant Validity

	PU	PEoU	SN	TSE	AC	TR	GS	TS	BI
PU	**0.72**								0.38
PEoU	0.11	**0.788**							0.23
SN	0.34	0.135	**0.74**	0.11	0.14	0.07	0.05	0.11	0.31
TSE	0.2	0.183		**0.67**					0.24
AC	0.08	0.121		0.06	**0.79**			0.01	0.06
TR	0.06	0.099		0.15	0.08	**0.75**	0.05		0.07
GS	0.08	0.142		0.1	0.03	0.01	**0.83**	0.2	0.16
TS	0.35	0.101		0.18				**0.9**	0.13
BI									**0.76**

Note: Diagonal values are AVE, and off-diagonal are inter-construct squared correlations

In the end, a Nomological validity test will be done where the correlation between the measurement model constructs will be checked. Table 18 and Table 19 shows the results of nomological validity which depicts that there is some positive relationship between government support and technical support, but the level of significance is very low similarly trust, and government support shows low level of significance. Apart from these two other values are consistent and supported nomological validity.

Table 18 - AMOS output - Covariances: (Group number 1 - Default model)

P	C.R	S.E	Estimate	Relationship between variables
***	6.459	0.183	1.214	TS<-->TSE
***	3.625	0.156	0.527	AC<-->TSE
0.209	1.325	0.19	0.242	AC<-->TS
***	5.125	0.152	0.883	TR<-->TSE
0.002	3.042	0.145	0.515	TR<-->TS
***	3.127	0.162	0.562	TR<-->AC
***	4.623	0.131	0.762	GS<-->TSE
***	6.568	0.213	1.114	GS<-->TS
0.003	3.124	0.182	0.624	GS<-->AC
0.132	1.423	0.145	0.324	GS<-->TR
***	7.678	0.165	1.423	SN<-->TSE
***	6.125	0.156	1.132	SN<-->TS
***	5.568	0.176	0.924	SN<-->AC
***	4.021	0.141	0.634	SN<-->TR
***	5.234	0.189	0.883	SN<-->GS
***	6.872	0.147	1.104	TSE<-->PEoU
***	5.512	0.115	1.103	TS<-->PEoU
***	5.262	0.193	0.982	AC<-->PEoU
***	5.021	0.179	0.621	TR<-->PEoU
***	5.81	0.193	1.121	GS<-->PEoU
***	6.1	0.152	0.912	SN<-->PEoU
***	6.235	0.174	0.923	PU<-->PEoU
***	7.138	0.152	1.132	TSE<-->PU
***	5.672	0.181	1.103	TS<-->PU
***	4.873	0.172	0.817	AC<-->PU
***	4.662	0.159	0.752	TR<-->PU
***	5.114	0.189	0.867	GS<-->PU
***	8.521	0.166	1.423	SN<-->PU
***	9.024	0.188	1.723	BI<-->PU
***	7.79	0.179	1.334	BI<-->PEoU
***	7.613	0.15	1.253	BI<-->TSE
***	6.124	0.171	1.111	BI<-->TS
***	4.146	0.174	0.752	BI<-->AC
***	4.538	0.182	0.762	BI<-->TR
***	6.341	0.192	1.102	BI<-->GS
***	7.345	0.162	1.312	BI<-->SN

Table 19 - AMOS output - Construct Correlations: (Group number 1 – Default model)

Estimate	Relationship between variables
0.415	TS<-->TSE
0.236	AC<-->TSE
0.15	AC<-->TS
0.352	TR<-->TSE
0.193	TR<-->TS
0.238	TR<-->AC
0.323	GS<-->TSE
0.434	GS<-->TS
0.203	GS<-->AC
0.123	GS<-->TR
0.545	SN<-->TSE
0.312	SN<-->TS
0.234	SN<-->AC
0.303	SN<-->TR
0.316	SN<-->GS
0.453	TSE<-->PEoU
0.342	TS<-->PEoU
0.343	AC<-->PEoU
0.312	TR<-->PEoU
0.373	GS<-->PEoU
0.364	SN<-->PEoU
0.323	PU<-->PEoU
0.473	TSE<-->PU
0.364	TS<-->PU
0.317	AC<-->PU
0.304	TR<-->PU
0.329	GS<-->PU
0.621	SN<-->PU
0.62	BI<-->PU
0.504	BI<-->PEoU
0.524	BI<-->TSE
0.403	BI<-->TS
0.273	BI<-->AC
0.302	BI<-->TR
0.423	BI<-->GS
0.534	BI<-->SN

The constructs derived from the literature were divided into exogenous constructs and endogenous constructs. Exogenous constructs are government support, technology self-efficacy, technical support, subjective norm, trust, and accessibility. Whereas, perceived usefulness, perceived ease of use, and behavioral constructs are classified as endogenous variables.

Table 20 –Structural model fit measurement assessment

			Parsimony Fit Indices	Incremental Fit Indices		Absolute Fit Indices		
	χ2	Df	AGFI	NFI	CFI	χ2/df	GFI	F
Criteria			?0.90	?0.90	?0.90	1< X2/df<3	?0.90	<0.05
Obtained	868.9	534	0.901	0.913	0.959	1.795	0.91	0.048

Note: χ**2** = Chi-square; **df** = degree of freedom; **GFI** = Goodness of fit index; **RMSEA** = Root mean square error of approximation; **NFI** = Normated fit index; **CFI** = Comparative fit index; **AGFI** – Adjusted goodness of fit index

Table 20 clearly shows that parameters of the hypothesized structural model are closed to the goodness of fit.

It has been seen earlier; four items dropped, and 33 items were used to construct the model again. Similarly, it is again important to undertake the test, and the covariance matrix was build using these coefficient parameter estimates. The cutoff limit for the consideration was a critical ratio higher than 1.96 with confidence level of 95%.

Table 21 - Regression estimates of latent constructs

Significance (P)	C.R	S.E	Estimate	Relationships
***	6.425	0.072	0.413	PEoU <-- TSE
***	4.152	0.063	0.213	PEoU <-- AC
0.005	2.834	0.054	0.178	PEoU <-- TR
***	7.314	0.063	0.486	PU <-- SN
0.1	1.662	0.052	0.112	PU <-- PEoU
0.002	3.124	0.058	0.193	PU <--TSE
0.242	1.142	0.054	0.052	PU <--GS
0.146	1.502	0.053	0.082	PU <--TS
***	4.963	0.037	0.302	BI <-- SN
***	7.397	0.042	0.397	BI <--PU
***	6.113	0.041	0.283	BI <-- PEoU

Note: CR – Critical Ratio; SE - Standard Error

Table 21 clearly shows that 9 out of 12 paths drawn between the variables show a critical ratio higher than 1.96, with a confidence level of 95%. The path significance indicates the perfect relationship between two variables and therefore included in final model.

The hypothesized paths between the perceived usefulness and perceived ease of use; perceived usefulness and government support; perceived usefulness and technical support indicated that their t-values did not exceed the cut-off point required for statistical significance. Thus, these paths were not statistically significant. Table 22 shows the hypotheses testing by taking standard regression weights (β).

Table 22 – Hypotheses Testing

S.No	β	Supported	Relationship (Positive)
1.	0.672	Yes	BI → AU (Hypothesis)
2.	0.087	No	TS →PU
3.	0.077	No	GS →PU
4.	0.139	Yes	TR→PEoU
5.	0.373	Yes	TSE→PEoU
6.	0.194	Yes	TSE→PU
7.	0.279	Yes	SN→PEoU
8.	0.453	Yes	SN→PU
9.	0.288	Yes	PEoU→BI(Sub Hypothesis)
10.	0.397	Yes	PU→BI(Sub-Hypothesis)

Three non-significant paths were removed, based on the above hypotheses testing. The structural model was re-specified and resulted shown in table 23 and 24:

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Table 23 Regression estimates of revised constructs after dropping insignificant paths

S.No	β	CR	Supported	Relationship (Positive)
1.	0.24	4.128	Yes***	BI → AU
2.	0.139	2.851	Yes**	TR→PEoU
3.	0.373	6.429	Yes***	TSE → PEoU
4.	0.214	3.461	Yes***	TSE →PU
5.	0.279	4.911	Yes***	SN →PEoU
6.	0.473	7.846	Yes***	SN →PU
7.	0.285	6.082	Yes***	PEoU→BI
8.	0.399	7.291	Yes***	PU →BI

Table 24 Goodness of fit indices revised structural model

			Parsimony Fit Indices	Incremental Fit Indices		Absolute Fit Indices		
	χ2	Df	AGFI	NFI	CFI	χ^2/df	GFI	RMSEA
Criteria			?0.90	?0.90	?0.90	1< χ^2/df<3	?0.90	<0.05
Obtained	578.27	368	0.933	0.935	0.975	1.571	0.94	0.039

The new model was formed based on the above test results, and the same is shown below:

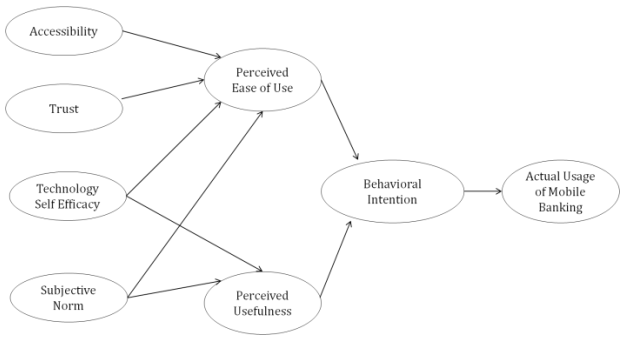

Figure 3 – Framework for mobile banking adoption to enhance financial inclusion in hilly areas of Champawat District

VII. DISCUSSION ON RESULTS AND CONCLUSION

The framework developed by testing the hypothesised relationships between the variables indicates that behaviour intention incorporates a important and positive result on the usage of mobile banking for enhancing financial inclusion in Champawat, Uttrakhand udner MGNREGA. The framework additionally symbolises that perceived ease of use and perceived usefulness even have a positive impact on behaviour intention. Each of the key variables that are evidenced by earlier studies even have continuing to be associate degree integral section of the current analysis still. The results additionally mirror that users perception towards a technology primarily is answerable for their behaviour. Trust and Technology-self-efficacy additionally were integral elements in developing the perceptions of the respondents. Thus, it's essential to grasp that in future, the speed of diffusion is ordered on the pillars on trust, that are a slow method and language self-efficacy, which might build the users independent. The framework additionally indicates that accessibility to mobile banking also contend a necessary role in enhancing perception ease of use. The provision of mobile banking with all and sundry registered in MGNREGA and straightforward access to cash through business correspondent within the village makes a win-win state of affairs for the users. Technology self-efficacy additionally contend a significant role in creating developing the perception because it results in the event of confidence throughout the usage of mobile banking. The constant usage of mobile banking by the stakeholders helped the end-users to grasp the practicality and therefore the method of depositing and retreating cash from the system. Therefore, the framework offers a sturdy mechanism in addressing the problem of economic inclusion through technology diffusion in MGNREGA.

Future research can work on the critically of the constructs and therefore addressing the most critical constructs will help in forming effective strategy or policy to enhance mobile banking adoption in hilly areas and increasing financial inclusion.

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