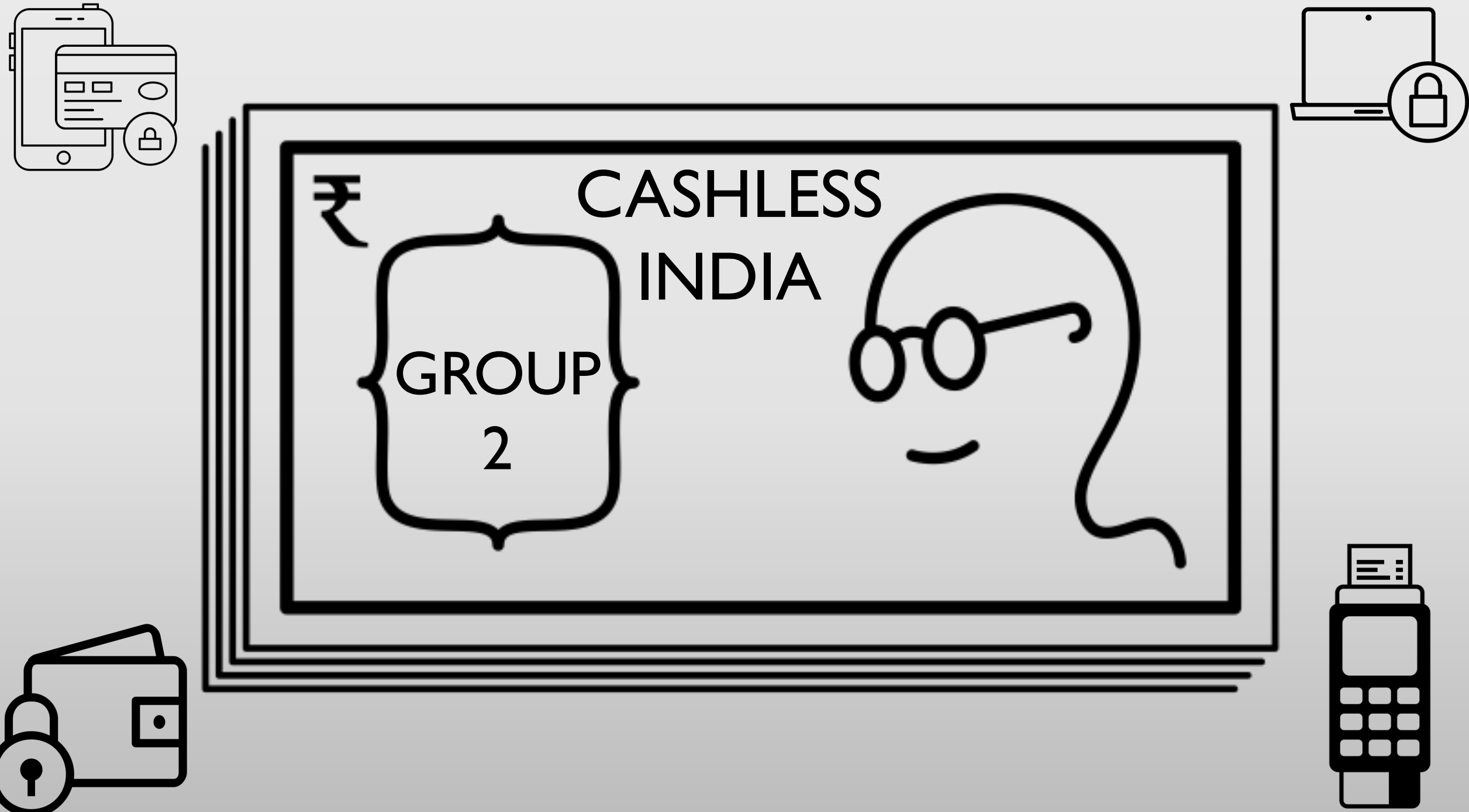
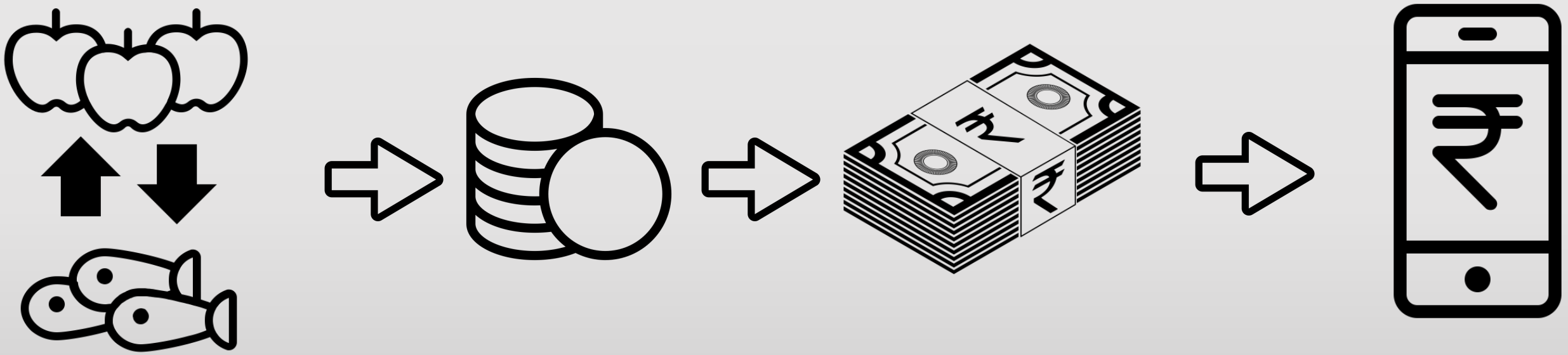

₹
CASHLESS
INDIA
GROUP
2

INTRODUCTION



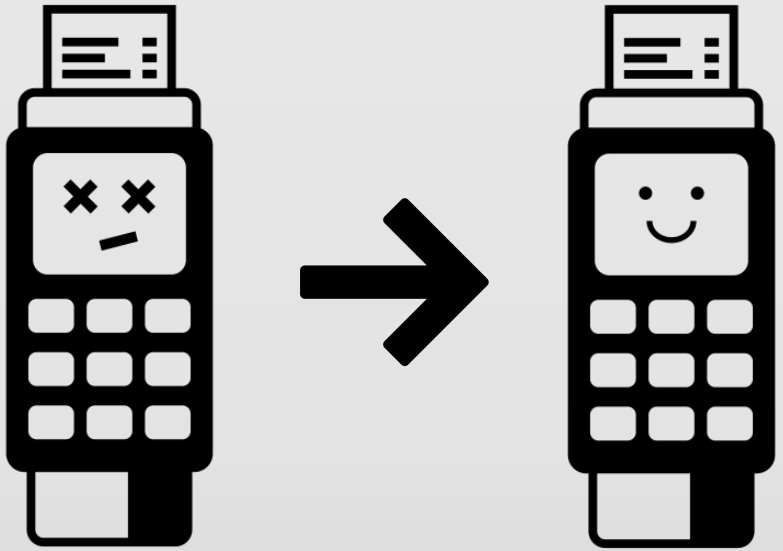
BARTER SYSTEM

COIN SYSTEM

PAPER BILLS SYSTEM

CASHLESS SYSTEM

OBJECTIVES



SOCIO-DEMOGRAPHIC FACTORS

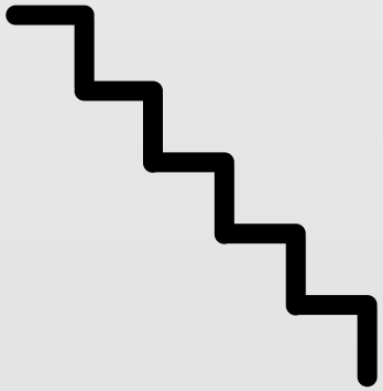
QUALITATIVE FACTORS

DAILY TRANSACTIONS

MOST PREFERRED WALLET

CASHLESS CONCERNS

RESEARCH DESIGN – PART I



RESEARCH METHODOLOGY

DEFINE OBJECTIVES

QUESTIONNAIRE DESIGN

PILOT SURVEY

FINAL QUESTIONNAIRE

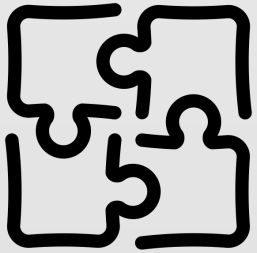
DATA COLLECTION

DATA ANALYSIS

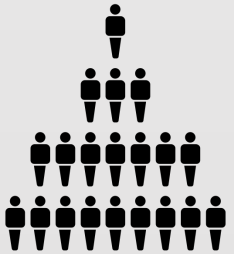
CONCLUSIONS

RESEARCH DESIGN – PART II

RESEARCH APPROACH



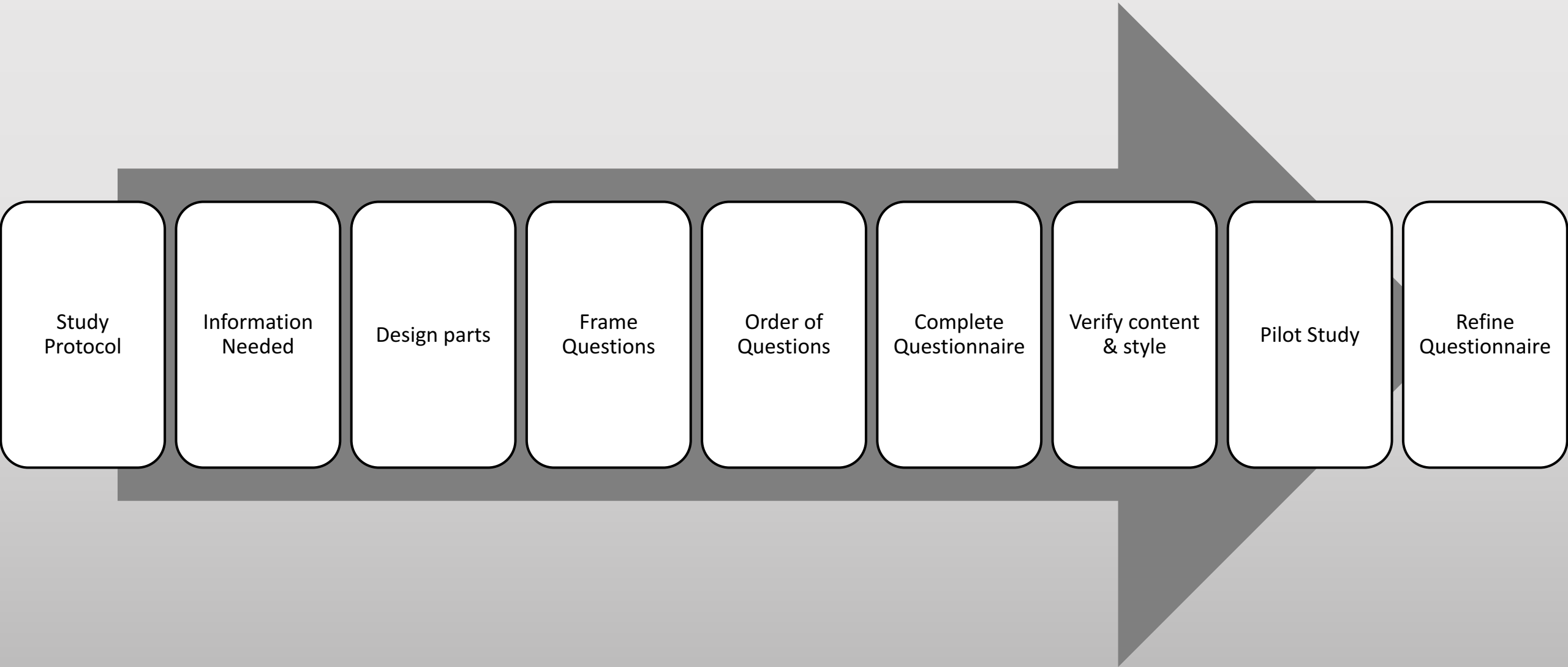
RESEARCH DESIGN



TARGET POPULATION & SIZE

STATISICAL SOFTWARE

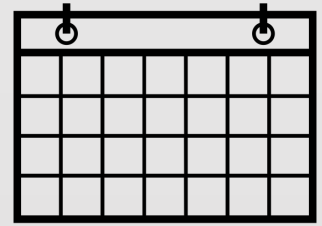
QUESTIONNAIRE DESIGN



DATA COLLECTION

PILOT
SURVEY

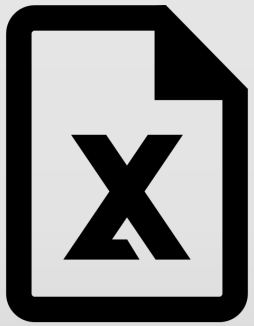
LIVE
SURVEY



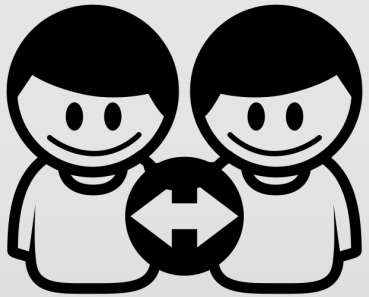
ONE
MONTH

1,150 RESPONSES

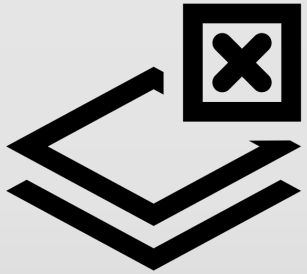
DATA CLEANING



EXPORT
EXCEL FILE

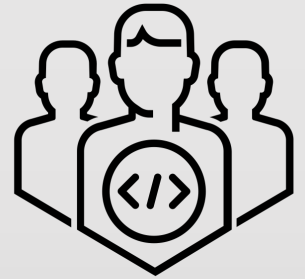


DUPLICATE
RESPONSES



UNNECESSARY
RESPONSES

SPEEDERS
&
LAGGARDS



CODING
RESPONSES

OBJECTIVE 1

To identify and analyze the socio-demographic factors that affect the people’s decision on whether to go cashless

BINARY LOGISTIC REGRESSION

$$\log\left(\frac{p}{p-1}\right) = g(x) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \sum_{j=1}^{5} \beta_{3j} X_{3j} + \sum_{j=1}^{7} \beta_{4j} X_{4j} + \sum_{j=1}^{7} \beta_{5j} X_{5j} + \sum_{j=1}^{3} \beta_{6j} X_{6j} + \sum_{j=1}^{5} \beta_{7j} X_{7j}$$

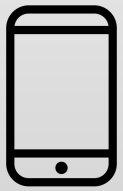
$$+ \sum_{j=1}^{3} \beta_{8j} X_{8j} + \beta_9 X_9 + \beta_{10} X_{10} + \beta_{11} X_{11} + \beta_{12} X_{12} + \beta_{13} X_{13} + \beta_{14} X_{14} + \beta_{15} X_{15} + \beta_{16} X_{16}$$

VARIABLES

CATEGORICAL

BINARY

GENDER



PHONE

TYPE OF BANK

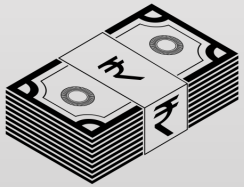
EDUCATION

OCCUPATION

MARITAL STATUS

RELIGION

TYPE OF FAMILY



INCOME

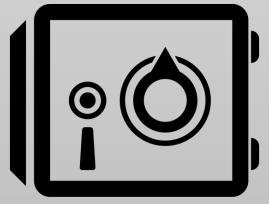
TYPE OF HOUSE

CONTINUOUS

AGE

DEPENDENTS

FAMILY MEMBERS



NO. OF ACCOUNTS

SUMMARY OF OUTPUT

Response Profile		
Ordered Value	**Cashless**	**Total Frequency**
1	1	912
2	0	202

Model Information		
Data Set	WORK.CASHLOGIT	
Response Variable	Cashless	Cashless
Number of Response Levels	2	
Model	binary logit	
Optimization Technique	Fisher's scoring	

Number of Observations Read	1114
Number of Observations Used	1114

STEPWISE SELECTION

Summary of Stepwise Selection							
	Effect						
Step	Entered	Removed	DF	Number In	Score Chi-Square	Wald Chi-Square	Pr > ChiSq
1	House		3	1	38.2205		<.0001
2	No_Accounts		1	2	24.7078		<.0001
3	Age		1	3	11.9170		0.0006
4	Occupation		7	4	29.2177		0.0001
5	Gender		1	5	20.0351		<.0001
6	Private		1	6	12.9773		0.0003
7	Phone		1	7	14.0380		0.0002
8	Income		5	8	19.7080		0.0014
9	Public		1	9	4.8561		0.0275

SIGNIFICANT VARIABLES

RELIGION

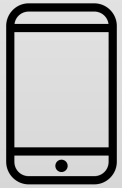
AGE

GENDER

EDUCATION

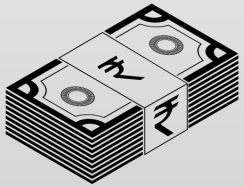
TYPE OF FAMILY

DEPENDENTS



PHONE

OCCUPATION



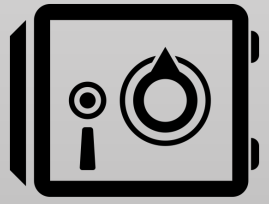
INCOME

FAMILY MEMBERS

TYPE OF BANK

MARITAL STATUS

TYPE OF HOUSE



NO. OF ACCOUNTS

GLOBAL TESTING

H_0 = The Design variables entered into the model by stepwise procedure are insignificant

$$\beta_0 = \beta_1 = \beta_2 = \ldots = \beta_k = 0$$

V/s

H_1 = The Design variables entered into the model by stepwise procedure are significant OR At least one coefficient is not zero.

Testing Global Null Hypothesis: BETA=0			
Test	**Chi-Square**	**DF**	**Pr > ChiSq**
Likelihood Ratio	176.3446	21	<.0001
Score	160.8875	21	<.0001
Wald	127.7253	21	<.0001

ANALYSIS OF EFFECTS

H_0 = Individual independent variable is insignificant

H_1 = Individual independent variable is significant

Type 3 Analysis of Effects			
Effect	**DF**	**Wald Chi-Square**	**Pr > ChiSq**
Age	1	28.9109	<.0001
Gender	1	19.6550	<.0001
Occupation	7	28.4680	0.0002
House	3	13.9932	0.0029
Income	5	20.2287	0.0011
Phone	1	13.1420	0.0003
Public	1	4.8237	0.0281
Private	1	18.8495	<.0001
No_Accounts	1	11.3951	0.0007

INDIVIDUAL TESTING

Analysis of Maximum Likelihood Estimates						
Parameter		**DF**	**Estimate**	**Standard Error**	**Wald Chi-Square**	**Pr > ChiSq**
Intercept		1	1.2976	1.3944	0.8660	0.3521
Age		1	-0.0545	0.0101	28.9109	<.0001
Gender	1	1	0.8331	0.1879	19.6550	<.0001
Occupation	1	1	-3.4134	1.1832	8.3220	0.0039
Occupation	2	1	-2.9177	1.2454	5.4884	0.0191
Occupation	3	1	-4.1107	1.2085	11.5707	0.0007
Occupation	4	1	-3.8645	1.1909	10.5300	0.0012
Occupation	5	1	-3.3596	1.2561	7.1531	0.0075
Occupation	6	1	10.5377	506.0	0.0004	0.9834
Occupation	7	1	-0.6233	1.5322	0.1655	0.6842
House	1	1	1.8721	0.7022	7.1067	0.0077
House	2	1	1.6169	0.7438	4.7260	0.0297
House	3	1	1.2079	0.7204	2.8111	0.0936
Income	1	1	-0.3165	0.4096	0.5974	0.4396
Income	2	1	-0.4730	0.3529	1.7963	0.1802
Income	3	1	-0.3533	0.3059	1.3336	0.2482
Income	4	1	0.0882	0.2995	0.0868	0.7682
Income	5	1	0.8592	0.3371	6.4956	0.0108
Phone	1	1	1.9463	0.5369	13.1420	0.0003
Public	1	1	0.4701	0.2140	4.8237	0.0281
Private	1	1	0.9705	0.2235	18.8495	<.0001
No_Accounts		1	0.3420	0.1013	11.3951	0.0007

FITTED MODEL

$$\log\left(\frac{p}{p-1}\right) = g(x) = 1.2976 - 0.0545(X_{11}) + 0.8331(X_{21}) - 3.4134(X_{41})$$
$$-2.9177(X_{42}) - 4.1107(X_{43}) - 3.8645(X_{44}) - 3.3596(X_{45}) + 1.8721(X_{61})$$
$$+ 1.6169(X_{62}) + 0.8592(X_{75}) + 1.9463(X_{101}) + 0.4701(X_{111}) + 0.9705(X_{121})$$
$$+ 0.3420(X_{161})$$

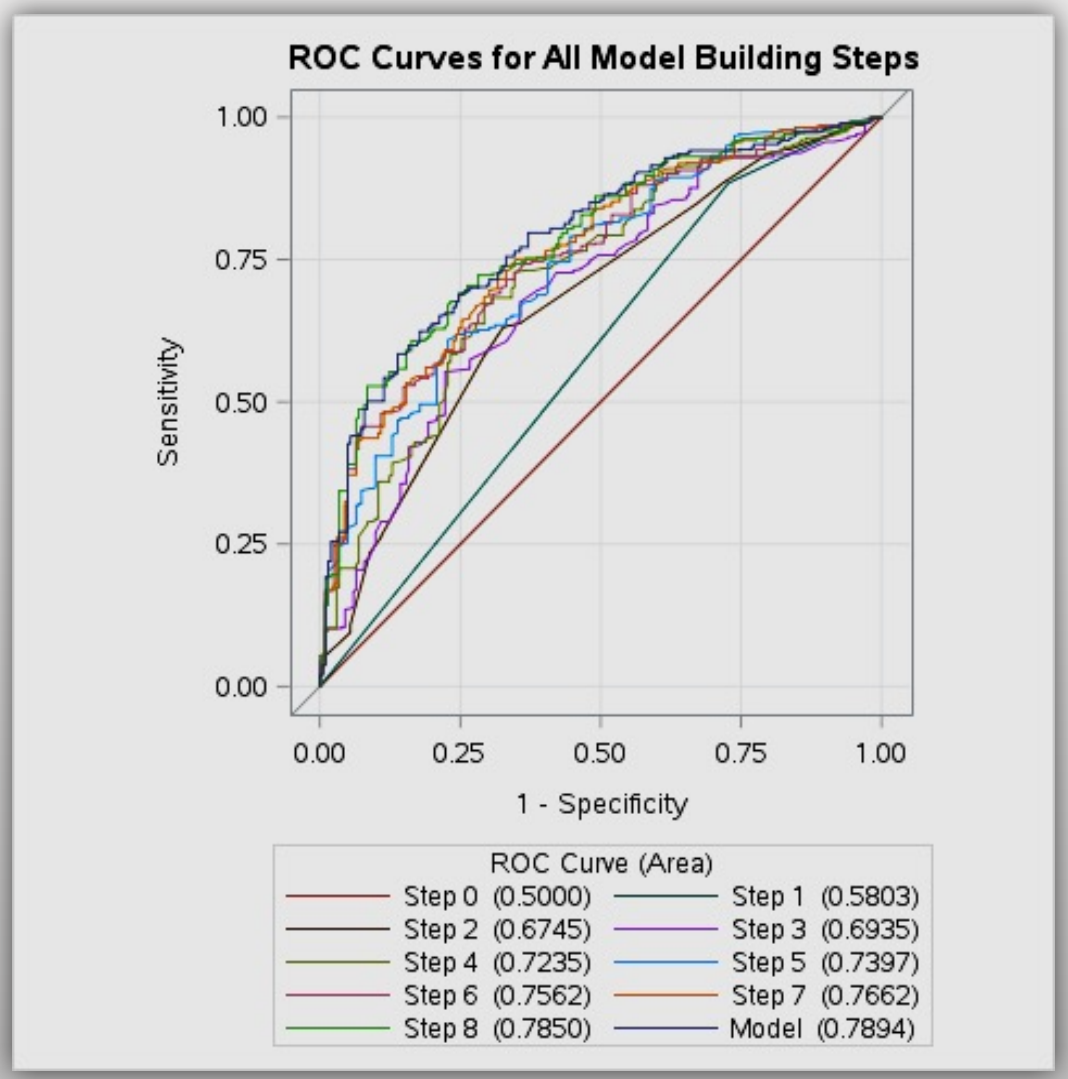
ODDS RATIO

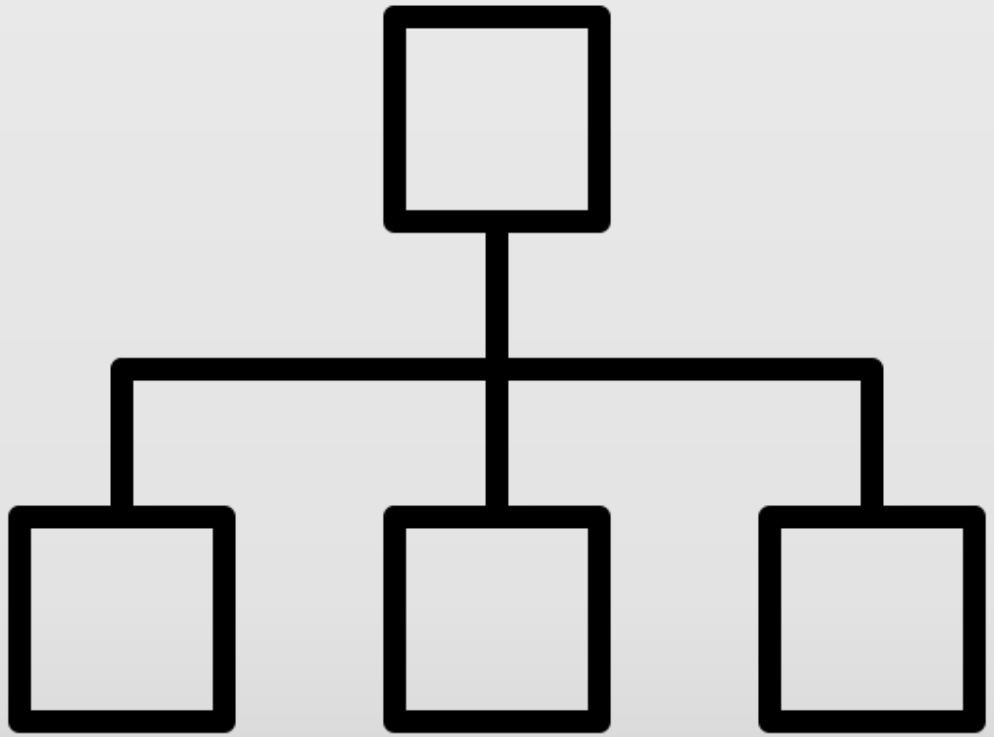
Odds Ratio Estimates			
Effect	**Point Estimate**	**95% Wald Confidence Limits**	
Age	0.947	0.928	0.966
Gender 1 vs 2	2.300	1.592	3.325
Occupation 1 vs 8	0.033	0.003	0.335
Occupation 2 vs 8	0.054	0.005	0.621
Occupation 3 vs 8	0.016	0.002	0.175
Occupation 4 vs 8	0.021	0.002	0.216
Occupation 5 vs 8	0.035	0.003	0.408
Occupation 6 vs 8	>999.999	<0.001	>999.999
Occupation 7 vs 8	0.536	0.027	10.803
House 1 vs 4	6.502	1.642	25.750
House 2 vs 4	5.037	1.173	21.642
House 3 vs 4	3.346	0.815	13.734
Income 1 vs 6	0.729	0.327	1.626
Income 2 vs 6	0.623	0.312	1.244
Income 3 vs 6	0.702	0.386	1.279
Income 4 vs 6	1.092	0.607	1.964
Income 5 vs 6	2.361	1.220	4.572
Phone 1 vs 2	7.002	2.445	20.056
Public 1 vs 2	1.600	1.052	2.434
Private 1 vs 2	2.639	1.703	4.090
No_Accounts	1.408	1.154	1.717

CLASSIFICATION & ROC CURVE

Classification Table									
	Correct		Incorrect		Percentages				
Prob Level	Event	Non-Event	Event	Non-Event	Correct	Sensi-tivity	Speci-ficity	False POS	False NEG
0.500	887	24	178	25	81.8	97.3	11.9	16.7	51.0

Association of Predicted Probabilities and Observed Responses			
Percent Concordant	78.9	Somers' D	0.579
Percent Discordant	21.1	Gamma	0.579
Percent Tied	0.0	Tau-a	0.172
Pairs	184224	c	0.789





OBJECTIVE 2

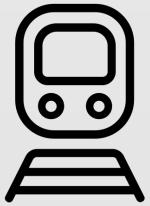
To identify and analyze other latent (qualitative) factors that influence the people’s preference to choose cash over cashless

FACTOR ANALYSIS

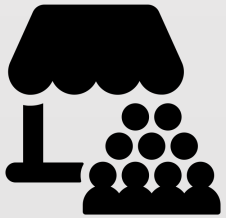
RESTAURANT

TRADES WORK AT HOME

PAYING A FRIEND



PUBLIC TRANSPORT



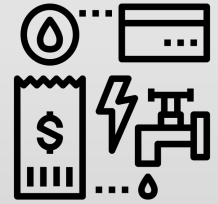
GOODS IN MARKET

BAR/ COFFEE SHOP

TICKETS FOR EVENTS

TAXI/ CAB

GOODS ON PHONE



UTILITY BILLS

GOODS IN RETAIL SHOP

DONATION TO CHARITY

MOTOR FUEL

GOODS ON WEB

GOVT. SERVICES

CORRELATION MATRIX

Correlations															
	F1	**F2**	**F3**	**F4**	**F5**	**F6**	**F7**	**F8**	**F9**	**F10**	**F11**	**F12**	**F13**	**F14**	**F15**
F1	1.00000	0.63673	0.40080	0.38916	0.52187	0.28404	0.27124	0.39868	0.47833	0.25512	0.31477	0.29865	0.33842	0.22162	0.39178
F2	0.63673	1.00000	0.37863	0.37271	0.40134	0.36949	0.34979	0.34255	0.41895	0.27452	0.30129	0.36278	0.36679	0.30288	0.36675
F3	0.40080	0.37863	1.00000	0.55862	0.43285	0.43295	0.43807	0.43275	0.39718	0.48567	0.34177	0.32965	0.61363	0.38966	0.48277
F4	0.38916	0.37271	0.55862	1.00000	0.40743	0.43587	0.43505	0.43863	0.42374	0.51980	0.42372	0.24403	0.49711	0.29338	0.41198
F5	0.52187	0.40134	0.43285	0.40743	1.00000	0.31249	0.34513	0.43913	0.43477	0.29717	0.34311	0.39954	0.30683	0.32998	0.37544
F6	0.28404	0.36949	0.43295	0.43587	0.31249	1.00000	0.49084	0.40345	0.38301	0.48891	0.43353	0.33772	0.34600	0.37948	0.37387
F7	0.27124	0.34979	0.43807	0.43505	0.34513	0.49084	1.00000	0.53199	0.40960	0.53763	0.47728	0.36525	0.50045	0.36581	0.37912
F8	0.39868	0.34255	0.43275	0.43863	0.43913	0.40345	0.53199	1.00000	0.48009	0.53379	0.47256	0.45672	0.47408	0.33389	0.47807
F9	0.47833	0.41895	0.39718	0.42374	0.43477	0.38301	0.40960	0.48009	1.00000	0.43125	0.45464	0.38216	0.46694	0.37803	0.48767
F10	0.25512	0.27452	0.48567	0.51980	0.29717	0.48891	0.53763	0.53379	0.43125	1.00000	0.48647	0.24441	0.55775	0.32546	0.40890
F11	0.31477	0.30129	0.34177	0.42372	0.34311	0.43353	0.47728	0.47256	0.45464	0.48647	1.00000	0.52558	0.45094	0.34737	0.38004
F12	0.29865	0.36278	0.32965	0.24403	0.39954	0.33772	0.36525	0.45672	0.38216	0.24441	0.52558	1.00000	0.37764	0.41543	0.37150
F13	0.33842	0.36679	0.61363	0.49711	0.30683	0.34600	0.50045	0.47408	0.46694	0.55775	0.45094	0.37764	1.00000	0.43685	0.45275
F14	0.22162	0.30288	0.38966	0.29338	0.32998	0.37948	0.36581	0.33389	0.37803	0.32546	0.34737	0.41543	0.43685	1.00000	0.45883
F15	0.39178	0.36675	0.48277	0.41198	0.37544	0.37387	0.37912	0.47807	0.48767	0.40890	0.38004	0.37150	0.45275	0.45883	1.00000

KMO & BARTLETT’s TEST

H_0 = Population correlation matrix is an identity matrix

H_1 = Population correlation matrix is not an identity matrix

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.914
Bartlett's Test of Sphericity	**Approx. Chi-Square**	6109.306
	Df	105
	Sig.	.000

COMMUNALITIES

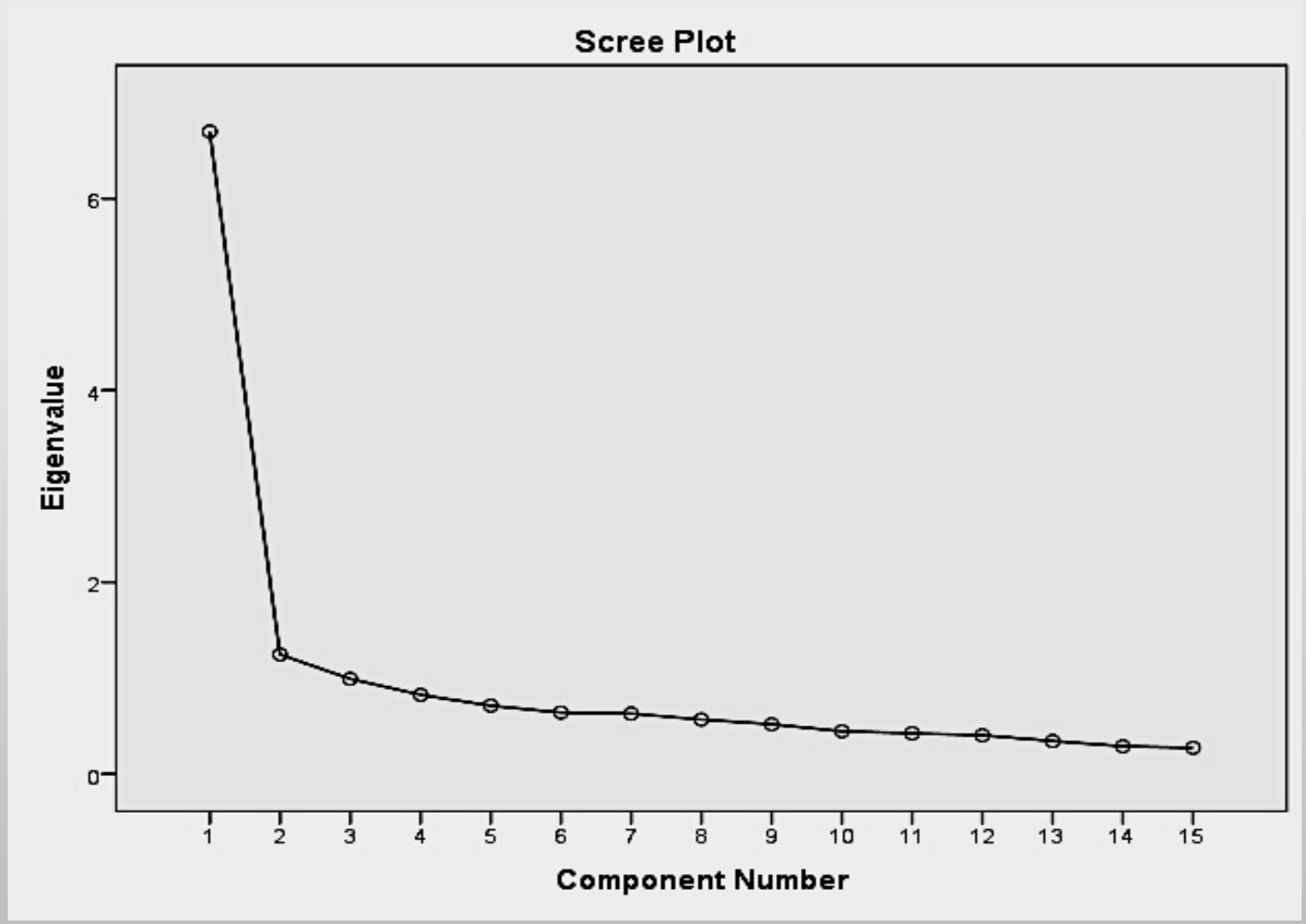
Communalities		
	Initial	Extraction
Food_restaurant	1.000	.800
Drinks	1.000	.645
Physicalgoods_store	1.000	.611
Tradesworkathome	1.000	.648
Tickets_events	1.000	.550
Donation	1.000	.456
Paying_friend	1.000	.569
Taxi	1.000	.542
Motorfuel	1.000	.520
Publictransport	1.000	.710
Goods_phone	1.000	.584
Goods_web	1.000	.755
Goods_market	1.000	.594
Utility_bills	1.000	.482
Govt_services	1.000	.470
Extraction Method: Principal Component Analysis.		

TOTAL VARIANCE EXPLAINED

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	6.698	44.655	44.655	6.698	44.655	44.655	3.706	24.710	24.710
2	1.245	8.303	52.958	1.245	8.303	52.958	2.656	17.709	42.418
3	.992	6.612	59.570	.992	6.612	59.570	2.573	17.152	59.570
4	.825	5.499	65.069						
5	.712	4.747	69.816						
6	.639	4.263	74.079						
7	.629	4.196	78.275						
8	.567	3.779	82.054						
9	.517	3.449	85.503						
10	.444	2.961	88.464						
11	.423	2.823	91.287						
12	.403	2.688	93.975						
13	.343	2.288	96.263						
14	.289	1.924	98.187						
15	.272	1.813	100.000						

Extraction Method: Principal Component Analysis.

SCREE PLOT


Scree Plot
Eigenvalue
0
2
4
6
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
Component Number

COMPONENT MATRIX

	Component		
	1	2	3
Food_restaurant	.612	.625	
Drinks	.615	.508	
Physicalgoods_store	.717		
Tradesworkathome	.690		
Tickets_events	.628		
Donation	.645		
Paying_friend	.694		
Taxi	.727		
Motorfuel	.704		
Publictransport	.693		
Goods_phone	.676		
Goods_web	.602		.619
Goods_market	.726		
Utility_bills	.589		
Govt_services	.683		
Extraction Method: Principal Component Analysis. Only three components extracted.			

ROTATED COMPONENT MATRIX

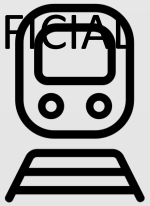
	Component		
	1	2	3
Food_restaurant		.873	
Drinks		.758	
Physicalgoods_store	.674		
Tradesworkathome	.719		
Tickets_events		.643	
Donation	.551		
Paying_friend	.626		
Taxi	.499		.459
Motorfuel		.474	
Publictransport	.814		
Goods_phone			.635
Goods_web			.828
Goods_market	.680		
Utility_bills			.620
Govt_services			
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.			
a. Rotation converged in 6 iterations.			

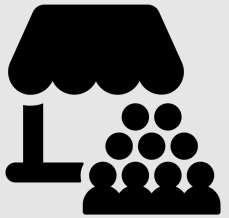
COMPONENT TRANSFORMATION MATRIX

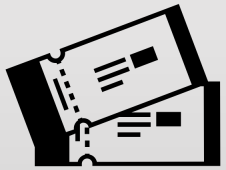
Component	1	2	3
1	.680	.511	.526
2	-.542	.834	-.109
3	-.494	-.211	.844
Extraction Method: Principal Component Analysis. **Rotation Method: Varimax with Kaiser Normalization.**			

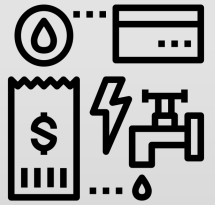
PRINCIPAL COMPONENTS

OFFICIAL PURPOSES



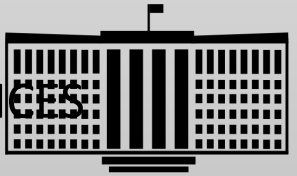


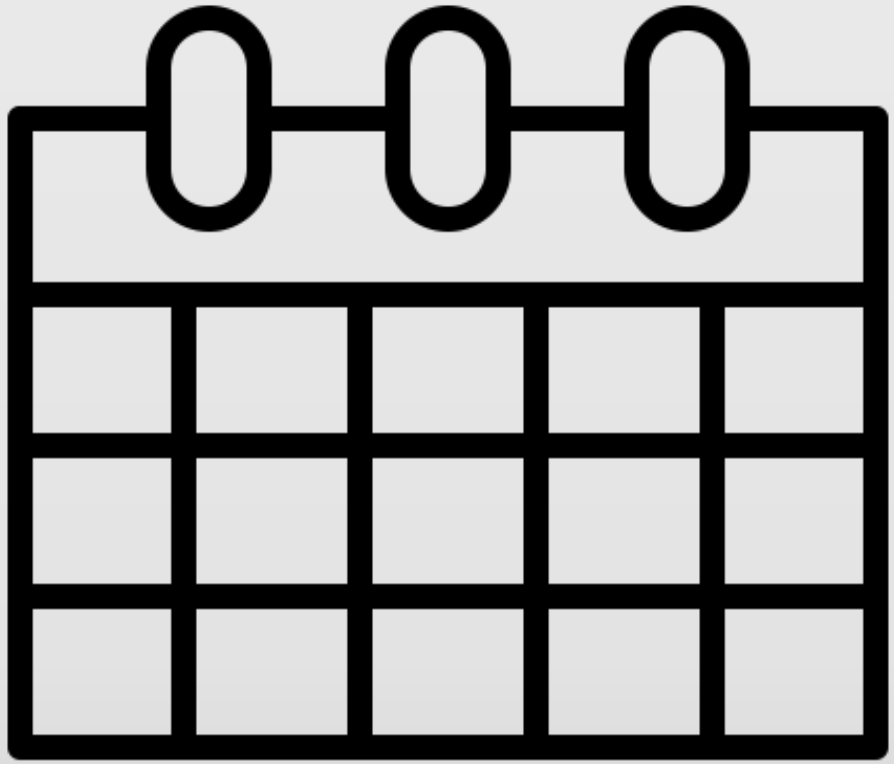




LEISURE

E-SERVICES

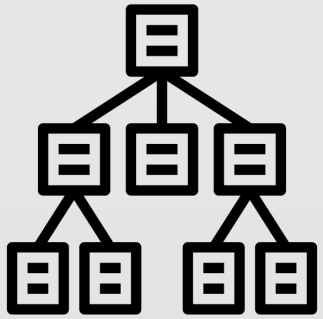




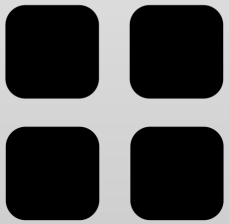
OBJECTIVE 3

To find the deciding factors leading up-to a person’s preference for using cashless in daily transactions

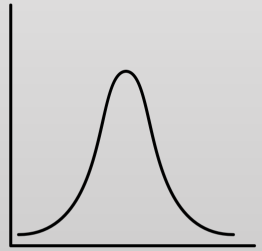
CART MODEL



DECISION TREE LEARNING

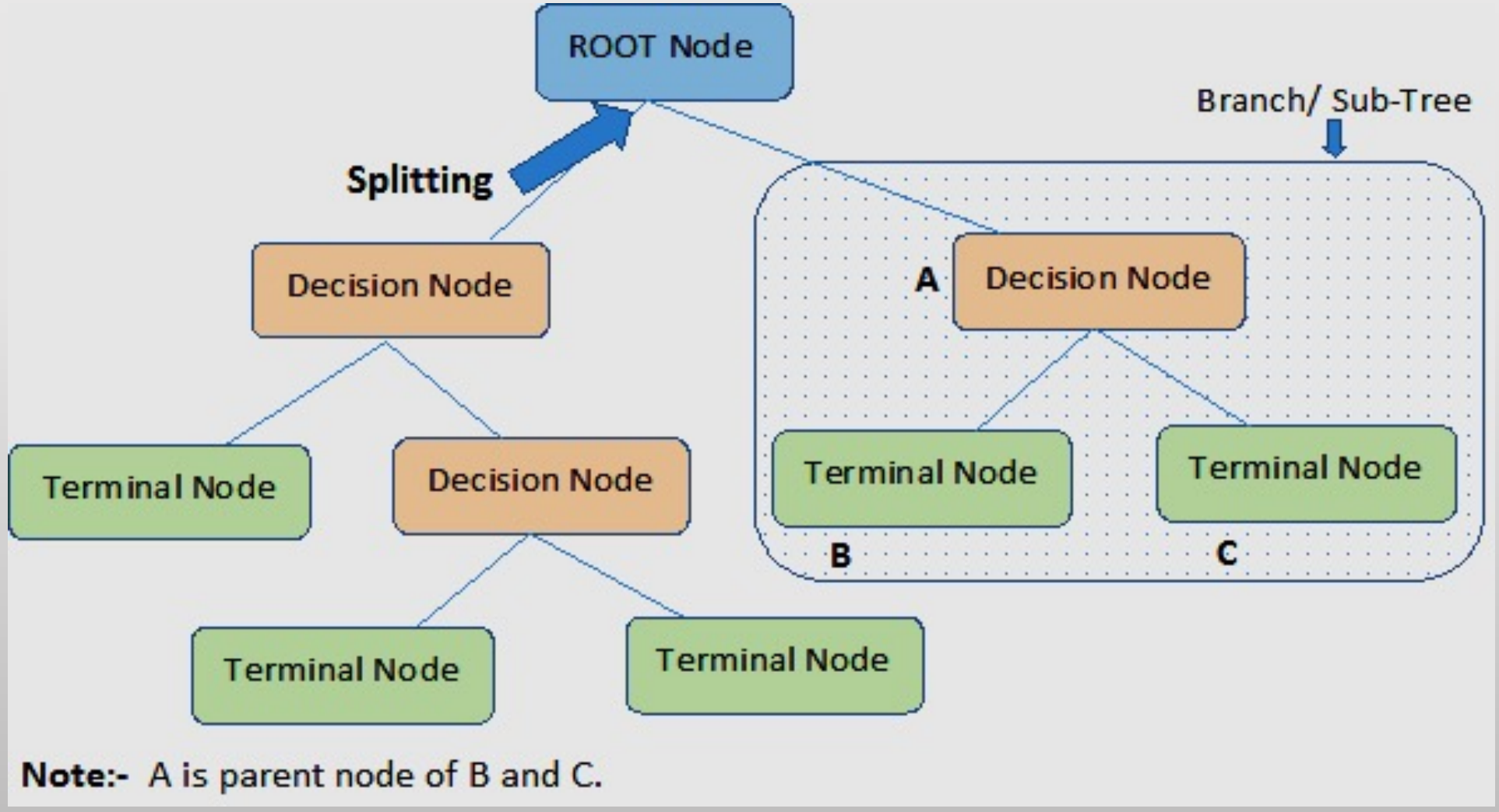


CATEGORICAL VARIABLE



CONTINUOUS VARIABLE

TERMINOLOGY



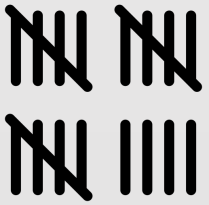
VARIABLES

AGE

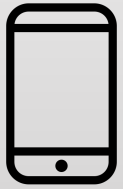
GENDER

DEMONETIZATION

ONLINE SHOPPING

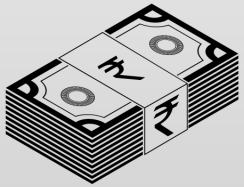


FREQUENCY OF USAGE



PHONE

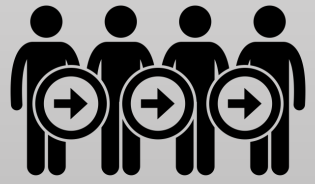
OCCUPATION



INCOME

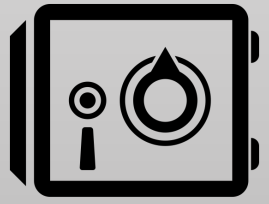
AVERAGE AMOUNT SPENT

PUBLIC PRIVATE



REFERRAL

TYPE OF HOUSE

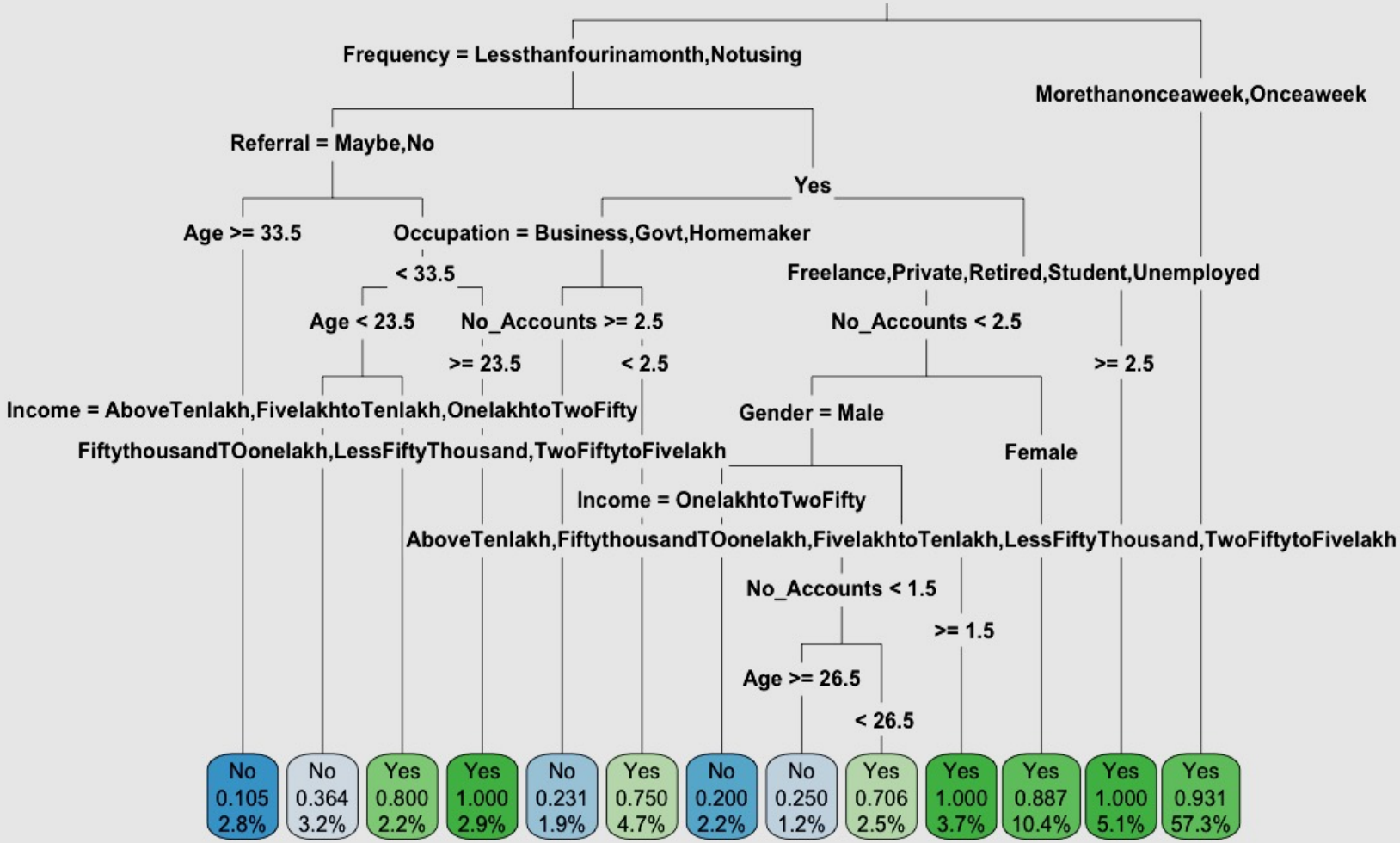


NO. OF ACCOUNTS

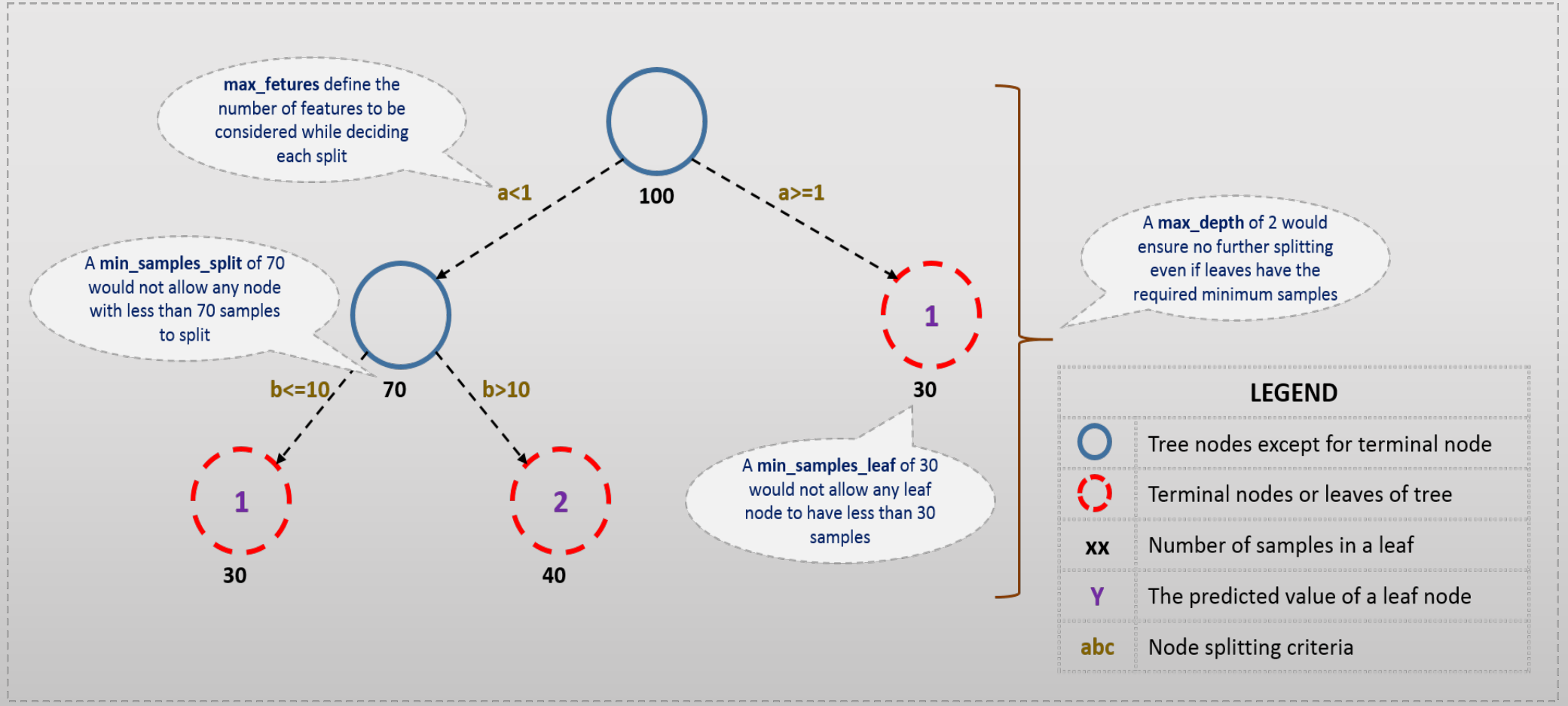
FULL MODEL

		Predicted Values	
		No	**Yes**
Actual Values	**No**	17	19
	Yes	8	184

$$\frac{184 + 17}{228} = 88.16\%$$



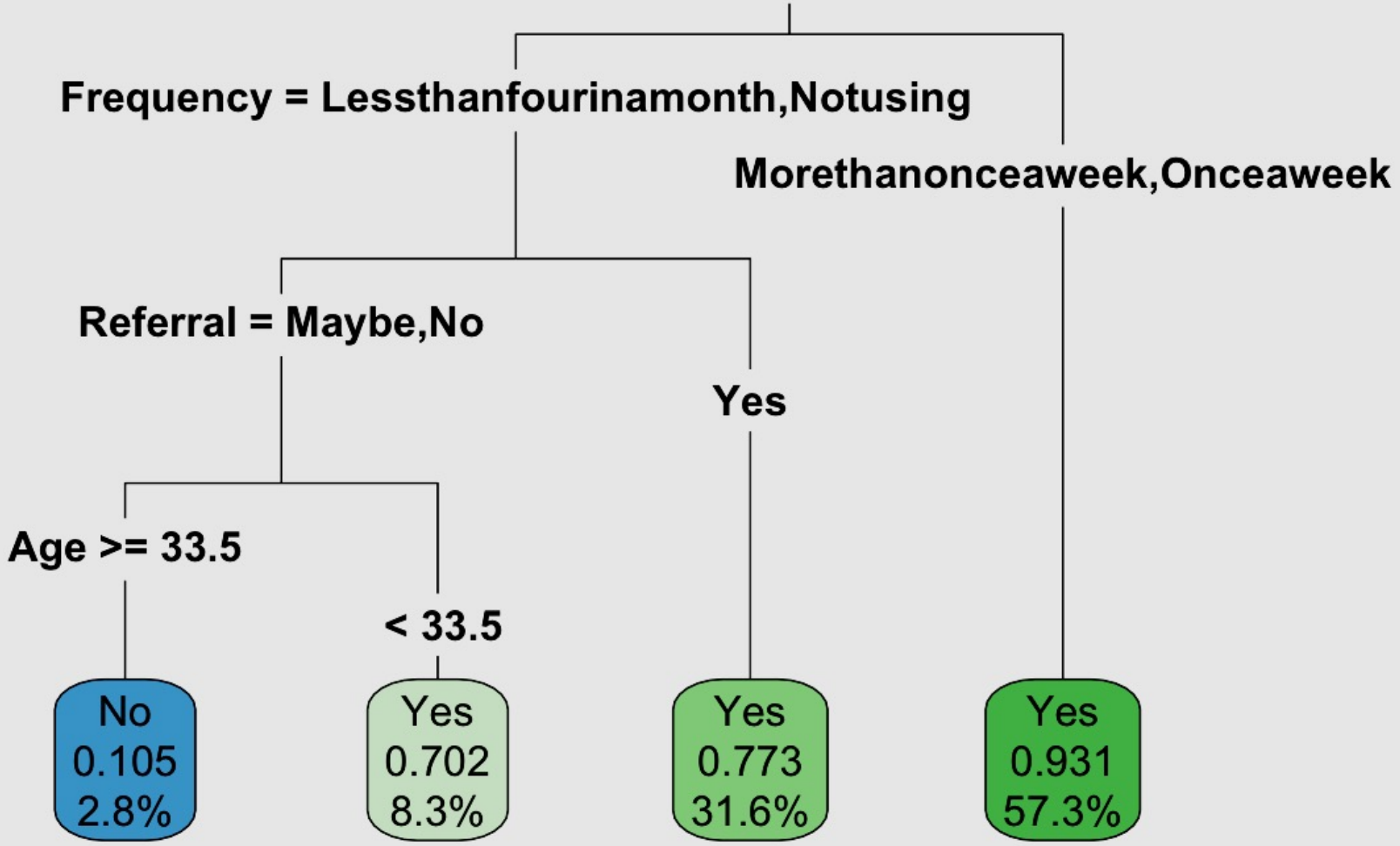
SETTING CONSTRAINTS ON TREE SIZE



MINSPLIT = 50

		Predicted Values	
		No	Yes
Actual Values	No	7	29
	Yes	4	188

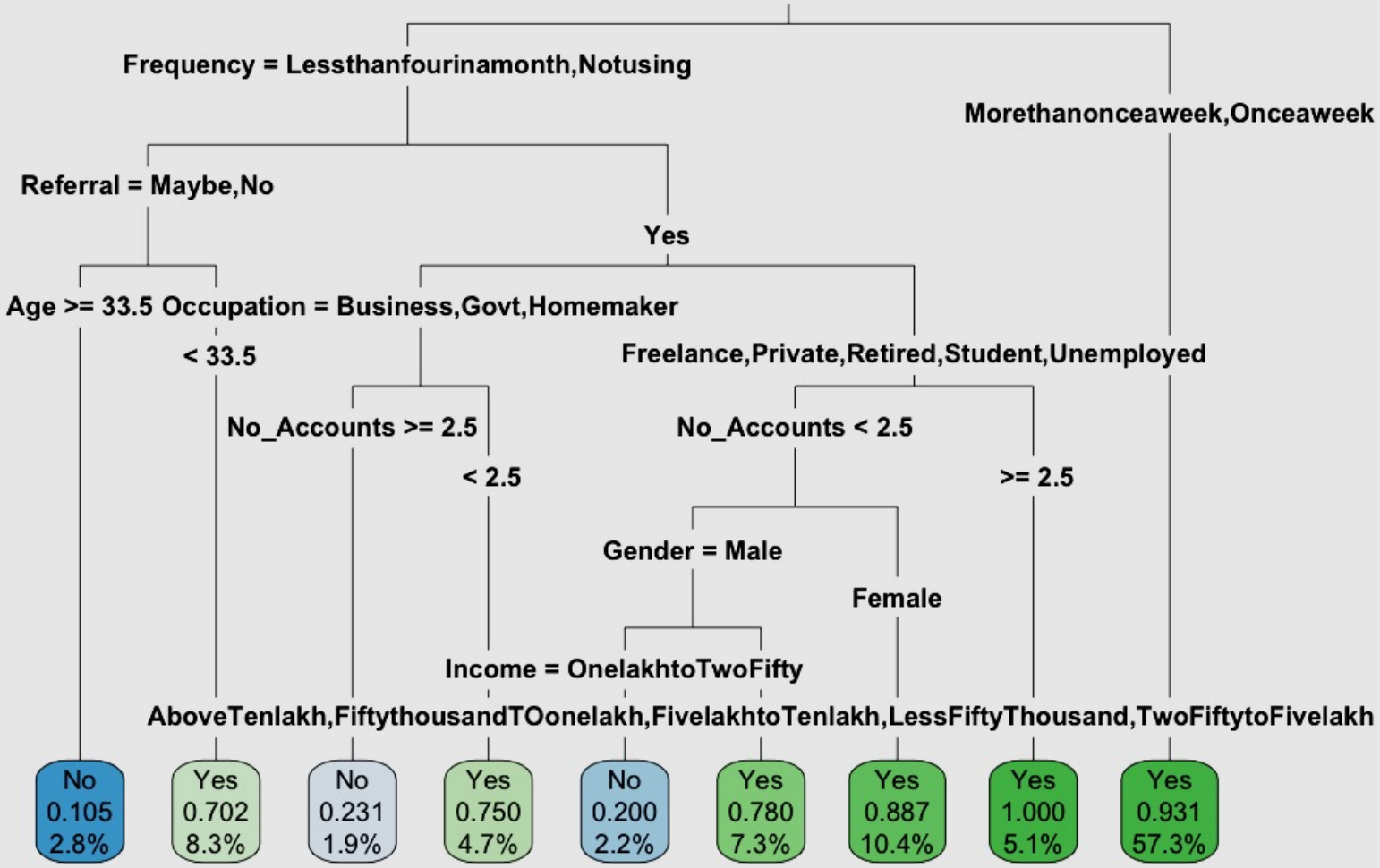
$$\frac{188 + 7}{228} = 85.52\%$$



MINSPLIT = 40

		Predicted Values	
		No	**Yes**
Actual Values	**No**	12	24
	Yes	5	187

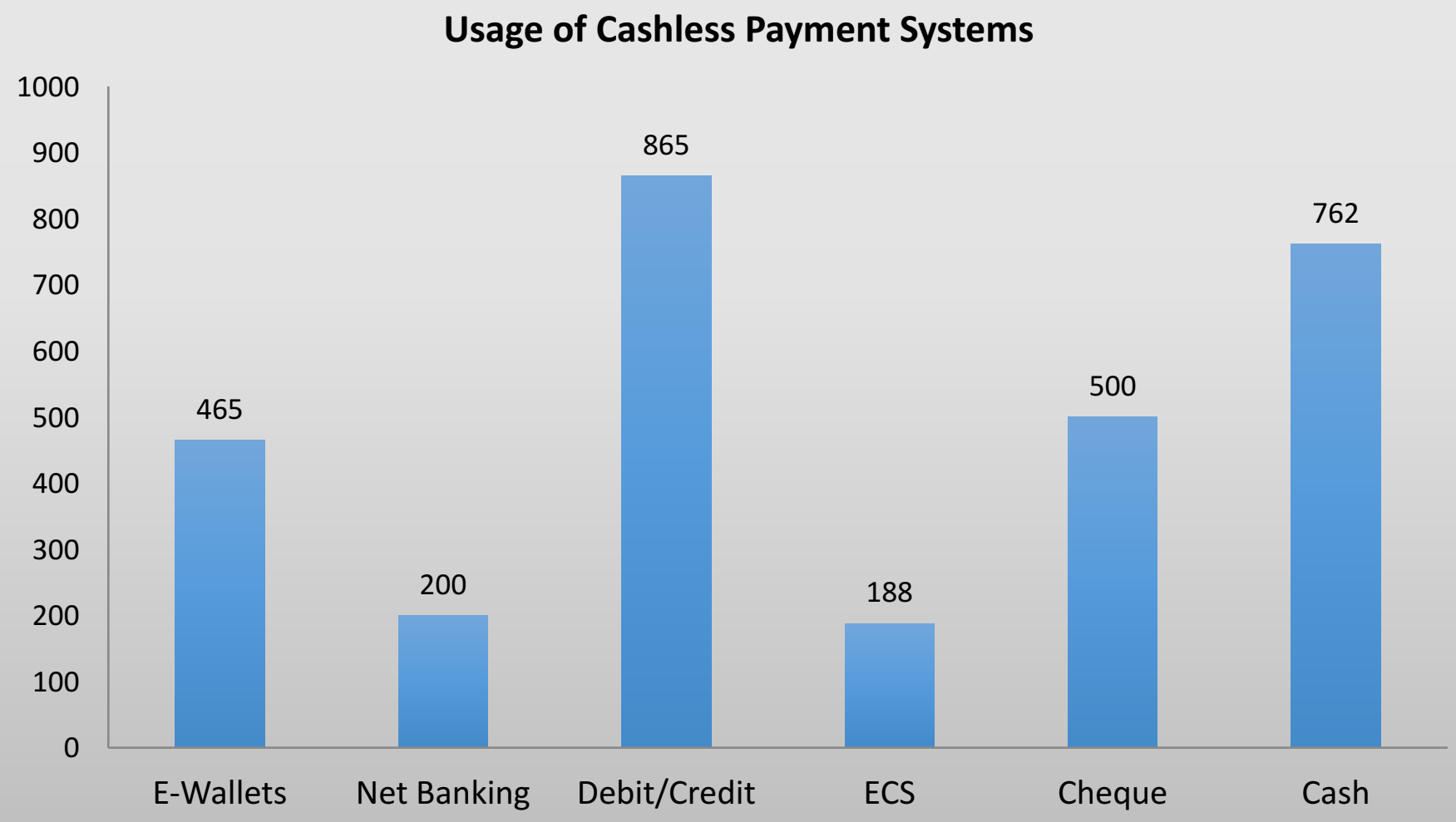
$$\frac{187 + 12}{228} = 87.28\%$$



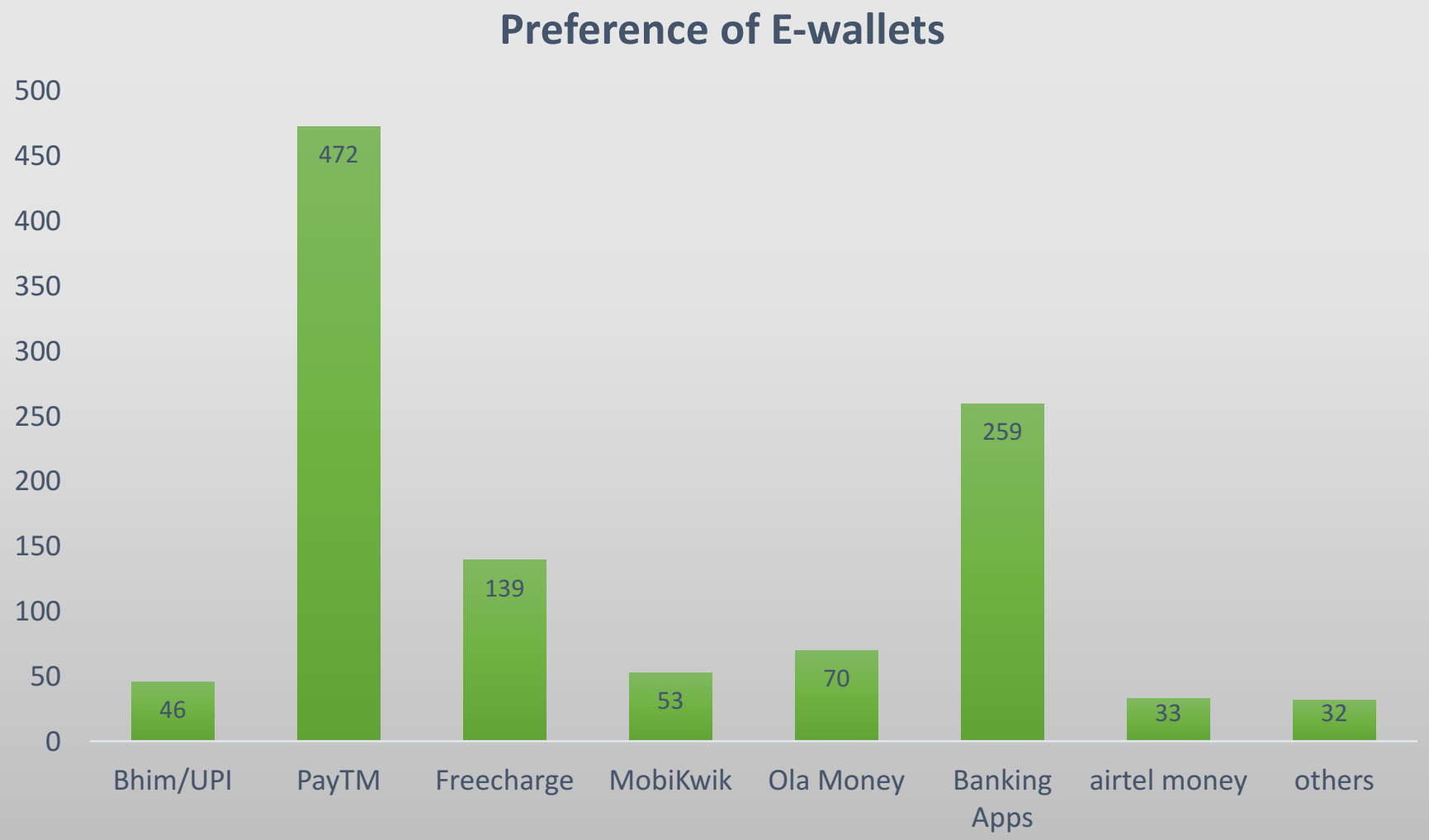
OBJECTIVE 4

To find out the most preferred cashless mode of payment/ online wallet and the factors behind its popularity

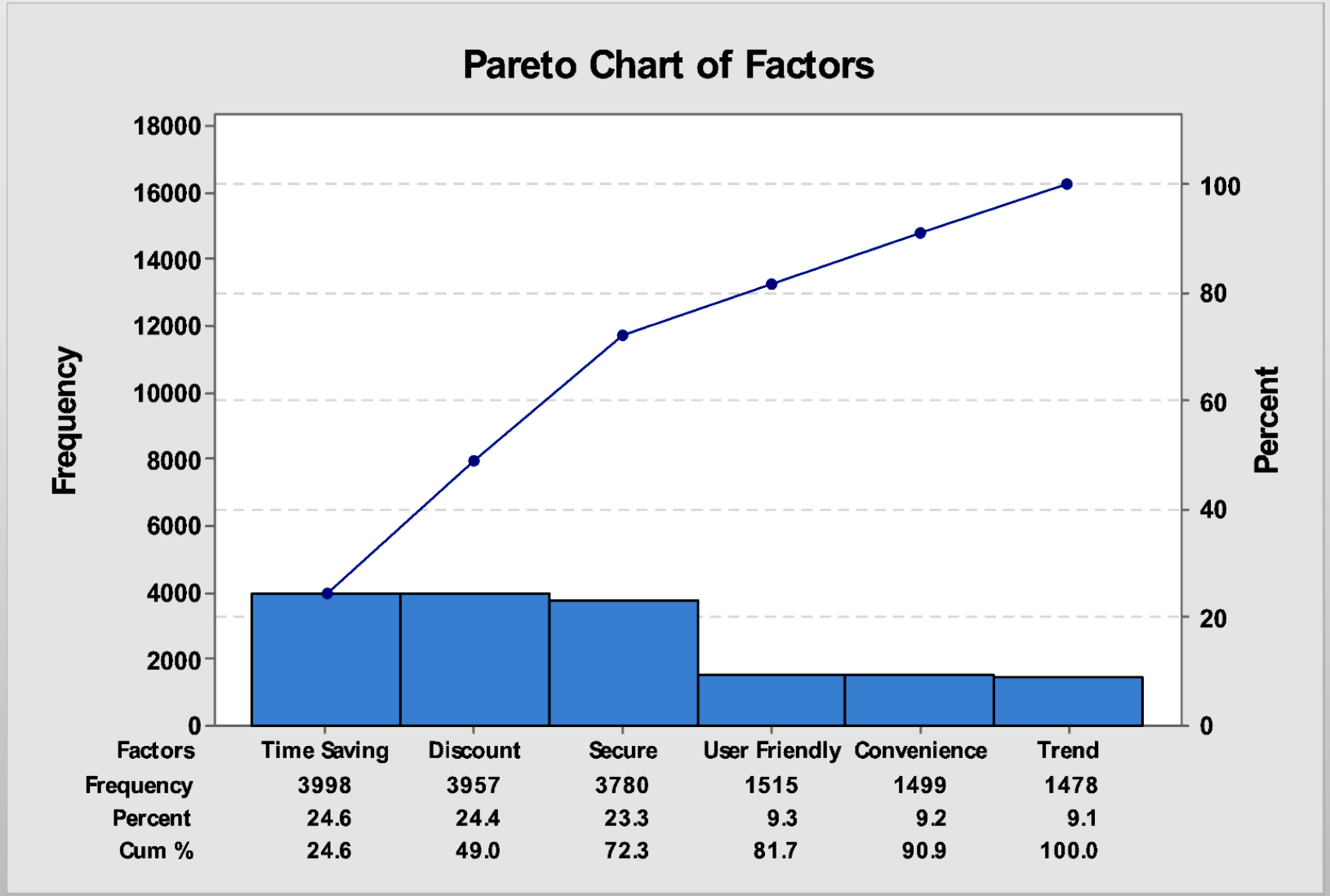
USAGE OF CASHLESS PAYMENT SYSTEMS



PREFERENCE OF E-WALLETS



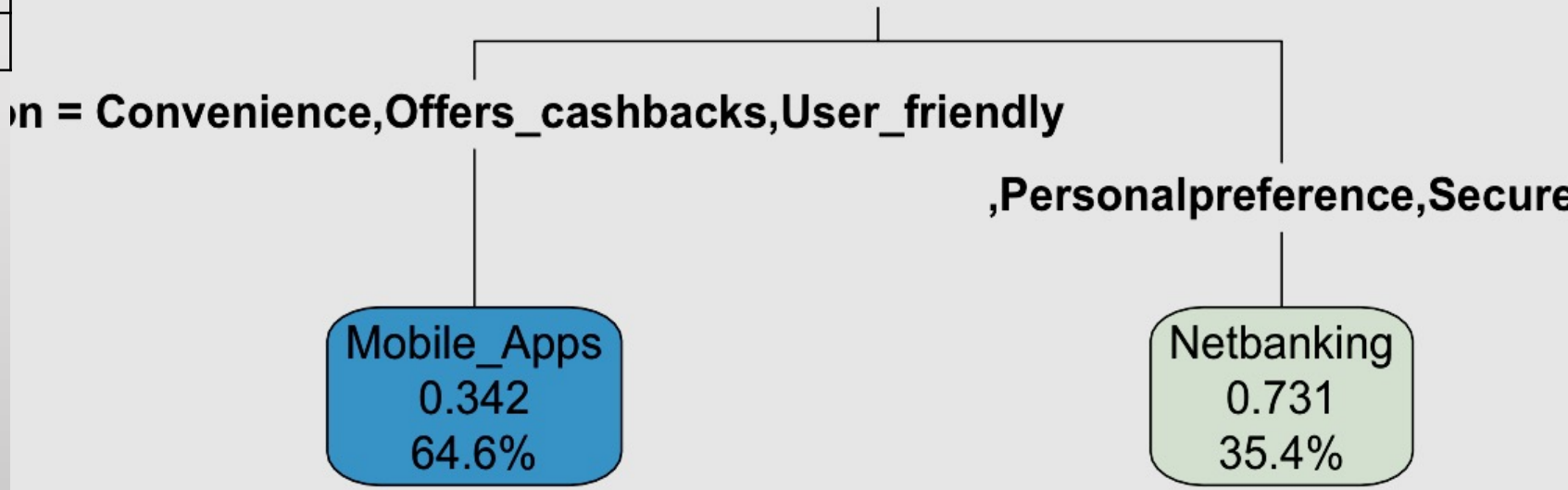
PARETO ANALYSIS



CART

		Predicted Values	
		No	**Yes**
Actual Values	**No**	94	25
	Yes	43	66

$$\frac{94 + 66}{228} = 70.18\%$$



RANDOM FOREST MODEL

TRAINING DATA

		Predicted Values	
		No	**Yes**
Actual Values	**No**	291	65
	Yes	151	177

$$\frac{291 + 177}{684} = 68.42\%$$

TESTING DATA

		Predicted Values	
		No	**Yes**
Actual Values	**No**	94	25
	Yes	43	66

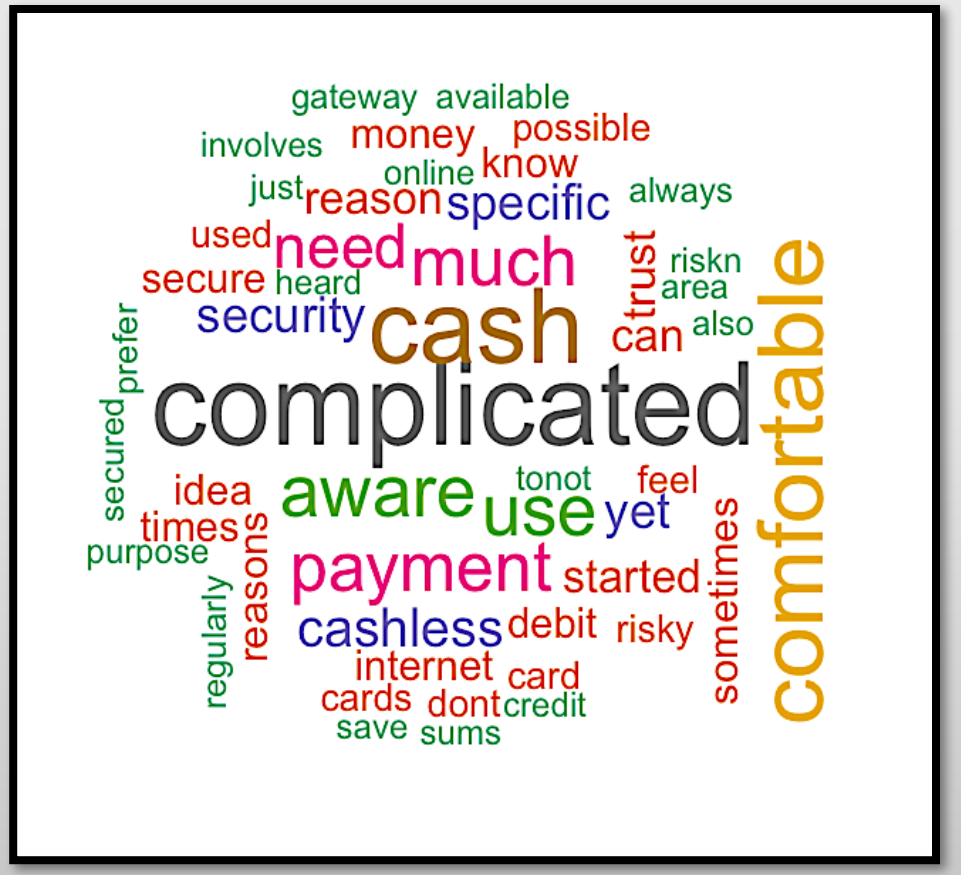
$$\frac{94 + 66}{228} = 70.18\%$$

OBJECTIVE 5

To find out the major concerns with current cashless payment systems among the people who use cashless and those who don’t

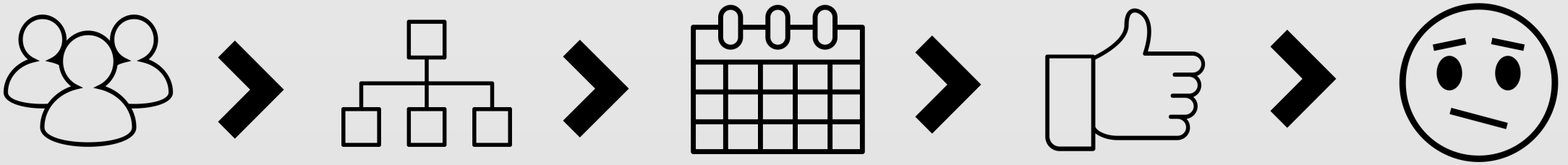
WORD CLOUD

USERS



NON - USERS

CONCLUSION



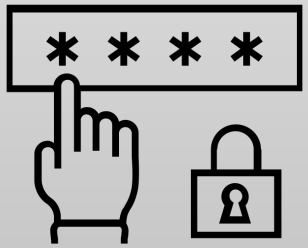
SOCIO-DEMOGRAPHIC FACTORS

QUALITATIVE FACTORS

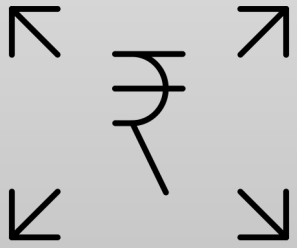
DAILY TRANSACTIONS

MOST PREFERRED WALLET

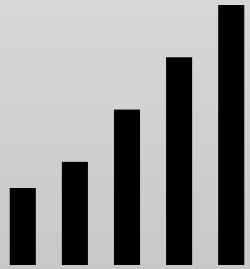
CASHLESS CONCERNS



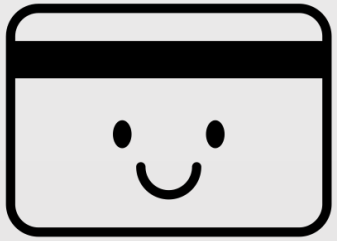
ROBUST SECURITY

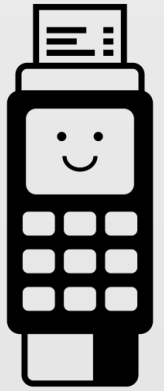


WIDESPREAD ACCESSIBILITY



ADVANCED TECHNICAL INFRASTRUCTURE





THANK YOU