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## **Analysis of Students' Attitudes towards Smart Phone features: SEM Approach**

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**Abstract:** Young generation is labeled as one of the most essential target market for the cell phone use. It is very important to understand the attitude they carry towards the use of cell phones and especially smart phones. This paper tends to provide the relationship of the attitude with different import factors such as perception of ease of use, perception of enjoyment while using cell phone and addiction with cell phone, etc. For this research a sample of 322 university students was studied using questionnaires. In this paper firstly, we have performed EFA to identify the factors, after that we have used those specific factors to run CFA and path analysis to finally complete the SEM. The relation among the five factors came out to be positively significant, implying that attitude was significantly affected by Perception of Ease and Enjoyment, Addiction, Receiving Advertisement, Action on Advertisement.

**Keywords:** *Cell phone, SEM, Path analysis, CFA.*

### **Introduction**

People around the world, especially in developing nations, including Pakistan, are quickly catching up on their adoption of technology, particularly cell phones and social media use. Recent studies have shown a tremendous growth in the use of cell phones in Pakistan. People are transferring to smart phones from the regular old fashion non smart phones, to gain better hold of technology. Study by "Pakistan Advertisers' Society" has recently suggested that 77% of the cell phone usage is between the ages of 21 to 30 years. The same study also concluded that 72% people are using smart phones<sup>1</sup>. This is a particular trend we will be examining further in this paper in detail using different advance statistical techniques.

### **Literature Review**

Although the growth of cell phone usage is observed in all walks of life but college and universities students have been considered as one of the most vital target market (Jurisic & Azevedo, 2011; Totten, Lipscomb, Cook, & Lesch, 2005). So far the major consumer group of cell phone services is this young lot of people (McClatchey, 2006). According to one of the studies young people have currently have a good buying power and also have a good potential for huge future buying power (Jurisic & Azevedo, 2011). Specific to these young adults, different researchers have investigated multiple aspects of cell phone use, such as motivation (Leung, 2007), health effects and psychological (Beranuy, Oberst, Carbonell, & Chamarro, 2009; Johansson, Nordin, Heiden, & Sandström, 2010; Thomee, Harenstam, & Hagberg, 2011), etiquette and manners (Lipscomb, Totten, Cook, & Lesch, 2005),

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<sup>1</sup> <http://www.pas.org.pk/smart-phone-usage-in-pakistan-infographics/>

implications on social networks (Auter, 2007; Subrahmanyam, Reich, Waechter, & Espinoza, 2008), impact on campus life (Quan-Haase, 2008), among many others.

On the other hand, the existing researches have determined how these different segments within this specific sort of population shape their attitudes. At the same time, although mobile phone manufacturers could easily assume that the extra features, apps and tools they wish to add to their offered devices, would make it better but on the other hand, there is no such evidence to signify that these young adults value this features sumptuousness.

Most of the current research is performed with intention of exploring in emerging and validating causal models which explain the interaction between varieties of constructs that ultimately lead to an endogenous variable. Mostly such models are assumed to be applicable across diverse consumer populations, belonging to different demographics. Few of the researchers have explored the relationship of the cell phone features and consumer demographics, such as age, gender, experience, and culture on the a variety of constructs and relationships within the proposed models across various contexts.

Nevertheless, there has been little research done in the field of information systems to explore at a more fundamental level of dividing consumer preferences by apparent features of utility of the technology (Head, Ziolkowski, 2012).

It is important to identify the way today's young generation tend to use technology. Their intentions and attitude behind using the cell phone along their perception of the comfort phone usage provide to them are the most talked and researched about topic these days.

We in this paper are also trying to find the relationships of attitude and other factors for this specific group of population. The reason to just consider this population for our analysis is that these are the people with current will to buy and invest in cell phones and have future buying power as well.

## **Theoretical background**

To add value to the research we have taken items from different published articles and have tried to identify new constructs and relationships with them. Five major characteristics were discovered during the literature review, these characteristics were further used in developing hypothesis. These five characteristics are Perception of Ease and Enjoyment, Addiction, Attitude, Receiving Advertisement, Action on Advertisement. The major relation of attitude with rest of the characteristics were observed. The hypothesis section will further put on light on these factor which make the foundation of this study.

## **Methodology**

This research is based on questionnaire survey which is intended to perform exploratory study to investigate the relationships between mobile phone users' perception and preferences with their attitude and mobile features. The study collected basic demographic, perception and behavioral characteristics from the respondents. There were 79 questions in the questionnaire, mostly based on 5 rank Likert scale. The questionnaire was adapted by multiple items used in different research, which was discussed in detail in section of theoretical background.

## **Sample Descriptive:**

The sample used to perform this research was taken from a university located in Lahore. A total of 350 questionnaires were handed out to the students to fill, out of which 340 questionnaires came back. A total of 322 respondents filled the questionnaire in the usable manner and that was our final sample. Table 1 shows the descriptive analysis of the complete sample for the study:

*Table 1: Sample Descriptive*

<b>Descriptive Analysis</b>			
<b>Variable</b>	<b>Options</b>	<b>Number</b>	<b>Percentage (%)</b>
<b>Model</b>	Smart Phone	308	96
	Not smart phone	14	4
<b>Operating System</b>	Android	182	57
	IOS	124	39
	Windows	15	5
<b>Gender</b>	Male	172	53
	Female	150	47
<b>Marital status</b>	Married	12	4
	Not married	310	96
<b>Age</b>	18-20	162	50
	20-22	150	47
	22-25	10	3
<b>Academic level</b>	High School	44	14
	BBA/BSC	274	85
	MBA/ MPhil	1	0
<b>Income</b>	Less than 1 lac	32	10
	1-2 lac	112	32
	2-3 lac	102	32
	Above 3 lac	73	23
<b>Pocket Money</b>	Yes	203	63
	No	118	37
<b>University Degree Funding</b>	Family	299	94
	Employment	4	1
	Government	3	1
	Scholarships	10	3
	Bank Loans	3	1
<b>Occupation</b>	Students	307	96
	Employment	4	1
	Both	8	3

As already perceived by the literature, 96% of the sample used smart phone as compared to a small number of people who were not using smart phones. The sample was almost divided among both the genders, 53% were male and 47% were female. Android was the most used operating system with 57% of the sample using this system in their cell phones, followed with IOS and Windows. 97% of the sample belongs to age group of 18 to 22. These are the group of people who have resources and time to use cell phone. They have a tendency to stay connected with each other over phone all the time as well as they tend to use cell phone for social media access.

### **Instrumentation:**

In this segment we will be discussing how different characteristics are driven from published papers and later used in developing questionnaire. The items are presented in a table with

their origin and questions. There were many other questions which we added and created according to the literature. The reason to add all these questions and items from already existing research is to make this current research more valuable and valid.

Many other variables were adapted from different studies to make a questionnaire of 79 question mostly which were graded at a Likert scale. Demographics are explained in the following section. The major contribution of this paper is the combination of so many already existing items and making new constructs and relationships out of them.

The following table was taken by

*Table 2: Items of the construct*

Perceived expressiveness (Nysveen et al., 2005a):
I often talk to others about my mobile phone's features
Using my mobile phone's features is part of how I express my personality
Other people are often impressed by the way I use my mobile phone
Enjoyment (Davis et al., 1992):
Using my mobile phone's features is exciting
Using my mobile phone's features is pleasant
I have fun using my mobile phone's features
I find using my mobile phone's features to be enjoyable
Perceived usefulness (Davis, 1989):
My mobile phone's features help me be more effective
My mobile phone's features make it easier to accomplish tasks
My mobile phone's features help me be more productive
Perceived ease of use (Venkatesh, 2000):
Interacting with my mobile phone's features does not require a lot of mental effort
I find it easy to get my mobile phone to do what I want to do
I find my mobile phone's features easy to use
Attitude (Hassanein & Head, 2007):
I have positive feelings about my mobile phone's features
Using my mobile phone's features is a good idea
The thought of using my mobile phone's features is appealing to me
Attitude (Sell, Mezei, Walden, 2014)
I use my mobile phone only for calls
without cell phone my social life would suffer
Phsycial Problems (Sandstrom et al, 2001)
Dizziness
fatigue
headaches
warmth behind/ on the ear
discomfort

(Source: Head & Ziolkowski,2012)

## Analysis:

Following section provides different analysis of the data. We have performed exploratory factor analysis, confirmatory factor analysis and structural equation modeling.

### Exploratory Factor Analysis

A total of 350 questionnaires were distributed to the randomly selected sample in the university, out of which 322 were considered valid, complete and worth using in the analysis. All of the 79 questions in these questionnaires were coded in the software of SPSS. Initially, we ran Exploratory Factor Analysis (EFA) which is a statistical method to use to identify and discover the fundamental structure of a relatively hefty set of variables. EFA is a technique of factor analysis with the intention to identify the probable relationships among the measured variables (Norris & Lecavalier, 2009). Researchers use this technique while developing a scale and it also serves as to identify a set of latent constructs underlying a series of measured variables.

For our analysis, the responses of the respondents were recorded and coded in the format where 1=strongly disagree and 5 = Strongly Agree. The Exploratory factor analysis was used in order to reduce the dimensions and clubbing all the individual items in one factor. EFA was carried out with Varimax rotation, Eigen value set to 1, and iterations for convergence were 25.

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### KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.865
Bartlett's Test of Sphericity	Approx. Chi-Square	8402.95
	df	1128

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The Kaiser-Meyer-Olkin Measure of Sampling Adequacy should be more than 0.8 and with our sample its 0.865 with significance at 0.000 making the findings significant.

This part of the output is the factor transformation matrix. This matrix provides information about the degree to which the factors were rotated to obtain a solution. If no such rotation was necessary, this matrix would have been an identity matrix, but that's not the case with our analysis.

*Table 3: Principal Component Matrix*

Component	1	2	3	4	5
1	0.816	0.424	0.37	0.114	-0.069
2	-0.497	0.386	0.49	0.594	0.104
3	0.179	-0.707	0.463	0.142	0.483
4	0.228	-0.011	-0.636	0.667	0.315
5	-0.061	0.413	-0.061	-0.412	0.808

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After running EFA we were able to identify five major latent variables with different items. Only 49 items out of 79 items had an Eigen value more than 1 and were considered to be significantly clustering into five major factors. These five factors are taken further do perform CFA and Path analysis to eventually conduct SEM. Following table shows those five factors and their items along their factor loadings:

*Table 4: Factors & Factor Loadings*

<b>Factor1</b>	<b>Factor Loading</b>
I find it easy to get my cf to do what I want to do	0.854
Using my cf features is a good idea	0.835
Using my cf features is enjoyable	0.828
My cf features help me to be more effective	0.827
I have fun using my cf features	0.827
My cf features makes it easier to accomplish tasks	0.825
I find my cf features easy to use	0.819
Using my cf features is pleasant	0.813
Interacting with my cf features does not require a lot of mental effort	0.783
Attitude : i have positive feelings about my cf features	0.779
My cf features help me to be more productive	0.693
The thought of using my mobile phones features is appealing to me	0.662
Using my cf features is exciting	0.606
I feel satisfied about your overall experience of smart phone usage	0.54
Do you intend to increase your smart phone usage	0.49
Mobile adv are almost everywhere	0.431
<b>Factor 2</b>	
I have my smart phone on my mind even when i m not using it	0.774
I feel impatient or anxious when i m not holding my smart phone	0.72
My life would be empty without my smart phone	0.68
There is nothing more fun to do than using my smart phone	0.669
I will never give up using my smart phone even when my daily life is greatly affected by it	0.647
Using my smart phone is the most fun thing to do	0.628
Always thinking that i should reduce my cf usage time	0.475
Take my cf to the toilet even when i am in a hurry	0.454
<b>Factor 3</b>	
Others are impresses by the way I use my C.F	0.711
Using my C.F features is part of how I express my personality	0.692
People who use smart phone have higher prestige than those who don't	0.659
People who use smart phone have a high profile	0.634
Using smart phone is considered a status symbol	0.595
People who influence my behavior think that I should use smart phone	0.591
I am the first one among my peers to explore new phone related technology.	0.501
Talk to others about cf	0.465

I have hard time concentrating in class while doing assignments	0.418
<b>Factor 4</b>	
I feel that receiving adv is pleasant	0.729
I feel receiving mobile advertisements is enjoyable and entertaining	0.658
Mobile adv provides the information I need	0.632
Mobile adv is a good source for timely information	0.605
I use mobile adv as a reference for purchasing	0.598
Overall I like mob adv	0.572
<b>Factor 5</b>	
Reading the adv	0.737
Action on receiving adv	0.63
Willing to receive adv	0.613

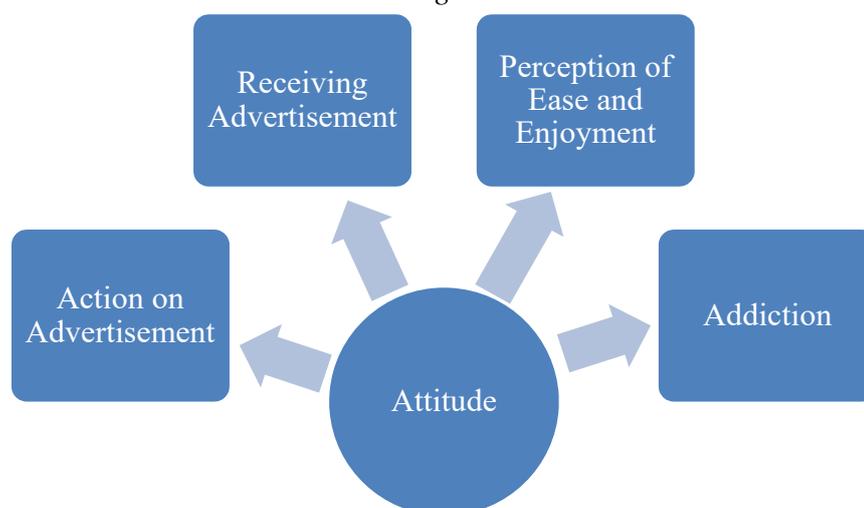
After identifying these five factors we were able to name them according to their items. The highest rating (largest factor loading) items were given more importance while deciding the name of the latent variable. The following table concludes the five final latent variables:

*Table 5: Identified Latent Variables*

Factor 1	Perception of Ease and Enjoyment
Factor 2	Addiction
Factor 3	Attitude
Factor 4	Receiving Advertisement
Factor 5	Action on Advertisement

After doing EFA we were able to make a basic model on which we will run CFA and Path Analysis. Here the model suggests that Perception of ease and enjoyment, along with addition, receiving advertisement and action on advertisement leads to attitude. The suggested model's diagram can be seen bellow.

*Figure 1: Model*



The above diagram shows the proposed model for this research. The model was created after performing EFA and identifying five distinct factors; Attitude, Action of Advertisement, Addiction, receiving advertisement and perception of ease and enjoyment. We would like to test if attitude is significantly dependent on all the other four factors or not. Following section will discuss the hypotheses proposed for it.

### Hypothesis

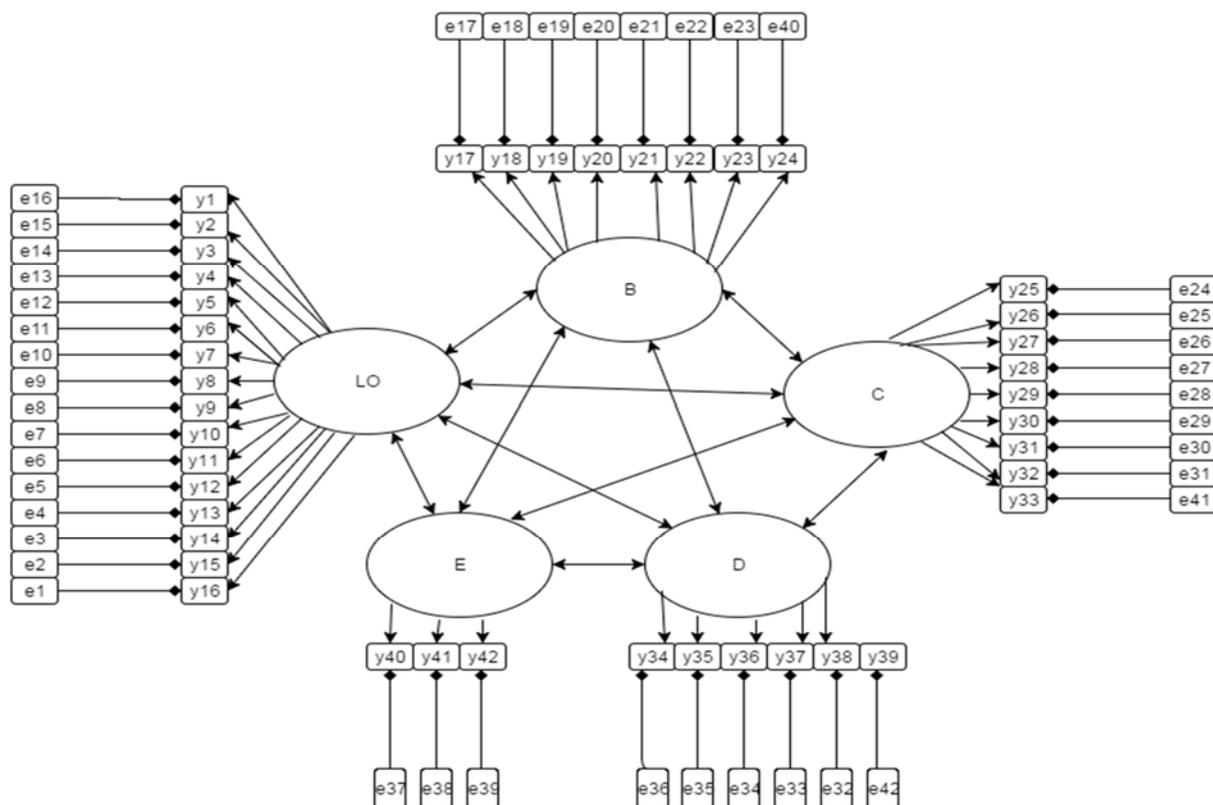
Before moving to the next step of CFA, we would like to define few of the basic hypotheses. Keeping the model in mind following hypotheses would be tested in SEM:

- Ho: There isn't any relationship between Action on advertisement and Attitude
- H1: There is a relationship between Action on advertisement and Attitude
- Ho: There isn't any relationship between Action on advertisement and Attitude
- H2: There is a relationship between Action on advertisement and Attitude
- Ho: There isn't any relationship between Addiction and Attitude
- H3: There is a relationship between Addiction and Attitude
- Ho: There isn't any relationship between Perception of Ease and Enjoyment and Attitude
- H4: There is a relationship between Perception of Ease and Enjoyment and Attitude

### Confirmatory Factor Analysis

Once we have successfully conducted the Exploratory Factor Analysis, we will further continue with a Confirmatory Factor Analysis. With 5 discrete factors identified by the EFA, the data is put into Amos for performing CFA. This CFA was conducted in order to be sure that variables identified by the EFA are confirmed and are significantly important items for a certain factor. CFA doesn't just confirm the significance of the factors it also important to see the relationship between the factors identified in EFA.

Figure 2: Confirmatory Factor Analysis



In diagram 1, we have run Confirmatory factor analysis, making relationships between all the possible factors which are identified in EFA. The default model has yet to be modified according to the suggestions made in the modification index. Following are the results of the default model.

**Computation of degrees of freedom (Default model)**

Number of distinct sample moments: 945  
 Number of distinct parameters to be estimated: 136  
 Degrees of freedom (945 - 136): 809

**Result (Default model)**

Minimum was achieved  
 Chi-square = 1665.180  
 Degrees of freedom = 809  
 Probability level = .000  
 The Chi-Square is coming out to be 1665.180 with 809 degree of freedom for our basic initial model.

Following table shows all of the items present in the model and their estimation.

*Table 6: Model Estimation*

Items	Estimate	S.E.	C.R.	P	Items	Estimate	S.E.	C.R.	P
y15	3.059	0.07	41.97	***	y23	3.262	0.069	46.96	***
y14	3.468	0.06	59.04	***	y24	3.152	0.075	42.03	***
y13	3.346	0.06	52	***	y25	2.911	0.065	44.71	***
y12	3.249	0.07	48.37	***	y26	2.975	0.066	45.24	***
y11	3.456	0.07	47.44	***	y27	3.101	0.075	41.16	***
y10	3.241	0.07	43.86	***	y28	3.059	0.073	42.11	***
y9	3.291	0.07	44.72	***	y29	3.245	0.072	44.77	***
y8	3.241	0.06	51.06	***	y30	3.034	0.064	47.34	***
y7	3.338	0.08	40.87	***	y31	3.173	0.076	41.57	***
y6	3.367	0.08	40.9	***	y32	2.992	0.072	41.41	***
y5	3.274	0.07	46.68	***	y34	2.848	0.074	38.6	***
y4	3.278	0.08	41.47	***	y35	2.747	0.073	37.71	***
y3	3.283	0.08	43.13	***	y36	2.97	0.071	42.07	***
y2	3.232	0.08	42.06	***	y37	3.11	0.079	39.36	***
y1	3.219	0.09	37.13	***	y40	2.038	0.077	26.51	***
y17	3.055	0.07	44.78	***	y41	1.911	0.068	28.08	***
y18	3.198	0.08	42.17	***	y42	1.692	0.04	42.53	***

y19	3.11	0.08	40.29	***	y16	3.397	0.073	46.63	***
y20	2.886	0.07	39.41	***	y33	3	0.071	42.1	***
y21	3.051	0.06	48.27	***	y38	3.063	0.067	46	***
y22	2.987	0.08	39.07	***	y39	3.03	0.074	40.91	***

Highest estimation is of Y14 with 3.468, followed by Y11 and Y16. The lowest estimation is of Item Y42 with 1.62 and Y41 with 1.911. All of the 42 items are significant.

Following is the Modification indices table showing the highest level of possible remedies to discrepancies between the proposed and estimated model. As suggested by the table, e10 and e12 should be linked to make the model fit better. Other possible changes are e8 with e3 and e4 with e26 and so on.

*Table 7: Modification Index (Default Model)*

			M.I.	Par Change
e10	<-->	e12	33.422	0.187
e3	<-->	e8	33.137	0.18
e4	<-->	e26	30.447	0.257
e8	<-->	e11	30.059	0.139
e28	<-->	e29	23.264	0.216
e21	<-->	e39	22.041	0.311
e40	<-->	e41	17.28	0.248
e9	<-->	e15	16.032	0.134
e7	<-->	e15	15.614	0.129
e20	<-->	e29	15.071	-0.176
e3	<-->	e10	14.61	-0.146
e25	<-->	e33	14.396	-0.175
e29	<-->	e31	13.353	-0.178

These are the model fit for the initial model and need not to be discussed in detail as the model fit will be discussed after modifications.

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	136	1665.18	809	0	2.058

Model	NFI Delta 1	RFI rho 1	IFI Delta 2	TLI rho	CFI
Default model	0.716	0.698	0.831	0.818	0.829

MODEL	RMSEA	LO 90	HI 90	PCLOSE
DEFAULT MODEL	0.067	0.062	0.072	0
INDEPENDENCE MODEL	0.157	0.153	0.161	0

Keeping in mind the suggested modification indices, the error terms are correlated to improve the model. While improving the model, e10 and e12, e3 and e8, e8 and e11, e28 and e29 and many other were correlated in the second model and the following result was obtained:

#### Computation of degrees of freedom (Default model)

Number of distinct sample moments	945
Number of distinct parameters to be estimated	159
Degrees of freedom (945-159)	786

#### Result (Default model)

Minimum was achieved

Chi-square = 1400.995

Degrees of freedom = 786

Probability level = .000

There was a noticeable improvement in the Chi-square by 265 units and the new modified Chi-Square is 1400, with p-value 0.00 which is significant.

The modification indices of the new model were also calculated to further improve the model and following is the table:

Table 8: Model 2 Modification Index

			M.I.	Par Change
e4	<-->	e26	27.678	0.235
e21	<-->	e39	22.002	0.312
e40	<-->	e41	17.229	0.246
e25	<-->	e33	13.994	-0.168
e20	<-->	e29	13.233	-0.155
e7	<-->	e39	10.61	-0.155
e9	<-->	e33	10.299	-0.127
e7	<-->	e21	9.417	-0.139
e28	<-->	e41	9.342	0.15
e19	<-->	e35	8.726	-0.175
e20	<-->	e30	8.712	0.176
e16	<-->	e31	8.614	-0.138

e3	<-->	e22	8.415	0.126
e30	<-->	e41	8.12	-0.188
e3	<-->	e20	8.12	0.112
e2	<-->	e42	7.97	-0.133
e16	<-->	e39	7.638	0.151
e14	<-->	e36	7.517	-0.123

Again the model fit analysis is as follows, but the discussion is done on the final model.

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	159	1400.995	786	0	1.782

Model	NFI	Delta 1	RFI rho 1	IFI Delta 2	TLI rho2	CFI
Model	0.961		0.938	0.979	0.965	0.977

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	0.058	0.053	0.062	0.006

The third and final modification is performed on the model to improve the model fit and complete the CFA.

#### Computation of degrees of freedom (Default model)

Number of distinct sample moments:	945
Number of distinct parameters to be estimated:	162
Degrees of freedom (945 - 162):	783

#### Result (Default model)

Minimum was achieved  
 Chi-square = 1381.520  
 Degrees of freedom = 783  
 Probability level = .000

Chi-Square is further improved to 1381.5 with correlating major error terms, with p-value 0.00 which means it is significant. After all the correction the full and final CFA model's item estimations are as follows:

Table 9: Model Estimation

	Factor Loading	S.E.	C.R.	P
	Estimate			
y14	3.468	0.059	59.057	***
y11	3.456	0.073	47.58	***
y16	3.397	0.073	46.634	***
y6	3.367	0.083	40.809	***
y13	3.346	0.064	52.202	***
y7	3.338	0.082	40.896	***
y9	3.291	0.074	44.711	***
y3	3.283	0.076	43.127	***
y4	3.278	0.079	41.488	***
y5	3.274	0.07	46.74	***
y23	3.262	0.069	46.963	***
y12	3.249	0.067	48.373	***
y29	3.245	0.072	44.769	***
y10	3.241	0.074	43.862	***

The highest estimation value is of Y14 and Y 13 with 3.468 and 3.56 respectively. All of the items are considered to be significant. The lowest estimation is of Y41 and Y42 with 1.911 and 1.692 respectively. These estimations show how much of a construct is explained by these items.

### Baseline Comparisons

Chi square tests the differences in between given over identified model and just identified model of it. The value of chi square 1381 represents differences between expected and actual data. As the degree of freedom 783 that's why this large Chi-square is justified. The larger the Chi-square value, the greater the probability that there really is a significant difference. All the values of NFI, RFI, IFI, TLI AND CFI indicate a reasonable model as the values are closer to 1, representing a saturated model. The CFI assesses the fit of a model compared to baseline model, typically independence or null model, which assumes zero population covariance among the observed variables.

Model	NFI 1	Delta	RFI rho 1	IFI Delta 2	TLI rho2	CFI
Model	0.964		0.941	0.982	0.968	0.98

RMSEA: The root mean squared error of approximation adjusts fit to correct for model. A value less than 0.05 or less indicates a close fit of the model in relation to Degree of freedom. The value of 0.050 shows a almost a close fit of the model

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	0.05	0.052	0.062	0.011

Ideal model fit:

Chi-Square/cmin	<5
p-value	>0.5
CFI	>0.94
GFI	>0.95
AGFI	>0.8
SRMR	>0.09
PCLOSE	>0.05

With exception of Chi-Square our values are according to the minimum requirement of the model fit.

### Discriminant Validity

To check if discriminant validity holds or not we have used the correlation matrix among the factors. The result is as follows: *Table 10: Correlation Analysis*

Correlations among the constructs					
	Addiction	Perceived enjoyment and ease	Attitude	Receiving advertisement	Action on advertising
<b>Ave</b>	<b>0.87</b>	<b>5.47</b>	<b>0.922</b>	<b>0.578</b>	<b>0.891</b>
<b>Addiction</b>					
<b>Perceived enjoyment and ease</b>	0.507				
<b>Attitude</b>	0.5	0.46			
<b>Receiving advertisement</b>	0.346	-0.082	0.408		
<b>Action on advertising</b>	-0.27	0.025	0.241	0.294	

Table 11: Discriminant Validity

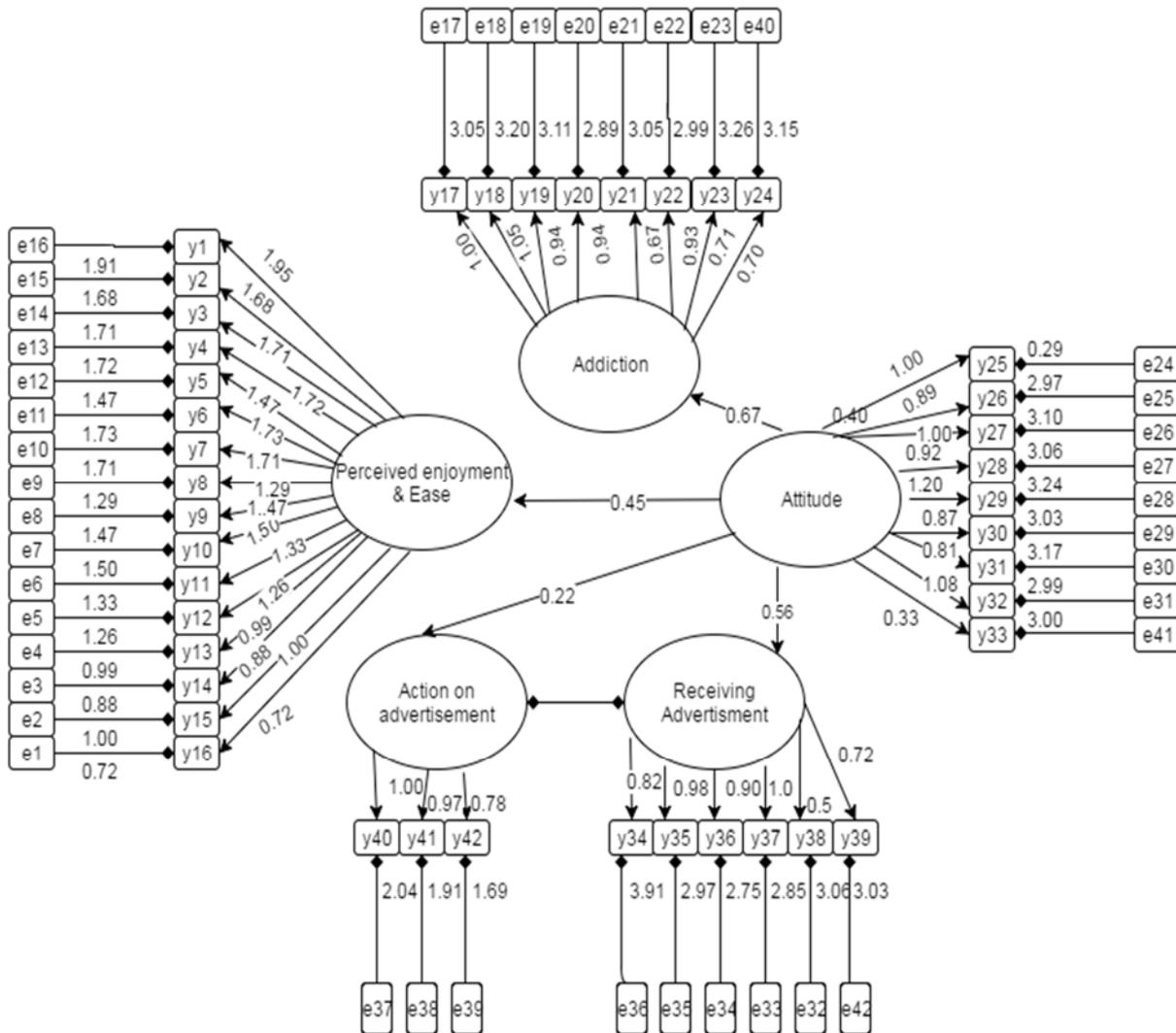
Latent variable	Ave	Discriminant validity
Perceived enjoyment and ease	5.4756	The discriminant validity holds
Addiction	0.87	The discriminant validity holds
Attitude	0.922	The discriminant validity holds
Receiving advertisements	0.578	The discriminant validity holds
Action on advertisement	0.891	The discriminant validity holds

We can easily conclude that discriminant validity holds in all of the factors, and it is safe to go ahead with path analysis.

**Path Analysis**

To complete our Structural Equation Model we performed Path analysis after modifying CFA model. The final model came out to be following:

Figure 3: Path Analysis



This model is modified to maximum and is depicting the original model recommended by us in the start of the paper, where all four constructs are explaining Attitude.

*Table 12: Effect of Constructs on Attitude*

			Estimate	S.E.	C.R.	P
Addiction	<---	Attitude	0.672	0.112	6.022	***
Perceived enjoyment and ease	<---	Attitude	0.45	0.088	5.123	***
Receiving advertisement	<---	Attitude	0.563	0.121	4.645	***
Action on advertising	<---	Attitude	0.224	0.09	2.483	0.013

The above table shows the direct effect of all four constructs on attitude. 67% of attitude is explained by addiction (with standard error of 0.112), 45% is explained by perceived enjoyment and ease (with standard error of 0.45), 56.3% is explained by receiving advertisement (with standard error of 0.121) and 22.45% is explained by action on advertising (with standard error of 0.224). Addiction, Perceived enjoyment and ease and receiving advertisement are significant at 1%, whereas p-value for action on advertising has a p-value of 0.013 which is still less than 0.05, so we can consider it significant at 5%.

#### **Computation of degrees of freedom (Default model)**

Number of distinct sample moments:	945
Number of distinct parameters to be estimated:	156
Degrees of freedom (945-156):	789

#### **Result (Default model)**

Minimum was achieved

Chi-square = 1445.672

Degrees of freedom = 789

Probability level = .000

The degree of freedom is calculated by subtracting number of distinct parameters to be estimated from number of distinct sample moments, which is coming out to be 789 (945-156). With such high degree of freedom high Chi-square value is commonly acceptable. Chi-square is 1445.672 with a probability level of 0.000 where we would consider is significant.

Now we can talk about the model fit:

Model	NFI Delta 1	RFI rho 1	IFI Delta 2	TLI rho2	CFI
Model	0.913	0.912	0.971	0.957	0.969

All the values of NFI, RFI, IFI, TLI AND CFI indicate a reasonable model as the values are closer to 1, representing a saturated model. The CFI assesses the fit of a model compared to baseline model, typically independence or null model, which assumes zero population covariance among the observed variables.

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	0.052	0.055	0.064	0.001

RMSEA: The root mean squared error of approximation adjusts fit to correct for model. A value less than 0.05 or less indicates a close fit of the model in relation to Degree of freedom. The value of 0.052 shows an almost a close fit of the model.

## Discussion

In this section we will be discussing results of SEM and path analysis. EFA was performed after measuring sample adequacy, which was well in range. After running EFA we were able to identify five major latent variables with 79 different items, which were further reduced to 49 keeping the Eigen value cut off point of 1. A model was created after performing EFA and identifying five distinct factors; Attitude, Action of Advertisement, Addiction, receiving advertisement and perception of ease and enjoyment. Further analysis of CFA was performed using Amos, in order to identify the dependency of attitude to rest of the four factors. The initial Chi-Square came out to be 1665, which was further improved by performing suggested modifications, such as correlating error terms.

The Chi-Square is coming out to be 1665.180 with 809 degree of freedom for our basic initial model. The final Chi-square value came out to be 1381.5 after performing correction three times. All the values of NFI, RFI, IFI, TLI AND CFI indicate a reasonable model as the values are closer to 1, representing a saturated model. Correlation matrix concluded that discriminant validity holds in all factors which further encouraged to perform Path analysis and complete Structural Equation Model. Addiction came out to have major effect on attitude, having 67% of attitude is explained by addiction, furthermore 45% is explained by perceived enjoyment and ease, 56.3% is explained by receiving advertisement and 22.45% is

explained by action on advertising. Addiction, Perceived enjoyment and ease and receiving advertisement are significant at 1%, whereas p-value for action on advertising has a p-value of 0.013 which is still less than 0.05, so we can consider it significant at 5%. These results are coinciding with the research previously done by Sell, Mezei, Walden, 2014. Further implications of these results are discussed in next section of conclusion.

## **Conclusion**

As the world becoming more and more technologically dependent, cell phone and especially smart phones are becoming a very integral part of the daily life. Much research is done on the use and attitude towards the use of the cell phones lately. This paper has tried to provide a new aspect to the much published data. We have tried to link attitude with four major aspects, perception of ease, perception of enjoyment, addiction and advertisement. The four hypotheses identifying the dependency of above mentioned factors on attitude was proven correct and we weren't able to accept any of the null hypotheses.

The interesting finding was that in our data the perception of ease and enjoyment was clustered together as one factor, where as many of the previous research such as Head & Ziolkowski(2012) and Ferguson & Brohaugh, 2008; Jurisic & Azevedo,(2011) has taken these two factors independently.

In this paper perception of enjoyment and ease tends to explain attitude, as proven in the previous research of Head & Ziolkowski(2012). With time it would be apparent that new generation is highly dependent on the technological developments. They would like to feel more comfortable using the features of cell phone. This aspect of their likelihood to spend money on cell phone should be cashed by the cell phone companies as well as the service providers. The target population of youth is very promising to keep buying and trying new phone technologies as far as they feel at ease and enjoy their phone features.

It is commonly noted that with time the regular use of phone is becoming more of an addiction, which again should be cashed by the phone companies. Although addiction of any sort is not encouraged by large but a decent level of phone use is becoming necessity. With fast moving world and intense social media presence, smart phone can very well be called the new drug addiction for youth.

Advertisement has become a vital part of today's society. Majority of companies spend large amount of capital on advertising their products to their target market. Cell phone has become an interesting and a growing source of communicating these advertisements. Not only the

phone service provider tends to advertise to their customer about their own products but they also make great revenue by outsourcing the numbers of their customers to marketing firms. In this research it was apparent that generally the sample from our population likes to receive and respond to advertisements.

In the conclusion we can safely say that the future of the smart phones is the way all its features merge in, and make it user friendly. With all these gadgets, apps and tools, one can make any user feel at ease and make their experience of using cell phone enjoyable.

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## Appendix

Table 13

Total Variance Explained						
Component	Initial Eigen values			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	12.405	25.844	25.844	9.704	20.216	20.216
2	5.033	10.485	36.329	4.640	9.667	29.883
3	2.744	5.717	42.047	4.365	9.094	38.978
4	2.131	4.440	46.487	3.225	6.719	45.696
5	1.684	3.509	49.995	2.063	4.299	49.995

Table 14: Rotated Component Matrix

Extraction Method: Principal Component Analysis.					
Rotation Method: Varimax with Kaiser Normalization.					
Rotated Component Matrix					
	Component				
	1	2	3	4	5

I find it easy to get my CF to do what I want to do	.854				
using my CF features is a good idea	.835				
using my CF features is enjoyable	.828				
My CF features help me to be more effective	.827				
I have fun using my CF features	.827				
My CF features makes it easier to accomplish tasks	.825				
I find my CF features easy to use	.819				
using my CF features is pleasant	.813				
interacting with my CF features does not require a lot of mental effort	.783				
Attitude : I have positive feelings about my CF features	.779				
My CF features help me to be more productive	.693				
the thought of using my mobile phones features is appealing to me	.662				
using my CF features is exciting	.606				
I feel satisfied about your overall experience of smart phone usage	.540				
Do you intend to increase your smart phone usage	.490				
mobile adv are almost everywhere	.431				
I have my smart phone on my mind even when I m not using it		.774			
I feel impatient or anxious when I m not holding my smart phone		.720			
my life would be empty without my smartphone		.680			
there is nothing more fun to do than using my smart phone		.669			
I will never give up using my smart phone even when my daily life is greatly affected by it		.647			
using my smart phone is the most fun thing to do		.628			
always thinking that I should reduce my CF usage time		.475			
take my CF to the toilet even when I am in a hurry		.454			
using excessive CF causes me to feel blurred vision		.435			
when I hear about a new phone related technology/inventions I find ways to buy it					

others are impressed by the way I use my C.F			.711		
using my C.F features is part of how I express my personality			.692		
people who use smart phone have higher prestige than those who don't			.659		
people who use smart phone have a high profile			.634		
Using smartphone is considered a status symbol			.595		
people who influence my behavior think that I should use smart phone			.591		
I am the first one among my peers to explore new phone related technology.			.501		
talk to others about cf			.465		
I have hard time concentrating in class while doing assignments			.418		
I miss planned work due to usage of smart phone					
I like to experiment					
I feel that receiving adv is pleasant				.729	
I feel receiving mobile advertisements is enjoyable and entertaining				.658	
mobile adv provides the information I need				.632	
mobile adv is a good source for timely information				.605	
I use mobile adv as a reference for purchasing				.598	
overall I like mob adv				.572	
reading the adv					.737
action on receiving adv					.630
willing to receive adv					.613
I feel mobile adv are irritating					
in general I am hesitant to try out new information technologies					