Role of Near Field Communication Technology and its Impact on Consumers

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ABSTRACT

The day-to-day changes in the technology have paved way for many new inventions. Near Field Communication (NFC) technology is one among the new inventions in recent years. The NFC technology which is installed in smart devices and felicitates the customers to transfer their data, make payments and many more activities. In this modern era, people are much away from cash, moving from traditional way of payment to the modern ways from cash transactions to paying through online mode through the smart devices. To perform this payment activities NFC technology is used. The research was carried out with 100 NFC using respondents and the sampling tools used were Factor analysis, Correlation Analysis, Regression Analysis. The sampling method used for the study is simple random sampling. The research was carried out and Cronbach's alpha reliability test proved to be consistent and reliable. The researcher has identified the factors influencing to use the NFC technology and also found the most influencing factors. The concluding observations are Services and Relative advantage is the most influencing factors from the study.

Key words: Information, NFC, Relative Advantage, Services, Uses.

INTRODUCTION

In the past 10 years there has been a dramatic change in the technology which has a huge impact in all the sectors of the country. Various new innovations have paved way for many new activities. The emergence of innovation has bought a change in the payment systems. Initially there was barter system and later on people moved on to cash transactions. Nowadays people are not interested to carry cash and coins along with them to pay for their purchases which have been replaced by the mobile wallets. Nowadays people are slowly moving into cashless transactions were people can pay through debit cards, credit cards, Unified Payment Interface (UPI) mode, National Electronic Fund Transfer (NEFT), Real Time Gross Settlement (RTGS), Cheque etc. After demonetization people are slowly moving on to cashless

transactions through the digital payments like payments through apps using their smart phones, mobile phones, laptops, tablets. Near Field Communication (NFC) technology is the contactless technology which helps in instant data transfer, payments by the consumer and many more activities. This technology helps the consumers, companies and also for research activities. This technology acts as an attractive tool for business activities. NFC payment apps include Android pay, Apple pay, Samsung pay, Visa pay wave, Master card pay pass, Google pay, PayPal, Pay with Square. NFC has crossed its infancy stage but still people are not much aware of this attractive technology. Basically NFC technology is available in smart devices which allow the consumer to transmit data or to make payments within the short distance of 4cm. The Smartphone market is very huge in the current scenario; it is always a favorable one for the mobile payments which eliminates the use of cash which is replaced by a single device, a Smartphone. The study has identified five factors which include services, relative advantage, complexity, amount of information, perceived usefulness.

REVIEW OF LITERATURE

Yeow Pooi Mun, Haliyana Khalid, Devika Nadarajah (2017) in their study "Millennials' Perception on Mobile Payment Services in Malaysia" has identified the various factors like perceived usefulness, perceived ease of use, perceived credibility and social influence.

Kamal Kakish, Raj.D.Shah (2016) in their study "Analysis of the risk of NFC mobile payment system" has examined the technical; evidence and validation that NFC transactions support a more secure mobile payment process where the NFC mobile

payment transactions become more widespread.

Yong Liu, Vassilis Kostakos, Shengli Deng (2016) in their study "Risk of using NFC mobile payments investigating the moderating effects of demographic attitudes" has determined various types of risk like privacy risk, performance risk, financial risk, Psychological risk. They have also noted that privacy and psychological risk as the most important risk dimensions for the NFC mobile payments.

Hassan Almahdi, Shajahan Shamsudeen, Nasser Khalufi (2018) in their study "A Study on Customers' Perception and Marketing Effectiveness of Proximity Marketing Communications on NFC and SMS-CB Enabled Mobile Phones in USA" has identified that the latest information on new product arrival, price and brands in the proximity marketing communications on NFC and SMS-CB enabled mobile phones, proximity marketing message credibility, authenticity and trust upon the retailer and assurance were the significant antecedents of marketing effectiveness.

Iviane Ramos De Luna, Francisco Montoro-Ríos Francisco Liébana-Cabanillas, Joao Gil De Luna (2016) in their study "NFC technology acceptance for mobile payments: A Brazilian Perspective" has identified that attitude, personal innovation in IT and perceived usefulness are determinants of future intention to use the NFC technology.

RESEARCH GAP

Review of literature suggests that number of studies have been carried out to study the NFC and its features. Researchers have also analyzed the economic factors, psychological aspects and also the societal factors. Many research studies have focused on the NFC Applications in devices for other uses but very little research study has been done on payment methods through NFC. There were no research studies based

on the consumer's aspect to find the preferences from consumers on the adoption of NFC. This study has looked into the consumer's preference and also on the payment method aspects.

OBJECTIVES OF THE STUDY

1) To study the factors that have the impact on consumers while using NFC and to identify the most influencing factor that makes the consumers to adopt the NFC payment methods which help the customers, the business people and companies.

2) To find out the relationship between the Gender and the impacting factors which enable the consumers to make use of the NFC technology.

3) To find out the relationship between the demographic factor Income and Service & Relative advantage to the consumers while using NFC technology.

RESEARCH METHODOLOGY

Table-1 Research methodology	
Research Design	Descriptive
Sampling area	Chennai city
Sample Size	100
Research Instrument	Self-designed structured printed questionnaire with scored using a five - Point Likert scale
Collection of Data	Primary data- questionnaire; Secondary data- Journals
Period of Study	June 2019 to October 2019
Statistical Techniques	Correlation analysis, Regression Analysis, Factor analysis and Cronbach's alpha.

HYPOTHESES FOR THE STUDY

1. H1: There is no significant relationship between Gender and Services which has impact on consumers while using NFC technology.

2. H2: There is no significant relationship between Gender and Complexity which has impact on consumers while using NFC technology.

3. H3: There is no significant relationship between Gender and Relative Advantage which has impact on consumers while using NFC technology.

4. H4: There is no significant relationship between Gender and information which has impact on consumers while using NFC technology.

5. H5: There is no significant relationship between Gender and uses which has impact on consumers while using NFC technology.

6. H6: There is no significant relationship between Income and Services and relative advantage which has impact on consumers while using NFC technology.

7. H7: There is no significant relationship between Income and Services and relative advantage which has impact on consumers while using NFC technology.

DATA ANALYSIS AND INTERPRETATION

Table-2 Demographic profile			
Particulars		Freq.	%
Age	15-25 years	56	56.0
	25-35 years	22	22.0
	35-45 years	12	12.0
	Above 45years	10	10.0
	Total	100	100.0
Gender	Male	68	680
	Female	32	32.0
	Total	100	100.0
Qualification	Below UG	20	20.0
	UG	32	32.0
	PG	36	36.0
	Professional course	6	6.0
	Diploma	6	6.0
	Total	100	100
Occupation	Private sector	62	62.0
	Public sector	6	6.0
	Semi-public	12	12.0
	Own business	20	20.0
	Total	100	100.0
Income	Below Rs.20000	60	60.0
	Rs.20000-Rs.30000	6	6.0
	RS.30000-Rs.40000	10	10.0
	Above Rs.40000	24	24.0
	Total	100	100.0
Source: Primary Data Analysis			

Interpretation: Table 2 shows that out of 100 respondents 56% of the respondents fall under the age group of 15-25years, 22% of the respondents are from the age group of 25-35 years, 10% come under the age group of 35-45 years and the remaining respondents are from the age group of above 45 years. There were 68% of the female respondents and 32% female respondents taken for the study. Out of 100 respondents, 20% of the respondents were below UG, 32% of the respondents were under-graduate, 36% of the respondents were post-graduate, 6% of the respondents were from **Data reliability**

the professional courses and 6% of the respondents are from diploma courses. Out of 100 respondents, 62% of the respondents were from private sector, 6% of the respondents belong to public sector 12% belong to semi-public and the remaining from own business. Out of 100 respondents, 60% of the respondents have monthly income of below Rs.20000, 6% of the respondents have Rs.20000-Rs.30000, 10% of the respondents have Rs.30000-Rs.40000 and 24% of the respondents have a monthly income of above Rs.40000.

Table-3 Reliability Statistics	
Reliability co-efficient	
N of cases=100	N of items=30
Alpha= 0.951	
Source: Primary Data Analysis	

Interpretation: The Cronbach's alpha value is found to be 0.951 which is found to be highly reliable and consistent.

Factor analysis

Factor analysis was done on the following five factors which enable the consumers to use the NFC technology. The factors were selected after an extensive literature survey on the NFC technology. Exploratory factor analysis was conducted and the results of tests of sampling adequacy showed the following results.

Table-4 KMO and Bartlett's Test		
KMO Measure of Sampling Adequacy.		.873
Bartlett's Test of Sphericity	Approx. x^2	471.837
	Df	10
	Sig.	.000
Source: Primary Data Analysis		

Interpretation: A KMO score of 0.873 is found to be a satisfactory count and these five factors were considered to be with greater adequacy and factor analysis was proceeded to find the most impacting factor (s) which has high impact on consumers.

Table-5 Communalities table		
	Initial	Extraction
Services	1.000	.676
Complexity	1.000	.889
Relative Advantage	1.000	.824
Information	1.000	.802
Uses	1.000	.867
Extraction Method: Principal Component Analysis. Source: Primary Data Analysis		

Interpretation: The above communalities table explains the initial Eigen values of the 5 factors which are considered to be the impacting factors. It is observed from the above table that services has the least value of 0.676 which is less than 0.7 which . implies that service is the least influencing factor in the impact of NFC technology. The above factors contribute 80% to 89% which implies these factors have high impact towards the NFC technology

Table-6 Total Variance Explained					
Component	Initial Eigen values			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.058	81.167	81.167	4.058	81.167	81.167
2	.430	8.604	89.771			
3	.217	4.333	94.104			
4	.190	3.805	97.908			
5	.105	2.092	100.000			
Extraction Method: PCA Source: Primary Data Analysis						

Interpretation: The above explains the percentage of variance explained in each derived factor elements towards the impact on NFC. For understanding the impacting factors in NFC in this analysis 1component labeled as Services which solely explains 81% of total variability in the data set.

Table-7 Component Matrix			
Factor label			**% of variance**
	Factors	Elements	
Inclination	Services	.839	
	Complexity	.951	
	Relative advantage	.907	81.167
	Information	.910	
	Uses	**.940**	
Extraction Method: Principal Component Analysis. a. 1components extracted.			

Interpretation: The above rotated component matrix explains the variables dominance in the elements of factors labeled. The last factor signifies its greater percentage of influence towards the NFC technology and all the dominant five statements are high positively correlated to their respective element. Factor analysis extracted one component in the rotated component matrix. The component is labeled as inclination contains 5 explanatory variables and it explains 81.167% of about impact of NFC technology on consumers.

Correlation analysis

Table-8 Correlation analysis						
	Gender	Services	Complexity	Relative advantage	Information	Uses
Gender	1	.010**	.306**	.353**	.028**	.042
Services	-	1	.772**	.663**	.617**	.678**
Complexity	-	-	1	.794**	.793**	.879**
Relative advantage	-	-	-	1	.808**	.816**
Information	-	-	-	-	1	.806**
Uses	-	-	-	-	-	1
H0 Accepted/Rejected		Rejected	Accepted	Accepted	Rejected	Rejected

Interpretation:

H1: There is no significant relationship between Gender and Services which has impact on consumers while using NFC technology. The correlation table reveals that the Pearson's coefficient of correlation value for the Relationship between gender and services is 0.010. There is significant relationship between gender and services. Thus the alternate hypothesis is accepted.

H2: There is no significant relationship between Gender and Complexity which has impact on consumers while using NFC technology. The correlation table reveals that the Pearson's coefficient of correlation value for the Relationship between gender and complexity is 0.360. There is no significant relationship between gender and complexity. Thus the null hypothesis is accepted.

H3: There is no significant relationship between Gender and Relative Advantage which has impact on consumers while using NFC technology. The correlation table reveals that the Pearson's coefficient of correlation value for the Relationship between gender and Relative advantage is 0.353. There is no significant relationship between gender and services. Thus the null hypothesis is accepted.

H4: There is no significant relationship between Gender and information which has impact on consumers while using NFC technology. The correlation table reveals that the Pearson's coefficient of correlation value for the Relationship between gender and services is 0.028. There is significant relationship between gender and services. Thus the alternate hypothesis is accepted.

H5: There is no significant relationship between Gender and uses which has impact on consumers while using NFC technology.
The correlation table reveals that the Pearson's coefficient of correlation value for the Relationship between gender and services is 0.042. There is significant relationship between gender and services. Thus the alternate hypothesis is accepted.

REGRESSION ANALYSIS
Further the relationship between gender and Services and relative advantage has been identified using the regression analysis.

H6: There is no significant relationship between Income and Services & relative advantage which has impact on consumers while using NFC technology.

H7: There is no significant relationship between Income and Services & relative advantage which has impact on consumers while using NFC technology

Table-9 Model summary								
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change statistics				H0 Accepted / Rejected
					R Square Change	F Change	Sig. F Change	Durbin Watson	
1	.166[a]	.028	.018	2.951	.028	2.775	.099	1.506	Accepted
2	.230	.053	.043	2.26773	.053	5.464	.021*	1.806	Rejected
Predictors: (Constant): Income									
Dependent Variable: Relative Advantage, Services									
** 0.01 significant level; * **0.05 significant level.**									
Model1-Relative Advantage; Model2- Services									

Interpretation: The above shows the regression analysis of the Dependent variable: Services, Relative Advantage and Independent Variables: Income the R square change value for model 1 is 0.028, which shows that only 2.8% of the variation in the impact of NFC technology among consumers which is significant at 0.05 levels. The R square change value for model 2 is 0.053, which shows that 5.3 % of the variation in the impact of NFC technology among consumers which is significant at 0.05 level. The Durbin-Watson 1.506 which is more than one and not greater than three also supports this regression model. Stepwise multiple regressions were performed taking Income independent variables and understanding services and Relative Advantage as dependent variable. The two dimensions of Impact factor for NFC technology such as Services and Relative Advantage emerged as the significant predictors of NFC technology. For model 1 multiple determination factor R square (Goodness of fit) value is 0.028, F-value of the regression is 2.775 (p = 0.00) and Factor R of multiple cross-correlation 16.6 percent shows high cross correlation which is less than the acceptance level of 0.01. For model 2 multiple determination factor R square (Goodness of fit) value is 0.053, F-value of the regression is 5.464 (p = 0.04) and Factor R of multiple cross-correlation 23 percent shows high cross correlation which is less than the acceptance level of 0.05.

Table-10 ANOVA						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	24.160	1	24.160	2.775	0.099[a]
	Residual	853.280	98	8.707		
	Total	877.440	99			
2	Regression	28.087	1	28.087	5.464	0.021[b*]
	Residual	503.753	98	5.140		
	Total	531.840	99			
a. Dependent Variable: Relative advantage, Services						
b. Predictors: (Constant), Income						

Interpretation: The hypotheses are further tested by ANOVA. In model 1, the F value and significance value, p indicates that there is no significant relationship between income and relative advantage since, the value is greater than 0.05. Thus, the null hypothesis is accepted.

In model 2, the F value and significance value, p indicates that there is a significant relationship between income and relative advantage since, the value is lesser than 0.05. Thus, the null hypothesis is rejected.

Table -11 Coefficients						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	8.643	0.565		15.289	0.000**
	Income	-0.394	0.236	-.166	-1.666	0.099
2	(Constant)	0.909	0.434		22.806	0.000**
	Income	-0.425	0.182	-0.230	-2.338	0.021*
a. Dependent Variable: Relative advantage						
a Dependent Variable: Services						
** 0.01 significant level; * 0.05 significant level						

Interpretation:
2 Regression equations were derived from the Analysis.

Model 1 (Relative Advantage)	$Y=8.643-0.394x_1$
Model 2 (Services)	$Y=0.909-0.425x_1$

FINDINGS FROM THE STUDY
Demographic profile
The majority respondents for the study were male from the age group of 15-25 years have competed their Post-Graduate working in the private sector and earning Below Rs.20000.

Factor Analysis
Only one component was identified while loading all the five factors of impact on NFC. The component was named as inclination where the factor uses has the highest score of 94%.

Correlation Analysis
There is no significant relationship between gender and all the factors impacting the NFC technology since, all the null hypotheses were accepted because gender does not affect any of the factors to use the NFC technology.

Regression Analysis
The regression analysis further supports the correlation analysis by rejecting the null hypothesis and reinstates that Income as a predictor in explaining Relative Advantage and Services. In this regression analysis two models were derived for understanding impacting factors for NFC technology. In model 1, Relative Advantage for 2.8% of variance in understanding impacting factors for NFC technology. In the model 2 services accounted for 5.3% of variance in understanding impacting factors for NFC technology.

CONCLUDING OBSERVATIONS
NFC technology is one among the new inventions, which is growing faster and has moved on from its infancy stage. Now many of them are aware of this technology and the prospect of it. The factors such as services,

compatibility, convenience, information and users were identified. The most influencing factor among these five factors were services and the relative advantage because people tend use the NFC technology only if it performs additional function other than payments, if it has attractive offers, up to the individuals expectation, make transactions efficiently, effectively and in an convenient manner, and if it makes the individual to control their spending habits. The needs of the individual are met only by a single click with the help of NFC technology.

SCOPE FOR FURTHER RESEARCH

This research work may form a basis for the future researchers, as the study has identified only the factors influencing the NFC technology and also has identified the most influencing factors. Future researchers can widen their research on the risk and the challenges faced by the NFC technology users. The research can also be widened on the operating activities of the NFC in smart devices.

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