

# Consumer Perception towards Risks Involved in Near Field Communication (NFC) Technology

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**Abstract-** In the midst of the safe payment tools and capital obtainable, Near Field Communication (NFC), technology has emerged as a leader. Innovative users of (NFC), in particular for payment purposes such as storing credit card information, are reasonably anxious primarily on the subject of the security and safety of their confidential information. Probable security attacks comprise eavesdropping, data corruption or alteration, interception attacks, and physical thefts. Shielding customers' payment dealings is pinnacle precedence for the majority businesses 72% of businesses cites fraud as an emergent concern, and 63% report the similar or elevated levels of deceitful losses over the recent past. NFC technology presents novel opportunities for conducting commerce that plea to consumers and businesses the same. Tapping a payment is no hesitation easier and additional expedient than a conventional card transaction. As long as consumers are certain of the safety of NFC transactions, the technology holds the latent to essentially alter and get better the payments know-how. The risk factors identified for the study were Sensitive Financial Data, Spyware and Malware Interface, Data Interception, Data Tampering, Mobile Malware and lack of education. The concluding observations for the research are that there is no noteworthy association between age and risk involved in usage of the NFC mobile payments.

**Keywords – Data Interception, Data Tampering, NFC, Risks, Sensitive Financial Data**

## I. INTRODUCTION

In an individual's day to day life an individual is caught up in technology while carrying out their financial chores. Starting and ending the day only with machines and material things while doing so. Every activity one carry out is involved with risk. Even though an end user has engaged in Near Field Communication (NFC) with men and machines with a very good approach, there are many chances for risks, mistakes and deviations arising out of it. Machines and technology have certain disadvantages and drawbacks which will obviously lead to risk arising out of that technology. NFC is one among the innovations which engage in recreation a essential position in the payment system in smart devices and many other activities. NFC is powerful for the future of mobility and is becoming the system of option for portable payments. NFC is a technology that has been around already for years, but has gained much attention. NFC which helps in payments for the consumers helps in storing their credit card information. People are very much concerned about storing their private information in smart devices. Probable securities attacks consist of eavesdrop, information corruption or alteration, interception attacks, and bodily thefts. It is also necessary to take necessary steps to protect the smart devices. For instance, protecting the smart devices with Personal Identification Number (PIN) password or biometric login would help the consumer to safe guard their mobile wallets. This paper highlights Consumer Perception towards Risks involved in Near Field Communication (NFC) technology and the relationship between the age and risk involved in usage, information and complexity by means of NFC technology.

## II. REVIEW OF LITERATURE

Haidong Zhao, Lini Zhang Sophia T Anong (2019) "Understanding the impact of financial incentives on NFC mobile payment adoption- An experimental analysis" has identified the accessibility of monetary encouragement had a constructive result on aim to accept NFC mobile compensation; monetary incentives ultimately pretentious purpose through supposed risk; and while different types, amounts or support periods did not seem to material for those in the low apparent danger cluster, the major result of endorsement stage and the interface result between quantity and support stage were noteworthy for those in the high apparent danger group.

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 newest in sequence on new manufactured goods arrival, cost and brands in the nearness advertising interactions 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.

Hongxiu Li (2018) in their study “Understanding the factors driving NFC-enabled mobile payment adoption: An Empirical Investigation.” has identified perceived usefulness and perceived risk do not affect the use intention significantly in adopting mobile payments among consumers

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 seclusion risk, presentation risk, monetary risk, emotional risk. They have also noted that seclusion and emotional risk as the most significant danger size for the NFC mobile payments.

Iviane Ramos De Luna, Francisco Montoro-Ríos Francisco Liébana-Cabanillas, Joao Gil De Luna (2016) in their study “NFC technology acceptance for mobile payments” has identified that approach, individual modernism in IT and apparent value are determinants of prospect purpose to use the NFC technology.

### III. RESEARCH GAP

Review of literature suggests that many records of studies have been carried out to study the NFC and its impacts. Researchers have also analyzed the monetary factors, emotional aspects and also the communal 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 towards the risk factors while using the NFC technology. This study has looked into the consumer’s perception and also on the payment method aspects towards the risk enabling factors while using NFC.

### IV. OBJECTIVES OF THE STUDY

- To determine the consumer perception towards risk involved while using the NFC technology.
- To find out the relationship between the age and risk involved in usage, information and complexity by means of NFC technology.

### V. RESEARCH METHODOLOGY

Table – 1 Methodology Description

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; survey of individual ideas Secondary data- Journals
Period of Study	June 2019 to October 2019
Statistical Techniques	Correlation analysis, Regression Analysis, and Cronbach’s alpha.

### VI. HYPOTHESIS FOR THE STUDY

- H<sub>01</sub>- There is no significant relationship between age and risk involved in usage by means of NFC technology.
- H<sub>02</sub>-- There is no significant relationship between age and risk involved in Information by means of NFC technology.
- H<sub>03</sub>- There is no significant relationship between age and risk involved in Complexity by means of NFC technology.
- H<sub>04</sub>- There is no significant relationship between income and risk involved in Sensitive Financial Data for using the NFC technology.

- H<sub>05</sub>- There is no significant relationship between income and risk involved in spyware or malware interface for using the NFC technology.
- H<sub>06</sub>- There is no significant relationship between income and risk involved in Data Interception for using the NFC technology.

## VII. DATA ANALYSIS AND INTERPRETATION

*Demographic Profile*

Table – 2 Demographic Profile

Particulars		Freq.	%
Age	15-25 Years	46	46.0
	25-35 Years	30	30.0
	35-45 Years	14	14.0
	Above 45years	10	10.0
	Total	100	100.0
Gender	Male	54	54.0
	Female	46	46.0
	Total	100	100.0
Qualification	Below UG	26	26.0
	UG	27	27.0
	PG	31	31.0
	Professional course	8	8.0
	Diploma	8	8.0
	Total	100	100
Occupation	Private Sector	52	52.0
	Public Sector	6	6.0
	Semi-Public	12	12.0
	Own Business	30	30.0
	Total	100	100.0
Income	Below Rs.20000	59	59.0
	Rs.20000-Rs.30000	7	7.0
	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 total 100 respondents in which 46% fall under the age group of 15-25 years where as 30% fall under the age group of 25-35 years 14% of the respondents were from 35-45 years of age. There were 54% male respondents taken for the study and 46% of the study was done with female respondents. Out of 100 respondents, 26% belong to below under graduation, 27% belong to under graduation, 31% of the respondents were from Post graduation. There were 52% respondents who are working in private sectors 6% of the respondents were from public sector, 12% of the respondents were from semi-public sectors and the remaining were from their own business. Out of 100 respondents, 59% of the respondents have monthly income of below Rs.20000, 7% 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.

*Reliability Analysis*

Table – 3 Reliability Statistics

Reliability Co-Efficient	
N of Cases=100	N of Items=36
Alpha= 0.956	
Source: Primary Data Analysis	

Interpretation: The Cronbach's alpha value is found to be 0.956 which is found to be highly reliable and consistent.

Table – 4 Correlation Analysis

	Gender	Usage	information	complexity
Gender	1	.107	.043**	.031**
usage	-	1	.860**	.910**
Information	-	-	1	.844**
complexity	-	-	-	1
H0 Accepted/Rejected	-	Accepted	Rejected	Rejected

**Interpretation:**

**H<sub>01</sub>- There is no noteworthy relationship between age and risk involved in usage by means of NFC technology.** The correlation table shows that the Pearson's coefficient of correlation value for the relationship between age and Usage is 0.107. There is no significant relationship between age and risk involved in usage. Thus the null hypothesis is accepted.

**H<sub>02</sub>- There is no noteworthy relationship between age and risk involved in Information by means of NFC technology.** The correlation table shows that the Pearson's coefficient of correlation value for the relationship between age and Information is 0.043. There is significant relationship between age and risk involved in information. Thus the alternate hypothesis is accepted.

**H<sub>03</sub>- There is no noteworthy relationship between age and risk involved in Complexity by means of NFC technology.** The correlation table shows that the Pearson's coefficient of correlation value for the relationship between age and complexity is 0.031. There is significant relationship between age and risk involved in complexity. Thus the alternate hypothesis is accepted.

*Regression Analysis*

Further the relationship between Income and the risk enabling factors has been identified using the regression analysis.

**H<sub>04</sub>- There is no noteworthy relationship between income and risk involved in Sensitive Financial Data for using the NFC technology.**

**H<sub>05</sub>- There is no noteworthy relationship between income and risk involved in spyware or malware interface for using the NFC technology.**

**H<sub>06</sub>- There is no noteworthy relationship between income and risk involved in Data Interception for using the NFC technology.**

Table – 5 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	.202a	.041	.041	.693	.041	4.161	.054	2.230	Accepted
2	.279a	.078	.069	.709	.078	8.303	.005	1.788	Rejected
3	.304a	.092	.083	.611	.092	9.944	.002	2.178	Rejected
Predictors: (Constant): Income									
Dependent Variable: Sensitive Financial Data, Spyware and Malware Interface, Data Interception.									
** 0.01 significant level; * 0.05 significant level.									
Source Primary Data Analysis									
Model1- Sensitive Financial Data; Model2- Spyware and Malware Interface, Model3- Data Interception									

**Interpretation:** The above shows the regression analysis of the Dependent variable: Sensitive Financial Data, Spyware and Malware Interface and Data Interception. Independent variable: Income. The R square change value for model 1 is 0.041, which shows that only 4.1% of the variation in the Risk of NFC technology among consumers which is significant at 0.05 levels. The R square change value for model 2 is 0.078, which shows that 7.8% of the variation in the risk of NFC technology among consumers which is significant at 0.05 level. The R square change value for model 3 is 0.092, which shows that 9.2% of the variation in the risk of NFC technology among consumers which is significant at 0.05 level. The Durbin-Watson 1.778 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 Sensitive Financial Data, Spyware and Malware Interface and Data Interception understanding as dependent variable. The three dimensions of Risk factor for NFC technology such as Sensitive Financial Data, Spyware and Malware Interface and Data Interception emerged as the significant predictors of NFC technology. For model 1 multiple determination factor R square (Goodness of fit) value is 0.041, F-value of the regression is 4.161 ( $p = 0.00$ ) and Factor R of multiple cross-correlation 20.2 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 0.078, F-value of the regression is 8.303 ( $p = 0.04$ ) and Factor R of multiple cross-correlation 27.9 percent shows high cross correlation which is less than the acceptance level of 0.05. For model 3 multiple determination factor R square (Goodness of fit) value is 0.092, F-value of the regression is 9.944 ( $p = 0.04$ ) and Factor R of multiple cross-correlation 30.4 percent shows high cross correlation which is less than the acceptance level of 0.05.

Table – 6 ANOVA

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	1.996	1	1.996	4.161	.054b
	Residual	47.004	98	.480		
	Total	49.000	99			
2	Regression	4.174	1	4.174	8.303	.005b
	Residual	49.266	98	.503		
	Total	53.440	99			
3	Regression	3.718	1	3.718	9.944	.002b
	Residual	36.642	98	.374		
	Total	40.360	99			

a. Dependent Variable: Sensitive Financial Data, Spyware and Malware Interface, Data Interception

b. Predictors: (Constant), Income

Source: Primary Data Analysis

**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 Sensitive Financial Data 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 significant relationship between income and Spyware and Malware Interface since, the value is lesser than 0.05. Thus, the null hypothesis is rejected.

In model 3, the F value and significance value, p indicates that there is significant relationship between income and Data Interception since, the value is lesser than 0.05. Thus, the null hypothesis is rejected.

Table – 7 Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t-Value	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.117	.127		16.672	.000
	Income	-.110	.054	-.202	-2.040	.044
2	(Constant)	2.154	.130		16.568	.000
	Income	-.159	.055	-.279	-2.882	.005
3	(Constant)	1.876	.112		16.735	.000
	Income	-.150	.047	-.304	-3.153	.002
a. Dependent Variable: Sensitive Financial Data						
a. Dependent Variable: Spyware and Malware Interface						
a. Dependent Variable: Data Interception						
** 0.01 significant level; * 0.05 significant level						
Source: Primary Data Analysis						

### Interpretation:

3 Regression equations were derived from the Analysis.

$$\text{Model 1 (Sensitive Financial Data)} \quad Y=2.117-0.110x_1$$

$$\text{Model 2 (Spyware and Malware Interface)} \quad Y=2.154-0.159x_1$$

$$\text{Model 3 (Data Interception)} \quad Y=1.876-0.150x_1$$

### VIII. FINDINGS FROM THE STUDY

**Demographic Profile:** The majority respondents for the study were male from the age group of 15-25 years have completed their Post-Graduate working in the private sector and earning Below Rs.20000.

**Correlation Analysis:** There is no noteworthy relationship between gender and uses for the NFC technology whereas gender and information and complexity have significant relationship between them. Gender has some impact towards the impact of 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 Sensitive Financial Data, Spyware and Malware

Interface, Data Interception. In this regression analysis three models were derived for understanding risk enabling factors for NFC technology. In model 1, Sensitive Financial Data for 4.1% of variance in understanding risk enabling factors for NFC technology. In the model 2 Spyware and Malware Interface accounted for 7.8% of variance in understanding risk enabling factors for NFC technology. In the model 3 Data Interception accounted for 9.2% of variance in understanding the risk enabling factors for NFC technology.

#### IX. CONCLUDING OBSERVATIONS

Tapping a payment is no hesitation easier and additional expedient than a conventional card transaction. As long as consumers are certain of the safety of NFC transactions, the technology holds the latent to essentially alter and get better the payments know-how. NFC technology is one among the new inventions, which is growing faster and has moved on from its infancy stage. Even though there are many goodness, there are many risk involved in it. The risk enabling factors such as spyware and malware interface, sensitive financial data, lack of education, mobile malware, data interception and data tampering were identified. The risk factors are being identified and can be deterred in a smart way.

#### X. SUGGESTIONS

NFC technology may well come into sight to be more susceptible to hackers in view of the fact that it facilitates the swap of responsive data that might be stolen while being transmitted “from end to end users .” But in appliance, NFC offers greater than before protections. NFC technology can be improved in a better way to avoid the risk involved like hacking. People will be more interested to use this type of technology if it does not cover any risks.

#### XI. SCOPE FOR FURTHER RESEARCH

This research work may form a basis for the future researchers, as the study has identified only risk enabling factors. Future researchers can widen their research on the activities involved in installing the technology into the smart devices and the ways in which these risks can be deterred easily in a smarter way.

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