Impact Of Security In 3G (3rd Generation) M-Commerce Applications For B2B & B2C Operations

Avdhesh Gupta* and Dr. Pankaj Madan#
*Research Scholor, GKV Haridwar
#Associate Professor, GKV Haridwar

Security challenges, security risks, and security implementations within 3-G M-Commerce is the main issues in this paper. Here, the attention will be paid to see the impact of security of 3-G M-Commerce applications on B2B and B2C operations. Further, by describing the current state of security within 3-G M-Commerce, the paper will show the pitfalls that need to be corrected. It is further envisaged to propose an ideal 3-G M-Commerce system that will overcome these pitfalls and provide optimal security and better quality without degrading the new technology to the point of uselessness. The work is aimed at addressing the issues related to the security of B2B & B2C operations in 3-G enabled M-Commerce so that we will have a positive effect on India's economic and social development.

1. INTRODUCTION

The E-Commerce, or the buying and selling of goods and services on the Internet, has become a part of daily life for many people. As the Internet expands to every corner of the globe, it is becoming easier and easier to access it from a wide variety of devices [1] . Cell phones, PDAs, and other mobile devices can now access the Internet from across the globe. E-Commerce over mobile devices has now been termed Mobile-Commerce [2] (M-Commerce). The M-Commerce by definition is the E-Commerce that is implemented through the use of wireless solutions such as cell phones, pocket PC's, and PDAs. It allows a user to purchase goods and services on the move, anytime, and anywhere.

An m-commerce application can be B2B, B2C or any other of the classifications available with e-commerce world [3]. Since wireless devices travel with the consumer, the ability or perhaps temptation to purchase goods and services is always present. This is clearly a technique that can be used to raise revenue. Also, the successful future of m-commerce depends on the power of the underlying technology drivers and the attractiveness of m-commerce applications. M-Commerce represents another wave of the e-commerce invasion that is changing the nature of business in the 21st century [4].

M-Commerce applications and the current 3-G have been finding it hard to be widely used in India. Wireless Application Protocol (WAP) is today's primary path for on-the-go access to Internet content and the 3-G. Recently 3-G services are provided by BSNL, MTNL, TATA-DOCOMO, AIRTEL, VODAPHONE etc in India. By the end of this year 2011, it is predicted that over 90 percent of all mobile phones users use 3-G services and 40 percent of 3-G users use m-commerce applications [5]. WAP has been designed to provide a user interface that is adapted to the small screen of a mobile handset and adjust to the speed

and latency restrictions of mobile networks. WAP is bearer independent and can be used on any digital mobile networks, packet-switched mobile data networks and 3G..

The third generation mobile networks are based on 2-G and 2.5-G networks. The underlying technology is same as the previous technology that enables the user to be connected without any interruptions and delays with high efficiency usage of networks. All it matters is to put a new layer on it to provide the latest and future perspective services. According to Lulea University of Technology [6] the technology and features associated with 3-G are illustrated in the Table 1.

Table 1 Technology and features of 3-G

	Technology	Bandwidth (Kbps)	Features
Third Generation Mobile (3-G) (UMTS)	IMT-2000 (International Mobile Telecommunications 2000) UMTS (Universal Mobile Telecommunications Systems)	64-2.048	* Always on * IP enabled * Very High speed data services

UMTS has a high data transfer rate (2 Mbit/s). This rate is comparable to broadband connections on home PCs. UMTS uses the W-CDMA (Wideband Code Division Multiple Access) interface, which also allows multiple users on the same radio frequency, such as GSM. The difference is that the frequency is not divided into time slots, but the narrowband information signal is spread over a wide band of frequencies (a technique called spread spectrum). UMTS uses what is called a paired spectrum, using a pair of 5 MHz spectrum, one for downloading (2100 MHz range) and the other for uploading (1900 MHz range).

2. M-COMMERCE APPLICATION FOR B2B AND B2C OPERATIONS

In a competitive marketplace, the need is to understanding how evolution of 3-G service affects the previous technologies. Financial transaction based organizations have moved from product centric to customer centric position. Analyzing service quality on B2B and B2C operations determines whether the businesses will survive or fail in future. With the development of 3-G enabled M-Commerce applications businesses and customers increasingly expect better services and more security in the coming information age.

The general m-commerce applications are categorized as transaction management, digital content delivery and telemetry services. The applications can be further subdivided into passive and active m-commerce application [7]. Active application relates with the applications in which the user has to take the initiative on his wireless device. In contrast, the passive applications themselves get activated towards accomplishing the assigned jobs or facilitate the users to carry forward. The Table 2 shows the B2B and B2C Operations for M-commerce applications [4, 8].

Table 2 B2B & B2C operations for M-commerce applications

B2B and B2C Operations	M-commerce Applications
Mobile Financial Applications (B2C,B2B)	Banking, brokerage, fund transfer, payments

B2B and B2C Operations	M-commerce Applications
	for mobile users
Mobile Advertising (B2C)	Sending user specific and location sensitive advertisements
Mobile Office (B2C)	Working from traffic jams, conferences etc.
Mobile Inventory Management(B2C,B2B)	Location tracking of goods, boxes & People
Wireless Data Centre (B2C,B2B)	Information downloaded by mobile users
Mobile Entertainment (B2C)	Video on demand, online TV, Online gaming etc.
Wireless Re-engineering (B2C,B2B)	Improvements of business services
Proactive Service Management (B2C,B2B)	Transmission of information related to aging components to Vendors
Product Locating and Shopping (B2C,B2B)	Locating/ordering certain items from a mobile device
Mobile Auction (B2C,B2B)	Services for customers to buy/sell certain items
Mobile Booking and Ticketing (B2C,B2B)	Services allowing customers to book, tickets for travel, hotel and events
Mobile Marketing Research (B2C)	Obtaining instant feedback from customers
Mobile CRM,Customer Support (B2C,B2B)	Customer acquisition and retention by providing truly personalized content
Mobile Entertainment Service (B2C)	VoD, MoD, gambling, interactive games and other services
Mobile Distance Education(B2C,B2B)	Taking classes, training courses using streaming video and audio
Wireless Business Re-engineering (B2C,B2B)	Information up/downloading by mobile users (e.g. adjusters in an insurance company.

3. M-COMMERCE SECURITY IN 3-G BASED M-COMMERCE

Security challenges, security risks, and security implementations within 3-G M-Commerce and also the quality in 3-G M-Commerce are the main issues in this research. Here, the attention will be paid to see the impact of security and quality of 3-G M-Commerce applications on B2B and B2C operations [10]. Further, by describing the current state of security within 3-G M-Commerce, the resear9 will show the pitfalls that need to be corrected. It is further envisaged to propose an ideal 3-G M-Commerce system that will overcome these pitfalls and provide optimal security and better quality without degrading the new technology to the point of uselessness.

In today's E-Commerce world, the security is the major issue that needs to be constantly monitored and improved. For the extensive use of 3-G enabled M-Commerce, it is necessary to see the impact on businesses and their customers. By expanding E-Commerce to mobile devices it is also necessary to ensure that these devices are protected against security threats. M-Commerce faces the same security threats that E-Commerce faces plus many others due to the mobile nature of the products.

An article [10] on "Security in M-Commerce" state that the M-Commerce industry is still in a developing phase. The protocols used in M-Commerce are inherited from E-Commerce. Hence, all the open issues in E-Commerce are also left unanswered in M-Commerce. This article describes the various security issues of M-Commerce.

According to Mike Fuller [11] there are many security challenges and weaknesses that exist within M-Commerce systems. In order to expand the usage of M-Commerce, the manufacturers, the developers, and the wireless carriers need to gain the consumer trust by implementing the security features into their devices. They also need to ensure that adding this security features is not overly burdensome to the consumer. If so, the devices and features will never be utilized. If the manufacturers and the developers bring out more secure devices and implement more secure protocols, and ensure that users are aware of the potential ramifications of their actions, then only the consumer's trust will come. The paper described many of the challenges and weaknesses that need to be overcome. It is hence up to the manufacturers, developers, and carriers to pay attention to the security aspects of M-Commerce and resolve the issues that exist today.

Sudhir Dixit, Yile Guo, and Zoe Antoniou [12] said that the third generation networks and services present opportunities to offer multimedia applications and services that meet end-to-end quality of service requirements. The key parts of the standards are already in place, and limited 3-G services have already been turned on. While the evolution to 3-G occurs, many operators will implement 2.5-G interim solutions for a good period of time. This paper briefly discusses the various evolution scenarios of quality related issues from the present 2-G networks to 3-G networks.

4. RESEARCH DESIGN AND HYPOTHESIS

The research will be carried out through two key modules: primary research and extensive desk research. The Secondary research will involve an in-depth survey of various literature sources like newspapers, magazines, etc., and primary data collection shall be through structured questionnaire and interviews across a cross-section of stakeholders. These also include the telecom operators, the content aggregators, the content owners, the customers and the technology enablers. To gain a better understanding of the dimension that affect the customer and the business perceived M-Commerce security and quality for B2B and B2C operations, the 360 degree stake holders' survey will be done. Further, we will investigate the customers from various sectors like banks, on line shopping and other B2B operators in northern India. The sample size will be of 100 company's representatives for B2B survey and of 200 customers accessing services through B2C. Appropriate hypothesis shall be evolved after in depth analysis of the previous researches done in this area.

H01 : There is no significant difference between security issues of 2G and 3G networks perceived by B2B and B2C operators.
H02 : Change in 3G Network security issues do not influence the intention to participate in M-commerce operations.

5. ANALYSIS AND INTERPRETATION

Now we did the survey to compare security and quality attributes of 3G services and previous 2G or 2.5G services. Table 3 shows 3G networks quality attributes as compared to 2G or 2.5G networks.

Table 3 Comparison between quality attributes of previous and 3G services

Rating \ Attributes	Security in 3G as in 2G		Trust on Network Accessibility		Secure 3G		Overall Security	
	Freq.	Percent	Freq.	Percent	Freq.	Percent	Freq.	Percent
Not Satisfied	8	2.6	31	10.8	12	3.9	33	10.2
Moderately satisfied	48	15.7	47	14.4	46	15.1	44	15.4
Compromised	90	29.5	133	39.7	73	23.9	121	43.6
Satisfied	145	47.5	70	28.5	155	50.8	87	23.0
The Overwhelmed Satisfaction	14	4.6	24	6.6	19	6.2	20	7.9
Total	305	100.0	305	100.0	305	100.0	305	100.0

47.5% users were satisfied with the security features in 3G m-commerce as compared to 2.0G or 2.5G, 29.5% users did compromised with the security features in 3G m-commerce as compared to 2.0G or 2.5G, 15.76% users were moderate satisfied with the security features in 3G m-commerce as compared to 2.0G or 2.5G, while only 4.6% users were have the overwhelmed satisfied with the security features in 3G m-commerce as compared to 2.0G or 2.5G and only 2.6% users are not satisfied with the security features in 3G M-commerce as compared to 2.0G or 2.5G.

39.6% users had compromised with the trust on 3G network as compared to 2G or 2.5G network, 28.5% users were satisfied with the trust on 3G network as compared to 2G or 2.5G network, 14.4% users were moderate satisfied with the trust on 3G network as compared to 2G or 2.5G network, while only 10.8% users were not satisfied with the trust on 3G network as compared to 2G or 2.5G network and only 6.6% users had the overwhelmed satisfaction satisfied with the trust on 3G network as compared to 2G or 2.5G network.

43.6% users had compromised with the overall security of 3G network as compared to 2G or 2.5G network, 36.0% users were satisfied with the overall security of 3G network as compared to 2G or 2.5G network, 15.4% users had moderate satisfaction with the overall security of 3G network as compared to 2G or 2.5G network, 10.2% users were not satisfied with the overall security of 3G network as compared to 2G or 2.5G network.

39.6% users had compromised with the trust on 3G network as compared to 2G or 2.5G network, 28.5% users were satisfied with the trust on 3G network as compared to 2G or 2.5G network, 14.4% users were moderate satisfied with the trust on 3G network as compared to 2G or 2.5G network, while only 10.8% users were not satisfied with the trust on 3G network as compared to 2G or 2.5G network and only 6.6% users had the overwhelmed satisfaction satisfied with the trust on 3G network as compared to 2G or 2.5G network, 7.9% users had the overwhelmed satisfaction with the overall security of 3G network as compared to 2G or 2.5G network.

Table 4 One sample statistics for comparison of security attributes between 3G network and 2G or 2.5G network

	N	Mean	Std.Deviation	Std. Error Mean
Trust on Network	305	3.03	1.052	0.060
Secure 3G Accessability	305	3.06	1.061	0.061
Security in 3G as in 2G	305	3.36	0.892	0.051
Overall Security	305	3.40	0.952	0.054

Table 5 One sample test for comparison of security attributes between 3G network and 2G or 2.5G network

	Test Value = 3					
	t	df	Sig.(2-tailed)	MeanDifference	95%Confidence Interval of the Difference	
					Lower	Upper
Trust on Network	0.490	304	0.625	0.030	-0.09	0.15
Secure 3G Accessibility	0.918	304	0.360	0.056	-0.06	0.18
Security in 3G as in 2G	6.995	304	0.000	0.357	0.26	0.46
Overall Security	7.400	304	0.000	0.403	0.30	0.51

The table 4 and 5 displays the number of cases, mean value, standard deviation, and standard error for the test variable(s). Since the One-Sample T Test procedure compares the mean to a specified value, it is useful to know what the mean value is.

The One-Sample T Test procedure tests whether the mean of a single variable differs from a specified constant. The mean value is displayed in the One Sample Statistics table, and the constant is test value displayed in the One Sample T Test table. A low significance value (typically below 0.05) indicates that there is a significant difference between the test value and the observed mean.

The test observed that:

(1) A significance value of 0.625 in case of trust on 3G networks, indicates that there is no significant difference between security issues of 2G and 3G networks perceived by B2B and B2C operators.
(2) A significance value of 0.360 in case of secure 3G accessibility, indicates that there is no significant difference between security issues of 2G and 3G networks perceived by B2B and B2C operators.
(3) A significance value of 0.000 in case of more security in 3G network as compared to 2G network, indicates a significant difference between security issues of 2G and 3G networks perceived by B2B and B2C operators.
(4) A significance value of 0.000 in case of speed, indicates a significant difference between security issues of 2G and 3G networks perceived by B2B and B2C operators. If the confidence interval for the mean difference does not contain zero, this also indicates that the difference is significant. If the significance value is high and the confidence interval for the mean difference contains zero, then we cannot conclude that there is a significant difference between the test value and the observed mean.

Table 6 Chi square statistics for availability of government regulation

	Observed N	Expected N	Residual
YES	183	152.5	30.5
NO	122	152.5	-30.5
Total	305		

Table 7 Chi square statistics for trust intention towards using M-commerce

	Observed N	Expected N	Residual
YES	249	152.5	96.5
NO	56	152.5	-96.5
Total	305		

Table 8 Chi square statistics for problem faced in M-commerce

	Observed N	Expected N	Residual
YES	166	152.5	13.5
NO	139	152.5	-13.5
Total	305		

Table 9 Chi square statistics for knowledge increase by using M-commerce

	Observed N	Expected N	Residual
YES	274	152.5	121.5
NO	31	152.5	-121.5
Total	305		

Tables 6,7,8 and 9 list the number of cases (both observed and expected) in each category of the variable being analyzed. One option is to have the expected N correspond to all categories having equal frequencies (as in this example). Alternatively, the expected N can correspond to a user-defined distribution. Here, a distribution of 50% High, 30% Medium, and 20% Low is hypothesized. Residual lists the difference between what is observed and what is hypothesized. Residuals identify categories which vary from the hypothesized distribution. In this example, the observed number of salespeople with a low sales volume is lower than expected and the observed number of attribute with yes/no is greater than expected..

Table 10 Chi square test statistics for user intention according to security attributes

	Availability of Government Regulation	Trust Intention towards using M-commerce	Faced Problem in M-commerce	Knowledge Increase by using M-commerce
Chi-Square(a)	12.200	122.128	2.390	193.603
df	1	1	1	1
Asymp. Sig.	0.000	0.000	0.122	0.000

Table 10 contains the output of the Chi-Square test. Df equals the number of categories minus one. In this example, the attributes has two categories (yes, no). Small significance values (<0.05) indicate that the observed distribution does not conform to the hypothesized distribution. Also there is only one case where small significance value is 0.122 in case of problem faced in m-commerce transaction, so the users are facing problems in M-commerce transaction.

6. CONCLUSION

This paper shows that there are significant differences between the security issues of 2G

or 2.5G and in 3G networks. Also due to this significant difference the consumer or business people use the m-commerce operations using 3G networks. In this survey it is very tough to identify the actual users of m-commerce; beside this we have taken the survey from the actual users only. The both hypothesis are rejected and hence the result is that there is significant difference between security issues of 2G and 3G networks perceived by B2B and B2C operators and change in 3G Network security issues influence the intention to participate in M-Commerce operations.

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