ISSN 2348-1196 (print)
International Journal of Computer Science and Information Technology Research ISSN 2348-120X (online)
Vol. 11, Issue 3, pp: (1-6), Month: July - September 2023, Available at: www.researchpublish.com

AWARENESS AND ACCEPTABILITY OF SINGLE SMART CARD TECHNOLOGY AMONG STUDENTS IN FEDERAL POLYTECHNIC BALI, TARABA STATE

[1]Ariwa Rosemary Ngozi

Department of Computer Science

Federal Polytechnic Bali, Taraba State

DOI: https://doi.org/10.5281/zenodo.8113163

Published Date: 04-July-2023

Abstract: **In today's world, carrying multiple cards by an individual to establish one's identity and make different transactions has become an essential part of our lives' routine. Several options have been adopted by various countries and every option has its pros and cons. However, it has been observed that in most cases, a single smart card solution has been preferred by users and organizations in some countries and Nigeria is yet to adopt it. This paper is mainly to study the Single smart card awareness, acceptability among Polytechnics students in Taraba State. The study adopted survey research design. Thus, two hundred (200) students were randomly sampled (from a population of one thousand six hundred) for the study. Two research questions guided the study. Data for the study was collected through a self-designed questionnaire. The data collected were analyzed using Arithmetic Mean and Standard Deviation. The findings of the study showed that many students go about with multiple cards without the awareness of single smart card technology, while others due to security challenges constrained the acceptability of a single smart card. The paper concluded that there is a need for awareness and training to familiarize users with the single smart card technology looking at its benefits and application outweighing it challenges. Also, the paper recommended among others that further research on the security of a single smart card should be carried out to enable users to accept and adapt to its functionality.**

Keywords: **Smart Card, Awareness, Acceptability, & Technology.**

I. INTRODUCTION

Information Technology (IT) today plays a vital role in serving various organizations such as a bank, the healthcare sector, hotels, industries even the federal government to provide security for its physical and information assets. Today, organization employees are issued different types of identification (ID) cards, which are used to access organizational facilities and buildings by security personnel. Equally, some of these cards are cannot be used for other purposes—such as access computer systems, ATM machines, Library, buildings, and Hotels to mention just a few and some of these cards can be easily forged, stolen, or altered to gain access to a system by others [1].

A smart card, chip card, or integrated circuit card (ICC or IC card) is **a physical electronic authorization device, used to control access to a resource.** It is a flexible credit card with an implanted microchip. smart card is a microchip or circuit that has been integrated into a pocket-size card [2]. A smart card is a portal device that is used to store several applications which can be accessed by the owner via a centralized database either offline or online. The size of the card is portal,

convenient, and safe for any transaction. The involvement of several parties in smart card technology is a security challenge to most people that are using the smart card.

II. THE BENEFIT OF A SINGLE SMART CARD TECHNOLOGY

Single smart card technology is a chip where users' personal information such as students, banks, hospitals, and driver's licenses data are embedded in a single chip. Thus, single smart card technology can be beneficial to societies when many people take advantage of this innovation. This can circumvent the need to carry multiple cards all the time, also this has reduced the stress of recalling access codes for different cards from a different organization. With the benefits that a single smart card has brought, one can make different transactions and pay bills at ease. Consequently, with this technology different organizations including the government can locate and find out the history of their employee, even when the card gets lost it can be traced from the central system. Also, it helps in tracing defaulters, or people with criminal acts from the central system. The application can help in reducing the number of fake licenses, and ghost workers and also acts as a mechanism that will aid the government to have control of its employees. This will go alone way in reducing duplication of data and maintaining data integrity among the employee

Many western countries among others in the world have adopted smart cards, yet developing countries are yet to embrace the innovation of smart card technology, developing countries that adopt it are not using it on a large scale because it has not valued its benefits [3]. However, for the technology to gain user acceptance, there is a need for user awareness of the advantages, features, and benefits which is one of the factors that will influence users to accept the innovation of a single smart card. User awareness has a great substantial and direct consequence on user approval of smart card technology. Equally, the knowledge about the technology can motivate users' acceptance of the innovation of a single smart card.

[4] maintain that for new technology to function effectively it depends on user acceptability which is very important. Lack of acceptance course barrier to the accomplishment of new technology. Thus, he viewed user acceptance as the essential factor responsible for the success or failure of any technology project. Equally, they opined that users' views and attitudes towards the adoption of smart card technologies should not be taken lightly because is paramount in the decision-making process. However, user awareness is imperative, and training and supporting users are also important. In the same vein, culture plays important role in determining single smart card technology acceptance. The difference in culture among many nations may affect the implementation of the new technology.

[5] observed that; many people now in most countries, inside their wallets, probably have different transactions ranging from credit cards, identification cards, card ATM cards, and maybe a few other plastic cards. Though smart card technology improves security and convenience it is not widely accepted in Middle East countries. However, for a new technology to be adopted there is a need for user acceptability. One of the major causes that affect the single smart card technology acceptance is users' awareness of the technology.

The modern way user's access and pays for transportation services is through an electronic smart card. The benefits of a smart card are directly proportional to the amount of data and applications that are programmed for use on a card. A single smart card (contact/contactless) can be programmed with multiple functions such as banking credentials, medical entitlement, driver's license/public transport entitlement, loyalty programs, club memberships, etc. Multi-factor and proximity validation have been built into a single smart card to enhance the security of all services on the card. For example, a smart card can be programmed to only allow a contactless transaction if it is also within range of another device like a uniquely paired mobile phone. With this, the security of smart cards can significantly improve. Companies, organizations, and governments save money because of security that has been improved and also reduced processing costs. These savings help reduce public budgets or enhance public services. For example, they only need to replace one card if their wallet is lost or stolen. The data storage on a card can reduce duplication, and even provide emergency medical information. Among other benefits of smart cards are Compactness, improved data, storage capacity, and Dependability that is virtually not affected by electrical and magnetic fields.

Consequently, [1] maintains that several benefits that smart cards offer to the different organization including the federal government, such as better validation of cardholders' identities, improved security over buildings, more effective data and computer systems protection, effective in a financial and non-financial transaction. The inherent security and flexibility of smart cards increase their utility. Improved data storage and security supplemented with provisioning of encryption and decryption by a user offer a high rate of convenience to users. **Healthcare:** The cards allow medical facilities to safely store information for a patient's medical history, instantly access the information and update it if needed and reduce health care

fraud. **Computer & Network Security:** Microsoft Windows, new versions of Linux, and Sun Microsystems have begun using smart cards as a replacement for user names and passwords. Understanding that Public Key Infrastructure (PKI)-enhanced security is needed, a smart card badge is becoming the new standard. With single smart cards, users can be identified and granted access to specific data.

[6] said the security threat has greatly influenced the adoption of single smart card technology. End users' understanding and adoption of the innovation can contribute to the development of the smart card system. [5] Maintains that users' trust in new systems and technology makes it to be accepted in society. Hence, the security of the technology motivates users to accept any innovation as well. Therefore, security has played a vital role in user satisfaction and consequently in user acceptance. It means that with an increasing level of security, the level of user acceptance will also increase. Thus, with the innovation of smart cards that have been in use in different ways across the globe, security become a concern in information Technology most especially in the areas that involved transactions and dissemination of data via the internet. Furthermore, security has been identified as one of the major factors that can influence the acceptance of a single smart card.

III. STATEMENT OF PROBLEM

In the world today, many people go about with different cards in their wallets, ranging from credit cards, identification cards, ATM cards, and maybe a few other plastic cards. [7] Many organizations such as supermarkets, hotels, banks, retail, Healthcare, and Mobile communication to mention a few have introduced smart cards to their services. It has been observed that many students of Federal Polytechnic Bali were not aware of the usage of a single e smart card, thereby going about with multiple cards. As a result of these multiple cards, there is the likelihood of duplication of data. With the rate of insecurity in the nation also pose a great concern on the acceptability of single smart card. Government and organization end up spending huge amount of money in producing multiple cards for employees. However, with a single card, the only need is to replace the card when lost or stolen. Based on the above-mentioned problems, the researcher tends to find out the level of awareness, acceptability of a single smart card among students of Federal Polytechnic Bali, Taraba state.

IV. AIM AND OBJECTIVES OF THE STUDY

The paper examines the level of awareness, acceptability, and prospects of Single smart card technology in Federal Polytechnic Bali.

Specifically, the study sought to:

1. Identify the level of awareness of a single Smart card among Polytechnic students using Federal Polytechnic Bali as case study.

2. Ascertain the extent of acceptability of a single smart card among Polytechnic students using Federal Polytechnic Bali as case study.

Research Questions

The following research questions guided the study

1. To what level is the awareness of a single smart card among students of Federal Polytechnic Bali?

2. To what extent is the acceptability of a single smart card among students of Federal Polytechnic Bali?

V. METHODOLOGY

The study adopted the descriptive survey research design. The population of the study was 1600 students of Federal Polytechnic Bali Taraba State. A simple random sampling technique was used to select 200 respondents from the population. A self-designed structured questionnaire was adopted for this study. The instrument was titled the Level Awareness of Single Smart Card among Students of Federal Polytechnic Bali (LASSCASFPB), Acceptability of Single Smart Card among Students of Federal Polytechnic Bali (ASSCASFPB), with 20 items used to collect data for the study. The Questionnaire which was designed on a four-point rating scale of Very High Level (VHL) 4, High Level (HL) 3, Low Level (LL) 2, and Very Low Level (VLL) 1 was validated by two experts. The questionnaires were administered and collected by the researcher. Data collected were analyzed using Arithmetic Mean and Standard Deviation. Any item with a mean rating of 2.50 and above was regarded as accepted while any item with a mean rating below 2.50 was regarded as rejected.

Research Question 1: To what level is the awareness of a single smart card among students of Federal Polytechnic Bali? **N=200**

Table 1: The level of awareness of single smart card among students of Federal Polytechnic Bali

S/N	ITEMS	VHL	HL	LL	VLL	MEAN	SD	Remark
1	Single Smart Card is easier to make payment of fees, healthcare, public transit etc	90	56	44	10	3.13	1.77	Accepted
2	Single Smart Card is used in changing interaction at the Canteen and Cafeteria	16	44	57	83	1.965	1.40	Rejected
3	Smart Card influence on students tracking system	7	23	90	80	1.785	1.33	Rejected
4	Single Smart Card simplifies the way students use Library	15	45	93	47	2.14	1.46	Rejected
5	Single smart card is used to take attendance in class	10	5	90	95	1.65	1.28	Rejected
6	Single Smart Card used for school dismissal	12	18	84	86	1.78	1.33	Rejected
7	Single Smart card aid Financial Transaction	85	65	36	14	3.11	1.76	Accepted
8	It serves as means of data storage	2	53	87	58	1.10	1.41	Rejected
9	It serves as security authentication & access control	3	30	67	100	1.68	1.30	Rejected
10	Its aid the facilitation of personal Identification	89	74	31	6	3.23	1.80	Accepted

Sources: Field Survey 2023

Table 1 revealed the mean responses on the level of awareness of a single smart card among students of Federal Polytechnic Bali. Based on the cut-off point of 2.5, the result indicates that 8 items with a mean score ranging from 1.10 to 2.14 from the responses were rejected which shows their level of awareness of single smart card technology. However, items 1, 7, and 10 with the mean score of 3.13, 3.11, and 3.23 respectively, which is above the cut-off mark of 2.50 revealed the level of their awareness of single smart card technology.

Research Question 2: To what extent is the acceptability of a single smart card among students of Federal Polytechnic Bali? **N=200**

Table 2: The extent of acceptability of a single smart card among students of Federal Polytechnic Bali

S/N	ITEMS	VHE	HE	LE	VLE	MEAN	SD	Remark
1	Security threats make it difficult to be adopted into the society	103	52	28	17	3.21	1.79	Accepted
2	A single smart card is too expensive to obtain and difficult to operate	36	64	85	15	2.61	1.61	Accepted
3	The fear of damage, loss, or stealing has constrained the acceptability of a single smart card	115	41	29	15	3.28	1.81	Accepted
4	Not every store has the necessary hardware for accepting the smart card for financial transaction	92	80	8	20	3.22	1.80	Accepted
5	Single smart card has more advantage over traditional cards	55	95	39	11	2.97	1.72	Accepted

Source: Field Survey 2023

The result in table 2 shows the extent of acceptability of a single smart card among students of Federal Polytechnic Bali. Based on the cut-off points, the result reveals that all 4 items from the responses were accepted as it shows the extent of acceptability of a single smart card technology among students in Federal Polytechnic Bali. The mean score obtained from the item ranges from 2.61 to 3.28. The finding implies that all items accepted the extent of acceptability of a single smart card technology among students of the Polytechnic.

VI. DISCUSSION OF FINDINGS

The result of the study relating to research question one on the level of awareness of single smart cards among students of Federal Polytechnic Bali reveals that only two items were rated above cut-off points, this shows that the majority of students are not aware of single smart card technology. The findings of the study are in agreement with the study of Taherdoost, et al (2013) who noted that for the technology to gain user acceptance, there is a need for user awareness of the advantages, features, and benefits which is one of the factors that will influence users to accept the innovation. User awareness has a great substantial and direct consequence on user approval of smart card technology.

Research question two results on the extent of acceptability of a single smart card among students of Federal Polytechnic Bali reveals that the polytechnic students are ready to accept the innovation of single smart card technology. However, security challenge has affected the acceptance of the technology, this is in line with Lai, P. C. (2016) that said the security threat has greatly influenced the adoption of single smart card technology. Similarly, research question three reveals that the single smart card technology has potential usage.

VII. CONCLUSION

It is obvious that many of the students are not aware of the innovation of single smart card technology. Equally, security threats have a negative effect on user satisfaction and consequently the acceptability of a single smart technology, this is in line with [5] that lack of user acceptance is a substantial barricade to the success of single smart card technology. However, there is a need for awareness and training to familiarize users with the single smart card technology looking at its benefits and application overweighing its challenges.

VIII. ACKNOWLEDGEMENT

I will like to express my profound gratitude to my institution and those who in one way or the other assisted me in making this research work a success, without their support, advice, cooperation and encouragement, I would not have been able to conclude at the stipulated time. My sincere gratitude also goes to TEtund providing the needed fund to carry out this research successfully.

IX. RECOMMENDATIONS

Based on the findings and conclusion of this study, the research recommended the following

1. Government should create awareness among the general public on the usage of single smart card technology either through Nigeria Communication Commission (NCC).

2. The management of the institution should organize a seminar for students on the prospect attached to the use of single smart card usage.

3. Further research on the security of a single smart card should be carried out to enable users to accept and adapt to its functionality.

4. Organizations that are into information technology such as Telcom service providers should introduce, educate and support end-users to be aware of its benefit, features, and advantages.

REFERENCES

[1] Joel C. Willemssen (2003), Challenges to the Adoption of Smart Card Technology GAO-03-1108T

[2] Abhishek Mahajan, Akash Verma, Dhruv Pahuja (2014) Smart Card: Turning Point of Technology: International Journal of Computer Science and Mobile Computing, Vol.3 Issue.10, pg. 982-987

[3] Taherdoost, E., Sahibuddin, S., & Jalaliyoon, N. (2013). Evaluation of User Awareness Effect on Smart Card Technology Satisfaction. *Global Journal on Technology*, *1*.

[4] Hamed Taherdoost & Maslin Masrom (2009), An Examination of Smart Card Technology Acceptance Using Adoption Model: *Proceedings of the ITI 2009 31st Int. Conf. on Information Technology Interfaces, June 22-25, 2009, Cavtat, Croatia*

[5] Taherdoost, H., Sahibuddin, S., & Jalaliyoon, N. (2011). Smart card security; Technology and adoption. *International Journal of Security*, *5*(2), 74-84.

[6] Lai, P. C. (2016). Design and Security impact on consumers' intention to use single platform E-payment. *Interdisciplinary Information Sciences*, *22*(1), 111-122.

[7] Taherdoost, H., Zamani, M., & Namayandeh, M. (2009, August). Study of smart card technology and probe user awareness about it: A case study of Middle Eastern students. In *2009 2nd IEEE International Conference on Computer Science and Information Technology* (pp. 334-338). IEEE.