

A Study of Cyber Security in Recent Banking System

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Abstract: Cyber-crime is emerging as serious threat. To the world of computer technology, government, Police and intelligence units are acting toward the issue closely. Different strategies are put into action. The Effort is done to educate people and to expose them to the idea that it is not safe anymore to navigate in the Cyber world without security. This report is based on different research done by people and organization about cyber security.

Keywords: Cyber-security, Cyber-Crime, Phishing and Hacking.

I. INTRODUCTION

Internet banking also known as electronic banking (E-banking), online banking and Virtual banking is widely promoted as a convenient banking solution. Internet banking has proved to be an ideal and profitable means of banking in the banking industry. Most banks have quickly migrated to this technology in order to reduce cost and improve customer experience.

The process of adoption of technology depends on information gathering and set of belief that will help the user in either accepting or rejecting it. The technology acceptance model or TAM determines that the user acceptance of technology is driven by two factors namely ease of using that technology and usefulness of the technology. Adoption of technology is the greatest challenge for the banking industry. Some of the risk associated with the Internet banking users are users themselves; their behavior when it comes to E-banking. Internet banking security risk can cause financial losses if the risk is real.

Financial sectors and banking sectors are more prone to security attacks. User acceptance is one of the key factors in the acceptance of technology. To work on Internet banking requires a certain level of information technology literacy. Users may not be comfortable in trusting a totally automated system. Despite the fact that banks in emerging countries have integrated security features yet users' behavior causes security vulnerabilities. A lot of internet security threats and vulnerabilities still continue to persist. An example is Internet banking users sharing their login credentials with others knowingly or unknowingly This may lead to compromising of the user account and may lead to security breaches. As new threats continue to emerge, banks will need to adopt new measures to protect users. Banks can do more by deploying Information Security policies that ensure safer Internet banking experience. The Information Technology security policies could consist of items related to users and machine based learning or Artificial intelligence, which would learn users' pattern while conducting Internet banking. For example, the bank artificial intelligence could detect trusted devices like trusted laptop or mobile device, The responses from the conducted survey highlighted two aspects regarding users:

1. User behaviour while conducting Internet banking and
2. User awareness on threats relates to Internet banking.

II. RELATED WORK

Numerous studies have been carried out in understanding the adoption of technology in Internet banking. A study is carried out by collecting the responses of 387 users who were using Internet banking to understand which factors affect the customer perspective of adopting

SST (Self Service Technology) and the way the user adopts the technology. The authors developed a readiness model to explain relationship between technology readiness, user informational-based readiness, customer readiness and



the purpose of adopting SST. In a model is proposed in Financial Institution Letter that will predict the behaviour of the Internet banking users. The letter highlights that security breaches are due to certain factors, which are associated with human behaviours aspect that include examples of not unlocking computers, installation of software from un-trusted source and password management. It concludes that there is a direct relationship between Internet banking security breaches and customer behaviour. 3 Martins et al. proposed a model that determines the user behaviour based on intention and usage of Internet banking. The conceptual model is a combination of unified theory of acceptance and the use of technology (UTAUT). In order to test the conceptual model 249 cases from Portugal bank were studied. The proposed model supports a relationship based on performance expectancy and role of risk based on stronger prediction on intention of use on Internet banking. The factors that influence the adoption of Internet banking in the Republic of Yemen is determined in. Information was gathered by conducting a survey on 1500 users. By using the theory of reason action (TRA) model it was extended by relative advantage, perceived risk, mass media, family influence and skepticism.

III. HISTORY

Many adults remember a time when their only way to use the internet was to dial in using a loud modem. Many don't know that the internet, and cyber security, were factors well before that. Companies today often work to minimize cyber-attacks to keep consumer and business data, high risk information, and much safer. To do this, they often need to incorporate cyber security.

Where did cyber security start? Understanding the history of cyber security may shed some light on just how in depth it is and how important people could be in preventing these risks from occurring.



IV. IMPORTANCE OF CYBER SECURITY

Cyber security's importance is on the rise. Fundamentally, our society is more technologically reliant than ever before and there is no sign that this trend will slow. Data leaks that could result in identity theft are now publicly posted on social media accounts. Sensitive information like social security numbers, credit card information and bank account details are now stored in cloud storage services like Dropbox or Google Drive. The fact of the matter is whether you are



an individual, small business or large multinational, you rely on computer systems every day. Pair this with the rise in cloud services, poor cloud service security, smartphones and the Internet of Things (IoT) and we have a myriad of potential security vulnerabilities that didn't exist a few decades ago. We need to understand the difference between cyber security and information security, even though the skillsets are becoming more similar.

Governments around the world are bringing more attention to cybercrimes. GDPR is a great example. It has increased the reputational damage of data breaches by forcing all Organizations that operate in the EU to:

- Communicate data breaches
- Appoint a data protection officer
- Require user consent to process information
- Anonymize data for privacy

The trend towards public disclosure is not limited to Europe. While there are no national laws overseeing data breach disclosure in the United States, there are data breach laws in all 50 states. Commonalities include:

- The requirement to notify those affected as soon as possible
- Let the government know as soon as possible
- Pay some sort of fine

California was the first state to regulate data breach disclosures in 2003, requiring persons or businesses to notify those affected "without reasonable delay" and "immediately following discovery". Victims can sue for up to \$750 and companies can be fined up to \$7,500 per victim.



This has driven standards boards like the National Institute of Standards and Technology (NIST) to release frameworks to help organizations understand their security risks, improve cyber security measures, and prevent cyber attacks

V. WHAT IS CYBER SECURITY?

Cyber security is the practice of protecting electronic systems like computers etc. and data from malicious attacks. It is also called Information technology security or electronic information security. Cyber security means the body of technologies and practices designed to protect networks, devices etc. from attack, damage from any unauthorized access.

WHAT IS THE NEED FOR CYBER SECURITY IN DIGITAL BANKING?

The primary purpose of Cyber security in digital banking is to protect the customer's assets. As people go cashless, more and more activities or transactions are done online. People use their digital money like credit cards and debit cards for transactions which require to be protected under Cyber security. Cybercrimes in digital banking not only affects the customer, but it also affects the banks while they attempt to recover the data. The banks may require spending a considerable amount of money to recover the data or information. A strong Cyber security is a must for banks as data breaches may make it tough to trust financial institutions. It may cause severe problems for banks. Cyber security in digital banking ensures that your sensitive data is safe and secure, which if revealed, could cause a lot of problems like fraud. One's data can be easily breached if it is not protected under Cyber security. It may cause substantial financial loss to a person and mental stress in a case where cybercrime occurs.

SPOOFING

This is one of the newest forms of cyber threats faced by banks. The cybercriminals will impersonate a banking website's URL with a website that is similar to the original one and functions the same way and when the user enters his or her login credentials that login credentials are stolen by these criminals and use it later.

This cyber threat has gone to the next level where new spoofing techniques have been employed by these criminals. In this, they use a similar URL and target users who visit the correct URL.

PHISHING

Phishing means the attempt to get sensitive information such as credit card details etc. for malicious activities by disguising as a trustworthy entity in an electronic communication. Online banking phishing scams have evolved continuously. They look to be genuine and real, but they fool you into giving away your access information.

Without a robust Cyber security measure in place, your sensitive data may be at risk. In this segment, we shall cover the biggest threats to the Cyber security of banks.

UNENCRYPTED DATA

It is one of the common threats faced by the banks where the data is left unencrypted, and hackers or cybercriminals use the data right away, thereby creating severe issues for the financial institution. All data that is stored on computers in financial institutions or online must be fully encrypted. It will ensure that even if your data is stolen, cybercriminals may not be able to use them.

MALWARE

End to end-user devices like computers and mobile devices are mostly used for conducting digital transactions; therefore, it must be secured. If it is compromised with malware, then it may pose a serious risk to the bank's Cyber security whenever they connect with your network.

Sensitive data passes through this network, and if the user device has malware installed in it without any security that malware can pose a serious threat to your bank's network.

THIRD-PARTY SERVICES

Many banks and financial institutions use third-party services from other vendors to serve their customers better. However, if these vendors don't have a tight

Cyber security measure, then the bank that has employed them will suffer badly.

ADVANTAGES OF CYBER SECURITY

1. Cyber security safeguard business:

The most significant benefit is that the best in IT security cyber security solutions can give your company comprehensive digital protection. This allows flexibility of accessing the internet.

2. Protects Personal Information:

In this age of a digitally-driven world, one of the most valuable commodities is personal information. If a virus is able to collect personal information about your employees or customers, it is quite likely that it will be sold or used to steal their money.

3. Protects and Enhances Productivity:

Viruses infecting your systems and network will result in functioning resulting in the almost impossibility of further working. In effect, this will cause downtime in work for your staff and wastage additionally bringing the entire company to a halt.

4. Prevents crashing of websites:

If you're a small business, you're probably hosting your own website. If your system is infected, there's a good risk your website will be forced to go down. This means that not only will you incur losses due to missed transactions, but you will also run the risk of losing trust from your clients, and some viruses may cause long-term damages to your systems.

5. Support Your IT Professional:

Typically, a good security system equips your organization and employees with the best .

DISADVANTAGES OF CYBER SECURITY

1. The high -cost of Cyber security

Businesses may find cyber security to be too expensive. This disadvantage may be experienced by businesses that do not have sufficient funds to protect their data and systems. It is not unusual for a company to have to invest more in cyber security than they receive in return. This is one of the primary reasons why many companies are hesitant to invest in cyber security.

2. The complicated nature of Cyber security

Businesses or organizations may find cyber security to be too difficult. Cyber security measures take a long time and effort to implement. For some businesses, it can even be too difficult to comprehend. This might lead to a slew of issues in the workplace. It can also result in data loss or even a security breach if the company does not have enough security measures in place.

3. The need for constant monitoring

Cyber security necessitates ongoing surveillance. A company's entire system's cyber security must be closely monitored. Especially since hackers and cybercriminals are constantly devising new ways to gain access to a company's network. Besides, the only best way to maintain any system's security is to remain up to date with continual monitoring. This remains the greatest approach to ensure things working in order and security are kept intact.

THE TOP CYBER SECURITY THREATS IN 2022 FOR BANKS

These are the top threats that are predicted to continue to cause grief for banks and financial institutions over the course of 2022.

1. Ransom ware

Ransom ware has been a major headache for organizations around the world for several years now and doesn't look like stopping any time soon. This is a method of cybercrime where files are encrypted and users are locked out, with the criminal's demanding money to re-access the system.

Organizations affected by ransom ware attacks can find their systems crippled for extended periods of time, particularly if they don't have backups. Paying ransoms to these criminals is also not guaranteed to result in your systems access being restored.

2. Ongoing risks from remote work

As the pandemic enters its third year, the reliance on remote work, hybrid workforces and cloud-based software systems has become almost ubiquitous. This also means that financial institutions have more potential cyber security vulnerabilities than ever before. Employees are no longer always accessing data on systems and networks that are controlled by the organization, so extra vigilance is necessary.

3. Cloud-based cyber-attacks on the rise

As more software systems and data are stored in the cloud, cybercriminals have seized upon this and there's been an increase in cloud-based attacks. Banks need to ensure that the cloud infrastructure is configured securely to protect from harmful breaches.



4. Social engineering

One of the biggest threats to banking and finance is social engineering. People are often the most vulnerable link in the security chain – they can be tricked into giving over sensitive details and credentials. This can equally affect a bank’s employees or its customers.

Social engineering takes many forms, it might be through phishing or whaling attacks or it could be by sending bogus invoices that purport to be from a trusted source. It’s important to keep your employees informed about social engineering tactics and how these threats con the cyber security landscape is always shifting, with threats becoming more sophisticated all the time.

VI. WHAT IS A FIREWALL



6.1 Firewall Definition

A firewall is a computer network security system that restricts internet traffic in, out, or within a private network. This software or dedicated hardware-software unit functions by selectively blocking or allowing data packets. It is typically intended to prevent anyone—inside or outside a private network—from engaging in unauthorized web activities and to help prevent malicious activity.

6.2 What is Firewall?

Firewalls can be viewed as gated borders or gateways that manage the travel of permitted and prohibited web activity in a private network. The term comes from the concept of physical walls being barriers to slow the spread of fire until emergency services can extinguish it. Comparably, network security firewalls are for web traffic management — typically intended to slow the spread of web threats.

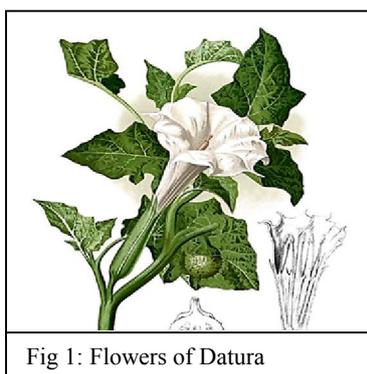
Firewalls create 'choke points' to funnel web traffic, at which they are then reviewed on a set of programmed parameters and acted upon accordingly. Some firewalls also track the traffic and connections in audit logs to reference what has been allowed or blocked.



VII. CONCLUSION

The Internet banking service is offered by banks to provide convenience for their customers, however, there is great benefits to banks as well. The most important benefit to banks is the reduction in operational cost be incorporating many services on their online portal. Therefore, the banks should take more responsibility in ensuring a more secure Internet banking environment for their customers. In this paper, we proposed a model that incorporates more responsibility on banks to ensure that the Information Technology policies are adhered by customers. For example, rather than informing customers that it is good practice to change password every 3-6 months, the banks should force customers to change their passwords every three months through expiring their passwords so that customers are forced to change their password. The Banks should also integrate the latest Information Security Technologies to ensure that the communication is secure between bank and customers. The proposed model would provide a more secure Internet banking environment which would be of mutual interest to both banks and customers. Also, the technologies proposed in this model are existing technologies and need not be invented nor developed from scratch. For example, the trusted device concept is an available technology and already in use by non-banking industries. Google already uses trusted devices in their Gmail application. Also, there are many existing algorithm.

Datura is a genus of plants belonging to the Solanaceae family (Angiospermaedicotiledon). Other plants belonging to this family include: mandrake (*Mandragora officinarum*), belladonna (*Atropa belladonna*), henbane (*oryamusniger*) and tobacco (*Nicotianatabacum*). Some other members of the family are edible fruits such as: tomato (*lycopersiconesculentum*), pepper (*Capsicum annum*) and potato (*Solanum tuberosum*)^[1]. The Datura genus however is comprised of four species- *DaturaInoxia*, *Daturametel*, *Daturaarborea* and *Daturastramonium*-policy recommendation for the prevention of similar cases. all of which possess potent, toxic, anticholinergic properties^[2]. *Daturastramonium* (DS) is a hallucinogenic plant that has been called numerous names, in various parts of the world such as: Jimson's weed, Angel's Trumpet, Angel's Tear, Thorn Apple etc.^[3]



Scientific Classification:

Kingdom	Plantae
Clade	Tracheophytes
Clade	Angiosperms
Clade	Eudicots
Clade	Asterids
Order	Solanales
Family	Solanaceae
Sub Family	Solanoideae
Tribe	Datureae
Genus	<i>Datura</i> L.
Species	<i>DaturaFerox</i> L.

II. PHARMACOGNOSTIC EVALUSATION OF PLANT:

Description

2.1 Macroscopical Characters

Datura Metal

1. Leaves

- (i) Sub glabrous spreading herb with cylindrical stem.
- (ii) Shape single triangular ovate.
- (iii) Base unequal
- (iv) Margin toothed.

2. Flower

- (i) Solitary, funnel shaped large and tubular, 7.5 to 9 cm length.
- (ii) Corolla 15 to 18 cm length, 10-12.5 cm across at the mout.

3. Fruit

Sub-globose capsule covered with short and blunt spines, 2.5 to 3.2 cm diameter nodding or sub erect.

4. Metel var. Fastuosa

While many characters of this plant are similar to those of *D. metel* the stem, branches, main veins of leaves and also flowers are violet or purple coloured. Double- flowered and triple flowered forms (outer corolla 5 teeth and inner corolla 6-10 teeth) also occur, through not so common.

D. Innoxia:

It also resembles *D. metel* but can be distinguished by the presence of dense pubescence, ovate leaves with cordate base, 10 toothed corolla and long weak spines on the capsular fruit.^[4]

2.2 Microscopical characters:

Lamina

a) Upper Epidermis

They are single layered, cells rectangular with cuticularized outer walls. Trichomes, both covering and glandular are seen. Covering trichomes are uniseriate, multicellular, warty and blunt at the apex. Glandular trichomes are made up to a stalk of one cell and a 2 to 4 celled glandular head.

b) Mesophyll

It is differentiated into palisade and spongy parenchyma.

c) Palisade

It is a single layered, compact and cells radially elongated

d) Spongy Parenchyma

They are many layered, loosely arranged with intercellular spaces. Sphaeraphides, microsphenoidal crystals and vascular strands are found in the upper layers of spongy parenchyma.

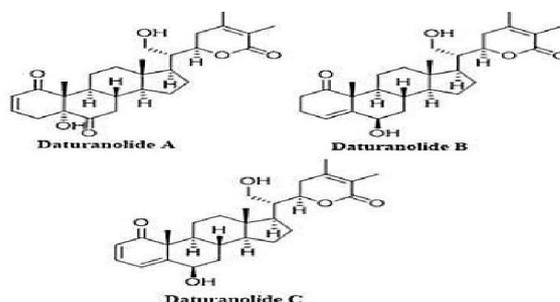
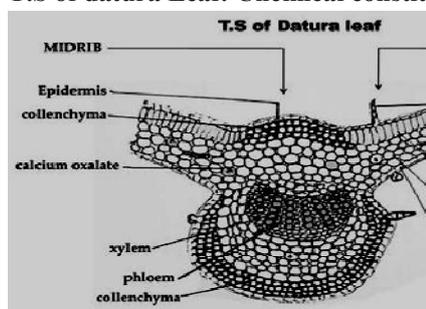
e) Lower Epidermis

It is identical to upper epidermis. Stomata and numerous trichomes are seen on the lower epidermis.

f) Midrib

The epidermis layers of lamina are continuous in the midrib region also. Strips of collenchymas appear below the upper and above the lower epidermis. This is followed by cortical parenchyma containing prisms of calcium oxalate and microsphenoidal crystals. Embedded in the central region of the cortical parenchyma is a bicollateral bundle.^[5]

T.S of datura Leaf: Chemical constituents:



Chemical constituents

1. Tropane alkaloids-

1. Hyoscyamine & Scopolamine (hyoscine)

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2. Fastudine and fastunine,
3. Fastusic acid, allantoin.
4. Ascorbic acid, etc.^[8,9]

III. PHARMACOLOGICAL ACTIVITY

1. Anticancer Effect

Worked against cancer cell of breast (specially MCF-7 cell line) through MTT assay with methanolic extract of leaves and stem of *Datura* spp. and compared it with vero line, resulted that leaf extract expressed higher anticancer property against MCF-7 cell and vero cell line as compared to stem extract^[6]. Cancer inhibiting effect on head, neck (FaDu), Breast (MDA-MB231), lung (A549) cancer cell line in in vitro condition by *Daturastramonium* leaf- aqueous extract (1mg/mL) for 24 & 48 hrs. respectively anticipated that plant parts possesses toxicity against living cells with increasing GSSG and agitating oxidative stress as well as considered changed quantity of enzyme which expresses redox sensitivity.^[10]

2. Anti-Insect Effect

Datura stramonium seed extract among ethanol, chloroform, and acetone has strong insecticidal efficacy than methanol and n-hexane^[8]. The insecticidal repellency properties of *Chromolaena odorata*, *Sennasiamea*, *Andrographis paniculata*, *Vernonia amygdalina*, *Daturastramonium* against *Callosobruchus maculatus* indicated *C. maculatus* egg laying capacity effectively reduced by *Sennasiamea* as compared to other plants.^[14,15]

3. Antimicrobial Effect

Worked on review of many medicinal plants of Bulgaria including *Daturastramonium* explained their antimicrobial, antioxidant, anti-inflammatory activity^[10]. Aerial part (mainly stem and bark) of *Daturastramonium* aqueous and ethanolic extract opposite to *Escherichia coli*, *Salmonella typhi*, *Staphylococcus aureus*, *Klebsiella pneumoniae*, *Shigella* and *Neisseria gonorrhoea* revealed that ethanol extract of the plant contains higher antimicrobial potential than aqueous extract but not in *Neisseria* and only *Staphylococcus aureus* displayed action to aqueous extract.^[11]

4. Antioxidant Effect

Investigation of anticancer activity by methanolic seed extract of *Daturastramonium* through DPPH radical scavenging, ABTS⁺ radical cation, Nitric oxide radical, Ferric reducing power assay and gained values as 35.26, 10.50, and 49.36 [13]. On behalf of in vitro study of highest free radical scavenging effect DS showed the $6.7 \pm 0.1 \mu\text{g/ml}$ inhibitory concentration value.^[13]

5. Nematicidal Effect

Whole plant of *Daturastramonium* has noxious property and because of that aqueous leaf extract of plant stated strong nematicidal activities.^[17]

6. Antifungal Effect

Many medicinal plant together with *Daturastramonium* acquired antifungal effect.^[14] Fermented or boiled mixture of *Azadirachta indica* (Neem), *Calotropis gigantea*, *Daturastramonium*, and cow fertilizer with methanol & water decoction (70/30 v/v) of *Azadirachta indica* (Neem), *Calotropis gigantea* and *Daturastramonium* beside fungi *Fusarium mangiferae* contains efficient antifungal effect.^[14]

7. Larvicidal and Repellent Effect

Daturastramonium leaves extract with ethanol for controlling the larva of *Culex quinquefasciatus*, *Anopheles stephensi*, *Aedes aegypti*, exhibited the Lethal dose values as 86.25, 16.07, 6.25 ppm and they also possess the repellency effect of above three insects and provided the values 2.73, 71.66, 117.7 in min. at 1% concentration.^[18]

8. Analgesic Effect

The analgesic property by intraperitoneally administration of alcoholic seed extract of *Daturastramonium* in severe but short and continual pain, through the hot plate test and formalin test, point out that pain was condensed dose dependently with Ed values = 25 and 50 mg/kg.^[20]

9. Antifeedant Effect

Leaves and seed extract of *Daturastramonium* L. (Solanaceae) respond against *Triboleum castenium* for the reason that, insect depicted different mortality rate at different time exposure.^[19]

10. Antiasthmatic Effect

With mild airway obstruction, *Daturastramonium* worked as good bronchodilator for asthmatic patients. *Daturastramonium* plant has various phytochemical including atropine, scopolamine and hyoscyamine. Scopolamine & atropine manifested anticholinergic properties and responsible for the blocking of M2 receptor of submucosal gland cell and smooth muscles of air pathway, In an observation when pregnant women took *Daturastramonium* for asthma treatment, with the constant releasing of acetylcholine, nicotinic receptor could desensitize finally result displayed in as damage fetus.^[19,20]

11. Atiperspirant Effect

Cholinergic compound esters exhibited effectual antiperspirant activity and Scopolamine; hydrobromide also rendered this potential with the higher skin incisive property.^[17]

IV. CONCLUSION

Since ancient time plants used as for food, shelter, fiber, tan, gum, oil, latex etc. Plants are rich source of nutrients, antioxidants, vitamins, carbohydrates, proteins, because of that they also contributed immuno-modulatory effect. From the above information we concluded that *Daturastramonium* with its medicinal properties exploited for cancer, rheumatism, ear pain, head ache, wound, burn, stress, depression, insomnia, asthma, boils, and inflammation. Whole plant with secondary metabolites (Phytochemicals) such as alkaloids, flavonoids, tannins, saponins manifested anticancer, antioxidant, antifungal, antibacterial, anti-inflammatory, larvicidal, repellent, analgesic, nematicidal properties, the alleopathic property of essential oil of *Daturastramonium* against five crops also reported. This Plant with the adequate quantity exhibits pharmacological effect and prepared as herbal or botanical drugs by pharmaceutical industries for many diseases, but not used in native form because of its lethal effect, furthermore from this plant, plant based biopesticides also have been made to control the harmful effect from the conventional pesticides.

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