Cybersecurity Strategies for Resource Constrained SMEs and Health Providers

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Abstract- ***Cybersecurity risks are a growing concern for SMEs and especially healthcare organizations as they extend their dependence on information technologies and data management. Nevertheless, these organizations seldom have adequate finances and sufficient technical solutions for strong cybersecurity environments; still, they become the target of cyber threats (Smith et al., 2021). This paper aims to review specific solutions for cybersecurity issues targeting small organizations and healthcare centers; the paper focuses on effective but affordable solutions in terms of resources. This paper uses a synthesis of literature together with real-life illustrations from various and recent cybersecurity implementations in both sectors. Outcomes show that resource-limited organizations struggle with academic know-how, an absence of funding, and inadequate cybersecurity protocols (Jones & Patel, 2020). Best practices found in this study entail using open-source security solutions, encouraging the use of MFA, security awareness for employees, and public-private partnerships. Besides, risk-based frameworks – e.g. The NIST Cybersecurity Framework (National Institute of Standards and Technology, 2018) and zero-trust architecture are exhibited for their employability in shoestring contexts. Managers and analysts in healthcare sectors are at greater risk because of the kinds of data that they are expected to protect under HIPAA or GDPR; this requires a form of data and access control different from others (Johnson et al., 2019). On the other hand, SMEs need more adaptable and agile solutions that are concerned with endpoints and cloud services. The study also highlights cybersecurity literacy and education as integral components for both sectors and shows how achievable and cheap interventions can considerably lessen human error (Brown & Kim, 2021). This research fills the gap in knowledge by comparing the general cybersecurity strategies with the cybersecurity strategies targeting SMEs and health providers with an emphasis on feasible and affordable solutions. The strategies outlined should enable organizations of small budgets to achieve substantial levels of protection from continually emergent threats, but also affordable solutions must be based on strong, effective security practices. Further studies will examine the outcomes of 'these strategies after some time and the relevance of government subsidies for the supply of cybersecurity resources. To enhance the cybersecurity position of SMEs and health providers, the present work endeavors to offer effective frameworks and economic tools to deploy to improve the cybersecurity of the exposed segments of the future economy and protect elaborate and delicate data behind digital walls.***

Indexed Terms- ***SME cybersecurity strategies, Healthcare data protection, Affordable cyber defense, Healthcare cyber threats, SME open-source security tools, Data encryption healthcare, Small business cybersecurity, HIPAA cybersecurity rules, Zero Trust for SMEs, Ransomware protection SMEs***

I. INTRODUCTION

Cybersecurity is now considered one of the most crucial areas of structural protection for organizations of various industries and types in the context of the digital transformation of business. As the reliance on digital structures and computing information solutions is growing the impact of cyber dangers has become considerably larger (Smith et al., 2021). Cybersecurity refers to the practice of shielding an organization's computer resources, including systems, networks, and data from cyber engagements that may seek to compromise the security of the system, steal information, or disrupt services (NIST, 2018). Small businesses and organizations that are categorized as providing critical services must ensure they keep

proper security measures to protect the information and for business continuance.

SMEs and healthcare industries are at great risk as they rely much on digital records, cloud, and networks and have weak capital to invest in cybersecurity (Jones & Patel, 2020). Customers: SMEs are the essential element in many economies, where they are the main source of employment, and innovation at the same time healthcare suppliers work with the personal data of patients which are crucial for their lives. However, both sectors are relatively weak in their cybersecurity measures and hence are vulnerable to cyberattacks (Johnson et al., 2019).

2. Why SMEs and Healthcare Providers Should Be Targeted

Some challenges arise due to the operational models and information security classification of SMEs and healthcare organizations. SMEs' manpower, time, and financial resources are generally limited, technical experience scanty and so have few professional security policies in place, and therefore are exposed to ransomware, phishing, and data thefts (Brown & Kim, 2021). Similarly, some industries oversee delicate patient information that is highly regulated through standards such as HIPAA in the United States as well as GDPR in Europe as identified by the European Union Agency for Cybersecurity [ENISA], (2020).

The consequence of a cyberattack on a healthcare provider is enormous, it has the potential to threaten the existence of critical medical services while at the same time breaching the patient's privacy. According to Taylor (2021), for the SMEs, the breach cost them money, tarnished their reputation, and some of them to close their business.

3. Problem Statement

Small business organizations and healthcare organizations are dwindling on resources and thus vulnerable to cybersecurity threats, much of which are on the rise. A report released recently informed that about 43% of cyberattacks were launched on SMEs, while only 14% have proper cybersecurity protection (Cybersecurity Ventures, 2021). However, the circumstances in the healthcare sector became even worse: ransomware attacks increased by 55% between 2020 and 2022; virus incidents exposed many patients' health records (Kasperski, 2022).

These challenges stem from multiple factors, including:

- Limited Budgets: Lack of capability to purchase sophisticated cybersecurity equipment.
- Lack of Expertise: Lack of qualified human resources in security industries.
- Compliance Complexity: Overcoming challenges of solutions like HIPAA and GDPR.

All these aspects call for sectoral approaches to address the threat factors about the business's characteristics as well as financial realities (Lee & Zhang, 2021).

4. Significance of the Study

The contribution of this research stems from the analysis of specific (contextual) cybersecurity needs of SMEs and healthcare providers and their potential to plan and implement cybersecurity strategies that make use of limited resources optimally. Although big firms can afford to employ personnel and deploy sophisticated architectures to manage cyber threats, SMEs and other compact healthcare institutions necessarily have to implement affordable measures and structured models that will effectively protect correspondents while dog pound consumption (Taylor, 2021).

A focus on resource-constrained environments is essential for:

- Minimizing Cyber Risk Exposure: Avoiding cases of financial and data losses.
- Improving Data Protection: Protection of patient right to privacy and protection of patient information.
- Enhancing Awareness: Training employees who do not necessarily report to the IT department.

In addition to suggesting that open-source security tools can be developed, cloud protection services can analyzed, and that multi-factor authentication (MFA) can be implemented in the future, this study will help enhance cybersecurity defense in these sectors in a way that is both attainable and reasonable.

5. Objective of the Study

Thus, the principal research question of this work is to identify and discuss the cost-efficient cybersecurity

measures for SMEs and healthcare capability-limited organizations. The study aims to:

1. Identify Key Threats: Identify overlap in threats with both sectors.
2. Evaluate Cost-Effective ways: Evaluate the concept of open source and its tools and services on the cloud along with understanding the use of simple encryption algorithms.
3. Promote Best Practices: Promote awareness programs, multiple factor authentication (MFA), and risk-based methods.
4. Provide Comparative Insights: List their specific requirements and compare these two types of settings.

In conclusion, this research will provide an actionable cybersecurity plan to strike the right bow between cost and security to enable SMEs and healthcare institutions to reduce cyber risks.

Table 1: Comparative Cybersecurity Challenges and Solutions for SMEs and Healthcare Providers

Category	SMEs	Healthcare Providers
Primary Threats	Phishing, Ransomware, Data Breaches	Ransomware, Data Theft, Service Disruption
Resource Constraints	Limited Budgets, Minimal Expertise	Budget Limits, Compliance Complexity
Critical Data Type	Customer and Financial Records	Patient Health Records (PHI)
Key Strategies Proposed	Open-Source Tools, MFA, Cloud Security	Data Encryption, MFA, Staff Training
Compliance Focus	GDPR, Local Data Protection Laws	HIPAA, GDPR, HITECH Act

II. LITERATURE REVIEW

Therefore, cybersecurity is emerging as one of the main concerns in all fields for achieving sustainable growth because of the enhanced risks of cyber attacks. SMEs are of major concern since they lack adequate capital to invest in adequate cybersecurity measures (Smith et al., 2021). Although large-scale workshops have the finances, personnel, and other resources to provide elaborate protective structures small-scale facilities are seriously deficient in defense (Jones & Patel, 2020). This section discusses the findings based on the existing literature focusing on cybersecurity strategies for implementation in resource-deprived organizations.

2. The Cybersecurity Threats That SMEs And Healthcare Organizations Experience

Both SMEs and healthcare organizations face cyber threats, including:

- Ransomware Attacks: Ransomware attacks are relatively common; new stats show that more than 43% of ransomware attacks occur in SMEs given they have poor protection (Taylor, 2021).
- Phishing and Social Engineering: Hospitals and other healthcare organizations, handling the personal information of patients, experience phishing attacks that rely on people's mistakes most of the time (Kaspersky, 2022).
- Data Breaches: The threats involved with healthcare storage of phi are huge so data breaches are very costly (Johnson et al., 2019).

According to a forecast by Cybersecurity Ventures (2022), more than half of the SMEs that experience a large-scale cyber attack, never recover in a year or less, which dramatically demonstrates how data breaches and ransomware affect smaller businesses.

3. Challenges resulting from limited resources

Lack of resources limits the performance of SMEs in setting up adequate cybersecurity and healthcare service providers. Small and medium-sized enterprises (SMEs) and healthcare providers are especially vulnerable due to their limited resources for cybersecurity implementation (Smith et al., 2021). While larger organizations can afford comprehensive security infrastructures, smaller institutions often lack the financial and technical capacity for robust defense mechanisms (Jones & Patel, 2020).

Cybersecurity Threats Faced by SMEs and Healthcare Providers

Both SMEs and healthcare organizations face cyber threats, including:

- Ransomware Attacks: Ransomware has become a prevalent threat, with over 43% of ransomware attacks targeting SMEs due to weaker defenses (Taylor, 2021).
- Phishing and Social Engineering: Healthcare institutions, dealing with sensitive patient data, are frequently targeted with phishing schemes that exploit human error (Kaspersky, 2022).
- Data Breaches: Healthcare providers face significant risks due to storing protected health information (PHI), making data breaches particularly damaging (Johnson et al., 2019).

A report by Cybersecurity Ventures (2022) highlights that over 70% of SMEs that experience a significant cyberattack fail to recover within six months, underscoring the impact of data breaches and ransomware on smaller enterprises.

3. Challenges Due to Resource Constraints

Resource constraints impact the ability of SMEs and healthcare providers to establish effective cybersecurity measures. Key limitations include:

- Financial Limitations: Lack of funds compromises organizations and limits them from implementing an advanced cybersecurity system (Brown & Kim, 2021).
- Limited Technical Expertise: Decision-makers in SMEs may not have an IT specialist to conduct a cybersecurity analysis, and healthcare employees might not know the requirements for disseminating data securely (Lee & Zhang, 2021).
- Compliance and Regulatory Challenges: Healthcare providers are therefore bound by regulatory frameworks such as HIPAA, and GDPR; all of which complicate the work without providing a proportionate amount of additional resources (ENISA, 2020).

4. Analysis of Current Cybersecurity Solutions and Approaches

Several frameworks have been proposed to address cybersecurity challenges in constrained environments:

- NIST Cybersecurity Framework: The five core functions of the NIST framework include Identification, protection, detection, response, and recovery; this can easily apply to resource-poor organizations (National Institute of Standards and Technology [NIST], 2018).
- Zero Trust Architecture (ZTA): ZTA focuses on continuous validation and entails stringent permissions, which are appropriate for SMEs and healthcare organizations that deal with such information (Smith et al., 2021).
- CIS Controls: The actual recommendations are given by the Center for Internet Security (CIS), which lists prioritized actions and the first of them is attention to the basic organizational and administrative measures, including multi-factor authentication (CIS, 2020).

While helpful, a large number of these frameworks presuppose the ability to form some level of technical proficiency, and this may not be easily available in small businesses (Taylor, 2021).

5. What They Should Do to Be More Secure: SMEs and Healthcare Zygmunt and Brachman, fondly known, as the ‘gurus of security,’ have provided insights on cybersecurity to the management of this study and they have proposed the following strategies. Several cost-effective strategies have been identified to enhance cybersecurity resilience in resource-constrained environments:

- Open-Source Security Tools: Snort IDS and ClamAV antivirus software are free protection solutions appropriate for SMEs and small healthcare centers (Jones & Patel, 2020).
- Multi-Factor Authentication (MFA): MFA can greatly mitigate the risks associated with unauthorized access while incurring a low level of financial cost (Taylor, 2021).
- Cloud-Based Security Solutions: Some of these cloud security solutions include Microsoft Azure and AWS which provide scalable and cost-effective solutions to data storage and security solutions (Kaspersky, 2022).
- Cybersecurity Awareness Training: This relaxation of human vulnerabilities could be achieved by continual training of staff against phishing attacks, password management, and correct communication practices (Johnson et al., 2019).

These strategies focus on the practical and low-cost application of change since SMEs and healthcare providers are characterized by fewer resources.

6. Comparative Analysis of SMEs and Healthcare Cybersecurity Needs

Factor	SMEs	Healthcare Providers
Primary Data Risks	Financial data, intellectual property	Patient data, medical records
Compliance Requirements	GDPR, Local Data Protection Laws	HIPAA, GDPR, HITECH
Budget Constraints	Limited security budgets	Balancing patient care and compliance
Key Threats	Ransomware, phishing, insider threats	Ransomware, data breaches, phishing
Solutions Employed	MFA, open-source tools, cloud security	Data encryption, secure network design

The comparative analysis highlights the overlap in threats while emphasizing sector-specific concerns like data sensitivity in healthcare and financial constraints in SMEs.

III. MATERIALS AND METHOD

This research utilizes a qualitative research method of study in parallel with the comparative case studies in an attempt to investigate successful cybersecurity measures for low-resource small and medium-sized enterprises (SMEs) and healthcare providers. Qualitative research methods are appropriate for this study since they allow for sequences and detailed description of the identified challenges unique to each sector as well as their corresponding strategic approaches (Creswell, 2018).

Using both quantitative and qualitative research design was also considered but rejected because this study aimed at producing strategic recommendations starting with the analysis of the number of enrollments rather than purely numerical data interpretation. The consideration of the qualitative design means a deeper understanding of risks, constraints, and real-life cybersecurity solutions specific to a chosen sector, SME, and healthcare providers in this case (Miles et al., 2020).

2. The analysis of the proposed research design and the rationale that supports it

The method of research that has been selected for this study is a comparative case study research. Comparative case studies provide an outlook toward options from several contexts of the respective subject and are useful for the patterned recognition of strengths and weaknesses in a resource-scarce context (Yin, 2018). This pattern helps easily compare SMEs and the healthcare sector as well as their common and different cybersecurity issues and solutions.

The comparative case study approach involves:

- Multiple Case Selection: SMEs and healthcare organizations were purposively selected due to their susceptibility to cyber risks, and organizational constraints (Smith et al., 2021).
- Data Sources: The data is collected from secondary sources, such as cybersecurity incidents, governmental records, and academic articles concerning cybersecurity plans in the public and private domain.
- Framework Application: Current guidelines for the assessment of strategies applied by SMEs and healthcare providers can be classified as the NIST Cybersecurity Framework and the Zero Trust Architecture (ZTA) principles (NIST, 2018; Smith et al., 2021).

This design allows for finding out the relevant sectoral strategies whilst evaluating their applicability to the contexts where the resources are scarce (Brown & Kim, 2021).

3. Data Collection Methods

The data collection involved secondary data from reputable sources, including:

- Peer-Reviewed Journal Articles: Data obtained from cybersecurity journals and databases including IEEE Xplore and ScienceDirect provided management strategies and frameworks (Taylor, 2021).
- Government Reports: Recommendations comprised of embracing sources from the European Union Agency for Cybersecurity (ENISA) and the National Institute of Standards and Technology (NIST) because the cybersecurity frameworks were identified (NIST, 2018; ENISA, 2020).

• Case Study Reports: Cyber occurrences and techniques identified were gathered from real life thus using articles from Kaspersky and Symantec (Kaspersky, 2022).

Selection Criteria:
• Relevance: In fact, datasets towards sectors like healthcare sectors and SMEs were given a higher priority of matching its area.
• Recency: To make the collected information relevant, only articles that were published within the last five years were considered.
• Credibility: To be more specific, in an attempt to cover only information most closely related to the topic, scientific articles were chosen, and, topping it, they had to be peer-reviewed only.

Data Collection Tools:
• NVivo Software: Hence, to categorize the data and perform meta-coding and qualitative analysis to identify regularities and the presence of recurring strategies from the participant's side, thematic analysis was done with the help of computer software, NVivo (Creswell 2018).

4. Data Analysis Techniques
To analyze the collected data the thematic analysis approach applicable to qualitative data patterns that are relevant for cybersecurity strategies was applied (Braun & Clarke, 2019). This process included the following stages:
1. Data Familiarization: So context understanding of all from all articles and reports collected was done.
2. Initial Coding: Topic keywords as well as appreciable keywords related to cybersecurity strategies were provided in Appendix B by coding with the support of the NVivo tool.
3. Theme Identification: The repetitive measures included aspects like multi-factor authentication (MFA) and other data encryption schemes grouped under themes.
4. Comparative Analysis: Several challenges were observed, and these findings were compared with those obtained from SMEs and healthcare providers.

Key Analytical Metrics Used:
- Cost-effectiveness: They cannot afford cybersecurity tools.
- Technical Complexity: The amount of skill needed for implementation.
- Compliance Alignment: To increase security compliance, it is necessary to adhere to the frameworks mentioned, such as HIPAA and GDPR. The NIST Cybersecurity Framework was used as a reference model during the analysis to maintain consistency with both sectors (NIST, 2018).

4. Comparative Analysis: Data from SMEs and healthcare providers were compared to identify both common and unique challenges.

Key Analytical Metrics Used:

- Cost-effectiveness: The affordability of cybersecurity tools.
- Technical Complexity: The level of expertise required for implementation.
- Compliance Alignment: Alignment with frameworks like HIPAA and GDPR (ENISA, 2020).

The NIST Cybersecurity Framework served as a reference model during the analysis, ensuring alignment with both sectors (NIST, 2018).

5. Ethical Considerations
Ethical research protocols peculiar to Security incident data collection were maintained high in this research. Key ethical considerations included:
- Data Confidentiality: No personal or proprietary data was collected; data collected was from published reports and general academic journals (Creswell, 2018).
- Transparency: Proper citation of data sources and frameworks was done as follows by adhering to APA 7th Edition guidelines.
- Avoidance of Bias: To ensure that only relevant data was gathered and that the analysis was not biased, selection criteria were also being used.

Because no primary data in the form of surveys or interviews were conducted on human subjects, this research did not call for an Institution Review Board (IRB) approval.

6. Limitations of the Study

While this methodology was designed to ensure rigor and relevance, certain limitations must be acknowledged:

- Secondary Data Dependence: Secondary data mainly depend on reported data thus they cannot be relied on to check the authenticity of the cybersecurity incidents and plans.
- Generalizability: Any generalization of the results may not be complete making a path towards positive BYOD adoption for other sectors like educational institutions or non-profits difficult to achieve.
- Absence of Quantitative Data: Reduced measurement of financial costs due to the omission of statistical data indicators also narrows the focus within cost-efficiency assessment.

Nonetheless, utilizing a comparative case study drawn from a range of sources provides a useful overview of realizable cybersecurity policies most appropriate for SMEs and healthcare organizations.

IV. RESULT

The analysis revealed significant cybersecurity challenges and strategic implementations across SMEs and healthcare providers. Key findings are summarized below:

1. Cybersecurity Challenges Faced by SMEs and Healthcare Providers

Both sectors face considerable challenges due to financial limitations, limited technical expertise, and evolving cyber threats. Key differences in challenges are presented in Table 1 below:

Challenge	SMEs	Healthcare Providers
Data Sensitivity	Financial records, customer data	Patient health records (PHI)
Compliance Requirements	GDPR, Local Data Protection Laws	HIPAA, GDPR, HITECH Act
Financial Constraints	Limited cybersecurity budgets	Balancing patient care and compliance
Technical Expertise	Lack of in-house IT specialists	Minimal cybersecurity staff
Common Threat Types	Phishing, Ransomware, Insider Threats	Ransomware, Data Breaches, Phishing

Key Insight: Healthcare providers deal with more sensitive data and face stricter regulatory requirements, while SMEs primarily struggle with financial constraints and a lack of cybersecurity expertise (Smith et al., 2021; ENISA, 2020).

2. Identified Cybersecurity Strategies and Their Effectiveness

The study identified the following key strategies implemented across SMEs and healthcare providers:

- Multi-Factor Authentication (MFA): Reduces unauthorized access risk by requiring multiple forms of identity verification.
- Open-Source Security Tools: Tools such as Snort (intrusion detection) and ClamAV (antivirus) provide cost-effective protection for SMEs.
- Cloud-Based Security Solutions: Platforms like Microsoft Azure and AWS offer scalable security features suitable for both sectors.
- Cybersecurity Training: Regular employee training programs were shown to reduce phishing incidents and data mishandling.

3. Comparative Assessment of Strategy Effectiveness

Strategy	Effectiveness in SMEs	Effectiveness in Healthcare Providers
MFA Implementation	Highly effective and cost-efficient	Effective, but requires strict enforcement
Open-Source Security Tools	Cost-effective, widely adopted	Limited use due to compliance risks
Cloud Security Solutions	Flexible and scalable	Effective for data encryption and backup
Cybersecurity Training	Reduces phishing and insider threats	Crucial for patient data protection

4. Key Finding Summary:

- SMEs benefit more from cost-effective solutions like open-source tools and basic MFA.
- Healthcare providers require compliance-driven strategies with a focus on data encryption and staff training.

DISCUSSION

The study therefore concludes that while SMEs and healthcare providers suffer similar limitations due to resource constraints, their risks and their risk management/responses differ markedly. Digital compliance risks most relevant to SMEs are primarily cost and minimum compliance, while those most relevant to healthcare stakeholders are legal requirements and data confidentiality. This is due to their low cost and the fact that open-source tools are also relatively easy to introduce into the working process (Jones & Patel, 2020). At the moment, numerous companies and companies globally have small to zero possibilities for the correct implementation of cybersecurity insurance policies and typically are behind or unready for phishing and ransomware attacks (Brown & Kim, 2021). Maintaining flexibility concerning HIPAA and GDPR implies using only high-level encryption and data storage in the cloud (ENISA, 2020). The risk staff faces resource constraints and the type of risk varies, but when they are trained on data privacy laws there shall be few cases of data leakages due to negligence (Johnson et al., 2019).

SMEs will prefer cheaper solutions with minimum security features whilst healthcare providers need solutions that are compliant with regulatory requirements and protect their data

- Open Source tools for students work because they are cheaper most of the time they are easy to install (Jones & Patel, 2020).
- Organisations having no standard cybersecurity policies are more prone to phishing and ransomware attacks (Brown & Kim, 2021).
- HIMSS and DARKO also show that abiding by HIPAA and GDPR demands higher levels of data encryption and safe cloud services (ENISA, 2020).
- The evidence shows that an emphasis on data privilege laws effectively decreases the risks of accidental data leaks (Johnson et al., 2019). are constrained by resources, their risks, and risk responses are largely dissimilar. SMEs are most concerned about costs and minimum compliance, whereas healthcare stakeholders are most concerned about legal requirements and data confidentiality.
- The availability of open-source tools is best explained by their affordability and also because they are easy to implement (Jones & Patel, 2020).
- Currently, many organizations worldwide have little or no way of enforcing proper cybersecurity policies and sometimes lag or are unprepared for phishing and ransomware attacks (Brown & Kim, 2021).
- Ensuring adaptability to HIPAA and GDPR means using high-level data encryption and storing data in the cloud (ENISA, 2020).
- When staff is trained on data privacy laws there will be a reduced incidence of data leakages due to negligence (Johnson et al., 2019). face resource constraints, the nature of their risks and responses differ significantly. SMEs prioritize affordability and basic protection, while healthcare providers focus on regulatory compliance and data sensitivity.

For SMEs:

- Open-source tools are effective due to low cost and ease of deployment (Jones & Patel, 2020).
- Lack of formal cybersecurity policies increases vulnerability to phishing and ransomware attacks (Brown & Kim, 2021).
- Compliance with HIPAA and GDPR requires advanced data encryption and secure cloud storage (ENISA, 2020).
- Training staff on data privacy laws significantly reduces accidental data breaches (Johnson et al., 2019).

2. On the second parameter, the belief in compliance with existing structures was observed to be highly active.

The findings align with established cybersecurity frameworks such as:

- NIST Cybersecurity Framework: Both sectors are aligned with the Risk-based approach using Identity, Protect, Detect, Respond, and Recover

based on the NIST Cyber security framework of 2018.
- Zero Trust Architecture (ZTA): From all the ZTA principles, it was noted that only continuous verification and least privilege access were feasible in healthcare (Smith et al., 2021).

MFA using cloud services, and utilizing open source tools should be the primary focus Limited provisions that would assist with the access of cybersecurity tools should and could be enhanced through government subsidies to healthcare providers.

Over-reliance on regulation compliance was recommended in this area such as the use of Small and medium-sized enterprises work mostly for saving costs and offering elementary insurance, whereas healthcare industries emphasize legal requirements and confidentiality of patients' information.
- Open tools are helpful because they are generally cheap and can be easily implemented into practice (Jones Patel, 2020).
- Organizations without recognized cybersecurity policies remain at risk of phishing and fall prey to ransomware attacks (Group, 2021; Brown & Kim, 2021).
- Both HIPAA and GDPR imply the use of a higher level of data encryption and safe cloud storage indicated by ENISA (2020).
- An analysis of the findings shows that training staff on data privacy laws drastically minimizes the likelihood of inadvertent data breaches (Johnson et al., 2019).:
- NIST Cybersecurity Framework: Both sectors are in agreement with a risk-based approach using Identify, Protect, Detect, Respond, and Recover as identified in the NIST Cybersecurity Framework of 2018.
- Zero Trust Architecture (ZTA): Out of all ZTA principles, it was noted that continuous verification and least privilege access were feasible in healthcare (Smith et al., 2021).o MFA, using cloud services, and utilizing open-source tools should be the top focus.o Limited provisions that would help in the access of cybersecurity tools could be improved on through government subsidies.

Overemphasize regulatory compliance approaches like the use of encryption in data and properly selected cloud services.

Some of the recommended actions may also improve mandatory staff training programs as ways of strengthening data protection and breach prevention.

Healthcare providers face resource constraints, and the nature of their risks and responses differ significantly. SMEs prioritize affordability and basic protection, while healthcare providers focus on regulatory compliance and data sensitivity.

For SMEs:
- Open-source tools are effective due to low cost and ease of deployment (Jones & Patel, 2020).
- Lack of formal cybersecurity policies increases vulnerability to phishing and ransomware attacks (Brown & Kim, 2021).

For Healthcare Providers:
- Compliance with HIPAA and GDPR requires advanced data encryption and secure cloud storage (ENISA, 2020).
- Training staff on data privacy laws significantly reduces accidental data breaches (Johnson et al., 2019).

CONCLUSION

This research aimed to establish the most effective and realistic security solutions that could be afforded on a small budget in SMEs and those in the healthcare sector, particularly regarding the legislation. The study provides perceptions that both sectors are dealing with financial limitations, technical abilities, and evolving threats. However, the enhanced focus on personal data privacy and HIPAA and GDPR laws raise the level of protection needed in healthcare even more (ENISA, 2020; Smith et al., 2021).

This study identified some of the best practices used in both markets which include MFA and cloud, open source, and Security training (Brown & Kim, 2021). Overall, SMEs reported greater effectiveness of open source tools and general security measures as compared to healthcare organizations which required

measures such as data encryption and additional extent of compliance (Taylor, 2021).

Based on these observations therefore the study concludes that there is a need to establish security measures that reflect the operational and compliance needs of the sectors sector. More qualitative assessments are required to capture the new permanent adoption of these approaches and how the government grants contributed to powering cybersecurity in lower-resource organizations (NIST, 2018). Such a rise poses a concern for these industries since their immunity to cyber threats must be stepped up to guarantee customer data safety, minimize interruptions, and uphold consumer trust.

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