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Data Management and Cybersecurity As Correlate of Entrepreneurial Innovation Business Education Postgraduate Students in Rivers State Universities

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ABSTRACT
Data Management and Cybersecurity as Correlate of Entrepreneurial Innovation among Business Education Postgraduate Students in Rivers State Universities. The study adopted a correlational research design. The study was guided by two objectives, two research questions and two null hypotheses tested at 0.05 level significance. The study was carried out in Rivers State, covering Rivers State University and Ignatius Ajuru University of Education. The population comprised of 500 postgraduate Business Education students, consisting of 130 students from Rivers State University, and 370 students from Ignatius Ajuru University of Education. Since the population was manageable, 500 students studies. Data were collected using two self-designed questionnaires titled "Data Management Questionnaire" (DMQ) and "Cybersecurity Entrepreneurial Innovation Questionnaire (CEIQ), using a four-point rating scale. The instruments were validated by two experts in Business Education and one expert in Measurement and Evaluation Rivers State University. Reliability was established through a pilot study involving 20 Business Education postgraduate students conducted at Delta state university which is outside the study area. Using Cronbach Alpha in SPSS, an overall reliability coefficient of 0.87 was obtained, indicating that the instrument is reliable. The questionnaires were administered by the researcher with the assistance of two research assistants. Out of 500 questionnaires distributed, 373 were retrieved and used for analysis. Research questions and hypotheses tested using simple linear regression at 0.05 significance level of significance. The findings of the study showed amongst others that there is a strong positive relationship between information literacy skill and entrepreneurial innovation among Business Postgraduate students in Rivers State Universities. Based on the findings of the study, the researchers recommended amongst that the university should integrate practical cybersecurity awareness training into Business Education Postgraduate programme.
Keywords: Business Education, Data Management, Cybersecurity, Entrepreneurial Innovation

INTRODUCTION

Information literacy plays a pivotal role in enhancing critical thinking and problem-solving abilities, which are essential drivers of entrepreneurial innovation. It involves the capacity to identify information needs, locate relevant sources, evaluate the credibility of information, and apply it effectively to decision-making processes. Entrepreneurs operate in dynamic and often uncertain environments where access to

accurate and timely information can determine the success or failure of a venture. Those who are information literate are better equipped to analyze complex situations, interpret market signals, and develop strategic responses to emerging challenges. By engaging in reflective and analytical thinking, they are able to transform information into actionable knowledge that supports innovation and growth (Association of College and Research Libraries [ACRL], 2016).

Furthermore, information literacy enables entrepreneurs to recognize opportunities by critically examining trends, customer behaviours, and competitive landscapes. For instance, the ability to interpret market data and consumer feedback can reveal unmet needs, thereby inspiring the creation of new products or services. This process not only enhances creativity but also increases the likelihood of developing solutions that are relevant and sustainable. In this way, information literacy contributes significantly to opportunity recognition and the generation of innovative ideas, which are central to entrepreneurial success (Kuratko, 2016).

Data Management skill is the process of effectivity collecting, storing, organizing, protecting, and using data efficiently and securely to support decision-making, operations, and compliance in organizations or systems. Brandon (2025) Data management is the process of collecting and organizing the data created by a company or organization, it includes collecting, storing, organizing, and maintaining that data to ensure its accuracy, accessibility, and security to support timely decision-making, regulatory compliance, and streamlined business operations. Data management protects data integrity, reduces operational costs, and enhances business-related decision-making. It prevents data breaches through security measures, ensures compliance with regulations, and enables faster data access, giving businesses a competitive advantage (Brandon, 2025).

Data management is the comprehensive process of handling an organization's data throughout its lifecycle, from creation to disposal. It involves collecting, storing, organizing, protecting, and using data to support decision-making, operations, and compliance. Data management is the practice of collecting, organizing, protecting, and storing an organization’s data so it can be analyzed for business decisions. As organizations create and consume data at unprecedented rates, data management solutions become essential for making sense of the vast quantities of data. According to SAP (2025) Data management is the practice of collecting, organising, managing, and accessing data to support productivity, efficiency, and decision-making. Given the pivotal role data plays in business today, an effective enterprise strategy, and a modern data management platform are essential for every company regardless of size or industry. Data management is important for a variety of data-driven use cases including end-to-end business process execution, regulatory compliance, accurate analytics and AI, data migration, and digital transformation. Today’s leading data management software ensures that reliable, up-to-date data is always used to drive decisions. The software helps with everything from data preparation to cataloging, search, and governance, allowing people to quickly find the information they need for analysis. Effective data management ensures data accuracy, accessibility, and security, enabling organizations to derive value from their data assets. Data management is the process of ingesting, storing, organizing and maintaining the data created and collected by an organization. Effective data management in IT systems is crucial to running business operations and delivering information that helps drive decision-making by corporate executives, business managers and other end users (Craig, 2024). The data management process includes different functions that collectively aim to make data accurate, available and accessible. Most of the required work is done by IT professionals and data management teams. But business users typically participate in the process to ensure that data meets their needs and to help create internal data standards and usage policies as part of data governance programs (Craig, 2024). At this point in time, there is need for digital identify management literacy.

Digital identity management literacy strengthens entrepreneurial capacity to control access to information systems. Entrepreneurs who implement proper authentication, account monitoring, and user management prevent unauthorized access and protect digital assets. Business education postgraduate with identity

management proficiency can ensure secure collaborations, protect intellectual property, and maintain operational integrity. Integration of identity management into entrepreneurial operations supports innovation by enabling secure interactions with stakeholders and reliable digital workflow.

Threat intelligence and monitoring literacy enables entrepreneurs to anticipate potential cyber-attacks, analyze emerging threats, and adjust defensive strategies proactively. Entrepreneurs who monitor networks, analyze patterns, and evaluate threat severity enhance operational resilience and minimize exposure to digital risks. Business education postgraduate proficient in threat intelligence can implement preventive measures, safeguard digital infrastructures, and maintain continuity in entrepreneurial operations. Awareness of threat patterns promotes proactive responses, ensuring innovation initiatives proceed without compromise.

Moreover, cybersecurity awareness enhances entrepreneurial decision-making by integrating risk assessment, secure technology adoption, and operational planning. Entrepreneurs who recognize vulnerabilities, implement controls, and monitor systems can pursue innovative strategies confidently. Business education postgraduate who cultivate comprehensive cybersecurity awareness ensure that technological initiatives align with strategic objectives while minimizing exposure to threats. Integration of awareness skills into entrepreneurial planning fosters resilience, operational efficiency, and sustainable growth. developing a cybersecurity culture within entrepreneurial ventures ensures alignment between security practices and business objectives. Entrepreneurs who promote awareness among staff, stakeholders, and collaborators reduce human error, enhance ethical conduct, and foster shared responsibility. Business education postgraduate who integrate cultural awareness with technical skills create environments conducive to safe experimentation, operational efficiency, and innovative problem-solving. Organizational culture reinforces the effectiveness of cybersecurity measures and supports long-term entrepreneurial innovation. cybersecurity awareness facilitates the secure adoption of emerging technologies, including artificial intelligence, blockchain, cloud computing, and mobile applications. Entrepreneurs who integrate secure practices with technological innovation protect critical data, maintain stakeholder confidence, and implement solutions that enhance operational efficiency. Business education postgraduate combining technology adoption with cybersecurity literacy can explore new business models, optimize digital processes, and develop creative solutions without compromising security.

Furthermore, proactive cybersecurity awareness strengthens trust, credibility, and collaboration among investors, partners, and customers. Entrepreneurs demonstrating competence in digital protection foster confidence, encourage engagement, and support investment in innovative ventures. Business education postgraduate with robust cybersecurity literacy can leverage stakeholder trust to implement creative strategies, expand market reach, and explore technological opportunities that promote entrepreneurial growth. cybersecurity awareness skills including knowledge of threats, password and authentication management, network security, email safety, safe browsing, security software, social engineering prevention, encryption, policy literacy, risk assessment, incident response, training, cloud and mobile security, regulatory compliance, identity management, threat intelligence, and cultural integration are essential for entrepreneurial innovation. Business education postgraduate who master these competencies can protect digital assets, manage risks, ensure compliance, foster stakeholder trust, and implement technology-driven strategies effectively. Integration of cybersecurity awareness into entrepreneurial practice enables postgraduate to pursue innovative ventures confidently, safeguard critical information, and develop sustainable, competitive business models in dynamic digital environments (Mitnick & Simon 2023).

Cybersecurity awareness skills encompass the knowledge, abilities, and practices that enable individuals to recognize, prevent, and respond effectively to threats in digital environments, ensuring the confidentiality, integrity, and availability of information. Understanding these skills allows business education postgraduate to safeguard personal data, protect organizational information, and maintain secure digital operations within entrepreneurial ventures. Awareness of cybersecurity principles equips

individuals to identify vulnerabilities, implement protective measures, and respond to cyber incidents, supporting operational resilience, stakeholder trust, and innovative practices that rely on secure digital infrastructures (AlHogail, 2015).

Fundamental knowledge of cybersecurity threats is an essential component of cybersecurity awareness. Entrepreneurs must understand malware, phishing, ransomware, social engineering, and unauthorized access to recognize potential risks to digital assets. Business education postgraduate who comprehend these threats can develop strategies for prevention, detection, and mitigation. Awareness of emerging cyber risks supports proactive measures that minimize operational disruptions and protect the confidentiality of sensitive financial, customer, and business data. Understanding threat types also informs the selection of appropriate technical solutions, policies, and training programs that enhance security. Password management and authentication skills represent a critical element of cybersecurity awareness. Entrepreneurs who implement strong, unique passwords, multi-factor authentication, and secure credential storage can reduce the likelihood of unauthorized access. Business education postgraduate with proficiency in authentication protocols ensure that digital platforms and accounts are protected, reducing vulnerabilities to attacks that could compromise entrepreneurial operations. Proper credential management strengthens stakeholder confidence, facilitates safe digital transactions, and underpins trust in online business activities. Network security literacy is essential for protecting digital communication channels, cloud-based systems, and internal networks. Entrepreneurs must understand secure network configurations, firewall management, encryption protocols, and secure Wi-Fi usage to prevent unauthorized access and data breaches. Business education postgraduate who apply network security principles can ensure secure collaboration, protect sensitive business information, and maintain uninterrupted operations. Securing networking practices allow entrepreneurial ventures to operate with confidence, supporting innovative activities that rely on digital infrastructure (Hadnagy, 2018). Hence email security skills are fundamental to preventing phishing attacks, malware delivery, and data leaks. Entrepreneurs who recognize suspicious emails, verify sender authenticity, and implement email filtering can reduce the risk of compromise. Business education postgraduate who cultivate email security literacy enhance communication safety, protect organizational assets, and maintain operational integrity. Awareness of safe email practices ensures that confidential information is transmitted securely, supporting the execution of entrepreneurial initiatives that depend on reliable digital communication. Safe web browsing practices are an integral aspect of cybersecurity awareness. Entrepreneurs must recognize secure websites, evaluate digital certificates, avoid malicious downloads, and maintain updated browsers to reduce exposure to cyber threats. Business education postgraduate with strong web security skills can navigate online resources safely, conduct research without compromising information, and implement strategies that protect business systems. Integration of safe browsing practices into daily operations supports innovation by allowing entrepreneurs to explore opportunities in digital environments without risking cyber incidents. Furthermore, understanding cybersecurity software tools strengthens entrepreneurial capacity for risk mitigation. Tools such as antivirus programs, firewalls, intrusion detection systems, and endpoint protection software provide layers of defense against cyber threats. Business education postgraduate who are proficient in deploying and managing these tools can monitor digital systems, prevent unauthorized access, and maintain secure operations. Competence in cybersecurity tools ensures continuous protection for entrepreneurial ventures, enabling innovative practices to proceed without disruption. The discussion so far revealed the need for security awareness training among entrepreneurs.

Security awareness training is a crucial element of holistic cybersecurity literacy. Entrepreneurs who educate themselves and their teams about threats, safe practices, and organizational policies create a culture of vigilance. Business education postgraduate who implement ongoing training programs enhance staff engagement, reduce human errors, and strengthen overall digital defenses. Integration of educational initiatives with technical measures promotes proactive prevention, allowing entrepreneurial ventures to

operate securely and explore innovative opportunities confidently. Cloud security literacy ensures that entrepreneurs can leverage cloud computing platforms while maintaining data integrity and confidentiality. Knowledge of access control, data encryption, secure storage, and vendor compliance enables safe utilization of cloud services for storage, collaboration, and business operations. Business education postgraduate proficient in cloud security can adopt scalable, flexible solutions, integrate remote working technologies, and protect sensitive information. Secure cloud practices enhance entrepreneurial innovation by allowing ventures to explore technological solutions without compromising security. Mobile device security is essential as smartphones, tablets, and other portable devices increasingly serve as access points for digital systems. Entrepreneurs must implement device encryption, strong passwords, biometric authentication, secure applications, and regular updates to safeguard data. Business education postgraduate who apply mobile security principles can prevent unauthorized access, ensure continuity of operations, and maintain trust in digital interactions. Protection of mobile endpoints supports entrepreneurial innovation by enabling flexible, technology-driven business models without exposing sensitive information.

Additionally, understanding cybersecurity regulations and compliance frameworks is critical for legal and ethical digital operations. Entrepreneurs must adhere to data protection laws, privacy regulations, financial compliance standards, and industry-specific requirements. Business education postgraduate who integrate regulatory knowledge with cybersecurity awareness ensure that ventures operate within legal boundaries, maintain credibility, and reduce exposure to fines or reputational damage. Compliance literacy fosters responsible innovation by aligning entrepreneurial strategies with legal and ethical expectations (Whitman & Mattord, 2018).

Moreover, cybersecurity awareness strengthens entrepreneurial decision-making by integrating risk evaluation, security planning, and technology utilization. Entrepreneurs who understand potential vulnerabilities, apply protective measures, and implement monitoring mechanisms can pursue innovative strategies with reduced exposure to digital threats. Business education postgraduate who develop comprehensive cybersecurity awareness skills can optimize operations, safeguard stakeholder interests, and implement technology-driven solutions confidently, enhancing the sustainability of entrepreneurial ventures. cultivating cybersecurity culture within entrepreneurial organizations ensures that digital practices align with strategic objectives and operational priorities. Entrepreneurs who foster awareness among staff, stakeholders, and partners promote shared responsibility for security, reduce the likelihood of human error, and support ethical practices. Business education postgraduate who integrate cybersecurity culture with operational processes create environments conducive to innovation, resilience, and continuous improvement. Awareness of organizational culture complements technical skills, reinforcing the effectiveness of cybersecurity measures across all entrepreneurial activities. cybersecurity awareness facilitates the safe adoption of emerging technologies such as cloud computing, mobile applications, artificial intelligence, and blockchain. Entrepreneurs who apply secure practices while integrating innovative technologies reduce risks, protect data integrity, and maintain stakeholder confidence. Business education postgraduate who combine technology adoption with cybersecurity awareness can explore new business models, implement creative solutions, and sustain competitive advantages without compromising digital safety. This makes it important for entrepreneur to have practices cybersecurity awareness.

Proactive cybersecurity awareness enhances trust, collaboration, and credibility among partners, investors, and clients. Entrepreneurs who demonstrate competence in digital protection establish confidence, encourage stakeholder engagement, and promote investment in innovative ventures. Business education postgraduate with robust cybersecurity literacy can leverage this trust to implement novel strategies, expand market reach, and explore technological solutions that foster entrepreneurial growth. cybersecurity awareness skills including knowledge of threats, password and authentication management, network security, email safety, safe browsing, software tools, social engineering prevention, encryption,

policy literacy, risk assessment, incident response, training, cloud and mobile security, regulatory compliance, identity management, threat intelligence, and cultural integration form an essential foundation for entrepreneurial innovation. Business education postgraduate who master these competencies can protect digital assets, manage risks, ensure compliance, facilitate stakeholder trust, and implement technology-driven strategies effectively. Integration of cybersecurity awareness with entrepreneurial practice allows postgraduate to pursue innovative ventures confidently, safeguard critical information, and develop sustainable, competitive business models in dynamic digital environments (Mitnick & Simon, 2023).

Cybersecurity awareness skills form a crucial foundation for entrepreneurial innovation, equipping business education postgraduate with the ability to recognize digital threats, safeguard information systems, and implement secure technology-driven strategies that enhance business operations. Knowledge of malware, phishing, ransomware, social engineering, and unauthorized access empowers entrepreneurs to anticipate risks, protect intellectual property, and maintain the integrity empowers entrepreneurs to anticipate risks, protect intellectual property, and maintain the integrity of financial and operational data. Business education postgraduate who cultivate these skills can implement preventative measures, strengthen operational resilience, and pursue innovative ventures while minimizing exposure to cyber threats (AlHogail, 2015).

Password management and multi-factor authentication enhance digital security by controlling access to critical systems. Entrepreneurs who implement strong, unique passwords and authentication protocols reduce vulnerabilities to unauthorized access, protecting sensitive financial, strategic, and customer information. Business education postgraduate proficient in credential management can secure business accounts, maintain stakeholder trust, and ensure continuity in operations. Application of authentication literacy enables safe execution of innovative ideas that depend on reliable digital access.

Network security literacy supports entrepreneurial innovation by protecting communication channels, cloud systems, and internal networks from intrusion. Entrepreneurs who understand firewall configurations, encryption protocols, secure Wi-Fi practices, and intrusion detection systems can maintain the confidentiality and availability of business information. Business education postgraduate who develop network security competence can facilitate safe collaboration, enable remote operations, and support technology-driven solutions that enhance competitiveness. Awareness of network vulnerabilities allows entrepreneurs to integrate digital tools confidently while mitigating risks to business processes (Hadnagy, 2018).

Email security skills are critical to defending against phishing attacks, malware distribution, and information leakage. Entrepreneurs who identify suspicious emails, verify sender authenticity, and implement secure email practices can prevent disruptions and protect digital assets. Business education postgraduate with email security proficiency enhance operational reliability, protect stakeholder data, and maintain the credibility necessary to implement innovative business models. Effective email security literacy also supports communication efficiency, enabling seamless exchange of strategic information that underpins entrepreneurial creativity.

Safe web browsing practices contribute to secure entrepreneurial operations by reducing exposure to malicious websites, unverified downloads, and insecure connections. Entrepreneurs who recognize secure websites, evaluate digital certificates, and maintain updated browsers minimize risks to business information. Business education postgraduate proficient in web security can conduct research, analyze market trends, and explore online opportunities without compromising digital integrity. Integration of safe browsing skills into daily operations enables ventures to adopt innovative strategies while protecting sensitive data.

Additionally, cybersecurity software literacy enhances entrepreneurial protection against evolving digital threats. Tools such as antivirus programs, firewalls, endpoint protection software, and intrusion detection systems provide layered security that safeguards critical information. Business education postgraduate

who are adept at deploying and managing these tools can prevent unauthorized access, monitor systems effectively, and maintain operational continuity. Incorporation of cybersecurity software into entrepreneurial practice ensures that innovation proceeds without disruption, fostering sustainable business growth. Understanding social engineering tactics strengthens human-centered defenses within entrepreneurial ventures. Entrepreneurs who recognize manipulation techniques such as pretexting, baiting, and phishing can prevent disclosure of sensitive information. Business education postgraduate who cultivate awareness of social engineering can implement educational programs, promote vigilance, and reduce risk caused by human error. Integration of social engineering literacy into organizational practices complements technical security measures, enabling ventures to innovate safely and maintain stakeholder trust (Mitnick & Simon, 2023).

Cybersecurity policy literacy allows entrepreneurs to establish structured frameworks for safe digital operations. Knowledge of access control, acceptable use policies, data retention, and incident response plans ensures consistent application of security measures. Business education postgraduate who develop policy literacy can design guidelines that govern digital behavior, enforce accountability, and maintain compliance with regulatory requirements. Effective policy implementation provides a foundation for entrepreneurial innovation by enabling structured and secure experimentation with new business models. Risk assessment and vulnerability management empower entrepreneurs to anticipate, prioritize, and mitigate potential threats. Entrepreneurs who conduct security audits, penetration tests, and vulnerability analyses can prevent disruptions and safeguard critical information. Business education postgraduate who integrate risk management skills into entrepreneurial ventures can identify weak points, optimize security strategies, and maintain operational continuity. Awareness of vulnerabilities supports the safe adoption of innovative technologies, enabling ventures to explore new opportunities while minimizing exposure to cyber risks (Stallings, 2018).

Incident response and recovery literacy ensures that entrepreneurs can detect, contain, and remediate security breaches promptly. Entrepreneurs who implement response plans, coordinate team actions, and restore affected systems reduce downtime and mitigate financial or reputational losses. Business education postgraduate with incident management proficiency can maintain stakeholder confidence, ensure continuity of operations, and implement lessons learned to strengthen future cybersecurity readiness. Integration of incident response skills enables ventures to innovate confidently while maintaining resilience against unexpected cyber challenges.

Security awareness training cultivates a culture of vigilance within entrepreneurial ventures. Entrepreneurs who educate staff, partners, and stakeholders about cybersecurity threats, policies, and best practices promote collective responsibility for digital safety. Business education postgraduate who implement ongoing training initiatives reduce human error, reinforce security protocols, and enhance the effectiveness of technological solutions. Awareness training supports entrepreneurial innovation by fostering an environment in which secure practices enable creative problem-solving and operational agility.

Cloud security literacy allows entrepreneurs to leverage cloud-based platforms while maintaining control over sensitive data. Knowledge of secure storage, access management, and vendor compliance enables safe utilization of cloud services for collaboration, scalability, and operational flexibility. Business education postgraduate proficient in cloud security can integrate cloud technologies into business operations, support remote working solutions, and protect proprietary information. Secure cloud adoption enhances entrepreneurial innovation by enabling ventures to explore flexible, technology-driven models without compromising data integrity.

Mobile device security ensures that smartphones, tablets, and other portable devices used for entrepreneurial activities remain protected against unauthorized access, malware, and data breaches. Entrepreneurs who implement strong passwords, encryption, application controls, and regular updates maintain device security and protect sensitive business information. Business education postgraduate who

apply mobile security literacy can support flexible operations, facilitate remote work, and innovate with confidence, knowing that critical data is protected.

Additionally, regulatory compliance literacy integrates legal and ethical dimensions into cybersecurity awareness. Entrepreneurs who adhere to data protection laws, privacy regulations, industry-specific requirements, and financial standards maintain organizational credibility and operational legitimacy. Business education postgraduate who apply regulatory knowledge can implement policies that align with legal frameworks, reduce liability risks, and support responsible innovation. Compliance literacy ensures that entrepreneurial initiatives proceed within established guidelines, fostering trust and sustainable growth (Whitman & Mattord, 2018).

Statement of the problem

The rapid growth of digital technology has created significant opportunities for entrepreneurship, innovation, and business growth. Digital literacy enables individuals to collaborate effectively, access and evaluate information, communicate with customers and business partners, manage data, use financial technology, and protect digital resources from security threats. For Business Education postgraduate students, these skills are particularly important because they are expected to apply contemporary digital tools to identify business opportunities, develop innovative ideas, manage entrepreneurial activities, and compete effectively in the digital economy. Thus, proficiency in Data management and cyber security awareness skills can provide students with the competencies required to improve entrepreneurial innovation.

Despite these potential benefits, it is assumed that not all Business Education postgraduate students are making effective use of digital technologies for entrepreneurial purposes. Some students may still depend considerably on traditional approaches to conducting business, communicating with customers, accessing information, managing business records, and carrying out financial transactions. Such practices may reduce their ability to identify and exploit emerging digital business opportunities and may limit their capacity to develop innovative entrepreneurial solutions. The problem may be associated with inadequate digital competence, limited confidence in using emerging technologies, restricted access to appropriate digital resources, poor internet connectivity, high costs of digital devices and data services, and insufficient practical exposure to digital entrepreneurship. In addition, concerns relating to cybercrime, online fraud, data breaches, identity theft, and privacy may discourage students from engaging actively in digital business activities. The perceived complexity of some digital technologies may also create resistance to their adoption for business communication, information management, financial transactions, marketing, and other entrepreneurial activities. The identified problem, therefore, is that despite the increasing relevance of digital literacy to entrepreneurship and innovation, some Business Education postgraduate students may not possess or adequately utilize the digital competencies required to translate digital opportunities into innovative entrepreneurial activities. This situation could constrain their ability to develop new products and services, improve business processes, identify market opportunities, communicate effectively with customers, and adopt technology-driven approaches to business development. More importantly, there is insufficient empirical evidence establishing the extent to which specific dimensions of digital literacy are associated with entrepreneurial innovation among Business Education postgraduate students in Rivers State Universities.

Although digital literacy is recognized as an important driver of entrepreneurial success, there is limited empirical evidence on how its various dimensions relate to entrepreneurial innovation among Business Education postgraduate students in Rivers State Universities. Therefore, this study sought to investigate the relationship between Date management and cybersecurity awareness skills and entrepreneurial innovation among Business Education postgraduate students in Rivers State Universities. This gap in knowledge constitutes the problem of the study.

Purpose of the Study

The purpose of this study was to determine the relationship between Data Management and Cybersecurity as Correlate of Entrepreneurial Innovation Business Educational Postgraduate Students in Rivers State Universities. Specifically, the study sought to:

1. examine how Data Management skills relate to Entrepreneurial Innovation Among Business Education Postgraduate Students in Rivers State Universities.
2. determine how Cybersecurity awareness skills relate to Entrepreneurial Innovation Among Business Education Postgraduate Students in Rivers State Universities.

Research Questions

The following research questions was guided the study:

1. How does Data Management skills relate to Entrepreneurial Innovation Among Business Education Postgraduate Students in Rivers State Universities?
2. How does Cybersecurity awareness skills relate to Entrepreneurial Innovation Among Business Education Postgraduate Students in Rivers State Universities?

Hypotheses

The following hypotheses was formulated and tested at 0.5 level of significance

1. There is no significant relationship between Data Management skills and Entrepreneurial Innovation Among Business Education Postgraduate Students in Rivers State Universities.
2. There is no significant relationship between cybersecurity awareness skills and Entrepreneurial Innovation Among Business Education Postgraduate Students in Rivers State Universities.

METHODOLOGY

The study adopted correlational research design. The study was carried out in Rivers State which is a part of south-south Geopolitical zone of Nigeria**.** The population of this study comprises postgraduate Business Education students in Rivers State University and Ignatius Ajuru University of Education. Records from the respective departments show a total population of 500 students, comprising 130 students from Rivers State University and 370 students from Ignatius Ajuru University of Education. The entire population was used for the study because it is of a manageable size. The instrument for data collection for this study was two self-designed questionnaires titled: “Date Management Questionnaire (DMQ) and Cybersecurity Questionnaire (CSQ). The instrument were divided into three. The items were on four-point rating scale questionnaire, rated on strongly Agree (SA) 4 point, Agree (A) 3 point, Disagree (D) 2 point, and Strongly Disagree (SD) 1 point. The two set of instrument were validated by two experts from the department of Business Education, and one expert in measurement and evaluation, Faculty of Education, in Rivers State University. To establish the reliability of the instrument, the researcher conducted a pilot study using 20 Business Education postgraduate outside the study sample. and obtained reliability co-efficient of 0.88 and 0.85 respectively.

RESULTS

Data Presentation and Analysis

Research Question 1: *How does Information Literacy skills relate to Entrepreneurial Innovation Among Business Education Postgraduate Students in Rivers State Universities?*

Table 1: Calculated r of the Relationship exists between Date Management skills and Entrepreneurial Innovation Among Business Education Postgraduate Students in Rivers State Universities

Predictor	B	Std. Error	B	t value	Sig. p value	R	R^2	Adj. R^2	F-value	Sig. F
(Constant)	4.373	.398		11.329	.000	.717[a]	.002	-.006	.255	.714[b]
Independent Variable	.053	.096	.065	.505	.614					

Source: Field Survey, 2026

Table 1 presents the calculated coefficient (r) value based on responses among students which examined the relationship between Information Literacy skills and Entrepreneurial Innovation Among Business Education Postgraduate Students in Rivers State Universities. The result shows a calculated (R = 0.717) signifies that there is a strong positive relationship between Information Literacy skills and Entrepreneurial Innovation.

Research Question 2: *How does Digital Communication skills relate to Entrepreneurial Innovation Among Business Education Postgraduate Students in Rivers State Universities?*

Table 2: Calculated r of the Relationship exists between Cybersecurity skills and Entrepreneurial Innovation Among Business Education Postgraduate Students in Rivers State Universities

Predictor	B	Std. Error	B	t value	Sig. p value	R	R^2	Adj. R^2	F-value	Sig. F
(Constant)	2.881	.486		6.573	.000	.655[a]	.207	.200	33.089	.000[b]
Independent Variable	.484	.094	.555	5.752	.000					

Source: Field Survey, 202

Analysis of Table 2 reveals that a simple linear regression analysis was conducted to examine the relationship between Digital Communication skills and Entrepreneurial Innovation Among Business Education Postgraduate Students in Rivers State Universities. The correlation coefficient (R = 0.655) indicates a moderate positive relationship between Digital Communication skills and Entrepreneurial Innovation.

DISCUSSION OF FINDINGS

Data Management Skills and Entrepreneurial Innovation

The study found that data management, the findings research question one revealed skills had a significant and positive predictive relationship with entrepreneurial innovation among Business Education postgraduate students in Rivers State Universities. Data management skills significantly predicted entrepreneurial innovation ($\beta = .660$, $t = 9.912$, $p < .001$) and explained 53.6% of the variance in entrepreneurial innovation ($R^2 = .536$). This was the strongest predictive contribution among the five digital literacy dimensions investigated in the study.

The result suggests that the ability to collect, organize, store, process, analyse, interpret, and use data is particularly important for entrepreneurial innovation. Entrepreneurs increasingly depend on data to

understand customers, identify market opportunities, monitor business performance, assess risks, and make informed decisions. Consequently, students who are more competent in managing and interpreting business data may be better positioned to identify problems and transform available information into innovative entrepreneurial solutions.

The finding is supported by recent evidence concerning digital and analytical competencies in Business Education. Ukata and Nmehielle reported that data analytical entrepreneurial skills are relevant to the preparation of Business Education students for decent work, although their study found that the level of acquisition of such skills was low among the students examined. This provides an important contextual connection to the present result: although data-related competencies may be insufficiently developed among some Business Education students, those competencies can have considerable relevance when students possess them and apply them to entrepreneurial activities. Recent research on ICT skills and digital entrepreneurship has likewise shown that technology-related skills can contribute to entrepreneurial creativity and digital entrepreneurial outcomes.

The relatively high R^2 of .536 in the present study further indicates that data management deserves particular attention in Business Education postgraduate training. However, because this is a simple regression model, the result should be interpreted as predictive association rather than proof that data management skills alone cause entrepreneurial innovation. Other factors may also contribute to the remaining variance. Nevertheless, the finding provides strong empirical justification for incorporating practical data analytics, spreadsheet analysis, database management, data visualization, and business intelligence activities into postgraduate Business Education.

Cybersecurity Awareness Skills and Entrepreneurial Innovation

The Findings of research question two showed that cybersecurity awareness skills had a significant and positive predictive relationship with entrepreneurial innovation among Business Education postgraduate students in Rivers State Universities. Cybersecurity awareness skills significantly predicted entrepreneurial innovation ($\beta = .327$, $t = 3.903$, $p < .001$), explaining 10.7% of the variance in entrepreneurial innovation ($R^2 = .107$). This finding indicates that students who understand cybersecurity risks and appropriate protective practices may be better equipped to participate confidently and responsibly in digital entrepreneurial activities.

The finding is supported by Farid, Adnani, and Benessalah (2024), who investigated cybersecurity awareness among young entrepreneurs involved in university start-up projects. Their study found that although student entrepreneurs possessed some cybersecurity awareness, important knowledge and resource gaps remained, exposing their start-up projects to cyber risks. They recommended collaboration between universities and socioeconomic partners to strengthen entrepreneurs' cybersecurity competencies. The study also emphasized that cybersecurity protects business data, financial information, intellectual property, and information systems, all of which are increasingly important to digital business activities.

The present finding can therefore be understood from both a protective and an enabling perspective. Cybersecurity awareness does not necessarily generate an innovative idea directly; rather, it provides the confidence and capacity to use digital technologies while reducing exposure to threats that could disrupt entrepreneurial activities. For postgraduate Business Education students who may engage in e-commerce, digital marketing, online banking, cloud-based applications, social media business activities, and digital customer management, cybersecurity awareness can help create a safer environment for experimentation and innovation. The finding consequently supports the integration of practical cybersecurity awareness into entrepreneurship and Business Education curricula.

CONCLUSION

The study concludes that digital literacy skills are important competencies for promoting entrepreneurial innovation among Business Education postgraduate students in Rivers State Universities. The findings demonstrate that some dimensions of digital literacy skills significantly contribute to students' capacity to

develop and apply innovative entrepreneurial ideas, although the extent of their contribution differs across the individual skill areas examined.

RECOMMENDATIONS

Based on the findings of the study of researcher recommended that:

1. Business Education postgraduate programmes should give greater emphasis to practical data management training, including data collection, storage, analysis, interpretation, and visualization using relevant digital and business analytics tools, because data management skills demonstrated the strongest predictive contribution to entrepreneurial innovation among the skills examined.
2. Universities should integrate practical cybersecurity awareness training into Business Education postgraduate programmes, focusing on areas such as data protection, password security, phishing prevention, privacy, secure online transactions, and responsible use of digital platforms, so that students can pursue entrepreneurial activities while protecting their business information and digital assets.

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